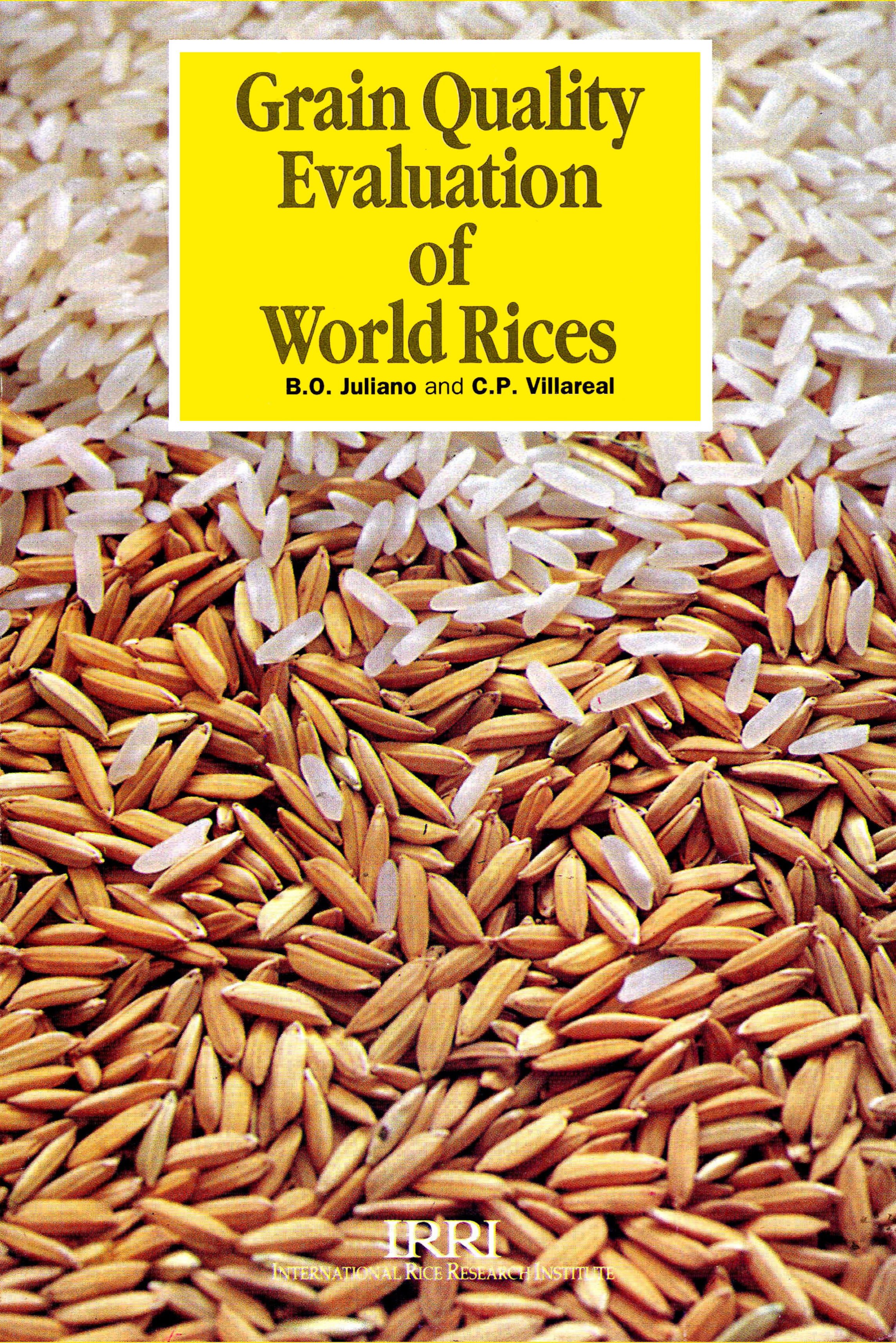

Grain Quality Evaluation of World Rices

B.O. Juliano and C.P. Villareal

IRRI
INTERNATIONAL RICE RESEARCH INSTITUTE

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1993

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The International Rice Research Institute (IRRI) was established in 1960 by the Ford and Rockefeller Foundations with the help and approval of the Government of the Philippines. Today IRRI is one of the 18 nonprofit international research centers supported by the Consultative Group on International Agricultural Research (CGIAR). The CGIAR is sponsored by the Food and Agriculture Organization of the United Nations, the Internatlonal Bank for Reconstruction and Development (World Bank), and the United Nations Development Programme (UNDP). Its membership is comprised of 50 donor countries, international and regional organizations, and private foundations.

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The responsiblity for this publication rests with the Internatlonal Rice Research Institute.

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Contents

Foreword

Grain quality has probably been used as a criterion to select rice since humans first cultivated it. For the International Rice Research Institute, grain quality has had a key role in research from the institute's beginning. In the future, grain quality will be even more important once the very poor—many of whom depend largely on rice for their staple food—become better off and begin to demand higher quality rice.

Cereal chemist B. O. Juliano, the first author of *Grain quality evaluation of world rices,* led IRRI's grain quality research for three decades. It is primarily due to his dedicated work in this important research area that IRRI scientists can routinely measure grain quality in prebreeding efforts serving national agricultural research systems. *Grain quality evaluation of world rices* is a much-needed data base of selected grain quality characteristics of milled rice from all countries producing more than 0.1% of the world's rice. Quality characteristics and preferences are discussed by country based on information obtained from national programs. The appendix of analysis provides a ready reference and comparison among 2679 milled rices (*Oryza sativa* L.) and 244 wild rices analyzed in the same laboratory under comparable conditions since 1963. This book updates and expands the 1980 IRRI publication *Quality characteristics of milled rice grown in different countries* by Juliano and C. G. Pascual.

Grain quality evaluation of world rices will be useful for rice breeders and chemists involved in grain quality breeding programs and for food scientists and nutritionists interested in rice grain quality, composition, processing, and use. C. Villareal prepared the data base and its statistical analyses. C. Dedolph edited the book with the assistance of T. V. Rola, and E. E. Putungan designed the layout.

Klaus Lampe
Director General

Abstract

Physicochemical data on protein content, apparent amylose content (AC), alkali spreading value (an index of starch gelatinization temperature [GT]), gel consistency (GC), Amylograph viscosity (peak, setback, and consistency), cooked rice Instron hardness and stickiness, and grain length and width were collected for 2679 milled rices (*Oryza sativa* L.) grown in 64 countries at 67 locations. We compared these data with the country's quality preferences when possible.

Mean protein is 7.3%. High AC predominates everywhere but in Europe. Intermediate AC, however, seems to be preferred for slightly sticky, soft-cooked rice. Low GT is preferred on all continents over intermediate GT, and soft GC over medium and hard GC, except in Africa, where hard GC is preferred.

Extra long grains predominate only in Surinam; long, slender grains in the Americas, Thailand, and other exporting countries. Medium-sized and -shaped grains predominate in most of Asia, except in Bangladesh; Bhutan; China; Japan; Republic of Korea; Taiwan, China; and Vietnam (traditional varieties), where people prefer short-grained rices. Medium-grained rice is also popular in Europe. Bulgaria, Spain, and Russia are the exceptions, where short, bold grains predominate. Consumers prefer long-grained, medium-shaped rices in Hungary.

Milled rice of 244 wild *Oryza* species, of which 195 were *O. glaberrima,* were characterized for AC, GT, and GC. Properties are similar to those of cultivated rice: 12% mean protein, high AC, low GT, and hard GC.

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Introduction

Data bases are available for grain characteristics of market samples in some rice-consuming countries (RCMD 1987, 1989; Rivenburgh 1961, Simpson et al 1965) and of germplasm collections (IITA 1985, IRRI 1990). Juliano and Pascual (1980) have the only data base for rice quality in some countries. In this book, all countries producing 0.1% or more of the world's rice are included along with quality information (when available), rice production data, and per capita milled rice supply from FAO.

Grain quality is second only to yield potential as the major breeding objective (Table 1) for the 11 countries responding to a 1990 survey of national rice programs (Juliano and Duff 1991). Apparent amylose content is the major factor influencing cooking and eating quality of milled rice. Alkali spreading value and GC can distinguish rices with similar AC, particularly waxy and high-amylose rices (Table 2).

Amylograph pasting viscosity indicates changes in texture during cooking. Many factors affect peak viscosity, but Amylograph setback and consistency relate to cooked rice hardening during cooling. Cooked rice hardness and stickiness are also important grain quality indicators. Milled rice length and width help to completely characterize grain size and shape.

Data for each sample are alphabetically listed and ordered chronologically for each variety. Variety names are cross-referenced when listed under an equivalent name in the same or a different country. Water regime data (upland, irrigated, deepwater, rainfed lowland, tidal wetlands, and hydromorphic) are included when available.

Only 4% of total rice production enters the world market. Some national programs have considered exporting their excess production. They often do not fully understand, however, the competitiveness of the world market and stringent quality requirements, particularly on contaminants (Efferson 1985). In Hongkong, for example, consumers

Table 1. Priority given to grain quality, yield potential, and other plant properties in some national rice breeding programs. IRRI, 1990.

Country	Priority[a] given to									
	Grain quality	Yield potential	Resistance to				Tolerance for			Direct seeding
			Diseases	Insects	Diseases and insects	Lodging	Drought	Cold	Adverse soils	
Bangladesh	1	4	0	0	3	0	2	0	0	0
China	2	2	0	0	2	0	0	0	0	0
Japan Super-rice Program	1.5	1.5	0	0	0	0	0	0	0	0
Republic of Korea (Suweon)	5	3	0	0	4	0	0	2	0	1
Republic of Korea (Milyang)	6	3.5	3.5	1	0	5	0	0	0	2
Madagascar	1	0	3	2	0	0	0	4.5	4.5	0
Malaysia										
Overall breeding	1	3	0	0	2	0	0	0	0	0
Grain quality breeding	3	1.5	0	0	1.5	0	0	0	0	0
Myanmar	2.5	2.5	0	0	0	0	1	0	0	0
Philippines										
Irrigated	2	5	4	2	0	1	0	0	0	0
Upland	1	5	4	3	0	0	2	0	0	0
Taiwan, China	2	2	2	0	0	0	0	0	0	0
Thailand[b]	2.5	2.5	0	0	2.5	0	0	0	0	2.5
USA	3	3	3	3	0	0	0	3	0	0
Total	33.5	38.5	19.5	11	15	6	5	9.5	4.5	5.5

[a] The highest number has the highest priority. [b] Improvement of cultural practices was listed as the first priority item.

Table 2. Classification of properties of milled rice starch in the IRRI rice breeding program (Juliano 1985).

Starch property	Class	Values
Apparent AC by iodine colorimetry (% milled rice. dry basis)	Waxy	0 - 5.0
	Very low	5.1 - 12.0
	Low	12.1 - 20.0
	Intermediate	20.1 - 25.0
	High	>25.0
Final GT (ºC) by alkali spreading value	Low (5.5-7.0)	55 - 69.5
	intermediate (3.5-5.4)	70 - 74
	Intermediate-high (2.6-3.4)	
	High (1.0-2.5)	74.5 - 80
GC (mm)	soft	61 - 100
	Medium	41 - 60
	Hard	25 - 40

prize very translucent, high head rice-yielding, long-grained Thai aromatics that have low GT and low to intermediate AC and Australian long- and medium-grained rices with low GT and low to intermediate AC over short, medium-shaped Chinese rices with low GT and high AC (Juliano et al 1990, Kaosa-ard and Juliano 1991, Luo et al 1987).

Materials and methods

Samples were obtained through national rice breeding programs. Wild rice samples were grown at IRRI and at the International Institute of Tropical Agriculture (IITA). Rough rice samples were dehulled in a Satake dehuller or McGill sheller, with the resulting brown rices milled either in a McGill miller (no. 2 or 3), a Satake TM-05 grain testing mill, a laboratory test tube rice miller, or a Kett Pearlest micromill.

Milled rice for protein and amylose assays and amylography was ground in a Wiley or Udy cyclone mill with a 40-mesh sieve. Samples for GC were ground in 10-grain lots for 40 s in a Wig-L-Bug amalgamator (Crescent Dental Mfg. Co.) or in a Udy cyclone mill with 60-mesh sieve.

We measured the length and width of 10 whole grains to the nearest mm using a photoenlarger calibrated to enlarge exactly 10 times the original size (Khush et al 1979). IRRI classifies brown rice grain length into extra long, >7.50 mm; long, 6.61-7.50 mm; medium, 5.51-6.60 mm; and short, 15.50 mm. IRRI classifies brown rice grain shape based on length-width (L-W) ratio as slender, >3.0; medium, 2.1-3.0; bold, 1.1-2.0; and round, 11.0. We used these classifications for milled rice samples without correction.

Protein content

The microKjeldahl method was used to measure protein in 50 mg rice flour manually digested with HgO or Se catalyst. We used the automated colorimetric procedure (indophenol blue after reaction with hypochlorite and alkaline phenol, using AutoAnalyzer modules [Juliano and Pascual 1980]) to determine the ammonia content in the digest. Kjeldahl N was multiplied by 5.95 to convert it to crude protein. This factor, expressed as wet weight, is based on the 16.8% N in rice protein.

Since 1967, rice powder (50 mg) was digested in 10-ml Kjeldahl flasks with 2 ml concentrated H_2SO_4 and 1 g K_2SO_4-catalyst mixture

(100:2 w/w) using a Labconco or King digestor. Samples were digested for 20 min or until they were completely clear and then cooled. Water was added up to the 20-ml calibration mark (at room temperature) to dissolve the digest. We transferred a portion of thoroughly mixed solution to the 8-ml sample cup of the AutoAnalvzer for the colorimetric analysis. Blanks and standards were run with the samples.

The following reagents were used for the colorimetric ammonia assay:

Citrate/tartrate. Na tartrate (600 g) and Na citrate (200 g) were dissolved in about 2500 ml distilled H_2O. NaOH (80 g) was dissolved in 500 ml distilled H_2O. We combined the two solutions, added distilled H_2O to make 4 liters, and shook it well.

Alkaline phenate. NaOH (553 g) was dissolved in about 2000 ml of distilled H_2O. Eighty-nine percent pure phenol (1060 ml) was slowly stirred into the solution while it cooled in an ice bath. Distilled water was added to make 4 liters. It was mixed well, and then stored in a refrigerator.

Hypochlorite. Commercial "chlorox" bleach (about 5% by weight NaOCl) was used.

10% sulfuric acid. Instead of H_2O, 10% sulfuric acid was used for blank wash. Concentrated H_2SO_4 (100 ml) was added to about 700 ml distilled H_2O in a 1000-ml volumetric flask. It was cooled, made up to volume, and then shaken.

Apparent amylose content

The modified simplified assay of Juliano et al (1981) was used. Milled rice flour (100 mg) was weighed in duplicate in 100-ml volumetric flasks. We then added 1 ml of 95% ethanol, washing down any sample adhering to the flask, followed by 9 ml of 1 N NaOH. The suspension was heated in a boiling water bath for 10 min to gelatinize the starch and then cooled for 1 h at room temperature. Samples were diluted to volume with distilled H_2O and mixed well.

Portions of the starch solution were transferred into AutoAnalyzer cups. The amylose-iodine blue color was determined at 608 nm at 78 samples/h (Juliano and Pascual 1980). A calibration curve was made with each set of unknown samples by plotting the absorbance of check milled samples against their known amylose content. Iodine solution prepared daily consisted of 3 ml 0.2% I_2 in 2% KI and 1 ml 1 N acetic acid diluted to 100 ml.

The amylose contents of check milled samples were obtained from 95% ethanol-defatted milled rice flour (reflux 18-24 h) using standard mixtures of 70 mg waxy rice flour (amylopectin), 10 mg amylose + 60 mg waxy rice, 20 mg amylose + 50 mg waxy rice, 25 mg amylose + 45 mg waxy rice, and 30 mg amylose + 40 mg waxy rice in 100 ml 0.09 N NaOH. Undefatted check samples could be used for the calibration curve of undefatted milled rice. Results were expressed on a dry weight basis.

Reagents:

NaOH, 1 N. Forty grams anhydrous NaOH were dissolved in 1 liter of distilled H_2O.

NaOH, 0.09 N. Nine milliliters 1 N NaOH were diluted into 100 ml with distilled H_2O.

Acetic acid, 1 N. Glacial acetic acid (57.75 ml) was dissolved in distilled H_2O in a 1-liter volumetric flask and made up to volume.

Iodine solution 0.2% I_2 in 2% KI. Two grams iodine and 20 g KI were dissolved in distilled water in a 1-liter volumetric flask and made up to volume.

In the study, AC was classified as waxy 0-5.0%, very low 5.1-12.0%, low 12.1-20.0%, intermediate 20.1-25.0%, and high >25.0% to allow for nonwaxy contamination of waxy rice.

Alkali spreading value

The method of Little et al (1958) was used. Six whole-grain, milled rice samples were placed in duplicate square plastic boxes (R.P. Cargille Laboratories, Inc., 4.6 × 4.6 × 1.9 cm) containing 10 ml of 1.7% KOH, arranged so that the grains did not touch each other. The boxes were covered and incubated for 23 h at 30 °C. Grain appearance and disintegration were visually rated after incubation, based on the following numerical scale:

Description	Score
Grain not affected	1
Grain swollen	2
Grain swollen, collar incomplete or narrow	3
Grain swollen, collar complete and wide	4
Grain split or segmented, collar complete and wide	5
Grain dispersed, merging with collar	6
Grain completely dispersed and intermingled	7

Check samples with scores of 2-7 were run with each analysis. A rating of 5.5-7.0 was classified in this study as low final gelatinization temperature (55-69 °C); 3.5-5.4, intermediate (70-74 °C); 2.6-3.4, intermediate-high; and 1.0-2.5, high (74.5-80 °C).

Gel consistency

Rice flour prepared with a Wig-L-Bug amalgamator (100 mg) was placed in 13- × 100-mm culture tubes and wetted with 0.2 ml 95% ethanol containing 0.03% thymol blue, according to the method of Cagampang et al (1973). We added 2 ml 0.2 N KOH mixed sufficiently (2-3 s) with a Vortex Genie mixer set at speed six. Tubes were covered with glass marbles and heated in a vigorously boiling water bath for 8 min, making certain that the contents reached two-thirds the height of the tube. The tubes were removed from the water bath for 5 min, cooled in an ice-water bath for 20 min, and laid flat on a laboratory table over ruled graphing paper for 1 h. The total length of the blue-colored gel was measured in millimeters to index cold paste viscosity. Gel height from the bottom of the tube was 25 ± 1 mm.

The method separated high-amylose rices into soft gel consistency (61-100 mm), medium gel consistency (41-60 mm), and hard gel consistency (25-40 mm). Check samples representing these three gel consistency types were run with each analysis.

Amylograph viscosity

We used the method of Halick and Kelly (1959), but with a total sample weight of 400 g instead of 500 g (Juliano et al 1985). Milled rice flour (40 g) was blended with 240 ml water for 1.5 min at high speed in a Waring blender. The slurry was transferred into the Amylograph bowl using an additional 120 ml water to wash adhering flour from the blender.

The sensing element was attached and the slurry heated, beginning at 30 °C, at the rate of 1.5 °C/min (with the Amylograph pen zeroed) up to 95 °C at a bowl speed of 75 rpm. The paste was heated 20 min at 95 °C before cooling to 50 °C at 1.5 °C/min.

We studied peak viscosity during heating, final viscosity at 94 °C (actual cooking temperature with thermostat set at 95 °C), and viscosity when cooled to 50 °C. All were expressed in Brabender units (BU).

Table 3. Typical Amylograph values for various amylose types.

Amylose type	Amylograph viscosity (BU)		
	Peak	Setback	Consistency
Waxy	100 - 900	–300 - 100	0 - 200
Low	550 - 1150	–350 - 0	50 - 400
Intermediate	450 - 1150	–350 - 200	100 - 400
High	400 - 1000	0 - 850	200 - 850

Setback viscosity was viscosity cooled to 50 °C minus peak viscosity. Amylograph consistency was viscosity cooled to 50 °C minus final viscosity at 94 °C or the increase in paste viscosity during cooling. A model VA 1 Viscoamylograph was used from 1962 to 1988, when a Viscograph type VS6E with electronic thermoregulator was acquired.

Table 3 shows the typical Amylograph values for the various amylose types.

Cooked rice hardness and stickiness

We measured cooked rice with an Instron model 1140 food tester as per the method of Perez and Juliano (1979). Twenty grams of milled rice was cooked in a predetermined optimum amount of water (26 ml for waxy rice, 34 ml for low-amylose, 38 ml for intermediate-amylose, and 42 ml for high-amylose) in 150-ml beakers for 20 min in Toshiba RC4B automatic electric cookers. There was an excess of 200 ml of water in the outer pot, with four samples per cooker. Cookers were not disturbed for at least 10 min after cooking. The cooked rice was then drained and cooled in plastic bags. All samples since 1989 were cooked with 42 ml water to obtain more consistent results among samples with borderline amylose contents.

Duplicate 17 g of cooked rice were placed in the Ottawa Texture Measuring System (OTMS) 50-cm^2 cell. It was modified with four side liners to reduce the cell cross-section to 15% of the original (7 cm^2). A 2.2- × 2.5-cm plunger was used. Each sample was pressed with 145 g weight for 1 min before extrusion. Hardness was the maximum force (in kg) needed to extrude the rice through the cell's 7-cm^2 perforated base with 5.2 -mm diam holes at the crosshead speed of 10 cm/min and the same chart speed. The 0-50 kg load cell was used. Hardness values were 15% of the value obtained with the standard cell. An OTMS 10-cm^2 cell was used from late 1982 onward and hardness values were multiplied by 0.7 to express them into kg/7 cm^2.

For the stickiness test, cooked rice (17 g) was pressed onto the platform with the OTMS plunger (6.9 × 6.9 cm) for 10s with a clearance of 0.4 mm. This allowed the rice to squeeze out around the edges. Stickiness, expressed in gram-centimeters, was the product of the force in grams required to lift the plunger and the distance in centimeters that the plunger traversed. It was measured directly by planimetry from the Instron chart paper. The 0-5 kg load cell was used. Chart speed was 100 cm/min and the crosshead speed was 5 cm/min.

Because of the very high correlation between amylose content and Instron stickiness, few samples were measured after 1977-79. Due to excessive pressure on the load cell since 1980, cooked rice has been pressed onto the platform with the 3.6-cm diam plunger with up to 4 kg maximum pressure. After the pressure stabilized (~20s), the plunger was lifted as described above. Area was reduced from 47.6 to 10.2 cm^2, or a factor of 4.67.

See Table 4 for typical Instron cooked rice hardness and stickiness values for the various amylose types.

Amylograms and cooked rice texture tests were only used for large samples of 100 g milled rice.

Linear correlation coefficients

Simple linear correlation coefficients were calculated among grain properties for each country having at least four samples. Only significant correlation coefficients (usually 0.60 or above) are discussed. Correlation coefficients without sample number (n) have the same n as the previous coefficients.

Table 4. Typical Instron cooked rice hardness and stickiness values for various amylose types.

Amylose type	Water-rice ratio	Instron cooked rice	
		Hardness (kq/7 cm^2)	Stickiness (g-cm)
Waxy	1.3	4 - 8	50 - 450
	2.1	3 - 4	200 - 600
Low	1.7	5 - 9	50 - 200
	2.1	4 - 5	
Intermediate	1.9	5 - 10	25 - 200
	2.1	4 - 9	
High	2.1	6 - 12	0 - 100

Results and discussion

Results and discussion are presented by continent, with countries in alphabetical order. Data on wild species are then presented.

Asia

In 1989, Asia produced 449.3 of the world's 492.1 million t of rough rice (FAO 1990b). Corresponding world rough rice consumption in 1986-88 was 418.7 million t, of which Asia consumed 380.2 million t. Asia produces and consumes more than 90% of all rice. Asia's per capita milled rice supply in 1986-88 was 85 kg/yr (FAO 1990a).

Bangladesh

Annual rough rice production was 25.5 million t in 1989 (FAO 1990b). Annual milled rice per capita consumption was 141 kg in 1979-81 (FAO 1984), 137 kg in 1986-88 (FAO 1990a, IRRI 1991), and 154 kg in 1988 (Duff 1991). Important varieties by district based on grain quality according to N.H. Choudhury (Bangladesh Rice Research Institute, 1990, pers. commun.) are Rajshahi—Jhingasail, Rajasail, and Indrasail (excellent); Bogra—White Biroi (very good), Purbachi (good); Dinajpur—Kataribhog (excellent); Khulna—Patnai (very good), Bhaital (good); Faridpur—Aman (good); Chittagong—Pajam (very good); Sylhet—Tepi boro (very good); Mymensingh—Red Biroi and Bashful (excellent); Dhaka—Kataribhog, Nizersail, and Red Biroi (excellent), Pajam (Mahsuri) and Jamir (very good), and Irrisail (IR20) (good).

A consumer demand study found that the retail market price for parboiled rice in four districts correlated positively with length-width ratio and volume expansion, and negatively with 1000-grain weight and moisture content (Choudhury et al 1991). Market parboiled samples of Kalaribhog had 27-28% AC and Pajam had 27-29% AC (RCMD 1987, 1989). Retail market price for raw rice correlated positively with gel consistency values and negatively with percent brokens and cooking time.

Table 5. Protein content and classification of milled rice in Asia and Oceania based on apparent AC, final GT, and GC. IRRI, 1963-91.

Source	Sample (no.)	Protein (%)		AC[a]					GT[b]				GC[c]		
		Range	Mean	Wx	VL	L	I	H	L	I	HI	H	S	M	H
Asia															
Bangladesh	58	5-12	7.7	0	0	2	7	49	40	15	3	0	23	14	15
Bhutan	40	5-9	6.9	0	0	2	22	16	37	3	0	0	6	11	23
Brunei Darussalam	11	6-13	7.9	0	1	0	4	6	9	1	1	0	1	4	6
Cambodia	34	4-12	6.4	0	0	4	5	25	23	8	3	0	7	10	9
China	75	6-13	8.3	4	0	18	12	41	46	28	1	0	24	23	22
India	52	6-11	8.5	0	0	2	8	42	34	17	1	0	24	6	15
India, Maharashtra	14	5- 8	6.3	0	0	0	2	12	6	8	0	0	4	5	5
Indonesia	133	5-11	7.9	5	2	5	50	71	52	70	7	2	34	46	39
Iran	33	5-12	9.2	0	0	11	15	7	13	20	0	0	3	12	5
Japan	67	5-12	7.2	5	0	57	5	0	61	4	2	0	21	6	0
Korea, Rep. of	147	6-10	8.2	4	2	121	19	1	140	7	0	0	99	33	0
Laos	20	6- 9	7.4	11	2	1	5	1	16	3	0	1	7	2	3
Malaysia, Sabah	10	6- 8	6.8	0	0	0	3	7	5	3	2	0	0	6	4
Malaysia, Sarawak	27	5-14	7.1	0	3	4	6	14	9	14	1	3	12	6	3
Malaysia, West	46	6-11	7.4	3	0	0	5	38	18	20	6	2	20	12	5
Myanmar	61	5-11	6.9	1	11	12	19	18	39	21	1	0	24	11	16
Nepal	46	5- 9	7.0	0	0	10	8	28	36	8	2	0	19	8	19
Pakistan	66	6-10	8.1	0	0	3	33	30	44	18	4	0	10	15	30
Philippines	331	5-14	8.2	39	3	23	100	166	136	145	42	8	83	60	104
Sri Lanka	67	6-13	8.8	0	0	0	6	61	13	52	2	0	26	10	17
Taiwan, China	58	4-11	7.6	10	0	34	6	8	50	8	0	0	36	2	4
Thailand	83	4-14	8.0	22	2	6	13	40	53	22	1	1	33	12	23
Turkey	14	6-10	7.4	0	0	13	1	0	13	0	1	0	9	3	2
Vietnam	133	5-11	7.7	1	0	6	24	102	83	47	3	0	49	16	58
Total	1626	4-14	7.8	105	26	334	378	783	976	542	83	17	574	333	426
Oceania															
Australla	24	5-10	6.7	2	0	13	7	2	17	6	1	0	19	2	1
New Zealand	4	8-13	10.8	0	0	0	4	0	4	0	0	0	2	1	0

[a] Wx = waxy (0-5.0%). VL = very low (5.1-12.0%). L = low (12.1-20.0%). I = Intermediate (20.1-25.0%), and H = high (>25%). [b] Indexed by alkali spreading value: L = low (6-7), I = intermediate (4-5). HI = high-intermediate (3), and H =high (2). [c]Only samples analyzed from mid-I971 have gel consistency values: S = soft (61-100 mm), M = medium (41-60 mm), and H = hard (25-40 mm).

Most Bangladeshi rice varieties are high-amylose (Appendix, Table 5), parboiled, and have low to intermediate GT. Parboiled rice is preferred, but raw rice is consumed in some districts such as Chittagong and Khulna (Choudhury et al 1991). Rices with red pericarp are not popular (Choudhury 1979). Long-grained varieties are preferred, although Jamir, with medium grain, and Bashful, with short, coarse grain that elongates when cooked, are popular. IR8, BR3, and Rajasail are coarse varieties with poor cooking and eating qualities. The rices with intermediate GT tended to have softer GC.

Samples with soft GC also had lower Amylograph setback and consistency and cooked rice Instron hardness values (Appendix). The grains varied widely in size (3.5-7.5 mm), and shape, from short-grained BR5 to long-grained DA 29 and Patnai 23. Cooked rice hardness correlated significantly with Amylograph setback (r = 0.80**, n = 20), as did Amylograph setback with alkali spreading value (r = 0.60**) and AC (r = 0.58**). Cooked rice hardness and GC were negatively correlated (r = 0.48**, n = 38).

Bhutan

Annual rough rice production in Bhutan was 83,000 t in 1989 (FAO 1990b). Annual milled rice availability in 1988 was about 50 kg/capita. G.B. Chettri (Department of Agriculture, 1990, pers. commun.) classifies the important Bhutanese rice varieties as follows:

- Red-pericarped, special eating quality, high altitude region, northern Bhutan (Paro Dumja, Paro Maap, Punakha Maap, Thimphu Maap, Thimphu Dumja, and Wangdi Maap).
- White slender-grained rices, used for beaten and puffed rice, medium altitude, western region (Punakha Sakha, Sem Kaap, Wangdi Kaap, Zakha, Dumja Kaap, and IR64).
- Aromatic rices, medium altitude, dry eastern zone (Sungsung and Sungpa).
- Good cooking and eating quality, medium altitude, humid southern zone (Attey, Sukhimay, and Baghay).

Our analysis showed that intermediate to high AC, low GT (except for Djambaran), and hard GC predominated in these traditional rice varieties (Table 5). The five red-pericarped *maap* rices had intermediate AC, low GT, and hard GC (Appendix). The white rices used for beaten and puffed rice had low to high AC, low GT, and medium GC. Attey, Sukhimay, and Chirang Baghey had intermediate AC, low GT, and hard GC.

The samples also differed widely in Amylograph viscosity, cooked rice Instron hardness, and grain dimensions. Red rices were Djambaran red, Paro Dumja, Paro Maap, Punakha Maap, Thimphu Maap, Thimphu Dumja, and Wangdi Maap. Grains were mainly short to medium in length, and bold to medium in shape.

Milled rice length and width were negatively correlated (r = –0.77**, n = 37). Amylose content correlated significantly with cooked rice hardness (r = 0.69**, n = 23), GC (r = 0.47**, n = 40), and Amylograph setback (r = 0.81**, n = 14) and consistency (r = 0.64*). Gel consistency and alkali spreading value were negatively correlated (r = –0.52**, n = 40).

Brunei Darussalam

Brunei Darussalam produced about 750 t rough rice in 1989 (FAO 1990b). Milled rice consumption in 1979-81 was estimated at 95 kg/capita per year (FAO 1984) and 82 kg in 1986-88 (FAO 1990a). The principal variety was the slender grained aromatic variety Disobok (O.-J. Hong, Kilanas Agricultural Research Centre, 1990, pers. commun.). IRRI analysis showed Disobok to have intermediate AC, low GT, and medium GC (Appendix).

High-intermediate AC, low GT, and hard-medium GC predominated (Table 5). Most samples were Malaysian (MR73-MR101) and had intermediate AC, except for Lumut with 9.7% AC (Appendix). Lumut had high-intermediate GT and medium GC.

Disobok had 25% amylose and softer cooked rice than the MR rices. 00.55/1 had a very high protein content of 13.5%. The MR varieties had L-W ratios of more than three and were longer than Disobok. Lumut had the shortest grain and the softest cooked rice. Long- and medium-length slender grained rices predominated.

Cooked rice hardness (n = 11) correlated significantly with AC (r = 0.85**), alkali spreading value (r = 0.82**), and Amylograph setback (r = 0.92**) and consistency (r = 0.71*), but not with GC (r = –0.16). Amylose content and alkali spreading value were correlated (r = 0.79**). Amylose content also correlated with Amylograph setback (r = 0.70*) and consistency (r = 0.61*). Alkali spreading value correlated with Amylograph setback (r = 0.64*) and peak viscosity (r = –0.71*) Milled rice length correlated with alkali spreading value (r = 0.82**), cooked rice hardness (r = 0.70*, and AC (r = 0.63*).

Cambodia

Annual rough rice production in Cambodia in 1989 was 2.1 million t (FAO 1990b). Annual consumption of milled rice per capita in 1975-77 was 139 kg (IRRI 1991); per capita supply in 1986-88 was 163 kg (FAO 1990a, IRRI 1991).

Most 1989 varieties had high AC, low GT, and variable GC (Table 5). Low-AC rices, such as Chhuthana and DID, were represented in earlier samples (Appendix). Chhuthana had intermediate AC in 1988 samples, but Neang Mon still had low AC. Some of the earlier samples had high-intermediate GT. Most were less than 7 mm long, except Banla Phadu and Neang Mon. Grain size and shape were predominantly medium. Neang Mon had the softest cooked rice, followed by San Leaw and Phkar Sla.

Cooked rice hardness correlated significantly with Amylograph setback (r = 0.92**, n = 20) and consistency (r = 0.89**), and AC (r = 0.76**). Amylose content correlated with Amylograph setback (r = 0.81**, n = 25) and consistency (r = 0.89**). Alkali spreading value also correlated with Amylograph setback (r = 0.65**, n = 25) and consistency (r = 0.64**).

China

China produced the most rough rice in the world in 1989—180.1 million t (FAO 1990b). Annual milled rice consumption in 1979-81 was 86 kg/capita (FAO 1984) and 111 kg/capita (Duff 1991) or 113.4 kg/capita (RCMD 1989) in 1988. Available rice supply in 1986-88 was 104 kg/capita based on the FAO (1990a) food balance sheet. Hybrids account for 45% of production and 25-30% of the rice area (RCMD 1989).

The Chinese Ministry of Agriculture considers rice to be of high grain quality if it has good total and head rice yield, translucency, and at least 7% protein for japonica and 8% for indica (Y.K. Luo, Cereal Chemistry Department, China National Rice Research Institute, Hangzhou, China, 1990, pers. commun.)

Japonica rices are grown in the north, indica rices in the south, and both in the central regions. Good quality indicas have alkali spreading value >4. They are classified as grade 1 when grain length is 6.6-7.0 mm, L-W ratio >3.0, AC 17-22%, and GC >60 mm, and as grade 2 when grain length is 5.6-6.5 mm, L-W ratio 2.5-3.0, AC 23-25% or <17%, and

GC 41-60 mm. Japonicas of high quality have alkali spreading value >6. They are divided into grade 1 (AC 14-18% and GC >70 mm) and grade 2 (AC 19-20% or <14% and GC 61-70 mm).

Japonica grain properties are closest to ministry standards, followed by medium-maturing indicas, late-maturing indicas, and early-maturing indicas. People in northern regions, including those in Huanghe River Valley, prefer japonica rices with a sticky, soft texture. People in the southern areas prefer indica rices: hard-texture, high-AC rices in Guangdong and Guangxi Provinces, and long-grained, low-amylose, soft-cooked rices in Hongkong (Juliano et al 1990, Luo et al 1987).

Both japonica and indica rices are grown and consumed in central China (Yangtze River Valley). Market samples have 17-26% AC (RCMD 1987, 1989). A small amount of waxy rices are also cultivated and consumed as special rice products, such as cakes, balls, and wine.

High-AC rices predominated in Chinese samples analyzed at IRRI (Appendix, Table 5). Most were soft-cooked rice with intermediate GT, and medium to soft GC (Appendix). The indica rices had varied AC, whereas japonica rices had low to intermediate AC. Short, bold japonica grains predominated, but some medium-long and medium-shaped indicas were included.

Amylose content correlated significantly with Amylograph setback (r = 0.86**, n = 11) and consistency (r = 0.93**), GC (r = –0.69**, n = 69), and cooked rice hardness (r = 0.64**, n = 32). Cooked rice hardness also correlated with GC (r = –0.71**, n = 32). Grain width correlated significantly with grain length (r = –0.72**, n = 32), protein content (r = –0.47**, n = 69), and Amylograph setback (r = –0.85*, n = 6).

India

Annual rough rice production in India was 106.2 million t in 1989, second only to China (FAO 1990b). Annual per capita consumption of milled rice in 1979-81 was 69 kg (FAO 1984) and 82 kg in 1988 (Duff 1991). Apparent per capita availability of rice was estimated at 71 kg in 1986 (RCMD 1987) and 64 kg in 1986-88 (FAO 1990a, IRRI 1991).

Quality preferences were difficult to obtain for India because of its size. Bhattacharya et al (1980), however, classified Indian rices into six of eight possible types based on total and water-insoluble AC and equilibrium water content.

Type III, high-AC rice, has low water-insoluble amylose as the predominant AC type (soft GC). Samples from northern and western India belong to type III. People in these areas prefer nonsticky soft-cooked rice. A similar trend occurs in samples from Kerala in southern India. Type II (high AC, medium insoluble amylose, medium GC) is a close second in preference in the northern states (Assam and West Bengal).

Varieties from the hilly border areas of northeastern and north-western India belong predominantly to semisticky (intermediate AC), sticky (low AC), and waxy rices. Scented intermediate-AC rices are fairly common among the samples from the northern region, especially Uttar Pradesh. Market samples of Basmati had 21-26% AC; Permal (PR-106), 24-25%; Poni, 25%; Mahsuri, 25-26%; and IR8,28% (RCMD 1987, 1989).

Most of the samples analyzed at IRRI were obtained from the All India Coordinated Rice Improvement Program, Hyderabad (now the Directorate of Rice Research), except for 14 varieties obtained in 1973 from Maharashtra. They were mainly high-AC rices with low GT and variable, but mostly soft, GC (Appendix, Table 5). Aromatic rice Basmati 370 had low-intermediate AC, lower Amylograph viscosity (setback and consistency), and cooked rice Instron hardness than the other high AC Indian rices. The Maharashtra samples were all high AC but intermediate to low GT, and variable GC. Grain size and shape were short to long and slender to bold.

Cooked rice hardness of non-Maharashtra samples correlated significantly with grain length (r = 0.80**, n = 10) and consistency (r = 0.79**), cooked rice stickiness (r = –0.77**), AC (r = 0.74**, n = 18), and alkali spreading value (r = 0.59**). Cooked rice stickiness also correlated significantly with Amylograph setback (r = –0.92**, n = 10) and consistency (r = –0.81**) and with protein content (r = –0.84**). Gel consistency correlated with Amylograph consistency (r = –0.66**, n = 18) and cooked rice hardness (r = –0.50*, n = 10). The only significant correlation with the Maharashtra samples was between AC and GC (r = –0.79**, n = 14) among four properties: protein, AC, GC, and alkali spreading value.

Indonesia

Indonesia produced 44.8 million t of rough rice in 1989 (FAO 1990b). Annual consumption of milled rice per capita in 1979-81 was 126 kg (FAO 1984) and 158 kg in 1988 (Duff 1991). Per capita rice availability in 1985 was 155 kg (RCMD 1987), 140 kg in 1988 (RCMD 1989), and 140 kg in 1986-88 (FAO 1990a, IRRI 1991).

A previous study of rice quality characteristics reveals that Javanese consumers prefer a smooth-textured rice (*pulen*) with intermediate AC. West and North Sumatran consumers prefer a more easily separating, high-AC rice with hard texture (*pera*) (Damardjati and Oka 1991). Traditional *bulu* varieties are priced more than twice that of modern varieties with similar cooking properties, except that they are aromatic and coarse-grained. A study of urban consumer preferences confirms that sticky cooked rice are premium-priced in Jakarta (Java) and Medan (Sumatra), but less sticky cooked rice is preferred in Ujung Pandang (Sulawesi) (Damardjati and Oka 1991). A market red rice sample had 20% AC; Cianjur had 19% AC (RCMD 1987,1989).

Medium-sized and -shaped grains predominated over long, slender grains. *Bulu* or javanica upland varieties had mainly intermediate AC, low GT, medium-sized and -shaped chalky grains, and aroma. Exceptions to this were low-AC Mandolin and high-AC Jidah and Kencara Muara (Appendix).

Many indica rices have the property of intermediate AC, but tend to have intermediate GT, medium-soft GC, and longer, slender grain. Cisadane, C4-63G, and IR64 are modern intermediate AC varieties that incorporate desirable taste characteristics (Damardjati and Oka 1991). Unnevehr et a1 (1985) found that retail price in Jakarta correlated negatively with L-W ratio. High-AC rices tended to have intermediate GT; black *ketan* waxy rices were available in Jakarta retail markets.

Tidal swamp rices (n = 44) had mainly high AC, intermediate GT, and hard-medium GC. But four were waxy, one had low AC, and five had intermediate AC (Appendix). Excellent quality rices were Kapuas, Karang-Duku 1, and Tampokong Kuning (G.A. Watson, 1983, unpubl. data). Deepwater (BJM) rices, except for two waxy rices, had high AC, intermediate GT, and hard GC.

Cooked rice hardness correlated significantly with grain width ($r = -0.60^{**}$, n = 50) and GC ($r = -0.73^{**}$, n = 54), whereas AC correlated with GC ($r = -0.66^{**}$, n = 119), Amylograph setback ($r = 0.56^{**}$, n = 65) and consistency (r = 0.65**), and cooked rice stickiness ($r = -0.62^{**}$, n = 27).

Iran

The rough rice production in the Islamic Republic of Iran was 1.2 million t in 1989 (FAO 1990b). Apparent annual per capita consumption of milled rice in 1978-82 was 35 kg (ITC 1984) and milled rice food supply per capita in 1986-88 was 34 kg (FAO 1990a, IRRI 1991). About 60,000 ha of Mazandaran Province, which is about one-third of the total riceland in Iran, were planted to Amol 2 and Amol 3 (Sona) in 1984 (Dalrymple 1986).

Sadri varieties, which look like Basmati rices and have a similar ability to elongate when cooked, predominated. They had low-intermediate AC and medium GC (Appendix, Table 5), but were not as aromatic as Basmati rices. The 1985 samples had more high-AC entries than earlier samples. Many had negative Amylograph setback due to high peak viscosity but 7-10 kg/7 cm^2 cooked rice Instron hardness.

Cooked rice hardness correlated significantly with Amylograph setback (r = 0.74**, n = 10) and consistency (r = –0.65**), GC (r = –0.70**, n = 11), alkali spreading value (r = 0.73**), AC (r = 0.69*), and grain width (r = 0.60*). Gel consistency also correlated with Amylograph setback (r = –0.79**, n = 11), AC (r = –0.75**, n = 20), alkali spreading value (r = –0.62**), and protein content (r = 0.62**). Amylograph setback correlated with AC (r = 0.76**, n = 22) and alkali spreading value (r = 0.66**).

Japan

Rough rice production in Japan was 12.9 million t in 1989 (FAO 1990b). Annual consumption of milled rice per capita in 1979-81 was 80 kg (FAO 1984), 77 kg in 1987 (Hirao 1990), 72 kg in 1986-88 (FAO 1990a, IRRI 1991), and 78 kg in 1988 (Duff 1991, RCMD 1989). Preferred varieties are Koshihikari in Niigata Prefecture and Sasanishiki in Miyagi Prefecture (Tohoku district only). Both have low AC and low-protein grains (S. Chikubu, Tokyo University of Agriculture, 1990, pers. commun.). In 1989, the major varieties by area planted were Koshihikari, Sasanishiki, and Nipponbare.

Starch-iodine blue value of cooked rice cooking water is <0.120 absorbance at 600 nm for very good quality rices, 0.121-0.179 for good-quality rices, and >0.180 for poor-quality rices. Starch-iodine blue value was used to index AC in low-AC Japanese rices with similar grain size and shape. Six market samples had 17-20% AC while a Hokkaido-grown rice had 22% (RCMD 1987,1989).

All Japanese rices analyzed at IRRI had low AC except five rices with intermediate AC and five waxy samples (Appendix, Table 5). All had low GT except Akenohoshi and the aromatic Hieri. Gel consistency values were either soft or medium. Koshihikari had lower AC and gave the softest cooked rice among the 1986 samples even when compared with other Japanese rices, including Sasanishiki.

Instron and Texturometer cooked rice hardness values were correlated for 29 Japanese rices (Ohtsubo et al 1990). Cooked rice hardness-adhesiveness ratio by the Texturometer and hardness-stickiness ratio by the Instron Food Tester revealed good correlations in 29 Japanese rices for AC and other important cooking qualities of rice (Ohtsubo et al 1990). The rices had mainly short, bold grains.

Cooked rice stickiness correlated with AC ($r = -0.97^{**}$, n = 37) and GC ($r = 0.91^{**}$, n = 9), and GC correlated with Amylograph peak viscosity ($r = -0.82^{**}$, n = 9) and consistency ($r = -0.82^{**}$). Amylose content also correlated with Amylograph peak viscosity ($r = 0.60^{**}$, n = 17) and consistency ($r = 0.65^{**}$), as did protein content with Amylograph setback ($r = 0.649^{**}$). Amylograph consistency correlated with grain length ($r = 0.83^{*}$, n = 6) and width ($r = -0.83^{*}$).

Korea, Republic of

The Republic of Korea's rough rice production in 1989 was 8.2 million t (FAO 1990b). Annual consumption of milled rice in 1979 was 135 kg per capita (IRRI 1991) and 133 kg in 1988 (Duff 1991). It is projected to decline to 100 kg by the year 2000 (RCMD 1987). Rice availability per capita in 1986-88 was 128 kg (FAO 1990a, IRRI 1991). Ricelands are mainly irrigated with 84% of production from japonica rice and 16% from Tongil (indica-japonica) rice (RDA 1990). The improvements in Korean rice varieties were recently reviewed. Varieties released through 1989 were described (RDA 1990). In 1989, 20.8% of rice area was planted to Dongjinbyeo, 12.7% to Seomjinbyeo, and 8.9% to Samgangbyeo (RDA 1990).

Principal japonica varieties are Hwaseongbyeo in the middle and southern plains (soft texture), Yeongdeogbyeo (Yongjubyeo) in the southeast coastal region of the southern plains (good grain shape), and Chucheongbyeo (Akibare ex Japan) in the middle plain (good grain shape and soft texture) (G.S. Chung, Yeongnam Crop Experiment Station, Milyang, 1990, pers. commun.). All varieties had good translucency. Market samples had 17-21% AC and low GT (RCMD 1987).

The Korean varieties had low-intermediate AC and low GT, except Suweon Jo, which had high AC (Appendix, Table 5). Of the three most important varieties, Hwaseongbyeo (20%) had intermediate AC, and Yongjubyeo (15%) and Chucheongbyeo (17%) had low AC. The earlier indica × japonica rices (such as Tongil) had harder GC than japonica rices at 120 mg/2 m10.2 N KOH (Perez and Juliano 1979). The newer varieties had soft GC, like japonica rices. The hardness of Milyang 23, for example, cannot be differentiated from that of freshly cooked Akibare (del Mundo et al 1989). All had low GT, soft GC, and similar grain size and shape. Tongil, Yushin, and the earlier indica × japonica rices had longer grain (>5.5 mm) than japonica rices (<5.5 mm). The Korean rices had short or medium length and bold or medium-shaped grains.

Grain length and width were correlated (r = –0.64**, n = 18). Grain width correlated with Amylograph peak viscosity (r = –0.78**, n = 17) and setback (r = 0.74**) and cooked rice stickiness (r = –0.30**, n = 106). Gel consistency and cooked rice stickiness were correlated (r = 0.65**, n = 35), as were AC and Amylograph consistency (r = 0.60**, n = 35).

Laos

Annual rough rice production in the Popular Democratic Republic of Laos was 1.2 million t in 1989 (FAO 1990b). Annual consumption of milled rice per capita was 160 kg in 1975-77 (IRRI 1991). Milled rice availability in 1986-88 per capita was 187 kg (FAO 1990a, IRRI 1991). Glutinous or waxy rice is the staple food in Laos, just as in north and northeast Thailand.

Waxy rices predominated over nonwaxy rices (Appendix, Table 5). The 1988 crop did not include any of the 1965 samples. All waxy samples had low GT, wider (2.6-2.9 mm) grains, medium short length, and medium or bold shape. The nonwaxy rices had mainly intermediate AC. The waxy rices had the lowest Amylograph consistency and cooked rice Instron hardness (2-3 kg/7 cm^2) followed by Meto (12% AC), intermediate-AC rices, and high-AC Sulakham 2-18-3-1-1.

Cooked rice hardness correlated with Amylograph setback (r = 0.92**, n = 12) and consistency (r = 0.98**), GC (r = –0.94**), AC (r = 0.98**), and grain width (r = –0.73**). Gel consistency also correlated with Amylograph setback (r = –0.88**, n = 12) and consistency (r = –0.89**), AC (r = –0.95**), protein (r = –0.64*), and grain width (r = 0.72**). Amylose content correlated with Amylograph setback (r = 0.70**, n = 15) and consistency (r = 0.84**) and with grain width (r = –0.80**, n = 12).

Grain width correlated with Amylograph setback (r = –0.63*, n = 12) and consistency (r = –0.73**), protein content (r = –0.64*), and alkali spreading value (r = 0.58*), whereas grain length correlated with protein content (r = 0.61*, n = 12), cooked rice hardness (r = 0.60*), and AC (r = 0.63*).

Malaysia, East

Annual rough rice production in Sabah was 112,000 t and 131,000 t in Sarawak in 1989 (MARDI data). The production in 1985 corresponded to 43% self-sufficiency in East Malaysia (Sabah and Sarawak). Per capita consumption in 1985 was 141 kg.

Sabah. Varieties preferred in Sabah and their special qualities are MR7, soft, sticky texture; C4-63, soft; Madcandu, good grain shape, flavor; TR2, soft, good flavor; and TR7, good grain shape (J. Idris, Agricultural Research Centre, 1990, pers. commun.).

Sabah samples had high-intermediate AC, low-intermediate GT, and medium-hard GC (Table 5). MR7 and C4-63 had intermediate AC and high-intermediate GT (Appendix). Madcandu, TR2, and TR7 had high AC, but TR2 had medium GC and the others had hard GC. TR2 and Madcandu had high-intermediate GT; TR7 had low GT. Taichung-Sen-Yu-195 had the softest cooked rice; Madcandu and MR1 had the hardest.

Cooked rice hardness correlated significantly (n = 10) with GC (r = –0.72*) and AC (r = 0.72*). Gel consistency also correlated with alkali spreading value (r = –0.64*) and AC (r = –0.72*).

Sarawak. Important rice varieties by decreasing preference are Adan, strongly aromatic, hard texture, chalky; Biris, strongly aromatic, medium texture, translucent; Wai, strongly aromatic, medium texture, chalky; Wangi, strongly aromatic, hard texture, translucent; Sri Sarawak, aromatic, medium texture, translucent; Acheh, aromatic, hard texture, translucent; Baru 3, aromatic, medium texture, slightly translucent; Sampangan, aromatic, soft texture, translucent; and Serendah Kuning, aromatic, soft texture, slightly translucent (P. Sim, Agricultural Research Centre, 1990, pers. commun.)

Samples had mainly high AC, intermediate GT, and soft GC (Table 3). Adan had very low to low AC among the aromatic rice varieties (Appendix). Adan, Dari, and Adan Buda had 11-12% AC, high GT, and were chalky (tombstone white). They are probably used as a substitute for waxy rice. Sri Sarawak (14% protein) and Sampangan had intermediate AC, Baru 3 had low AC, and Acheh 62 and

Serendah Kuning had high AC, with either low or intermediate GT. Low-AC rices had the softest cooked rice, followed by intermediate-high AC rices. Adan Buda, with 11 % AC, had harder cooked rice (6 kg/ 7 cm^2) than two other low (17%)-AC rices (4-5 kg/7 cm^2).

The significant correlations were alkali spreading value with AC (r = 0.63**, n = 27) and GC with protein content (r = –0.45*, n = 21).

Malaysia, West

Annual rough rice production in Malaysia was 1.7 million t in 1989 (FAO 1990b), of which 1.6 million was in West Malaysia. Self-sufficiency in rough rice production was 84% in West Malaysia in 1985. Per capita rice consumption was 100 kg in 1985 (Wong et al 1991). Per capita supply of milled rice in 1986-88 was 83 kg (FAO 1990a, IRRI 1991), but this may be underestimated because official statistics do not reflect rice transactions in the illegal border trade with Thailand. Principal varieties in the Muda Development (95,000 ha) 1984 main season were IR42 (27%) and MRI (20%) and in the off-season, IR42 (41.5%), MR71 (26.3%), and MR1 (17.8%) (Dalrymple 1986). IR42 had low head rice yield in the Muda, particularly when harvested late or overdried (Ibabao et al 1987). Head rice is defined as milled grain retaining at least 75-80% the length of whole-grain milled rice.

Mahsuri, with good cooking quality, taste, medium grain, and stable yields, and Matcandu, with high AC, intermediate GT, soft GC, long, and slender grains, were popular from 1960 to 1970 (A.N. Husain, Malaysian Agricultural Research and Development Institute (MARDI), 1990, pers. commun.). Graded mixtures of long-grained rices Al, A2, B1, and B2 presently have high AC, low GT, and medium GC.

Imported Thai rices have long, slender grain, soft-cooked rice, high volume expansion, intermediate AC, low GT, and soft GC. Thai fragrant rice and Calrose with low AC are also imported. The Malaysian Rice National Board (LPN) now imports aged Thai fragrant (Jasmine, low AC) rice. Low-intermediate AC is generally preferred over high AC (Husain 1984). Intermediate GT is preferred over low GT among high-AC rices. A market sample of A-1 rice had 24% AC and a mixture of low and intermediate GT grains (RCMD 1987).

The samples from West Malaysia were mostly high AC because of the recommended MARDI (MR) varieties (Table 5, Appendix). All Mahsuri samples had high AC, intermediate GT, and variable GC.

MR7 had intermediate AC. Three waxy rice samples (two Pulut Suding [or MR47] and Pulut Malaysia Satu) were represented, reflecting the popularity of waxy rice in Southeast Asia. Amylograph consistency and cooked rice hardness were lowest for waxy rices and highest for high AC rices such as Mahsuri, MR88, Muda, MR81, and MR84. The grains were mainly medium long and slender or medium-shaped.

Cooked rice hardness correlated with AC (r = 0.72**, n = 19) and GC (r = –0.54*, n = 20), whereas GC correlated with AC (r = –0.44**, n = 36) and Amylograph peak viscosity (r = –0.68**, n = 14) and consistency (r = –0.66**). Amylograph consistency also correlated with AC (r = 0.60**, n = 19) and grain length (r = –0.58*, n = 13).

Myanmar

Myanmar produced 13.6 million t of rough rice in 1989 (FAO 1990b). Annual consumption per capita in 1979-81 was 194 kg (FAO 1984) and 187 kg in 1988 (RCMD 1989). Milled rice supply per capita in 1986-88 was 186 kg (FAO 1990a, IRRI 1991). Principal modern varieties in the 1983-84 season were Shwe-wa-tun (IR5 mutant) 38.7%, Shwe-ta-soke 22.77% and Manawhari (Mahsuri) 21.1% (Dalrymple 1986).

Important Myanmar varieties based on grain characteristics are classified as follows: high volume expansion, fair eating quality — Manawhari, Manawthukha, Shwe-wa-tun, and Sin-thein-gi (BR4); stickiness — Sein talay, Hmawbi-2 (long-grain), Shwe-man(l), Khau-pher-phu, Khaupher-phone, and Lone-thwe-hmwe (aroma); soft texture—Inn-ma-ye-baw, Sin-Ekari(2), and Sin-Ekari(3); soft texture, long grain — Rakhinithuma, Padinthuma, and Ekarine; elongation on cooking, soft texture, high volume expansion — Nga Kywe and Paw-san-hmwe (aroma) (Sein Tun, Agricultural Research Institute, 1990, pers. commun.)

Export premium rices are classified as long-grained (Hmawbi-2, 15-25% extra long [≥7 mm] 35-40% long [6.6-6.9 mm], 30-40% medium [6.2-6.5 mm], and 5-10% short [<6.2 mm]), Emata (Inn-ma-ye-baw and Yebaw lat, 15-25% long, 60% medium, and 15-25% short), Zeera (Hnangar, medium/short slender, up to 6.6 mm), and Pearl (short, bold L:W ~2,Nga Kywe and Pawsan) (MAPT 1990). Market samples of Emata rice had 18-26% AC; Ngasein, 26% AC; Nga Kywe 17,22% AC; and Zeera, 25.4% AC (RCMD 1987,1989).

The high-volume expansion varieties with fair eating quality had mainly high AC, low GT, and hard GC (Appendix). The sticky varieties all had low AC (except for Khaupher-phone with 4.6% AC), low GT (except for Sein talay), and soft or medium GC. Soft textured varieties had low AC, low GT, and soft GC for Inn-ma-ye-baw and Sin-Ekari(3), and high AC, intermediate-low GT, and hard-medium GC for Sin-Ekari(2), Padinthuma, and Ekarine. Nga Kywe and Paw-san-hmwe had intermediate AC, soft GT, and medium GC. Nga Kywe elongated more than Basmati rices when raw rice was precooked. The cooked rice length was shorter because it was a medium grain variety. Grain type ranged from long to short and slender to bold.

Cooked rice hardness correlated significantly with GC (r = 0.93**, n = 13), AC (r = 0.66*, n = 13), and Amylograph setback (r = 0.99**, n = 6) and consistency (r = 0.99**). Gel consistency correlated significantly with Amylograph setback (r = –0.93**, n = 7) and consistency (r = –0.97**), and AC (r = –0.68**, n = 51). Amylose content also correlated significantly with Amylograph setback (r = 0.80**, n = 16) and consistency (r = 0.58*). Milled rice length correlated negatively with Amylograph consistency (r = –0.96**, n = 15) and setback (r=–0.94**).

Nepal

Annual rough rice production in Nepal was 3.4 million t in 1989 (FAO 1990b). Annual consumption of milled rice per capita was 98 kg in 1979-81 (IRRI 1991) and 89 kg in 1988 (Duff 1991). Milled rice supply per capita in 1986-88 was 96 kg (FAO 1990a, IRRI 1991). Important varieties in 1983 were CH 45, Taichung 176, Chianung 242, Masuli (Mahsuri), Durga, Laxmi (IR2061-628-1), Sabitri (IR2071-124-6-4), Janaki, and Bindeswari (Dalrymple 1986).

The majority of these varieties had high AC, except Taiwanese varieties Taichung 176 and Chianung 242, which had low-intermediate AC and low GT (Appendix, Table 5). Varieties analyzed at IRRI mainly had high AC, but many low- and intermediate-AC samples were included.

Popping varieties from Nepal had high and intermediate AC. Medium, short, and medium- to slender-shaped grains were represented but length and width were not related to AC. Low-AC IET2938 had the lowest cooked rice Instron hardness and Amylograph setback and consistency, and IR2071-124-6-4 (Sabitri) had the highest values.

Cooked rice hardness correlated with Amylograph setback (r = 0.91**, n = 9) and consistency (r = 0.92**), AC (r = 0.85**), and stickiness (r = –0.90**). Cooked rice stickiness correlated with Amylograph set-back (*r* = –0.89**, n = 9) and consistency (*r* = –0.92**), and AC (*r* = –0.98**). Amylose content also correlated with Amylograph set-back (*r* = 0.82**, n = 14) and consistency (*r* = 0.86**).

Pakistan

Annual rough rice production in Pakistan was 4.8 million t in 1989 (FAO 1990b). Annual consumption of milled rice per capita in 1979-81 was 23 kg (FAO 1984) and 21 kg (Duff 1991) or 19.2 kg (RCMD 1989) in 1988. Milled rice supply per capita in 1986-88 was 16 kg (FAO 1990a, IRRI 1991). About 95% of Pakistan's rice production is concentrated in Punjab and Sind (Dalrymple 1986).

In Punjab, 1.1 million ha are grown to Basmati rice and 0.1 million ha to IR6-type rices (A. Majid, Rice Research Institute, 1990, pers. commun.). More than 80% of the 1989 Basmati crop is Basmati 385 (PK487), which has yielded 50% more than Basmati 370. Mehran 69 (IR6-156-2) is the principal variety in the Dokri region. Market samples of Basmati had intermediate AC; IRRI-6 had high AC (RCMD 1987, 1989).

Rices from Pakistan had mainly intermediate-high AC, low GT, and hard GC (Table 5). Both fine aromatic, elongating Basmati-type rices and coarse IR6(Mehran)-type rices from Pakistan were represented (Appendix).

Grain was medium or long, and slender or medium-shaped. Good Basmati rices had uniformly chalky grain, intermediate AC, low GT, and medium GC (represented by the Punjab crop). The Dokri crop had intermediate GT and less elongation. Basmati 385 had properties similar to those of Basmati 370, including elongation, but it yielded more. Mehran 69 had better eating quality than IR8, but similar properties (high AC, low GT, hard GC), probably because of its more slender grain. Both Mehran 69 and Basmati rices were exported. Basmati-type rices gave lower Amylograph setback and consistency and cooked rice Instron hardness than IR6-type rices.

Cooked rice hardness correlated significantly with AC (*r* = 0.65**, n = 28), Amylograph setback (*r* = 0.69**, n = 19) and consistency (*r* = 0.62**), and alkali spreading value (*r* = 0.54**, n = 28). Amylose content also correlated with Amylograph setback (*r* = 0.74**, n = 33) and consistency (*r* = 0.66**). Gel consistency and alkali spreading values were correlated (*r* = –0.47**, n = 55).

Philippines

The Philippines produced 9.5 million t of rough rice in 1989 (FAO 1990b). Annual consumption of milled rice per capita in 1979-81 was 91 kg (IRRI 1991) and 105 kg in 1988 (Duff 1991). Milled rice supply per capita in 1986-88 was 90 kg (FAO 1990a, IRRI 1991). Rices with intermediate AC and soft GC are preferred (Merca et al 1979; P.B. Escuro, Rice Varietal Improvement, Philippine Rice Research Institute, College, Laguna, 1990, pers. commun.). Three market samples of local rices had 22-25% AC (RCMD 1989).

Grain size was mostly medium, followed by short and long. Shape was predominantly medium, then slender or bold. All IR varieties were included under the Philippines (Appendix). Most had high AC, low-intermediate GT, and variable GC (Table 5) as reported by Khush and Juliano (1985). The softer textured rices such as IR5, IR32, IR62, IR66, and IR72 had soft GC and intermediate GT characteristic of traditional varieties. Among the two intermediate-AC rices, IR64 had softer cooked rice than IR48 (low GT), but cooked IR64 tended to harden quickly when stored. IR24 and IR43, the low-AC rices, had sticky cooked rices. Waxy IR29 and IR65 had replaced Malagkit Sungsong, a japonica variety, in waxy rice preparations, but they lacked the tackiness and aroma of Malagkit Sungsong. Waxy rices included low- and high-GT samples and black Tapol and Perurutong rices.

The traditional upland varieties Kinandang Patong, Milagrosa, Dinorado, Intan, and Palawan had 18-22% AC and low-intermediate GT, suggesting preference for this AC range. C4-63 had intermediate AC. Wagwag was a medium slender variety popular in Luzon with high AC and intermediate GT. IR42, with similar grain size and shape, substituted for it (Juliano et al 1989). The new upland variety Makiling had intermediate AC.

Amylograph viscosity and cooked rice Instron hardness varied widely: it was lowest for waxy rices and highest for high-amylose rices (Appendix). Waxy rices varied widely in Amylograph peak viscosity, most of them with <500 BU.

Cooked rice hardness correlated with stickiness (r = –0.84**, n = 15), Amylograph setback (r = 0.66**, n = 125) and consistency (r = 0.65**), AC (r = 0.50*, n = 163), and GC (r = –0.59**, n = 165). Stickiness of cooked rice correlated with Amylograph peak viscosity (r = –0.94**, n = 10) and consistency (r = –0.68*), and grain width (r = 0.61*). Amylose content also correlated with Amylograph setback (r = 0.55**, n = 209) and consistency (r = 0.70**), grain width (r = –0.56**, n = 142), and GC

(r = –0.55**, n = 239). Amylograph setback correlated with alkali spreading value (r = 0.45**, n = 212) and GC (r = –0.46**, n = 144).

Sri Lanka

Annual rough rice production in Sri Lanka was 2.1 million t in 1989 (FAO 1990b). Annual consumption of milled rice per capita in 1979-81 was 95 kg (FAO 1984). Milled rice supply per capita in 1986-88 was 101 kg (FAO 1990a, IRRI 1991). Parboiled rice is preferred in most of the country, except in the south (RCMD 1987). Bg34-8, Bg94-1, and Bg276-5 (3-3.5-mo rices) comprised 52% of the total rice area in 1982-83 (Dalrymple 1986). Bg11-11, Bg90-2, Bg379-2, and Bg400-1 are 4-4.5-mo varieties; Bg3-5 is 5-6 mo. Consumers in Kandy district prefer undermilled red parboiled rice with medium grain size (Breckenridge 1979). A local red and a white milled rice from the market had high AC and intermediate GT (RCMD 1987).

Grains had short or medium length and medium or bold shape. Roundish milled (short bold) grains about 4 mm long and 2.3-3.1 mm wide characterized Podiwi A-8 and Bgl1-11 (Appendix). These samba varieties were probably priced over the medium-sized and -shaped grain varieties because of intermediate GT, medium-soft GC, and roundish shape. All had high AC. Many of the varieties had red pericarp (such as H-4). Varieties differed in Amylograph viscosity and cooked rice hardness, despite the narrow AC range (Table 5). Some did not show distinct Amylograph peak viscosity but instead reached a plateau even less than 500 BU.

Cooked rice hardness correlated with stickiness (r = –0.71**, n = 31). Protein content correlated with grain length (r = –0.53**, n = 30), Amylograph peakviscosity (r = –0.44**, n = 46) and setback (r = 0.52**), and cooked rice stickiness (r = –0.48**, n = 31). Grain length correlated with Amylograph peak viscosity (r = 0.54**, n = 22).

Taiwan, China

Taiwan, China, produced 2.4 million t of rice in 1989 (FAO 1990b). About 89% was short-grained japonica with relatively low AC. Only 3.6% was waxy rice, and the rest, indica rice (Huang 1987). Per capita consumption of milled rice was 133 kg in 1964-66,105 kg in 1980, and 85 kg in 1986 (Huang 1987) and in 1988 (Duff 1991). The population prefers short-grained japonica rice with relatively low AC (Y.C. Teng, Council of Agriculture, Food and Agriculture Division, Taipei, Taiwan, 1990, pers. commun.).

Varieties with high milling yield, good appearance, and low AC include Tainan 9, Taiken 1, Taiken 2, Taichung 189, Tainung Sen 20, Taichung Sen 10, and Taisen 1 (Song 1990). Indica rices (Tainung Sen 20, Taichung Sen 10, Taisen 1) usually have 2% more protein than japonica rices (Tainan 9, Taiken 1, Taiken 2, Taichung 189). These rices all have low AC, low GT, and soft GC, unlike the earlier native indica varieties, such as Taichung Native 1, that have high AC, hard GC, and low GT. Market samples of japonica and indica rices (two of each) had low AC and low GT (RCMD 1987).

Low AC, low GT, and soft GC predominated in rice samples (Table 5). Analyses confirmed the low AC of the new native indica varieties (Appendix) although they still had longer grains (medium length and size) than japonicas (short, bold grain) (TCA 1987). Grains of indica waxy rices were still longer than those of waxy japonicas. Even among waxy rices, indicas Taichung Sen Glutinous 1 and Tainung Sen Glutinous 2 had harder cooked rice and higher protein than japonica rices Taichung Glutinous 70 and Tainan Glutinous Yu 7 (Appendix). Indicas in China also had higher protein content than japonicas.

Grain length and width were negatively correlated (r = –0.85**, n = 42). Cooked rice hardness correlated significantly with stickiness (r = –0.86**, n = 14), and GC (r = –0.70**, n = 30). Amylose content correlated significantly with Amylograph setback (r = 0.57**, n = 40) and consistency (r = 0.78**, n = 40), and GC (r = –0.65**, n = 58).

Thailand

Annual rough rice production in Thailand was 21.3 million t in 1989 (FAO 1990b). Annual per capita consumption of milled rice in 1979-81 was 145 kg (FAO 1984) and 153 kg in 1988 (Duff 1991). Milled rice supply per capita in 1986-88 was 135 kg (FAO 1990a, IRRI 1991).

Long (>7 mm), slender grains are preferred (Kongseree 1979). Principal varieties are Khao Dawk Mali 105 (low AC, aromatic), RD7 (intermediate AC), and Leuang Pra Tew 123 (high AC) in the central region; Khao Dawk Mali 105, RD6 (waxy, aromatic), and RD15 (low amylose, aromatic) in the north; and Khao Dawk Mali 105 and RD15 in the northeast (N. Kongseree, Pathum Thani Rice Research Center, 1990, pers. commun.). RD15 is similar to Khao Dawk Mali 105 in quality. Thai export rices vary in AC as raw rice but have mainly intermediate and high amylose in parboiled rice (Juliano et al 1990). The processing quality is more variable than that of US long-grained rices. Market samples of Thai rices had low-intermediate AC (RCMD 1987, 1989).

Grains were mainly long and slender, followed by medium-sized and -shaped types (Appendix). Our analysis verified Thai data that principal rice varieties exhibited different AC types (Table 5). Most samples (particularly Khao Dawk Mali 105) had clear, translucent grains, unlike IR841-67-1 (IR262-43-8-11 /Khao Dawk Mali 105) grown at IRRI. Deepwater rices had mostly high AC, except for waxy Nahng Chalong. All the waxy rices had low GT except for the harder textured RD4. RD6, a selection from irradiated Khao DawkMali 105 (RRI 1982), had a texture close to that of traditional variety Niaw San Pahtawng. Aromatic rices Khao Dawk Mali 105 and RD15 were exported as Jasmine rice. Both had low AC, low GT, and soft GC. RD15 was produced by the ionizing radiation on Khao Dawk Mali 105. It matured 1 wk earlier than the parent.

RD7 is the most popular short-statured variety to date. It has the intermediate AC and high-intermediate GT of its parent C4-63G (RRI 1982). Nahng Mon S-4 is a popular aromatic Thai variety with intermediate AC.

Cooked rice hardness correlated with stickiness (r = –0.86**, n = 14), Amylograph peak viscosity (r = 0.77**, n = 13), setback (r = 0.64*) and consistency (r = 0.92*), AC (r = 0.86**, n = 31), GC (r = –0.72**, n = 38), protein content (r = –0.57**,n = 38), and grain length (r = 0.44**, n = 37). Amylose content correlated with Amylograph peak viscosity (r = 0.47**, n = 48), setback (r = 0.70**) and consistency (r = 0.84**), GC (r = –0.63**, n = 60), and grain length (r = 0.43**, n = 43). Gel consistency also correlated with Amylograph setback (r = –0.68**, n = 31) and grain length (r = –0.45**, n = 50). Grain length also correlated with Amylograph peak viscosity (r = 0.69**, n = 15), setback (r = 0.59*), and consistency (r = 0.60*).

Turkey

Turkey produced 330,000 t of rough rice in 1989 (FAO 1990b). Annual consumption per capita of milled rice in 1979-81 was 4 kg (FAO 1984). An apparent value for 1981 was 4.9 kg/capita (ITC 1984) and 4.7 kg in 1988 (RCMD 1989). Milled rice food supply per capita was 5.3 kg in 1986-88 (FAO 1990a). Market samples of locally grown rices had L-W >2, low AC, and low GT (RCMD 1989). Eight other market samples had low AC, except for Maratelli with 23% AC (RCMD 1987,1989).

All Turkish rice varieties had low AC (except for IZ68 with 20.7% AC) and low GT (except for BAL/SK [5Y03]) (Appendix, Table 5). Many Italian varieties were grown with Russian variety Krasnodarsky and Spanish variety Sequial. IZ68 had the highest L-W of 2.7; Krasnodarsky had the lowest at 1.6. Grains were mostly medium-sized but varied from long to short. Most were medium-shaped. Rocca had the softest cooked rice and Baldo the hardest, probably because of the latter's high protein content (10%).

Cooked rice hardness correlated with protein content (r = 0.77**, n = 14), GC (r = –0.90**), and AC (r = 0.62*). Amylose content correlated with Amylograph peak viscosity (r = –0.74**), setback (r = 0.84**) and consistency (r = 0.57*), and GC (r = –0.74**). Grain length correlated with protein content (r = 0.61**), GC (r = –0.60*), and grain width (r = 0.59*). Gel consistency correlated also with Amylograph peak viscosity (r = 0.59**) and setback (r = –0.74**), and protein content (r = –0.82**). Alkali spreading value correlated with AC (r = 0.53*) and Amylograph peak viscosity (r = –0.58*) and setback (r = 0.53*).

Vietnam

Annual rough rice production in Vietnam was 18.1 million t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 122 kg in 1979-81 (IRRI 1991). Milled rice food supply per capita in 1986-88 was 146 kg (FAO 1990a, IRRI 1991). The important Vietnamese rice varieties in the various regions and their special properties are (L.T. Thuy, University of Cantho, Mekong Delta Farming Systems Research and Development Centre, 1990, pers. commun.):

Variety	Province	Property
Nang Thom	Long An	Aromatic, soft texture
Tau Huong	Hau Giang	Aromatic, soft texture
Lua Thom	Cuu Long	Aromatic
Huyet Rong	Long An, Hau Giang	Very aromatic, high volume expansion
Mong Chim Roi	Kien Giang	Long grain, high volume expansion
Mot Bui Lun	Kien Giang, Minh Hai	Long grain, high volume expansion

Chin Henh	Kien Giang	Long grain, high volume expansion
Tau Bun	Cuu Long, Hau Giang	Long grain, high volume expansion

IR36 was planted in 60% of the southern ricelands in 1981 but only in pockets in the north (Dalrymple 1986).

Short grains and medium shape predominated because many traditional varieties were included (Appendix). Vietnamese rice samples mostly had high AC (Appendix, Table 5), but Nang Thom and Tau Huong had intermediate AC and GT, and were aromatic and soft-textured. Lua Thom, Huyet Rong, Mong Chim Roi, Mot Bui Lun, Chin Henh, and Tau Bun had high AC and high volume expansion. A black waxy rice Nep Cam had low GT, very low Amylograph viscosity, and gave the softest cooked rice. Nonwaxy rice samples in 1990 included two with intermediate AC and one with high AC. Low- and intermediate- AC rices had lower Amylograph setback and consistency and cooked rice Instron hardness than high-AC, hard-GC rices. Intermediate-GT, high-AC rices had softer cooked rice than low-GT, high-AC rices with hard GC.

Cooked rice hardness correlated with Amylograph setback (r = 0.62**, n = 33) and consistency (r = 0.66**), GC (r = –0.58**, n = 67), and AC (r = 0.59*, n = 67). Gel consistency correlated with Amylograph setback (r = –0.58**, n = 33) and consistency (r = –0.55**), and alkali spreading value (r = –0.63**, n = 122). Amylose content also correlated with Amylograph setback (r = 0.44**, n = 43) and consistency (r = 0.57**), and with protein content (r = –0.42**, n = 133). Alkali spreading value also correlated with Amylograph peak viscosity (r = –0.55**, n = 43), setback (r = 0.69**), and consistency (r = 0.50**). Grain length correlated with grain width (r = –0.35**, n = 97) and with protein content (r = –0.40**).

Summary

Medium grains predominate in Cambodia, India, Indonesia, Laos, West Malaysia, Nepal, Pakistan, Philippines, and Turkey, while short grains predominate in Bangladesh; Bhutan; China; Japan; Republic of Korea; Taiwan, China; and Vietnam (traditional varieties). These short-grained rices are mainly bold-shaped in Bhutan; China; Japan; Republic of Korea; and Taiwan, China, but medium-shaped in the others. Medium and short grains are important in Sri Lanka. Indica/japonica Korean rices tend to have medium grains. Long, slender grains predominate in exporting countries such as Thailand and Myanmar, and in Iran and Brunei. High-AC rices predominate in Asia, except in Bhutan; Iran; Japan; South Korea; Laos; Myanmar; Pakistan; Taiwan, China; and Turkey (Table 5). Waxy rices predominate over intermediate-AC rice in Laos. Low-AC rices predominate in Taiwan, China; Japan; South Korea; and Turkey, and intermediate-AC rices in Bhutan, Iran, Myanmar, and Pakistan.

Waxy rices are preferred in Laos and North Thailand as a staple; low-AC rices in Taiwan, China; Japan; South Korea; Nepal; Turkey; and Northeast Thailand; low-intermediate AC in northern China (japonica) and Iran; intermediate-AC rices in Cambodia, Basmati-consuming regions of India and Pakistan, Indonesia, Malaysia, Myanmar, Philippines, Central Thailand, and Vietnam; and high-AC rices in Bangladesh, South China (indica), India, Pakistan, Philippines, Sri Lanka, and Thailand. Soft GC is preferred over hard GC among high-AC rices, except for making noodles.

Out of 24 countries/regions, cooked rice hardness correlates with AC in 19, with GC in 15, with alkali spreading value in 7, with Amylograph setback in 17, and with Amylograph consistency in 13. Amylose content correlates with GC in 15 regions, with Amylograph setback in 21, and with Amylograph consistency in 20. Gel consistency correlates significantly with Amylograph setback in 11 countries and with Amylograph consistency in 13 countries, Alkali spreading value correlates significantly with Amylograph setback in six countries and with Amylograph consistency in five locations. Amylograph setback correlates with consistency in 21 locations. Amylose content seems a better grain quality index in Asia than GC and alkali spreading value.

Oceania

Australia

Australia produced 0.8 million t of rough rice in 1989 (FAO 1990b). Annual milled rice consumption in 1979-81 was 6 kg/ capita (FAO 1984) and 5.84 kg in 1988 (RCMD 1989). Milled rice supply per capita was 6.0 kg in 1986-88 (FAO 1990a).

Both medium- (70%) and long-grained (30%) varieties are grown (RCMD 1989). Medium-grained varieties are Calrose type (A.B. Blakeney, Yanco Agricultural Institute, 1990, pers. commun.).

Amaroo was the major variety; Echuca (YRM6) was planted late. Bogan yielded poorly but had better translucency than Echuca. YRB1 had white belly similar to that of Amaroo and the Spanish variety Bahia. All had low AC, low GT, and soft GC (Appendix).

Australian rices had mainly low AC, low GT, and soft GC (Table 5). Grain size varied from long to short; shape was slender to bold (Appendix). The major long-grained variety was Pelde, which had soft-textured cooked rice. Pelde replaced Inga, which had a problem with chalkiness during some seasons (Blakeney 1979). YRF6 (Goolarah) had high aroma, soft, long grain, very good translucency, and intermediate cooked grain expansion. YRF6 is similar to Thai jasmine rice. Both had low AC, low GT, and soft GC (Appendix).

YRL25 (Doonqara) is a firm-cooking, long-grained variety with high AC, low GT, and soft GC. Queensland produced long-grained rices from the southern USA, such as Finn and Lamont, Queensland Bluebonnet had 23% AC; Inga from New South Wales, 17-18% AC; and Calrose, 18% AC (RCMD 1987). Doonqara had the hardest cooked rice Instron value. Yau Jim rice, obtained from Hongkong as an Australian import, was probably not Australian because of its high AC (29%).

Grain length and width were negatively correlated (r = –0.75**, n = 15). Linear correlation coefficients were highly significant between cooked rice stickiness of five nonwaxy and one waxy rice and GC (r = –0.93**) and Amylograph consistency (r = –0.95**), between alkali spreading value and Amylograph peak viscosity (r = –0.76**, n = 14), and between Amylograph peak viscosity and consistency (r = –0.72**, n = 14). Gel consistency and AC were negatively correlated (r = –0.44*, n = 20), whereas AC correlated positively with Amylograph consistency (r = 0.62*, n = 13) and cooked rice hardness (r = 0.61*, n = 14); alkali spreading value correlated with Amylograph setback (r = 0.59*, n = 14).

New Zealand

New Zealand grew rice in 1970 but cancelled the project. The four 1970 crop samples all had intermediate AC, low GT, and soft GC (Table 5, Appendix).

North, Central, and South America

North and Central America

Total rough rice production in 1988 was 9.5 million t (1.9% of world total) (FAO 1990b). Rough rice food supply in 1986-88 was 5.2 million t (FAO 1990a) and per capita food supply was 9 kg milled rice/yr (FAO 1990a).

Costa Rica

Costa Rica produced 234,000 t of rough rice in 1989 (FAO 1990b). Annual consumption of milled rice in 1979-81 was 37 kg/capita (FAO 1984). Mean annual supply of milled rice per capita in 1986-88 was 40 kg (FAO 1990a). Seed sales in 1983 were 90.6% CR1113,7.0% CR5272, and 2.4% CR201 (Dalrymple 1986). Centro Internacional de Agricultura Tropical (CIAT) estimated that 72,300 ha were planted to modern varieties in 1981-82, virtually all of it (97%) as upland rice.

CR1113 had high AC, low GT, and hard GC, whereas CR5272 had intermediate AC (Table 6, Appendix). CR1821 had high AC and the highest Amylograph setback and consistency. Samples showed high Instron cooked rice hardness. The high Amylograph setback and consistency, cooked rice Instron hardness, hard GC, and high protein suggest that all are probably high-AC rices. The decrease in AC may be partially because of high protein content. CR1113 and CR1707 were long-grained; CR1821 and CR5272, medium-grained. Shape was mainly slender (CR1821 was medium).

Amylograph peak viscosity correlated with protein content (r = 0.99**, n = 3) and grain width (r = –0.99**).

Table 6. Protein content and classification of milled rice in the Americas based on apparent AC, final GT, and GC. IRRI, 1963-91.

Source	Sample (no.)	Protein (%)		AC[a]					GT[b]				GC[c]		
		Range	Mean	Wx	VL	L	I	H	L	I	HI	H	S	M	H
North America															
Costa Rica	4	9-13	10.5	0	0	0	2	2	4	0	0	0	0	0	4
Cuba	27	6- 9	7.5	0	0	10	7	10	17	9	1	0	11	12	4
Dominican Republic	9	4- 9	7.6	0	0	1	2	6	8	1	0	0	0	1	8
El Salvador	12	6-11	8.2	0	0	0	5	7	11	1	0	0	4	3	5
Guatemala	8	6- 8	6.8	0	0	0	2	6	8	0	0	0	1	4	3
Haiti	6	6- 7	6.0	0	0	0	2	4	2	4	0	0	4	2	0
Mexico	35	5-11	7.2	0	0	1	12	22	18	14	3	0	18	10	7
Panama	2	6	6.2	0	0	0	0	2	2	0	0	0	0	0	2
USA	87	5-10	7.0	5	1	40	23	18	53	28	4	2	46	21	7
Total	190	4-13	7.2	5	1	52	55	77	125	55	8	2	84	53	40
South America															
Argentina	46	6- 9	7.6	0	0	23	16	7	33	10	3	0	28	14	4
Bolivia	6	7-10	8.2	0	0	1	5	0	6	0	0	0	1	4	1
Brazil	91	5-13	8.5	0	0	23	26	42	74	15	1	1	23	24	44
Chile	14	6-10	7.4	0	0	5	9	0	14	0	0	0	14	0	0
Colombia	27	6-11	7.6	0	0	0	7	20	23	4	0	0	7	10	8
Ecuador	17	6- 8	6.4	0	0	0	3	14	17	0	0	0	1	6	10
Guyana	10	7-12	8.8	0	0	0	4	6	5	5	0	0	1	3	6
Paraguay	15	7-10	8.4	0	0	1	2	12	15	0	0	0	0	2	13
Peru	35	5-11	7.7	0	0	11	8	16	31	3	1	0	12	7	8
Surinam	34	6-10	7.5	0	0	8	15	11	9	21	3	1	20	9	2
Venezuela	6	6- 7	7.1	0	0	0	0	6	6	0	0	0	0	3	3
Total	301	5-13	7.9	0	0	72	95	134	233	58	8	2	107	82	99

[a] Wx = waxy (0-5.0%), VL =very low (5.1-12.0%), L = low (12.1-20.0%), I = intermediate (20.1-25.0%), and H = high (>25%). [b] Indexed by alkali spreading value: L = low (6-7), I = intermediate (4-5), HI = high-intermediate (3). and H = high (2). [c] Only samples analyzed from mid-1971 have gel consistency values: S = soft (61-100 mm), M = medium (41-60 mm), and H = hard (25-40 mm).

Cuba

Cuba produced 532,000 t of rough rice in 1989 (FAO 1990b). Annual consumption per capita in 1979-81 was 48 kg milled rice (FAO 1984). Mean food supply of milled rice per capita in 1986-88 was 52 kg/yr (FAO 1990a). About 70% of ricelands in 1984 were planted to Jucarito 104, 15% to IR880-C9,10% to Naylamp, and 5% to Caribe I (Dalrymple 1986). Three market samples had high AC and low GT (RCMD 1987).

Grain quality breeding goals are low-intermediate AC, soft GC, L-W ratio >3, ≥5% head rice (from rough rice) >90% translucency (D. Castillo, Instituto de Investigaciones del Arroz, 1991, pers. commun.). IR1529, IAC13, and IAC15 have good head rice yield (>55%) and >90% translucency, low AC, and low GT. Intermediate GT is compatible only with intermediate AC. Grain fissuring is reported to be a problem contributing to low head rice yield not only in Cuba but in all Latin American rice-producing countries.

Rices from Cuba were all nonwaxy AC types, with low-intermediate GT, and medium-soft GC (Table 6). Jucarito 104 had intermediate AC and GT, and medium GC (Appendix), but was susceptible to grain breakage and had a chalkiness problem (50% translucency). IR880-C9, Naylamp, and Caribe I had high AC, low GT, and medium-hard GC. Naylamp and IR880-C9 samples in 1985 had harder cooked rices than Caribe I and Jucarito 104. Three new varieties (IAC13, IAC14, and IAC15) all had low AC and soft GC (Appendix).

Cooked rice stickiness correlated significantly with cooked rice hardness (r = –0.93**, n = 10), Amylograph setback (r = –0.94**) and consistency (r = –0.90**), GC (r = 0.88**), and AC (r = –0.98**). Amylose content correlated with GC (r = –0.87**, n = 24) and Amylograph setback (r = 0.82**) and consistency (r = 0.75**). Gel consistency also correlated with Amylograph setback (r = –0.72**, n = 24) and consistency (r = –.72**). Cooked rice hardness also correlated with protein content (r = 0.61**, n = 24).

Dominican Republic

The Dominican Republic produced about 467,000 t rough rice in 1989 (FAO 1990b). Annual consumption per capita of milled rice was 44 kg in 1979-81 (FAO 1984) and 50 kg in 1986-88 (FAO 1990a). Varieties grown in 1981-82 were Juma 58 (28%), Juma 57 (23%), Tanichi (25%), 44/40 (12%), IR8 (2%), and other locals (20%)

(Dalrymple 1986). A market sample of selection Tono Brea had high AC (RCMD 1987).

The rice samples had mainly high AC, low GT, and variable GC (Table 6, Appendix). Of seven varieties analyzed in 1989-90, Juma 63 had low AC, intermediate GT, and medium GC (Appendix). Juma 57 and Tanioka had intermediate AC. The rest had high AC, low GT, and hard GC. Grains were fissured, dimensions could not be measured. Juma 58 had long, slender- to medium-shaped grain. Juma 63 had the softest cooked rice and Juma 61 had the hardest; Amylograph setback and consistency values confirmed this.

Cooked rice hardness correlated with Amylograph setback (r = 0.98**, n = 7) and consistency (r = 0.96**), AC (r = 0.96**), alkali spreading value (r = 0.89**), and GC (r = –0.97**). Amylose content correlated with GC (r = –0.94**, n = 9), alkali spreading value (r = 0.93**), and Amylograph setback (r = 0.90**, n = 7) and consistency (r = 0.86*). Gel consistency also correlated with alkali spreading value (r = –0.94**, n = 9) and Amylograph setback (r = –0.93**, n = 7) and consistency (r = –0.89**). Alkali spreading value also correlated with Amylograph setback (r = 0.80*, n = 7).

El Salvador

Rough rice production in El Salvador was 63,000 t in 1989 (FAO 1990b). Annual consumption of milled rice per capita in 1986-88 was 10 kg (FAO 1990a). Modern varieties grown in El Salvador in the early 1980s included CR1113, Nilo 9, Nilo 11, X-10, CICA 4, CICA 6, CENTA A2, and CENTA A3 (Dalrymple 1986).

The rices had high-intermediate AC, low GT, and variable GC (Table 6). Rices received for the 1979 crop had predominantly intermediate AC (Appendix). All the 1990 crop samples had high AC and low GT. Grain was mainly long and slender or medium-shaped. CENTA A5 had extra long, slender grain and gave the softest cooked rice among the samples. The high-AC samples in 1979, Nilo 1 and CICA-9, also had soft cooked rice.

Cooked rice hardness correlated with GC (r = –0.83**, n = 12), Amylograph setback (r = 0.88**, n = 12) and consistency (r = 0.87**), and grainlength (r = –0.92*, n = 5) and width (r = 0.90*). Gel consistency also correlated with Amylograph setback (r = –0.78**, n = 12) and consistency (r= –081**), and alkali spreading value (r = –0.82**). Amylograph viscosity correlated with protein content (r = –0.76**).

Guatemala

Guatemala produced 51,000 t of rough rice in 1989 (FAO 1990b). Annual per capita consumption of milled rice in 1979-81 was 4 kg (FAO 1984). Milled rice supply per capita in 1986-88 was 4.4 kg/yr (FAO 1990a). About 60% of total rice area in 1980 was planted to Tikal 2, a sister line of CICA 9 (Dalrymple 1986).

Guatemalan rices had predominantly high AC, low GT, and variable GC (Table 6, Appendix). ICTA Motagua Lisa and Pico Negro were the two intermediate AC rices. Pico Negro had the softest gel consistency and Instron cooked rice and also the lowest Amylograph setback and consistency. Grains were long and slender.

Grain length and width were correlated (*r* = 0.86*, n = 8). Gel consistency correlated significantly with Amylograph setback (*r* = –0.91**, n = 7) and consistency (*r* = –0.86**), cooked rice hardness (*r* = –0.81*) and grain width (*r* = 0.73*). Cooked rice hardness correlated with Amylograph setback (*r* = 0.88**, n = 7) and grain length (*r* = 0.85*). Grain length and Amylograph setback were also correlated (*r* = 0.87*, n = 7).

Haiti

Haiti produced 108,000 t rough rice in 1989 (FAO 1990b). Rice availability per capita in 1986-88 was 14 kg/yr (FAO 1990a). During 1983-84, the rice area was fairly evenly divided among ODVA 1, MCE 3, and Quisqueya (Dalrymple 1986).

The six samples had 6-7% protein and had either high AC, low GT, soft GC, or intermediate AC and GT and medium GC (Table 6). The high-AC rices were medium- or long-grained with medium shape; the intermediate-AC rices were medium or long and slender (Appendix). Setback was positive for the high-AC rices but negative for the intermediate-AC rices. Crête a Pierrot had the highest Amylograph peak viscosity. Amylograph consistency overlapped between the two AC types.

Cooked rice Instron hardness correlated with Amylograph setback viscosity (*r* = 0.90*, n = 6), AC (*r* = 0.88*), alkali spreading value (*r* = 0.89*), GC (*r* = 0.84*), and grain width (*r* = 0.94**). Amylose content also correlated strongly with GC (*r* = 0.93**) and Amylograph setback viscosity (*r* = 0.94**), as well as with alkali spreading value (*r* = 0.82*), grain width (*r* = 0.91*), and Amylograph peak viscosity (*r* = –0.88*). Alkali spreading value correlated significantly with Amylograph set back (r = 0.89*) and peak viscosity (r = –0.83*), and grain width (r = 0.91*). Gel consistency and grain width exhibited very strong correlation (r = 0.96**).

Mexico

Mexico produced 506,000 t of rough rice in 1989 (FAO 1990b). Annual consumption of milled rice per capita was 5.3 kg in 1979-81 (FAo 1984),5.3 kg in 1985 (RCMD 1989), and 4.9 kg in 1986-88 (FAO 1990a). The principal varieties (based on area planted) in 1983 were 46% Navolato A71, 17.3% Campeche A80, 8.2% IR8 (Milagro Filipino), and 5.8% CICA4 (Dalrymple 1986).

Culiacan A82, Navolato A71, CICA4, and Milagro Filipino (IR8) are planted in the northwest and have long and medium grain, translucence, and hard texture (L.L. Delgado, Instituto Nacional de Investigaciones Forestales y Agropecuarias, 1990, pers. commun.). Those in the Pacific Coast have high volume expansion on cooking: Milagro Filipino, CICA8, Navolato A71, Campeche A80, Morelos A70, and Morelos A83. Morelos A70, Morelos A83, and Morelos A88, varieties in the Central Region, have medium to long grain, and high volume expansion. Rices on the Gulf of Mexico coast have translucent grain and high volume expansion (Milagro Filipino, Chetumal A86, Palizada A86, CICA4, Campeche A80, and Cardenas A80). Those in the Southeast have translucent grain, hard texture, and high volume expansion: Palizada A86, Milagro Filipino, CICA4, CICA6, CICA8, Chetumal A86, Campeche A80, Cardenas A80, and Sureste A90. Nine market samples have 24-28% AC and low-intermediate GT (RCMD 1987,1989).

High-AC and then intermediate-AC rices predominated among Mexican varieties (Appendix, Table 6). All of the varieties listed above that were analyzed had high AC (except Cardenas A80 and Morelos A70). Joachin A74 was the only low-AC rice. Among the five high-AC rices, the upland variety Sureste A90 had the softest cooked rice. Long-grained rices predominated over medium-grained and so did slender-shaped over medium-shaped types.

Cooked rice stickiness correlated significantly with cooked rice hardness (r = –0.77**, n = 18), AC (r = –0.85**),and Amylograph setback (r = –0.79**) and consistency (r = –0.83**). Cooked rice hardness also correlated with Amylograph setback (r = 0.76**, n = 23) and consistency (r = 0.77**), alkali spreading value (r = 0.61**), and protein content (r = 0.72**). Amylose content correlated with Amylograph setback (r = 0.68**, n = 23) and consistency (r = 0.68**) and so did alkali spreading value with Amylograph peak viscosity (r = –0.68**, n = 231, setback (r = 0.71**) and consistency (r = 0.60**). Protein content also correlated with alkali spreading value (r = 0.55**, n = 34) and Amylograph peak viscosity (r = –0.53**, n = 23).

Panama

Panama produced 180,000 t of rough rice in 1989 (FAO 1990b). Annual consumption of milled rice per capita was 48 kg in 1979-81 (FAO 1984) and 54 kg in 1986-88 (FAO 1990a). CICA7 was planted in 34% of the rice area in 1982-83. CICA8, CR5272, L4444, T-5430, and CR1113 were also planted (Dalrymple 1986).

Only Anayansi ex CIAT was analyzed and had high AC, low GT, and hard GC (Appendix). Its grain had medium length and shape. The other varieties listed above had mostly high AC, except CR5272 from Costa Rica, which had intermediate-high AC.

USA

Rough rice production in the USA was 7.0 million t in 1989 (FAO 1990b). Annual consumption of milled rice per capita was 4.5 kg in 1979-81 (FAO 1984) and >4 kg in 1981 (Webb et a1 1985). Milled rice supply per capita in 1986-88 was 6.1 kg/yr (FAO 1990a). Production was 70-75% long grain and 25-30% medium and short grain.

The preferred quality characteristics of US long-grained rices are intermediate AC, intermediate to intermediate-high GT, and soft GC (B.D. Webb, Rice Research Southern Region, ARS, USDA, 1990, pers. commun.). Production is limited of special long-grained rices Rexmont (high AC), Toro II (low AC), Della (Texmati) and A301 (intermediate AC, aromatic), and Jasmine 85 (IR841-67-1, low AC, aromatic).

The preferred qualities among medium- and short-grained rices are low AC, low GT, and soft GC. There is limited production of Kokuhorose and M401, which have large, medium-grained rices with translucent flavorful grains. Mochigome has waxy, short grains. Imported long-grained rices are Thai jasmine (100,000 t/yr), Basmati (India), Thai waxy, Thai purple and red rices, and Italian bold, medium-grained Arborio rice with white core (Webb 1990).

IRRI analyses confirmed Webb's physicochemical data (Appendix). US rices had variable AC, low-intermediate GT, and soft-medium GC (Table 6). Long-grained rice had the most variable quality. It had predominantly intermediate AC, except for Century Patna 231, Toro, L-202, Jojutla, Newrex, and Rexmont. Century Patna 231 and Toro had low AC and the rest had high AC. These high-AC rices had harder cooked rice than typical long-grained rice, but not as hard (8-10 kg/7 cm^2) as IRGA-409- and IR8-type rices (12 kg/7 cm^2). California long-grained rice L-202 had high AC and was grown in Spain as Thaibonnet. Lemont is still the principal long-grained variety despite some processing problems due partially to thick grains.

Grain length and width were correlated (r = –0.75**, n = 56). Cooked rice hardness correlated with cooked rice stickiness (r = –0.64**, n = 17), Amylograph setback (r = 0.71**, n = 39) and consistency (r = 0.74**), AC (r = 0.64**, n = 55), GC (r = –0.40**), and grain length (r = 0.63**, n = 48) and width (r = –0.54**). Amylose content correlated with Amylograph peak viscosity (r = 0.57**, n = 47), setback (r = 0.42**) and consistency (r = 0.81**), grain width (r = –0.71**, n = 56) and length (r = 0.71*), GC (r = –0.45**, n = 74), and alkali spreading value (r = –0.42**, n = 87). Gel consistency correlated with Amylograph consistency (r = –0.63**, n = 43) and setback (r = –0.34*). Grain width also correlated with Amylograph peak viscosity (r = –0.44**, n = 33) and consistency (r = –0.58**) and alkali spreading value (r = 0.63**, n = 56), whereas grain length correlated with Amylograph setback (r = 0.50**, n = 33) and consistency (r = 0.70**) and alkali spreading value (r = –0.42**, n = 87).

South America

Rough rice production in South America was 17.1 million t (3.5% of world total) of which 13.5 million t were available for consumption in 1986-88 (FAO 1990a,b). Per capita milled rice supply was 32 kg/yr in 1986-88 (FAO 1990a).

Argentina

Argentina's annual rough rice production was 469,000 t in 1989 (FAO 1990b). Annual consumption per capita was estimated as 3 kg in 1979-81 (FAO 1984) and about 4 kg in 1988 (RCMD 1989). Mean annual milled rice supply per capita in 1986-88 was 5.5 kg (FAO 1990a).

Preferred rices Fortuna Inta, Yerua P.A., and Bluebelle have long (>7 mm), slender (L-W ratio >3) grains with low AC, low GT, and soft GC (A.A. Vidal, Estacion Experimental "Ing. Agric. Julio Hirschhorn," Universidad Nacional de la Plata, 1990, pers. commun.). Long slender varieties (primarily Bluebonnet and Bluebelle [long-medium type]) were planted on 50-55% of the rice area, Fortuna on 35-40%, and a medium-grained type, such as Itape, on <10% (RCMD 1987). The Rice Council for Market Development (1987) obtained amylose values from market samples of Itape (17% AC), Fortuna (20.3% AC), and Bluebonnet (26.2% AC). Market samples in 1988 had 18-25% AC (RCMD 1989).

Argentinean rices were all nonwaxy AC types with low-intermediate GT, and soft-medium GC (Table 6). The AC of Fortuna Inta, Yerua P.A., and Bluebelle ranged from 18 to 22% (Appendix). They had low GT and medium-soft GC. Their cooked rice Instron hardness ranged from 6 to 9 kg/7 cm^2, lowest for Villaguay PA and highest for Guayaquiraro. Grains were mainly medium or long in size and slender in shape. Some of the 1983 selections had grain lengths >7 mm.

Gel consistency correlated significantly with cooked rice hardness (r = –0.66**, n = 26) and AC (r = –0.64*, n = 46). Grain length also correlated with cooked rice hardness (r = –0.41*, n = 26) and GC (r = 0.39*).

Bolivia

Bolivia produced 194,000 t of rough rice in 1989 (FAO 1990b). Annual consumption of milled rice per capita was 11 kg in 1979-81 (FAO 1984). Mean milled rice supply per capita in 1986-88 was 17 kg/yr (FAO 1990a). Modern rice varieties grown in 1980 included Saavedra V4 (IR1529-430-3), Saavedra V5 (CICA6), CICA8, and CICA9 (Dalrymple 1986).

Bolivian samples all had intermediate AC and low GT, except for Saavedra V4 (low AC) (Appendix, Table 6). Grains were mainly long and slender or medium-shaped. Cooked rice hardness was lowest for Saavedra V4 and highest for CICA8. Dorado and Saavedra V4 had shorter, coarser grains than the other four.

Grain length and width correlated (r = –0.84*, n = 6), while cooked rice hardness correlated with GC (r = –0.85*).

Brazil

Annual rough rice production in Brazil in 1989 was 11.0 million t (FAO 1990b). Annual consumption of milled rice per capita was 42 kg in 1979-81 (IRRI 1991). Mean milled rice supply per capita in 1986-88 was 43 kg/ yr (FAO 1990a). There is increasing preference, particularly in urban centers, for fine long-grained type instead of coarse (upland) type. These are translucent, nonaromatic, and soft-cooking rices that stay soft even after cooling. The long-grained varieties have high or intermediate AC and low GT (P.S. Carmona, Instituto Rio Grandense do Arroz, and E. da Maia de Castro, Centro Nacional de Pesquisa de Arroz e Feijao, EMBRAPA, 1990, pers. commun).

Major varieties (80%) are IRGA409 and IRGA410 in the 40% irrigated rice area in the South and Southeast. Bluebelle, CICA8, Metica 1, and MG1 are also planted. In the 60% upland areas, varieties IAC25, IAC47, IAC164, Cuiabana, and Araguaia are important in the central, western, and northern/northeastern zones. The major (70%) upland areas in the central part are planted to Araguaia, Rio Paranaiba, Guarani, IAC25, Douradao, IAC47, IAC165, and IAPAR9.

Peole in the central and southern areas prefer long-grained rices but those in the northern and northeastern areas have no grain shape preference. IA25, IAC47, and IAC165 are the varieties found in northern and northeastern Brazil. Big city consumers are starting to prefer long-grained, nonaromatic, soft rice with high translucency. Imported japonica IAC65 is an important variety in Sao Paolo. Market samples had high AC (RCMD 1987).

Brazilian rices were all nonwaxy AC types, with mainly low GT and variable GC (Table 6). All of the irrigated rices mentioned above had high AC, low GT, and hard GC except Bluebelle, which had intermediate AC and GT and medium-soft AC (Appendix). Many low- and intermediate-AC rices were also evaluated. Low GT and hard GC predominated (Table 6). All of the IRGA varieties had high AC, except IRGA407 and IRGA411 with low AC, and IRGA408 with intermediate AC. Upland rices IAC25, IAC47, IAC164, Araguaia, and Cuiabana had intermediate AC; Douradao, Cabacu, and Rio Paranaiba had low AC, and Guarani, high AC. Softest cooked rices were Douradao, Cabacu, and Bico Torto (low AC). The hardest cooked rice samples were IRGA412 and IRGA414. Grain length was mainly long; shape was mainly medium or slender. Coarse grain samples included Pacha Murcha, Guapore, Caloro, and Batatais; only Caloro was bold.

Cooked rice hardness correlated with Amylograph setback (r = 0.87**, n = 25) and consistency (r = 0.69**), alkali spreading value (r = 0.54**, n = 72), GC (r = –0.74**), AC (r = 0.56*) and grain width (r = –0.55**). Amylose content correlated with Amylograph setback (r = 0.69**, n = 31) and consistency (r = 0.68**) and GC (r = 0.51**, n = 91). Grain width correlated with Amylograph peak viscosity (r = –0.69**, n = 25) and setback (r = –0.62*) and GC correlated with Amylograph consistency (r = –0.66**, n = 31).

Chile

Chile produced 185,000 t of rough rice in 1989 (FAO 1990b). Annual per capita consumption was 7.7 kg milled rice in 1979-81 (FAO 1984). Mean annual milled rice supply per capita was 9.4 kg in 1986-88 (FAO 1990a). About 90% of the production consisted of medium-bold grain variety Oro (60%) and long-medium grain variety Diamante (40%).

Rices from Chile (including Oro and Diamante) had intermediate-low AC, low GT, and soft GC (Appendix, Table 6). Rices received in 1990 had low-intermediate AC (19-21% AC), low GT, and soft GC with cooked rice hardness of 4-6 kg/7 cm^2. Amylograph peak viscosity was 445-570 BU; setback and consistency were also relatively low. Cinia 196 had the softest cooked rice; Quella and Niquen, the hardest. All, except Oro and Quella-INIA with medium bold grains, had extra-long or long, and medium- or slender-shaped grains. Cinia 196 had the longest grain.

Grain length and width were correlated (r = –0.88**, n = 10). Amylograph consistency and protein content were correlated (r = –0.84**, n = 14) and so were Amylograph peak viscosity and setback (r = –0.88**). Amylograph setback correlated with GC (r = –0.62**, n = 14), and Amylograph consistency with grain length (r = –0.65*, n = 10) and width (r = 0.66*). Cooked rice hardness correlated with AC (r = 0.57*, n = 14) and protein content (r = 0.62*).

Colombia

Rough rice production in Colombia was 1.9 million t in 1989 (FAO 1990b). Annual consumption of milled rice per capita in 1979-81 was 37 kg (FAO 1984). Mean supply of milled rice per capita in 1986-88 was 37 kg (FAO 1990a). Consumers prefer long, slender grain and translucency (D.M. Leal, Instituto Colombiano Agropecuario Regional no. 8, 1990, pers. commun.).

Cooked rice should be nonsticky but soft, which corresponds to high-intermediate AC, low-intermediate GT, and hard-medium GC. Principal varieties are IR22, CICA4, CICA8, Metica 1, Oryzica 1, Oryzica 2, Oryzica 3, Oryzica Llanos 4, and Oryzica Llanos 5. In 1984, riceland was planted to an estimated 26% Oryzica 1, 20% CICA8,16% IR22,15% CICA4,12% Metica 1,8% CICA9, and 3% CICA7 (Dalrymple 1986). Market samples of IR22, CICA9, Linia 8, and Metica 1 all had high AC. CICA8, grown in Llanos, had intermediate AC (RCMD 1987).

Samples, including CICA rices, were mostly high-AC varieties (Appendix, Table 6). Bluebonnet 50 and ICA-10 had mostly intermediate AC. Many of the high-AC samples had medium-soft GC despite low GT, probably due to ambient temperature effects. Intermediate-GT IR rices tended to have low GT when grown at CIAT, Colombia. Bluebonnet 50 had low GT, although it is an intermediate GT variety in the US. The samples were long or medium in length, and slender or medium-shaped.

The seven varieties from the 1990 crop had high AC, except Oryzica 2 and Oryzica 3, which had intermediate AC (Appendix).

Cooked rice stickiness correlated with Amylograph setback ($r = -0.99^{**}$, n = 6) and consistency ($r = -0.99^{**}$) and cooked rice hardness ($r = -0.84^{*}$, n = 7). Cooked rice hardness correlated with Amylograph setback ($r = 0.83^{*}$, n = 6) and consistency ($r = 0.83^{*}$), and GC ($r = -0.76^{*}$, n = 7). Amylose content correlated with Amylograph setback ($r = 0.81^{*}$, n = 6) and GC correlated with alkali spreading value ($r = -0.71^{**}$, n = 18) and grain length ($r = -0.66^{*}$, n = 11).

Ecuador

Ecuador produced 806,000 t of rough rice in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 25 kg in 1979-81 (FAO 1984) and 40 kg in 1986-88 (FAO 1990a). The two main improved varieties in 1984 were INIAP415 (60,000 ha) and CICA6 (40,000 ha) (Dalrymple 1986).

Most rice samples had high AC and low GT, except Bluebonnet 50, Colorado, and INIAP10, which had intermediate AC (Appendix, Table 6). These three varieties had soft cooked rice as did some high- AC rices of medium GC, such as Donato, INIAP6, and INIAP11. Both INIAP415 and CICA6 (Colombia) had high AC, low GT, and hard GC. INIAP7 and INIAP415 had the hardest cooked rice, but INIAP6, Colorado, INIAP11, and Bluebonnet 50 had the softest cooked rice. Varieties had more long than medium grains and more medium- than slender-shaped grains. Brasileiro and Chato Serrano had shorter grains than the other varieties.

Length and width of grain were correlated (r = –0.59*, n = 17). Cooked rice hardness correlated with Amylograph setback (r = 0.66**) and consistency (r = 0.77**), protein content (r = –0.63**), and AC (r = 0.55*). Amylose content correlated with Amylograph peak viscosity (r = 0.72**), setback (r = 0.59*) and consistency (r = 0.78**), GC (r = –0.73**), and protein content (r = -0.80**). Gel consistency correlated with Amylograph peak viscosity (r = -0.67**), setback (r = –0.60*) and consistency (r = –0.71*). Protein content correlated with Amylograph peak viscosity (r = –0.53*), setback (r = –0.56*) and consistency (r = –0.69**).

Guyana

Guyana produced 203,000 t of rough rice in 1989 (FAO 1990b). Annual consumption was 87 kg of milled rice per capita in 1979-81 (FAO 1984) and 85 kg in 1986-88 (FAO 1990a). Varieties N and S (introduced in the early 1970s), Rustic, and Champion occupied 57% of the rice area in 1981 (Dalrymple 1986). A market sample of long-grained rice had 24% AC and low GT (RCMD 1989).

Guyana rices had high-intermediate AC, low-intermediate GT, and mainly hard GC (Table 6). Rustic, Champion, and varieties N and S had high AC, low GT, and hard GC (Appendix). Varieties N and S had harder cooked rice than Rustic and Champion. Bluebelle, Starbonnet, and variety T had intermediate AC and GT and medium-hard GC. Grain length varied from extra long to medium, but most were long and slender. Only cooked rice hardness and alkali spreading value were significantly correlated (r = 0.68*, n = 10).

Paraguay

Paraguay produced 88,000 t of rough rice in 1989 (FAO 1990b). Annual consumption of milled rice was 12 kg per capita in 1979-81 (FAO 1984) and 13 kg in 1986-88 (FAO 1990a). About 63% of the total rice area was planted with CICA varieties during the 1981-82 season (Dalrymple 1986).

Rices from Paraguay had mostly high AC, low GT, and hard GC (Table 6). Of the 15 rices analyzed from the 1990 crop, 12 had high AC, Bluebelle and CICA6 had intermediate AC, and Vista had low AC (Appendix). CEA-1 and Vista had medium GC. Vista had the softest cooked rice and the lowest L-W ratio of 2.4. Long slender grains predominated.

Cooked rice hardness correlated with Amylograph setback ($r = 0.88^{**}$, n = 15) and consistency ($r = 0.76^{**}$), AC ($r = 0.88^{**}$), and GC ($r = -0.75^{**}$). Amylose content correlated significantly with Amylograph setback ($r = -0.73^{**}$) and consistency ($r = -0.68^{**}$), and GC ($r = -0.82^{**}$). Gel consistency in turn correlated significantly with Amylograph setback ($r = -0.73^{**}$) and consistency ($r = -0.68^{**}$). Grain length correlated with GC ($r = -0.61^{*}$) and AC ($r = -0.59^{*}$) and grain width correlated with Amylograph setback ($r = 0.52^{*}$) and consistency ($r = -0.56^{**}$).

Peru

Rough rice production in Peru was 1.1 million t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 28 kg in 1979-81 (FAO 1984) and 34 kg in 1986-88 (FAO 1990a).

Important varieties in the Costa region are Inti, Viflor, and Amazonas; San Martin and Alto Mayo are important in the Selva Alta region (J.L. Hernandez, Instituto Nacional de Investigacion Agraria y Agroindustrial Peru, 1990, pers. commun.). Amazonas has soft texture and flavor. Consumer preferences may change because of the new free market system in which US rices, such as Bluebelle and Labelle, can be imported. More than 60% of the rice area in Alto Mayo was planted to CICA8 in 1984 (Dalrymple 1986). A market sample of Ecasa rice had 18% AC (RCMD 1987).

Peruvian rices had all nonwaxy AC types, mostly low GT, and variable GC (Table 6). Among the varieties mentioned above, Inti, Viflor, and Amazonas had low AC and GT. San Martin and Alto Mayo had intermediate AC, low GT, and medium GC (Appendix). High-AC rices predominated (Table 6). The soft texture and flavor of Amazonas may be due to its low AC. All were long-grained rices, although San Martin was only 6.5 mm long with L-W ratio of 2.6. Earlier maturing, short, medium-shaped grain varieties were Mochica and Radin China. Grain size was more often long than medium and grain shape more medium than slender.

Cooked rice stickiness correlated with Amylograph setback (*r* = –0.94**, n = 12) and consistency (*r* = –0.89**), GC (*r* = 0.86**), AC (*r* = –0.90**), and cooked rice hardness (*r* = –0.58*). Cooked rice hardness correlated with Amylograph setback (*r* = 0.75**, n = 23) and consistency (*r* = 0.67**), GC (*r* = –0.58**), and AC (*r* = 0.62**). Amylose content also correlated with Amylograph setback (*r* = 0.65**, n = 33) and consistency (*r* = 0.67**), and GC (*r* = –0.59**, n = 27). Gel consistency correlated negatively with Amylograph setback (*r* = –0.60**, n = 25) and consistency (*r* = –0.54*). Amylograph peak viscosity was correlated with alkali spreading value (*r* = –0.51**, n = 33) and protein content (*r* = –0.53**).

Surinam

Rough rice production in Surinam was 260,000 t in 1989 (FAO 1990b). Annual consumption of milled rice per capita was 85 kg in 1979-81 (FAO 1984). Supply per capita was estimated at 94 kg/yr in 1986-88 (FAO 1990a). An estimate of 1986 consumption was more than 100 kg/capita (RCMD 1987) and 147 kg/capita in 1987-88 (RCMD 1989). Half of Surinam's rice is exported, mainly to the European Economic Community (EEC) (Dalrymple 1986). Part of the exported rice was parboiled. Two market samples of local rices had intermediate AC and intermediate GT (RCMD 1987,1989).

Surinam rices had all nonwaxy AC types, mainly intermediate GT, and soft GC (Table 6). Earlier rice samples had AC ranging from low to high (Appendix). Samples of promising lines during 1984 had six intermediate and four high-AC rices. The grains were also mainly extra long and slender, a distinct character of Surinam rices. They exhibited high Amylograph peak viscosity and low setback and consistency. Most of them had soft-medium GC.

Cooked rice stickiness correlated with Amylograph peak viscosity (*r* = 0.91**, n = 10), setback (*r* = –0.85**) and consistency (*r* = –0.79**), AC (*r* = –0.86**), grain length (*r* = 0.65*), alkali spreading value (*r* = –0.72*), and GC (*r* = 0.63*). Cooked rice hardness correlated with GC (*r* = –0.71**, n = 22) and alkali spreading value (*r* = 0.65**). Amylose content correlated with Amylograph peak viscosity (*r* = –0.82**, n = 12) and setback (*r* = 0.81**), grain length (*r* = –0.58**, n = 25), and alkali spreading value (*r* = 0.52**, n = 34). Gel consistency correlated with alkali spreading value (*r* = –0.74**, n = 31) and Amylograph peak viscosity (*r* = 0.65*, n = 12) and setback (*r* = –0.62*). Alkali spreading value also correlated with Amylograph setback (*r* = 0.64*) and consistency (*r* = 0.66*).

Venezuela

Rough rice production in Venezuela was 313,000 t in 1989 (FAO 1990b). Annual consumption of milled rice per capita was 23 kg in 1979-81 (FAO 1984) and 13 kg in 1986-88 (FAO 1990a). Araure 1 represented about 80% of the modern variety area in 1981-82 and CICA4 occupied the remaining 20% (Dalrymple 1986).

Rices had high AC, low GT, and medium-hard GC (Table 6). Araure 1 had high AC, low GT, and hard GC (Appendix). About half the other varieties had medium GC. Grain length was either long or medium and mainly medium-shaped. Palmar and P2231F4-138-6-1 gave softer cooked rice than Cimarron and Araure 1 and Araure 4. Cimarron had Amylograph consistency similar to that of Palmar and P2231F4-138-6-1.

Amylograph consistency and gel consistency were correlated ($r = -0.96^{**}$, n = 5). Cooked rice hardness correlated with Amylograph setback ($r = 0.94^{*}$), alkali spreading value ($r = 0.90^{*}$), and grain length ($r = 0.94^{*}$). Gel consistency and grain width were also correlated ($r = -0.85^{*}$, n = 6).

Summary

In both North and South America, high AC predominates over intermediate and low AC (Table 6). Only the USA has waxy and very low-AC rices. Intermediate AC is the preferred type in Brazil (upland rice), Bolivia, Chile, Mexico (upland), and the USA (long grain), and probably Surinam. Low AC is preferred in Argentina, Peru, and the USA (short and medium grain); high AC is desired in Brazil (irrigated rice), Colombia, Costa Rica, Mexico, Guyana, and Venezuela. Cubans prefer low-intermediate-AC rices. Waxy rices in the USA are produced in California (Webb et al 1985).

Long, slender-grained rices predominate over medium-grained rices, particularly in North America. Long, medium-shaped grain is more common in South America. Extra long grains predominate in Surinam. Short-grained rices are represented only in the USA and Peru.

Cooked rice hardness correlates significantly with GC in 12 countries, with Amylograph setback in 10, with Amylograph consistency in 8, and with AC in 7. Amylose content and Amylograph setback are significantly correlated in 10 countries, and with Amylograph consistency in 8. Gel consistency correlates significantly with Amylograph setback and consistency in 10 countries.

Europe

Europe produced 2.2 million t of rough rice in 1988 (0.45% of world total). The corresponding rough rice availability in 1986-88 was 2.9 million t (FAO 1990a,b). Per capita milled rice supply in 1986-88 was 3.8 kg/yr.

Bulgaria

Rough rice production in Bulgaria was 50,000 t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 4 kg in 1979-81 (FAO 1984) and 4.4 kg in 1986-88 (FAO 1990a).

Rice production in Bulgaria was 99% Krasnodarski 424 and 1 % Belozem (K. Perfanov, Institute of Introduction and Plant Genetic Resources, 1990, pers. commun.). Krasnodarski 424 had intermediate AC, low GT, and soft GC (Appendix). Belozem had low AC, low GT, and soft GC. Both had similar grain size and shape (Table 7). All 1985 samples had short, bold grains, except N:11M and Plovdiv 22, which had medium grain. Most of these samples had low AC, compared with earlier samples which had up to 27% AC. Krasnodarski 424 had the softest cooked rice despite its intermediate AC, probably because of its low protein content.

Grain length and width were negatively correlated ($r = -0.54^{**}$, n = 14). Amylose content correlated with alkali spreading value ($r = -0.60^{**}$, n = 23), and Amylograph peak viscosity ($r = -0.63^{**}$, n = 18), setback ($r = 0.71^{**}$) and consistency ($r = 0.78^{**}$). Cooked rice hardness correlated with GC ($r = -0.64^{**}$, n = 15) and protein content ($r = 0.71^{**}$), whereas cooked rice stickiness correlated with protein content ($r = -0.79^{*}$, n = 8), GC ($r = -0.79^{*}$), and Amylograph setback ($r = -0.76^{*}$) and consistency ($r = -0.76^{*}$).

Table 7. Protein content and classification of milled rice in Europe based on apparent AC, final GT, and GC. IRRI, 1965 91.

Source	Sample (no.)	Protein (%)		AC[a]					GT[b]				GC[c]		
		Range	Mean	Wx	VL	L	I	H	L	I	HI	H	S	M	H
Bulgaria	23	6-10	7.4	0	0	14	8	1	23	0	0	0	17	4	0
France	50	5-12	7.1	0	0	31	17	2	50	0	0	0	29	12	5
Greece	10	5- 8	6.4	0	0	3	5	2	8	2	0	0	4	4	2
Hungary	42	6-11	7.2	0	0	15	26	1	38	4	0	0	10	22	7
Italy	40	5- 8	6.9	0	0	14	25	1	39	1	0	0	20	7	5
Portugal	31	5- 8	6.8	0	0	17	13	1	30	1	0	0	26	4	1
Russia	25	5- 7	6.4	0	0	16	9	0	17	4	3	1	22	3	0
Spain	12	6-13	8.2	0	0	9	3	0	12	0	0	0	9	0	0
Total	233	5-13	7.0	0	0	119	106	8	217	12	3	1	137	56	20

[a] Wx = waxy (0-5.0%). VL = very low (5.1-12.0%,), L = low (12.1-20.0%), I = Intermediate (20.1-25.0%). and H = high (>25%). [b] Indexed by alkali spreading value: L = low (6-7), I = Intermediate (4-5). HI = high-Intermediate (3). and H = high (2). [c] Only samples analyzed from mid-1971 have gel consistency values: S = soft (61-100 mm). M = medium (41-60 mm). and H = hard (25-40 mm).

France

France produced 96,000 t of rough rice in 1989 (FAO 1990b). Annual consumption of milled rice per capita was less than 4 kg in 1979-81 (FAO 1984), 3.94 kg in 1988 (RCMD 19891, and 3.7 kg/yr in 1986-88 (FAO 1990a). Major varieties planted in 1989 to 16,508 ha (104,200 t yield) were Ariette (3,683 ha), Cigalon (2,785 ha), Lido (2,515 ha), and Onda (1,500 ha) (J. Faure, CIRAD/IRAT, 1990, pers. commun.). New varieties are Alfa, Cripto, Koral, Miara, Ringo, and Rocca. Medium- and long-grained varieties are consumed locally, but 20-30% of short-grained rices are exported. Long-grained US, Surinam, and Thai rices are preferred, except for use in desserts. Two market samples of French rice had 18% AC and L-W ratio of 2.5-2.7 (RCMD 1989).

Medium-sized and -shaped grains predominated among French rices (Appendix). French rices had mainly low-intermediate AC, low GT, and soft-medium GC (Table 7). Ariette, Cigalon, Lido, and Onda all had low AC, low GT, and medium-soft GC (Appendix). But Ariette and Onda had medium-sized and -shaped grain, Lido had short, medium-shaped grain, and Cigalon had short, bold grain. None of the new varieties approached the intermediate (23-25%) AC of Arlesienne (Feillet and Marie 1979).

Delta was the first translucent long-grained variety released as a replacement for Arlesienne, which was susceptible to shattering and cracking. Arlesienne had 6-8 kg/7 cm^2 cooked rice hardness compared with 5-7 kg/7 cm^2 for Delta. Arlesienne had positive Amylograph setback and consistency values (310-410 BU) that were higher than those of Delta. The 1989-90 samples of Cripto and Alpha (Alfa) (short-medium, bold grains), and Arlesienne, Rocca, Koral, Ringo, and Miara (medium-long, medium-shaped grains) all had low-intermediate AC. Cripto had hard GC and AC as high as Arlesienne's (Appendix). Many of the samples were Italian varieties except for Miara, Cigalon, and Onda.

Cooked rice stickiness correlated with Amylograph setback ($r = -0.93$**, n = 10) and consistency ($r = -0.95$**), GC ($r = -0.82$**, n = 11), AC ($r = -0.72$*), cooked rice hardness ($r = -0.66$*), and grain width ($r = -0.86$**, n = 8). Amylograph peak viscosity correlated with grain length ($r = 0.60$**, n = 24) and AC ($r = -0.64$**, n = 31). Gel consistency correlated with Amylograph setback ($r = -0.69$**, n = 27) and consistency ($r = -0.54$**), cooked rice hardness ($r = -0.59$**), and grain width ($r = -0.55$**).

Greece

Greece produced 110,000 t of rough rice in 1989 (FAO 1990b). Annual consumption of milled rice per capita was less than 4 kg/yr in 1979-81 (FAO 1984) and 4.3 kg/yr in 1986-88 (FAO 1990a). Both indica (30%) and japonica (70%) varieties are grown. Indica varieties Bluebelle E and Rea, with L-W >3 and about 23% AC, are particularly popular in urban areas where consumption is increasing (S. Hadjisavva, Institut de Cereales, 1990, pers. commun.). The popular japonica varieties are Axios, Strimonas, Evropi, Ispaniki A, and Roxani. Roxani has L-W >2. Both parboiled and raw rices are consumed (RCMD 1987). A market sample of Rozza had 18% AC (RCMD 1987).

The Greek rices had variable AC, low GT, and variable GC (Table 7). The 1984 samples had low-intermediate AC, but the 1989 samples included high-AC rices (Appendix). Amylose content values in 1989 for the same three varieties were at least 5% higher. Rea and Bluebelle E had the hardest cooked rice and highest Amylograph consistency and setback. Low-AC Axios had the softest cooked rice. Japonica varieties had low-intermediate AC, low GT, and medium-soft GC. Indica varieties Bluebelle E (long, slender grain) and Rea (medium size and shape) had intermediate-high AC, low-intermediate GT, and medium-hard GC. All japonica varieties had medium-long, medium-shaped grains.

Cooked rice hardness correlated with Amylograph setback ($r = 0.91^*$, n = 6) and consistency ($r = 0.97^{**}$) and grain width ($r = -0.70^*$, n = 10). Amylose content correlated with Amylograph setback ($r = 0.90^{**}$, n = 6) and consistency ($r = 0.97^{**}$) and GC ($r = -0.93^{**}$, n = 10). Gel consistency correlated with Amylograph setback ($r = -0.92^{**}$, n = 6) and consistency ($r = -0.85^*$) and protein content ($r = -0.65^*$, n = 10).

Hungary

Rough rice production in Hungary was 45,000 t in 1989 (FAO 1990b). Consumption was 3-4 kg/yr (I.K. Simon, Research Institute for Irrigation, 1990, pers. commun.). Per capita supply of milled rice in 1986-88 was 3.7 kg/yr (FAO 1990a).

The preferred variety was Oryzella with L-W ratio of 2.8-3.0 (long grain). Oryzella, Ringola, Sandora, and Karmina had highly translucent grains, medium texture, high volume expansion on cooking, and no aroma. A market sample of short-grained Hungarian milled rice had 22% AC, low GT, and 7.8% protein (RCMD 1987).

Long grains predominated over medium and short grains, and medium shape predominated over bold and slender (Appendix). The Hungarian rices had mainly intermediate-low AC, low GT, and medium GC (Table 7). The preferred variety, Oryzella, had intermediate AC, low GT, and long, medium-shaped grain (Appendix). Ringola, Sandora, and Karmina had the same traits, except Karmina which had slightly shorter grain. Low-AC samples in 1989 had softer cooked rice (4.5-5.2 kg/7 cm^2 Instron hardness) than intermediate-AC rices (6.5-7.6 kg/7 cm^2). Only G-238/SZ-11 had high protein with 10.7%.

Grain length and width were significantly correlated (r = –0.53**, n = 38). Cooked rice stickiness correlated with cooked rice hardness (r = –0.85**, n = 12), GC (r = 0.76**, n = 121, and Amylograph consistency (r = –0.68*). Cooked rice hardness correlated with Amylograph peak viscosity (r = 0.60**, n = 38) and setback (r = –0.35**), and GC (r = –0.69**). Amylose content correlated with Amylograph setback (r = 0.52**, n = 42) and consistency (r = 0.52**), alkali spreading value (r = 0.44**, n = 42), grain width (r = –0.33*, n = 38), and GC (r = –0.32*, n = 39).

Italy

Italy produced 1.2 million t of rough rice in 1989 (FAO 1990b). Mean per capita consumption of milled rice was 4 kg/yr in 1979-81 (FAO 1984), 4.8 kg (Juliano et al 1990) or 5.2 kg (RCMD 1989) in 1988, and 4.8 kg/yr in 1986-88 (FAO 1990a).

Long, coarse-grained varieties with excellent water absorption and high AC are generally preferred (R. Carriere, Associazione Industrie Risiere Italiene, 1990, pers. commun.). Regional preferences are also observed, but trademarks are becoming more important relative to variety name. Major varieties planted in 1988 were Lido (49,000 ha), Arborio (22,000 ha), Balilla (20,000 ha), Europa (13,000 ha), and Ringo and Sant Andrea (11,000 ha each) (Baldi et al 1989). Reported AC values were Arborio, 19.6%; Balilla, 20.7%; Europa, 19.7%; Ringo, 19.3%; and Sant Andrea, 19.0% (Baldi et al 1978). Newer varieties, such as Bonnet Bell and Elio, had 24% AC (Baldi et al 1989). Market samples had 16-21% AC (RCMD 1987,1989).

In a survey of Rome retail rice markets in May 1988, Italian brown and milled raw and parboiled rices had mainly low AC, low GT, and more soft gel than medium gel (Juliano et al 1990, Kaosa-ard and

Juliano 1991). Milled rice protein was 5.5-8.8% (6.9% mean). Raw rice was cheaper than parboiled rice. Carnaroli was an exception (intermediate AC, hard GC); it had a higher retail price than even parboiled rices.

Medium and short grains predominated over long grains, and medium shape over bold (Appendix). Italian rices had intermediate-low AC, low GT, and mainly soft GC (Table 7). The popular variety, Lido, had short, medium-shaped grain, intermediate AC, low GT, and soft GC (Appendix). Arborio (long, medium-shaped) and Balilla (short, bold) had wider grains with white core or belly, intermediate AC, low GT, and soft GC. Both gave softer cooked rice than Lido. Europa, Ringo, and Sant Andrea had medium size and shape, intermediate AC, and softer cooked rice than Lido.

No rice had replaced the 24-25% AC Raffaello, which gave the hardest cooked rice, until Bonnet Bell, Carnaroli, and Elio were released. Among the tested Italian varieties, Raffaello had the least sticky and hardest cooked rice; Padamo, the softest cooked rice; Ringo and Sant Andrea, the stickiest (Mazzini et al 1990). Among the three 1990 samples, long, medium-shaped grained Bonnet Bell and Carnaroli had intermediate AC; short, bold-grained Elio had high AC (Appendix).

Cooked rice stickiness correlated significantly with cooked rice hardness (r = –0.80**, n = 11), Amylograph setback (r = –0.86**), consistency (r = –0.80**) and peak viscosity (r = 0.63*), GC (r = 0.83**), and AC (r = –0.91**). Cooked rice hardness correlated with Amylograph setback (r = 0.80**, n = 11) and consistency (r = 0.90**), grain width (r = –0.68**, n = 18), AC (r = 0.63**, n = 19), and GC (r = –0.53*). Gel consistency also correlated with Amylograph setback (r = –0.84**, n = 11), consistency (r = –0.94**) and peak viscosity (r = 0.60*), and AC (r = –0.55**, n = 29). Amylose content correlated with Amylograph peak viscosity (r = –0.81**, n = 19) and setback (r = 0.63**), and alkali spreading value (r = 0.48**, n = 37). Protein content and grain length also correlated (r = 0.84**, n = 10).

Portugal

Portugal produced 147,000 t of rough rice in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 16 kg in 1979-81 (FAO 1984) and 17 kg in 1986-88 (FAO 1990a). Two market samples of local rices had 19-21% AC (RCMD 1987).

Most Portuguese rices had medium or short size and medium or bold shape (Appendix). Portuguese rices had low-intermediate AC, low GT, and mainly soft GC (Table 7). All the 1986 samples had low AC except for Safari, which had 21% AC (Appendix). Estrella A did not have low GT or soft GC, but had extra long, slender grain. It was the only long-grained Portuguese variety. Ponta Rubra had the highest AC (23-26%). Most samples had low Amylograph setback and consistency. Safari and Banata 35 had cooked rice harder than that of higher AC Ponta Rubra.

Grain length and width were significantly correlated (r = –0.71**, n = 19). Cooked rice stickiness correlated with Amylograph setback (r = –0.93**, n = 11) and consistency (r = –0.88**), AC (r = –0.93**),and GC (r = 0.65*). Cooked rice hardness correlated with GC (r = –0.68**, n = 21) and Amylograph consistency (r = –0.44*). Amylose content correlated with Amylograph setback (r = 0.87**, n = 21) and consistency (r = 0.77**), and grain length (r = –0.50**, n = 19). Grain length correlated with protein content (r = 0.68**, n = 19) and alkali spreading value (r = –0.80**). Grain width correlated with Amylograph peak viscosity (r = –0.66**, n = 19). GC correlated with protein content (r = –0.48**, n = 31).

Russia

Russia produced 2.5 million t of rough rice in 1989 (FAO 1990b). Annual per capita consumption of milled rice was about 9 kg in 1979-81 (FAO 1984) and 7.3 kg in 1986-88 (FAO 1990a).

Milled rices had low-intermediate AC, generally low GT, and soft GC (Appendix, Table 7). Luch and Dubovski 129 had the softest cooked rice. All had low Amylograph setback and consistency. Samples from 1986 had low AC and <6 mm grain length. Grains were mostly short and bold. Only Kulon and Luch had medium-sized and -shaped grains.

Cooked rice stickiness correlated with grain length (r = –0.86**, n = 8), cooked rice hardness (r = 0.82*), Amylograph peak viscosity (r = 0.72*), and alkali spreading value (r = –0.83*). Cooked rice hardness, in turn, correlated with GC (r = –0.87**, n = 18), Amylograph consistency (r = –0.76**), grain width (r = 0.50*), and AC (r = –0.48*). Amylose content correlated with Amylograph peak viscosity (r = –0.86**, n = 18), setback (r = 0.90**) and consistency (r = 0.70**), grain width (r = 0.59**), grain length (r = 0.52*), alkali spreading value (r = 0.59**, n = 25), and GC (r = 0.49*). Gel consistency correlated with Amylograph consistency (r = 0.68**, n = 18), grain width (r = 0.66**), and protein content (r = –0.41*, n = 25). Alkali spreading value also correlated with Amylograph peak viscosity (*r* = –0.82**, n = 18) and setback (*r* = 0.66**), and grain length (*r* = 0.51*, n = 18). Grain width correlated with Amylograph consistency (*r* = 0.69**, n = 18). Amylograph peak viscosity and setback were correlated (*r* = –0.94**) as well.

Spain

Rough rice production in Spain was 341,000 t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 6 kg in 1979-81 (FAO 1984), 6.4 kg in 1986-88 (FAO 1990a), and 7.1 kg in 1988 (RCMD 1989). Spain has traditionally grown short- and medium-grained varieties. Long-grained varieties have been planted since 1987 in response to an EEC subsidy. California variety L-202, renamed Thaibonnet by the Spaniards, was the most popular long-grained variety (RCMD 1989).

Spanish rices had low-intermediate AC, low GT, and soft GC (Table 7). All had 17-21% AC except for Betis and Rinaldo Bersani, which had 14-15% AC (Appendix). All had low GT and soft GC. Bahia was the principal variety in the late 1970s (Barber and Tortosa 1979). Later samples did not have the high protein content of Bomba, Rinaldo Bersani, and Balilla from the 1964 samples. All the 1986 samples had low AC and were similar in Amylograph setback and consistency and cooked rice hardness. Spanish rices were mainly short and bold-grained. Betis, however, had medium-sized and -shaped grain (5.9 mm), but was still shorter than rices from Portugal (8 mm) and France (6.5 mm).

Amylose content correlated with alkali spreading value (*r* = 0.72**, n = 12) and grain length (*r* = –0.76*, n = 9). Cooked rice hardness correlated with protein content (*r* = 0.80**, n = 9).

Summary

The japonica type varieties grown in Europe have medium-short, medium-bold shaped grains and low-intermediate AC (Table 7). Medium-sized and -shaped varieties are more important than varieties with short, bold grains except in Bulgaria, Russia, and Spain. Long, medium-shaped grain is important in Hungary. A few intermediate (23-26%)-AC rices with hard cooked rice texture—Arlesienne (France), Raffaello (Italy), and Ponta Rubra (Portugal)—are observed in the older samples, but are no longer cultivated. Long-grained varieties, subsidized by the EEC in lieu of import, are being grown in France, Portugal, and Spain (Thaibonnet [L-202]).

The preferred AC type in Spain, France, Portugal, and Russia is low AC; consumers in Greece, Italy, Hungary, and Bulgaria prefer intermediate AC. Many promising lines from Bulgaria have low AC, but its principal variety, Krasnodarski 424, has intermediate AC.

Amylose content correlates significantly with Amylograph setback (positive) in seven European countries (except Spain), with Amylograph consistency (positive) in five, and with alkali spreading value (four positive, one negative). Cooked rice hardness correlates significantly with GC (negative) in six countries and with Amylograph consistency (positive) in four.

Africa

Africa produced 10.7 million t of rough rice in 1988 (2.2% of world's total). In 1986-88, 13.2 million t of rough rice were available for consumption (FAO 1990a,b). Per capita milled rice consumption in 1986-88 was 15 kg/yr.

Benin

Rough rice production in Benin was 8,000 t in 1986-88 (FAO 1990b) and per capita milled rice supply was 9 kg/yr (FAO 1990a). Analysis of nine popular and farmers' field varieties showed mostly intermediate AC, intermediate GT, and hard GC (IITA 1985). The only sample from Benin analyzed at IRRI was long, slender-grained ADNY 11, which had high AC, low GT, and medium GC (Appendix, Table 8). This may not be the typical rice in Benin, based on an IITA survey (IITA 1985).

Cameroon

The Republic of Cameroon produced 90,000 t of rough rice in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 6 kg in 1979-81 (FAO 1984) and 10 kg in 1986-88 (FAO 1990a). IR46, planted to more than 10,000 ha, was the most popular variety in northern Cameroon in 1983 (Dalrymple 1986). Tainan 5 predominated near Bamenda. The IITA Genetic Resources Unit reported that of 20 popular rices from farmers' fields, 17 had high AC, 3 had intermediate AC, 17 had intermediate GT, and most had variable GC (IITA 1985).

Only two rices from Cameroon, obtained through the International Network for Genetic Evaluation of Rice (INGER), have been analyzed

Table 8. Protein content and classification of milled rice in Africa based on apparent AC, final GT, and GC. IRRI, 1965-91.

Source	Sample (no.)	Protein (%)		AC[a]					GT[b]				GC[c]		
		Range	Mean	Wx	VL	L	I	H	L	I	HI	H	S	M	H
Benin	1	-	8.6	0	0	0	0	1	1	0	0	0	0	1	0
Cameroon	2	8-11	9.8	0	0	0	1	1	2	0	0	0	0	0	2
Egypt	44	5-10	6.7	0	0	29	8	7	42	2	0	0	30	2	9
Ghana	22	6- 9	7.8	0	0	0	7	15	15	5	2	0	7	6	3
Ivory Coast	21	6-11	7.9	0	0	5	7	9	4	17	0	0	7	8	6
Liberia	12	6- 9	7.6	0	0	2	3	7	8	3	0	1	5	5	2
Madagascar	9	5-10	7.5	0	0	1	3	5	8	1	0	0	5	4	0
Nigeria	66	6-11	7.7	0	0	7	16	43	52	9	4	1	15	12	29
Senegal	11	5-10	7.2	0	0	0	1	10	7	4	0	0	3	1	7
Sierra Leone	108	5-10	7.0	0	0	9	14	85	38	64	5	0	20	23	53
Tanzania	1	-	8.6	0	0	0	0	1	1	0	0	0	0	0	1
Togo	2	8	7.6	0	0	0	1	1	1	1	0	0	1	1	0
Zambia	1	-	7.4	0	0	0	1	0	0	1	0	0	0	1	0
Total	300	5-11	7.3	0	0	53	62	185	169	117	11	2	93	64	12

[a] Wx = waxy (0-5.0%), VL = very low (5.1-12.0%). L = low (12.1-20.0%). I = Intermediate (20.1~25.0%), and H = high (>25%). [b] Indexed by alkali spreading value: L = low (6-7), I = lnterrnediate (4-5), HI = high-Intermediate (3). and H = high (2). [c] Only samples analyzed from mid-I971 have gel consistency values: S = soft (61-100 mm). M = medium (41-60 mm), and H = hard (25-40 mm).

(Appendix, Table 8). IAC25 had intermediate AC (as in Brazil). Tainan 5 had high AC, low GT, hard GC, and high protein content. Amylograph viscosity and cooked rice hardness were also higher for Tainan 5 than for IAC25. Tainan 5 had longer grain than IAC25, but both had long, medium-shaped grain.

Egypt

Rough rice production in Egypt was 2.7 million t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 31 kg in 1979-81 (FAO 1984), estimated to be 34 kg in 1981 (ITC 1984), about 35 kg in 1986 (RCMD 1987),30 kg in 1986-88 (FAO 1990a), and 23.6 kg in 1988 (RCMD 1989). Leading varieties in 1982 in terms of total area planted were Giza 17 (49.5%), Giza 171 (43.6%), Giza 159 (3.7%), Nahda (2.9%), and others (0.3%) (not including Sakha 1 [Giza 180]) (Dalrymple 1986). Current popular varieties are Giza 176 (japonica), Giza 175 (japonica-indica), and Giza 181 (indica).

The Egyptians traditionally consume short-grained rices. About 85% of production is from japonica types which are preferred more than the higher yielding IR varieties (RCMD 1989). The effort to popularize long-grained indica rice requires low-intermediate AC. Two market samples of Egyptian rice had 17% and 21% AC (RCMD 1987, 1989). Five popular and farmers' field samples had low AC (l), intermediate AC (2) and high AC (2), low-intermediate GT, and variable GC (IITA 1985).

Egyptian rices had mainly low AC, low GT, and soft GC (Table 8). Giza 171, Giza 172, Giza 176, and Giza 181 had low AC, low GT, and soft GC (Appendix). Giza 171 and Giza 172 were derived from the traditional variety Nahda. The high-AC rices were mainly from IR rices, including Sakha 1 with medium-hard GC, hard-cooked rice, and high Amylograph setback and consistency. Short grains predominated over medium grains, and bold shape over medium and slender grain. Giza 175 had intermediate AC, low GT, and hard GC.

Grain length and width were significantly correlated (r = –0.85**, n = 22). Cooked rice stickiness correlated with Amylograph setback (r = –0.89**, n = 9) and consistency (r = –0.94**), cooked rice hardness (r = –0.79**, n = 13), AC (r = –0.73**), GC (r = 0.62*), and grain width (r = 0.68*, n = 10). Gel consistency correlated with Amylograph setback (r = –0.96**, n = 9) and consistency (r = –0.98**), cooked rice hardness (r = –0.86**, n = 25), AC (r = –0.77**, n = 40), and protein content (r = –0.41**, n = 40). Amylose content correlated with Amylograph setback (r = 0.92**, n = 12) and consistency (r = 0.91**) and cooked rice hardness (r = 0.63**, n = 25). Cooked rice hardness further correlated with Amylograph setback (r = 0.83**, n = 9), consistency (r = 0.88**), and peak viscosity (r = 0.69*), grain width (r = –0.55**, n = 21), and protein content (r = 0.51**, n = 25). Amylograph peak viscosity correlated with grain width (r = –0.81**, n = 9) and grain length (r = 0.84**). Protein content also correlated negatively with grain width (r = –0.58**, n = 22).

Ghana

Ghana produced 74,000 t of rough rice in 1989 (FAO 1990b). Annual per capita supply of milled rice was 8 kg in 1979-81 (FAO 1984) and 8 kg in 1986-88 (FAO 19904. Of the nine popular and farmers' field samples, eight had intermediate AC and one had high AC; all had low-intermediate GT; and seven had hard GC (IITA 1985).

Rices from Ghana had high-intermediate AC, intermediate GT, and variable GC (Table 8). Ghanaian rices obtained from and analyzed at IITA, including TOS 7460-7474, had either high or intermediate AC, intermediate-low GT, and medium-soft GC (Appendix, Table 8). TOS 7460-7474 mostly had intermediate AC, but TOS 10601-10640 mainly had high AC. GR19 also had high AC and low GT. Only Nickerie had intermediate AC among the 1965 samples. Five market samples of raw rice, obtained through West Africa Rice Development Association (WARDA), in Accra and Ashiama had 24-28% AC, low GT, and medium-hard GC (IRRI 1990, unpubl. data). It included Ghanaian variety DS3. Local rices had protein contents of 6.1 and 8.4%. Four imported rices were raw, but three of four local samples were par-boiled. Grain length was mainly medium or short, but medium shape predominated over bold.

Grain length and width were significantly correlated (r = –0.74**, n = 15). Alkali spreading value correlated significantly with Amylograph setback (r = 0.94**, n = 7) and consistency (r = 0.96**). Grain width also correlated with GC (r = 0.58*, n = 15).

Ivory Coast

Ivory Coast's rough rice production was 650,000 t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 59 kg in 1979-81 (FAO 1984), 64 kg in 1987 (RCMD 1989), and 58 kg in 1986-

88 (FAO 1990a, IRRI 1991). About 30,000 ha were planted during 1982-83 with Boake 1896 and Bg90-2 (Dalrymple 1986).

Preference is for good head rice, good volume expansion on cooking, and a soft-medium, cooked-rice texture (A. A. Adewusi, WARDA, 1990, pers. commun.). Rice is usually cooked by boiling in water (Adewusi et al 1989). Ivory Coast consumers prefer the long-grained type because it cooks dry with the grains often remaining separate (Firmin 1990). Fifteen samples had 6.1-8.6% protein (mean 7.5%).

Twenty-seven market samples obtained by WARDA had 5-8% protein; 2 had low AC, 23 had intermediate AC, and 2 had high AC (A.O. Adewusi, WARDA, 1990, pers. commun.). Seven were parboiled. Market samples of local rices had 20-29% AC (RCMD 1989). Twenty-four popular and farmers' field samples (except IRAT 13 [low AC]) had intermediate AC; low-intermediate GT; and medium, hard, or soft GC (IITA 1985).

Ivory Coast rices had variable AC, mainly intermediate GT, and variable GC (Table 8). IRAT rices and Chianan 8 had low AC; Palawan and Tjempovelut, intermediate AC, and Bg141 and Bg187 (from Sri Lanka), high AC (Appendix). Moroberekan and IAC164 upland rices had intermediate AC similar to that of Philippine upland variety Palawan. Only Dourado (and IRAT13 from Liberia) had long grains. Low-AC rices and Moroberekan gave softer cooked rice than high-AC rices Bg141, Bg187, and Zakpale 3. Grain length was mainly medium rather than short or long. Grain was mainly medium-shaped.

Amylose content correlated significantly with Amylograph setback (r = 0.86**, n = 21), peak viscosity (r = –0.70**), and consistency (r = 0.50*, n = 20), cooked rice hardness (r = 0.75**, n = 21), GC (r = –0.63**), and grain width (r = –0.75**). Cooked rice hardness correlated with Amylograph setback (r = 0.65**) and peak viscosity (r = –0.50*), and with grain width (r = –0.54*). Grain width also correlated with Amylograph peak viscosity (r = 0.69**) and setback (r = –0.75**). Amylograph peak viscosity and setback correlated as well (r = –0.81**, n = 21), as did Amylograph consistency and set back (r = –0.53*, n = 20).

Liberia

Liberia produced 280,000 t of rough rice in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 111 kg in 1979-81 (FAO 1984) and 105 kg in 1986-88 (FAO 1990a).

Suakoko 8, well-suited for cultivation in inland valley swamps with iron toxicity, covered 2,000 ha in 1978 (Dalrymple 1986). Suakoko 9, a selection from LAC23, that is suited for upland culture, covered an estimated 80,000 ha, replacing LAC23 in the early 1980s. Two market samples had intermediate AC and GT (RCMD 1987). Twenty-one popular and farmers' field rices had intermediate AC, low GT, and medium-hard GC (IITA 1985).

Liberian rices had all AC types, mainly low GT, and variable GC (Table 8). The 1981 samples and 1988 INGER rices from Liberia had variable AC, GT, and GC (Appendix, Table 8). IRAT13 and M55 had low AC, LAC23 and Moroberekan had intermediate AC, and the rest had high AC. M55 gave the lowest Amylograph setback and consistency and the softest cooked rice. Grain length was long or medium except for short-grained Mahsuri. Grain shape was mostly medium. Five market samples of raw rice from Fendall obtained through WARDA had 7-11 % protein, 26-29% AC, low GT, and hard or medium GC (IRRI 1990, unpubl. data). One local sample was parboiled as was one of three imported rices.

Cooked rice hardness correlated with grain width (r = –0.76**, n = 12), AC (r = –0.71**), Amylograph consistency (r = 0.99**, n = 31, and GC (r = –0.63*, n = 12). Amylose content in turn correlated with Amylograph peak viscosity (r = 1.00**, n = 3), grain width (r = –0.81**, n = 12) and length (r = –0.60*), and alkali spreading value (r = 0.60*). Gel consistency further correlated with alkali spreading value (r = –0.63*).

Madagascar

Rough rice production in Madagascar was 2.38 million t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 128 kg in 1979-81 (FAO 1984) and 114 kg in 1986-88 (FAO 1990a, IRRI 1991).

Preferred varieties differ by region (B.B. Shahi, Madagascar-IRRI, Rice Research Project, 1990, pers. commun.):

- High plateau (deficit area)—coarse grain, intermediate AC, soft-medium GC, low GT, and 40% red rices (Rojofotsy, Rojomena, Vary vato, Ambabalava type, Chianan 8). In Fiancrantsva, the southern part of the high plateau, long-grains, intermediate AC, medium GC, low GT, white grain (Vary lava 1031, Vary lava 1).
- Northwest coastal area (surplus)—medium-long, translucent grain, medium GC, intermediate AC, and low GT (Tsipala, Ali combo, Kiriminy, Kalila).

- Southwest area, such as Tanandava, Morandava and East Coast - round white chalky grain, low AC, and soft GC (Botry, Sary Tsipala, IR8, Taiwanese type, Mampana, Tsimatahotrosa, Bengiza).
- Lac Alaotra region (surplus)—medium-long, white grain, medium GC, and intermediate AC (Makalioka 34, Makalioka complex, Madigal, Tsipala complex, some Vary lava).

Retail market samples in Marovoay, Lac Alaotra, and Antananarivo City in 1986-87 were mainly medium-long, medium-shaped, high AC, low GT, and variable GC (Andrianilana et al 1990). Three market samples had 21-27% AC (RCMD 1987). Twenty farmers' field varieties were reported to have more intermediate than high or low AC, intermediate GT, and more hard than soft or medium GC (IITA 1985).

The 1986 Madagascar samples mostly had high AC, but Chianan 8 had low AC. IAC25, Madinika, and Tsipala A were intermediate-AC varieties (Appendix, Table 8). All had low GT except Rojofotsy (red rice), which had intermediate GT. Gel consistency was either soft or medium. Amylograph viscosity results suggested the absence of hard GC among the high-AC rices. Chianan 8 and Rojofotsy had the softest cooked rice; Madinika, the hardest. Chianan 8 (bold) and Tsipala A (medium-shape) had short grains, but Ali Combo and Madinika had extra-long, slender grain. All grain lengths and shape (except round) were represented.

Cooked rice hardness correlated with grain width ($r = -0.69^*$, n = 9) which in turn correlated with Amylograph consistency ($r = -0.68^*$). Amylose content correlated with Amylograph setback ($r = 0.85^{**}$) and consistency ($r = 0.76^*$). Gel consistency and alkali spreading value were highly correlated ($r = -0.86^{**}$).

Mali

Rough rice production in Mali was 329,000 t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 21 kg in 1979-81 (FAO 1984) and 24 kg in 1986-88 (FAO 1990a). Four farmers' field samples had high AC, intermediate-low GT, and variable GC (IITA 1985). Market samples of local and imported raw rices from Bamako, Niono, and Dioro were obtained through WARDA. Out of 20 local market samples, 10 were raw and 10 were parboiled. Only two out of seven imported rices were parboiled. All local rices had high AC, low GT, and hard GC, except one with soft GC (IRRI, 1990, unpubl. data). Protein content was 5-8% (mean 6.2%). Grain is long and mainly slender and medium-shaped.

Nigeria

Rough rice production in Nigeria was 1.4 million t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 12 kg in 1979-81 (FAO 1984) and 11 kg in 1986-88 (FAO 1990a, IRRI 1991). Parboiled rice was popular (RCMD 1989). Faro26 was planted on 10,000 ha in 1984 in Kwara State. Faro27 was grown on more than 50,000 ha in Anambra State and also in Lake Chad Basin (Dalrymple 1986). Market samples of local rices had 21-26% AC (RCMD 1989). Of 19 popular and farmers' field rices, 16 had intermediate AC and three had high AC; all had low-intermediate GT and variable GC (IITA 1985).

The 66 samples from Nigeria mainly had high AC, low GT, and hard GC (Appendix, Table 8). The 1988 samples included six lines: three with high AC and three with low AC. The four check varieties were intermediate- and high-AC rices. Low-AC ITA307 and ITA135 had the lowest Amylograph setback and consistency and the softest cooked rice. High-AC rices Bg90-2, Faro27, ITA212, and ITA222 gave the hardest cooked rices and highest Amylograph setback and consistency. The new rices were long-grained with medium to slender shape. Overall, long predominated over medium and extra long grains, and medium shape over slender.

Cooked rice stickiness correlated with Amylograph setback ($r = -0.94$**, n = 10) and consistency ($r = -0.90$**), GC ($r = 0.87$**), and AC ($r = -0.87$**). Cooked rice hardness correlated with Amylograph setback ($r = 0.56$**, n = 32), GC ($r = -0.71$**, n = 33), alkali spreading value ($r = 0.56$**), and grain width ($r = -0.46$*, n = 30). Gel consistency correlated with Amylograph setback ($r = -0.77$**, n = 32) and consistency ($r = -0.62$**), alkali spreading value ($r = -0.68$**, n = 56), and AC ($r = -0.59$**). Amylose content correlated with Amylograph setback ($r = 0.75$**, n = 42) and consistency ($r = 0.70$**), alkali spreading value ($r = 0.69$**, n = 66), and grain width ($r = -0.44$**, n = 35). Alkali spreading value also correlated with Amylograph setback ($r = 0.69$**, n = 42) and consistency ($r = 0.65$**).

Senegal

Senegal produced 168,000 t of rough rice in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 62 kg in 1979-81 (FAO 1984), 59 kg in 1986-88 (FAO 1990a), and 60 kg in 1987-88 (RCMD 1989). Leading modern varieties during the 1981-82 season were I-Kong-Pao, KSS, IR8, Jaya, and D52-37 in the North; I-Kong-Pao, IR8, IR442-2-58, and IR1529-680-3 in the South; and I-Kong-Pao in the East (Dalrymple 1986). DJ.12.519 (semidwarf) appears promising for shallow, drought-prone areas and could replace I-Kong-Pao, which has become susceptible to neck blast.

Preferred varieties had good grain swelling on cooking, soft-medium cooked rice, but no premium for head rice (A. O. Adewusi, WARDA, 1990, pers. commun.). Cooking rice with other ingredients and pan frying in oil are equally important as simple boiling (Adewusi et al 1989).

Of 13 raw rices obtained from markets by WARDA, one had low AC, two intermediate AC, and 10 high AC. All had 5-8% protein (A.O. Adewusi, WARDA, 1990, pers. commun.). Market samples of local rices Bahia and Sequial had 17-18% AC (RCMD 1987). Consumers traditionally preferred 100% brokens (RCMD 1989). Mean AC of 1988 local varieties was 26.6% (Adewusi et al 1989). Twenty farmers' field rices had 18 with intermediate and 2 with high AC, intermediate or low GT, and soft or hard GC (IITA 1985).

Market samples in 1977 and 1990 samples from Institut Senegalais de Recherches Agricoles (ISRA), St. Lois, had predominantly high AC except for DJ 684 D, which had intermediate AC (Appendix, Table 8). All grain sizes and shapes were represented; I-Kong-Pao (bold) and DJ.12.519 (medium) were short-grained. ROK5 had the softest cooked rice. DJ 684 D had hard-cooked rice, probably because it had high protein content and gave the hardest GC.

Length and width of grain were correlated ($r = -0.94^{**}$, n = 6). Cooked rice hardness correlated with Amylograph consistency ($r = 0.92^{**}$) and GC ($r = -0.89^{*}$). Gel consistency correlated with Amylograph consistency ($r = -0.98^{**}$). Protein content correlated with AC ($r = -0.80^{**}$, n = 11) and alkali spreading value ($r = 0.78^{**}$). Alkali spreading value correlated with AC ($r = -0.81^{**}$) and Amylograph peak viscosity ($r = 0.88^{*}$, n = 6). Amylograph peak viscosity and grain length were also correlated ($r = 0.88^{*}$).

Sierra Leone

Rough rice production in Sierra Leone was 430,000 t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 92 kg in 1979-81 (IRRI 1991) and 84 kg in 1986-88 (FAO 1990a, IRRI 1991). ROKl5 and ROKl6 are rainfed upland varieties that were grown on about 150,000 ha in 1984 (Dalrymple 1986).

Preferred varieties have good head rice yield, good grain swelling on cooking, and soft-medium cooked rice (A.O. Adewusi, WARDA, 1990, pers. commun.). Of 24 popular and farmers' field rices, 20 had intermediate AC, two had low AC, and two had high AC. All had intermediate GT, and variable GC (IITA 1985). Thirteen market samples had five with intermediate AC and eight with high AC, and 6-11% protein; eight were parboiled (A. O. Adewusi, WARDA, 1990, pers. commun.). Mean AC of 1988 local rices was 24.3% (Adewusi et al 1989).

Samples of irrigated, upland, and tidal swamp varieties were predominantly high AC (Appendix, Table 8). Upland and irrigated rices had low- and intermediate-AC entries, but all tidal swamp rices had high AC, intermediate GT, and hard-medium GC. Grain size and shape were variable, but most were medium-short, medium-slender-shaped. Some long-grained rices were included in the samples. ROK3 had harder cooked rice than ROKl6, evident from their GC and Amylograph viscosity.

Cooked rice hardness correlated with grain width (r = –0.40**, n = 44), GC (r = -0.42**), AC (r = 0.51**), and alkali spreading value (r = 0.44**). Grain width correlated with AC (r = –0.60**, n = 85), and grain length with GC (r = 0.47**).

Tanzania

Tanzania produced 570,000 t of rough rice in 1989 (FAO 1990b). Annual per capita consumption of milled rice in 1986-88 was 18 kg (FAO 1990a). Twelve popular and farmers' field rices had nine with low AC and GT and three with intermediate AC and GT (IITA 1985). The INGER sample of Salama had high AC, low GT, and hard GC (Appendix, Table 8). It had long, medium-shaped grain.

Togo

Rough rice production in Togo was 29,000 t in 1989 (FAO 1990b). Annual per capita consumption of milled rice was 9 kg in 1979-81 (FAO 1984) and 11 kg in 1986-88 (FAO 1990a). The two samples from INGER were TGR94 (intermediate AC and GT) and IR46 (high AC and low GT) (Appendix). IR46 had intermediate GT at IRRI and was medium-sized and -shaped. TGR94 had lower Amylograph setback and consistency and softer cooked rice than IR46. It also had short, bold grain.

Zambia

Rough rice production in Zambia was 12,000 t in 1989 (FAO 1990b). Per capita annual consumption in 1986-88 was about 1.6 kg (FAO 1990a). Ten popular and farmers' field samples had four varieties with intermediate (AC), four with high AC, and two with low AC, but eight had intermediate GT, one high-intermediate GT, and one low GT (IITA 1985). Seven samples had soft GC and three had medium GC. Two samples were a mixture of red and white-pericarped grains. Kalembwe was one of four basic varieties grown in 1984 (Dalrymple 1986). It had intermediate AC and GT, medium GC (Appendix), and medium, bold grains.

Summary

High-AC rices predominate in Africa (Table 8), except in Egypt (low AC), and part of Madagascar and probably Ivory Coast (intermediate AC). Low-AC rices are important in Egypt, Ivory Coast, Liberia, Madagascar, Nigeria, and Sierra Leone. Low GT predominates over intermediate GT, and hard and soft GC over medium GC. Grain length is mostly medium, followed by short and long. Grain shape is mostly medium, then slender and bold. Long grains predominate in Liberia, Mali, and Nigeria; medium grains in Ivory Coast; medium-short grains in Ghana and Sierra Leone; and short, bold grains in Egypt. All grain types are present in Madagascar. Not enough samples were obtained from Benin, Cameroon, Tanzania, Togo, and Zambia to make any conclusion on rice quality characteristics.

The most common significant correlation is between GC and cooked rice hardness in five countries, followed by AC and hardness, AC and grain width, and hardness and grain width in four countries.

Oryza glaberrima and other wild rices

Two major cultigens of rice are grown in Africa. *Oryza glaberrima* is rarely grown in pure stands; instead it is usually mixed with *O. sativa.* Samples were derived from the IRRI germplasm bank. The IITA gene bank provided 180 accessions of *O. glaberrima.*

The *O. glaberrima* samples were all nonwaxy and had predominantly high AC, low GT, and soft-medium GC (Appendix, Table 9). The four low-AC rices with 18.9-19.4% AC had 9-12% protein and may actually be intermediate-AC types. Liberia had more intermediate-AC than high-AC rices. Protein analyses of earlier samples were very limited (Ignacio and Juliano 1968). *O. glaberrima* reflected the distribution of rice starch properties of *O. sativa* in Africa but had less low AC and hard GC (Table 8).

Protein content correlated significantly with alkali spreading value (r = 0.73**, n = 15) and AC (r = 0.54%). Gel consistency correlated with alkali spreading value (r = –0.24**, n = 179) and AC (r = 0.18*).

Apparent AC and GT were more evenly distributed in other wild species than in *O. glaberrima* (Table 9, 10). All AC types were represented except very low AC. Intermediate GT predominated; high GT followed. High GT was prevalent in *O. rufipogon, O. nivara, O. breviligulata, O. latifolia,* and *O. punctata.* Only two high-AC samples of *O. officinalis* had soft GC. Protein content of the milled rice from wild rices was more than that of *O. sativa,* except in *O. latifolia.*

Amino acid composition of the brown rice for wild species was similar to that of cultivated rice (Ignacio and Juliano 1968).

Most of the 1990 samples were thin-grained. Brown rice 100-grain wt was less than 1 g. Grain length was 2.9-6.3 mm; width was 1.1-2.8 mm. *O. ridleyi* had a L-W ratio of 5.7. It was test tube-milled for alkali spreading value.

Among *O. breviligulata* entries, AC and alkali spreading value were correlated (r = 0.82*, n = 7). Among *O. rufipogon* entries, AC correlated significantly with protein content (r = –0.81**, n = 10) and alkali spreading value (r = 0.92**); the latter correlated with protein content (r = –0.72**, n = 11).

Table 9. Classification of *O. glaberrima* accessions obtained from IRRI and IITA based on apparent AC, final GT, and GC. IRRI, 1965,1967,1982, 1991.

Source	Sample (no.)	AC[a]			GT[b]		GC[c]		
		L	I	H	L	I	S	M	H
Burkina Faso[d]	13	0	0	13	10	13	2	8	0
Cameroon	14	0	1	13	13	1	5	7	1
Chad	8	0	1	7	8	0	5	3	0
Gambia	7	0	2	5	6	1	6	0	0
Guinea	11	1	1	9	9	2	6	3	0
Ivory Coast	15	0	2	13	15	0	7	4	3
Liberia	32	0	18	14	32	0	12	16	4
Mali	9	0	1	8	9	0	9	0	0
Nigeria	41	0	11	30	39	2	23	13	3
Senegal	21	0	5	16	21	0	13	5	3
Sierra Leone	19	0	10	9	17	2	11	5	1
Zaire	2	0	1	1	2	0	0	2	0
Others	3	3	0	0	0	3	0	0	0
Total	195	4	53	138	181	24	99	66	15

[a]L = low 12.1-20.0%. I = intermediate 20.1-25.0%, and H = high >25%. [b]Indexed by alkali spreading value: L = low 6-7 and I = intermediate 4-5. [c]Only samples analyzed from mid-1971 have GC values: S = soft 61-100 mm. M = medium 41-60 mm, and H = hard 25-40 mm. [d]Upper Volta.

Table 10. Distribution of milled rice of wild *Oryza* species other than *O. glaberrima* in terms of apparent AC, final GT, and GC. IRRI, 1965, 1967, 1989, 1991.

Oryza species	Sample (no.)	Protein (%)	Apparent AC[a]					GT[b]				GC[c]		
		Mean	Wx	VL	L	I	H	L	I	HI	H	S	M	H
O. alta	2	12.0	0	0	0	2	0	1	1	0	0	0	0	0
O. australiensis	2	12.1	0	0	0	2	0	0	2	0	0	0	0	0
O. brachyantha	1	12.1	0	0	0	1	0	1	0	0	0	0	0	0
O. breviligulata	7	13.9	0	0	1	1	5	1	5	0	1	0	0	0
O. eichingeri	2	10.7	0	0	0	1	1	1	1	0	0	0	0	0
O. grandiglumis	2	10.4	0	0	0	2	0	2	0	0	0	0	0	0
O. latifolia	2	7.8	0	0	0	2	0	0	1	0	1	0	0	0
O. minuta	1	12.0	0	0	0	1	0	0	1	0	0	0	0	0
O. nivara	9	11.3	0	0	3	4	2	1	5	0	3	0	0	0
O. officinalis	4	11.0	0	0	1	1	2	2	2	0	0	2	0	0
O. perennis	1	13.1	0	0	0	1	0	1	0	0	0	0	1	0
O. punctata	1	11.1	0	0	1	0	0	0	0	0	1	0	0	0
O. ridleyi	1	12.3	0	0	0	1	0	1	0	0	0	0	0	0
O. rufipogon	11	11.3	1	0	8	2	0	2	3	0	6	0	0	0
O. stapfie	3	15.6	0	0	0	0	3	0	3	0	0	0	0	0
Total	49	11.9[d]	1	0	14	21	13	13	24	0	12	2	0	0

[a] Wx= waxy(0-5.0%), VL=very low (5.1-12.0%), L= low (12.1-20.0%), I =intermediate (20.1-25.0%), and H = high (>25%). [b]Indexed by alkali spreading value: L = low (6-7), I = intermediate (4-5), HI = high-intermediate (3), and H = high (2). [c]Only samples analyzed from mid-1971 have gel consistency values: S = soft (61-100 mm), M = medium (41-60 mm), and H = hard (25-40 mm).

General discussion and conclusions

Grain properties are summarized by continent. Milled rice has a mean protein content of 7.3% (Table 11). High AC predominates over intermediate and low AC in all continents except Europe. Low GT is more prevalent than intermediate GT. Soft GC is more prevalent than medium and hard GC, except in Africa, which has hard GC.

More people prefer intermediate AC than other AC types (Table 12) based on the grain quality preference of cooked rice being soft but not very sticky. Thus, the analyzed major varieties that are often recommended based on overall performance do not always reflect the preferred grain quality types. This trend becomes obvious when an AC scattergram (from Tables 5-8) is compared with the preferred AC type based on grain quality (Table 12). Wide variation in quality preferences within a country or region of a country is evident for Brazil, China, India, Madagascar, Pakistan, Philippines, Thailand, and USA.

All grain size and shape types are represented, except round shape. Medium-sized grain has plurality over long grains. Short and medium shape predominates, followed by slender, and then bold. Extra long grain is important mainly in Surinam. Long slender grain is important in the Americas and in exporting countries such as Myanmar, Thailand, Pakistan, and Vietnam. Medium grain has plurality in Africa, but grain size differs widely among the countries sampled. Medium and short grains are important in Asia and Europe: medium grains in Cambodia, India, Indonesia, Laos, West Malaysia, Nepal, Pakistan, Philippines, and Turkey; short grains in Bangladesh; Bhutan; China; Japan; Republic of Korea; China-Taiwan; and Vietnam (traditional varieties); and both types in Sri Lanka. In Europe, long grain is the major type in Hungary; medium grain in France, Greece, Italy, and Portugal; and short grain in Bulgaria, Russia, and Spain.

The correlation of Amylograph setback with Amylograph consistency is deleted from country discussions. Forty-two countries/locations have positive correlations significant at the 1% level and three others at the 5% level. Amylose content-Amylograph setback correlations are significant in 41 locations; AC-Amylograph consistency and GC-cooked rice hardness in 38; AC-cooked rice hardness and Amylograph setback-cooked rice hardness in 33; AC-GC in 30; GC-Amylograph consistency in 29; Amylograph consistency-cooked rice

Table 11. Summary of protein content and classification of milled rice based on apparent AC, final GT, and GC, by continent and by wild rice species. IRRI, 1963-91.

Source	Sample (no.)	Protein (%)		Apparent AC[a]					GT[b]				GC[c]			
		Range	Mean	Wx	VL	L	H	I	H	L	I	HI	H	S	M	H
Oryza sativa L.																
Asia	1626	4-14	7.8	105	26	334	378	783	976		542	83	17	574	333	426
Australia[d]	24	5-10	6.7	2	0	13	7	2	17		6	1	0	19	2	1
North America	190	4-13	7.2	5	1	52	55	77	125		55	8	2	84	53	40
South America	301	5-13	7.9	0	0	72	95	134	233		58	8	2	107	82	99
Europe	233	5-13	7.0	0	0	119	106	8	217		12	3	1	137	56	20
Africa	300	5-11	7.3	0	0	53	62	185	169		117	11	2	93	64	112
Total	2674	4-14	7.7	112	27	643	703	1190	1737		790	114	24	1014	590	698
Wild species																
0. glaberrima	195	9-14	12.0	0	0	4	53	138	181		14	0	0	99	66	15
Others	49	8-17	11.9	1	0	14	21	13	13		24	0	12	2	0	0
Total	244	8-17	11.9	1	0	18	74	151	194		38	0	12	101	66	15

[a] Wx = waxy (0-5.0%). VL = very low (5.1-12.0%). L = low (12.1-20.0%), I = Intermediate (20.1-25.0%), and H = high (>25%). [b] Indexed by alkali spreading value: L = low (6-7). I = intermediate (4-5), HI = high-intermediate (3), and H = high (2). [c] Only samples analyzed from mid-1971 have gel consistency values: S = soft (61-100 mm), M = medium (41-60 mm), and H = hard (25-40 mm). [d] Excludes four samples from New Zealand.

Table 12. Preferred rice grain type (based on apparent AC) in various rice-producing countries. IRRI, 1991. [a]

Waxy	Low	Intermediate	High
		Asia	
Laos	China (japonica)	Cambodia	Bangladesh
Thailand (North)	Japan	China[b] (japonica)	China (indica)
	Republic of Korea	India (Basmati)	India
	Nepal	Indonesia	Pakistan (IR6 type)
	Taiwan, China (japonica)	Malaysia	Philippines
		Myanmar	Sri Lanka
	Thailand (Northeast)	Pakistan (Basmati)	Thailand (North, Central, South)
		Philippines	
		Thailand (Central)	
		Vietnam	
		Outside Asia	
	Argentina	Brazil (upland)	Brazil (irrigated)
	Australia	Cuba	Colomb ia
	Cuba	Italy	Guinea [c]
	Madagascar (South-west)	Ivory Coast	Mexico
		Liberia	Peru
	Russia	Madagascar	
	Spain	Nigeria	
	USA (short, medium grain)	USA (long grain)	

[a] Estimates taken from countries which produced 0.1% or more of total world rice production. [b] Data from the China National Rice Research Institute, Hangzhou. [c] Data from the International Institute for Tropical Agriculture, Lagos, Nigeria.

hardness in 27; GC-Amylograph setback and stickiness-Amylograph setback in 26; AC-alkali spreading value in 21; and grain length-width, cooked rice hardness-stickiness, and grain width-cooked rice hardness in 18.

Protein content, AC, GT (alkali spreading value), GC, Amylograph viscosity, cooked rice hardness and stickiness, and grain length and width vary widely for each location. Actual consumer demand analyses of country samples and surveys of quality preferences by national programs are needed to verify and fully describe the rice grain quality prized in each location.

The mean protein for 230 samples of wild rices is 11.9%. This is much higher than that of cultivated rice (Table 11). High AC, low GT, and soft GC predominate.

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Cross reference index of variety names

A

ADNY2 Liberia *see* ROK11 Liberia/ Sierra Leone

Akibare Japan *see* also Chucheongbyeo Rep. of Korea

Alfa *see* Alpha France

B

Bg90-2 Sri Lanka *see also* Bg90-2 Liberia, Nepal, Nigeria

BR1 *see* Chandina Bangladesh

BR2 *see* Mala Bangladesh

BR4 Bangladesh *see also* Sin-thein-gi Myanmar

BR5 *see* Dulhabhog Bangladesh

BR7 *see* Balam Bangladesh

BR8 *see* Asha Bangladesh

BR9 *see* Sufala Bangladesh

BR-IRGA409 *see* IRGA409 Brazil, Paraguay, USA

BR-IRGA4lO *see* IRGA410 Brazil

BR-IRGA411 *see* IRGA411 Brazil

BR-IRGA412 *see* IRGA412 Brazil

BR-IRGA413 *see* IRGA413 Brazil

BR-IRGA414 *see* IRGA414 Brazil

Brrisail *see* BR4 Bangladesh

C

Chu Cheong byeo *see also* Akibare Rep. of Korea

CICA4 Colombia *see also* Chancay Peru

D

D25-4 *see* Nga Kywe Myanmar

DR-83 *see* IR2053-261-2-3 Pakistan

Doonqara *see* YRL25 Australia

Dum Safid *see* Dom Safid Iran

Dum Safid 76 *see* Dom Suffaid 76 Iran

Dum Siah *see* Dom Siah Iran

Dum Surkh *see* Dom Surkh Iran

Dum Zard *see* Dom Zard Iran

E

Echuca *see* YRM6 Australia

ECIA67 *see* IAC14 Cuba

ECIA179 *see* IAC15 Cuba

F

FAROl *see* Bg79 Nigeria

FARO2 *see* Dl14 Nigeria

FARO4 *see* KAVl2 Nigeria

FARO5 *see* Makalioka 823 Nigeria

FARO6 *see* I.C.B. Nigeria

FARO7 *see* Mali Ong Nigeria

FAR08 *see* Mas2401 Nigeria

FARO9 *see* Siam29 Nigeria

FARO10 *see* Sindano Nigeria

FAROl 1 *see* OS6 Nigeria

FARO12 *see* SML 140/10 Nigeria

FARO13 *see* IR8 Nigeria

FARO14 *see* B Type x Kunter Nigeria

FARO15 *see* Bg79 x IR8 Nigeria

FARO16 *see* Tjina x TN1 Nigeria

FARO17 *see* Mas2401 x TNl Nigeria

FARO18 *see* Tjina Nigeria

FARO19 *see* IR20 Nigeria

FARO20 *see* BPI-76 (Bicol) Nigeria

FARO21 *see* Taichung Native 1 Nigeria

FARO22 *see* IR627-1-31-4-3-7 Nigeria

FARO23 *see* IR5-47-2 Nigeria

FARO24 *see* De Gaulle Nigeria

FARO25 *see* FARO × 56/30 Nigeria

FARO29 *see* Bg90-2 Nigeria

FAROX 147 *see* Mas2401 x B572 Nigeria

FAROX 166 *see* Tjina × IR8 Nigeria

FAROX 1880 *see* Tjina//IR8 × IR8 Nigeria

G

Giza 173 *see* Reiho Egypt

Giza 180 *see* Sakha1 (IR579-48-1-2) Egypt

Acronyms of rice varieties/lines

Code	Meaning	Station/Country
A	Antersal	India
AA	-	Sierra Leone
Adt	Aduthurai	Aduthurai Rice Expt. Stn, Tamil Nadu, India
B	-	Hungary
BAL/SK	-	Turkey
BAM	Berhampur	Berhampur Rice Res. Stn., Berhampur, Orissa, India
BD	-	Sierra Leone
B-E-	-	Philippines
Bg	Batalagoda	Central Agric. Res. Inst., Batalagoda, Sri Lanka
BH	-	Sierra Leone
BJM	Deepwater rice	Indonesia
BKNFR	Bangkhen-floating rice	Prachinburi Rice Expt. Stn., Ransang, Prachinburi, Thailand
BL	Balandean	Central Res. Inst. for Agric. Expt. Stn., Balandean, Banjar, Indonesia
BPI	Bureau of Plant Industry	Dept. of Agriculture, Manila, Philippines
BQ	-	Sierra Leone
BR	Bangladesh rice	Bangladesh Rice Res. Inst., Jovdebpur, Dhaka, Bangladesh
BR	Bihar rice	Bihar, India
BRJ	Bangladesh rice Joydebpur	Bangladesh Rice Res. Inst., Joydebpur, Dhaka, Bangladesh
BW	Bombuwella	Bombuwella Rice Res. Stn., Bombuwella, Sri Lanka
C	College of Agriculture	University of the Philippines, Los Baños, Laguna, Philippines
C	Centro Operativo Colonia Mascias	Sta. Fe, Argentina

CEA	-	Paraguay
CENTA	Centro Nacional de Tecnificacion Agricola	El Salvador
CH	Chira	India
CICA	Centro Instituto Colombiano Agropecuario	Cali, Colombia ex International Center for Tropical Agriculture
CINIA	-	Chile
CN	-	Vietnam
CNA	-	Philippines
CP	Cuba Los Palacios	Rice Res. Stn., Los Palacios, Perai del Rio, Cuba
CR	Central rice	Central Rice Res. Inst., Cuttack, Orissa, India
CR	Costa Rica	Costa Rica
D		Myanmar
DA	Dacca	Dacca Res. Stn., Dacca, Bangladesh
DB	Dhaka, Bangladesh	Bangladesh
DJ	-	Pakistan
E	-	Nigeria
EAL	-	Peru
ECIA	Estacion Central Investigaciones del Arroz	Havana, Cuba
EEA	Estacao Experimental do Arroz	Cachoeira, Brazil
EMPASC	-	Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA), Goiania, Goias, Brazil
EPEAL	-	Brazil
FARO	Federal Agricultural Research Oryzae	Nigeria
FAROX	Federal Agricultural Research Oryzae Cross	Nigeria
FB	-	Philippines
FMC	-	Peru
G	-	Hungary
GC	-	Sierra Leone
GEB	Government Economic Botany	Tamil Nadu Agric. Univ., Coimbatore, Tamil Nadu, India
GR	-	Ghana
Gz	Giza cross	Agricultural Research Center, Giza, Egypt

H	Hybrid	Central Agric. Res. Inst., Batalagoda, Sri Lanka
H	-	Estacion Experimental de Arroz, Univ. Nacional de la Plata, Argentina
H	-	Japan
HSC	-	Hungary
IAC	Instituto Agronomico de Campinas	Sao Paolo, Brazil
ICA	Instituto Colombiano Agropecuaria	Cali, Colombia
ICTA	Institute of Agricultural Science and Technology	Guatemala
IET	Initial Evaluation Trial	All-India Coordinated Rice Improvement Program, Hyderabad, India
IGP	-	India
INIAP	-	Ecuador
IR	IRRI rice	Int. Rice Res. Inst., Los Baños, Laguna, Philippines
IRAT	Institut de Recherches Agronomiques Tropicales et des Cultures Vivrieres (France)	Bouake, Ivory Coast
IRGA	Instituto Rio Grandense do Arroz	Cachoeira, Brazil
ISA	-	Dominican Republic/ Sierra Leone
ITA	Institute of Tropical Agriculture	Int. Inst. of Tropical Agriculture, Ibadan, Nigeria
Iz	Izmir	Izmir, Turkey
J	Jeypore	Rice Res. Stn. (OUAY), Jeypore, Orissa, India
JS	-	All-India Coordinated Rice Improvement Program, Hyderabad, India
K	Karjat	Karjat, Maharashtra, India
KAV		Nigeria
KN	Kuningan	Rice Res. Stn., Kuningan Branch, Cirebon, Indonesia
KS	Kala Shah Kaku	Rice Res. Stn., Kala Shah Kaku, Lahore, Pakistan
KT	-	Nepal

L	Long grain	California Coop Rice Res. Found. Inc., Biggs, CA, USA
L	Lua (paddy)	Cantho Univ., Cantho, Vietnam
LAC	Liberian Agric. Co.	Central Agric., Res., Inst., Suakoko, Liberia
LD	Labuduwa	Govt. Farm, Labuduwa, Galle, Sri Lanka
M	Medium grain	California Coop Rice Res. Found. Inc., Biggs, CA, USA
M	Maros	Maros Agric. Res. Inst., Maros, Sulawesi, Indonesia
MG	-	Brazil
MR	MARDI rice	Malaysia Agric. Res. and Dev. Institute, Kuala Lumpur, Malaysia
MRC	Maligaya Research Center	Maligaya Rice Res. and Training Center, Muñoz, Nueva Ecija, Philippines
MTL	Mien Tay Lua	Cantho Univ. Cantho, Vietnam
N	Nong Nghiep (Agriculture)	Vietnam
OM	O Mon	Cuu Long Delta Agric. Tech. Center, 0 Mon, Hau Giang, Vietnam
OS	*Oryza sativa*	Federal Dept. of Agriculture, Nigeria
P	Palmira	CIAT Substation, Palmira, Colombia
PARC	Philippine Atomic Research Center	Quezon City, Philippines
PK	Pakistan	Rice Res. Inst., Kala Shah Kaku, Lahore, Pakistan
PNA	-	Peru
PSBRc	Philippine Seed Board Rice	Manila, Philippines
Ptb	Pattambi	Central Rice Res. Stn., Pattambi, Kerala, India
RAU	Rajendra Agricultural University	Pusa, Bihar, India
RC	-	Sierra Leone
RD	Rice Department	Bangkok, Thailand
RH	-	Sierra Leone
ROK	Rokupr	Rice Res. Stn., Rokupr, Sierra Leone
ROHYB	WAR lines	WARDA Rice Res. Stn., Rokupr, Sierra Leone

RP	Rice Project	All-India Coordinated Rice Improvement Program, Hyderabad, India
RPW	-	India
RTN	-	Agric. Res. Stn., Maharashtra, India
RU	-	MARDI Rice Research Center, Malaysia
S	Short grain	California Coop Rice Res. Found. Inc., Biggs, CA, USA
SL	-	Sierra Leone
SLU	Samalkot	Rice Res. Stn., Samalkot, Andhra Pradesh, India
SML	Stechling Mechanische Landbouw	SML Agric. Found., New Nickerie, Surinam
SPR	Suphan Buri rice	Suphan Buri Rice Expt. Stn., Suphan Buri, Thailand
SR	Suweon rice	Suweon Crop Expt. Stn., Suweon, Korea
T	Type	Central Rice Res. Inst., Cuttack, Orissa, India
TGR	-	Togo
TOS	Tropical Oryzae selection	Int. Inst. of Tropical Agriculture, Ibadan, Nigeria
TP	-	Sabah, Malaysia
U	-	Vietnam
UPL-Ri	University of the Philippines at Los Baños-Rice	College, Laguna, Philippines
V	-	Vietnam
WAR	West Africa Rice	West Africa Rice Development Association, Bouake, Ivory Coast
X	-	El Salvador
YRB	Yanco rice bold	Yanco Agric. Inst., Yanco, LSW, Australia
YRF	Yanco rice fragrant	Yanco Agric. Inst., Yanco, NSW, Australia
YRL	Yanco rice long	Yanco Agric. Inst., Yanco, NSW, Australia
YRM	Yanco rice medium	Yanco Agric. Inst., Yanco, NSW, Australia

Appendix

Appendix

Quality characteristics of milled rice, by country, and wild rice.

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu)[a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
							ORYZA SATIVA								
							ARGENTINA								
AGULAO X DESC.	83	11	84	6.8	18.3	7.0	76	-	-	-	7.0	-	7.0	2.6	I
BLUEBELLE SEL.DREW	76	8	76	7.7	22.0	7.0	60	-	-	-	-	-	-	-	I
BLUEBONNET SEL.INTA	76	8	76	6.2	24.5	5.2	65	-	-	-	-	-	-	-	I
BOND	83	11	84	8.3	25.8	6.5	48	-	-	-	7.0	-	6.6	2.0	I
CALA P.A.	76	8	76	6.8	20.0	7.0	80	-	-	-	-	-	-	-	I
CHAJARI P.A.	76	8	76	5.8	21.3	7.0	76	-	-	-	-	-	-	-	I
CICA Y DESC 3-1-2-3-1	83	11	84	7.1	18.9	4.8	60	-	-	-	8.4	-	6.5	2.0	I
CLAUDIO P.A.	76	8	76	7.8	16.8	7.0	81	-	-	-	-	-	-	-	I
COL. MASCIAS 5	83	11	84	8.2	17.2	6.6	76	-	-	-	7.4	-	6.8	2.0	I
CUPALEN P.A.	76	8	76	8.6	16.3	7.0	82	-	-	-	-	-	-	-	I
DAWN P.A.	76	8	76	7.5	25.9	7.0	60	-	-	-	-	-	-	-	I
ENTRERRIANO P.A.	76	8	76	5.9	21.8	7.0	75	-	-	-	-	-	-	-	I
FORTUNA INTA	76	8	76	9.0	22.1	6.9	57	-	-	-	-	-	-	-	I
FORTUNA INTA	83	11	84	7.0	19.6	7.0	82	-	-	-	7.5	-	6.7	2.6	I
GUAYAQUIRARO	83	11	84	9.4	21.6	6.0	30	-	-	-	9.3	-	6.4	2.1	I
H124-36-1-1-1-2	83	11	84	6.9	25.3	6.8	32	-	-	-	8.8	-	6.5	2.2	I
H135-20	83	11	84	7.4	17.4	4.2	66	-	-	-	7.7	-	6.5	2.1	I
H135-23	83	11	84	8.2	18.2	3.0	67	-	-	-	8.8	-	6.7	2.4	I
H135-48-2	83	11	84	7.1	19.0	3.0	91	-	-	-	7.8	-	6.3	2.2	I

H136-22	83	11	84	7.9	16.6	3.1	68	-	-	-	8.1	-	6.5	1.9	I
H149-2-3	83	11	84	6.6	18.2	5.0	84	-	-	-	7.2	-	6.9	2.0	I
H149-3-2-2	83	11	84	6.6	19.2	5.1	61	-	-	-	7.6	-	7.1	2.0	I
H150-4-4-1	83	11	84	6.7	25.4	7.0	30	-	-	-	8.7	-	6.3	2.1	I
H156-1-1-2	83	11	84	7.4	19.2	6.0	51	-	-	-	8.6	-	6.9	1.9	I
H156-40-1	83	11	84	6.4	19.6	5.5	40	-	-	-	8.5	-	6.2	2.0	I
H7-39-1	83	11	84	7.8	19.8	6.3	69	-	-	-	8.2	-	6.2	2.5	I
H7-45-1	83	11	84	8.1	25.1	6.0	51	-	-	-	8.6	-	6.5	2.3	I
H7-9-1-1	83	11	84	8.3	22.7	7.0	53	-	-	-	8.7	-	7.5	2.1	I
H7-9-1-2	83	11	84	7.8	24.5	4.3	69	-	-	-	7.9	-	7.6	2.1	I
H7-9-1-3	83	11	84	8.8	20.6	5.6	81	-	-	-	6.8	-	7.2	2.2	I
IET4940-1-1-1	83	11	84	8.6	28.8	7.0	43	-	-	-	8.5	-	6.0	2.1	I
INACORA SEL.IBERA	76	8	76	8.6	19.3	5.4	84	-	-	-	-	-	-	-	I
IR841	83	11	84	7.8	19.4	7.0	54	-	-	-	7.9	-	6.7	2.2	I
LA PLATA AYUI F.A.	76	8	76	7.0	20.3	7.0	67	-	-	-	-	-	-	-	I
LA PLATA GUALEYAN F.A.	76	8	76	8.6	17.9	7.0	70	-	-	-	-	-	-	-	I
LA PLATA ITAPE F.A.	76	8	76	7.0	16.3	3.7	95	-	-	-	-	-	-	-	I
LEMONT	83	11	84	7.8	23.1	6.7	47	-	-	-	8.3	-	6.4	2.1	I
LUCAS P.A.	76	8	76	7.4	26.0	7.0	44	-	-	-	-	-	-	-	I
MONTIEL P.A	76	8	76	8.5	19.8	6.9	85	-	-	-	-	-	-	-	I
NANCAY P.A.	76	8	76	9.0	22.1	7.0	59	-	-	-	-	-	-	-	I
SF CAPIAQUI C.A.	76	8	76	6.3	24.9	5.8	68	-	-	-	-	-	-	-	I
SF CAPIAQUI C.A.	83	11	84	7.6	24.1	5.2	46	-	-	-	8.5	-	6.2	2.0	I
TAIPERO P.A.	76	8	76	8.2	16.5	7.0	80	-	-	-	-	-	-	-	I
VILLAGUAY P.A.	83	11	84	6.6	20.8	4.7	71	-	-	-	6.0	-	7.0	2.3	I
YAMANI M.A.	76	8	76	7.0	21.0	7.0	75	-	-	-	-	-	-	-	I
YERUA P.A.	76	8	76	8.3	18.2	7.0	79	-	-	-	-	-	-	-	I

AUSTRALIA

AMAROO	89	7	89	6.0	17.5	7.0	75	720	-130	260	5.0	-	5.4	2.6	I
BARU	77	1	78	7.7	14.6	4.5	100	880	-150	250	6.0	112	6.1	2.2	I
BLUEBONNET 50	64	7	65	8.0	27.4	6.2	-	870	-50	430	-	-	-	-	I
BOGAN	89	7	89	5.6	18.6	6.2	82	740	-160	230	4.9	-	5.4	2.5	I
CALORO	64	7	65	5.5	23.0	7.0	-	630	-30	310	-	-	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu)[a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
CALROSE	70	7	72	7.5	20.1	6.9	94	-	-	-	-	-	-	-	I
CALROSE	77	1	78	6.5	18.4	7.0	91	800	-200	180	6.0	142	5.3	2.7	I
CALROSE	81	-	81	6.0	19.0	7.0	76	-	-	-	5.2	-	5.4	2.7	I
EARLY CALORO	77	1	78	6.5	20.1	7.0	80	65	0	200	6.6	118	-	-	I
INGA	77	1	78	7.1	17.5	4.8	92	940	-240	205	6.0	139	6.5	2.0	I
INGA	80	2	82	5.6	20.6	4.8	88	-	-	-	5.3	-	7.2	2.6	I
INGA	81	-	81	6.5	17.2	3.7	90	-	-	-	5.3	-	7.1	2.1	I
INGA	85	-	86	7.7	15.8	6.2	73	-	-	-	-	-	-	-	I
KANGAROO EX HONGKONG	73	-	73	7.0	19.0	7.0	84	-	-	-	-	-	-	-	I
KULU	69	7	72	5.9	19.4	3.4	100	-	-	-	-	-	-	-	I
KULU	70	7	72	5.3	21.3	5.2	100	-	-	-	-	-	-	-	I
KULU	77	1	78	6.0	20.3	5.6	89	950	-270	200	5.8	147	7.0	2.0	I
KURO MOCHI	71	7	72	5.9	-	7.0	100				-	-	-	-	I
PELDE	89	7	89	6.4	18.5	7.0	78	800	-60	330	5.2	-	6.7	1.8	I
STARBONNET	85	6	86	7.0	21.6	4.9	48				-	-	6.5	1.9	I
TARRA 140	77	1	78	8.0	-	6.0	36	795	-135	90	5.6	254	4.9	2.8	I
YRF6 (GOOLARAH)	89	7	89	9.6	16.3	6.8	77	730	-120	230	4.7	-	6.6	1.9	I
YRL25 (DOONQARA)	89	7	89	7.1	25.6	7.0	48	730	-40	280	7.4	-	6.9	2.0	I
YRM6 (ECHUCA)	89	7	89	5.9	18.5	7.0	78	760	-110	270	5.2	-	5.3	2.6	I
BANGLADESH															
AMISHRAJ	73	4	73	6.3	29.5	7.0	48	-	-	-	-	-	-	-	I
ASHA (BR8)	78	10	78	6.1	30.4	7.0	56	1050	950	850	8.8	56	5.3	2.5	I
ADSHABHOG	73	4	73	7.7	25.0	6.5	-	-	-	-	-	-	-	-	I
BALAM (BR7) (IR 2053-87-3-1)	78	10	78	5.5	23.5	4.8	84	1075	-15	390	5.8	128	-	-	I
BR10 (PROGOTI)	79	-	80	9.3	31.4	5.5	86	-	-	-	7.6	66	-	-	I

BR10 (PROGOTI)	85	6	86	8.4	27.2	6.0	42	-	-	-	9.1	-	6.0	2.1	I
BR11 (MUKTA)	79	-	80	7.8	30.8	5.7	92	-	-	-	7.7	64	-	-	I
BR11 (MUKTA)	85	6	86	7.1	27.0	6.0	64	-	-	-	7.7	-	5.5	2.5	I
BR11 (MUKTA)	85	-	86	6.7	25.5	7.0	30	770	50	310	8.3	-	5.7	2.5	I
BR3	73	4	73	5.1	29.7	7.0	54	-	-	-	-	-	-	-	
BR3	78	10	78	5.7	29.5	7.0	44	1105	620	795	7.4	35	5.7	2.4	I
BR4 (BRRISAIL)	78	10	78	8.4	29.3	7.0	38	1010	620	630	8.8	33	-	-	I
BR4 (BRRISAIL)	85	6	86	6.5	28.1	6.0	39	-	-	-	9.0	-	5.5	2.1	I
BR4 (BRRISAIL)	85	-	-86	9.0	25.2	6.6	26	-	-	-	10.0	-	5.9	2.2	I
BR6 (IR28)	78	10	78	6.2	31.0	7.0	38	1030	1150	1090	0.1	54	5.7	1.9	I
BRJ3-12-B-15	73	4	73	6.1	29.2	7.0	42	-	-	-	-	-	-	-	I
CHANDINA (BR1) (IR532-1-176)	78	10	78	5.8	30.6	5.0	91	890	200	520	5.4	69	5.0	2.3	I
CHIANUNG SEN-YU-6	79	-	80	9.0	29.4	6.8	48	-	-	-	8.0	51	-	-	I
DA29	73	4	73	5.2	30.6	6.0	-	-	-	-	-	-	-	-	I
DA29	85	6	86	6.2	28.2	5.4	95	-	-	-	7.7	-	7.5	2.2	I
DA31	73	4	73	5.8	19.1	7.0	100	-	-	-	-	-	-	-	I
DA31	85	6	86	8.4	16.0	7.0	68	-	-	-	7.7	-	7.0	2.5	I
DHARIAL	78	10	78	9.1	29.5	5.0	89	730	345	460	8.0	55	4.8	2.6	I
DULAR	73	4	73	11.3	27.4	3.0	70	-	-	-	-	-	-	-	I
DULHABHOG (BR5)	73	4	73	8.8	26.1	6.9	32	-	-	-	-	-	-	-	I
DULHABHOG (BR5)	78	10	78	10.9	27.2	7.0	37	510	500	470	8.0	50	3.5	1.9	I
DULHABHOG (BR5)	85	6	86	7.3	24.7	6.1	33	-	-	-	8.3	-	3.9	2.0	I
HABIGANJ BORO II	73	4	73	12.0	20.6	3.8	-	-	-	-	-	-	-	-	I
HABIGANJ BORO II	78	10	78	7.1	27.4	5.2	69	970	85	405	6.0	72	3.8	2.5	I
HABIGANJ BORO IV	78	10	78	9.5	28.9	4.6	62	695	365	540	6.0	41	5.1	2.3	I
HABIGANJ BORO VI	73	4	73	8.6	23.8	4.2	50	-	-	-	-	-	-	2.7	I
HABIGANJ BORO VI	78	10	78	6.8	28.7	5.8	66	960	130	410	5.6	61	4.0	2.7	I
HABIGANJ BORO VIII	73	4	73	10.6	21.5	4.0	-	-	-	-	-	-	-	-	I
HASHIKALMI	73	4	73	10.0	29.2	2.9	58	-	-	-	-	-	-	-	I
HASHIKALMI	78	10	78	8.9	29.5	6.2	78	810	520	660	7.0	45	4.2	2.4	I
IR20 (IRRISAIL)	85	6	86	7.6	26.3	6.0	32	-	-	-	8.0	-	5.6	2.1	I
IR36	79	-	80	9.7	29.4	5.0	72	-	-	-	6.8	71	-	-	I
JESSOBALAM	73	4	73	6.8	30.1	6.8	70	-	-	-	-	-	-	-	I
KATAKTARA	73	4	73	9.6	28.8	3.1	75		-	-	-	-	-	-	I
KATAKTARA	77	10	78	7.1	29.1	5.0	78	730	260	480	6.0	55	5.2	2.1	I
KATARIBHOG	73	4	73	7.3	27.4	6.2	60	-	-	-	-	-	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
KATARIBHOG	77	10	78	10.7	23.5	6.2	40	-	-	-	6.0	71	4.4	1.7	I
LATISAIL	73	4	73	6.7	31.5	6.0	-	-	-	-	-	-	-	-	I
LATISAIL	77	10	78	8.6	29.7	6.1	61	1130	705	775	8.6	37	5.0	2.4	I
LATISAIL	85	6	86	6.8	28.8	5.0	46	-	-	-	9.1	-	5.8	2.4	I
MALA (BR2) (IR272-4-1-2)	77	10	78	6.2	30.9	5.3	84	1290	690	800	9.0	66	5.3	2.3	I
NIZERSAIL	73	4	73	7.3	31.3	7.0	-	-	-	-	-	-	-	-	I
NIZERSAIL	77	10	78	8.7	29.1	7.0	32	955	905	865	8.0	31	4.5	1.9	I
NIZERSAIL	85	6	86	7.1	28.0	6.0	38	-	-	-	8.7	-	5.4	2.0	I
PAJAM	85	-	86	7.1	26.6	6.0	26	900	780	1000	7.2	-	5.4	2.1	I
PAJAM (MAHSURI)	85	6	86	7.3	25.6	5.9	28	-	-	-	8.7	-	5.3	2.0	I
PAJAM II	77	10	78	5.0	28.7	6.3	30	870	1050	970	9.4	40	-	-	I
PATNAI 23	73	4	73	6.2	31.6	7.0	100	-	-	-	-	-	-	-	I
PATNAI 23	85	6	86	7.3	28.8	5.0	93	-	-	-	8.3	-	7.3	2.1	I
RAJASAIL	73	4	73	9.0	28.1	6.0	58	-	-	-	-	-	-	-	I
RAJASAIL	85	6	86	7.5	28.6	5.0	43	-	-	-	8.8	-	5.5	2.4	I
SUFALA (BR9)		10	78	6.5	31.0	7.0	42	1030	1175	995	9.7	56	-	-	I
TILOKKACHARI	73	4	73	5.4	29.2	6.0	71	-	-	-	-	-	-	-	I
BENIN															
ADNY11 EX INGER	88	11	90	8.6	29.8	6.9	42	680	495	615	9.0	-	7.4	2.0	
BHUTAN															
ATTEY	88	7	89	7.3	23.8	7.0	37	-	-	-	7.8	-	5.0	2.5	I
BG400-1	88	7	89	8.5	26.0	7.0	30	-	-	-	9.1	-	6.1	2.0	I
BOMTELING	83	6	86	5.6	24.8	7.0	46	-	-	-	-	-	5.3	2.5	I
BR153-2B-10-1-3	88	7	89	6.6	28.7	7.0	38	800	350	600	9.7	-	5.9	2.1	I

BW293-2	88	7	89	8.3	26.2	7.0	28	-	-	-	10.2	-	5.8	2.4	I
CHIRANG ATTEY	86	12	86	5.9	23.8	7.0	34	455	-20	115	8.1	-	4.1	2.5	I
CHIRANG BAGHEY	86	12	86	6.2	23.9	7.0	31	580	35	235	7.6	-	4.7	2.6	I
CHIRANG SUKHIMEY	86	12	86	7.7	22.4	6.9	27	470	-15	125	7.6	-	4.6	2.7	I
DJAMBARAN RED	77	9	77	5.9	30.4	4.8	55	-	-	-	-	-	-	-	I
DJAMBARAN WHITE	77	9	77	4.8	29.6	5.0	95	-	-	-	-	-	-	-	I
DUMJA KAAP	83	6	86	5.6	23.5	7.0	38	-	-	-	-	-	5.2	2.4	I
GUNJA	83	6	86	7.0	25.4	7.0	38	-	-	-	-	-	5.6	2.6	I
IR20913-B-26-2-2-3	88	7	89	7.2	25.8	7.0	30	-	-	-	10.7	-	6.2	2.3	I
IR64	88	7	89	6.4	26.6	7.0	63	-	-	-	6.9	-	6.9	2.1	I
KACHUM	83	6	86	7.1	24.7	6.8	54	-	-	-	-	-	5.1	2.6	I
KAMSING	83	6	86	7.0	24.9	6.0	49	-	-	-	-	-	4.4	2.9	I
KAMSING (DEEP)	83	6	86	9.0	24.3	6.0	47	-	-	-	-	-	4.4	2.8	I
LOCAL VARIETY	77	9	77	6.7	27.8	4.5	88	-	-	-	-	-	-	-	I
MILYANG 54	88	7	89	6.4	27.4	7.0	38	-	-	-	9.4	-	6.3	2.0	I
MRAH	83	6	86	6.6	25.8	7.0	42	-	-	-	-	-	4.6	2.6	I
NGURMLINGBOO	83	6	86	6.4	24.7	7.0	37	-	-	-	-	-	5.3	2.6	I
NO. 11	88	7	89	7.7	18.9	7.0	66	-	-	-	5.4	-	5.0	2.8	I
PARO DUMJA	86	12	86	7.4	22.0	6.2	27	475	215	410	6.7	-	5.3	2.7	I
PARO MAAP	86	12	86	7.2	22.2	6.7	31	560	50	190	7.4		5.2	2.6	I
PASAKACHUM	83	6	86	5.8	24.9	7.0	47	-	-	-	-	-	5.1	2.7	I
PUNAKHA MAAP	86	12	86	6.2	23.2	7.0	35	500	10	175	7.4	-	4.9	2.7	I
PUNAKHA SAKHA	86	12	86	7.4	17.6	7.0	34	745	-250	85	7.2	-	6.6	2.1	I
SEMKAAP	83	6	86	6.8	25.1	7.0	43	-	-	-	-	-	5.0	2.6	I
SHINTILA	83	6	86	6.6	24.8	7.0	46	-	-	-	-	-	4.8	2.4	I
SUKHIMAY	88	7	89	8.6	23.6	7.0	35	580	100	370	7.5	-	5.1	2.6	I
SUNGPA	83	6	86	7.1	25.9	7.0	51	-	-	-	-	-	5.0	2.6	I
SUNGSUNG	83	6	86	5.4	26.2	7.0	58	-	-	-	-	-	5.0	2.6	I
THIMPHU DUMJA	86	12	86	7.0	22.4	6.7	32	580	-40	195	7.0	-	5.3	2.5	I
THIMPHU MAAP	86	12	86	7.1	22.0	6.1	33	465	15	200	7.3	-	5.3	2.7	I
THIMPHU MAAP (RED)	88	7	89	8.3	23.4	7.0	32	-	-	-	7.6	-	5.6	2.4	I
WANGDI KAAP	86	12	86	5.9	25.6	6.1	83	440	60	150	7.2	-	5.8	2.3	I
WANGDI MAAP	86	12	86	6.9	22.2	6.7	33	560	15	220	7.8	-	5.7	2.7	I
WANGDI MAAP (RED)	88	7	89	7.3	23.5	7.0	37	-	-	-	6.9	-	5.5	2.4	I
ZAKHA KAAP	88	7	89	7.1	27.6	7.0	96	440	190	360	8.6	-	5.8	2.3	I
ZECHUM	83	6	86	6.9	24.2	7.0	35	-	-	-	-	-	5.2	2.4	I

	Crop year	Date analyzed (mo)	(yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu)[a]	Setback (Bu)	Consistency (Bu)	Instron: Hardness (kg)	Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
BOLIVIA															
BLUEBELLE	90	7	90	9.9	22.4	6.6	48	-	-	-	8.6	-	7.2	2.4	
BLUEBONNET	90	7	90	9.3	22.4	6.0	49	-	-	-	7.6	-	7.1	2.2	
CICA8	90	7	90	7.8	24.8	7.0	31	-	-	-	10.5	-	7.4	2.2	
DORADO	90	7	90	7.7	22.6	6.8	44	700	40	360	7.3	-	6.4	3.0	
IR1529 (SAAVEDRA V4)	90	7	90	7.4	18.6	7.0	59	750	-95	290	5.2	-	6.6	2.5	
IR-DOMINICANO	90	7	90	6.9	23.6	5.8	68	760	-85	315	6.4	-	7.0	2.2	
BRAZIL															
410 M030	86	10	86	8.2	25.8	7.0	31	795	465	525	10.6	-	6.8	2.0	I
AGULHA BICO TORTO	76	11	76	7.8	16.5	2.7	100	-	-	-	-	-	-	-	I
AGULHA PRECOCE	76	11	76	6.6	19.8	7.0	100	-	-	-	-	-	-	-	I
ARAGUAIA	89	12	89	9.0	25.4	7.0	40	710	40	370	7.2	-	7.4	2.3	U
ARAGUAIA	90	12	90	9.2	22.4	7.0	36	-	-	-	8.7	-	6.9	2.3	
BATATAIS	66	6	67	10.2	24.0	4.9	62	815	50	340	-	-	-	-	I
BATATAIS	89	12	89	8.5	25.4	6.8	34	660	50	380	7.9	-	6.7	2.7	U
BATATAIS	90	12	90	7.2	23.8	6.8	35	-	-	-	7.0	-	6.3	2.8	U
BICO TORTO	90	12	90	6.1	17.0	3.8	63	-	-	-	5.3	-	6.8	2.7	
BLUEBELLE	76	11	76	6.4	23.8	5.0	100	-	-	-	-	-	-	-	I
BLUEBELLE	86	10	86	6.2	24.4	5.2	44	675	5	210	10.1	-	6.7	2.1	I
BLUEBELLE	90	12	90	6.1	24.1	6.7	36	-	-	-	7.4	-	6.4	2.1	U
BR4	90	12	90	9.4	24.0	7.0	53	-	-	-	9.0	-	7.0	2.5	
CABACU	89	12	89	8.3	15.8	5.0	90	800	-210	245	4.9	-	7.2	2.5	U
CABACU	90	12	90	8.3	15.2	5.0	85	-	-	-	5.1	-	7.0	2.6	
CALORO	90	12	90	9.6	22.3	7.0	34	-	-	-	8.3	-	5.5	3.1	

CENTRO AMERICA	89	12	89	8.8	25.2	7.0	60	655	20	330	7.8	-	7.3	2.5	U
CENTRO AMERICA	90	12	90	8.2	23.3	7.0	45	-	-	-	8.1	-	6.6	2.4	
CICA4	90	12	90	9.3	24.6	7.0	35	-	-	-	8.1	-	6.4	2.2	
CICA7	90	12	90	9.1	27.2	7.0	26	-	-	-	10.8	-	7.0	2.1	
CICA8	90	12	90	7.9	28.2	7.0	26	-	-	-	9.8	-	6.6	2.2	I
CICA9	90	12	90	8.6	26.6	7.0	26	-	-	-	11.4	-	7.0	2.2	
CUIABANA	89	12	89	9.4	25.8	7.0	48	650	25	330	7.6	-	8.2	2.2	U
CUIABANA	90	12	90	9.6	23.3	7.0	29	-	-	-	7.8	-	7.2	2.2	
DAWN	90	12	90	6.0	26.9	7.0	36	-	-	-	7.4	-	6.4	2.0	
DE ABRIL	90	12	90	8.1	28.3	7.0	28	-	-	-	10.7	-	7.2	2.4	
DOURADAO	90	12	90	11.2	14.4	4.4	81	705	-180	215	5.0	-	7.6	2.6	I
DOURADO AGULHA	66	6	67	13.4	19.7	5.0	38	785	125	360	-	-	-	-	I
DOURADOPRECOCE	66	6	67	12.5	19.7	5.0	66	820	90	370	-	-	-	-	I
EEA201	76	11	76	5.3	20.4	7.0	100	-	-	-	-	-	-	-	I
EEA404	76	11	76	5.5	16.3	6.4	100	-	-	-	-	-	-	-	I
EEA404	90	12	90	9.8	19.6	7.0	33	-	-	-	6.8	-	7.0	2.6	
EEA405	76	11	76	5.5	15.4	2.5	100	-	-	-	-	-	-	-	I
EEA406	76	11	76	5.8	15.5	7.0	100	-	-	-	-	-	-	-	I
EMCAPA 1	90	12	90	11.7	21.9	6.8	38	-	-	-	6.1	-	7.0	2.6	
EMPASC 101	90	12	90	7.9	26.0	7.0	26	-	-	-	11.6	-	6.9	2.2	
EMPASC 102	90	12	90	8.0	25.5	7.0	26	-	-	-	11.1	-	7.2	2.2	
EMPASC 103	90	12	90	7.5	28.6	7.0	32	-	-	-	10.3	-	6.7	2.1	
EMPASC 104	90	12	90	8.1	17.2	7.0	56	-	-	-	5.7	-	6.7	2.3	
EMPASC 104 EX CIAT	89	6	89	6.9	27.0	7.0	28	-	-	-	-	-	6.6	2.3	
EPEAL 101	90	12	90	7.4	27.8	7.0	28	-	-	-	10.2	-	6.7	2.2	
EPEAL 102	90	12	90	8.1	27.8	7.0	26	-	-	-	10.1	-	6.9	2.2	
FORMOSA	76	11	76	7.0	17.9	7.0	90	-	-	-	-	-	-	-	I
GUAPORE	89	12	89	7.8	22.0	5.6	56	730	-105	280	6.1	-	6.9	2.6	U
GUAPORE	90	12	90	9.5	19.4	6.6	70	-	-	-	6.2	-	6.5	2.6	
GUARANI	89	12	89	8.2	26.0	7.0	48	660	85	405	7.3	-	7.5	2.6	U
GUARANI	90	12	90	8.1	24.8	7.0	48	-	-	-	7.6	-	7.2	2.6	U
IAC1278	90	12	90	8.5	27.1	7.0	28	-	-	-	10.8	-	6.5	2.3	
IAC164	90	12	90	10.9	22.5	7.0	33	-	-	-	8.5	-	7.1	2.7	
IAC165	90	12	90	10.4	23.4	7.0	46	660	65	365	7.6	-	7.4	2.7	U
IAC25	89	12	89	9.1	24.4	6.9	46	670	50	340	7.3	-	6.9	2.5	U
IAC25	90	12	90	9.9	22.8	7.0	43	-	-	-	7.6	-	6.5	2.4	U
IAC4440	90	12	90	5.3	29.5	7.0	26	-	-	-	10.5	-	6.5	2.3	

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
IAC47	89	12	89	8.5	24.6	7.0	44	640	30	320	7.2	-	6.9	2.5	U
IAC47	90	12	90	7.8	25.5	7.0	59	-	-	-	7.5	-	6.8	2.6	U
IAC899	90	12	90	8.2	29.0	7.0	62	-	-	-	9.1	-	7.1	2.2	
IGUAPE AGULHA	66	6	67	9.6	19.4	5.0	50	860	130	400	-	-	-	-	I
INCA	90	12	90	9.3	24.6	7.0	26	-	-	-	8.5	-	6.3	2.2	
IR841	90	12	90	10.3	17.3	7.0	60	700	-80	255	5.7	-	7.6	2.2	U
IRGA117-23-27-2	86	10	86	7.4	26.2	7.0	40	790	505	545	10.3	-	6.8	2.0	I
IRGA172-F4SS-39	86	10	86	7.0	20.1	7.0	47	770	-120	135	7.6	-	6.5	2.2	I
IRGA181-F4SS-54	86	10	86	7.8	25.1	7.0	43	790	470	525	10.0	-	6.8	2.1	I
IRGA181-F4SS-73	86	10	86	7.7	18.4	7.0	63	800	-190	95	8.3	-	6.6	2.1	I
IRGA407 (BR-IRGA407)	76	11	76	6.5	19.1	7.0	100	-	-	-	-	-	-	-	I
IRGA408 (IR930-31-10)	76	11	76	7.8	24.1	5.0	69	-	-	-	-	-	-	-	I
IRGA409 (BR-IRGA409)	86	10	86	7.2	25.2	7.0	32	770	420	485	10.2	-	6.4	2.0	I
IRGA409 (BR-IRGA409)	90	12	90	9.9	25.3	7.0	26	-	-	-	11.3	-	6.5	2.1	I
IRGA409 (BR-IRGA409) EX CIAT	88	6	88	-	27.6	7.0	28	-	-	-	-	-	6.4	2.1	
IRGA409 (BR-IRGA409) EX CIAT	89	6	89	6.8	27.6	7.0	28	-	-	-	-	-	6.5	2.1	
IRGA410 (BR-IRGA410)	86	10	86	6.8	25.5	7.0	41	770	425	465	10.1	-	6.6	2.1	I
IRGA410 (BR-IRGA410)	90	12	90	9.8	76.1	7.0	26	-	-	-	11.5	-	6.6	2.1	I
IRGA411 (BR-IRGA411)	90	12	90	10.9	16.5	6.7	58	-	-	-	6.3	-	7.1	2.3	
IRGA412 (BR-IRGA412)	90	12	90	9.8	25.7	7.0	26	-	-	-	11.8	-	6.4	2.1	
IRGA413 (BR-IRGA413)	90	12	90	9.2	27.0	7.0	26	-	-	-	10.9	-	5.9	2.2	
IRGA414 (BR-IRGA414)	90	12	90	8.7	26.2	7.0	26	-	-	-	11.8	-	6.8	2.2	
MEARIM	90	12	90	7.6	29.4	7.0	42	-	-	-	10.5	-	6.4	2.2	
METICA 1	90	12	90	8.9	28.4	7.0	28	-	-	-	10.7	-	6.7	2.3	U
MG1	90	12	90	8.7	27.2	6.9	26	-	-	-	10.1	-	7.1	2.3	I
MG2	90	12	90	8.5	29.1	7.0	29	-	-	-	9.7	-	6.6	2.2	
P790 L	86	10	86	7.3	26.0	7.0	32	775	485	525	10.0	-	6.4	2.1	I
P798 L38 BS1	86	10	86	6.9	26.2	7.0	33	790	485	515	11.3	-	6.8	1.9	I

PACHA MURCHA	90	12	90	9.8	25.9	7.0	44	-	-	-	9.6	-	6.2	3.0	
PESAGRO 101	90	12	90	8.4	28.4	6.9	26	-	-	-	9.9	-	6.7	2.3	
PESAGRO 102	90	12	90	8.2	28.9	7.0	72	-	-	-	9.4	-	6.4	2.1	
PESAGRO 103	90	12	90	8.6	28.1	7.0	26	-	-	-	10.8	-	7.2	2.3	
PRATAO	66	6	67	10.3	21.4	5.0	55	860	95	385	-	-	-	-	I
PRATAO PRECOCE	66	6	67	11.4	22.4	5.0	49	805	75	360	-	-	-	-	I
PRATAO PRECOCE	90	12	90	11.2	24.1	7.0	30	580	165	410	8.8	-	7.1	2.6	
RIO PARANAIBA	89	12	89	9.2	18.7	5.4	81	715	-165	215	5.8	-	7.3	2.5	U
RIO PARANAIBA	90	12	90	9.2	19.9	6.0	86	-	-	-	6.6	-	7.1	2.5	I
TRIUNFO	90	12	90	9.0	18.9	5.3	70	665	-135	225	6.1	-	7.1	2.6	U
BRUNEI DARUSSALAM															
0.026 EXP0'80	89	11	89	6.9	24.6	5.5	44	730	70	395	6.9	-	6.9	2.0	I
00.55/1	89	11	89	13.5	22.6	7.0	28	405	95	275	8.2	-	7.7	2.1	I
CISADANE	89	11	89	6.2	23.8	5.0	54	870	-160	320	5.1	-	6.3	2.5	I
DISOBOK	88	11	89	6.9	25.0	6.0	50	760	-130	270	6.2	-	5.9	1.9	I
LUMUT	88	11	89	8.6	9.7	3.0	49	890	-120	315	3.5	-	4.9	2.2	I
MR100	89	11	89	7.2	28.8	7.0	36	610	480	580	9.8	-	7.2	2.2	I
MR101	89	11	89	7.3	30.8	6.0	38	880	380	655	9.6	-	6.7	2.1	I
MR73	89	11	89	8.4	25.7	7.0	40	590	100	360	7.2	-	6.6	2.1	I
MR77	89	11	89	8.5	29.8	6.0	30	570	310	490	9.0	-	6.4	2.1	I
MR84	89	11	89	6.5	29.7	7.0	76	330	430	420	10.4	-	6.7	2.2	I
MR97	89	11	89	6.7	28.7	7.0	30	670	550	660	9.8	-	6.8	2.2	I
BULGARIA															
BELLARDONE	67	4	68	7.0	27.3	6.3	-	665	50	285	-	-	-	-	I
BELOZEM	85	6	86	6.9	16.0	7.0	71	960	-360	50	6.4	-	4.8	2.9	I
KRASNODARSKI 424	72	8	73	7.2	20.9	7.0	82	-	-	-	-	-	-	-	I
KRASNODARSKI 424	77	6	78	6.1	22.4	7.0	88	610	30	200	5.1	103	4.7	3.1	I
MARITZA B	77	10	78	7.5	20.0	7.0	61	665	0	215	6.6	91	5.1	2.7	I
MONTICELLI	72	8	73	8.5	18.7	7.0	82	-	-	-	-	-	-	-	I
N:10 M	85	6	86	7.3	23.1	7.0	49	950	-145	225	8.3	-	5.0	3.0	I
N:11 M	85	6	86	9.5	17.8	7.0	52	970	-335	35	7.8	-	5.9	3.0	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
N:24 D	85	6	86	8.2	17.0	6.7	64	1100	-475	30	7.6	-	4.8	3.1	I
N:44	85	6	86	6.0	17.7	7.0	79	1035	-445	-10	7.0	-	5.3	2.9	I
PLOVDIV	67	4	68	9.8	24.3	6.8	72	685	-85	215	-	-	-	-	I
PLOVDIV 1/1	77	10	78	7.4	22.8	7.0	60	600	155	305	7.6	87	5.4	3.1	I
PLOVDIV 19/1	77	10	78	7.5	22.7	7.0	47	615	100	275	6.6	68	4.9	2.9	I
PLOVDIV 22	77	10	78	6.5	19.8	7.0	92	665	-45	190	6.2	97	-	-	I
PLOVDIV 22	85	6	86	7.4	18.0	7.0	76	1080	-425	10	7.4	-	6.5	2.5	I
PLOVDIV 24/1	77	10	78	6.2	19.0	7.0	82	790	-130	190	5.7	113	5.1	3.0	I
PLOVDIV Y	77	10	78	6.0	20.2	7.0	74	670	-10	210	5.6	106	5.3	3.2	I
PLOVDIV YP	77	10	78	6.9	19.4	7.0	75	690	-30	200	6.2	105	5.3	2.9	I
RANBALI	72	8	73	8.5	19.9	7.0	78	-	-	-	-	-	-	-	I
ROSA	85	6	86	6.1	20.0	7.0	64	1020	-355	25	6.0	-	5.3	2.9	I
SESILLA	72	8	73	8.3	18.4	7.0	86	-	-	-	-	-	-	-	I
SLAVA	67	4	68	8.6	25.0	6.1	-	710	-40	225	-	-	-	-	I
USPECH	73	8	73	8.0	19.2	7.0	76	-	-	-	-	-	-	-	I
CAMBODIA															
BANLA PHADU	88	11	89	6.0	26.2	7.0	46	570	310	480	8.0	-	7.1	2.2	
CHHMAR KRAHUM	72	4	73	8.6	28.5	3.1	30	-	-	-	-	-	-	-	I
CHHMAR PROM	89	2	90	5.5	28.4	6.4	54	795	285	585	8.9	-	5.7	1.8	
CHHMAR PROM KANDAL	89	2	90	5.4	30.6	6.8	39	790	265	560	8.2	-	5.5	1.8	
CHHUTHANA	64	4	65	12.0	16.8	6.0	-	725	-65	200	-	-	-	-	I
CHHUTHANA	72	4	73	7.7	18.9	6.4	64	-	-	-	-	-	-	-	I
CHHUTHANA	88	11	89	10.1	23.9	6.9	30	710	260	500	8.2	-	5.5	2.2	
CHONG BANLA	72	4	73	6.3	29.1	3.5	32	-	-	-	-	-	-	-	I
CHONG BANLA	88	11	89	7.0	25.7	6.0	48	800	-10	390	6.5	-	5.3	2.5	
DID	64	4	65	6.5	14.9	3.7	-	970	-320	190	-	-	-	-	I

F3C23.2.2	64	4	65	6.0	24.9	6.0	-	680	345	485	-	-	-	-	I
HIB14	64	4	65	6.7	22.1	5.2	-	825	-40	200	-	-	-	-	I
KONG KHMAU	72	4	73	5.4	24.8	3.7	-	-	-	-	-	-	-	-	I
KONG TELL K131	72	4	73	4.1	25.1	3.0	64	-	-	-	-	-	-	-	I
KRAHAM	89	2	90	5.7	29.2	6.3	85	745	225	530	8.7	-	6.5	2.0	
LEAK SANLEK	72	4	73	6.2	27.6	3.5	-	-	-	-	-	-	-	-	I
LEAK SANLEUK	88	11	89	6.2	25.3	6.0	54	850	-30	410	6.5	-	5.5	2.2	
LEAK SLEK	72	4	73	5.0	29.8	4.6	-	-	-		-	-	-	-	I
NEANG MEAS	64	4	65	7.2	23.1	5.2	-	820	50	350	-	-	-	-	I
NEANG MEAS	88	11	89	5.7	26.4	6.2	54	850	-10	410	6.8	-	5.3	2.2	
NEANG MENH	72	4	73	5.9	27.5	3.1	31	-	-	-	-	-	-	-	I
NEANG MINH	88	11	89	5.9	29.0	6.5	38	900	320	630	8.3	-	5.5	2.4	
NEANG MINH	89	2	90	5.4	30.6	6.9	70	760	345	6 10	8.7	-	5.5	2.3	
NEANG MINH TONN	88	11	89	6.5	26.2	6.0	54	800	50	430	6.8	-	5.2	2.2	
NEANG MON	88	11	89	7.7	16.8	7.0	78	820	-110	280	5.6	-	7.7	2.3	
NEANG SAR	88	11	89	6.5	28.5	6.8	34	830	360	630	7.9	-	6.2	2.3	
PHKA PNOS	89	2	90	5.4	31.2	6.8	72	755	295	565	9.2	-	6.2	2.1	
PHKA SLA	89	2	90	5.5	31.3	6.6	72	755	375	615	9.5	-	5.6	2.4	
PHKAR SLA	88	11	89	6.0	26.4	6.9	42	7 30	120	460	6.2	-	5.5	2.1	
PRAM BEI KOUR	89	2	90	5.5	29.6	7.0	49	790	260	575	8.8	-	5.8	2.1	
PRAM BEI KUOR	88	11	89	5.9	28.4	6.0	32	830	370	650	9.0	-	5.8	1.9	
SAM LEAV	88	11	89	5.7	25.1	6.1	58	840	-90	360	5.7	-	6.7	2.5	
SRAU SAR	89	2	90	5.8	29.6	6.9	56	765	295	575	8.4	-	5.4	2.3	
STRAUV KOL	72	4	73	7.1	29.2	3.5	30	-	-	-	-	-	-	-	I

CAMEROON

IAC25 EX INGER	88	11	90	8.4	24.6	6.0	34	680	50	385	5.8	-	6.7	2.4
TAINAN 5 EX INGER	88	11	90	11.2	27.4	7.0	27	695	505	665	9.1	-	7.4	2.5

CHILE

CINIA 196	90	10	90	6.0	19.0	7.0	72	520	15	265	4.4	-	7.8	2.2
CINIA 234	90	10	90	6.6	19.4	7.0	78	570	-40	225	4.8	-	7.6	2.2
CINIA 239	90	10	90	7.9	19.4	7.0	74	530	0	240	5.2	-	7.1	2.4

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amy-lose (%)	Alkali spread-ing value	Gel consis-tency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Set-back (Bu)	Amylograph viscosity: Consis-tency (Bu)	Instron: Hard-ness (kg)	Instron: Sticki-ness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
CINIA 268	90	10	90	6.6	20.6	7.0	66	445	90	240	5.0	-	7.6	2.2	
CRISTAL-INDUS	90	10	90	7.1	20.0	7.0	66	510	25	250	5.2	-	6.9	2.8	
DIAMANTE	80	9	80	9.6	21.6	7.0	94	565	-50	145	5.2	-	-	-	I
DIAMANTE-INIA	90	10	90	6.4	21.2	7.0	75	465	70	255	5.6	-	7.5	2.6	
NIQUEN	80	9	80	10.3	20.8	7.0	61	485	80	200	6.4	-	-	-	I
ORO	80	9	80	8.5	21.0	7.0	66	540	-15	155	5.9	-	-	-	I
ORO	90	10	90	5.5	20.1	7.0	68	540	50	295	5.0	-	5.6	3.1	
PERLA-INDUS	90	10	90	7.3	18.7	7.0	78	515	-5	235	5.3	-	6.8	2.7	
QUELLA	80	9	80	8.3	21.0	7.0	84	470	45	180	6.4	-	-	-	I
QUELLA-INIA	90	10	90	6.4	20.6	7.0	63	475	75	270	5.8	-	5.5	2.9	
QUILA 67320	90	10	90	6.7	20.4	7.0	68	505	30	250	5.1	-	6.7	2.6	
CHINA															
720	81	9	82	8.1	18.8	3.0	67		-	-	5.8	-	5.1	2.8	
AI-CHI-NAN	76	2	77	7.6	27.0	5.2	48		-	-	-	-	-	-	I
CE48	81	9	82	8.5	21.5	7.0	50		-	-	6.1	-	4.9	2.8	
CH'ANG-KO 21	76	2	77	9.1	26.8	4.8	59		-	-	-	-	-	-	I
CHAI-YEH-CHING 8	76	2	77	7.0	25.8	4.0	46		-	-	-	-	-	-	I
CHAO-YANG-TSAO 18	76	2	77	8.6	27.5	5.0	45		-	-	-	-	-	-	I
CHE-CHANG 9	76	2	77	11.2	25.5	5.9	57		-	-	-	-	-	-	I
CHEN-CHIEN-NUO	76	2	77	8.1	1.0	6.0	80		-	-	-	-	-	-	I
CHIEN 75-10	76	2	77	9.0	27.4	6.3	36		-	-	-	-	-	-	I
CHING-FENG 2	76	2	77	8.4	17.8	7.0	92		-	-	-	-	-	-	I
CHING-FENG 5	76	2	77	6.8	19.7	7.0	86		-	-	-	-	-	-	I
CHING-FENG 7	76	2	77	7.0	18.4	7.0	86		-	-	-	-	-	-	I
CHING-FENG 8	76	2	77	7.2	16.0	6.8	98		-	-	-	-	-	-	I
CHING-HSI 3	76	2	77	6.6	18.5	6.8	100		-	-	-	-	-	-	I
CHING-HSI 9	76	2	77	7.0	17.8	7.0	98		-	-	-	-	-	-	I

CHU-LIEN-AI	76	2	77	9.0	25.1	4.6	36	-	-	-	-	-	-	-	I
DONG-TING-WAN-XIAN	81	9	82	9.6	28.3	6.3	29	-	-	-	8.5	-	6.1	2.1	
ER-BAI-AI	81	9	82	8.7	27.4	5.4	42	-	-	-	6.4	-	5.5	2.5	
ER-JIN-QING	83	10	84	11.8	24.5	5.0	29	540	20	300	8.2	-	5.4	2.5	I
ER-JIU-QING	81	9	82	11.0	22.8	5.0	29	-	-	-	8.6	-	5.3	2.4	
GUANG-LU-AI 4	81	9	82	11.5	25.4	5.2	29	-	-	-	6.8	-	5.0	2.6	
GUI-CHAO 13	81	9	82	7.2	28.3	7.0	29	-	-	-	7.8	-	5.1	2.7	
HSIANG-AI-TSAO 7	76	2	77	8.6	25.7	4.9	34	-	-	-	-	-	-	-	I
HSIANGAI-TSAO 9	76	2	77	6.2	26.8	4.8	43	-	-	-	-	-	-	-	I
HSIANG-KENG 12	76	2	77	6.6	17.4	6.9	88	-	-	-	-	-	-	-	I
HSIANG-KENG 13	76	2	77	7.8	15.1	6.6	78	-	-	-	-	-	-	-	I
HSIANG-NUO 1	76	2	77	7.4	1.0	6.0	88	-	-	-	-	-	-	-	I
HSIN-CHING-AI	76	2	77	8.0	24.4	5.9	32	-	-	-	-	-	-	-	I
HSIN-TIEH-TA	76	2	77	7.9	26.7	5.0	52	-	-	-	-	-	-	-	I
HUA 03	91	7	91	10.8	13.1	7.0	70	-	-	-	-	-	5.8	2.6	
JIA HU 4	83	10	84	8.3	20.8	7.0	49	970	-339	175	9.1	14	4.9	2.9	I
JIME EX HONGKONG	63	7	65	7.7	31.3	5.9		880	220	550	-	-	-	-	I
JIN-NUO 3	81	9	82	9.1	1.3	7.0	100	-	-	-	4.7	-	4.9	2.7	
KWANG-ER-AI 5	76	2	77	5.6	28.4	5.0	64	-	-	-	-	-	-	-	I
LI-YOU 57	81	9	82	7.3	19.0	7.0	53	-	-	-	5.2	-	4.8	2.8	
NAN-ERH-AI 5	76	2	77	8.6	27.0	4.9	40	-	-	-	-	-	-	-	I
NAN-GAN 34	81	9	82	9.6	17.0	7.0	52	-	-	-	7.0	-	5.1	2.8	
NAN-JING 11	81	9	82	13.0	27.8	6.2	30	-	-	-	7.7	-	5.5	2.5	
NAN-KENG 11	76	2	77	6.0	15.6	6.9	93	-	-	-	-	-	-	-	I
NAN-KENG 33	76	2	77	7.2	15.8	7.0	99	-	-	-	-	-	-	-	I
NAN-TSAO 32	76	2	77	10.5	24.2	4.9	56	-	-	-	-	-	-	-	I
NAN-TSAO 33	76	2	77	7.1	27.9	4.7	44	-	-	-	-	-	-	-	I
NEW SILVER BAMBOO EX HONGKONG	73	-	73	6.5	29.5	5.5	81	-	-	-	-	-	-	-	I
NEW SOUTH JIM EX HONGKONG	73	-	73	8.0	28.9	6.4	33	-	-	-	-	-	-	-	I
NEW WEST JIM EX HONGKONG	73	-	73	7.4	29.0	5.0	56	-	-	-	-	-	-	-	I
NEW YEW JIM EX HONGKONG	73	-	73	7.3	29.1	6.2	62	-	-	-	-	-	-	-	I
NONG-HU 6	81	9	82	8.8	21.4	7.0	42	-	-	-	7.0	-	4.8	2.7	
NONG-HU 6	83	10	84	6.2	19.5	7.0	52	1120	-360	200	7.4	31	5.0	2.8	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu)[a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
PAO-KWANG 81	76	2	77	8.4	26.3	4.9	30	-	-	-	-	-	-	-	I
QING-ER-AI 1	81	9	82	9.9	27.6	5.6	29	-	-	-	7.3	-	5.8	2.6	
QING-GANG-HANG	83	10	84	10.3	31.2	6.0	55	440	420	440	9.6	-	5.2	2.5	I
SEE MEW HUNG EX HONGKONG	73	-	73	7.5	29.1	5.2	70	-	-	-	-	-	-	-	I
SHAN-YOU 6	81	9	82	11.7	25.4	7.0	29	-	-	-	8.2	-	5.8	2.3	
SHANGHAI PEARL EX HONGKONG	63	7	65	6.4	21.9	6.9	-	380	220	370	-	-	-	-	I
SHUANG-NUO 4	81	9	82	9.7	1.2	7.0	92	-	-	-	4.4	-	4.7	2.6	
SZE MEE EX HONGKONG	63	7	65	6.7	30.0	5.7	-	980	150	490	-	-	-	-	I
TIEH-KU-AI 4	76	2	77	6.1	27.9	4.0	44	-	-	-	-	-	-	-	I
TIEH-LU 17	76	2	77	9.8	23.2	4.6	70	-	-	-	-	-	-	-	I
TUNG-CH'IU-AI	76	2	77	10.2	26.6	6.0	42	-	-	-	-	-	-	-	I
WAHNAM EX HONGKONG	63	7	65	6.9	31.4	6.4	-	650	370	560	-	-	-	-	I
WAN-CHAN	76	2	77	10.3	26.2	4.8	39	-	-	-	-	-	-	-	I
XIANG-AI-ZAO 7	81	9	82	8.3	27.6	5.5	29	-	-	-	6.6	-	5.4	2.6	
XIANG-AI-ZAO 9	81	9	82	7.4	28.4	5.4	29	-	-	-	7.5	-	5.5	2.9	
YAU JIM EX HONGKONG	63	7	65	7.3	30.4	6.4	-	810	310	600	-	-	-	-	I
YAU JIM EX HONGKONG	64	7	65	7.0	29.0	4.5	-	980	-	480	-	-	-	-	I
YU-CHI-231-8	81	9	82	10.6	28.8	6.2	30	-	-	-	8.5	-	5.8	2.3	
ZHE JIE 66	83	10	84	8.0	21.8	7.0	43	830	-140	270	8.6	8	5.1	2.9	I
ZHENG GANG ZHAO	83	10	84	9.7	30.8	6.3	28	735	425	535	9.1	-	5.0	2.5	I
ZHONG-DAN 2	81	9	82	7.9	19.6	7.0	59	-	-	-	6.3	-	4.9	2.8	
ZHONG-HUA 8	81	9	82	7.2	21.0	7.0	62	-	-	-	5.2	-	5.0	2.8	
ZHONG-HUA 9	81	9	82	6.6	21.6	7.0	70	-	-	-	4.0	-	5.0	2.8	
ZHONG-XI 7720	81	9	82	7.2	19.6	6.3	69	-	-	-	5.2	-	4.8	2.8	
ZHONG-ZUO 75	81	9	82	8.4	19.3	5.0	57	-	-	-	5.5	-	5.5	2.7	
ZHONG-ZUO 9	81	9	a2	7.6	19.4	4.9	65	-	-	-	5.1	-	5.3	2.8	
ZHU-FEI 10	81	9	a2	9.6	28.0	5.0	29	-	-	-	6.6	-	6.7	2.3	
ZHU-KE 2	81	9	82	8.8	28.3	5.0	29	-	-	-	7.5	-	6.7	2.3	

COLOMBIA

BLUEBONNET 50	71	11	71	5.8	25.6	6.8	67	-	-	-	-	-	-	-	I
BLUEBONNET 50	76	6	77	7.9	23.7	6.0	84	-	-	-	6.6	59	6.7	2.1	I
BLUEBONNET 50	77	3	78	11.4	23.1	6.8	53	730	-35	240	6.6	77	6.6	2.0	I
CICA4 (IR930-31)	71	11	71	7.3	25.8	6.8	80	-	-	-	-	-	-	-	I
CICA4 (IR930-31)	77	3	78	8.7	27.4	6.4	100	755	25	280	5.2	75	6.2	2.2	I
CICA6	77	3	78	8.5	28.8	7.0	41	820	610	700	7.8	40	-	-	I
CICA6 EX CIAT	89	6	89	7.3	26.3	7.0	28	-	-	-	-	-	6.7	2.4	I
CICA7	76	6	77	10.0	22.4	7.0	30	-	-	-	-	45	6.7	2.1	I
CICA7	77	3	78	9.9	28.3	7.0	32	745	545	605	7.2	44	-	-	I
CICA8	77	3	78	9.1	28.3	7.0	78	840	380	535	7.2	49	6.3	2.1	I
CICA8	90	6	91	7.6	26.5	6.0	42	880	490	720	8.2	-	6.8	2.2	
CICA8 EX CIAT	88	6	88	-	28.1	6.8	31	-	-	-	-	-	6.6	2.2	I
CICA8 EX CIAT	89	6	89	5.5	25.8	6.9	44	-	-	-	-	-	6.9	2.1	I
CICA9	76	6	77	8.8	24.8	7.0	59	-	-	-	-	41	6.8	2.2	I
CICA9	77	3	78	8.0	29.4	7.0	50	720	530	580	7.6	48	6.6	2.3	I
ICA-10	71	11	71	5.8	21.6	4.7	98	-	-	-	-	-	-	-	I
IR8	71	11	71	6.6	28.8	7.0	-	-	-	-	-	-	-	-	I
JAPON	71	11	71	7.4	27.0	4.8	-	-	-	-	-	-	-	-	I
METICA 1	90	6	91	7.5	28.2	7.0	52	850	565	750	9.9	-	6.9	2.2	
MONOLAYA	71	11	71	7.0	25.2	5.2	94	-	-	-	-	-	-	-	I
ORYZICA 1	90	6	91	8.0	28.5	7.0	30	835	620	805	8.9	-	7.2	2.1	
ORYZICA 1 EX CIAT	89	6	89	6.6	28.6	7.0	29	-	-	-	-	-	6.8	2.2	I
ORYZICA 2	90	6	91	7.3	24.5	5.7	49	850	-60	385	6.2	-	6.7	2.2	
ORYZICA 3	90	6	91	9.4	21.1	5.0	42	795	-130	300	5.5	-	6.4	2.0	
ORYZICA LLANOS 4	90	6	91	7.0	26.8	7.0	27	765	260	375	9.5	-	6.6	2.4	
ORYZICA LLANOS 5	90	6	91	9.0	26.0	7.0	28	765	250	330	10.6	-	7.4	2.2	
TAPURIPA	71	11	71	8.0	27.0	6.8	53	-	-	-	-	-	-	-	I

COSTA RICA

CR1113 (IR822-81-2)	90	7	90	9.4	25.4	7.0	28	710	310	300	11.2	-	6.9	2.1	U
CR1707	90	7	90	13.3	23.7	7.0	26	-	-	-	11.8	-	6.8	2.1	U

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
CR1821	90	7	90	8.6	25.8	7.0	28	670	825	835		-	6.4	2.2	U
CR5272	90	7	90	10.7	24.2	6.1	28	785	405	590	10.0	-	6.5	1.9	U
CUBA															
AMISTAD 82	85	6	86	7.6	18.2	7.0	81	730	-210	50	8.7	-	6.9	2.0	I
BLUEBELLE	78	4	79	7.4	22.4	4.7	76	745	-70	220	6.0	119	6.9	2.0	I
CARIBE I	78	4	79	7.6	23.2	7.0	45	490	180	260	6.8	100	6.9	2.3	I
CARIBE I	85	6	86	7.5	26.6	7.0	54	605	40	155	8.0	-	6.8	2.2	I
CP3C2	85	6	86	7.8	19.6	6.3	59	845	-285	60	8.3	-	7.0	2.2	I
ECIA 31-104-2-1-7	85	6	86	7.1	16.6	6.0	78	915	-375	30	6.8	-	6.8	2.0	I
ECIA 31-14-1-1-1	85	6	86	8.3	18.0	3.0	75	840	-280	60	8.3	-	7.0	2.2	I
GUARINA	85	6	86	8.1	25.5	5.0	72	690	0	120	7.8	-	7.7	2.1	I
IAC13 (PERLA)	90	6	91	7.0	17.6	7.0	76	900	-270	255	4.3	-	7.2	2.2	I
IAC14 (ECIA 67)	90	6	91	6.7	17.1	7.0	70	890	-225	280	4.4	-	6.8	2.1	I
IAC15 (ECIA 179)	90	6	91	7.0	16.8	7.0	80	975	-270	280	4.0	-	6.8	2.1	I
IR1529 (IR43)	78	4	79	6.2	16.8	6.2	77	870	-265	155	4.9	174	6.6	2.1	I
IR1529 (IR43)	85	6	86	7.5	17.1	6.4	82	845	-280	105	7.6	-	6.8	2.0	I
IR1529-382-4	78	4	79	6.3	28.1	7.0	42	745	635	695	6.9	66	6.6	2.2	I
IR759-54-2-2-2	78	4	79	7.4	28.0	4.8	53	785	305	480	7.0	77	5.9	2.0	I
IR880-C9	78	4	79	6.8	27.7	7.0	31	865	385	570	7.6	74	6.7	2.2	I
IR880-C9	85	6	86	8.3	27.7	7.0	28	860	320	480	10.1	-	6.7	2.1	I
ITALIAN VARIETY	78	4	79	7.6	15.6	7.0	95	750	-215	120	4.7	154	7.7	2.2	I
JUCARITO 104 (IR480/ IR930)	85	6	86	9.0	23.2	4.8	58	740	-255	80	8.6	-	7.0	2.4	I
JUCARITO 104 (IR480/ IR930)	85	6	86	8.2	24.4	5.0	51	740	-185	115	8.8	-	7.0	2.4	I
JUCARITO 104 (IR480/ IR930)	85	6	86	7.9	23.8	5.0	47	770	-210	100	8.8	-	6.9	2.4	I

JUCARITO 104 (IR480/ IR930)	85	6	86	8.0	24.2	4.8	49	780	-225	75	9.1	-	6.9	2.3	I
JUCARITO 104 (IR480/ IR930)	85	6	86	7.9	24.4	4.4	48	780	-215	125	8.8	-	6.6	2.4	I
NAYLAMP (IR930-2-6)	78	4	79	5.8	28.2	7.0	41	730	580	650	7.0	79	6.6	2.1	I
NAYLAMP (IR930-2-6)	85	6	86	8.2	28.6	7.0	32	695	365	420	11.0	-	7.1	2.1	I
PNA12-1-2-6	78	4	79	7.4	28.1	7.0	31	760	540	665	7.0	67	6.6	2.0	I
PNA46	78	4	79	7.7	27.7	5.1	47	800	320	490	7.8	74	6.7	2.1	I

DOMINICAN REPUBLIC

ISA40	90	11	90	8.8	25.3	7.0	26	705	805	855	9.5	-	-	-
JUMA57	90	11	90	8.2	24.0	7.0	30	430	470	540	8.2	-	-	-
JUMA58 (TONO BREA/IR8)	90	11	90	7.3	25.4	7.0	27	670	800	860	9.6	-	-	-
JUMA58 (TONO BREA/ IR8) EXCIAT	88	6	89		28.4	7.0	29	-	-	-	-	-	7.0	2.2
JUMA58 (TONO BREA/ IR8) EXCIAT	89	6	89	6.7	27.0	7.0	29	-	-	-	-	-	6.9	2.3
JUMA61	90	11	90	4.4	25.3	7.0	27	750	1020	999	10.7	-	-	-
JUMA63	90	11	90	8.6	13.8	5.0	54	825	-175	230	3.4	-	-	-
P3831	90	11	90	7.7	26.6	7.0	28	735	805	860	9.6	-	-	-
TANIOKA	90	11	90	8.8	23.1	7.0	36	605	275	490	7.3	-	-	-

ECUADOR

BLUEBONNET 50	90	11	90	7.7	23.6	7.0	36	765	135	455	7.1	-	7.0	2.2
BRASILEIRO	90	11	90	5.6	28.5	7.0	30	950	685	880	9.4	-	6.0	2.4
CAFURINGA	90	11	90	5.7	29.1	7.0	33	880	630	835	9.3	-	7.4	2.2
CHATO SERRANO	90	11	90	6.2	29.6	7.0	36	885	470	735	9.2	-	5.8	2.3
CHEPITA	90	11	90	6.3	28.6	7.0	28	925	500	770	8.9	-	7.1	2.3
COLORADO	90	11	90	7.7	24.0	7.0	41	730	155	480	6.8	-	6.6	2.4
DONATO	90	11	90	6.3	26.1	6.9	56	770	185	530	7.4	-	7.4	2.1
GO-31430	90	11	90	6.0	28.5	6.8	49	620	405	590	8.6	-	6.8	2.4
INIAP10	90	11	90	6.8	24.6	6.8	48	770	230	530	7.6	-	6.9	2.2

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu) [a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
INIAP11	90	11	90	6.3	25.7	6.2	54	785	70	425	7.0	-	7.3	2.2	
INIAP415	90	11	90	6.3	27.6	7.0	28	860	770	860	9.9	-	6.8	2.3	
INIAP6	90	11	90	6.4	26.0	6.8	60	740	185	500	6.8	-	6.5	2.2	
INIAP7	90	11	90	6.4	27.8	7.0	30	785	615	715	6.9	-	6.9	2.3	
NO TE AHUEVES	90	11	90	5.8	30.1	7.0	34	1215	275	775	9.6	-	6.7	2.3	
PLATA AL BOLSILLO	90	11	90	7.0	20.3	6.6	89	560	230	445	8.7	-	7.2	2.2	
SABIDO	90	11	90	5.9	28.7	6.2	39	880	420	700	8.9	-	6.5	2.4	
TRIPA DE POLLO	90	11	90	5.9	29.1	6.9	30	920	415	670	9.0	-	6.8	2.4	
EGYPT															
AGAMI MI	73	4	73	6.6	25.3	7.0	30	-	-	-	-	-	-	-	IT
ARABI	66	9	66	5.8	22.7	6.1	-	930	-150	265	-	-	-	-	IT
ARABI	73	4	73	6.9	24.8	6.0	30	-	-	-	-	-	-	-	IT
CR259-93	77	7	78	6.2	20.2	7.0	96	720	-85	165	5.3	139	4.5	2.8	I
CR259-93	78	4	79	5.4	18.0	6.8	84	-	-	-	-	-	-	-	I
CR316-3-1-4	78	4	79	6.1	28.4	5.0	63	-	-	-	7.0	100	-	-	I
CR484-2-1-2	78	4	79	4.8	17.8	6.0	85	-	-	-	5.0	227	4.5	2.8	I
CR484-8-1-3	77	7	78	7.0	19.9	7.0	96	805	-155	160	5.2	136	5.0	2.8	I
GIZA14	73	4	73	7.5	18.5	7.0	72	-	-	-	-	-	-	-	
GIZA159	66	9	66	5.3	17.9	7.0	-	1020	-330	190	-	-	-	-	IT
GIZA159	73	4	73	6.4	18.5	7.0	68	-	-	-	-	-	-	-	IT
GIZA170	73	4	73	6.4	18.3	7.0	70	-	-	-	-	-	-	-	I
GIZA171 (NAHDA/ CALADY 40)	77	7	78	6.6	18.4	7.0	86	720	-120	15	5.1	144	4.9	2.5	I
GIZA171 (NAHDA/ CALADY 40)	78	4	79	4.8	17.1	6.2	94	-	-	-	-	-	-	-	I

GIZA171 (NAHDA/ CALADY 40)	86	4	87	6.5	17.8	7.0	68	-	-	-	6.0	-	4.7	2.4	I
GIZA172 (NAHDA/KISAME)	77	7	78	6.0	20.0	7.0	95	730	-120	140	5.4	134	4.8	2.7	I
GIZA172 (NAHDA/KISAME)	78	4	79	5.2	17.4	7.0	89	-	-	-	-	-	-	-	I
GIZA175 (GZ1394-10-1)	86	4	87	7.7	23.5	7.0	28	-	-	-	8.3	-	4.6	2.4	I
GIZA176 (GZ2175-5-6)	86	4	87	6.6	18.6	7.0	72	-	-	-	6.2	-	4.6	2.5	I
GIZA181 (IR1626-203)	77	7	78	8.0	19.6	7.0	90	895	-210	175	6.4	115	6.4	2.1	I
GIZA181 (IR1626-203)	78	4	79	6.2	17.3	6.8	82	-	-	-	-	-	-	-	I
GIZA181 (IR1626-203)	86	4	87	7.2	20.1	7.0	60	-	-	-	6.2	-	6.1	2.0	I
GZ1108-4-1-3	86	4	87	7.7	24.8	7.0	28	-	-	-	11.2	-	4.9	2.4	I
GZ1368-5-4	86	4	87	7.7	24.8	7.0	27	-	-	-	11.2	-	5.0	2.2	I
GZ2175-5-1	86	4	87	6.7	18.9	7.0	66	-	-	-	5.7	-	4.7	2.7	I
GZ2175-5-3	86	4	87	6.7	18.6	7.0	69	-	-	-	6.6	-	4.7	2.5	I
GZ2175-5-4	86	4	87	6.7	19.0	7.0	76	-	-	-	6.5	-	4.7	2.6	I
H230-173	73	4	73	5.7	16.2	7.0	90	-	-	-	-	-	-	-	I
IR1615-246	77	7	78	8.3	20.0	7.0	89	870	-175	175	6.6	115	6.0	2.1	I
IR1615-246	78	4	79	6.2	17.8	6.3	80	-	-	-	-	-	-	-	I
IR1615-31-3	77	7	78	8.6	19.2	7.0	90	800	-110	170	6.6	111	6.2	2.1	I
IR19743-46-2	86	4	87	9.7	25.2	7.0	27	-	-	-	10.0	-	5.6	2.1	I
IR2153-43-2-5	78	4	79	6.4	27.7	7.0	66	-	-	-	6.1	86	-	-	I
IR28	86	4	87	8.6	26.0	4.2	35	-	-	-	8.5	-	-	-	I
KIM RAD C-57	77	7	78	7.4	18.0	7.0	100	770	-200	130	5.0	128	4.7	2.7	I
NABATAT ASMAR	73	4	73	7.6	24.7	7.0	30	-	-	-	-	-	-	-	IT
NAHDA	66	9	66	4.6	18.2	7.0	-	985	-240	210	-	-	-	-	I
NAHDA	73	4	73	6.4	17.6	7.0	96	-	-	-	-	-	-	-	I
REIHO (GIZA 173)	77	7	78	7.3	19.6	7.0	98	785	-145	160	5.6	134	4.6	2.8	I
REIHO (GIZA 173)	78	4	79	5.2	17.3	6.9	88	-	-	-	-	-	-	-	I
SAKHA 1 (GIZA 180, IR579-48-1-2)	77	7	78	6.7	27.6	7.0	46	875	600	695	8.8	51	5.9	2.0	I
SAKHA 1 (GIZA 180, IR579-48-1-2)	78	4	79	6.2	28.0	6.8	32	-	-	-	7.7	77	-	-	I
YABANI 15	73	4	73	6.9	16.5	7.0	92	-	-	-	-	-	5.9	2.0	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
							EL SALVADOR								
BLUEBONNET	79	9	80	9.6	22.0	6.0	74	625	-70	205	6.9	-	-	-	
CENTA A1	90	11	90	9.6	25.7	7.0	26	595	695	735	10.7	-	6.6	2.3	
CENTA A2	90	11	90	9.7	25.3	7.0	26	570	540	630	10.2	-	6.4	2.2	
CENTA A4	90	11	90	5.8	27.1	6.5	42	830	660	810	9.6	-	6.9	2.2	
CENTA A5	90	11	90	5.9	25.5	6.9	37	835	215	545	8.0	-	7.7	2.1	
LINEA 5 (P4725F2-9-2 -MS)	90	11	90	8.2	26.4	6.4	32	585	475	615	10.2	-	6.9	2.3	
LIRA	79	9	80	8.2	22.9	6.2	84	575	20	225	6.9	-	-	-	
MASOL 1	79	9	80	10.8	23.0	6.7	40	560	235	355	7.4	-	-	-	
MASOL 4	79	9	80	8.7	22.2	5.8	78	590	-15	210	6.8	-	-	-	
NIL0 1	79	9	80	7.6	27.5	5.0	93	515	185	330	6.8	-	-	-	
X-10	79	9	80	7.8	22.3	7.0	58	625	150	325	7.4	-	-	-	
XICA-9	79	9	80	6.8	27.4	7.0	42	715	555	655	8.0	-	-	-	
							FRANCE								
ALPHA [ALFA)	89	6	91	7.0	19.4	7.0	65	565	-5	165	4.8	-	5.7	3.2	I
ARIETTE	88	7	89	5.9	17.2	7.0	72	770	-80	310	5.3	-	6.3	2.6	I
ARLATAN	86	11	87	6.5	20.4	7.0	55	-	-	-	-	-	5.2	2.9	I
ARLATAN	88	4	89	6.0	21.0	7.0	51	565	-10	265	6.1	-	5.4	3.1	I
ARLESIENNE	66	7	67	9.6	20.9	7.0	53	690	200	380	-	-	-	-	I
ARLESIENNE	72	5	73	8.6	22.9	7.0	41	-	-	-	-	-	-	-	I
ARLESIENNE	76	8	77	8.0	23.8	7.0	40	610	220	390	7.2	54	5.9	2.7	I
ARLESIENNE	77	4	79	8.2	23.3	7.0	48	625	125	310	6.1	90	-	-	I
ARLESIENNE	78	4	79	5.8	25.3	7.0	46	-	-	-	6.0	107	6.4	2.7	I
ARLESIENNE	86	11	87	6.3	24.8	7.0	40	-	-	-	-	-	6.0	2.8	I
ARLESIENNE	88	4	89	6.2	25.3	7.0	36	500	200	410	7.6	-	6.2	2.9	I

ARLESIENNE	90	6	91	8.9	23.2	7.0	36	510	135	355	6.9	-	6.6	3.2
BALILLA	72	5	73	7.0	20.6	7.0	100	-	-	-	-	-	-	-
BALILLA	77	4	79	5.8	22.5	7.0	79	585	-15	170	4.5	134	4.5	2.3
BALILLA	78	4	79	6.0	21.9	7.0	71	595	-15	165	4.2	135	-	-
BALILLA	86	11	87	5.7	21.0	7.0	52	515	-50	105	7.9	-	4.4	2.7
BALILLA 28	66	7	67	7.5	19.0	7.0	-	610	115	285	-	-	4.6	2.6
CALENDAL	86	11	87	5.7	18.9	7.0	68	655	-230	55	6.6	-	6.0	2.8
CESARIOT	66	7	67	10.7	16.9	7.0	-	730	-35	220	-	-	-	-
CESARIOT	72	5	73	8.3	18.8	7.0	72	-	-	-	-	-	-	-
CESARIOT	86	11	87	7.0	19.1	6.9	70	685	-185	100	7.4		5.7	2.7
CESARIOT BETA THETA	72	5	73	8.2	20.1	6.5	84	-	-	-	-	-	-	-
CIGALON	66	7	67	11.8	16.3	7.0	-	675	40	255	-	-	-	-
CIGALON	72	5	73	7.2	19.2	7.0	98	-	-	-	-	-	-	-
CIGALON	77	4	79	7.4	21.7	7.0	82	670	-120	145	4.3	135	5.7	2.4
CIGALON	86	11	87	6.8	20.4	7.0	52	590	-110	90	7.5	-	4.8	2.7
CIGALON	88	7	89	7.7	17.1	7.0	68	590	10	290	5.4	-	4.9	2.8
CRIPTO	90	6	91	8.0	23.8	7.0	30	490	150	365	7.0	-	5.4	3.0
CRISTAL	72	5	73	7.3	19.3	7.0	76	-	-	-	-	-	-	-
CRISTAL	77	4	79	5.9	19.9	7.0	79	730	-115	135	4.6	129	-	-
CRISTAL	78	4	79	5.1	19.9	7.0	81	620	-85	140	4.6	134	5.6	2.4
DELTA	72	5	73	7.6	18.3	7.0	82	-	-	-	-	-	-	-
DELTA	78	4	79	5.8	18.1	7.0	82	705	-175	115	5.3	144	6.6	2.4
DELTA	86	11	87	6.2	18.6	6.9	75	775	-250	55	6.9	-	6.5	2.5
DELTA	88	7	89	7.4	14.4	7.0	68	880	-150	300	6.0	-	6.8	2.6
EURIBE	66	7	67	8.4	15.6	7.0		845	-75	260	-	-	-	-
EURIBE	72	5	73	8.1	19.1	7.0	66	-	-	-	-	-	-	-
EURIBE	77	4	79	7.1	18.0	7.0	62	660	-95	165	5.8	140	5.9	2.4
EURIBE	78	4	79	7.0	18.0	7.0	71	675	-115	165	6.0	154	6.2	2.3
KORAL	90	6	91	7.7	19.0	7.0	56	580	-90	235	5.1	-	6.6	2.6
LIDO	88	7	89	6.4	17.8	7.0	50	650	90	380	6.3	-	5.3	2.4
MARATHON	86	11	87	4.9	19.4	7.0	61	655	-180	75	5.4	-	5.3	2.9
MIARA	90	6	91	9.5	15.8	7.0	66	600	-115	215	4.9	-	7.0	2.1
ONDA	88	7	89	6.8	16.3	7.0	60	630	1	280	5.7	-	6.3	2.6
PYGMALION	86	11	87	7.8	19.9	7.0	54	570	-100	105	8.0	-	5.9	2.7
RINGO	89	6	91	7.1	18.0	7.0	72	675	-110	255	4.2	-	6.4	2.8
ROCCA	89	6	91	6.4	20.5	7.0	80	675	-105	255	3.8	-	6.7	2.9

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
SMERALDO ITALIEN	86	11	87	5.9	19.2	6.9	72	785	-250	65	7.5	-	5.7	2.4	I
STIRPE136-7T	86	11	87	5.2	19.8	7.0	67	-	-	-	-	-	5.4	2.7	I
STIRPE136-7T	88	4	89	5.3	18.2	7.0	78	600	-120	230	6.1	-	5.5	2.8	I
							GHANA								
77/44/54	65	11	65	9.0	27.1	5.0		645	55	265					I
GR 19 EX INGER	88	11	90	8.9	27.7	7.0	28	650	560	690	9.0	-	6.8	2.4	
NICKERIE	65	11	65	9.0	24.3	4.5	-	695	0	235	-	-	-	-	I
SML 128/4	65	11	65	8.9	29.2	4.9	-	580	70	250	-	-	-	-	I
SML 242	65	11	65	8.0	29.2	4.7	-	775	-55	260	-	-	-	-	I
SML 352	65	11	65	9.1	28.4	4.2	-	580	50	250	-	-	-	-	I
TOS10,601 EX IITA	85	10	86	7.2	25.8	4.1	47	-	-	-	-	-	6.3	2.2	I
TOS10,604 EX IITA	85	10	86	7.1	26.2	3.0	78	-	-	-	-	-	6.2	2.2	I
TOS10,607 EX IITA	85	10	86	7.2	26.2	4.7	51	-	-	-	-	-	6.2	2.2	I
TOS10,617 EX IITA	85	10	86	7.0	26.4	4.9	95	-	-	-	-	-	4.9	2.7	I
TOS10,619 EX IITA	85	10	86	7.0	25.4	3.0	40	-	-	-	-	-	6.4	2.2	I
TOS10,626 EX IITA	85	10	86	8.0	26.2	4.4	85	-	-	-	-	-	6.2	2.5	I
TOS10,635 EX IITA	85	10	86	6.5	26.6	4.7	91	-	-	-	-	-	4.8	2.7	I
TOS10,640 EX IITA	85	10	86	5.8	23.0	5.1	70	-	-	-	-	-	6.0	2.5	I
TOS7460 EX IITA	85	10	86	8.1	25.4	4.9	92	-	-	-	-	-	6.2	2.5	I
TOS7461 EX IITA	85	10	86	6.4	23.2	4.5	38	-	-	-	-	-	6.0	2.2	I
TOS57463 EX IITA	85	10	86	7.5	25.6	5.0	87	-	-	-	-	-	4.6	2.7	I
TOS7465 EX IITA	85	10	86	8.1	21.6	6.0	42	-	-	-	-	-	5.2	2.4	I
TOS7468 EX IITA	85	10	86	8.3	22.1	6.0	44	-	-	-	-	-	5.1	2.5	I
TOS7469 EX IITA	85	10	86	8.1	22.1	6.0	43	-	-	-	-	-	5.3	2.6	I
TOS7474 EX IITA	85	10	86	7.9	21.5	6.0	55	-	-	-	-	-	-	-	I
YOGAGA	65	11	65	8.1	32.8	5.0	-	520	135	295	-	-	-	-	I

							GREECE								
AXIOS	89	8	90	6.6	18.5	7.0	62	620	-75	260	3.9	-	6.5	2.9	I
BLUEBELLE "E"	89	8	90	8.0	25.8	7.0	28	-	-	-	7.0	-	6.8	2.1	I
EVROPI	89	8	90	5.7	20.8	7.0	52	570	-	285	4.4	-	6.3	2.7	I
ISPANIKI	84	12	85	5.2	17.8	7.0	81	-	-	-	6.3	-	5.4	2.6	I
ISPANIKI "A"	89	8	90	6.8	22.7	7.0	58	555	35	325	4.8	-	5.5	2.7	I
REA	84	12	85	6.0	21.4	5.0	51	-	-	-	8.2	-	6.2	2.3	I
REA	89	8	90	6.5	28.2	7.0	30	585	250	520	7.1	-	6.5	2.4	I
ROXANI	84	12	85	5.7	15.8	4.0	89	-	-	-	5.1	-	5.9	2.7	I
ROXANI	89	8	90	7.0	21.0	6.0	64	715	-130	290	4.6	-	6.6	2.3	I
STRIMONAS	89	8	90	6.7	21.6	7.0	52	655	-65	290	4.4	-	6.4	2.6	I
							GUATEMALA								
ICTA MOTAGUA LISA	89	7	90	7.0	22.6	7.0	50	545	500	565	9.9	-	7.0	2.3	
ICTA MOTAGUA PUBESCENTE	89	7	90	6.4	25.2	7.0	46	660	615	690	9.5	-	7.1	2.3	
ICTA POLOCHIC	89	7	90	5.8	26.7	6.8	38	795	605	815	9.4	-	6.7	2.1	
ICTA QUIRIGUA	89	7	90	7.6	26.2	6.1	42	770	375	640	8.7	-	7.1	2.1	
ICTA TEMPISQUE	89	7	90	6.8	27.0	5.9	56	775	505	700	9.7	-	7.1	2.3	
PICO NEGRO	89	7	90	6.8	24.2	6.0	84	590	-5	305	7.0	-	7.6	2.5	
PRECOZ ICTA	89	7	90	8.0	26.6	7.0	38	445	590	585	11.0	-	6.7	2.1	
TIKAL 2 EX CIAT	89	6	89	6.2	27.0	7.0	28	-	-	-	-	-	7.2	2.3	
							GUYANA								
6039	83	11	84	7.9	29.2	7.0	30	-	-	-	9.9	-	6.6	1.9	I
BLUEBELLE	83	11	84	9.9	21.8	4.7	36	-	-	-	9.6	-	7.3	2.0	I
CHAMPION	83	11	84	11.7	24.7	7.0	31	-	-	-	8.7	-	7.1	2.1	I
DIWANI	83	11	84	9.1	27.8	5.0	48	-	-	-	7.3	-	8.0	2.2	I
NO. 79	83	11	84	8.7	31.8	5.0	86	-	-	-	7.7	-	6.5	2.3	I
RUSTIC	83	11	85	7.2	31.2	7.0	57	-	-	-	9.5	-	8.0	1.8	I
STARBONNET	83	11	84	7.1	22.2	5.0	41	-	-	-	8.4	-	6.8	2.0	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu)[a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
VARIETY N	83	11	84	9.1	30.2	7.0	30	-	-	-	11.0	-	7.2	2.0	I
VARIETY S (IR1055)	83	11	84	7.3	29.8	7.0	29	-	-	-	10.3	-	6.5	2.3	I
VARIETY T	83	11	84	10.0	22.9	5.4	40	-	-	-	7.8	-	7.0	2.3	I
HAITI															
CRETE A PIERROT	90	6	91	5.6	20.3	4.9	55	1000	-160	370	5.1	-	7.1	2.0	
FOLTON	90	6	91	6.0	26.2	6.0	86	690	10	370	6.6	-	6.1	2.3	
MADAME BLANC	90	6	91	5.7	28.0	5.8	92	650	50	390	6.6	-	5.9	2.3	
MANZETA	90	6	91	5.6	29.4	5.6	91	600	115	405	6.8	-	6.0	2.3	
TORO CRYSTAL	90	6	91	6.3	28.4	6.0	89	605	190	475	7.8	-	7.0	2.4	
WALIPATE	90	6	91	6.6	23.3	5.3	54	765	-135	310	5.7	-	6.5	2.0	
HUNGARY															
316	89	7	90	6.8	19.8	6.4	66	635	-90	265	5.2	-	7.3	2.7	I
B-12	89	7	90	7.1	18.8	6.0	56	755	-180	255	4.9	-	7.0	2.6	I
B-13	89	7	90	7.7	19.2	6.6	54	735	-170	250	4.9	-	7.0	2.6	I
B-16	89	7	90	8.1	16.2	4.6	70	715	-145	255	4.7	-	7.0	2.6	I
DUBOVSZKIJ 129	67	10	67	8.2	20.0	7.0	-	785	-105	195	-	-	-	-	I
DUNGHAN SHALI	67	10	67	7.5	25.4	6.7	-	710	60	275	-	-	-	-	I
DUNGHAN SHALI	77	7	78	7.3	23.6	7.0	58	710	10	260	7.0	99	5.5	2.7	I
G-185	77	7	78	6.3	20.9	7.0	71	685	-35	190	4.6	128	5.6	2.7	I
G-195	77	7	78	7.3	23.7	7.0	52	750	-15	265	6.7	69	6.4	2.4	I
G-238	85	6	86	5.8	18.6	7.0	53	1025	-320	95	8.8	-	6.7	2.6	I
G-238/SZ-11	85	6	86	10.7	17.3	7.0	41	960	-395	25	9.1	-	6.8	2.5	I
G-242	85	6	86	5.7	17.0	6.9	60	1170	-510	55	7.6	-	5.8	2.6	I

G-258	77	7	78	6.4	23.0	7.0	54	755	-5	280	6.0	102	5.8	2.7	I
G-264	85	6	86	7.6	24.2	7.0	34	1005	-50	315	10.3	-	6.5	2.6	I
G-264/SZ-1	85	6	86	9.7	23.2	7.0	32	985	-145	260	10.5	-	6.4	2.3	I
G-316	77	7	78	7.8	23.9	6.7	57	735	-5	250	6.8	99	6.5	2.3	I
G-341	77	7	78	8.0	23.8	7.0	60	705	45	280	7.4	88	6.6	2.4	I
G-409	85	6	86	8.5	22.8	6.7	50	1070	-300	210	8.8	-	7.2	2.6	I
G-780	85	6	86	6.9	23.2	6.0	46	1240	-555	120	8.3	-	7.0	2.5	I
HEIJAN-14	85	6	86	7.8	17.4	7.0	46	930	-355	65	8.3	-	4.5	3.0	I
HSC-1	89	7	90	6.2	17.7	4.9	60	740	-175	255	4.5	-	7.0	2.6	
HSC-2	89	7	90	6.4	18.8	4.6	72	795	-195	260	5.4	-	7.4	2.6	
KAKAI 162	67	10	67	7.2	23.2	7.0		720	45	305	-	-	-	-	I
KAKAI 203	67	10	67	8.7	22.4	6.8	91	740	-45	265	-	-	-	-	I
KAKAI 203	77	7	78	6.4	22.2	7.0	63	680	20	240	6.0	102	5.4	2.7	I
KALARIS	85	6	86	6.6	14.5	4.8	80	1350	-610	80	7.4	-	5.4	2.6	I
KARMINA	89	7	90	6.8	22.8	7.0	31	495	245	460	7.6	-	6.8	2.7	I
KOROSTAF	89	7	90	7.6	21.8	7.0	33	570	95	280	7.2	-	5.9	2.7	I
M-225	85	6	86	8.1	17.6	7.0	49	980	-405	65	9.4	-	5.3	3.0	I
MUTASHALI	77	7	78	7.0	21.4	7.0	92	630	0	190	4.4	134	7.3	2.7	I
MUTASHALI	85	6	86	6.4	18.8	7.0	49	1060	-460	-35	7.8	-	7.3	2.8	I
NUCLEORYZA	77	7	78	6.6	23.6	7.0	48	600	200	340	7.7	69	5.5	2.7	I
NUCLEORYZA	85	6	86	6.2	22.5	7.0	39	1020	-170	220	9.5	-	6.0	2.8	I
OKI-3	89	7	90	7.6	17.0	7.0	55	625	-35	270	5.0	-	7.2	2.6	I
OLIMPIA	89	7	90	6.6	21.4	7.0	32	470	225	410	7.7	-	6.1	2.5	I
ORYZELLA	85	6	86	7.0	22.8	6.0	40	1190	-455	115	8.8	-	7.4	2.5	I
RINGOLA	89	7	90	7.1	23.4	6.8	45	670	55	390	7.3	-	7.4	2.5	I
SANDORA	89	7	90	5.8	23.2	7.0	44	665	5	345	6.5	-	7.0	2.6	I
SZARVASI 70	77	7	78	6.6	23.6	6.8	52	775	-15	270	6.2	99	5.4	2.7	I
SZARVASI KARCSIE	77	7	78	7.6	20.4	7.0	78	570	80	200	5.4	100	6.4	2.6	I
TIMIS 53	77	7	78	7.1	20.4	7.0	70	620	-5	165	5.8	97	4.4	3.0	I
VICA	85	6	86	6.7	23.6	6.4	41	1190	-405	125	9.3	-	6.9	2.2	I

INDIA (HYDERABAD & CUTTACK)

ADT35	81	7	81	-	22.9	5.4	76	-	-	-	-	-	-	-	I
AKASHI (IR8/N22)	79	4	80	9.0	27.5	5.4	100	455	380	410	7.0	85	-	-	I

	Crop year	Date analyzed (mo)	(yr)	Protein (%)	Amy-lose (%)	Alkali spread-ing value	Gel consis-tency (mm)	Amylograph viscosity Peak (Bu)[a]	Set-back (Bu)	Consis-tency (Bu)	Instron Hard-ness (kg)	Sticki-ness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
BAM9	64	7	65	7.6	22.6	5.1	-	875	535	660	-	-	-	-	I
BASMATI 370	73	5	73	9.2	17.6	3.7	39	-	-	-	-	-	6.9		1.9 I
BASMATI 370	79	4	80	6.7	22.3	5.0	74	640	-50	210	5.6	127	-	-	I
CAUVERY (TKME/TN-1)	73	5	73	9.2	28.0	5.4	-	-	-	-	-	-	-	-	I
CR2001	64	7	65	7.2	26.8	4.9	-	515	355	420	-	-	-	-	I
GEB24	73	5	73	8.4	26.5	7.0	32	-	-	-	-	-	-	-	I
IET1991	73	5	73	7.8	27.5	7.0	95	-	-	-	-	-	-	-	I
IET1991	73	5	73	11.3	25.8	7.0	77	-	-	-	-	-	-	-	I
IET2508	73	5	73	9.0	27.2	7.0	34	-	-	-	-	-	-	-	I
IET5656	79	4	80	10.2	27.4	5.5	70	775	205	400	7.3	95	-	-	I
IET5656	81	9	82	7.9	29.1	6.0	31	-	-	-	8.6	-	5.6		2.4 I
I ET5854	79	4	80	10.7	25.4	5.0	31	570	575	560	7.8	71	-	-	I
IET5897	81	9	82	7.3	29.2	6.0	88	-	-	-	7.1	-	5.2		2.6 I
IET6314	81	9	82	8.3	28.4	6.0	34	-	-	-	8.3	-	5.8		2.5 I
INDIA IR20	81	7	81	-	28.2	6.8	45	-	-	-	-	-	-	-	I
J192	64	7	65	6.3	22.0	6.0	- 735		325	495	-	-	-	-	I
JAGANNATH	73	5	73	8.8	27.8	4.8	-	-	-	-	-	-	-	-	I
JAYA (TN-1/T141)	73	5	73	8.2	26.8	7.0	42	-	-	-	-	-	-	-	I
JAYA (TN-1/T141)	73	5	73	9.0	26.3	7.0	43	-	-	-	-	-	6.1	2.5	I
JAYA (TN-1/T141)	81	9	82	6.8	29.1	7.0	30	-	-	-	9.0	-	6.5	2.6	I
K540	73	5	73	9.2	27.6	5.0	94	-	-	-	-	-	-	-	I
LATISAIL	73	5	73	7.6	28.0	5.0	28	-	-	-	-	-	-	-	I
MAHSURI	73	5	73	8.8	24.1	7.0	30	-	-	-	-	-	4.8		2.0 I
MAHSURI	79	4	80	10.6	27.0	5.0	31	670	460	515	7.6	76	-	-	I
MANOHARSALI	73	5	73	7.3	27.3	6.0	90	-	-	-	-	-	-	-	I
NEIKITCHIDI	81	7	81	-	23.4	4.2	62	-	-	-	-	-	-	-	I
PARAKKUM SITTU	81	7	81	-	28.1	7.0	86	-	-	-	-	-	-	-	I
PTB10	64	7	65	8.1	23.5	3.0	-	770	160	390	-	-	-	-	I
RASI	79	4	80	10.1	27.7	7.0	46	370	490	465	7.3	83	-	-	I
RATNA	73	5	73	9.2	27.8	7.0	97	-	-	-	-	-	-	-	I

RATNA	73	5	73	7.8	28.9	6.2	85	-	-	-	-	-	-	-	I
RP193-1	73	5	73	7.7	26.3	7.0	65	-	-	-	-	-	-	-	I
RP4-14	73	5	73	7.4	28.7	5.1	100	-	-	-	-	-	6.4	2.0	I
RP4-14	79	4	80	8.0	28.6	5.2	100	505	370	435	8.2	94	-	-	I
RP4-14	81	9	82	5.7	30.8	5.1	90	-	-	-	7.9	-	6.5	2.0	I
RP5-32	73	5	73	7.3	26.8	7.0	36	-	-	-	-	-	-	-	I
RP6-17	81	9	82	7.3	30.0	7.0	43	-	-	-	9.6	-	6.8	2.2	I
RP79-23	73	5	73	9.8	27.2	6.8	90	-	-	-	-	-	-	-	I
RPW6-17	79	4	80	10.3	27.5	6.3	38	675	355	460	7.8	83	-	-	I
SL013	73	5	73	7.5	26.7	6.9	100	-	-	-	-	-	-	-	I
SUREKHA	81	9	82	7.3	30.0	7.0	43	-	-	-	9.6	-	6.8	2.2	I
T141	64	7	65	7.9	23.7	5.7	-	425	315	350	-	-	-	-	I
T141	73	5	73	10.1	26.2	6.9	100	-	-	-	-	-	-	-	I
T3	73	5	73	8.3	18.6	4.5	65	-	-	-	-	-	-	-	I
T90	73	5	73	8.7	25.5	6.9	100	-	-	-	-	-	-	-	I
TELLAHAMSA	79	4	80	11.2	27.7	7.0	32	630	570	610	8.4	84	-	-	I
TELLAHAMSA	81	9	82	9.0	29.4	7.0	32	-	-	-	9.1	-	6.7	2.0	
VANI (IR8/CR1014)	79	4	80	9.0	28.1	7.0	88	335	325	310	7.6	87	-	-	I
VELLAI PONNI	81	7	81	-	27.8	6.7	32	-	-	-	-	-	-	-	I
VIJAYA (T90/IR8)	73	5	73	8.7	28.2	6.2	86	-	-	-	-	-	-	-	I

INDIA (MAHARASHTRA)

AMBEMOHAR 157	73	5	73	7.1	21.2	3.6	86	-	-	-	-	-	-	-	I
JS180	73	5	73	6.9	29.0	4.6	40	-	-	-	-	-	-	-	I
KALA RATNA 1-24	73	5	73	7.6	30.3	4.4	42	-	-	-	-	-	-	-	I
KAMOD 253	73	5	73	6.5	24.9	4.8	80	-	-	-	-	-	-	-	I
KARJAT 116	73	5	73	5.4	28.6	7.0	32	-	-	-	-	-	-	-	I
KARJAT14-7	73	5	73	7.0	31.2	7.0	42	-	-	-	-	-	-	-	I
KARJAT 184	73	5	73	5.8	31.6	7.0	39	-	-	-	-	-	-	-	I
KARJAT7-3A	73	5	73	6.7	31.4	7.0	46	-	-	-	-	-	-	-	I
KOLAMBA 42	73	5	73	4.9	31.6	3.8	39	-	-	-	-	-	-	-	I
KOLAMBA 540	73	5	73	4.7	31.6	4.5	41	-	-	-	-	-	-	-	I
PALGHAR60	73	5	73	6.3	31.2	7.0	35	-	-	-	-	-	-	-	I
RATNAGIRI24	73	5	73	6.9	27.9	6.9	70	-	-	-	-	-	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
SATYA	73	5	73	6.0	30.1	5.2	50	-	-	-	-	-	-	-	I
ZINYA 14	73	5	73	5.9	30.5	4.7	69	-	-	-	-	-	-	-	I
INDONESIA															
+2791MR-257-2	79	-	80	8.3	21.9	2.3	75	825	-205	215	-	-	6.3	2.3	I
221/BC IV/I/45/8/2	63	8	63	7.4	23.1	4.9	-	960	-270	250	-	-	-	-	I
221/BC IV/I/45/8/2	63	8	63	7.6	23.8	4.9	-	835	-10	350	-	-	-	-	I
531B/TK/8/16/PN/3	71	10	71	8.6	22.2	4.2	50	-	-	-	-	-	-	-	I
ANGKONG	79	-	80	9.2	23.4	4.4	63	780	-60	300	7.1	119	5.3	2.2	I
ASAHAN (IR2071-621-2)	78	11	79	-	13.8	7.0	79					-	5.5	2.2	I
BAHBUTONG	85	6	86	9.5	21.0	4.2	45	1340	-550	195	7.1	-	6.1	2.5	I
BANIH HIRANG 1 (ACC 57553)	83	-	83	-	28.4	5.2	45	-	-	-	-	-	-	-	T
BANIH HIRANG 2 (ACC 57554)	83	-	83	-	28.6	5.0	48	-	-	-	-	-	-	-	T
BANIH PEKAT 1 (ACC 57555)	83	-	83	-	27.9	5.2	32	-	-	-	-	-	-	-	T
BANIH TAYAN 1 (ACC 57556)	83	-	83	-	1.6	6.0	100	-	-	-	-	-	-	-	T
BAOK	63	8	63	7.6	23.2	5.7	-	885	-200	295	-	-	-	-	I
BAO K	71	10	71	7.1	23.7	5.0	82	-	-	-	-	-	-	-	I
BAOK III	79	-	80	7.5	22.1	6.0	26	830	-135	295	6.8	120	5.2	2.6	U
BATANG PANE	85	6	86	9.5	27.2	4.9	38	900	60	365	8.8	-	6.4	2.5	I
BAYAR KUNING (ACC 57557)	83	-	83	-	28.4	4.4	49	-	-	-	-	-	-	-	T
BAYAR KUNING 1 (ACC 57558)	83	-	83	-	28.3	5.4	40	-	-	-	-	-	-	-	T

BAYAR KUNING 2 (ACC 57559)	83	-	83	-	27.4	5.5	30	-	-	-	-	-	-	-	T
BEAK GANGGAS	63	8	63	8.4	22.0	6.0	-	940	-255	255	-	-	-	-	I
BEAK GANGGAS	71	10	71	8.0	24.7	6.0	63	-	-	-	-	-	-	-	I
BENGAWAN	63	8	63	7.4	22.8	4.9	-	890	-170	325	-	-	-	-	I
BENGAWAN	71	10	71	7.5	26.2	5.0	67	-	-	-	-	-	-	-	I
BENGAWAN	76	6	76	5.3	24.4	6.0	76	915	-165	270	7.1	88	-	-	I
BENONG 130	63	8	63	8.4	24.2	5.9	-	820	-140	320	-	-	-	-	I
BENONG 130	71	10	71	7.8	24.8	6.0	49	-	-	-	-	-	-	-	T
BIBIT DELAPAN 1 (ACC 57560)	83	-	83	-	28.6	4.6	46	-	-	-	-	-	-	-	T
BIJI NANGKA (ACC 57561)	83	-	83	-	27.8	5.6	35	-	-	-	-	-	-	-	T
BILIS/BANIH HIRANG 1 (ACC 57562)	83	-	83	-	27.8	5.1	34	-	-	-	-	-	-	-	T
BJM10	86	4	87	7.2	27.8	5.0	32	925	-45	40	9.2	-	5.2	2.3	D
BJM11	86	4	87	7.5	29.8	5.8	32	870	5	265	9.6	-	6.3	1.7	D
BJM12	86	4	87	7.2	29.3	5.0	36	855	135	415	9.8	-	5.8	2.1	D
BJM13	86	4	87	7.1	29.0	5.2	34	840	160	410	8.8	-	6.1	1.8	D
BJM14	86	4	87	8.5	27.9	5.1	29	885	140	425	8.9	-	5.5	1.8	D
BJM15	86	4	87	7.2	27.6	5.0	30	815	70	335	9.0	-	6.4	2.0	D
BJM16	86	4	87	7.4	7.6	7.0	83	555	-195	-	7.1	-	6.2	2.1	D
BJM17	86	4	87	6.8	28.8	5.0	32	875	-65	225	9.4	-	6.6	2.1	D
BJM3	86	4	87	8.1	27.8	6.1	28	815	200	435	9.6	-	6.2	1.5	D
BJM4	86	4	87	6.7	29.8	5.0	32	915	25	315	9.0	-	5.4	2.0	D
BJM5	86	4	87	7.1	28.6	5.0	32	930	-60	275	8.8	-	5.6	2.0	D
BJM6	86	4	87	6.8	29.0	5.2	30	900	140	425	9.1	-	6.2	1.6	D
BJM7	86	4	87	6.8	4.8	7.0	94	635	-230	15	6.6	-	6.2	2.1	D
BJM8	86	4	87	7.4	27.6	5.0	30	820	25	300	8.7	-	5.3	1.9	D
BJM9	86	4	87	7.0	28.6	6.0	32	805	60	295	8.6	-	6.0	1.6	D
BOGOWONTO	85	6	86	8.7	24.2	4.6	33	1195	-260	295	9.3	-	5.5	2.3	I
BRANTAS	78	11	79	-	28.5	4.3	67	-	-	-	-	-	6.8	2.2	I
C4-63G	78	11	79	-	25.3	4.3	70	-	-	-	-	-	6.2	2.2	I
CENDRAWATI	79	-	80	5.0	24.5	6.2	67	30	-85	270	5.6	176	5.2	2.6	U
CIKAPUNDONG	85	6	86	7.8	22.0	5.0	50	1370	-550	170	7.3	-	5.9	2.5	I
CISADANE	79	-	80	8.5	21.2	3.2	64	790	-150	225	5.9	124	6.3	2.3	I

	Crop year	Date analyzed		Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity			Instron		Length (mm)	Width (mm)	Water regime[b]
		(mo)	(yr)					Peak (Bu)[a]	Setback (Bu)	Consistency (Bu)	Hardness (kg)	Stickiness (g-crn)			
CISADANE	80	3	80	7.9	22.1	4.3	58	-	-	-	5.9	-	-	-	I
CISADANE	85	6	86	9.5	21.1	4.7	42	1250	-330	265	7.6	-	6.2	2.5	I
CISOKAN	85	6	86	10.6	25.6	3.0	33	705	345	440	9.7	-	5.9	2.2	I
CITARUM	78	11	79	-	19.8	3.8	70	-	-	-		-	7.0	2.4	I
CITARUM	79	-	80	8.0	24.5	5.0	50	750	-95	255	7.2	126	6.9	2.7	I
DARUN 1 (ACC 57563)	83	-	83	-	25.4	4.9	34	-	-	-		-	-	-	T
DEWI RATIH	76	6	76	5.1	28.3	5.9	53	1050	235	465	7.5	65	-	-	I
DJAMBU 129	63	8	63	8.1	24.4	5.4	-	820	-150	315	-	-	-	-	I
DJELITA	63	8	63	6.3	31.2	4.9	-	1030	260	590	-	-	-	-	I
DWARF BIJI/NANG-KALAYANG (ACC 57564)	83	-	83	-	23.0	5.5	34	-	-	-	-	-	-	-	T
GADIS CIAMIS	79	-	80	10.7	20.3	3.1	50	655	25	100	6.9	112	5.6	2.3	I
GADIS JAMBE	79	-	80	10.5	19.9	3.0	70	810	-160	230	6.9	126	5.4	2.3	I
GROPAK GEDE 97	63	8	63	7.8	22.8	6.0	-	910	-240	260					I
HAWARBATU	79	-	80	6.3	24.9	6.3	74	705	-40	295	7.0	141	5.6	2.5	U
IR34	78	11	79	-	28.0	7.0	30	-	-	-	-	-	6.8	2.1	I
IR38	78	11	79	-	22.7	4.2	58	-	-	-	-	-	6.2	1.8	I
IR8	71	4	71	-	26.0	-	-	-	-	-	-	-	-	-	I
JIDAH	79	-	80	8.5	26.2	6.3	26	900	445	675	8.2	81	5.9	2.3	U
KAMUNING (ACC 57565)	83	-	83	-	28.6	5.2	45	-	-	-	-	-	-	-	T
KAPUAS (ACC 57566)	83	-	83	-	23.4	5.2	38	-	-	-	-	-	-	-	T
KARANG-DUKU 1 (ACC 54101)	83	-	83	-	29.0	4.9	47	-	-	-	-	-	-	-	T
KATUMBAR KUNING 1 (ACC 57567)	83	-	83	-	27.9	5.2	43	-	-	-	-	-	-	-	T
KATUMBAR PUTIH 1 (ACC 17805)	83	-	83	-	27.6	5.0	73	-	-	-	-	-	-	-	T
KENCANA MUARA	70	-	80	8.6	27.3	4.9	79	600	285	440	7.4	92	6.5	2.2	U
KEWAL	79	-	80	6.5	24.3	5.6	56	780	-100	250	6.7	135	6.0	2.2	U

KRIAU 1 (ACC 57568)	83	-	83	-	1.4	6.3	100	-	-	-	-	-	-	-	T
KRUENG ACEH	85	6	86	8.8	20.9	3.0	38	1250	-455	155	7.7	-	5.9	2.5	I
LAKATAN GADUR 1 (ACC 57569)	83	-	83	-	1.5	6.4	100	-	-	-	-	-	-	-	T
LAKATAN LAKATUT 1 (ACC 57570)	83	-	83	-	1.5	6.8	100	-	-	-	-	-	-	-	T
LAKATAN LAKATUT2 (ACC 57571)	83	-	83	-	23.7	5.8	45	-	-	-	-	-	-	-	T
LAKATAN PAHU 1 (ACC 57572)	83	-	83	-	27.9	5.5	34	-	-	-	-	-	-	-	T
LAYANG KUNING 1 (ACC 57573)	83	-	83	-	27.8	5.8	38	-	-	-	-	-	-	-	T
LAYANG PUTIH 1 (ACC 57574)	83	-	83	-	23.4	5.8	40	-	-	-	-	-	-	-	T
LAYANG PUTIH 2 (ACC 57575)	83	-	83	-	27.2	5.2	50	-	-	-	-	-	-	-	T
LEMO 1 (ACC 20207)	83	-	83	-	27.5	5.9	51	-	-	-	-	-	-	-	T
MANDOLIN	79	-	80	7.7	14.9	2.7	58	850	-240	210	6.5	196	6.4	2.2	U
MAYOR	79	-	80	7.1	24.3	6.3	50	640	5	275	7.0	133	5.6	2.7	U
PADI GABADUL 1 (ACC 57576)	a3	-	83	-	28.0	5.2	50	-	-	-	-	-	-	-	T
PALINGKAU1 (ACC 57577)	83	-	83	-	27.6	5.5	44	-	-	-	-	-	-	-	T
PANDANWANGI	79	-	80	8.6	23.8	6.7	40	705	-20	260	6.9	126	6.3	2.5	U
PELITA 1-1	71	10	71	6.6	24.5	2.6	74	-	-	-	-	-	-	-	I
PELITA 1-1	76	6	76	6.7	23.4	3.6	76	960	-175	270	6.5	72	5.8	2.6	I
PELITA 1-1	78	11	79	-	22.7	4.2	58	-	-	-	-	-	5.8	2.2	I
PELITA 1-2	71	10	71	7.5	25.5	5.7	38	-	-	-	-	-	-	-	I
PELITA 1-2	78	11	79	-	23.3	5.4	78	-	-	-	-	-	6.1	2.2	I
RADEN SAW0 (ACC 57578)	83	-	83	-	28.2	5.4	83	-	-	-	-	-	-	-	T
REMADJA	63	8	63	7.2	30.4	4.9		990	240	565	-	-	-	-	I
RENDAH PADANG	79	-	80	6.1	27.5	4.8	35	955	200	545	7.3	99	5.7	2.2	I
RENDAH PADANG (ACC 43740)	83	-	83	-	28.7	5.0	56	-	-	-	-	-	-	-	T
RENDAHPADANG2 (ACC 57579)	a3	-	83	-	29.0	4.8	46	-	-	-	-	-	-	-	T

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
ROJOLELE	71	4	71	-	27.0	-	-	-	-	-	-	-	-	-	I
ROJOLELE	76	6	76	8.0	23.8	5.9	100	7 10	-110	210	6.1	76	6.2	2.4	I
ROJOLELE	79	-	80	10.2	22.0	4.8	79	845	-180	225	5.9	131	7.4	2.6	U
SARANG BURUNG (ACC 18690)	83	-	83	-	27.4	6.0	43	-	-	-	-	-	-	-	T
SARIMAHI	79	-	80	9.7	23.0	4.8	44	820	-90	300	7.4	116	5.9	2.4	I
SEMERU (IR2307-247-2-2-3)	79	-	80	8.6	25.4	7.0	66	460	455	515	7.1	85	6.4	2.1	I
SEMERU (IR2307-247-2-2-3)	80	3	80	8.9	28.9	7.0	60	-	-	-	7.1	-	6.2	2.1	I
SEMERU (IR2307-247-2-2-3)	85	6	86	8.7	25.7	7.0	58	455	340	390	8.7	-	6.7	2.2	I
SENTANI	85	6	86	8.4	19.0	3.8	52	1310	-510	170	8.0	-	6.9	2.2	I
SERATUS MALAM	71	10	71	10.4	23.9	4.3	54	-	-	-	-	-	-	-	I
SERATUS MALAM	76	6	76	6.6	24.0	6.0	66	925	-130	260	6.7	76	-	-	I
SERATUS MALAM	79	-	80	9.6	23.1	5.0	55	730	15	295	7.0	108	7.1	2.7	U
SERATUS MALAM	81	-	82	8.7	23.0	6.0	38	-	-	-	-	-	-	-	
SERAYU	78	11	79	-	28.5	5.0	52	-	-	-	-	-	5.5	2.5	I
SERAYU	79	-	80	9.8	26.1	4.9	64	670	305	500	7.3	91	6.5	2.8	I
SIBUNG RENDAH (ACC 57580)	83	-	83	-	27.4	5.0	43	-	-	-	-	-	-	-	T
SIBUNG TINGGI 1 (ACC 57581)	83	-	83	-	27.7	4.9	41	-	-	-	-	-	-	-	T
SIGADIS	63	8	63	8.2	27.8	4.9	-	1000	200	545	-	-	-	-	I
SUKANANDI	63	8	63	7.6	23.2	5.4	-	960	-60	360	-	-	-	-	I
SUKANANDI	71	10	71	7.6	23.9	5.6	65	-	-	-	-	-	-	-	I
SYNTHA	71	10	71	6.2	25.2	5.3	56	-	-	-	-	-	-	-	I
SYNTHA	79	-	80	7.3	26.1	2.5	42	985	240	550	8.0	95	6.5	2.0	I

TAMPOKONG KUNING (ACC. 57582)	83	-	83	-	28.0	6.0	34	-	-	-	-	-	-	-	T
TAMPOKONG PUTIH 1 (ACC 18973)	83	-	83	-	20.3	7.0	82	-	-	-	-	-	-	-	T
TUNTANG	85	6	86	8.0	27.6	5.0	37	885	65	350	8.1	-	6.6	2.4	I
UMBANG GADABUNG 1 (ACC 57583)	83	-	83	-	27.7	5.2	53	-	-	-	-	-	-	-	T
UMBANG GADABUNG 2 (ACC 57584)	83	-	83	-	28.7	5.3	44	-	-	-	-	-	-	-	T
UMBANG KABATIK 1 (ACC 57585)	83	-	83	-	27.9	5.5	48	-	-	-	-	-	-	-	T
UMBANG KABATIK 2 (ACC 57586)	83	-	83	-	27.8	5.4	50	-	-	-	-	-	-	-	T
UMBANG KENCANA 1 (ACC 57587)	83	-	83	-	28.0	5.7	36	-	-	-	-	-	-	-	T
UMBANG PUTIH 1 (ACC 57589)	83	-	83	-	28.2	5.8	52	-	-	-	-	-	-	-	T
UMBANG SAMPAHIRANG (ACC 57590)	83	-	83	-	27.3	6.1	38	-	-	-	-	-	-	-	T
UMBANG SAMPAHIRANG 2 (ACC 57591)	83	-	83	-	10.5	7.0	80	-	-	-	-	-	-	-	T
WULUNG	79	-	80	7.3	24.0	7.0	48	805	65	400	8.1	116	6.1	2.5	U

IRAN

172	66	6	67	4.8	14.8	6.0	-	910	-320	140	-	-	-	-	I
346 NO316 ITALY (JAPONICA)	66	6	67	10.0	15.0	6.0	-	820	-200	200	-	-	-	-	I
ADVANCED LINE 1033	85	7	86	7.1	27.3	7.0	28	805	485	570	8.8	-	7.2	2.0	I
AHLAMI-TAROM	85	7	86	8.1	25.7	5.6	42	730	-75	155	7.3	-	6.8	2.0	I
AMOL-2 (IR28)	85	7	86	7.1	28.9	7.0	28	840	455	595	9.1	-	6.6	2.1	I
BINAM	85	7	86	7.9	21.6	5.0	50	750	-230	90	7.4	-	6.6	2.1	I
BINAM (BEENAM)	66	6	67	11.8	22.9	5.3	-	925	-195	265	-	-	-	-	I
DOM SAFID (DUM SAFID)	66	6	67	11.2	18.3	5.3	-	845	-135	250	-	-	-	-	I
DOM SIAH (DUM SIAH)	66	6	67	10.8	17.2	5.0	75	940	-190	260	-	-	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu) [a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
DOM SIAH (DUM SIAH)	73	8	74	9.4	20.8	5.7	46	-	-	-	7.5	50	7.2	1.9	I
DOM SIAH (DUM SIAH)	85	7	86	8.6	22.9	5.1	54	720	-180	90	8.3	-	6.9	2.1	I
DOM SUFFAID 76 (DUM SAFID 76)	73	8	74	8.8	20.4	4.2	48	-	-	-	-	-	-	-	I
DOM SURKH (DUM SURKH)	73	8	74	10.2	21.0	5.2	53	-	-	-	-	-	-	-	I
DOM ZARD (DUM ZARD)	66	6	67	10.7	19.9	5.3	-	930	-200	250	-	-	-	-	I
DOM ZARD (DUM ZARD)	73	8	74	10.0	20.0	5.6	50	-	-	-	-	-	-	-	I
FEEROUZ	66	6	67	11.3	19.2	4.0	-	940	-220	255	-	-	-	-	I
GARM CHAMPA	66	6	67	7.7	27.4	5.0	-	-	-	-	-	-	-	-	I
GHARIB	66	6	67	12.3	17.2	5.0	-	-	-	-	-	-	-	-	I
GILL-1	85	7	86	7.8	28.0	5.5	32	635	90	245	9.1	-	6.8	2.2	I
HARAZ	85	7	86	7.1	28.8	7.0	36	820	355	465	9.7	-	7.4	2.2	I
HASSANEE	85	7	86	9.6	22.4	7.0	36	670	0	125	9.1	-	6.3	2.6	I
KHAZAR	85	7	86	8.8	22.5	4.8	56	805	-250	80	7.7	-	7.0	1.9	I
MEHR	66	6	67	10.1	19.0	4.2	-	1000	-120	355	-	-	-	-	I
MEHR 111	73	8	74	9.0	21.8	5.1	60	-	-	-	-	-	-	-	I
MEHR 131	73	8	74	8.6	22.2	5.8	80	-	-	-	-	-	-	-	I
MIRZA AMBERBOW	73	8	74	9.5	20.3	4.0	66	-	-	-	-	-	-	-	I
MOOSA TAROM 1 (MOOSA TARON 1)	66	6	67	9.6	19.3	5.0	-	805	-60	285	-	-	-	-	I
MOOSA TAROM 110 (MUSSA TAROM 110)	73	8	74	8.4	21.3	4.8	54	-	-	-	-	-	-	-	I
SALARI (SALARIE)	66	6	67	11.1	20.9	5.6	-	875	-155	245	-	-	-	-	I
SALARI (SALARIE)	73	6	67	9.6	21.0	4.3	56	-	-	-	-	-	-	-	I
SARD CHAMPA	66	6	67	8.0	27.5	5.0	-	560	140	300	-	-	-	-	I
TAICHUNG 65	66	6	67	8.8	16.1	6.0	-	725	-130	195	-	-	-	-	I
TAROM-AMOL	85	7	86	8.9	24.2	5.0	49	705	-130	115	8.1	-	7.0	2.0	I

ITALY

ARBORIO	64	5	65	8.3	17.1	7.0	-	740	-95	145	-	-	-	-	I
ARBORIO	72	6	73	7.8	20.2	7.0	46	-	-	-	-	-	-	-	I
ARBORIO	77	6	78	7.6	20.6	7.0	89	640	-60	160	4.1	106	6.4	3.0	I
BAHIA	82	12	82	-	20.8	7.0	85	-	-	-	4.4	-	5.5	2.9	
BALD0	77	6	78	7.1	20.6	7.0	90	645	-25	200	4.9	102	6.6	2.8	I
BALILLA	72	6	73	5.8	20.8	7.0	48	-	-	-	-	-	-	-	I
BALILLA	77	6	78	6.3	22.0	7.0	92	580	40	165	4.2	108	4.7	2.7	I
BALILLA GRANA GROSSA	64	5	65	5.6	16.5	7.0	-	775	45	325	-	-	-	-	I
BONNET BELL	90	6	91	7.5	23.4	7.0	42	440	205	380	7.5	-	6.9	2.7	
CARNAROLI	90	6	91	6.8	24.1	7.0	32	480	155	365	7.0	-	7.1	3.2	
ELIO	90	6	91	6.1	25.4	7.0	40	425	195	320	6.5	-	4.9	3.1	
EUROPA	72	6	73	7.8	20.2	7.0	49	-	-	-	-	-	-	-	I
EUROPA	77	6	78	6.8	20.4	7.0	86	645	-55	170	4.4	111	5.7	2.5	I
GRITNA	77	6	78	7.5	21.0	7.0	79	680	-50	160	5.2	91	6.5	2.5	I
ITALPATNA	72	6	73	6.7	20.7	7.0	50	-	-	-	-	-	-	-	I
ITALICO RONCAROLO	82	12	82	-	19.4	7.0	68	-	-	-	4.4	-	4.5	2.7	
LIDO	82	12	82	-	20.6	7.0	62	-	-	-	5.2	-	5.3	2.3	
MARATELLI	72	6	73	5.4	21.2	7.0	58	-	-	-	-	-	-	-	I
MONTICELLI	82	12	82	-	20.7	7.0	70	-	-	-	3.2	-	5.3	3.0	
ORIGINARIO	82	12	82	-	21.0	7.0	68	-	-	-	4.4	-	4.7	2.8	
PADANO	77	6	78	6.1	21.1	7.0	92	660	-50	190	4.1	118	5.1	2.9	I
RAFFAELLO	72	6	73	6.7	23.7	7.0	28	-	-	-	-	-	-	-	I
RAFFAELLO	76	12	76	6.8	24.7	7.0	36	550	175	390	7.4	52	-	-	I
RAZZA 82	64	5	65	7.2	15.2	5.0	-	980	-295	190	-	-	-	-	I
RIBE	72	6	73	6.6	19.2	7.0	78	-	-	-	-	-	-	-	I
RIBE	77	6	78	6.8	19.8	7.0	89	710	-90	170	5.0	130	6.1	2.6	I
RINALDO BERSANI	64	5	65	8.0	16.8	7.0	-	820	-50	280	-	-	-	-	I
RINALDO BERSANI 265	64	5	65	6.9	15.1	6.8	-	880	-140	220	-	-	-	-	I
RING0	77	6	78	6.6	20.7	7.0	91	710	-95	175	4.2	115	6.1	2.5	I
RIZZOTTO 264	64	5	65	6.5	16.9	7.0		920	-160	260	-	-	-	-	I
ROMA	72	6	73	6.8	17.1	6.0	99	-	-	-	-	-	-	-	I
ROMA	77	6	78	7.3	18.2	7.0	94	655	-135	120	4.0	144	6.1	2.8	I
ROSAMARCHETTI	72	6	73	7.7	20.0	7.0	74	-	-	-	-	-	-	-	I
ROSAMARCHETTI	77	6	78	6.5	21.4	7.0	89	640	-40	160	4.6	91	5.5	2.7	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amy-lose (%)	Alkali spread-ing value	Gel consis-tency (rnm)	AMylograph viscosity Peak (Bu) [a]	Set-back (Bu)	Consis-tency (Bu)	Instron Hard-ness (kg)	Sticki-ness (g-cm)	Length (mm)	Width (rnm)	Water regime [b]
SANT ANDREA	82	12	82	-	21.6	7.0	72	-	-	-	4.2	-	6.0	2.9	
STIRPE 136	64	5	65	6.3	19.3	7.0	-	800	-105	230	-	-	-	-	I
VENERIA	82	12	82	-	20.2	7.0	72	-	-	-	4.6	-	5.9	2.6	
VIALONE	64	5	65	8.1	19.3	6.8	-	930	125	445	-	-	-	-	I
VIALONE NANO	72	6	73	7.5	22.6	7.0	40	-	-	-	-	-	-	-	I
VOLANO	82	12	82	-	20.2	7.0	55	-	-	-	4.0	-	6.6	3.2	
							IVORY COAST								
BG141	88	8	88	6.5	28.0	5.0	66	640	130	340	8.8	-	5.7	2.5	I
BG141	88	8	88	8.4	27.1	5.0	54	445	190	335	8.1	-	5.5	2.5	U
BG187	88	8	88	6.5	27.5	5.2	53	500	230	255	7.7	-	5.4	2.4	U
BG187	88	8	88	9.1	26.7	5.0	46	565	205	360	8.8	-	5.8	2.5	I
CHIANAN 8	88	8	88	8.2	15.6	7.0	68	690	-270	-	6.4	-	4.9	3.0	I
DOURADO	88	8	88	7.0	25.7	5.2	68	605	-115	180	8.8	-	7.2	2.5	U
DOURADO	88	8	88	8.2	24.7	5.0	44	720	-235	105	6.6	-	7.1	2.6	I
IAC164 EX INGER	88	11	90	10.9	22.0	5.0	38	685	30	340	6.7	-	7.2	2.7	U
IRAT144	88	8	88	7.0	16.7	4.7	76	820	-380	100	6.2	-	6.5	2.8	U
IRAT144	88	8	88	9.1	15.9	5.0	77	805	-345	125	7.3	-	6.5	2.8	I
IRAT156	88	8	88	6.8	17.0	4.7	75	700	-295	120	6.3	-	6.5	2.5	U
IRAT156	88	8	88	7.3	16.9	4.8	78	890	-390	125	6.8	-	6.5	2.7	I
MOROBEREKAN EX INGER	88	11	90	8.6	21.7	6.0	50	630	-85	270	6.0	-	6.7	2.6	U
PALAWAN	88	8	88	7.6	21.5	5.0	40	550	-210	95	7.3	-	5.3	2.6	U
PALAWAN	88	8	88	6.3	22.9	5.0	44	785	-280	375	6.9	-	5.9	2.8	I
TEKSICHUT	88	8	88	7.0	26.8	5.0	40	555	220	435	7.6	-	6.2	2.4	U
TEKSICHUT	88	8	88	7.9	27.5	5.0	44	655	125	195	8.4	-	6.2	2.4	I
TJEMPOVELUT	88	8	88	7.7	23.1	5.6	36	590	-145	175	7.8	-	5.8	2.6	U
TJEMPOVELUT	88	8	88	8.4	23.6	5.9	42	765	-205	375	8.4	-	5.9	2.8	I

ZAKPALE 3	88	8	88	8.1	26.7	5.0	37	540	200	375	8.7	-	5.6	2.4	U
ZAKPALE 3	88	8	88	8.4	27.3	5.0	39	575	205	85	8.5	-	5.9	2.5	I

JAPAN

AKENOHOSHI	86	-	88	6.8	14.1	3.4	-	-	-	-	5.6	120	5.0	2.7	I
AKENOHOSHI	86	-	88	7.7	14.6	3.0	-	-	-	-	6.1	104	5.2	2.6	I
AKIBARE	72	8	73	6.4	18.2	7.0	88	-	-	-	-	-	-	-	I
AKIHIKARI	86	-	88	7.8	14.6	7.0	-	-	-	-	6.8	105	4.6	2.6	I
AKIHIKARI	86	-	88	6.8	14.1	7.0	-	-	-	-	5.5	114	4.7	2.7	I
AKIHIKARI	86	-	88	7.0	14.7	7.0	-	-	-	-	6.0	100	4.7	2.8	I
CHUGOKU 102	86	-	88	6.9	14.2	3.8	-	-	-	-	5.7	121	5.4	2.7	I
FUJIMINORI	72	8	73	7.1	18.8	7.0	92	-	-	-	-	-	-	-	I
H87-88	89	12	90	7.6	13.5	3.8	44	840	-10	410	4.6	-	6.9	2.0	
HATSUNEMOCHI	70	-	71	7.6	1.0	6.5	-	515	-75	45	-	-	-	-	I
HATSUNEMOCHI	70	-	71	6.5	1.0	6.7	81	595	-100	45	6.0	370	-	-	I
HIERI (AROMATIC)	81	-	82	7.6	20.3	4.7	88	-	-	-	-	-	-	-	
HOKURIKU 129	86	-	88	6.5	14.0	7.0	-	-	-	-	5.0	97	5.2	2.3	I
HOKURIKU 130	86	-	88	6.9	14.4	6.4	-	-	-	-	6.2	115	6.4	3.0	I
HOKURIKU 133	86	-	88	6.9	14.3	6.5	-	-	-	-	5.3	100	5.1	2.8	I
HOKURIKU NO. 52	66	2	67	7.4	15.6	7.0	-	665	-35	255	-	-	-	-	I
HONENWASE	72	8	73	7.3	16.1	6.0	100	-	-	-	-	-	-	-	I
HONENWASE	76	12	76	6.6	16.7	7.0	68	690	-115	185	6.6	89	4.6	2.7	I
HONENWASE	86	-	88	6.9	14.4	7.0	-	-	-	-	5.2	115	4.6	2.7	I
ISHIKARI	80	9	82	7.2	21.6	7.0	56	-	-	-	-	-	4.9	2.7	
KANTO 138	86	-	88	8.8	14.5	7.0	60	-	-	-	6.5	115	5.0	3.0	I
KINMAZE	72	8	73	6.0	17.6	7.0	100	-	-	-	-	-	-	-	I
KINNANPUU	66	2	67	6.4	12.1	6.4	-	715	-120	215	-	-	4.7	2.7	I
KINPA	76	12	76	5.4	19.1	7.0	55	585	-50	185	6.1	72	4.4	2.6	I
KIYONISHIKI	86	-	88	6.8	15.2	7.0	-	-	-	-	6.0	112	4.6	2.7	I
KOGANEMOCHI	70	-	71	6.5	1.0	6.3	86	560	-80	35	5.6	326	-	-	I
KOSHIHIKARI	66	2	67	6.0	12.4	7.0	-	770	-160	220	-	-	-	-	I
KOSHIHIKARI	72	8	73	5.2	15.6	6.0	100	-	-	-	-	-	-	-	I
KOSHIHIKARI	76	12	76	5.0	17.3	7.0	66	625	-195	65	5.9	81	4.6	2.6	I
KOSHIHIKARI	86	-	88	6.3	13.3	7.0	-	-	-	-	4.7	119	4.8	2.6	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-crn)	Length (mm)	Width (mm)	Water regime [b]
KOSHIJIWASE	66	2	67	7.8	13.6	7.0	-	710	-80	215	-	-	-	-	I
KOSHIJIWASE	72	8	73	7.3	15.2	6.0	100	-	-	-	-	-	-	-	I
KOSHIMINORI	80	9	82	5.4	21.3	5.4	64	-	-	-	-	-	4.7	2.8	
KOSHINISHIKI	76	12	76	6.0	16.2	7.0	66	675	-230	85	6.0	92	4.9	2.7	I
MILYANG 23	86	-	88	7.1	16.4	7.0	-	-	-	-	6.2	93	6.0	2.4	I
MILYANG 23	86	-	88	8.0	14.6	7.0	-	-	-	-	6.2	108	6.5	2.3	I
NAKATAMOCHI	70	-	71	7.0	1.0	7.0	90	350	-5	80	5.9	347	-	-	I
NAKATE-SHINSENBON	72	8	73	7.1	16.7	7.0	100	-	-	-	-	-	-	-	I
NAN-EI	64	-	64	12.0	19.5	7.0	-	-	-	-	-	-	-	-	I
NIHONBARE	80	9	82	6.4	19.8	7.0	57	-	-	-	-	-	4.9	2.9	
NIPPONBARE	72	8	73	7.0	18.5	6.6	100	-	-	-	-	-	4.7	2.8	I
NIPPONBARE	86	-	88	8.7	14.6	7.0	-	-	-	-	6.7	87	4.9	2.7	I
NIPPONBARE	86	-	88	7.2	15.4	7.0	-	-	-	-	6.2	89	4.9	2.8	I
NIPPONBARE	86	-	88	7.8	15.1	6.9	-	-	-	-	6.3	110	5.1	2.7	I
NORIN 1	66	2	67	7.0	13.9	7.0	-	715	-105	215	-	-	-	-	I
NORIN 1	70	-	71	9.6	1.0	7.0	86	350	-15	65	6.9	267	-	-	I
NORIN 25	63	-	64	8.1	21.2	7.0	-	560	150	315	-	-	-	-	I
NORIN 41	64	-	64	8.9	17.5	7.0	-	-	-	-	-	-	-	-	I
OUU324	86	-	88	7.8	13.7	7.0	-	-	-	-	6.0	109	5.0	2.7	I
OUU325	86	-	88	6.5	15.0	7.0	-	-	-	-	5.3	104	4.8	2.7	I
OUU326	86	-	88	6.5	15.5	7.0	-	-	-	-	6.0	95	5.3	2.8	I
OUU327	86	-	88	7.5	15.2	7.0	-	-	-	-	6.3	106	5.6	3.1	I
REIHO	86	-	88	7.9	15.6	7.0	-	-	-	-	6.7	95	5.0	2.8	I
REIHOH	80	9	82	7.1	20.8	7.0	58	-	-	-	-	-	5.0	2.8	
REIMEI	72	8	73	8.2	15.6	6.0	81	-	-	-	-	-	-	-	I
SAIKAI 168	86	-	88	8.0	15.2	7.0	-	-	-	-	6.0	88	5.0	2.6	I
SAIKAI 179	86	-	88	7.2	16.2	7.0	-	-	-	-	6.5	99	5.0	2.9	I
SAIKAI 180	86	-	88	6.4	16.6	7.0	-	-	-	-	7.3	102	5.2	2.6	I
SASANISHIKI	72	8	73	5.6	18.2	6.8	95	-		-	-	-	4.6	2.5	I

SASANISHIKI	80	9	82	5.7	19.4	7.0	55	-	-	-	-	-	4.9	2.7	
SASANISHIKI	86	-	88	6.0	15.0	7.0	-	-	-	-	5.6	105	4.7	2.7	I
SENSHUURAKU	66	2	67	6.7	18.5	7.0	-	715	·65	250	-	-	-	-	I
SHIOKARI	72	8	73	8.1	19.3	7.0	100	-	-	-	-	-	-	-	I
TAINUNG 67	86	-	88	6.7	15.4	7.0	-	-	-	-	5.5	104	4.8	3.0	I
TOYONISHIKI	86	-	88	8.7	13.5	7.0	-	-	-	-	6.3	99	4.8	2.8	I
YAMABIKO	72	8	73	8.1	17.3	6.2	100	-	-	-	-	-	-	-	I
YUKHARA	64	-	64	10.9	18.6	7.0	-	-	-	-	-	-	-	-	I

KOREA, REPUBLIC OF

AKIBARE	77	5	78	6.7	17.5	7.0	90	610	·125	160	4.6	39	4.6	2.7	I
AKIBARE	81	6	83	7.7	19.3	7.0	71	-	-	-	4.9	22	4.8	2.8	I
AKIBARE	82	6	83	7.3	18.4	6.7	83	-	-	-	3.8	34	4.8	2.8	I
AKIBARE	88	-	89	6.7	19.0	7.0	72	510	35	295	6.4	39	4.9	2.7	I
AKUHIKALI	81	6	83	9.1	18.5	7.0	56	-	-	-	5.2	12	4.7	2.7	I
BAEG YANG BYEO	81	6	83	9.2	17.1	5.0	54	-	-	-	4.9	14	5.6	2.6	I
BAEG YANG BYEO	82	6	83	9.2	17.5	6.0	83	-	-	-	4.0	38	5.5	2.7	I
BAEG YANG BYEO	84	12	85	8.9	14.1	6.0	86	-	-	-	5.8	-	5.5	2.6	I
BEA KYUNG JO	67	12	67	6.7	19.1	5.0	-	630	·100	195	-	-	-	-	I
CHEUNGCHEUNGBYEO	81	6	83	10.8	17.6	7.0	58	-	-	-	4.7	21	5.8	2.5	I
CHEUNGCHEUNGBYEO	82	6	83	9.5	16.1	6.5	78	-	-	-	4.2	26	5.7	2.6	I
CHIAG BYEO	82	6	83	7.5	17.8	6.0	77	-	-	-	5.0	17	4.7	3.0	I
CHIL SEONG BYEO	84	12	85	9.3	12.7	6.4	80	-	-	-	6.3	-	4.7	2.4	I
CHUCHEONGBYEO (AKIBARE)	84	12	85	8.3	16.6	7.0	79	-	-	-	6.8	-	4.8	2.7	I
CHUNG KUNDO	67	12	67	7.4	20.7	5.3	-	805	·200	200	-	-	-	-	I
CHUPUNG BYEO	81	6	83	8.9	18.7	7.0	55	-	-	-	4.5	20	5.6	2.4	I
DAE CHEONG BYEO	84	12	85	8.2	15.8	7.0	78	-	-	-	6.6	-	5.1	2.8	I
DO BONG BYEO	81	6	83	8.4	19.4	7.0	66	-	-	-	5.2	11	4.9	3.1	I
DO BONG BYEO	82	6	83	8.5	18.5	6.0	80	-	-	-	3.8	22	5.0	2.7	I
DONG JIN BYEO	81	6	83	7.2	19.3	7.0	65	-	-	-	5.0	8	4.8	2.9	I
DONG JIN BYEO	82	6	83	6.6	18.8	7.0	84	-	-	-	5.0	17	5.0	2.8	I
EUN HA BYEO	82	6	83	7.3	18.0	6.8	72	-	-	-	3.8	22	4.7	2.8	I
GAYA BYEO	82	6	83	7.4	18.9	7.0	55	-	-	-	4.6	11	5.8	2.5	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
GEUM GANG BYEO	81	6	83	9.5	18.8	7.0	51	-	-	-	5.8	18	5.4	2.6	I
GEUM GANG BYEO	82	6	83	7.4	18.5	7.0	53	-	-	-	4.5	11	5.4	2.6	I
GWAN AG BYEO	81	6	83	9.2	19.5	7.0	55	-	-	-	5.4	11	4.7	3.0	I
GWAN AG BYEO	82	6	83	9.2	18.1	6.6	64	-	-	-	3.6	30	4.6	2.6	I
HAMBUR JO	67	12	67	7.6	19.4	5.0	-	595	-100	135	-	-	-	-	I
HANGANGCHAL BYEO	88	-	89	6.7	1.8	6.0	100	550	-300	65	6.4	71	6.0	2.6	I
HUKUHIKALI	82	6	83	8.2	17.0	7.0	67	-	-	-	4.8	15	4.9	2.7	I
HWASEONGBYEO	88	-	89	7.9	20.3	7.0	86	445	-45	205	7.3	31	4.9	2.8	I
IR1350	82	6	83	9.3	17.4	6.0	79	-	-	-	4.6	21	5.9	2.7	I
JAEKEUN	63	2	64	8.3	22.7	6.6	-	555	85	200	-	-	-	-	I
JINHEUNG	63	2	64	8.0	22.9	6.5	-	570	100	195	-	-	-	-	I
JINHEUNG	72	5	73	6.7	21.6	7.0	77	-	-	-	-	-	-	-	I
JINHEUNG	75	6	76	7.0	19.1	7.0	100	625	-85	175	5.7	102	-	-	I
JINHEUNG	77	5	78	6.6	18.2	7.0	98	615	-50	175	4.8	122	5.2	2.8	I
JINHEUNG	82	6	83	7.7	18.7	7.0	60	-	-	-	4.2	23	5.1	2.9	I
JINJU BYEO	81	6	83	8.2	19.6	7.0	57	-	-	-	5.1	28	4.9	2.8	I
JINJU BYEO	82	6	83	8.1	18.9	7.0	70	-	-	-	5.0	17	4.8	2.9	I
JOSENG TONGIL	81	6	83	9.2	19.4	7.0	55	-	-	-	5.9	20	6.1	2.7	I
JUNG WEON BYEO	84	12	85	8.3	12.2	7.0	82	-	-	-	6.6	-	5.1	2.5	I
KUCHUN DO	68	12	68	8.4	20.5	7.0		530	50	215	-	-	-	-	I
MAN SEUG BYEO	81	6	83	10.0	18.1	7.0	54	-	-	-	5.0	15	5.3	2.5	I
MAN SEUG BYEO	82	6	83	8.8	17.7	6.8	58	-	-	-	4.4	22	5.6	2.5	I
MANKEUNG	72	5	73	6.2	21.3	7.0	80	-	-	-	-	-	-	-	I
MILYANG 21	77	5	78	8.9	15.0	7.0	93	750	-200	150	4.9	111	5.0	2.5	I
MILYANG 21	81	6	83	9.7	18.1	7.0	49	-	-	-	5.3	12	5.8	2.2	I
MILYANG 23	77	5	78	7.1	19.5	7.0	92	840	-260	130	4.7	122	6.0	2.4	I
MILYANG 23	81	6	83	9.4	18.5	7.0	64	-	-	-	5.7	14	6.0	2.5	I
MILYANG 23	82	6	83	9.0	17.6	5.8	82	-	-	-	4.9	22	5.9	2.5	I
MILYANG 23	84	12	85	7.8	16.5	7.0	72	-	-	-	6.2	-	5.9	2.5	I

MILYANG 23	88	-	89	7.8	19.0	6.7	58	680	·85	255	6.6	44	6.1	2.6	I
MILYANG 29	81	6	83	11.1	17.9	6.0	65	-	-	-	5.0	20	5.6	2.4	I
MILYANG 30	77	5	78	7.9	18.0	7.0	88	730	·155	165	4.9	112	5.1	2.4	I
MILYANG 30	81	6	83	10.2	17.0	7.0	59	-	-	-	5.3	14	4.9	2.6	I
MILYANG 30	82	6	83	8.9	16.4	6.8	80	-	-	-	3.8	50	5.2	2.6	I
MILYANG 42	81	6	83	10.5	18.5	7.0	66	-	-	-	5.7	21	5.0	2.6	I
MILYANG 42	82	6	83	9.0	19.0	6.5	74	-	-	-	4.4	47	5.4	2.7	I
MILYANG 53	81	6	83	9.8	17.9	7.0	54	-	-	-	5.1	12	5.8	2.3	I
MILYANG 58	82	6	83	7.6	18.4	7.0	63	-	-	-	5.0	12	5.5	2.5	I
MILYANG 59	82	6	83	6.9	18.6	7.0	68	-	-	-	5.0	13	6.1	2.6	I
MILYANG 60	82	6	83	7.5	18.7	7.0	64	-	-	-	5.0	12	4.9	2.6	I
MILYANG 61	82	6	83	8.4	17.8	7.0	60	-	-	-	4.4	18	5.8	2.5	I
MILYANG 62	82	6	83	8.1	17.8	7.0	74	-	-	-	5.0	15	6.0	2.4	I
MILYANG 63	82	6	83	8.2	17.4	6.5	72	-	-	-	4.8	18	5.7	2.6	I
MILYANG 64	82	6	83	6.7	18.2	7.0	77	-	-	-	3.6	30	4.8	2.7	I
MILYANG 65	82	6	83	6.4	19.3	7.0	75	-	-	-	5.0	14	4.8	2.9	I
MILYANG 66	82	6	83	6.9	22.6	7.0	50	-	-	-	5.3	10	4.9	2.9	I
MILYANG 67	82	6	83	6.5	18.8	7.0	70	-	-	-	5.1	14	5.1	2.7	I
MILYANG 77	85	6	85	10.5	17.0	7.0	74	532	·162	65	7.4	-	-	-	I
NAG DONG BYEO	81	6	83	9.2	18.6	6.3	48	-	-	-	5.1	9	5.0	2.8	I
NAG DONG BYEO	82	6	83	7.7	17.7	6.5	70	-	-	-	4.4	22	4.9	2.8	I
NAG DONG BYEO	84	12	85	7.7	16.0	6.1	75	-	-	-	6.1	-	4.9	2.7	I
NAM PUNG BYEO	82	6	83	8.1	18.5	7.0	68	-	-	-	4.8	12	5.6	2.5	I
NONG BAEG	81	6	83	8.2	19.5	7.0	57	-	-	-	5.8	10	4.7	2.8	I
NONGBAEK	72	5	73	9.1	19.6	7.0	86	-	-	-	-	-	-	-	I
NOPOONG	77	5	78	8.3	18.2	7.0	95	770	·230	90	4.6	134	5.5	2.2	I
NORIN 716	72	5	73	6.5	21.4	7.0	82	-	-	-	-	-	-	-	I
OU DAE BYEO	81	6	83	9.1	18.6	6.3	58	-	-	-	4.9	12	5.2	3.0	I
OU DAE BYEO	82	6	83	6.6	18.0	7.0	64	-	-	-	4.9	14	5.4	2.9	I
PAL GEUM	81	6	83	10.3	17.9	7.0	55	-	-	-	5.1	12	5.5	2.8	I
PAL GWANG BYEO	81	6	83	10.6	17.2	6.0	56	-	-	-	5.2	15	5.5	2.6	I
PAL GWENG	81	6	83	8.9	19.4	7.0	58	-	-	-	5.7	10	4.9	3.0	I
PALKUM	72	5	73	7.1	20.3	7.0	79	-	-	-	-	-	-	-	I
PALKWENG	72	5	73	6.2	21.7	7.0	83	-	-	-	-	-	-	-	I
PALTAL	63	2	64	7.6	23.7	6.3	-	530	140	210	-	-	-	-	I
POONGSANG BYEO	81	6	83	9.6	17.4	5.0	67	-	-	-	5.0	20	5.9	2.4	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
PUNGSAN BYEO	82	6	83	9.4	17.8	5.5	83	-	-	-	3.6	45	6.0	2.6	I
RAEGYENG	77	5	78	7.2	14.0	7.0	86	765	-185	140	5.0	126	6.1	2.4	I
REIMEI	81	6	83	7.9	17.5	7.0	71	-	-	-	4.2	24	4.9	2.8	I
REIMEI	82	6	83	6.7	17.7	6.7	73	-	-	-	4.2	34	4.8	2.8	I
SADOMINARI	81	6	83	8.0	19.2	7.0	56	-	-	-	4.7	18	4.9	2.8	I
SAET BYUL BYEO	81	6	83	9.4	17.1	5.5	75	-	-	-	4.5	35	5.6	2.3	I
SAM GANG BYEO	81	6	83	9.4	17.1	7.0	61	-	-	-	4.6	16	5.4	2.3	I
SAM GANG BYEO	82	6	83	7.7	16.2	7.0	82	-	-	-	3.6	41	5.3	2.5	I
SAM GANG BYEO	84	12	85	8.3	12.8	7.0	76	-	-	-	5.4	–	5.4	2.4	I
SAM NAM BYEO	81	6	83	8.2	19.0	7.0	59	-	-	-	5.1	15	5.0	2.9	I
SAM NAM BYEO	82	6	83	8.2	17.6	6.8	66	-	-	-	3.9	22	5.0	2.8	I
SANG PUNG BYEO	82	6	83	8.0	17.9	7.0	74	-	-	-	4.8	15	4.8	2.9	I
SEM JIN BYEO	84	12	85	7.3	14.9	7.0	84	-	-	-	6.1	–	4.9	2.7	I
SEOL AG BYEO	81	6	83	9.4	17.8	7.0	65	-	-	-	4.9	16	4.9	2.8	I
SEU (SEO) GWANG BYEO	81	6	83	9.9	18.0	6.0	66	-	-	-	4.9	17	6.0	2.4	I
SEU (SEO) GWANG BYEO	81	6	83	9.8	17.6	7.0	75	-	-	-	4.2	20	5.8	2.6	I
SEU (SEO) NAM BYEO	81	6	83	8.3	18.5	7.0	51	-	-	-	5.3	12	4.8	2.8	I
SEU (SEO) NAM BYEO	82	6	83	6.9	17.8	7.0	58	-	-	-	4.5	12	5.0	2.8	I
SEUMJEN BYEO	82	6	83	7.3	17.6	7.0	81	-	-	-	3.8	24	5.1	2.9	I
SHIN 2	81	6	83	7.4	18.8	7.0	68				4.8	27	4.7	2.8	I
SHINPOONG	63	2	64	7.8	23.2	6.6	-	565	95	230	-	-	-	-	I
SINSEONCHALBYEO	88	-	89	7.6	1.7	6.0	100	145	-40	15	5.8	64	4.6	2.8	I
SIROKANE	72	5	73	6.1	20.7	7.0	85	-	-	-	-	-	-	-	I
SO BAEG BYEO	81	6	83	8.8	18.0	6.0	70	-	-	-	4.6	30	4.8	2.8	I
SO BAEG BYEO	82	6	83	7.0	16.7	6.3	84	-	-	-	4.4	40	5.0	2.8	I
SUJEUNG BYEO	82	6	83	9.2	17.2	5.5	72	-	-	-	4.5	23	5.8	2.4	I
SUSANG JO	67	12	67	7.9	17.8	5.0	-	650	-70	210	-	-	-	-	I
SUWEON 213	72	5	73	8.0	22.3	7.0	72	-	-	-	-	-	-	-	I
SUWEON 213-1	72	5	73	8.9	22.2	7.0	66	-	-	-	-	-	-	-	I

SUWEON 251	77	5	78	7.1	18.2	7.0	99	855	-245	150	3.8	168	5.6	2.3	I
SUWEON 258	77	5	78	6.9	19.2	6.3	95	775	-195	140	4.2	162	5.1	2.5	I
SUWEON 264	77	5	78	8.2	18.6	7.0	92	790	170	170	4.4	123	5.2	2.5	I
SUWEON 300	81	6	83	8.9	18.2	7.0	61	-	-	-	4.9	18	5.5	2.5	I
SUWEON 301	81	6	83	9.4	18.0	7.0	65	-	-	-	4.6	20	4.9	2.7	I
SUWEON 302	81	6	83	9.2	18.3	7.0	66	-	-	-	5.0	13	4.7	2.8	I
SUWEON 306	81	6	83	6.8	19.1	7.0	62	-	-	-	5.1	20	4.9	2.8	I
SUWEON 306	82	6	83	7.1	18.4	7.0	65	-	-	-	4.9	14	5.1	2.7	I
SUWEON 312	82	6	83	8.3	15.5	7.0	66	-	-	-	4.2	28	6.4	2.8	I
SUWEON 314	82	6	83	8.5	18.1	7.0	52	-	-	-	5.2	10	5.9	2.3	I
SUWEON 315	82	6	83	8.2	17.8	6.5	67	-	-	-	4.8	13	5.7	2.6	I
SUWEON 82	63	2	64	8.5	21.9	5.4	-	645	451	500	-	-	-	-	I
SUWEON 82	72	5	73	8.7	19.6	7.0	88	-	-	-	-	-	-	-	I
SUWEON JO	67	12	67	6.8	31.5	6.0	-	360	2802	950	-	-	-	-	I
TADO AEK	68	12	68	5.7	24.1	6.0	-	685	-30	240	-	-	-	-	I
TAE BAEG BYEO	81	6	83	9.2	18.0	7.0	51	-	-	-	5.3	19	6.0	2.2	I
TAE BAEG BYEO	82	6	83	7.0	18.3	6.5	64	-	-	-	4.6	19	5.8	2.3	I
TAE BAEG BYEO	84	12	85	8.9	13.8	7.0	74	-	-	-	6.5	-	5.8	2.1	I
TAIGOL BYE	68	12	68	7.2	24.2	7.0	-	600	-60	105	-	-	-	-	I
TONGIL (IR667-98)	75	6	76	7.0	19.9	7.0	94	665	-95	185	7.4	102	-	-	I
TONGIL CHAL (WX-126)	75	6	76	8.4	-	6.0	87	505	-180	65	4.9	330	-	-	I
TONGIL CHAL (WX-126)	76	1	77	8.8	-	7.0	100	-	-	-	-	-	5.6	2.5	I
TOYA Z1	68	12	68	6.1	6.8	6.1	-	200	-35	55	-	-	-	-	I
TU DO	68	12	68	6.6	23.4	6.1	-	685	-70	200	-	-	-	-	I
YONGJUBYEO (YEONG DEOG BYEO)	88	-	89	9.7	15.0	6.3	82	685	-110	260	6.6	30	5.4	2.6	I
YONGMUNBYEO	85	6	86	10.0	11.5	7.0	56	-	-	-	-	-	5.4	2.6	I
YOUNG PUNG BYEO	81	6	83	10.7	18.1	7.0	54	-	-	-	5.4	18	5.9	2.4	I
YOUNG PUNG BYEO	82	6	83	7.6	18.0	7.0	67	-	-	-	4.4	26	6.0	2.3	I
YUSHIN	75	6	76	7.8	19.2	7.0	100	705	-155	150	5.9	111	5.7	2.5	I
YUSHIN	81	6	83	9.3	18.2	7.0	71				4.9	20	5.6	2.5	I

LAOS

CHAO LEP NOK	88	11	89	8.2	24.6	6.9	27	760	370	590	8.3	-	6.5	2.2	R
CHAO PHEUANG DENG	88	11	89	9.2	23.0	6.3	30	720	110	450	6.9	-	6.2	2.2	R

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
DO HAK PHAY	88	11	89	7.4	22.0	5.4	50	800	-70	340	6.2	-	6.7	2.1	R
DOLAY	65	6	66	9.1	-	5.8	-	510	-180	45	-	-	-	-	R
DONANGNUANE	65	6	66	7.4	-	6.4	-	565	-125	65	-	-	-	-	R
HOMLAY	65	6	66	7.3	23.6	4.4	-	825	45	320	-	-	-	-	R
I LOUB	88	11	89	6.5	3.2	7.0	76	630	-270	80	2.7	-	5.1	2.8	R
KEOLAY	65	6	66	7.4	-	6.2	-	645	-275	65	-	-	-	-	R
KET TAO	65	6	66	8.6	-	6.0	-	590	-160	55	-	-	-	-	R
LEUA NHIA	88	11	89	6.8	3.4	7.0	74	640	-290	80	2.6	-	6.3	2.9	R
MAK KHAM	88	11	89	7.3	7.5	6.8	62	520	-40	130	3.0	-	6.0	2.2	R
ME HANG	88	11	89	6.4	2.6	7.0	70	595	-225	75	2.0	-	5.1	2.6	R
METO	88	11	89	6.4	11.8	7.0	46	290	120	150	4.4	-	5.9	2.9	R
NANG KHAO	88	11	89	6.2	3.4	7.0	72	680	-250	105	2.8	-	6.1	2.8	R
PA LAT	88	11	89	7.3	4.8	6.8	72	670	-230	100	2.7	-	6.4	2.8	R
PHAMA	65	6	66	8.3	-	6.0	-	805	-340	45	-	-	-	-	R
PHOKHA	65	6	66	6.5	21.0	4.0	-	965	-230	205	-	-	-	-	R
SALAKHAM 2-18-3-1-1	88	11	89	7.3	26.4	7.0	32	680	7 30	780	9.4	-	6.4	2.2	R
SERENA	65	6	66	7.2	16.8	2.3	-	985	-285	175	-	-	-	-	R
SOM PHOU	88	11	89	7.3	3.2	7.0	71	695	-295	90	2.6	-	5.5	2.9	R
LIBERIA															
BG 90-2	81	9	82	6.1	29.2	5.5	56	-	-	-	6.8	-	6.8	2.5	I
IR5	81	9	82	5.9	29.6	5.0	98	-	-	-	6.2	-	6.2	2.7	I
IRAT 13	81	9	82	7.5	17.6	2.0	90	-	-	-	5.8	-	7.4	3.0	I
LAC23	81	9	82	9.3	23.1	6.0	52	-	-	-	7.4	-	6.7	2.9	I
LAC23(W) EX INGER	88	11	90	7.1	25.8	6.8	51	765	30	410	6.7	-	6.7	2.8	I
M55 EX INGER	88	11	90	7.9	15.6	3.5	88	865	-260	245	4.6	-	7.2	3.1	I
MAHSURI	80	9	82	7.9	28.0	5.5	30	-	-	-	7.4	-	5.4	2.1	I
MOROBEREKAN	79	9	82	8.7	23.3	6.0	63	-	-	-	7.1	-	6.6	2.8	U

ROK11 (ADNY2)	81	9	82	6.4	29.5	5.0	90	-	-	-	8.0	-	6.6	2.1	I
ROK16	81	9	82	7.2	23.6	6.0	60	-	-	-	7.0	-	6.5	2.7	I
SUAKOKO	81	9	82	8.5	28.4	5.5	51	-	-	-	7.6	-	7.0	2.2	I
SUAKOKO 8 EX INGER	88	11	90	8.4	29.4	5.8	30	730	385	600	9.3	-	6.3	2.2	I
MADAGASCAR															
ALI COMBO	86	10	86	7.8	26.1	6.0	100	405	145	245	7.2	-	8.2	2.4	I
AMBALALAVA	86	10	86	8.6	26.6	6.3	92	600	205	315	8.5	-	6.2	2.4	I
CHIANAN 8	86	10	86	5.4	16.7	7.0	72	640	-210	30	6.4	-	4.7	2.8	I
IAC25	86	10	86	10.4	21.6	7.0	43	585	-20	155	8.5	-	6.8	2.4	I
MADINIKA	86	10	86	7.2	24.4	7.0	49	730	-100	110	9.1	-	7.7	2.2	I
MAKALIOKA	86	10	86	6.8	25.8	6.9	44	895	265	440	8.3	-	6.5	1.9	I
ROJOFOTSY	86	10	86	6.1	27.0	5.2	100	490	160	260	6.3	-	6.1	2.6	I
TSIPALA A	86	10	86	8.1	23.0	7.0	42	575	5	200	7.7	-	5.4	2.3	I
VARY VATO	86	10	86	7.1	25.8	6.1	86	650	235	370	7.7	-	6.6	2.2	I
MALAYSIA, EAST (SABAH)															
BG 96-3	82	11	82	6.9	29.2	7.0	32	-	-	-	7.2	-	-	-	I
C4-63	82	11	82	8.2	22.7	4.0	54	-	-	-	6.4	-	-	-	I
DAMIT	82	11	82	7.8	29.6	5.0	44	-	-	-	7.6	-	-	-	
MADCANDU (MATCHANDU)	82	11	82	6.0	29.1	5.4	32	-	-	-	8.2	-	-	-	I
MR1	82	11	82	7.1	28.4	6.7	30	-	-	-	8.2	-	-	-	I
MR49	82	11	82	6.4	25.6	7.0	48	-	-	-	6.5	-	-	-	I
MR7	82	11	82	7.7	22.8	3.2	58	-	-	-	7.0	-	-	-	I
TAICHUNG-SEN-YU-195	82	11	82	5.8	21.1	7.0	52	-	-	-	5.1	-	-	-	I
TR2	82	11	82	6.5	28.0	3.0	56	-	-	-	6.2	-	-	-	I
TR7	82	11	82	6.0	28.4	7.0	38	-	-	-	7.0	-	-	-	I
MALAYSIA, EAST (SARAWAK)															
ACHEH 62	72	12	72	5.4	29.7	6.0	-	-	-	-	-	-	-	-	I
ADAN	72	12	72	6.3	11.8	2.5	-	-	-	-	-	-	-	-	I
ADAN BUDA	76	7	76	9.2	11.2	2.2	44	875	-235	230	6.2	112	-	-	I

	Crop year	Date analyzed		Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity			Instron		Length (mm)	Width (mm)	Water regime[b]
		(mo)	(yr)					Peak (Bu)[a]	Setback (Bu)	Consistency (Bu)	Hardness (kg)	Stickiness (g-cm)			
ADAN DARI	76	7	76	7.6	18.6	6.5	86	-	-	-	-	-	-	-	I
ADAN KURA	76	7	76	6.4	18.4	6.0	86	-	-	-	-	-	-	-	I
BAHAGIA	72	12	72	6.3	28.7	5.0	-	-	-	-	-	-	-	-	I
BARU 3	82	11	82	6.2	18.8	6.2	42	-	-	-	4.7	-	-	-	
BIAN SU	82	11	82	5.8	27.3	5.0	38	-	-	-	6.1	-	-	-	
BUNTAR B	72	12	72	8.2	24.1	5.0	61	-	-	-	-	-	-	-	I
CHELOM	76	7	76	7.5	29.2	5.2	57	-	-	-	-	-	-	-	I
DARI	76	7	76	5.7	9.9	2.2	83	-	-	-	-	-	-	-	I
KARA 1	72	12	72	5.4	29.7	6.0	-	-	-	-	-	-	-	-	I
KERIBANG	76	7	76	9.0	29.0	5.9	42	-	-	-	-	-	-	-	I
MAHSURI LINE 17	72	12	72	6.6	28.1	5.0	-	-	-	-	-	-	-	-	I
MENALAM	72	12	72	6.2	25.2	5.0	78	-	-	-	-	-	-	-	I
MENSIA	72	12	72	6.5	25.4	4.8	80	-	-	-	-	-	-	-	I
PADI BERIS	82	11	82	7.3	27.4	5.0	40	-	-	-	6.9	-	-	-	
PADI HITAM	82	11	82	6.5	27.8	4.8	44	-	-	-	6.6	-	-	-	
PADI ITAM	76	7	76	9.0	23.9	7.0	80	-	-	-	-	-	-	-	I
RADIN JAMPURAK	82	11	82	5.1	18.7	3.0	74	-	-	-	4.3	-	-	-	
RU 369-7-2	82	11	82	8.4	27.3	5.0	44	-	-	-	7.0	-	-	-	
SAMPANGAN B	72	12	72	6.6	24.6	5.0	84	-	-	-	-	-	-	-	I
SERASAN PUTEH	72	12	72	7.1	24.1	5.5	88	-	-	-	-	-	-	-	I
SERENDAH KUNING	72	12	72	6.3	28.9	5.0	62	-	-	-	-	-	-	-	I
SIAM 29	72	12	72	6.3	29.3	6.0	-	-	-	-	-	-	-	-	I
SRI SARAWAK	76	7	76	14.2	23.0	4.2	29	-	-	-	-	-	-	-	I
TERBAT A1	82	11	82	6.1	22.5	5.3	68	-	-	-	6.0	-	-	-	
MALAYSIA, WEST															
ACHEH PUTEH	62	7	63	7.6	30.3	5.0	-	750	450	640	-	-	-	-	I
ANAK NAGA 21	62	7	63	9.2	27.7	5.0	-	700	260	460	-	-	-	-	I

BAHAGIA (IR5-278)	71	10	71	7.2	28.9	3.8	53	-	-	-	-	-	-	-	I
BAHAGIA (IR5-278)	77	6	77	6.6	28.4	3.4	100	-	-	-	-	-	-	-	I
BETAS BERUYAMI, BASMATI	67	-	67	8.0	25.4	5.3	71	-	-	-	-	-	-	-	I
CHINA NO.1	67	-	67	7.7	28.5	6.1	53	-	-	-	-	-	-	-	I
CHINA NO.2	67	-	67	9.3	29.0	5.1	65	-	-	-	-	-	-	-	I
GLUTINOUS RICE	67	-	67	7.0	24.0	6.3	-	-	-	-	-	-	-	-	I
IMPROVED MAHSURI	80	9	81	6.8	25.4	4.8	45	-	-	-	7.3	-	-	-	I
JAYA	77	6	77	8.0	23.0	2.0	100	-	-	-	-	-	-	-	I
KADARIA (MR27)	80	9	81	7.4	27.3	5.0	81	-	-	-	7.9	-	5.6	2.0	I
KADARIA (MR27)	86	6	86	7.1	28.2	3.1	60	860	120	365	9.1	-	5.8	2.1	I
KODAH NO.1	67	-	67	5.7	28.1	5.0	-	-	-	-	-	-	-	-	I
MAHSURI	71	10	71	10.9	26.6	3.5	42	-	-	-	7.8	52	-	-	I
MAHSURI	77	6	77	6.8	27.0	2.7	70	-	-		-	-	5.1	2.0	I
MAHSURI (MUTANT)	88	6	89	5.8	29.0	5.0	39	820	320	630	9.8	-	6.5	1.8	
MAHSURI MUTANT	86	6	86	5.7	30.9	4.9	54	855	40	315	9.0	-	6.5	2.0	I
MAKMUR (MR73)	86	6	86	6.9	24.4	7.0	50	1145	-200	310	8.4	-	6.6	2.0	I
MALINJA	71	10	71	6.5	28.4	3.8	72	-	-	-	-	-	-	-	I
MALINJA	77	6	77	6.8	26.6	5.0	96	-	-	-	-	-	-	-	I
MANIK (MR52)	86	6	86	6.6	27.4	7.0	69	655	415	440	10.3	-	6.8	2.0	I
MR81	88	6	89	6.5	29.8	5.0	33	980	170	590	9.4	-	5.9	2.0	
MR84	86	6	86	6.9	29.8	7.0	82	420	335	320	9.5	-	6.6	2.2	I
MR88	88	6	89	7.3	30.6	7.0	74	360	380	440	9.9	-	6.5	1.9	
MUDA (MR71)	86	6	86	6.0	27.2	7.0	40	795	285	430	9.7	-	7.2	2.1	I
MURNI	77	6	77	6.6	28.0	3.0	100	-	-	-	-	-	-	-	I
PULUT MALAYSIA SATU	77	6	77	7.7	3.0	6.0	100	-	-	-	-	-	-	-	I
PULUT SIDING (MR47)	80	9	81	8.2	-	7.0	100	485	-205	75	3.4	-	6.9	2.0	I
PULUT SIDING (MR47, PULOT SIDING)	86	6	86	6.6	-.8	6.1	98	560	-280	35	5.1	-	7.2	2.0	I
RADIN EBOS 33	62	7	63	6.4	30.4	5.0		890	245	500	-	-	-	-	I
RIA (IR8)	71	12	71		30.6	7.0	33	-	-	-	-	-	-	-	I
RIA (IR8)	77	6	77	6.3	28.6	7.0	52	-	-	-	-	-	-	-	I
RIA163 (163-2-3-6-9-10)	71	12	71		30.1	7.0	77	-	-	-	-	-	-	-	I
SEBERANG (MR77)	86	6	86	7.6	29.8	4.7	53	880	55	330	9.1	-	6.4	2.1	I
SEKEMBANG (MR10)	80	9	81	8.7	27.8	7.0	58	-	-	-	8.3	-	5.9	2.0	I
SEKENCANG (MR7)	77	6	77	6.2	22.8	2.0	99	-	-	-	-	-	6.5	2.0	I

	Crop year	Date analyzed (mo)	(yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Setback (Bu)	Consistency (Bu)	Instron Hardness (kg)	Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
SEKENCANG (MR7)	80	9	81	7.5	23.5	3.0	81	-	-	-	6.9		6.4	2.1	I
SERAUP 50	62	7	63	8.0	30.1	5.0	-	710	280	420	-	-	-	-	I
SERENDAHKUNING60	62	7	63	8.6	28.8	5.4	-	860	240	510	-	-	-	-	I
SERIBU GANTANG	80	9	81	7.9	28.1	4.9	81	880	345	585	7.3		5.7	2.1	I
SETANJUNG (MR1)	80	9	81	8.6	28.0	7.0	44	780	780	830	7.1	-	-	-	I
SIAM	67	-	67	8.9	25.8	4.9	-	-	-	-	-	-	-	-	I
SIAM 48	62	7	63	8.5	30.0	5.8	-	765	375	520	-	-	-	-	I
SRIMALAYSIADUA	77	6	77	7.5	28.4	7.0	49	-	-	-	-	-	-	-	I
SRI MALAYSIA II	80	9	81	8.8	28.1	7.0	37	-	-	-	8.2	-	-	-	I
SRI MALAYSIA SATU	77	6	77	6.7	27.0	3.0	100	-	-	-	-	-	-	-	I
MEXICO															
BAMOA A75 (IR837-46-2)	78	5	79	7.6	28.1	5.0	76	710	330	490	8.0	64	6.6	2.1	I
BLUEBONNET 50	70	1	72	7.4	23.9	6.2	100	-	-	-	-	-	-	-	I
CAMPECHE A72	71	1	72	6.8	23.9	4.3	100	-	-	-	-	-	6.7	2.1	I
CAMPECHE A80	78	5	79	5.6	27.3	7.0	43	615	280	410	6.5	75	-	-	U
CARDENAS A80	78	5	79	6.3	22.8	2.8	60	840	-155	240	6.4	108	-	-	U
CHAMPOTON A79	78	5	79	5.1	23.2	2.7	42	790	-180	190	6.2	102	6.4	2.1	U
CHETUMAL A86	90	2	91	10.1	26.0	7.0	26	695	435	640	9.6	-	7.3	2.1	U
GRIJALVA A71	78	5	79	8.6	22.4	4.3	55	600	-85	170	6.0	122	6.6	1.9	U
JOACHINA74	78	5	79	5.8	17.3	4.3	74	885	-250	170	6.2	148	6.8	2.0	I
JOJUTLA MEJORADO	78	5	79	5.2	28.4	5.0	64	850	205	460	7.5	68	6.9	2.3	I
JUCHITAN A74	78	5	79	7.2	27.9	4.9	76	805	305	480	7.8	63	-	-	I
MACUSPANA A75	78	5	79	5.3	20.1	5.0	62	685	-60	200	6.6	131	6.4	1.9	U
MORELOS A70	78	5	79	7.6	23.6	6.0	29	710	270	450	8.3	94	7.2	2.6	I
MORELOS A83	90	2	91	11.3	26.1	7.0	26	670	600	720	10.9	-	6.8	2.3	I
MORELOS A88	90	2	91	8.9	25.9	7.0	32	445	160	300	10.6	-	7.4	2.6	I
NAVOLATO A71 (IR22)	71	1	72	8.9	28.1	7.0	31	-	-	-	-	-	-	-	I
NAVOLATO A71 (IR22)	78	5	79	7.9	27.9	7.0	37	640	620	610	8.4	63	6.2	2.0	I

NAYARIT A72	71	1	72	6.4	24.7	2.8	100	-	-	-	-	-	-	-	I
PALIZADA A86	90	2	91	10.5	27.0	7.0	26	610	755	790	11.8	-	6.7	2.1	U
PAPALOAPAN A78	78	5	79	5.8	28.4	4.8	67	760	295	480	7.8	76	6.7	2.0	U
PIEDRAS NEGRAS A74 (IR831-20-3-6)	78	5	79	5.7	28.4	5.0	72	780	295	470	8.2	71	6.6	2.2	I
SAN LORENZO A72	71	1	72	7.0	28.8	6.6	64	-	-	-	-	-	6.7	2.1	I
SAN LORENZO A79	78	5	79	6.8	28.4	5.2	74	675	335	470	8.3	76	-	-	I
SINALOA A64	70	1	72	7.5	22.5	5.2	100	-	-	-	-	-	-	-	I
SINALOA A64	78	5	79	7.2	23.4	5.8	90	600	120	300	7.6	83	6.2	1.8	I
SINALOA A68 (IR160-27-4)	70	1	72	8.0	24.9	7.0	82	-	-	-	-	-	6.7	2.4	I
SINALOA A68 (IR160-27-4)	78	5	79	9.6	22.5	6.8	43	590	260	370	8.0	76	6.7	2.4	I
SINALOA A72	71	1	72	7.5	29.8	7.0	87	-	-	-	-	-	-	-	I
SINALOA A80 EX CIAT	88	6	88	-	30.4	6.0	52	-	-	-	-	-	6.8	2.3	
SINALOA A80 EX CIAT	89	6	89	6.8	28.2	6.9	47	-	-	-	-	-	6.7	2.3	
SURESTE A90	90	2	91	7.7	26.0	6.0	54	705	-75	305	6.6	-	5.7	2.3	U
TABASCO A72	71	1	72	6.4	25.7	3.9	100	-	-	-	-	-	-	-	I
TANCASNEQUE A79	78	5	79	5.5	28.4	4.8	56	835	275	510	8.1	69	-	-	I
TRES RIOS A72	71	1	72	6.4	30.9	3.9	75	-	-	-	-	-	-	-	I
ZACATEPEC A79	78	5	79	5.4	28.4	7.0	45	620	445	490	7.0	102	6.6	2.1	I
MYANMAR															
BENGAWA(N) EX HONGKONG	65	8	66	9.1	27.6	5.0	48	1005	345	535	-	-	-	-	I
BYAT	84	12	85	6.0	20.8	6.0	73	-	-	-	-	-	-	-	I
C22	82	9	a2	7.1	27.6	4.8	38	-	-	-	6.4	-	6.6	2.2	U
DAWEBYAN	65	8	66	6.5	29.8	4.7	-	705	255	295	-	-	-	-	I
EKARINE	65	8	66	8.0	27.8	4.3	-	990	485	555	-	-	-	-	I
EMATA	65	8	66	7.7	20.7	6.3	-	1120	-180	360	-	-	-	-	I
HMAWBI-2 (IR21836-90-3)	84	12	85	7.0	15.8	6.1	80	-	-	-	-	-	-	-	I
INN-MA-YE-BAW	89	7	90	4.7	19.3	7.0	61	695	-20	350	5.6	-	6.3	2.4	
KA THE NGA CHEIK	84	12	85	6.1	5.4	7.0	86	-	-	-	-	-	-	-	I
KHAOPAPYU	82	9	82	11.0	16.6	6.7	58	-	-	-	7.0	-	6.2	2.5	U
KHAUPHER-PHONE	89	7	90	6.2	4.6	6.8	61	-	-	-	6.0	-	6.0	2.7	

	Crop year	Date analyzed		Protein (%)	Amy-lose (%)	Alkali spread-ing value	Gel consis-tency (mm)	Amylograph viscosity			Instron		Length (mm)	Width (mm)	Water regime[b]
		(mo)	(yr)					Peak (Bu)[a]	Set-back (Bu)	Consis-tency (Bu)	Hard-ness (kg)	Sticki-ness (g-cm)			
KYWE THWA	84	12	85	6.8	6.3	7.0	63	-	-	-	-	-	-	-	I
KYWE THWA GYI	84	12	85	7.0	5.4	7.0	80	-	-	-	-	-	-	-	I
LONE-THWE-HMWE	89	7	90	6.4	15.3	7.0	68	-	-	-	4.4	-	7.1	2.1	
LOT THAW GYI	76	10	76	5.6	23.8	6.0	60	-	-	-	-	-	-	-	I
MA NAW THU KHA	84	12	85	6.9	24.1	5.1	56	-	-	-	-	-	-	-	I
MANAWHARI (MAHSURI)	89	7	90	7.1	28.1	6.2	26	890	460	745	9.6	-	5.1	2.1	
MEEDONE EX HONGKONG	65	8	66	6.2	20.6	4.7	-	1000	-180	315	-	-	-	-	I
MI GAUK	76	10	76	5.3	29.2	5.0	57	-	-	-	-	-	-	-	I
MYA YA NGA CHEIK	84	12	85	7.6	18.7	7.0	38	-	-	-	-	-	-	-	I
NA MA THA LAY	84	12	85	8.1	19.7	4.0	36	-	-	-	-	-	-	-	I
NGA CHEIK	84	12	85	6.8	6.5	6.1	71	-	-	-	-	-	-	-	I
NGA CHEIK	84	12	85	5.1	5.4	6.0	80	-	-	-	-	-	-	-	I
NGA CHEIK GYI	84	12	85	5.9	20.8	7.0	33	-	-	-	-	-	-	-	I
NGA CHEIK PYU	84	12	85	6.8	5.3	6.0	85	-	-	-	-	-	-	-	I
NGA KYWE (D25-4)	65	8	66	7.2	22.8	5.4	-	900	-140	250	-	-	-	-	I
NGA KYWE (D25-4)	65	-	67	9.6	22.3	7.0	-	-	-	-	-	-	-	-	I
NGA KYWE (D25-4)	75	1	77	7.1	25.0	6.0	51	-	-	-	-	-	-	-	I
NGA KYWE (D25-4)	75	8	77	7.2	23.0	5.3	59	840	-90	280	5.2	82	-	-	I
NGA KYWE (D25-4)	76	10	76	6.8	24.3	5.9	70	-	-	-	-	-	-	-	I
NGA KYWE (D25-4)	81	9	82	7.3	21.7	5.7	40	-	-	-	-	-	5.2	2.8	
NGA KYWE (D25-4)	84	12	85	5.7	22.2	6.0	42	-	-	-	-	-	-	-	I
NGA KYWE TAUNG PYAN	84	12	85	7.9	20.0	5.1	38	-	-	-	-	-	-	-	I
NGA PYAG YI	84	12	85	6.3	23.5	5.0	37	-	-	-	-	-	-	-	I
NGA SHINT THWE	84	12	85	7.0	6.0	6.0	62	-	-	-	-	-	-	-	I
NGASEIN	65	8	66	7.4	27.8	5.0	-	910	160	445	-	-	-	-	I
NGASEIN SMS	65	8	66	7.0	28.8	5.2	-	960	140	470	-	-	-	-	I
NGWE TOE	76	10	76	6.0	28.6	3.9	36	-	-	-	-	-	-	-	I
PA LE THWE (PELITA I-1)	84	12	85	7.0	21.8	5.0	71	-	-	-	-	-	-	-	I
PADINTHUMA	89	7	90	5.5	29.9	6.0	26	-	-	-	10.5	-	7.0	2.3	
PAW SAN BAY KYAR	84	12	85	6.4	21.0	5.9	39	-	-	-	-	-	-	-	I
PAW SAN HMWAY	76	10	76	7.5	24.5	5.9	64	-	-	-	-	-	-	-	I

PAW SAN HMWE	84	12	85	5.6	21.8	6.0	40	-	-	-	-	-	-	-	I
SEIN TALAY (C4-113/ YE-BAW-SEIN)	84	12	85	6.4	15.6	3.1	91	-	-	-	-	-	-	-	I
SHWE CHE GYIN	76	10	76	6.2	28.2	4.8	34	-	-	-	-	-	-	-	I
SHWE DIN GAR	76	10	76	7.8	19.0	7.0	77	-	-	-	-	-	-	-	I
SHWE PA LIN	84	12	85	7.0	5.3	7.0	62	-	-	-	-	-	-	-	I
SHWE TA SOKE	84	12	85	6.0	24.7	5.1	51	-	-	-	-	-	-	-	I
SHWE-MAN (1)	89	7	90	5.8	19.9	7.0	54	735	-75	320	5.1		6.9	2.6	
SHWEBO KHUN NI	76	10	76	6.2	28.9	6.9	40	-	-	-	-	-	-	-	I
SHWEWATUN	89	7	90	6.5	29.6	6.5	30	-	-	-	10.0	-	6.5	2.3	
SIN-EKARI (2)	89	7	90	6.4	26.5	4.9	50	-	-	-	6.8	-	6.6	2.1	
SIN-EKARI (3)	89	7	90	6.7	17.7	7.0	69	860	-270	250	4.1	-	6.8	2.3	
SIN-THEIN-GI (BR 4)	89	7	90	6.8	27.9	6.2	26	890	415	7 15	9.4	-	5.6	2.3	
TAUNG DATE PAN	76	10	76	6.8	29.5	6.0	61	-	-	-	-	-	-	-	I
TAUNG YOE NGA CHAKE	84	12	85	8.2	5.3	6.0	73	-	-	-	-	-	-	-	I
WET SU PYU	84	12	85	6.7	5.3	7.0	80	-	-	-	-	-	-	-	I
YAHINE	65	8	66	8.9	29.6	5.0	-	840	90	345	-	-	-	-	I
YE BA ME	84	12	85	6.2	6.0	6.0	86	-	-	-	-	-	-	-	I
YEBAW SEIN	76	10	76	5.6	20.0	7.0	71	-	-	-	-	-	-	-	I
ZEERA	65	8	66	9.6	30.5	4.9	-	1060	210	520	-	-	-	-	I

NEPAL

ACCHAME MASINO	72	3	73	8.2	24.9	6.9	68	-	-	-	-	-	-	-	I
ANP JHUTTE	72	3	73	6.7	27.0	4.7	28	-	-	-	-	-	-	-	I
BAHARNI	72	3	73	7.4	25.2	6.9	29	-	-	-	-	-	-	-	I
BANS BARELLI	72	3	73	6.6	25.0	6.7	61	-	-	-	-	-	-	-	I
BASMATI 198	72	3	73	8.2	23.0	3.6	28	-	-	-	-	-	-	-	I
BASMATI 3	72	3	73	7.0	27.3	7.0	26	-	-	-	-	-	-	-	I
BASMATI JANAKPUR	72	3	73	6.0	26.7	6.6	27	-	-	-	-	-	-	-	I
BG90-2	78	5	79	5.6	28.6	4.8	50	930	210	430	8.0	76	6.2	2.0	I
BHALSARI	72	3	73	6.4	27.0	6.6	43	-	-	-	-	-	-	-	I
BIJLI BATTI	72	3	73	6.0	27.1	6.8	27	-	-	-	-	-	-	-	I
BRAMBUSI	72	3	73	8.2	24.2	6.9	66	-	-	-	-	-	-	-	I
CH45	76	8	76	8.8	27.1	5.5	30	1080	145	49 5	-	-	-	-	I
CH45	78	5	79	6.9	27.6	4.8	31	990	195	465	7.4	76	5.8	2.2	I
CHAINUNG NATIVE 11	75	5	76	6.7	28.3	3.0	46	-	-	-	-	-	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
CHANDINA	78	5	79	6.1	29.0	4.7	88	645	335	470	7.0	75	5.0	2.1	I
CHIANUNG 242	75	5	76	6.3	19.6	7.0	64	-	-	-	-	-	-	-	I
CHIANUNG 242	78	5	79	6.1	20.1	7.0	86	560	65	185	6.5	164	4.7	2.8	I
CLAKET 27	75	5	76	8.2	19.0	7.0	70	-	-	-	-	-	-	-	I
GIZA 14	75	5	76	8.4	19.8	7.0	66	-	-	-	-	-	-	-	I
HANDIPHOOL	76	8	76	5.2	28.6	6.8	98	635	365	510	-	-	-	-	I
HANDIPHOOL	78	5	79	6.7	27.9	6.0	88	475	375	425	7.4	81	6.0	2.2	I
HANDIPHOOL	80	1	82	6.5	25.8	5.8	66	-	-	-	-	-	6.0	2.2	I
IET2938	78	5	79	5.5	16.0	6.0	80	950	-280	170	5.5	194	6.0	2.0	I
IR2061-628-1 (LAXMI)	78	5	79	6.9	28.5	7.0	38	760	630	650	8.3	65	5.9	2.2	I
IR2071-124-6-4 (SABITRI)	78	5	79	7.2	27.4	6.0	30	745	620	665	8.6	62	5.6	2.0	I
JHALI	80	1	82	7.6	26.9	3.4	68	-	-	-	-	-	5.3	1.8	I
KALANIMAK	76	8	76	6.8	25.8	6.9	44	670	210	415	-	-	-	-	I
KANAKJIRA	76	8	76	8.4	27.2	3.8	38	715	340	565	-	-	-	-	I
KAOHSIUNG 41	75	5	76	6.3	18.9	7.0	80	-	-	-	-	-	-	-	I
KARIA KAMOD	72	3	73	7.4	25.1	7.0	29	-	-	-	-	-	-	-	I
KN-1B-361-8-6-9-2-10	75	5	76	6.9	27.9	7.0	35	-	-	-	-	-	-	-	I
KN-1B-361-8-6-9-2-8	75	5	76	6.7	28.1	7.0	45	-	-	-	-	-	-	-	I
KOUSHENG	75	5	76	6.8	19.9	7.0	73	-	-	-	-	-	-	-	I
KT31/1	75	5	76	8.9	22.6	7.0	56	-	-	-	-	-	-	-	I
KT31/4	75	5	76	6.0	24.3	7.0	35	-	-	-	-	-	-	-	I
KT32/2	75	5	76	6.0	17.2	4.0	84	-	-	-	-	-	-	-	I
MAKWANPUR MASINO	72	3	73	6.2	25.9	6.0	28	-	-	-	-	-	-	-	I
MAKWANPURI FINE	76	8	76	6.8	27.8	6.8	36	920	290	535	-	-	-	-	I
MALBHOG	72	3	73	6.9	26.3	6.8	36	-	-	-	-	-	-	-	I
NOKHI	80	1	82	6.7	26.3	3.6	68	-	-	-	-	-	5.4	2.1	I
PHUL KUMARI	72	3	73	5.6	26.7	6.0	29	-	-	-	-	-	-	-	I
POKHARALI MASHINO	78	5	79	6.7	20.0	7.0	42	825	-110	180	6.4	155	6.5	1.8	I
POKHRELE HASHINA	75	5	76	8.4	18.7	7.0	46	-	-	-	-	-	-	-	I
SANJEERA	72	3	73	8.2	24.7	6.9	28	-	-	-	-	-	-	-	I

TAIPEI 306	75	5	76	7.4	19.3	7.0	67	-	-	-	-	-	-	-	I
TULSI PHUL	72	3	73	7.6	25.3	6.5	72	-	-	-	-	-	-	-	I
NEW ZEALAND															
HUNGARIAN NO.1	70	-	71	10.5	21.1	7.0	94	-	-	-	-	-	-	-	I
NORIN N0.6	70	-	71	8.0	20.3	7.0	-	-	-	-	-	-	-	-	I
SHINSETSU	70	-	71	11.4	21.0	7.0	96	-	-	-	-	-	-	-	I
TE PUKE GOLD	70	-	71	13.2	23.1	7.0	51	-	-	-	-	-	-	-	I
NIGERIA															
AGBEDE	64	2	66	6.5	21.8	5.6	-	1070	-140	320	-	-	-	-	I
B TYPE X KUNTER (FARO14)	78	4	79	7.0	27.8	6.2	38	-	-	-	-	-	-	-	
BEKOM	70	1	72	8.6	21.8	6.0	82	-	-	-	-	-	-	-	I
BG79 (FAR01)	64	2	66	8.0	29.3	5.8		375	375	365	-	-	6.7	2.4	I
BG79 (FAR01)	78	4	79	6.2	28.0	6.2	73	-	-	-	-	-	-	-	
BG79 X IR8 (FAR015)	78	4	79	5.9	27.5	7.0	32	-	-	-	-	-	-	-	
BG79 X IR8 (FAR015)	85	10	86	7.4	24.8	6.9	35	810	375	385	12.0	-	6.5	2.5	I
BG90-2 (FAR029)	85	9	86	-	26.4	6.2	32	945	145	390	11.7		6.3	2.4	I
BG90-2 (FAR029)	88	11	90	7.9	27.8	6.5	31	655	540	650	9.4	-	6.5	2.3	
BG90-2 (FAR029) EX LIBERIA	81	9	82	6.1	29.2	5.5	56	-	-	-	6.8	-	6.8	2.5	
BPI-76 (BICOL) (FAR020)	78	4	79	7.4	23.3	5.2	31	-	-	-	-	-	-	-	
D114 (FAR02)	64	2	66	6.7	28.2	5.6	-	1080	360	585	-	-	-	-	I
D114 (FAR02)	78	4	79	8.4	27.5	6.8	32	-	-	-	-	-	-	-	
D99	64	2	66	8.1	27.4	6.1	-	770	640	630	-	-	-	-	I
DE GAULLE (FAR024)	78	4	79	6.3	27.5	5.1	44	-	-	-	-	-	-	-	
E425	70	1	72	8.4	18.8	3.0	100	-	-	-	-	-	-	-	I
FARO27 (IR655-79-2)	85	10	86	8.8	24.8	7.0	31	795	425	510	13.5	-	6.4	2.2	I
FARO27 (IR655-79-2)	85	9	86	-	26.8	7.0 33		895	505	625	13.3	-	6.4	2.1	I
FARO27 (IR655-79-2)	88	11	90	8.9	27.7	7.0	28	650	560	690	9.0	-	6.8	2.4	
FARO29 (BG90-2)	85	10	86	7.4	25.1	5.8	32	960	60	270	9.5	-	6.5	2.5	I
FAROX 56/30 (FAR025)	78	4	79	6.8	22.4	5.9	63	720	-140	200	6.4	104	6.7	2.6	I
FAROX 56/30 (FAR025)	88	11	90	9.2	22.9	6.1	36	780	60	430	6.7	-	6.5	2.6	

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
GEB 24/37	64	2	66	9.6	27.6	6.1	-	980	420	550	-	-	-	-	I
I.C.B. (FAR06)	78	4	79	8.1	28.0	6.2	36	-	-	-	-	-	-	-	
INDO CHINE BLANC	64	2	66	8.6	28.0	6.0	-	945	185	415	-	-	-	-	I
IR20 (FAR019)	78	4	79	7.8	27.5	7.0	30	-	-	-	-	-	-	-	
IR5-47-2 (FAR023)	78	4	79	6.2	27.8	6.0	88	-	-	-	-	-	-	-	
IR627-1-31-4-3-7 (FAR022)	78	4	79	7.1	27.4	6.9	30	-	-	-	-	-	-	-	
IR8 (FAR013)	78	4	79	8.4	27.6	6.8	32	940	435	645	7.6	67	-	-	I
ITA123	85	10	86	10.0	24.3	5.9	40	765	335	430	11.8	-	6.8	2.1	I
ITA128	85	10	86	10.6	15.2	3.3	65	660	-220	40	8.2	-	6.8	2.5	I
ITA135	88	11	90	7.1	16.4	3.0	88	830	-255	230	4.6	-	7.4	2.6	
ITA150	88	11	90	7.4	25.7	5.8	46	725	-10	350	6.6	-	7.7	2.8	
ITA212	85	10	86	5.8	26.2	4.8	48	1000	-60	250	8.8	-	6.6	2.1	I
ITA212	88	11	90	7.9	29.6	6.6	32	815	520	710	9.4	-	7.3	2.3	
ITA222	85	10	86	6.9	26.0	6.0	41	860	60	320	8.8	-	6.8	2.2	I
ITA222	88	11	90	7.7	31.0	5.8	40	880	430	685	9.3	-	6.7	2.4	
ITA257	88	11	90	8.5	20.0	3.7	65	705	-60	300	5.1	-	6.9	2.7	
ITA306	85	10	86	6.7	26.6	5.0	49	1015	-60	270	9.2	-	6.9	2.1	I
ITA307	88	11	90	8.4	13.2	3.3	76	930	210	275	3.7	-	6.7	2.7	
KAV12 (FAR04)	64	2	66	7.0	27.3	6.3	-	960	500	585	-	-	5.5	2.0	I
KAV12 (FAR04)	78	4	79	6.4	28.3	6.9	32	-	-	-	-	-	-	-	
MAKALIOKA 823 (FAR05)	78	4	79	6.8	27.8	5.4	68	-	-	-	-	-	-	-	
MALI ONG (FAR07) (IR790-35-5-3)	78	4	79	6.2	27.8	5.7	62	-	-	-	-	-	-	-	
MAS2401 (FAR08)	64	2	66	7.8	28.7	6.1	-	920	560	550	-	-	6.6	2.4	I
MAS2401 (FAR08)	78	4	79	8.0	27.5	5.7	50	640	235	435	6.0	83			I
MAS2401 X B572 (FAR0X 147)	78	4	79	7.4	27.2	5.8	31	785	475	590	8.1	54	6.9	2.2	I
MAS2401 X TN 1 (FAR017)	78	4	79	10.7	27.2	7.0	29	-	-	-	-	-	-	-	

OFADA	71	1	72	8.0	25.1	6.5	72	-	-	-	-	-	-	-	I
OS4	70	1	72	8.2	16.1	2.0	100	-	-	-	-	-	-	-	U
OS6 (FARO11)	70	1	72	8.0	21.3	6.0	68	-	-	-	-	-	6.7	2.5	I
OS6 (FARO11)	78	4	79	7.5	22.9	6.0	68	720	-40	260	6.7	99	-	-	I
OS6 (FARO11)	85	10	86	10.3	19.6	6.0	31	680	0	195	11.4	-	6.8	2.6	I
OS6 (FARO11)	88	11	90	6.1	24.1	6.0	42	830	40	455	6.5	-	7.0	2.7	
SIAM29 (FARO9)	64	2	66	7.2	24.2	6.4	-	995	475	615	-	-	6.3	2.2	I
SIAM29 (FARO9)	78	4	79	6.5	28.0	6.0	32	-	-	-	-	-	-	-	
SINDANO (FARO10)	78	4	79	8.0	27.9	5.9	32	-	-	-	-	-	-	-	
SML 140/10 (FARO12)	78	4	79	6.3	25.3	5.2	50	810	55	355	6.3	84	8.1	2.1	I
SML 140/10 (FARO12)	85	10	86	7.9	24.0	4.2	40	740	0	215	8.8	-	8.0	2.1	I
TAICHUNG NATIVE 1 (FARO21)	78	4	79	8.9	27.8	6.9	30	-	-	-	-	-	-	-	
TJINA (FARO18)	78	4	79	7.6	22.6	5.3	58	730	-120	220	6.8	116	6.9	2.2	I
TJINA X IR8 (FAROX 166)	78	4	79	7.4	27.5	6.2	36	740	430	550	8.0	56	5.8	2.2	I
TJINA X TN 1 (FARO16)	78	4	79	7.5	27.1	6.9	32	-	-	-	-	-	-	-	
TJINA//IR8 X IR8 (FAROX 1880)	78	4	79	7.7	23.4	7.0	46	835	145	445	7.8	95	6.8	2.4	I
TJINA//IR8 X IR8 (FAROX 1880)	78	4	79	7.7	23.5	6.2	51	895	85	420	7.0	85	6.1	2.2	I
TOMA112	63	2	66	7.2	28.3	6.1	-	755	450	550	-	-	-	-	I
							PAKISTAN								
BARA	76	8	76	8.4	24.8	6.9	61	-	-	-	-	-	-	-	I
BASMATI (DOKRI)	80	12	81	6.5	21.8	4.7	36	600	150	375	2.6	-	-	-	
BASMATI 198	76	8	76	6.8	25.1	7.0	71	-	-	-	-	-	6.4	1.8	I
BASMATI 198	79	2	80	7.6	22.4	7.0	36	-	-	-	-	-	-	-	I
BASMATI 198	84	-	85	-	24.2	7.0	32	-	-	-	8.0	-	6.3	1.8	I
BASMATI 370	63	4	66	9.4	25.7	4.3	-	645	15	230	-	-	-	-	I
BASMATI 370	65	4	66	7.9	22.2	5.9	-	805	400	515	-	-	-	-	I
BASMATI 370	65	4	66	8.2	22.7	6.9	-	900	-160	230	-	-	-	-	I
BASMATI 370	70	4	71	7.6	20.9	3.2	74	1010	-365	85	-	-	-	-	I
BASMATI 370	70	4	71	7.5	22.7	4.0	50	750	125	345	8.0	51	-	-	I
BASMATI 370	76	8	76	7.0	23.8	6.1	56	-	-	-	-	-	-	-	I
BASMATI 370	79	2	80	7.5	22.4	6.3	36	-	-	-	-	-	6.3	1.8	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
BASMATI 370	80	12	81	7.1	21.9	4.8	42	595	105	305	6.4	-	-	-	I
BASMATI 370	81	-	82	6.8	23.2	6.6	47	-	-	-	-	-	-	-	
BASMATI 370	84	-	85	-	24.6	6.8	35	-	-	-	7.8	-	6.4	1.8	I
BASMATI 385 (PK487)	84	6	85	-	24.6	6.9	42	-	-	-	8.7	-	6.7	1.8	I
BASMATI 385 (PK487)	90	12	90	7.3	22.8	7.0	34	670	310	555	6.7	-	6.4	1.9	
BASMATI 6129	65	4	66	9.3	20.9	5.5	-	755	65	300	-	-	-	-	I
BASMATI 6129	70	4	71	7.8	19.7	2.9	40	1000	-170	290	-	-	-	-	I
BASMATI 6129	70	4	71	9.0	23.0	7.0	42	975	-75	340	7.0	57	-	-	I
BASMATI 6129	76	8	76	9.4	24.3	7.0	48	-	-	-	-	-	6.8	1.7	I
BASMATI 6129	80	12	81	7.2	21.7	4.6	31	600	30	320	3.0	-	6.9	-	
BASMATI 622	65	4	66	7.6	21.8	5.6	-	860	-130	235	-	-	-	-	I
BASMATI PAK	79	2	80	8.5	22.4	7.0	40	-	-	-	-	-	-	-	I
BASMATI PAK	84	-	85	-	23.0	7.0	31	-	-	-	8.7	-	6.9	1.8	I
BENGALO	80	12	81	8.9	19.7	4.9	40	530	30	240	5.1	-	-	-	
DWARF RED GANJA	80	12	81	7.9	28.4	6.5	32	660	360	430	8.3	-	6.1	2.5	I
IET3363	79	2	80	7.9	25.2	7.0	44	-	-	-	-	-	-	-	I
IET4094	80	12	81	7.6	28.1	5.0	41	530	485	700	9.1	-	-	-	I
IR1561	79	2	80	8.2	25.4	7.0	44	360	630	650	-	-	-	-	I
IR2053-261-2-3 (DR-83)	80	12	81	8.0	21.7	3.5	52	400	60	235	6.2	-	-	-	I
IR36	79	2	80	9.0	25.2	5.0	31	-	-	-	-	-	-	-	I
IR42	79	2	80	7.8	27.5	7.0	82	-	-	-	-	-	-	-	I
IR424-2-1-PK1	70	4	71	8.7	21.5	7.0	28	-	-	-	-	-	-	-	I
IR424-2-1-PK2	70	4	71	8.1	21.5	7.0	29	-	-	-	-	-	-	-	I
IR6 (MEHRAN 69) (IR6-156-2)	76	8	76	7.7	29.6	7.0	29	-	-	-	-	-	6.2	1.9	I
IR6 (MEHRAN 69) (IR6-156-2)	79	2	80	9.8	25.4	7.0	34	-	-	-	-	-	-	-	I
IR6 (MEHRAN 69) (IR6-156-2)	80	12	81	8.6	29.5	7.0	34	750	520	620	9.2	-	6.4	1.9	I

IR8	80	12	81	7.0	28.4	7.0	30	670	650	670	8.9	-	6.1	2.4	I
IR841 (IR841-36-2)	80	12	81	7.9	24.0	7.0	30	685	405	570	9.2	-	-	-	
JAJAI-77	80	12	81	9.6	20.8	5.6	38	425	110	280	7.6	-	6.1	1.8	I
JAPONICA	65	4	66	7.3	16.8	7.0	-	860	-240	180	-	-	-	-	I
JHONA 349	76	8	76	10.0	28.0	4.3	71	-	-	-	-	-	-	-	I
JHONA 369	65	4	66	7.8	26.8	4.4	-	640	430	560	-	-	-	-	I
KANGNI	65	4	66	8.1	26.6	6.4	-	585	140	325	-	-	-	-	I
KANGNI 27	80	12	81	6.5	26.6	4.2	95	440	265	410	7.8	-	-	-	
KANGNI X TOEH	80	12	81	7.7	24.3	5.0	73	420	100	150	5.9				
KS282 (BASMATI 370/ IR95)	85	6	86	9.6	26.3	7.0	28	-	-	-	-	-	7.0	2.0	I
KS282 (IRRI 85 WS)	85	6	86	9.9	27.6	7.0	28	-	-	-	-	-	6.5	2.1	I
MUSHKAN 41	76	8	76	9.0	24.5	6.2	66	-	-	-	-	-	-	-	I
PALMAN	65	4	66	8.0	27.3	6.3	-	605	135	315	-	-	-	-	I
PALMAN 246	65	4	66	8.5	27.5	3.0	-	440	580	580	-	-	-	-	I
PALMAN 246	70	4	71	9.4	28.6	4.0	78	-	-	-	-	-	-	-	I
PERMAL	76	8	76	10.2	28.2	5.0	72	-	-	-	-	-	-	-	I
PK1080	84	6	85	-	28.0	7.0	30	-	-	-	11.1	-	6.3	1.7	I
PK177	76	8	76	10.1	22.2	3.6	58	-	-	-	-	-	-	-	I
PK178	76	8	76	8.4	29.5	7.0	30	-	-	-	-	-	-	-	I
PK196	84	6	85	-	24.5	4.9	44	-	-	-	8.5	-	6.7	1.8	I
PK198	76	8	76	8.6	27.3	7.0	46	-	-	-	-	-	-	-	I
PK285	84	6	85	-	27.0	7.0	30	-	-	-	10.1	-	7.0	1.8	I
PK71	84	6	85	-	26.9	6.2	29	-	-	-	9.4	-	6.6	1.6	I
PK81	84	6	85	-	25.2	8.0	30	-	-	-	11.9	-	6.6	1.9	I
SIND BASMATI	80	12	81	8.4	25.4	7.0	37	310	310	430	9.2	-	6.2	1.7	I
SONAHRI KANGNI	80	12	81	6.0	27.4	2.6	59	540	475	600	8.1	-	-	-	
SONAHRI SUGDARI	80	12	81	6.6	23.4	5.4	33	640	-50	275	5.1	-	-	-	
SWAT PADDY	65	4	66	7.2	23.1	6.7		780	-30	270	-	-	-	-	I

PANAMA

ANAYANSI ex INGER	88	6	88	-	29.2	6.2	32	-	-	-	-	-	6.4	2.3	
ANAYANSI ex INGER	89	6	89	6.2	28.9	7.0	36	-	-	-	-	-	6.2	2.4	

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
PARAGUAY															
ADELAIDA	90	10	90	9.0	26.1	7.0	32	655	795	775	9.7	-	6.9	2.2	
BLUEBELLE	90	10	90	8.0	23.3	6.3	36	690	100	435	6.2	-	7.1	2.2	
CEA-1	90	10	90	6.7	25.8	6.8	48	635	445	625	9.0	-	6.7	2.2	
CEA-2	90	10	90	7.1	26.8	7.0	27	665	785	795	10.1	-	7.0	2.2	
CEA-3	90	10	90	7.1	26.8	7.0	33	730	465	650	8.7	-	6.8	2.2	
CICA6	90	10	90	9.4	22.8	6.6	37	640	705	950	7.8	-	6.6	2.1	
CICA8	90	10	90	7.7	28.2	6.9	30	795	660	790	9.3	-	6.7	2.2	
IET4506	90	10	90	8.6	27.4	6.9	32	725	530	690	8.8	-	6.3	2.2	
IR25909	90	10	90	8.6	28.0	7.0	28	800	650	790	9.7	-	6.5	2.2	
IR9826	90	10	90	8.7	26.8	7.0	32	750	510	670	8.8	-	6.9	2.2	
IRGA409 (BR-IRGA409)	90	10	90	8.7	26.6	7.0	29	595	650	690	9.7	-	6.9	2.1	
P2231F4	90	10	90	8.5	27.2	7.0	32	725	465	650	9.4	-	7.1	2.3	
P3293F4	90	10	90	9.0	27.2	6.9	30	700	520	670	8.8	-	7.2	2.1	
VISTA	90	10	90	9.6	15.4	7.0	54	625	-90	220	5.0	-	5.9	2.3	
WILCKE 2	90	10	90	8.6	27.4	7.0	28	715	685	770	10.3	-	7.1	2.1	
PERU															
ALTO MAYO	90	12	90	8.9	24.0	7.0	48	370	335	380	9.7	-	6.9	2.4	
AMAZONAS	90	12	90	9.4	17.6	7.0	54	580	165	355	6.4		7.2	2.3	
BG90-2	90	12	90	7.1	28.1	7.0	46	820	660	760	10.0	-	7.1	2.6	
C-27	67	12	67	5.9	21.1	7.0	-	820	10	285	-	-	-	-	I
CAROLINO	79	10	79	7.7	25.4	6.0	50	705	25	260	6.1	104	6.6	2.6	I
CHANCAY (CICA 4)	79	10	79	9.3	28.1	6.2	34	745	415	530	8.2	67	6.4	2.0	I
CHICLAYO	67	12	67	10.8	27.2	5.7	-	890	360	550	-	-	-	-	I
EAL-60	67	12	67	5.4	21.9	6.5	-	870	-20	305	-	-	-	-	I

FMC-100-X5-60	67	12	67	5.1	19.2	2.7	-	1110	-390	200	-	-	-	-	I
FORTUNA	67	12	67	6.8	25.2	4.7	-	895	-105	285	-	-	-	-	I
FORTUNA	79	10	79	10.4	22.1	6.0	48	670	-15	210	7.8	113	6.8	2.6	I
HUALLAGA (IR442-2-50)	79	10	79	6.9	28.7	6.1	42	890	280	530	7.4	81	6.4	2.3	I
INTI	79	10	79	10.2	15.3	7.0	83	730	-145	170	6.9	160	6.7	2.3	I
INTI EX INGER	88	6	88	-	16.4	7.0	83	-	-	-	-	-	6.7	2.5	
INTI EX INGER	89	6	89	6.5	18.8	7.0	76	-	-	-	-	-	6.5	2.5	
IR8	79	10	79	8.5	28.1	7.0	31	850	440	620	7.8	69	6.2	2.6	I
MINABIR 2	67	12	67	5.9	20.8	6.0	-	825	-10	285	-	-	-	-	I
MINABIR 2	79	10	79	8.4	16.2	4.8	86	695	-60	190	7.6	114	6.8	2.2	I
MINAGRA	79	10	79	8.4	29.0	6.6	32	775	240	420	8.4	85	5.7	2.2	I
MINAGRA MEJORADO	67	12	67	6.5	31.3	6.1	95	945	415	600	-	-	-	-	I
MOCHICA	67	12	67	5.7	20.0	7.0	-	875	-90	255	-	-	-	-	I
MOCHICA	78	10	79	6.7	19.0	7.0	84	790	50	320	8.0	128	5.3	2.4	I
NAYLAMP (IR930-2-6)	79	10	79	8.0	28.6	7.0	36	730	585	610	9.2	51	6.8	2.2	I
PERU 65	67	12	67	6.6	26.8	5.4	90	755	60	325	-	-	-	-	I
PERU 65	90	12	90	8.1	25.6	7.0	64	470	290	430	8.0	-	6.9	2.3	
PNA1010-F4-64-1	90	12	90	8.5	26.2	7.0	26	820	430	540	9.4	-	6.9	2.5	
PNA386-F4-341-1	90	12	90	8.2	24.9	7.0	32	630	955	985	9.6	-	7.3	2.4	
PNA521-F4-90-3	90	12	90	8.3	17.5	7.0	82	625	65	340	5.7	-	7.4	2.4	
PNA714-F4-304	90	12	90	9.1	16.8	7.0	65	670	20	300	6.1	-	6.9	2.4	
PORVENIR	90	12	90	8.4	23.8	6.6	54	650	320	525	8.6	-	7.5	2.2	
RADIN CHINA	79	10	79	7.6	27.9	7.0	35	810	255	450	7.6	73	5.3	2.4	I
SAN MARTIN	90	12	90	8.0	21.7	7.0	62	470	255	350	7.0	-	6.5	2.5	
SIAM GARDEN	67	12	67	6.2	27.6	5.7	-	1120	290	605	-	-	-	-	I
SIAM GARDEN	79	10	79	6.8	29.1	6.8	33	845	395	560	8.8	67	6.0	2.1	I
VIFLOR	90	12	90	8.9	17.4	7.0	80	755	-25	305	5.7	-	7.7	2.5	

PHILIPPINES

APOSTOL (ACC 5156)	86	4	87	9.6	25.2	6.0	32	760	115	335	8.0	-	4.9	2.5	I
AUS12	81	5	82	-	25.4	5.2	56	-	-	-	-	-	-	-	U
AUS197	81	5	82	-	27.3	5.0	59	-	-	-	-	-	-	-	U
AZUCENA	62	7	63	7.2	19.6	4.6	-	730	-90	270	-	-	-	-	U
AZUCENA	63	-	64	13.3	21.6	5.0	-	740	25	325	-	-	-	-	U

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu)[a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
AZUCENA	63	-	63	9.1	25.0	4.3	-	630	60	300	-	-	-	-	U
AZUCENA	68	6	69	7.1	21.3	2.7	-	1020	-170	275	-	-	-	-	U
AZUCENA	81	-	82	7.6	23.2	5.1	50	-	-	-	-	-	-	-	U
AZUCENA	86	4	87	7.7	21.8	5.0	43	725	-135	180	8.5	-	7.2	2.2	U
AZUCENA (ACC 328)	86	4	87	10.5	21.6	4.6	32	800	-15	265	8.2	-	5.9	2.0	U
AZUCENA (ACC 328)	86	9	87	-	21.0	5.2	40	625	-200	110	9.3	-	5.4	1.8	U
B-E-3	62	7	63	8.1	21.0	5.2	-	720	20	350	-	-	-	-	I
BALUWADANG EX BANAWE	89	12	89	-	4.8	6.0	100	-	-	-	-	-	6.1	3.1	U
BENGAWAN	62	7	63	7.2	22.0	5.8	-	660	10	315	-	-	-	-	I
BENGAWAN	63	-	63	8.6	27.1	4.6	-	590	55	195	-	-	-	-	I
BENGAWAN	63	-	64	10.4	22.8	5.1	-	785	-105	235	-	-	-	-	I
BENGAWAN	72	8	72	7.4	22.2	3.0	-	-	-	-	-	-	-	-	I
BINAGSANG (ACC 52970)	86	9	87	-	24.1	4.8	30	910	-110	220	9.4	-	-	-	U
BINALASANG (ACC 44321)	86	4	87	9.0	20.0	4.8	44	825	-245	150	6.5	-	-	-	I
BINALASANG (ACC 52971)	86	9	87	-	17.9	4.3	30	730	-260	85	-	-	4.9	1.7	U
BINATO	62	7	63	7.1	19.8	4.8	-	810	-140	280	-	-	-	-	I
BINAYABAS (ACC 586)	86	4	87	10.2	1.2	6.7	100	470	-140	15	6.4	-	5.7	2.3	I
BINONDOK	66	-	67	11.1	1.8	9.9	-	200	25	45	-	-	-	-	I
BINONDOK	67	-	67	9.3	3.6	5.8	-	190	100	60	-	-	-	-	I
BPI-121.407	72	8	72	6.8	24.2	7.0	74	-	-	-	-	-	-	-	I
BPI-121.407	73	-	74	7.4	24.2	7.0	46	-	-	-	-	-	-	-	I
BPI-121.407	78	8	78	7.7	23.7	7.0	50	-	335	135	6.6	-	6.5	2.2	I
BPI-3-2	78	10	78	8.4	27.4	4.0	81	800	-55	255	5.8	83	5.4	2.0	I
BPI-3-2	86	10	86	6.6	22.0	3.1	58	780	-270	100	6.2	-	5.9	2.1	I
BPI-76	62	7	63	8.7	21.4	3.8	-	830	-160	240	-	-	-	-	I
BPI-76	63	-	64	12.3	22.5	4.1	-	755	-40	285	-	-	-	-	I
BPI-76	63	-	63	8.9	26.0	4.4	-	820	-100	300	-	-	-	-	I
BPI-76	63	-	63	14.3	27.2	4.8	-	680	-20	285	-	-	-	-	I

BPI-76 (NS)	68	6	69	8.6	22.4	2.9	-	915	-145	260	-	-	-	-	I
BPI-76 (NS)	86	10	86	7.5	21.8	3.3	67	800	-300	150	6.1	-	5.7	2.1	I
BPI-76-1	72	8	72	8.1	25.1	3.2	49	855	-130	260	-	-	-	-	I
BPI-76-1	73	-	74	8.7	24.4	4.3	40	-	-	-	-	-	-	-	I
BPI-76-1	77	-	78	9.7	28.2	5.0	99	-	-	-	6.4	64	5.7	2.2	I
BPI-Ri-1	86	10	86	6.7	-.9	6.0	100	600	-195	5	5.9	-	5.9	2.5	I
BPI-Ri-10	86	10	86	7.5	21.4	3.0	79	830	-325	95	6.7	-	6.3	2.1	I
BPI-Ri-2	86	10	86	7.4	25.3	5.0	29	815	40	215	7.6	-	5.5	2.1	I
RPI-Ri-3	86	10	86	6.8	-.9	6.0	98	460	-145	50	5.2	-	6.0	2.5	I
BPI-Ri-4	78	10	78	6.4	29.3	6.9	32	855	515	670	8.3	59	6.2	2.1	I
BPI-Ri-4	86	10	86	6.5	23.2	4.9	64	645	15	230	7.6	-	6.1	2.2	I
C12	72	8	72	7.2	24.1	2.4	-	-	-	-	-	-	-	-	I
C12	77	-	78	8.2	23.5	4.2	86	865	-115	250	5.6	93	5.8	2.1	I
C131-129	73	-	73	7.6	26.1	7.0	47	-	-	-	-	-	-	-	I
C168	77	-	78	7.3	22.6	4.3	84	850	-150	235	5.8	97	-	-	I
C168-134	88	7	88	9.0	20.8	4.6	45	685	-215	155	7.8	-	6.7	2.2	I
C18	67	-	67	8.3	28.0	4.1	-	1005	205	450	-	-	-	-	I
C18	72	8	72	7.4	25.1	2.8	-	-	-	-	-	-	-	-	I
C22	77	-	78	8.8	27.9	5.0	72	-	-	-	7.6	53	6.0	2.2	I
C22	88	7	88	9.8	26.4	5.0	30	760	80	280	9.4	-	6.2	2.3	I
C4-113	67	-	67	7.4	29.5	3.0	-	960	450	660	-	-	-	-	I
C4-137	72	8	72	6.7	28.0	3.0	-	-	-	-	-	-	-	-	I
C4-137	73	-	74	7.7	26.0	3.1	77	820	3235	495	-	-	-	-	I
C4-137	77	-	78	10.2	27.9	5.2	100	895	200	415	7.6	56	6.4	2.2	I
C4137	88	7	88	10.2	26.3	4.6	28	830	70	320	9.8	-	6.9	2.2	I
C4-63	68	6	69	7.3	23.2	2.3	-	1050	-210	300	-	-	-	-	I
C4-63G	72	8	72	6.0	26.6	2.6	-	-	-	-	-	-	-	-	I
C4-63G	73	-	73	7.3	21.7	2.7	72	-	-	-	-	-	-	-	I
C463G	73	-	74	7.8	20.2	3.2	79	-	-	-	-	-	-	-	I
C4-63G	73	-	74	7.3	21.7	3.7	72	760	-355	265	-	-	-	-	I
C4-63G	73	-	74	9.0	22.2	4.0	36	605	1	270	-	-	-	-	I
C4-63G	74	-	74	7.6	20.4	3.1	92	-	-	-	-	-	-	-	I
C4-63G	77	-	78	7.2	22.5	2.8	99	-	-	-	6.0	85	6.5	2.2	I
C4-63G	78	8	78	8.0	23.7	3.8	87	-	-285	170	4.8	-	6.9	2.5	I
C4-63G	80	-	81	6.4	24.4	3.8	66	-	-	-	6.2	-	6.7	2.2	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
C4-63G	89	7	89	7.4	20.4	4.6	48	710	-140	280	5.6	-	6.3	2.0	I
CAMOROS (ACC 47446)	87	11	87	6.9	24.4	5.0	40	-	-		7.9	-	5.7	2.6	U
CARREON	81	5	82	-	25.4	5.1	66	-	-		-	-	-	-	U
CARREON (ACC 38703)	86	4	87	10.6	23.0	5.0	47	640	185	330	11.1	-	5.1	2.5	I
CNA4120	86	4	87	8.6	13.7	3.0	53	705	-150	180	7.8	-	6.9	2.3	U
CNA4136	86	4	87	9.0	20.2	3.0	41	720	-125	215	7.5	-	6.4	2.4	U
DARAGADONG EX MARAWI CITY	89	1	90	8.3	16.7	4.0	50	760	-225	185	4.6	-	5.2	2.2	
DB-4	67	-	67	9.1	26.1	3.2	-	680	-25	270	-	-	-	-	I
DINALAGA	62	7	63	6.7	17.2	5.6	-	840	-90	330	-	-	-	-	U
DINALAGA	68	6	69	6.7	24.8	2.9	-	985	-125	305	-	-	-	-	U
DINORADO	86	9	87	-	20.6	4.6	36	7 10	-230	130	8.2	-	4.2	1.7	U
DINORADO	86	4	87	10.4	18.9	5.0	34	615	-40	205	10.8	-	5.6	2.2	U
DINORADO (ACC 30333)	87	11	87	9.7	21.9	4.9	36	-	-	-	7.8	-	4.8	2.1	U
ELON-ELON (ACC 5193)	86	4	87	10.3	25.2	6.0	28	860	1	295	8.2	-	5.7	2.2	I
FB-121	62	7	63	8.0	21.9	4.9	-	665	1	305	-	-	-	-	I
FB-121	62	-	63	8.9	25.2	4.6	-	585	35	280	-	-	-	-	I
FB-121	62	-	63	9.1	26.0	4.6	-	575	45	255	-	-	-	-	I
GALLIANO (ACC 47209)	87	9	87	-	25.2	5.0	30	945	-60	245	10.0	-	-	-	U
GUINANGANG (ACC 5994)	86	4	87	11.4	24.2	6.2	28	840	140	360	10.6	-	-	-	I
GUMALENGON EX BANAWE	89	12	89	-	2.9	6.0	100	-	-	-	-	-	5.6	3.0	U
HINOMAY (ACC 47222)	87	11	87	7.4	27.6	5.0	78	-	-	-	8.4	-	5.8	2.0	U
INGUIWE EX BANAWE	89	12	89	-	3.0	6.0	100	-	-	-	-	-	5.7	3.1	U
INILANG ILANG	64	-	64	-	-	3.2	-	-	-	-	-	-	-	-	I
INILANG-ILANG	86	4	87	11.5	1.9	3.1	100	690	-200	15	7.8	-	5.6	2.8	I
INTAN	62	7	63	7.2	20.9	4.9	-	715	-55	295	-	-	-	-	I
INTAN	63	-	64	10.8	23.0	5.0	-	800	-45	325	-	-	-	-	I
INTAN	68	-	74	7.2	21.2	5.7	54	-	-	-	-	-	-	-	I
INTAN	72	8	72	6.0	23.8	2.9	-	-	-	-	-	-	-	-	I

IR20	72	8	72	7.3	28.4	3.6	-	-	-	-	-	-	-	-	I
IR20	73	-	74	8.2	25.4	4.8	38	-	-	-	-	-	-	-	I
IR20	73	-	74	6.8	25.4	5.2	32	800	235	440	-	-	-	-	I
IR20	74	-	74	7.5	25.6	4.2	62	935	85	350	-	-	-	-	I
IR20	77	8	77	8.7	24.6	4.0	55	-	-	-	-	-	-	-	I
IR20	77	2	78	8.5	27.4	5.0	56	-	-	-	-	-	-	-	I
IR20	87	7	87	6.9	26.4	3.0	26	870	410	610	8.8	-	5.4	2.1	I
IR20	88	5	89	9.7	26.6	5.9	27	760	330	580	9.4				I
IR20	89	9	89	8.2	24.9	6.1	28	-	-	-	8.2				I
IR22	71	-	74	6.8	26.0	7.0	28	890	350	440	-	-	-	-	I
IR22	72	8	72	8.1	29.1	7.0	-	-	-	-	-	-	-	-	I
IR22	73	-	74	9.2	25.7	7.0	30	-	-	-	-	-	-	-	I
IR22	73	-	74	9.2	25.7	7.0	30	-	-	-	-	-	-	-	I
IR22	73	-	74	9.4	27.2	7.0	31	630	540	510	-	-	-	-	I
IR22	76	2	77	7.3	28.9	7.0	42	-	-	-	-	-	-	-	I
IR22	87	7	87	7.3	26.6	7.0	27	590	790	740	10.4	-	6.3	2.0	I
IR24	72	8	72	7.1	18.8	6.9	-	-	-	-	-	-	-	-	I
IR24	73	-	74	7.6	14.2	7.0	82	-	-	-	-	-	-	-	I
IR24	73	-	74	9.8	15.4	7.0	46	635	-95	150	-	-	-	-	I
IR24	74	-	74	6.6	14.6	6.7	98	865	-285	130	-	-	-	-	I
IR24	76	2	77	9.0	14.6	7.0	88	-	-	-	-	-	-	-	I
IR24	87	7	87	6.5	15.7	6.6	81	1000	-330	260	7.1	-	6.4	2.1	I
IR26	73	-	74	8.2	27.8	7.0	31	500	400	440	-	-	-	-	I
IR26	74	-	74	6.2	27.1	7.0	80	795	295	480	-	-	-	-	I
IR26	77	8	77	8.3	25.5	7.0	56	-	-	-	-	-	-	-	I
IR26	77	2	78	8.3	28.4	7.0	60	-	-	-	-	-	-	-	I
IR26	87	7	87	6.5	25.3	7.0	45	510	540	620	9.2	-	5.6	2.2	I
IR28	76	8	76	8.6	28.5	7.0	30	-	-	-	-	-	-	-	I
IR28	76	2	77	8.4	28.3	7.0	33	-	-	-	-	-	-	-	I
IR28	87	7	87	7.3	25.4	7.0	26	610	840	820	12.2	-	6.6	2.0	I
IR29	76	2	77	8.0	-	6.2	99	-	-	-	-	-	-	-	I
IR29	77	8	77	7.8	-	6.8	100	365	95	100	-	-	-	-	I
IR29	87	7	87	6.8	2.7	6.0	100	660	-60	110	7.7	-	5.8	2.0	I
IR29	89	10	90	7.6	2.0	6.0	89	-	-	-	2.0	58	6.6	2.1	I
IR30	76	2	77	7.6	25.6	3.5	88	-	-	-	-	-	-	-	I
IR30	77	8	77	6.9	25.7	4.7	50	-	-	-	-	-	-	-	I
IR30	87	7	87	7.3	24.4	3.0	54	620	425	615	10.4	-	5.8	2.3	I

	Crop year	Date analyzed		Protein (%)	Amy-lose (%)	Alkali spread-ing value	Gel consis-tency (mm)	Amylograph viscosity			Instron		Length (mm)	Width (mm)	Water regime[b]
		(mo)	(yr)					Peak (Bu)[a]	Set-back (Bu)	Consis-tency (Bu)	Hard-ness (kg)	Sticki-ness (g-cm)			
IR32	77	8	77	8.9	24.7	5.0	100	-	-	-	-	-	-	-	I
IR32	77	2	78	10.0	27.6	5.8	100	-	-	-	-	-	-	-	I
IR32	87	7	87	6.5	24.8	5.5	85	590	530	630	11.5	-	5.7	2.1	I
IR34	76	8	76	7.1	28.6	7.0	46	-	-	-	-	-	-	-	I
IR34	76	2	77	8.2	26.5	7.0	38	-	-	-	-	-	-	-	I
IR34	87	7	87	6.0	25.9	7.0	26	740	640	750	9.3	-	6.3	2.1	I
IR36	77	8	77	8.4	25.0	4.0	51	-	-	-	-	-	-	-	I
IR36	77	2	78	7.7	27.8	5.0	65	-	-	-	-	-	-	-	I
IR36	80	-	81	10.0	26.3	5.0	32	-	-	-	6.4	-	6.7	2.0	I
IR36	87	7	87	8.2	25.4	3.8	38	790	170	370	8.5	-	6.3	2.0	I
IR36	88	5	89	7.3	28.0	4.6	29	855	255	600	9.9	-	-	-	I
IR36	89	9	89	8.2	25.0	6.0	30	-	-	-	7.7	-	-	-	I
IR38	77	8	77	7.2	26.0	5.0	80	-	-	-	-	-	-	-	I
IR38	77	2	78	8.1	27.7	5.2	100	-	-	-	-	-	-	-	I
IR38	87	7	87	6.3	26.0	4.8	48	850	345	565	9.3	-	6.0	2.1	I
IR40	76	5	77	7.2	26.8	4.7	60	-	-	-	-	-	-	-	I
IR40	77	8	77	7.4	25.8	4.7	52	-	-	-	-	-	-	-	I
IR40	87	7	87	7.2	26.0	4.2	26	820	480	670	9.0	-	5.6	2.0	I
IR42	77	8	77	8.6	24.8	7.0	30	-	-	-	-	-	-	-	I
IR42	77	2	78	7.4	28.4	7.0	40	-	-	-	-	-	-	-	I
IR42	80	-	81	8.8	27.9	7.0	28	-	-	-	7.8	-	5.7	2.2	I
IR42	87	7	87	6.3	25.8	7.0	27	680	720	770	9.5	-	5.7	2.0	I
IR42	87	5	88	8.9	25.0	7.0	27	-	-	-	9.7	-	5.8	2.0	I
IR42	88	5	89	7.4	26.8	7.0	26	755	695	850	9.9	-	-	-	I
IR42	89	9	89	7.4	24.9	7.0	26	-	-	-	9.2	-	-	-	I
IR43	87	7	87	6.6	16.6	6.2	76	890	-270	250	7.6	-	6.3	2.2	U
IR44	87	7	87	6.6	25.6	6.5	35	790	480	640	9.0	-	6.1	2.1	I
IR45	87	7	87	6.3	25.5	6.9	38	690	660	720	8.2	-	5.1	2.0	U
IR46	87	7	87	6.6	26.4	4.9	95	550	260	450	6.6	-	6.0	2.0	I
IR46	89	9	89	7.5	26.0	5.0	93	-	-	-	8.4	-	-	-	I

IR48	87	7	87	6.5	22.4	7.0	49	7 10	80	400	8.1	-	6.6	2.2	I
IR5	68	6	69	6.7	27.2	2.2	-	7 40	170	395	-	-	-	-	I
IR5	72	8	72	6.6	28.4	3.0	-	-	-	-	-	-	-	-	I
IR5	73	-	73	6.2	29.8	3.2	100	-	-	-	-	-	-	-	I
IR5	73	-	74	8.8	27.6	3.9	91	580	225	380	-	-	-	-	I
IR5	73	-	74	7.0	26.2	4.2	71	510	175	310	-	-	-	-	I
IR5	74	2	74	6.7	26.5	4.4	86	-	-	-	-	-	-	-	I
IR5	76	2	77	6.1	30.0	3.0	76	-	-	-	-	-	-	-	I
IR5	87	7	87	6.1	26.0	4.9	90	490	200	370	8.1	-	5.2	2.4	I
IR50	87	7	87	7.2	27.0	4.8	40	750	460	620	10.1	-	6.1	2.0	I
IR50	87	5	88	9.4	27.3	5.0	41	-	-	-	10.3	-	6.3	1.9	I
IR50	88	5	89	7.1	29.4	5.4	28	860	405	680	9.5	-	-	-	I
IR50	88	9	88	9.8	27.3	5.0	31	-	-	-	9.8	-	6.4	1.9	I
IR50	89	9	89	9.1	26.3	5.8	31	-	-	-	8.9	-	-	-	I
IR52	87	7	87	6.6	26.2	7.0	33	490	520	560	9.4	-	6.4	2.0	I
IR54	87	7	87	6.5	25.8	4.0	33	910	410	650	9.3	-	6.2	2.0	I
IR54	87	5	88	7.3	26.0	5.0	28	-	-	-	8.9	-	6.2	2.0	I
IR56	87	7	87	7.5	26.0	7.0	32	660	420	600	9.4	-	6.5	2.0	I
IR58	87	7	87	8.4	25.6	6.8	26	810	670	800	10.1	-	5.7	2.1	I
IR60	87	7	87	8.2	26.2	7.0	42	320	400	440	9.0	-	6.0	2.0	I
IR62	87	7	87	7.1	27.6	4.3	75	590	250	450	9.2	-	6.0	2.2	I
IR64	87	7	87	6.6	21.4	3.4	76	830	-190	290	6.6	-	6.6	2.0	I
IR64	87	5	88	8.2	20.3	3.2	70	-	-	-	6.0	-	7.0	2.1	I
IR64	88	5	89	7.0	23.6	3.0	46	725	-140	265	6.0	-	7.0	2.1	I
IR64	89	9	89	8.2	22.0	5.5	51	-	-	-	6.1	-	-	-	I
IR65	87	7	87	7.1	2.6	6.0	100	650	-180	80	6.7	-	6.3	1.9	I
IR66	88	8	88	9.2	27.8	5.0	89	535	265	460	8.9	-	6.4	2.0	I
IR66	88	9	88	9.2	27.8	5.0	89	-	-	-	8.9	-	6.4	2.0	I
IR68	88	8	88	7.9	27.6	7.0	27	690	735	805	10.3	-	7.7	2.1	I
IR68	88	5	89	10.5	27.9	7.0	27	510	520	620	10.6	-	-	-	I
IR68	88	9	88	7.9	27.6	7.0	27	-	-	-	10.3	-	7.7	2.1	I
IR68	89	9	89	7.4	26.8	7.0	29	-	-	-	9.7	-	-	-	I
IR70	88	8	88	9.1	25.2	6.0	29	680	470	630	9.2	-	6.1	2.1	I
IR70	88	9	88	9.1	25.2	6.0	29	-	-	-	9.2	-	6.1	2.2	I
IR72	87	4	88	7.6	26.8	5.0	50	680	105	315	8.5	-	6.5	2.0	I
IR72	87	5	88	7.6	26.8	5.0	50	-	-	-	8.5	-	6.6	2.0	I
IR72	88	5	89	7.6	29.2	5.0	54	585	330	540	8.8	-	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu)[a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
IR72	88	9	88	10.6	26.6	5.8	50	-	-	-	9.1	-	6.7	2.2	I
IR72	89	9	89	9.1	25.0	5.1	49	-	-	-	8.6	-	-	-	I
IR74	87	4	88	9.1	24.5	7.0	28	815	375	510	9.4	-	7.0	2.0	I
IR74	87	5	88	9.1	24.5	7.0	28	-	-	-	8.4	-	7.2	2.1	I
IR74	88	5	89	9.8	26.2	7.0	26	750	625	765	10.8	-	-	-	I
IR74	88	9	88	7.9	26.2	7.0	27	-	-	-	9.6	-	7.1	2.0	I
IR74	89	9	89	6.8	24.4	7.0	27	-	-	-	9.7	-	-	-	I
IR8	68	6	69	6.6	31.7	7.0	-	1080	640	780	-	-	-	-	I
IR8	68	6	69	6.4	33.0	7.0	-	1060	585	725	-	-	-	-	I
IR8	72	8	72	6.8	28.0	7.0	-	-	-	-	-	-	-	-	I
IR8	72	-	74	8.5	24.0	7.0	26	730	545	600	-	-	-	-	I
IR8	73	-	73	6.6	28.3	7.0	40	-	-	-	-	-	-	-	I
IR8	73	-	74	7.8	25.5	7.0	35	-	-	-	-	-	-	-	I
IR8	73	-	74	8.0	29.4	7.0	29	710	495	550	-	-	-	-	I
IR8	74	-	74	7.5	26.5	7.0	31	785	-85	260	6.8	68	-	-	I
IR8	77	8	77	7.1	24.9	7.0	34	-	-	-	-	-	-	-	I
IR8	77	2	78	7.3	27.7	7.0	42	-	-	-	-	-	-	-	I
IR8	87	7	87	7.3	26.5	7.0	27	770	640	750	9.9	-	5.9	2.4	I
IR8	88	5	89	7.0	26.8	7.0	26	670	480	675	9.8	-	-	-	I
IR8	89	9	89	7.0	24.0	7.0	27	-	-	-	9.4	-	-	-	I
IR841-67-1	80	-	81	9.3	15.1	7.0	74	-	-	-	5.6	-	7.0	2.2	I
IRAT104	86	4	87	6.8	13.4	3.0	72	840	-285	165	6.9	-	6.3	2.8	U
IRAT9	81	5	82	-	27.7	7.0	32	-	-	-	-	-	-	-	U
KALANA (RED) EX MARAWI CITY	89	1	90	8.3	29.6	7.0	31	780	470	675	10.8	-	6.5	2.3	
KHAO DAWK MALI 105	86	4	87	8.3	16.6	7.0	59	835	-330	100	7.7	-	7.6	2.1	D
KINANDANG PATONG	81	8	82	-	22.2	5.2	37	-	-	-	6.3	-	-	-	U
KINANDANG PATONG	82	8	82	-	22.4	5.1	54	-	-	-	5.8	-	-	-	U
KINANDANG PATONG	86	4	87	7.8	20.6	5.0	31	640	-40	250	8.0	-	4.4	2.6	U
KURIKIT PUTI (ACC 26882)	86	4	87	11.8	20.4	5.4	32	620	0	220	8.1	-	5.9	1.6	I

LEB MUE NAHNG III	81	5	82	-	25.4	6.2	34	–	–	–	–	–	–	–	U
LUBANG (ACC 598)	87	11	87	8.0	26.0	5.0	31	–	–	–	8.3	–	–	–	U
M527·9	67	-	67	9.1	28.5	4.4	–	960	275	525	–	–	–	–	I
MAGSANAYA(ACC 725)	86	4	87	10.5	20.2	5.9	36	675	·95	190	6.6	–	–	–	I
MAGUINSALAY (ACC 303)	86	4	87	11.5	23.1	6.0	28	810	165	380	11.7	–	5.4	2.2	I
MAKALPO (RED) EX MARAWI CITY	89	1	90	7.3	26.0	7.0	38	655	60	365	7.4	-	5.4	2.3	
MAKAPILAY-PUSA (ACC 606)	86	4	87	11.1	1.6	6.0	99	470	·135	15	8.4	-	5.3	2.7	I
MAKILING (PSBRc1)	90	6	91	9.3	23.2	5.0	45	705	·80	315	6.2	–	6.4	2.4	U
MALAGKIT (ACC 2060)	86	4	87	9.3	·.5	7.0	100	115	5	20	6.0	–	5.2	2.5	I
MALAGKIT SUNGSONG	62	7	63	6.8	5.0	6.0	–	675	·235	130	–	–	–	–	I
MALAGKIT SUNGSONG	62	-	63	8.2	4.5	6.2	–	510	·9 5	150	–	–	–	–	I
MALAGKIT SUNGSONG	63	-	64	10.4	5.0	5.9	–	430	45	150	–	–	–	–	I
MALAGKIT SUNGSONG	66	-	67	8.7	2.0	6.1	–	100	·10	25	–	–	–	–	I
MALAGKIT SUNGSONG	67	-	67	8.1	2.9	5.9	–	225	·20	35	–	-	4.8	2.7	I
MALAGKIT SUNGSONG	68	6	69	7.3	4.1	4.6	–	540	·70	90	–	–	–	–	I
MALAGKIT SUNGSONG	68	6	69	7.0	5.0	4.5	–	495	·75	50	–	–	–	–	I
MALAGKIT SUNGSONG	77	-	77	7.4	-	6.4	100	440	·105	65	3.5	462	4.6	2.8	I
MALAGKIT SUNGSONG	82	-	82	9.3	1.2	7.0	74	–	–	–	–	–	–	–	I
MALAGKIT SUNGSONG	89	10	90	7.4	4.4	6.0	96	–	–	–	6.0	60	4.9	2.8	I
MALAGKIT SUNGSONG PUTI	62	-	63	13.8	4.3	6.9	–	375	·55	90	–	–	–	–	I
MALIKET (ACC 44590)	86	4	87	12.0	18.7	4.6	33	765	·180	135	9.2	-	5.8	2.2	I
MANGAREZ	62	7	63	7.5	18.8	4.9	–	935	·145	335	–	–	–	–	I
MANGAREZ	62	-	63	8.4	18.4	4.5	–	560	100	300	–	–	–	–	I
MANONG BALAY (ACC 52856)	86	9	87	-	20.8	4.3	56	–	–	-	7.8	–	–	–	U
MANUMBALAY (ACC 57181)	86	4	87	12.6	22.0	5.8	28	775	95	315	9.4	-	6.5	2.2	I
MILAGROSA	62	7	63	8.0	20.3	4.0	63	780	·30	350	–	–	–	–	I
MILAGROSA	81	-	82	6.9	23.2	4.7	49	–	–	–	–	–	–	–	
MILFOR 6(2)	62	-	62	8.3	26.8	4.8	–	625	110	320	–	–	–	–	I
MILFOR 6(2)	62	-	63	10.4	25.1	6.4	–	600	80	295	–	–	–	–	I
MILFOR 6(2)	63	-	63	8.5	28.3	4.1	–	750	230	350	–	–	–	–	I
MILKETAN 6	67	-	67	8.4	25.3	4.7	–	950	20	375	–	–	–	–	I
MRC10993-308	86	10	86	7.5	23.8	4.5	36	960	·20	320	9.7	–	5.9	2.0	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu) [a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
MRC11055-430	86	10	86	6.9	24.8	6.5	58	540	245	275	8.9	-	6.9	2.0	I
MRC11334-979	86	10	86	6.3	25.9	4.2	37	675	5	210	7.4	-	6.3	2.0	I
MRC12379-927-1	86	10	86	6.9	21.8	3.1	64	740	-250	150	6.0	-	6.5	2.0	I
MRC14364-9	86	10	86	6.2	20.7	3.0	51	730	-290	120	5.9	-	5.6	2.1	I
MRC407-1	73	-	73	7.2	23.7	6.8	66	-	-	-	-				I
MRC603-303	77	8	78	8.0	28.1	7.0	37	865	635	720	8.2	45	6.6	2.1	I
MRC7849-584	86	10	86	5.7	27.4	4.7	38	905	45	340	8.4	-	6.4	2.1	I
NAM SAGUI 19	81	5	82	-	27.6	5.2	34	-	-	-	-	-	-	-	U
NGUP-PUR EX BANAWE	89	12	89		1.6	7.0	100	-	-	-	-	-	4.7	2.7	U
NONA BOKRA	85	4	87	8.9	27.2	5.0	58	635	190	345	8.4	-	5.0	2.4	D
NORELON 340(CS)	67	-	67	9.0	30.2	4.8	-	505	135	275	-	-	-	-	I
PALAWAN	62	7	63	6.2	19.2	5.1	-	1045	-225	395	-	-	-	-	U
PALAWAN	62	-	63	7.5	27.4	4.4	-	780	10	350	-	-	-	-	U
PALAWAN	68	6	69	6.1	24.4	2.0	-	1140	-260	320	-	-	-	-	
PALAWAN (A)	86	4	87	7.0	20.8	4.9	35	670	-105	215	7.8	-	5.2	2.5	U
PANGASINAN	64	-	65	-	-	4.0	-	-	-	-	-	-	-	-	I
PANKAJ (ACC 46502)	83	-	83	-	28.0	5.0	95	-	-	-	-	-	-	-	D
PANPET 63	68	6	69	6.9	1.6	2.0	-	1170	-380	115	-	-	-	-	
PANPET 63	68	6	69	6.8	2.1	2.0	-	1135	-375	90	-	-	-	-	
PANPET 63	71	-	-	7.3	-	2.3	100	870	-275	80	5.9	210			I
PARC2-2	73	-	73	6.6	28.0	6.9	34	-	-	-	-	-	-	-	I
PATNAI 23	86	4	87	9.8	26.3	5.0	67	515	400	435	10.0	-	7.2	2.0	D
PERURUTONG NBA (ACC 754)	86	4	87	9.2	2.0	3.8	100	780	-260	35	6.2	-	5.9	2.4	I
PETA	62	7	63	7.6	25.3	4.8	-	840	390	600	-	-	-	-	I
PETA	62	-	63	6.5	32.8	3.3	-	690	440	540	-	-	-	-	I
PETA	62	-	63	7.5	30.2	4.4	-	570	320	460	-	-	-	-	I
PETA	63	-	64	10.8	27.7	5.0	-	830	375	585	-	-	-	-	I
PETA	72	8	72	6.4	28.1	3.0	-	-	-	-	-	-	-	-	I

PINIDUT	86	9	87	-	24.2	5.0	28	795	20	270	10.2	-	-	-	U
PINK-KITAN EX BANAWE	89	12	89		1.6	7.0	100	-	-	-	-	-	5.4	2.6	U
POKKALI	86	4	87	11.9	25.2	5.0	37	630	235	375	9.7	-	5.3	2.5	D
PSBRc2 (IR32809-26, NAHALIN)	90	6	93	-	27.4	5.0	81	520	280	500	7.2	-	7.1	2.2	I
PSBRc4 (IR41985-111, MOLAWIN)	91	6	91	-	23.4	5.0	44	645	-65	300	5.6	-	6.6	2.3	I
PULUTAN (ITUM) EX MARAWI CITY	89	1	90	6.1	9.2	5.6	84	710	-145	195	3.1	-	5.3	2.5	
PULUTAN (PUTI) EX MARAWI CITY	89	1	90	8.6	8.3	6.9	71	370	80	150	3.5	-	6.6	2.2	
RAMADIA (ACC 44713)	86	4	87	8.2	26.5	5.4	86	530	210	335	8.8	-	5.7	2.2	I
RAMINAD STR 3 (ACC 32557)	86	4	87	12.0	21.2	4.6	44	720	-115	155	8.6	-	5.9	2.1	I
RAMINAD STR 3 (ACC 40)	87	11	87	8.2	23.1	4.0	45	-	-	-	8.2	-	5.6	2.2	U
RAMINAD STR.3	62	7	63	8.5	20.9	4.7	-	700	10	325	-	-	-	-	I
RAMINAD STR.3	62	-	63	11.6	20.8	4.1	-	625	40	330	-	-	-	-	I
RAMINAD STR.3	63		63	12.2	23.5	4.8	-	790	-80	300	-	-	-	-	I
RAMINAD STR.3	63	-	63	8.4	21.8	3.1	-	1050	-370	300	-	-	-	-	I
RENDA-I EX MARAWI CITY	89	1	90	7.6	27.3	6.5	56	660	-50	295	6.7	-	6.0	2.2	
SALUMPIKIT	81	5	82	-	28.2	5.0	81	-	-	-	-	-	-	-	U
SENORITA	64	-	64		-	3.7	-	-	-	-	-	-	-	-	I
SERAUP KECHIL 36 STR.482	62	7	63	7.2	25.3	5.3	-	775	380	575	-	-	-	-	I
SIAM29	63	-	63	13.0	31.4	6.0	-	730	335	445	-	-	-	-	I
SIAM29	63	-	63	7.3	31.2	5.1	-	950	300	550	-	-	-	-	I
SR26 B	86	4	87	8.5	26.4	5.0	42	630	210	395	8.2	=	6.4	2.0	D
TAPOL (ACC 615)	86	4	87	10.5	3.2	3.0	94	700	-170	50	8.2	-	6.6	2.2	I
TERIMAS EX MARAWI CITY	89	1	90	8.4	29.0	6.8	44	655	-35	310	7.3	-	6.9	2.2	
TJERE MAS	62	7	63	6.9	29.0	4.7	-	810	360	530	-	-	-	-	I
TJERE MAS	62	-	63	10.2	29.0	4.6	-	580	380	500	-	-	-	-	I
TJERE MAS	63	-	63	11.8	26.2	5.9	-	810	420	530	-	-	-	-	I
TJERE MAS	63	-	63	6.4	30.0	5.4	-	980	2 10	490	-	-	-	-	I
TJERE MAS	72	8	72	5.5	28.1	2.8	-	-	-	-	-	-	-	-	I
UPLRi-1	77	-	78	7.2	1.4	6.4	100	400	-145	50	3.3	520	6.4	2.5	I
UPLRi-1	88	7	88	7.6	2.1	6.0	99	550	-310	20	6.3	-	6.7	2.6	I
UPLRi-2	88	7	88	9.8	19.2	3.3	47	620	-150	180	7.4	-	6.6	2.3	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu) [a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
UPLRi-3	88	7	88	8.9	21.3	4.6	42	670	-230	150	7.3	-	6.6	2.2	I
UPLRi-4	88	7	88	7.6	26.5	6.2	28	820	120	350	9.0	-	6.8	2.2	I
UPLRi-5	86	4	87	7.3	20.6	3.0	40	685	-110	195	7.8	-	6.0	2.1	U
UPLRi-5	88	7	88	9.9	18.7	3.0	42	610	-140	190	6.9	-	6.6	2.2	I
UPLRi-7	88	7	88	8.7	26.8	7.0	35	440	325	405	9.5	-	6.7	2.4	U
WAGWAG	61	-	62	7.7	30.3	2.3	-	910	580	750	-	-	5.3	2.0	I
WAGWAG	85	-	85	8.1	28.8	6.9	32	765	340	465	10.0	-	4.6	2.0	I
WAGWAG	85	4	87	8.1	28.8	6.9	32	765	340	465	10.0	-	4.6	2.0	D
WAGWAG (ACC 38847)	87	11	87	6.5	23.1	4.6	58	-	-	-	7.8	-	6.3	2.3	U
WAGWAG (ACC 5824)	86	4	87	10.8	25.4	6.0	31	700	235	380	9.8	-	5.6	1.9	I
WAGWAG A	62	-	63	12.3	28.2	6.0	-	880	235	495	-	-	5.2	2.1	I
PORTUGAL															
ALLORIO	72	5	73	7.6	21.9	7.0	95	-	-	-	-	-	-	-	I
ALLORIO	77	6	78	6.4	21.2	7.0	92	680	5	190	5.2	92	5.5	2.5	I
ALLORIO	85	9	86	5.7	19.2	7.0	78	580	-75	90	6.8	-	5.9	2.8	I
BALILLA	72	5	73	6.8	19.3	7.0	100	-	-	-	-	-	-	-	I
BALILLA	77	6	78	5.2	20.9	7.0	95	685	-4 5	160	4.8	108	4.4	2.6	I
BALILLA	85	9	86	5.6	18.4	7.0	80	690	-190	40	6.8	-	4.9	2.8	I
BALILLA GRANA GROSSA	72	5	73	6.2	20.9	7.0	100	-	-	-	-	-	-	-	I
BALILLA GRANA GROSSA	77	6	78	6.5	20.4	7.0	79	665	-35	180	4.8	110	-	-	I
BALILLA GRANA GROSSA	85	9	86	6.0	17.4	7.0	74	655	-150	65	6.8	-	5.4	2.8	I
BANATA 35	85	9	86	7.2	17.2	7.0	62	615	-155	50	7.5	-	5.5	3.0	I
CHINES	72	5	73	6.3	20.9	7.0	95	-	-	-	-	-	-	-	I
CHINES	77	6	78	6.5	20.9	7.0	82	630	45	205	4.4	102	5.0	2.8	I
ESTRELLA A	85	9	86	7.7	16.0	4.3	72	855	-310	45	7.0	-	8.1	2.1	I
ESTRELLA A	88	12	89	8.4	17.5	6.0	56	730	-4 5	290	5.0	-	7.8	2.1	I
PONTA RUBRA	72	5	73	7.3	25.7	7.0	91	-	-	-	-	-	-	-	I

PONTA RUBRA	76	10	76	7.6	23.1	7.0	55	755	215	425	6.7	66	-	-	I
PONTA RUBRA	77	6	78	6.8	24.1	7.0	80	685	175	335	6.2	76	5.2	2.7	I
PRECOCE 6	72	5	73	6.8	20.3	7.0	98	-	-	-	-	-	-	-	I
PRECOCE 6	77	6	78	6.4	19.1	7.0	90	880	-210	195	5.6	118	5.5	2.7	I
PRECOCE 6	85	9	86	7.8	16.2	7.0	50	660	-180	50	7.6	-	5.8	2.8	I
PRITS	85	9	86	7.6	18.1	7.0	57	635	-135	50	7.5	-	5.6	2.7	I
RIBE	72	5	73	8.0	18.5	7.0	80	-	-	-	-	-	-	-	I
RIBE	77	6	78	6.5	18.7	7.0	88	875	-215	140	6.0	110	5.8	2.2	I
RIBE	85	9	86	6.4	16.8	7.0	70	740	-255	50	6.8	-	6.3	2.6	I
RINALDO BERSANI	72	5	73	7.1	19.1	7.0	91	-	-	-	-	-	-	-	I
RINALDO BERSANI	77	6	78	7.0	18.7	7.0	84	860	-240	155	4.8	127	6.1	2.4	I
RINGO	77	6	78	7.2	17.2	7.0	90	800	-200	135	5.1	131	5.4	2.6	I
SAFARI	85	9	86	7.1	20.4	7.0	39	680	-65	145	7.6	-	6.2	2.6	I
STIRPE 136	72	5	73	6.7	20.3	7.0	96	-	-	-	-	-	-	-	I
STIRPE 136	77	6	78	5.7	21.3	7.0	86	715	-55	195	4.6	99	5.4	2.6	I
VALLEJO	72	5	73	5.3	18.9	7.0	100	-	-	-	-	-	-	-	I

RUSSIA

ALTAIR	86	3	87	7.4	18.1	7.0	56	790	-240	100	8.2	-	5.3	2.7	I
DUBOVSKI 129	72	10	73	7.4	20.1	7.0	86	-	-	-	-	-	-	-	I
DUBOVSKI 129	77	6	78	6.3	20.5	7.0	94	740	-150	150	4.3	79	5.2	2.9	I
GORIZONT	86	3	87	6.0	16.0	3.0	76	970	-420	100	6.4	-	4.3	2.8	I
HORISONT	77	6	78	5.8	18.7	3.8	89	900	-305	160	5.0	136	4.8	2.7	I
JEMCHUJNYI	86	3	87	6.9	19.0	6.0	70	875	-285	100	8.4	-	4.7	2.9	I
KRASNODARSK 424	72	10	73	5.1	20.4	7.0	98	-	-	-	-	-	-	-	I
KRASNODARSK 424	77	6	78	6.1	22.4	7.0	88	610	30	200	5.1	103	4.8	3.1	I
KRASNODARSK(Y)I 424	86	3	87	6.2	19.8	7.0	56	700	-135	105	8.4	-	4.5	2.8	I
KUBAN 3	72	10	73	6.9	19.6	2.5	89	-	-	-	-	-	-	-	I
KUBAN 3	77	6	78	6.7	17.8	3.8	95	890	-300	140	5.0	126	4.8	3.0	I
KUBAN 3	86	3	87	5.7	16.2	3.0	80	1000	-390	90	6.5	-	4.4	2.8	I
KUBAN 9	77	6	78	7.5	19.9	5.2	91	815	-235	150	5.4	126	4.8	3.1	I
KULON	86	3	87	6.9	18.6	7.0	56	810	-240	85	7.9	-	5.9	2.7	I
LIMAN	86	3	87	6.4	17.7	7.0	68	815	-315	60	7.0	-	4.5	2.7	I
LUCH	77	6	78	6.5	21.2	7.0	81	660	-60	160	4.1	51	6.1	2.8	I
SOLARIS	86	3	87	6.2	17.8	7.0	74	840	-275	80	6.6	-	4.9	2.7	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
SOLNECHNY	77	6	78	6.3	20.4	7.0	82	750	-140	175	4.6	91	4.9	2.9	I
SPALCHIK	86	3	87	6.8	18.0	7.0	68	830	-335	65	6.8	-	4.5	2.7	I
START	86	3	87	7.4	16.0	3.0	66	1000	-360	120	7.0	-	4.2	2.7	I
USBEKSKI 2	72	10	73	6.4	20.0	7.0	100	-	-	-	-	-	-	-	I
USBEKSKI 5	72	10	73	6.0	20.8	7.0	89	-	-	-	-	-	-	-	I
USROS 269	72	10	73	6.1	20.0	7.0	100	-	-	-	-	-	-	-	I
USROS 7/13	72	10	73	5.3	21.2	7.0	100	-	-	-	-	-	-	-	I
ZHEMCHUZHNY	77	6	78	7.0	20.5	5.4	84	870	-280	160	4.4	108	5.1	3.0	I
SENEGAL															
DJ 684 D	90	7	90	9.9	23.6	7.0	26	635	705	760	10.3	-	6.3	2.4	
DJ.12.519	90	7	90	8.3	27.4	6.8	30	980	465	780	10.3	-	5.5	2.6	U
DJAMBERAN RED (MARKET SAMPLE)	77	10	77	5.9	30.4	5.0	55	-	-	-	-	-	-	-	
DJAMBERAN WHITE (MARKET SAMPLE)	77	10	77	4.8	29.6	4.9	95	-	-	-	-	-	-	-	
I KONG PAO (I.K.P.)	90	7	90	7.1	25.3	6.8	31	890	410	695	9.6	-	4.9	2.8	I
I KONG PAO (MARKET SAMPLE)	77	10	77	6.5	29.7	5.8	35	-	-	-	-	-	-	-	I
IR1529-680-3	90	7	90	7.6	25.4	6.9	30	690	660	745	10.3	-	6.9	2.2	
JAYA	90	7	90	7.3	25.4	7.0	30	700	730	745	9.5	-	6.3	2.5	
ROK5 (ROCK5) EX SIERRA LEONE	90	7	90	8.2	26.2	7.0	*78*	460	250	435	8.4	-	7.3	2.3	
SE3026 (MARKET SAMPLE)	77	10	77	6.7	27.8	5.0	35	-	-	-	-	-	-	-	U
SENEGALESE RICE (MARKET SAMPLE)	77	10	77	6.7	27.8	5.0	88	-	-	-	-	-	-	-	I

SIERRA LEONE

2/91/ZC.2	72	6	73	7.4	30.6	4.6	100	-	-	-	-	-	-	-	I
AA4A	73	4	74	4.9	27.4	7.0	-	-	-	-	-	-	-	-	I
AA8A	73	4	74	4.6	27.9	7.0	-	-	-	-	-	-	-	-	I
ADNY301	86	4	87	6.1	28.0	5.2	30	-	-	-	9.4	-	5.7	2.1	I
ADNY301	86	-	87	9.0	25.6	5.6	27	-	-	-	-	-	5.1	2.2	T
ANETHODA	72	6	73	7.0	28.7	5.0	60	-	-	-	-	-	-	-	I
AZ X F46	73	4	74	8.5	18.3	3.8	-	-	-	-	-	-	-	-	I
B2039C-KN-72-5-3 (7-2-5-3)	86	-	87	6.8	30.2	4.7	34	-	-	-	-	-	6.0	2.4	T
BAANYALOJOPOIHUN	72	6	73	5.6	30.1	6.0	100	-	-	-	-	-	-	-	I
BD2	72	6	73	6.6	29.6	3.8	100	-	-	-	-	-	-	-	I
BG380-2	86	-	87	6.9	30.4	5.0	39	-	-	-	-	-	6.2	2.3	T
BG400-1	86	4	87	8.0	26.7	5.0	28	-	-	-	10.6	-	5.3	2.3	I
BH2	73	4	74	4.8	27.6	6.0	-	-	-	-	-	-	-	-	I
BQ5B	73	4	74	6.2	27.7	7.0	-	-	-	-	-	-	-	-	I
BQ5B	86	4	87	6.9	26.6	5.8	31	-	-	-	9.0	-	4.9	2.4	I
C13E3	72	6	73	7.2	30.1	5.0	100	-	-	-	-	-	-	-	I
C13F1	73	4	74	5.2	27.1	6.5	-	-	-	-	-	-	-	-	I
C13H3	73	4	74	5.2	28.0	7.0	-	-	-	-	-	-	-	-	I
C22	86	4	87	6.6	26.4	4.8	30	-	-	-	8.5	-	5.6	2.1	U
C22	86	-	87	8.2	28.6	4.9	30	-	-	-	-	-	5.6	2.0	T
CP4	72	6	73	6.1	29.9	5.8	97	-	-	-	-	-	-	-	I
CP4	86	4	87	7.5	26.8	6.6	26	-	-	-	9.2	-	4.8	2.3	I
CP4	86	-	87	7.6	27.9	5.4	26	-	-	-	-	-	4.8	2.3	T
CP9	73	4	74	5.7	27.8	7.0	-	-	-	-	-	-	-	-	I
FAROX 299	86	4	87	7.2	22.6	4.9	36	-	-	-	7.4	-	6.2	2.8	U
GATANG	86	4	87	7.3	28.2	6.4	31	-	-	-	9.4	-	4.8	2.3	I
GBASSIN	86	-	87	6.2	28.8	5.8	28	-	-	-	-	-	5.0	2.3	T
GC21	73	4	74	5.4	27.6	7.0	-	-	-	-	-	-	-	-	I
GISSI 27	86	4	87	7.5	28.0	7.0	27	-	-	-	10.5	-	5.3	2.2	I
INDIA PA LIL-46	72	6	73	5.5	26.7	4.6	65	-	-	-	-	-	-	-	I
IR23429-R-WAR-1	86	-	87	6.4	25.4	3.2	27	-	-	-	-	-	5.6	2.2	T
IR58	86	4	87	6.7	27.2	5.8	28	-	-	-	9.6	-	5.0	2.2	I
IRAT161	86	4	87	7.3	18.0	3.0	61	-	-	-	7.2	-	5.9	2.5	U
ISA6	86	4	87	7.3	17.5	3.0	50	-	-	-	7.4	-	5.9	2.2	U

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
ITA235	86	4	87	6.5	16.8	3.0	66	-	-	-	7.7	-	6.0	2.4	U
ITA257	86	4	87	7.5	20.0	3.6	52	-	-	-	5.6	-	5.7	2.5	U
KUATIK KUNDOR	86	-	87	6.9	27.8	6.0	28	-	-	-	-	-	4.9	2.2	T
MAHSURI	86	4	87	5.9	28.3	5.1	26	-	-	-	9.2	-	4.7	2.0	I
MAUNG NYO 824-92	86	-	87	6.8	28.2	5.8	28	-	-	-	-	-	5.0	2.0	T
MOYAMBAN 1	86	4	87	6.6	27.7	4.8	28	-	-	-	9.0	-	5.4	2.1	I
NGIEYA YAKEI	72	6	73	7.9	28.8	5.8	82	-	-	-	-	-	-	-	I
NGIEYA YAKEI	73	4	74	8.5	26.8	5.7	-	-	-	-	-	-	-	-	I
RADIN JAWA (GURDIL)	86	-	87	6.9	28.5	6.4	27	-	-	-	-	-	5.3	2.1	T
RAU4045-2A	86	4	87	9.0	26.9	4.8	30	-	-	-	8.0	-	4.2	2.4	I
RC4-46	86	4	87	5.8	27.8	5.0	30	-	-	-	8.6	-	4.8	2.4	I
RH2	72	6	73	5.3	29.9	5.9	100	-	-	-	-	-	-	-	I
ROHYB1-1	86	4	87	7.7	27.6	4.9	78	-	-	-	8.0	-	5.2	2.2	I
ROHYB15 WAR-3-3-B-2	86	4	87	6.9	28.1	4.9	63	-	-	-	8.4	-	6.4	2.1	T
ROHYB15-WAR-3-3-B-2	86	-	87	7.9	28.9	5.0	56	-	-	-	-	-	6.4	2.1	T
ROHYB16-4	86	4	87	6.9	27.9	4.9	55	-	-	-	9.3	-	5.9	2.3	I
ROHYB4-WAR-1-1-B-2	86	-	87	6.4	30.1	5.0	42	-	-	-	-	-	6.5	2.1	T
ROHYB4-WAR-1-3-B-2	86	-	87	6.2	29.3	5.0	49	-	-	-	-	-	6.6	2.1	T
ROHYB6 WAR-6-2-B-2	86	4	87	6.8	27.6	5.5	26	-	-	-	8.4	-	5.6	2.3	I
ROHYB6-WAR-6-2-B-2	86	-	87	7.1	28.3	5.0	38	-	-	-	-	-	6.0	2.1	T
ROK1	86	4	87	8.7	28.4	5.0	70	-	-	-	9.0	-	6.7	2.2	U
ROK10	86	4	87	5.4	28.7	5.2	28	-	-	-	8.3	-	4.6	2.2	I
ROK10	86	-	87	7.6	27.4	5.4	27	-	-	-	-	-	5.0	2.3	T
ROK11 (ADNY2)	86	4	87	7.0	28.3	4.6	58	-	-	-	8.1	-	5.8	2.1	I
ROK11 (ADNY2)	86	-	87	7.4	29.0	4.9	70	-	-	-	-	-	6.0	2.0	T
ROK11 (ADNY2) EX LIBERIA	81	9	82	6.4	29.5	5.0	90	-	-	-	8.0	-	6.6	2.1	
ROK12	86	4	87	7.2	28.9	5.0	28	-	-	-	8.0	-	6.4	1.9	I
ROK14	86	4	87	6.0	27.2	7.0	26	-	-	-	9.3	-	5.9	2.5	I
ROK15	86	4	87	8.6	28.0	5.0	34	-	-	-	7.8	-	5.7	2.1	U
ROK16	86	4	87	7.1	25.8	5.8	33	-	-	-	6.2	-	5.4	2.4	U

ROK16 EX INGER	88	11	90	7.9	26.4	6.1	48	690	-40	320	6.2	-	6.8	2.7	
ROK16 EX LIBERIA	81	9	82	7.2	23.6	6.0	60	-	-	-	7.0	-	6.5	2.7	
ROK2	86	4	87	7.4	17.6	3.0	76	-	-	-	7.1	-	5.6	2.6	U
ROK3	86	4	87	7.3	27.6	4.9	28	-	-	-	9.0	-	6.4	2.1	U
ROK3 EX INGER	88	11	90	9.0	30.2	5.0	30	785	580	745	9.3	-	7.1	2.3	
ROK4	86	4	87	5.7	29.4	4.9	69	-	-	-	8.4	-	6.5	2.1	T
ROK5	86	4	87	5.9	29.2	5.0	54	-	-	-	7.8	-	6.4	2.0	T
ROK5	86		87	8.8	28.7	5.0	52	-	-	-	-	-	6.0	2.1	T
ROK6 (IR5-198-1-1)	86	4	87	7.2	27.6	4.9	38	-	-	-	7.8	-	5.0	2.2	I
ROK7	86	4	87	6.7	24.5	4.6	35	-	-	-	8.0	-	5.6	2.1	I
ROK8	86	4	87	5.5	28.4	5.0	49	-	-	-	7.8	-	6.6	2.1	T
ROK9	86	4	87	7.0	27.9	5.0	46	-	-	-	8.5	-	6.4	2.0	T
RTN16-2-1-1-1	86		87	6.7	29.6	5.0	28	-	-	-	-	-	5.3	2.3	T
SL22-617	86	4	87	5.3	29.2	5.0	31	-	-	-	8.9	-	5.3	2.2	I
SR26	86	4	87	5.9	28.6	4.7	54	-	-	-	8.3	-	6.7	2.1	I
SUAKOKO 8	86	4	87	5.9	28.9	5.0	27	-	-	-	8.5	-	6.4	2.1	I
T X 52.10.1 (T X 52101)	72	6	73	5.3	29.6	6.0	86	-	-	-	-	-	-	-	I
T X 52.10.1 (T X 52101)	73	4	74	7.0	28.1	6.5	-	-	-	-	-	-	-	-	I
T X 5225	73	4	74	9.7	23.5	5.0	-	-	-	-	-	-	-	-	I
TOS3230 EX IITA	85	9	86	9.0	23.2	-	29	-	-	-	-	-	-	-	I
TOS3231 EX IITA	85	9	86	6.9	24.2	4.9	77	-	-	-	-	-	6.7	2.2	I
TOS3234 EX IITA	85	9	86	7.4	25.2	5.0	34	-	-	-	-	-	6.8	2.3	I
TOS6895 EX IITA	85	9	86	9.4	19.6	5.1	43	-	-	-	-	-	6.5	2.1	I
TOS6898 EX IITA	85	9	86	6.4	20.5	6.0	57	-	-	-	-	-	4.8	3.0	I
TOS6900 EX IITA	85	9	86	9.0	18.8	5.8	55	-	-	-	-	-	5.1	2.8	I
TOS6905 EX IITA	85	9	86	7.8	20.0	6.0	54	-	-	-	-	-	5.2	3.1	I
TOS6920 EX IITA	85	9	86	8.1	21.6	5.8	57	-	-	-	-	-	5.9	2.8	I
TOS6941 EX IITA	85	9	86	7.2	25.0	4.9	33	-	-	-	-	-	6.5	2.3	I
TOS6950 EX IITA	85	9	86	8.9	21.0	5.7	42	-	-	-	-	-	6.2	2.6	I
TOS6980 EX IITA	85	9	86	6.6	20.2	5.0	57	-	-	-	-	-	5.9	2.6	I
TOS6988 EX IITA	85	9	86	7.7	20.3	5.8	40	-	-	-	-	-	5.4	2.5	I
TOS7073 EX IITA	85	9	86	7.9	23.1	5.0	31	-	-	-	-	-	5.3	2.2	I
TOS7078 EX IITA	85	9	86	7.4	25.3	5.0	62	-	-	-	-	-	6.5	2.1	I
TOS7087 EX IITA	85	9	86	6.7	25.0	5.0	60	-	-	-	-	-	6.6	2.1	I
WAR44-5-5-2	86		87	6.2	28.5	5.2	28	-	-	-	-	-	5.1	2.1	T
WAR44-50-4-1	86		87	6.7	28.5	5.8	30	-	-	-	-	-	4.9	2.2	T
WAR49-5-1-3-1	86		87	6.6	30.3	4.6	32	-	-	-	-	-	6.1	2.1	T

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
WAR52-384-3-2-1	86	-	87	7.4	29.1	5.0	30	-	-	-	-	-	5.9	2.5	T
WAR77-3-2-2	86	-	87	9.9	28.5	5.0	38	-	-	-	-	-	6.6	2.0	T
WAR81-2-1-2	86	-	87	8.0	29.6	4.0	30	-	-	-	-	-	4.5	2.3	T
WAR81-2-1-3-2	86	-	87	9.8	27.4	4.6	29	-	-	-	-	-	5.3	2.3	T
WAR81-2-3-2 (81-2-3-3-1)	86	-	87	8.7	27.8	4.8	28	-	-	-	-	-	5.3	2.3	T
WAR87-4-R1-1-1	86	-	87	8.0	28.0	5.8	26	-	-	-	-	-	5.2	2.4	T
WARKAIY0 4	86	4	87	5.8	30.2	5.1	32	-	-	-	8.7	-	5.3	2.1	I
SPAIN															
BAHIA	78	10	78	5.8	19.6	7.0	85	745	-150	180	4.6	137	5.3	3.0	I
BALILIA	64	2	65	10.3	18.4	6.0	-	670	-70	215	-	-	-	-	I
BALILIA X SOLLANA	78	10	78	5.9	20.4	7.0	82	770	-170	170	3.9	123	4.9	2.9	I
BETIS	86	7	87	9.0	14.9	6.6	81	690	-245	75	6.3	-	5.9	2.6	I
BOMBA	64	2	65	12.7	20.8	7.0	-	605	225	370	-	-	-	-	I
GIRONA	78	10	78	6.5	20.7	7.0	83	585	25	210	5.7	89	5.2	2.7	I
JUCAR	86	7	87	7.6	17.4	6.6	64	730	-255	90	5.5	-	5.2	2.8	I
NIVA	86	7	87	8.2	18.3	6.7	76	645	-190	90	6.2	-	5.1	2.8	I
RINALDO BERSANI	64	2	65	11.8	14.0	6.0	-	750	-125	195	-	-	-	-	I
SENIA	86	7	87	6.4	18.6	6.6	82	760	-255	115	5.6	-	5.5	2.8	I
SEQUIAL	78	10	78	7.4	19.0	7.0	83	635	-95	140	5.8	116	5.2	2.6	I
TEBRE	86	7	87	7.2	17.7	6.5	77	740	-220	95	5.9	-	5.3	3.1	I
SRI LANKA															
62-355	70	6	71	10.1	27.6	4.0	42	940	430	590	-	-	-	-	I
62-355	78	7	78	6.8	26.6	4.8	94	940	170	440	6.6	61	5.1	2.5	I
62-355	78	3	79	7.5	27.1	5.1	42	-	-	-	7.4	59	-	-	I
A12-17	70	6	71	9.9	27.1	7.0	28	1050	600	810	-	-	4.2	2.5	I
BG11-11	70	7	71	10.6	27.0	3.3	93	460	340	355	6.0	39	3.8	2.4	I

BG11-11	78	7	78	7.6	24.3	5.0	90	635	365	515	6.5	61	3.6	2.3	I
BG11-11	78	3	79	7.7	26.4	5.0	61	695	345	585	6.3	57	-	-	I
BG11-11	86	6	86	8.5	22.8	4.8	36	615	190	340	9.7	-	3.6	2.4	I
BG276-5	86	6	86	6.8	25.7	4.4	30	1000	-15	285	8.0	-	6.0	2.5	I
BG3-5	78	7	78	7.3	25.8	5.0	95	880	200	455	6.1	64	5.2	2.2	I
BG3-5	78	3	79	6.9	28.1	5.3	44	1040	-140	690	6.2	57	-	-	I
BG33-2	78	7	78	10.2	26.2	6.0	73	830	210	410	6.9	56	3.2	2.5	I
BG33-2	78	3	79	10.3	26.4	6.0	33	-	-	-	7.5	44	3.2	2.5	I
BG34-11	70	6	71	10.8	27.2	3.7	51	570	475	560	-	-	-	-	I
BG34-12	70	6	71	9.6	28.4	4.0	52	850	295	550	-	-	-	-	I
BG34-6	70	6	71	9.7	27.2	4.3	31	1060	305	595	-	-	-	-	I
BG34-6	77	7	78	9.1	25.2	5.0	81	930	170	420	6.4	53	5.9	2.5	I
BG34-6	78	3	79	8.5	26.0	5.0	37	-	-	-	6.7	49	5.5	2.6	I
BG34-6	86	6	86	7.1	25.0	5.0	38	710	-135	115	10.0	-	5.6	2.6	I
BG34-8	70	6	71	7.4	27.4	4.0	46	1100	290	585	-	-	-	-	I
8634-8	78	7	78	8.3	25.5	5.0	82	950	180	440	6.5	56	-	-	I
BG34-8	78	3	79	8.1	26.9	4.8	30	-	-	-	7.0	41	-	-	I
BG34-8	86	6	86	6.7	26.8	4.7	38	935	45	325	8.6	-	5.3	2.6	I
BG35-2	70	6	71	7.9	25.3	3.8	-	-	-	-	-	-	6.0	3.0	I
BG35-7	70	6	71	8.2	26.2	4.6	-	-	-	-	-	-	7.0	3.0	I
BG379-2	86	6	86	7.7	26.6	4.8	84	590	175	290	8.3	-	5.0	2.4	I
BG400-1	86	6	86	7.4	26.8	5.0	74	930	110	350	9.4	-	6.0	2.4	I
BG573	86	6	86	7.8	23.8	5.1	28	805	225	405	10.0	-	4.0	2.1	I
BG90-2	78	7	78	5.7	28.1	5.2	100	940	210	470	5.8	59	6.3	2.4	I
BG90-2	78	3	79	5.9	28.0	5.2	44	-	-	-	7.3	43	-	-	I
BG94-1	78	7	78	8.8	25.2	5.7	79	790	335	480	7.3	56	6.2	2.2	I
BG94-1	78	3	79	9.1	26.3	5.0	32	805	450	670	7.0	55	-	-	I
BG94-1	86	6	86	7.5	26.9	5.0	44	805	145	320	9.5	-	6.6	2.2	I
BW242-5-5	78	3	79	8.4	25.8	7.0	29	880	685	960	6.8	47	-	-	I
BW265	78	3	79	7.2	27.6	5.2	34	-	-	-	7.4	43	-	-	I
BW266-7	78	3	79	8.3	26.4	7.0	33	-	-	-	7.1	52	-	-	I
BW267-1	78	3	79	8.3	27.0	5.3	29	-	-	-	7.0	41	-	-	I
BW78	78	7	78	7.4	25.9	4.5	100	630	70	300	5.8	56	3.9	2.5	I
ELE WEE	78	3	79	7.2	26.8	4.0	95	630	260	390	6.0	53	-	-	I
H-4	63	-	63	9.7	31.3	5.2	-	720	600	600	-	-	-	-	I
H-4	70	6	71	11.7	27.0	5.0	31	910	515	590	9.1	31	-	-	I
H-4	78	7	78	8.3	26.2	5.0	100	930	200	460	7.4	51	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
H-4	78	3	79	7.5	27.6	5.5	42	968	382	650	7.2	41	6.3	2.4	I
H-4	86	6	86	7.8	26.3	5.0	33	840	130	360	9.8	-	6.4	2.4	I
H-501	63	3	64	13.5	30.8	5.3	-	335	250	265	-	-	-	-	I
H-7	64	-	64	7.4	29.9	4.0	-	1100	300	620	-	-	-	-	I
H-9	70	6	71	8.5	26.6	3.3	-	-	-	-	-	-	5.5	2.5	I
K8 MUTANT	70	6	71	9.1	28.2	4.0	68	930	270	510	-	-	5.8	2.3	I
KAHATA SAMBA	70	6	71	10.9	24.6	4.7	-	-	-	-	-	-	4.2	3.1	I
KALU HEENATI	79	3	79	8.0	26.8	5.0	92	670	485	665	7.4	38	-	-	I
KARAMANA	78	3	79	7.8	26.3	4.0	84	-	-	-	7.5	51	-	-	I
KARAWEE	78	3	79	8.8	26.2	5.0	88	-	-	-	7.8	58	-	-	I
KURU-WEE (SAMBA)	70	6	71	11.5	25.3	5.2	-	-	-	-	-	-	4.0	3.0	I
LD66	70	6	71	8.6	28.4	4.2	78	960	385	560	-	-	-	-	I
LUMBINI	78	3	79	8.9	26.5	4.2	66	-	-	-	7.0	40	-	-	I
NEWUDU SAMBA	79	3	79	-	27.6	3.8	61	-	-	-	-	-	-	-	I
PACHCHAIPERUMAL 2462/11	63	-	63	10.8	28.4	4.8	-	465	320	320	-	-	-	-	I
PACHCHAIPERUMAL 2462/11	70	6	71	9.7	29.6	3.7	59	720	325	495	-	-	-	-	I
PACHCHAIPERUMAL 2462/11	78	3	79	9.1	26.0	5.0	84	600	350	450	7.3	55	-	-	I
PK-1	70	6	71	10.6	25.0	5.8	-	-	-	-	-	-	-	-	I
PODIWI A-8 (PODIWEE A-8)	63	3	64	10.5	30.5	5.9	-	485	425	425	-	-	-	-	I
PODIWI A-8 (PODIWEE A-8)	79	3	79	-	25.8	5.5	78	420	410	450	-	-	-	-	I
PODIWI A-8 (PODIWEE A-8)	86	6	86	8.0	26.4	4.7	86	605	85	255	7.0	-	4.1	2.6	I
PTB-16	63	-	63	10.6	30.5	5.8	-	610	590	590	-	-	-	-	I
SAMBA (ACC. 7700)	70	6	71	10.6	25.3	5.6	-	-	-	-	-		4.0	3.0	I
SIGADIS	63	-	63	8.6	30.5	6.1	-	880	445	550	-	-	-	-	I
SUDURU SAMBA	79	3	79	-	25.8	5.0	73	-	-	-	-	-	-	-	I

SURINAM

70104/1	78	1	79	7.2	22.7	3.8	87	735	-105	200	7.0	100	8.0	1.9	I
70135/1	78	1	79	7.3	27.2	3.9	66	740	-140	200	5.6	100	7.7	2.1	I
71101/1	78	1	79	8.5	22.7	5.0	62	750	-180	180	6.2	108	8.1	2.1	I
71101/9	78	1	79	7.5	23.8	4.8	64	775	-185	170	6.2	114	8.0	1.9	I
7231/8	78	1	79	9.4	17.1	3.2	92	820	-275	150	5.7	122	8.3	2.1	I
7464/2	78	1	79	7.4	27.2	4.7	69	680	10	230	6.4	96	7.7	2.1	I
7464/3	78	1	79	7.3	27.7	4.9	58	680	30	260	6.6	89	7.8	2.2	I
7474/14	78	1	79	7.5	17.8	2.0	90	860	-270	170	6.0	140	8.1	2.2	I
770.51/2	84	9	85	7.3	21.7	5.6	66	-	-	-	8.7	-	7.7	2.2	I
770.80/5	84	9	85	6.7	17.2	3.6	79	-	-	-	7.7	-	7.8	2.1	I
771.42/5	84	9	85	7.6	24.0	6.9	41	-	-	-	10.3	-	7.8	2.0	I
771.56/1	84	9	85	9.3	19.7	5.9	35	-	-	-	11.4	-	7.8	1.9	I
780.2/42	84	9	85	6.7	15.2	3.0	70	-	-	-	7.7	-	8.0	2.0	I
780.5/4	84	9	85	7.1	15.6	3.5	70	-	-	-	7.8	-	8.3	2.3	I
780.7/8	84	9	85	7.1	21.1	4.6	60	-	-	-	8.4	-	8.5	2.1	I
780.8/4	84	9	85	7.0	22.4	5.9	74	-	-	-	8.6	-	8.4	2.1	I
781.62/3	84	9	85	6.0	20.9	6.1	45	-	-	-	8.3	-	8.2	2.1	I
781.62/6	84	9	85	6.2	20.0	5.4	49	-	-	-	7.8	-	8.5	2.1	I
CAMPONI	78	1	79	7.4	23.4	3.6	69	750	-150	200	5.6	99	7.6	2.0	I
CAMPONI	79	6	79	9.9	22.8	5.1	70	825	-70	285	-	-	-	-	I
DIWANI	78	1	79	6.8	22.6	4.1	87	820	-205	180	5.6	110	7.7	2.2	I
DIWANI	79	6	79	8.9	22.8	5.8	60	740	-90	265	-	-	8.1	2.2	I
DIWANI	84	9	85	8.9	20.1	5.0	45	-	-	-	8.8	-	7.9	2.2	I
ELONI	84	9	85	7.3	22.0	5.0	50	-	-	-	9.0	-	7.9	2.2	I
SML-1010/1	70	12	71	6.2	25.8	5.0	76	-	-	-	-	-	-	-	I
SML-22/431	71	12	71	5.8	25.6	4.8	90	-	-	-	-	-	-	-	I
SML-66H19/1	71	12	71	8.8	26.6	7.0	28	-	-	-	-	-	-	-	I
SML-67T4/4	71	12	71	7.8	25.8	5.2	68	-	-	-	-	-	-	-	I
SML-68143	71	12	71	7.2	18.6	3.0	100	-	-	-	-	-	-	-	I
SML-6921/1	71	12	71	8.4	27.5	6.2	-	-	-	-	-	-	-	-	I
SML-ACORNI	71	12	71	6.6	25.0	4.8	-	-	-	-	-	-	-	-	I
SML-ALUPI	71	12	71	7.8	24.6	4.0	-	-	-	-	-	-	7.4	2.2	I
SML-APANI	71	12	71	7.2	28.1	4.4	76	-	-	-	-	-	-	-	I
SML-AWINI	71	12	71	7.2	28.8	7.0	57	-	-	-	-	-	6.9	2.1	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
TAIWAN, CHINA															
BIR-ME-FEN	63	-	63	10.8	26.2	5.0	-	640	215	360	-	-	-	-	I
BIR-ME-FEN	63	-	63	9.6	25.7	4.9	-	1075	285	610	-	-	-	-	I
BIR-ME-FEN	63	-	63	7.3	25.0	4.9	-	1255	175	560	-	-	-	-	I
CHAINUNG NATIVE 11	78	10	78	9.3	28.5	5.6	56	750	240	410	6.8	64	6.0	2.2	I
CHIANUNG 242	62	-	62	7.9	19.8	7.0	-	750	-100	250	-	-	-	-	I
CHIANUNG 8	77	6	77	8.2	17.7	7.0	78	-	-	-	-	-	-	-	I
GUZE	63	-	63	6.9	24.3	7.0	-	1020	260	540	-	-	-	-	I
GUZE	63	-	63	8.1	24.8	7.0	-	1035	225	525	-	-	-	-	I
GUZE	63	-	63	7.9	24.0	5.0	-	1120	145	550	-	-	-	-	I
HSINCHU 64	85	9	86	4.6	15.6	6.1	73	880	-325	90	6.4	-	4.7	2.8	I
HSINCHU WAXY 4	80	4	81	9.3	1.3	7.0	100	-	-	-	5.0	-	4.4	2.7	I
HUNG-CHUEH-CHU	80	4	81	9.7	1.6	4.6	88	-	-	-	5.4	-	4.8	2.4	I
IR661	80	2	82	-	20.1	7.0	72	-	-	-	-	-	-	-	I
KAOHSIUNG 137	71	11	71	5.5	18.2	6.8	100	-	-	-	-	-	-	-	I
KAOHSIUNG 138	71	11	71	5.4	19.2	7.0	90	-	-	-	-	-	-	-	I
KAOHSIUNG 139	78	10	78	4.7	18.5	6.0	100	870	-290	150	4.1	207	4.5	2.8	I
KAOHSIUNG NATIVE 2	71	11	71	6.9	27.9	4.6	27	-	-	-	-	-	-	-	I
KAOHSIUNG SELECTION 1	78	10	78	7.3	21.4	6.2	100	440	-55	130	4.4	137	4.5	2.6	I
TAICHUNG 178	71	11	71	7.0	18.1	6.1	84	-	-	-	-	-	-	-	I
TAICHUNG 181	78	10	78	9.1	17.6	6.8	100	630	-95	140	5.0	157	4.3	2.8	I
TAICHUNG 184	71	11	71	6.9	18.3	6.0	100	-	-	-	-	-	-	-	I
TAICHUNG 186	71	11	71	6.6	18.6	6.0	82	-	-	-	-	-	-	-	I
TAICHUNG 189	85	9	86	5.8	14.0	6.0	80	885	-355	30	7.0	-	4.3	2.8	I
TAICHUNG 65	62	-	62	6.6	18.8	6.4	-	640	30	270	-	-	-	-	I
TAICHUNG GLUTINOUS 46	62	-	62	7.1	3.0	6.4	-	290	-10	70	-	-	-	-	I
TAICHUNG GLUTINOUS 46	78	10	78	8.7	1.8	6.0	100	200	-20	20	3.6	320	4.4	2.8	I
TAICHUNG GLUTINOUS 46	80	4	81	9.2	1.5	6.4	100	-	-	-	5.0	-	4.6	2.8	I

TAICHUNG GLUTINOUS 70	89	5	90	7.9	2.1	7.0	100	105	-30	20	5.8	82	4.4	3.0	I
TAICHUNG NATIVE 1	62	-	62	8.1	31.2	7.0	-	530	440	510	-	-	-	-	I
TAICHUNG NATIVE 1	78	10	78	5.4	29.3	7.0	38	895	515	700	6.8	48	4.8	2.6	I
TAICHUNG NATIVE 2	71	11	71	8.0	27.9	4.8	28	-	-	-	-	-	-	-	I
TAICHUNG NATIVE 2	78	10	78	10.7	28.5	5.6	35	460	110	240	7.0	57	-	-	I
TAICHUNG NATIVE 3	78	10	78	7.0	18.0	6.7	90	760	-250	140	4.3	178	-	-	I
TAICHUNG SEN 10	85	9	86	8.4	13.2	7.0	81	840	-295	45	6.1	-	6.2	2.2	I
TAICHUNG SEN 3	85	9	86	8.3	12.8	7.0	75	885	-325	60	6.4	-	6.3	2.2	I
TAICHUNG SEN GLUTINOUS 1	89	5	90	9.1	2.2	6.8	100	395	-195	50	6.3	79	6.2	2.3	I
TAINAN 3	63	-	63	7.8	16.2	7.0	-	900	-230	240	-	-	-	-	I
TAINAN 3	63	-	63	7.5	15.6	6.8	-	1060	-340	230	-	-	-	-	I
TAINAN 3	63	-	63	6.7	14.2	5.8	-	990	-300	200	-	-	-	-	I
TAINAN 3	63	-	63	7.4	17.0	7.0	-	800	-170	200	-	-	-	-	I
TAINAN 3	63	-	63	7.0	15.9	7.0	-	720	-80	210	-	-	-	-	I
TAINAN 3	63	-	63	8.3	15.1	7.0	-	870	-245	205	-	-	-	-	I
TAINAN 5	71	11	71	6.2	17.7	6.0	98	-	-	-	-	-	-	-	I
TAINAN 5	78	10	78	4.2	18.1	6.0	100	900	-285	170	3.7	222	4.3	2.9	I
TAINAN 5	80	1	81	9.0	19.6	7.0	80	-	-	-	6.0	-	4.6	2.6	I
TAINAN 9	85	9	86	7.1	15.7	7.0	73	650	-155	70	7.6	-	4.7	2.8	I
TAINAN GLUTINOUS YU 7	89	5	90	8.2	1.8	7.0	100	70	-15	10	5.2	63	4.7	3.0	I
TAINUNG 67	80	1	81	9.0	18.0	6.9	80	-	-	-	5.9	-	4.4	3.0	I
TAINUNG 67	85	9	86	7.6	15.2	6.9	73	625	-165	90	7.3	-	4.5	2.8	I
TAINUNG 69	85	9	86	6.5	14.7	6.8	80	585	-185	105	6.8	-	4.8	2.7	I
TAINUNG 70	85	9	86	6.8	14.2	6.1	84	700	-265	-	5.9	-	4.6	2.9	I
TAINUNG SEN 20	85	9	86	8.3	16.9	7.0	53	790	-240	60	7.2	-	5.7	2.1	I
TAINUNG SEN GLUTINOUS 2	89	5	90	9.0	2.4	6.9	100	445	-215	65	6.5	77	5.5	2.8	I
TAINUNG SEN YU 122	85	9	86	8.6	14.2	7.0	78	830	-280	80	6.8	-	6.4	2.2	I
TAIPEI 306	71	11	71	6.8	17.7	7.0	98	-	-	-	-	-	-	-	I
TAIPEI 309	71	11	71	5.8	19.2	7.0	87	-	-	-	-	-	-	-	I
TAITUNG 28	78	10	78	8.6	18.0	4.5	100	795	-225	140	4.0	140	4.5	2.9	I
WU-KO-CHU	80	4	81	9.2	1.5	6.6	100	-	-	-	4.8	-	5.2	2.5	I
TANZANIA															
SALAMA EX INGER	88	11	90	8.6	26.0	7.0	36	715	175	5 10	6.7	-	7.0	2.6	

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu)[a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
THAILAND															
BKNFR76014-51-5-1	82	-	-	-	30.0	5.0	37	-	-	-	-	-	6.8	2.0	D
BUN NAHK 16-1-2-1	76	10	77	8.4	-	6.8	100	-	-	-	4.0	354	6.2	2.5	I
DAWK PAYAWN	90	12	90	8.8	25.0	6.2	62	-	-	-	-	-	7.2	1.9	
DAWK PAYORM	82	-	82	7.6	22.7	5.9	50	-	-	-	6.0		7.4	2.0	U
DAWLEY 4-2	63	8	63	11.8	2.0	6.9	-	815	-325	105	-	-	-	-	I
GAHB YANG	76	10	77	8.5	-	7.0	100	-	-	-	4.7	297	7.2	2.4	I
GAM PA1 41	62	8	63	6.5	5.2	6.4	-	730	-210	140	-	-	-	-	I
GAW RUANG 88	63	8	63	9.0	22.0	4.7	-	715	-25	280	-	-	-	-	I
GAW RUANG 88	70	-	71	8.8	24.0	5.2	100	1080	-230	270	-	-	-	-	I
GAW RUANG 88	72	5	73	10.7	21.4	-	54	700	-20	275	-	-	-	-	I
HTA7205-11	82	-	82	-	29.2	7.0	31	-	-	-	-	-	6.7	2.0	D
IR11185-0-0-0—416-1	82	-	82	-	30.2	5.0	38	-	-	-	-	-	6.8	2.1	D
KHAO DAWK MALI 105	62	8	63	7.8	17.3	6.8	-	1085	-405	220	-	-	-	-	I
KHAO DAWK MALI 105	72	5	73	-	15.5	-	66	970	-235	215	-	-	-	-	I
KHAO DAWK MALI 105	76	7	76	5.4	15.6	7.0	94	1085	-380	195	6.6	102	-	-	I
KHAO DAWK MALI 105	81	-	82	7.7	14.5	7.0	60	-	-	-	-	-	7.5	2.0	
KHAO HAWN NAKORN PATOM(LEUANG HAWM)	62	8	63	13.6	24.0	6.9	-	385	375	375	-	-	-	-	I
KHAO HAWN NAKORN PATOM(LEUANG HAWM)	63	8	63	8.9	29.4	7.0	-	510	320	425	-	-	-	-	I
KHAO NIAW DAM	62	8	63	11.0	5.7	6.0	-	550	-125	100	-	-	-	-	I
KHAO PAHK MAW 148	70	-	71	7.7	23.7	4.9	100	990	-190	250	-	-	-	-	I
KHAO PAHK MAW 148	72	5	73	11.6	21.5	-	36	700	5	280	-	-	-	-	I
KHAO PUONG 32	82	-	82	5.9	30.2	5.8	40	-	-	-	5.7	-	7.2	2.3	D
KOO MUANG LUANG	82	-	82	7.8	28.0	7.0	30	-	-	-	7.8	-	8.2	2.4	U
LEB MUE NAHNG 111	82	-	82	8.0	29.0	5.9	32	-	-	-	6.3	-	7.4	2.3	D
LEB MUE NAHNG 111	87	-	87	6.5	28.1	6.0	31	855	95	350	9.5	-	7.2	2.1	D
LEUANG AWN	70	-	71	8.8	26.5	5.2	60	900	490	625	-	-	-	-	I
LEUANG AWN	76	7	76	6.8	27.7	6.7	34	930	280	520	-	-	-	-	I

LEUANG PRA-TEW 123	70	-	71	8.4	27.7	4.5	100	1150	170	515	-	-	-	-	I
LEUANG PRA-TEW 123	72	5	73	8.8	29.2	-	40	885	275	515	-	-	7.0	2.0	I
LEUANG YAI	76	7	76	7.6	28.8	7.0	38	910	475	625	-	-	-	-	I
LEUANG YAI 34	62	8	63	6.8	31.2	7.0	-	850	620	660	-	-	-	-	I
MUEY NAWNG 62M	63	8	63	8.5	3.0	6.5	-	770	-240	115	-	-	-	-	I
MUEY NAWNG 62M	78	2	79	9.7	1.6	6.0	76	495	-140	75	3.6	689	6.3	2.6	I
NAHNG CHALONG	82	-	82	6.9	1.6	6.0	96	-	-	-	4.0	-	7.1	2.8	D
NAHNG MON S4	62	8	63	6.5	26.2	7.0	-	660	240	450	-	-	-	-	I
NAHNG MON S-4	63	8	63	7.9	23.3	6.2	-	735	85	330	-	-	-	-	I
NAHNG MON S-4	70	-	71	7.7	23.8	5.4	80	920	-20	340	-	-	-	-	I
NAHNG MON S-4	76	7	76	8.6	25.0	7.0	36	685	-135	335	-	-	6.7	2.2	I
NAHNG PRAYA 132	62	8	63	8.3	29.4	5.6	-	870	335	535	-	-	-	-	I
NAHNG PRAYA 132	70	-	71	8.0	27.8	5.1	49	945	285	535	-	-	-	-	I
NIAW SAN PAHTAWNG	62	8	63	7.4	2.8	6.8	-	700	-230	110	-	-	-	-	I
NIAW SAN PAHTAWNG	76	10	77	6.2	-	6.8	100	540	-265	70	4.9	397	6.7	1.8	I
NIAW SAN PAHTAWNG	78	2	79	10.2	1.5	6.3	98	460	-120	70	3.4	634	6.5	2.0	I
NIAW SAN PAHTAWNG	88	-	89	6.5	1.9	6.0	100	-	-	-	-	-	-	-	
PAE	76	10	77	8.0	-	7.0	100	-	-	-	5.0	300	5.8	2.8	I
PAH LEUAD RAED 29-15-137	76	10	77	8.8	-	7.0	100	-	-	-	5.2	274	5.4	2.3	I
PATHUMTHANI 60	90	12	90	7.6	21.3	7.0	26	-	-	-	-	-	7.5	1.8	
PIN GAEW 56	62	8	63	7.8	30.4	5.6	-	795	275	470	-	-	-	-	I
PIN GAEW 56	70	-	71	7.9	27.8	5.1	48	900	200	465	-	-	-	-	I
PIN GAEW 56	82	-	82	-	30.6	5.1	98	-	-	-	-	-	7.4	2.1	D
PIN GAEW 56	87	-	87	5.7	29.9	5.0	94	605	100	255	7.4	-	7.6	2.0	D
PLAI NGHAM	87	-	87	4.7	29.6	5.1	38	830	125	380	8.4	-	7.4	2.2	D
PUANG NAHK16	63	8	63	9.4	28.2	7.0	-	750	440	465	-	-	-	-	I
RD1	72	5	73	8.8	27.9	-	28	745	610	685	-	-	-	-	I
RD1	76	7	76	6.9	29.9	7.0	32	865	645	730	-	-	7.1	1.7	I
RD10	82	-	82	7.9	1.5	6.8	94	-	-	-	4.6	-	7.3	2.1	I
RD11	82	-	82	6.9	28.0	7.0	31	-	-	-	8.4	-	7.3	2.1	I
RD13	82	-	82	5.9	29.1	5.8	60	-	-	-	7.0	-	6.8	2.2	I
RD15	82	-	82	7.9	15.6	7.0	66	-	-	-	5.5	-	7.2	2.0	I
RD17	82	-	82	7.5	28.8	5.0	38	-	-	-	7.0	-	6.5	2.2	D
RD19	82	-	82	7.1	30.0	5.0	55	-	-	-	7.7	-	7.0	2.5	D
RD19	87	-	87	3.7	29.9	5.0	58	945	145	415	8.3	-	7.2	2.3	D
RD2 (IR253-4)	78	2	79	9.5	1.5	6.0	78	440	-120	50	3.7	546	6.6	2.4	I
RD21	82	-	82	11.2	16.1	7.0	63	-	-	-	5.8	-	6.9	2.1	I
RD23	82	-	82	7.2	23.8	5.6	49	-	-	-	6.9	-	6.9	2.0	I

	Crop year	Date analyzed (mo)	(yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Setback (Bu)	Consistency (Bu)	Instron Hardness (kg)	Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
RD25	82	-	82	7.3	28.6	7.0	63	-	-	-	7.1	-	7.0	2.2	I
RD27	82	-	82	6.4	25.6	6.0	55	-	-	-	5.6	-	7.4	2.2	I
RD3	72	5	73	7.7	28.2	-	29	725	650	745	-	-	-	-	I
RD4	76	10	77	7.0	-	2.0	100	-	-	-	6.6	284	6.5	2.2	I
RD4	78	2	79	11.5	1.7	3.7	80	695	-165	105	4.6	382	6.9	2.1	I
RD4	80	-	81	10.0	1.7	3.6	80	-	-	-	4.6	-	6.9	2.3	
RD6	76	10	77	6.1	-	7.0	100	-	-	-	5.9	357	6.6	2.0	I
RD6	78	2	79	7.8	1.5	6.2	96	485	-160	65	3.0	895	6.9	2.2	I
RD6	80	-	81	8.0	1.5	7.0	96	-	-	-	3.0	-	6.9	2.1	
RD6	88	-	89	6.1	1.9	6.0	96	510	-255	60	6.1	69	6.5	2.1	
RD7	76	8	76	6.5	25.1	3.2	67	935	-175	260	-	-	-	-	I
RD8	82	-	82	7.4	1.5	7.0	99	-	-	-	3.7	-	6.4	2.4	I
RD9	82	-	82	8.1	28.2	6.0	34	-	-	-	8.1	-	6.9	2.1	I
SPR7233-32-1-6-1	82	-	82	-	30.4	5.4	97	-	-	-	-	-	7.1	2.2	D
SPR7270-18	82	-	82	-	28.5	5.4	56	-	-	-	-	-	7.1	2.2	D
TAH POW GAEW 161	63	8	63	11.0	28.0	4.8	-	830	245	455	-	-	-	-	I
TAH POW GAEW 161	82	-	82	-	29.8	5.3	32	-	-	-	-	-	7.3	2.0	D
TAH POW GAEW 161	87	-	87	5.2	29.6	6.0	30	930	75	370	9.6	-	7.3	1.9	D
TOGO															
IR46 EX INGER	88	11	90	7.7	30.4	6.6	92	530	335	515	8.4	-	6.5	2.2	
TGR94 EX INGER	88	11	90	7.6	22.8	5.0	56	800	-185	270	5.6	-	5.0	2.9	
TURKEY															
BAL/SK (5Y03)	86	10	86	8.0	13.8	3.0	78	970	-405	35	7.6	-	5.7	2.5	I
BAL/SK (5Y04)	86	10	86	6.2	16.1	7.0	82	750	-245	55	7.4	-	5.9	2.7	I
BALD0	86	10	86	10.0	19.2	7.0	39	750	-165	105	10.5	-	6.7	2.7	I

IZ46	86	10	86	7.3	18.8	7.0	60	450	-35	65	9.0	-	6.4	2.7	I
IZ68	86	10	86	9.5	20.7	7.0	33	515	85	110	9.6	-	7.0	2.6	I
KRASNODARSKY	86	10	86	6.9	18.0	7.0	66	630	-80	70	8.4	-	4.9	3.0	I
LIETO	86	10	86	7.7	17.6	7.0	54	560	-60	40	8.4	-	6.0	2.8	I
MARATELLI	86	10	86	7.5	17.7	7.0	59	635	-100	145	8.8	-	5.6	2.9	I
PA/FS4	86	10	86	7.2	18.4	7.0	61	580	-80	145	8.9	-	6.4	2.7	I
PADONA	86	10	86	6.2	16.9	7.0	76	775	-250	90	8.2	-	5.4	2.8	I
RANBELLI	86	10	86	6.2	18.2	7.0	70	575	-55	155	7.8	-	5.4	3.0	I
RIBE	86	10	86	7.8	13.9	7.0	76	820	-315	50	7.5	-	5.9	2.5	I
ROCCA	86	10	86	6.0	18.1	6.7	81	830	-295	70	6.6	-	6.3	2.8	I
SEQUIAL	86	10	86	6.8	16.1	7.0	73	785	-275	25	8.0	-	5.2	2.9	I
							USA								
A-301	88	7	89	7.3	20.8	5.8	34	730	-40	320	6.1	-	7.5	2.0	I
BELLE PATNA	62	6	63	6.8	24.7	3.6	-	795	-190	245	-	-	-	-	I
BELLE PATNA	72	5	73	6.5	27.0	4.7	100	-	-	-	-	-	-	-	I
BLUEBELLE	72	5	73	5.7	27.1	3.8	100	-	-	-	-	-	-	-	I
BRAZOS	78	11	78	6.7	17.1	6.0	92	800	-245	125	5.5	142	5.4	2.7	I
BRAZOS	80	-	81	5.8	17.1	6.0	92	-	-	-	5.4	-	5.8	2.6	I
CALMOCHI-101	89	7	90	6.2	2.0	6.7	100	145	-67	19	6.0	78	5.0	2.8	I
CALMOCHI-101	89	10	90	7.7	2.0	7.0	99	-	-	-	2.0	-	4.8	2.8	I
CALMOCHI-101 (BIGGS, CA)	88	7	89	7.1	1.8	7.0	100	210	-40	40	2.2	-	5.1	2.9	I
CALORO	72	5	73	6.6	18.4	6.3	-	-	-	-	-	-	-	-	I
CALROSE	76	2	77	6.6	17.5	7.0	57	615	5	220	6.8	95	5.3	2.5	I
CENTURY PATNA 231	62	6	63	7.4	18.8	2.1	-	820	-220	335	-	-	-	-	I
CENTURY PATNA 231	78	12	78	6.2	15.9	3.0	86	820	-290	160	4.4	166	5.9	1.9	I
CENTURY PATNA 231	84	-	85	7.0	13.1	2.4	85	-	-	-	7.1	-	6.8	2.0	I
CENTURY PATNA 231	88	7	89	5.8	15.4	3.6	80	960	-290	280	4.6	-	5.9	2.0	I
COLUSA	72	5	73	6.2	19.9	6.5	-	-	-	-	-	-	-	-	I
CRUMBLY 7154 (CROWLEY, LA)	64	12	64	10.0	19.5	3.9	-	-	-	-	-	-	-	-	I
CS-M3	72	5	73	4.8	19.9	7.0	-	-	-	-	-	-	-	-	I
CS-S4	72	5	73	6.8	19.4	7.0	-	-	-	-	-	-	-	-	I
DAWN	72	5	73	5.0	28.2	3.8	100	-	-	-	-	-	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
DELLA	81	-	82	7.5	21.8	4.5	36	-	-	-	-	-	-	-	
IRGA409	88	7	89	7.8	26.7	7.0	79	550	460	560	12.0	-	6.2	1.9	I
JOJUTLA	78	12	78	6.4	28.7	6.4	41	900	440	620	7.4	60	7.4	2.4	I
KOKUHOROSE	76	2	77	4.7	17.0	7.0	78	595	0	185	5.9	94	-	-	I
L-202	88	7	89	8.2	27.2	5.0	47	495	315	530	8.1	-	7.1	2.0	I
L-202	89	10	90	7.4	27.4	7.0	69	-	-	-	6.9	-	6.9	2.1	I
L-202 (BIGGS, CA)	88	7	89	6.0	28.2	6.0	38	460	250	455	8.5	-	6.8	2.0	I
LABELLE	72	5	73	5.5	27.4	5.0	100	-	-	-	-	-	-	-	I
LABELLE	75	7	76	6.9	24.1	5.2	68	870	-155	220	7.5	77	-	-	I
LABELLE	78	11	78	7.1	22.8	3.2	83	785	-175	185	6.1	104	6.3	2.0	I
LABELLE	80	-	81	7.8	23.4	3.7	78	-	-	-	6.7	-	7.0	2.0	I
LABELLE	83	-	85	8.4	24.0	5.0	50	760	-50	200	-	-	-	-	I
LABELLE	84	-	85	8.0	21.1	3.9	67	-	-	-	7.8	-	6.6	2.0	I
LABELLE	88	7	89	9.9	22.7	5.9	61	650	15	340	7.0	-	6.5	2.0	I
LEBONNET	78	11	78	6.6	23.3	4.8	78	805	-105	245	6.8	101	6.5	2.1	I
LEBONNET	84	-	85	7.6	21.2	4.4	70	-	-	-	8.6	-	7.2	2.3	I
LEBONNET	88	7	89	7.3	23.0	4.9	35	755	-60	330	6.7	-	6.6	2.1	I
LEMONT	84	-	85	6.9	23.2	4.6	68	-	-	-	8.6	-	7.7	2.1	I
LEMONT	88	7	89	7.2	23.2	5.6	57	810	-105	240	7.4	-	6.6	2.1	I
LEMONT	88	7	89	9.2	24.5	6.4	44	700	50	400	8.2	-	7.3	2.3	I
LEMONT	89	10	90	8.9	25.5	5.4	62	-	-	-	6.1	-	6.7	2.2	I
LEMONT	89	10	90	8.2	25.2	5.6	50	-	-	-	6.3	-	6.9	2.2	I
M-103 (BIGGS, CA)	88	7	89	5.8	15.4	7.0	86	730	-50	230	4.9	-	5.6	2.6	I
M-201	84	-	85	8.6	10.7	7.0	82	-	-	-	6.7	-	6.0	2.6	I
M-201	88	7	89	8.4	13.3	7.0	78	845	-265	230	4.4	-	5.6	2.4	I
M-201 (BIGGS, CA)	88	7	89	6.4	16.1	7.0	27	710	-155	225	4.3	-	5.5	2.5	I
M-202	89	10	90	6.5	18.4	7.0	76	-	-	-	5.1	-	5.6	2.8	I
M-202 (BIGGS, CA)	88	7	89	6.8	13.8	7.0	86	710	-170	210	4.4	-	5.6	2.6	I
M-401 (BIGGS, CA)	88	7	89	7.1	16.7	7.0	58	550	-30	240	5.2	-	5.9	2.6	I
M-7	84	-	85	5.0	16.7	7.0	72	-	-	-	8.1	-	5.8	2.7	I

MARS	84	-	85	7.9	12.5	6.7	75	-	-	-	7.0	-	6.0	2.6
MOCHIGOME	83	-	85	6.4	1.1	7.0	100	160	20	20	-	-	-	-
MOCHIGOME	89	7	90	6.3	2.5	6.8	100	159	-94	10	5.8	71	5.0	2.9
NATO	62	6	63	7.2	16.3	6.0	-	755	-215	195	-	-	-	-
NATO	72	5	73	6.3	16.8	6.0	-	-	-	-	-	-	-	-
NATO	75	7	76	7.2	14.4	7.0	80	870	-285	135	5.0	98	-	-
NATO	78	11	78	7.6	16.4	4.9	85	815	-255	145	5.1	136	5.5	2.6
NATO	84	-	85	7.7	12.2	7.0	79	-	-	-	7.1	-	-	-
NATO	88	7	89	7.3	15.0	7.0	43	840	-250	210	5.1	-	5.1	2.4
NEWBONNET	84	-	85	7.3	22.2	4.4	59	-	-	-	8.6	-	7.1	2.0
NEWBONNET	88	7	89	6.4	24.4	5.6	44	775	-20	375	6.8	-	6.9	2.0
NEWBONNET	89	10	90	8.2	24.0	6.2	56	-	-	-	6.1	-	6.4	2.1
NEWREX	83	-	85	8.3	28.4	5.0	33	910	150	430	-	-	-	-
NEWREX	84	-	85	7.8	26.1	4.9	43	-	-	-	9.4	-	7.2	1.9
NORTAI	72	5	73	5.2	17.0	6.0	-	-	-	-	-	-	-	-
NORTAI	75	7	76	5.4	16.1	7.0	88	865	-285	155	4.8	109	-	-
PECOS	83	-	85	7.6	17.6	7.0	53	955	-375	80	-	-	-	-
REXMONT	88	7	89	6.7	28.8	6.0	42	795	355	610	10.4	-	6.5	2.0
REXMONT	89	10	90	8.4	29.9	5.6	48	-	-	-	9.4	-	7.2	2.1
REXORO	70	5	73	7.3	27.0	5.0	97	-	-	-	-	-	-	-
REXORO 83	62	6	63	7.6	25.5	3.2	-	735	-80	300	-	-	-	-
S-101 (BIGGS, CA)	88	7	89	7.0	16.3	7.0	81	710	-150	230	4.5	-	4.9	2.8
S-201 (BIGGS, CA)	88	7	89	7.0	16.4	7.0	86	680	-160	210	4.0	-	5.1	2.9
S-6	75	8	76	7.4	19.9	7.0	58	735	-85	180	5.0	100	-	-
SATURN	72	5	73	5.2	17.0	6.0	-	-	-	-	-	-	-	-
SKYBONNET	84	-	85	7.7	22.8	4.6	65	-	-	-	8.4	-	7.0	2.1
STARBONNET	72	5	73	5.2	26.6	3.7	100	-	-	-	-	-	-	-
STARBONNET	78	11	78	7.4	22.6	3.1	60	780	-130	235	6.2	95	6.4	2.0
STARBONNET	84	-	85	6.6	23.1	4.7	48	-	-	-	8.6	-	7.1	2.1
STARBONNET	88	7	89	6.9	22.3	4.8	35	760	-90	335	7.3	-	6.4	1.9
TEBONNET	84	-	85	7.8	21.2	5.0	58	-	-	-	7.8	-	7.1	2.1
TERSO	76	2	77	7.2	17.5	7.0	52	680	-20	190	6.3	86	-	-
TOR0	78	12	78	5.0	19.8	7.0	65	630	452	225	6.2	130	6.6	2.2
TORO-2	84	-	85	7.3	14.3	6.7	83	-	-	-	7.4	-	7.6	2.2
TORO-2	88	7	89	6.8	16.6	7.0	76	870	-270	220	4.1	-	6.6	2.1
TORO-2	89	10	90	8.4	17.4	7.0	76	-	-	-	4.9	-	7.0	2.2
VISTA	72	5	73	6.5	19.4	6.0	-	-	-	-	-	-	-	-

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
							VENEZUELA								
ARAURE 1	90	10	90	7.3	26.6	7.0	28	775	775	830	10.4	-	6.9	2.3	
ARAURE 2 EX INGER	88	6	88	6.4	26.3	7.0	36	-	-	-	-	-	6.2	2.4	
ARAURE 4	90	10	90	7.2	28.5	6.3	34	895	455	685	9.4	-	6.8	2.3	
CIMARRON	90	10	90	7.4	27.9	7.0	58	445	350	410	9.8	-	7.0	2.1	
P2231F4-138-6-1	90	10	90	7.4	26.1	6.0	48	845	15	445	6.7	-	6.5	2.2	
PALMAR	90	10	90	7.0	25.4	6.0	50	835	-5	415	7.0	-	6.4	2.2	
							VIETNAM								
314	85	6	86	6.0	30.2	4.7	87	710	25	235	8.0	-	5.8	2.2	I
BA LE	81	5	81	8.1	27.7	6.2	75	-	-	-	6.6	-	-	-	I
BAO THAI	85	6	86	6.0	27.9	4.9	49	930	-115	245	8.3	-	5.2	2.4	I
BAO THAI HONG	86	5	87	9.3	27.0	6.2	32	-	-	-	-	-	5.4	2.2	
BAT DE	72	3	73	6.6	28.9	4.0	76	-	-	-	-	-	-	-	I
BAU 157	72	3	73	5.4	30.6	4.4	94	-	-	-	-	-	-	-	I
BL-90	90	12	90	8.4	23.0	4.7	48	685	-175	205	5.6	-	6.4	1.9	
BONG BOI	72	3	73	7.6	22.6	4.9	86	-	-	-	-	-	-	-	I
BONG DEN	72	3	73	5.9	29.3	4.9	80	-	-	-	-	-	-	-	I
C10	88	6	89	7.5	26.0	5.9	26	-	-	-	11.0	-	5.7	2.3	
C15	86	5	87	8.2	25.6	7.0	26	-	-	-	10.7	-	6.9	2.0	
C15	90	12	90	7.0	26.4	7.0	26	660	690	740	9.1	-	7.5	2.2	
CA DUNG KET LO	62	7	63	7.4	27.8	5.0	-	740	250	440	-	-	-	-	I
CHIEM CHANH	72	3	73	6.6	29.3	4.9	82	-	-	-	-	-	-	-	I
CHIN HENH	89	6	90	6.0	28.6	7.0	63	580	255	465	8.4	-	7.2	2.2	
CN2 1 (IR19746-11-3-3)	85	6	86	6.4	28.3	7.0	30	785	370	505	9.4	-	6.2	2.0	I
CN2 2	85	6	86	7.4	27.2	6.9	29	745	255	425	9.5	-	6.1	2.0	I
D148	85	6	86	7.7	27.8	6.7	29	725	300	455	8.8	-	6.2	2.4	I
DAU DEN HA NAM	86	5	87	8.2	29.2	6.0	38	-	-	-	-	-	4.3	2.7	

DAU DO THAI BINH	86	5	87	8.3	27.2	5.1	90	-	-	-	-	-	4.0	2.4	
DAU HAI DUONG	86	5	87	8.2	29.2	6.0	38	-	-	-	-	-	5.1	2.1	
DAU SOM THAI BINH	86	5	87	7.9	27.9	5.6	34	-	-	-	-	-	5.2	2.5	
DAU TRANG MUON TB	86	5	87	7.7	28.3	5.6	76	-	-	-	7.3	-	4.0	2.4	
DI DO HAI PHONG	86	5	87	8.1	29.0	6.0	35	-	-	-	-	-	5.1	2.2	
DI HUONG HAI PHONG	86	5	87	8.9	29.1	5.1	74	-	-	-	-	-	4.8	2.1	
DI SON TAY	86	5	87	7.4	29.2	5.8	89	-	-	-	8.3		5.3	2.3	
DI VANG HAI DUONG	86	5	87	7.2	28.0	6.9	32	-	-	-	-	-	4.9	2.2	
DOC GIANG	72	3	73	8.0	28.5	4.5	92	-	-	-	-	-	-	-	I
DONG 100	86	5	87	8.2	27.0	6.0	82	-	-	-	8.6	-	-	-	
DONG 116	86	5	87	8.6	29.1	6.1	29	-	-	-	-	-	5.7	1.9	
DONG 1555	86	5	87	7.0	29.4	7.0	72	-	-	-	-	-	6.0	2.0	
DONG 166	86	5	87	9.0	18.5	7.0	63	-	-	-	5.8	-	5.7	2.1	
DONG 17	86	5	87	9.2	26.2	7.0	36	-	-	-	10.3	-	6.0	2.0	
DONG 380	86	5	87	9.5	18.1	5.9	43	-	-	-	-	-	5.2	2.3	
DONG N11	86	5	87	9.1	27.1	7.0	28	-	-	-	9.5	-	5.1	2.4	
DONG N13	86	5	87	7.6	29.3	7.0	27	-	-	-	-	-	5.2	2.4	
DONG N5	86	5	87	9.5	20.0	7.0	37	-	-	-	-	-	5.3	2.1	
DONG N6	86	5	87	11.1	27.6	6.9	26	-	-	-	-	-	-	-	
DONG U14	86	5	87	8.0	26.2	6.7	33	-	-	-	-	-	5.9	2.1	
DONG U17	86	5	87	9.2	26.2	7.0	36	-	-	-	10.3	-	6.0	2.0	
DONG U9	86	5	87	7.5	24.6	6.9	33	-	-	-	8.3	-	6.0	2.1	
DU HAI DUONG	86	5	87	8.0	29.2	6.1	65	-	-	-	8.4	-	-	-	I
DU HUONG HA1 PHONG	86	5	87	8.9	29.1	5.1	74	-	-	-	-	-	4.8	2.1	
DU THOM HA1 DUONG	86	5	87	7.7	27.4	5.7	49	-	-	-	-	-	4.9	2.0	
DU THOM THAI BINH	86	5	87	8.2	24.4	5.4	32	-	-	-	-	-	4.3	1.8	
DU THOM THAI BINH	86	5	87	7.7	24.5	6.1	30	-	-	-	-	-	4.6	1.9	
DU VANG NAM TINH	86	5	87	7.4	24.1	5.6	32	-	-	-	-	-	4.8	2.1	
GAO DO	73	5	73	6.8	26.8	3.0	74	-	-	-	-	-	-	-	
GIE HAI DUONG	86	5	87	8.5	25.8	5.5	29	-	-	-	-	-	5.0	2.3	
GIE HIEN NAM TINH	86	5	87	7.0	27.1	7.0	28	-	-	-	-	-	4.8	2.0	
GIE HOA SON TAY	86	5	87	10.2	27.8	5.5	84	-	-	-	-	-	4.7	2.2	
GIE THANH HOA	86	5	87	7.5	29.2	6.6	29	-	-	-	-	-	4.8	2.1	
GIE THOM HOA BINH	86	5	87	8.4	28.3	6.0	30	-	-	-	-	-	4.9	2.1	
GIE XA HUONG HOA BINH	86	5	87	7.6	30.7	5.8	32	-	-	-	-	-	4.8	2.1	
HOA BINH	73	5	73	6.5	29.2	4.4	80	-	-	-	-	-	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
HUYET RONG	89	6	90	7.4	26.8	5.0	57	720	-60	335	6.1	-	6.5	2.0	
IR29708-13	89	9	90	8.0	25.3	5.0	56	760	60	420	6.6	-	7.2	2.1	
IR29725-40	89	9	90	7.7	29.4	6.3	84	555	335	530	7.4	-	6.7	2.2	
IR44595-70	89	9	90	6.1	27.4	5.0	70	730	70	420	5.9	-	7.0	2.1	
IR64 NC	89	9	90	7.7	24.6	5.0	60	760	0	370	6.5	-	7.4	2.1	
IR66	89	9	90	6.7	27.7	5.0	72	565	255	485	7.3	-	7.0	2.0	
IR68	89	9	90	6.8	28.9	6.9	34	695	655	740	9.3	-	7.9	2.1	
IR9729	90	12	90	7.4	23.1	5.2	65	730	-160	270	4.7	-	6.7	2.1	
L13	88	6	89	7.9	28.1	6.8	26	-	-	-	10.8	-	6.3	2.3	
LD347	85	6	86	8.1	27.4	7.0	28	835	400	535	8.8	-	6.9	2.2	I
LOC HIEN THANH HOA	86	5	87	8.6	27.6	6.0	29	-	-	-	-	-	4.9	2.3	
LOC THAI BINH	86	5	87	8.8	25.6	5.6	32	-	-	-	-	-	4.8	2.4	
LOC THANH HOA	86	5	87	8.1	25.7	7.0	29	-	-	-	-	-	5.1	2.1	
LOC TRANG SON TAY	86	5	87	8.4	28.5	5.9	28	-	-	-	-	-	4.6	2.2	
LOC TRON HA TINH	86	5	87	9.5	28.7	5.8	51	-	-	-		-	4.8	2.3	
LOC TRON NGHE AN	86	5	87	8.3	24.5	6.0	28	-	-	-		-	4.7	2.4	
LUA RUNG	73	5	73	6.3	29.1	3.6	72	-	-	-		-	-	-	I
LUA THOM	89	6	90	5.3	30.4	6.8	61	720	500	625	7.7	-	6.8	2.0	
LUA TIEU HANOI	62	7	63	6.9	26.4	5.7	-	1020	270	560	-	-	-	-	I
LUA TUONG	62	7	63	7.0	27.2	5.0	-	830	320	525	-	-	-	-	I
MOC TUYEN	88	6	89	6.7	28.8	7.0	27	-	-	-	8.8	-	4.8	2.4	
MONG CHIM ROI	89	6	90	5.8	29.4	5.1	88	900	-190	325	6.7	-	7.2	2.0	
MOT BUI LUN	89	6	90	6.3	28.6	5.0	66	950	-240	315	6.0	-	7.0	2.1	
MTL 58 TUYEN	89	9	90	7.3	27.1	7.0	40	690	465	650	9.0	-	7.0	2.1	
NANG HUONG	81	5	81	8.9	22.7	5.3	50	-	-	-	6.8	-	-	-	I
NANG KEO	62	7	63	5.7	27.4	5.1	-	1000	90	480	-	-	-	-	I
NANG LINH	72	3	73	6.9	29.2	4.8	91	-	-	-	-	-	-	-	I
NANG PHET KHLAI	72	3	73	10.9	20.8	3.5	91	-	-	-	-	-	-	-	I
NANG THOM	62	7	63	8.4	24.8	5.1	-	750	10	355	-	-	-	-	I
NANG THOM CHO DAO	89	6	90	6.3	29.5	6.0	81	810	-20	415	6.3	-	6.8	2.0	

NANG THOM SOM	73	5	73	7.1	29.3	4.8	96	-	-	-	-	-	-	-	I
NEP CAM (BLACK)	90	12	90	10.3	2.0	7.0	92	125	-45	20	2.1	-	5.8	2.7	
NHO CHUM	73	5	73	7.0	29.5	4.2	96	-	-	-	-	-	-	-	I
NHO THOM	73	5	73	8.1	29.6	4.2	98	-	-	-	-	-	-	-	I
NN75-6	88	6	89	10.3	14.6	7.0	52	-	-	-	6.1	-	6.8	2.1	
0M44-5	89	9	90	7.9	27.4	5.1	48	600	300	505	8.1	-	6.8	2.1	
0M576-18	89	9	90	7.3	28.2	6.9	35	670	420	590	9.0	-	7.0	2.1	
0M59-7	89	9	90	8.0	27.0	7.0	31	675	520	660	8.5	-	6.5	2.2	
PUANG NGEON	62	7	63	7.4	28.2	4.9		830	450	615	-	-	-	-	I
SOC NAU	62	7	63	7.6	28.1	5.1		900	230	480	-	-	-	-	I
SOC NAU	72	3	73	9.0	28.4	5.0	82	-	-	-	-	-	-	-	I
TAM	85	6	86	8.7	24.0	5.5	38	1030	-300	150	8.6	-	5.0	2.1	I
TAM SO 1	86	5	87	8.9	23.7	6.1	32	-	-	-	8.5	-	4.6	2.1	
TAM SO 10	86	5	87	9.6	25.1	6.0	33	-	-	-	8.4	-	4.8	2.0	
TAM SO 11	86	5	87	9.1	24.2	6.4	32	-	-	-	7.7	-	4.7	2.1	
TAM SO 12	86	5	87	7.9	25.1	6.8	45	-	-	-	8.7	-	4.9	2.1	
TAM SO 211	86	5	87	8.3	28.6	6.0	74	-	-	-	-	-	4.8	2.1	
TAM SO 212	86	5	87	9.0	28.5	6.0	32	-	-	-	-	-	4.8	2.3	
TAM SO 7	86	5	87	8.8	25.9	6.1	41	-	-	-	7.0	-	4.9	2.1	
TAM SO 8	86	5	87	8.9	25.1	6.0	39	-	-	-	7.6	-	4.9	2.2	
TAM SO 9	86	5	87	9.8	24.9	6.1	39	-	-	-	8.5	-	5.1	2.5	
TAU BAT	72	3	73	8.7	21.5	4.0	100	-	-	-	-	-	-	-	I
TAU BUN	89	6	90	7.7	26.4	5.8	61	830	320	620	8.5	-	6.5	2.1	
TAU HUONG	62	7	63	7.8	24.4	5.2	-	715	125	400	-	-	-	-	I
TAU HUONG	73	5	73	7.0	27.3	3.2	78	-	-	-	-	-	-	-	I
TAU HUONG	81	5	81	7.6	22.6	5.0	68	-	-	-	6.3	-	-	-	U
TAU HUONG	89	6	90	7.4	22.2	5.1	74	825	-155	320	6.0	-	6.7	2.0	
TE DONG NAM TINH	86	5	87	7.3	28.0	4.9	73	-	-	-	-	-	4.8	2.1	
TE HIEN HOA BINH	86	5	87	9.0	27.9	4.9	35	-	-	-	-	-	4.9	2.1	
TE LOM HUNG YEN	86	5	87	6.8	28.7	6.0	44	-	-	-	9.1	-	4.6	2.4	
TE LUOI HOA BINH	86	5	87	7.4	18.1	7.0	78	-	-	-	5.8	-	4.9	2.6	
TE MONG ME HOA BINH	86	5	87	10.0	26.1	6.5	27	-	-	-	-	-	4.9	2.3	
TE TRANG HA GIANG	86	5	87	7.2	24.1	6.1	31	-	-	-	-	-	4.8	2.3	
TE TRANG NAM TINH	86	5	87	7.0	28.0	6.1	31	-	-	-	-		4.9	2.3	
TRANG DOC	62	7	63	8.5	22.7	4.8		815	-145	275	-	-	-	-	I
TRANG LUA	81	5	81	8.3	23.5	5.1	39	-	-	-	7.0	-	-	-	I

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
TRANG MOT BUI	81	5	81	7.4	27.9	6.1	32	-	-	-	7.0	-	-	-	I
U 14	88	6	89	7.0	22.8	6.9	32	-	-	-	5.1	-	6.2	2.0	
U 16	88	6	89	6.7	26.8	6.9	30	-	-	-	8.5	-	6.1	2.2	
U17	85	6	86	6.4	28.9	4.1	66	955	95	370	9.0	-	6.1	2.3	I
U17	88	6	89	7.3	29.4	7.0	30	-	-	-	8.8	-	5.7	2.2	
U9	88	6	89	6.8	22.8	5.4	34	-	-	-	5.5	-	6.2	2.0	
V.X.1.5	85	6	86	7.2	13.9	3.0	80	1480	-700	130	6.3	-	7.2	1.9	I
V.X.1.7	85	6	86	7.2	25.1	5.9	70	675	-150	90	6.4	-	6.8	2.0	I
V14	85	6	86	8.3	26.7	7.0	28	740	480	580	9.5	-	5.4	2.5	I
VE VANG	62	7	63	6.4	27.0	5.9	-	820	410	580	-	-	-	-	I
XUAN SO 2	86	5	87	6.4	27.8	5.0	43	-	-	-	8.6	-	-	-	
XUAN SO 2	88	6	89	5.1	28.3	6.9	30	-	-	-	8.4	-	5.6	2.3	
ZAMBIA															
KALEMBWE EX INGER	88	11	90	7.4	23.5	5.0	42	730	-60	345	6.1	-	5.8	3.2	
WILD RICES															
O. ALTA															
ACC. 101395 (FRENCH SUDAN)	65	-	67	10.6	23.9	6.5	-	-	-	-	-	-	-	-	
ACC. 101395 (FRENCH SUDAN)	90	6	91	13.3	24 3	5.0	-	-	-	-	-	-	5.6	1.7	
O. AUSTRALIENSIS															
ACC. 100882 (INDIA)	65	-	67	11.3	22.1	4.5	-	-	-	-	-	-	-	-	
ACC. 100882 (INDIA)	90	6	91	12.9	22.5	5.0	-	-	-	-	-	-	5.6	2.1	

O. BRACHYANTHA

ACC. 101232	90	6	91	12.1	2l.6	7.0	-	-	-	-	-	-	5.5	1.2	

O. BREVILIGULATA

ACC. 100117 (GUINEA)	65	-	65	13.4	29.1	5.1	-	-	-	-	-	-	-	-	
ACC. 100119 (MALI)	65	-	65	15.1	26.6	4.8	-	-	-	-	-	-	-	-	
ACC. 100122 (GAMBIA)	65	-	65	16.0	25.9	5.6	-	-	-	-	-	-	-	-	
ACC. 100931 (SUDAN)	65	-	65	14.5	26.7	4.8	-	-	-	-	-	-	-	-	
ACC. 101252 (BURKINA FASO)	65	-	65	16.1	25.4	5.0	-	-	-	-	-	-	-	-	
EB-27 (AFRICA)	65	-	65	10.4	20.4	4.5	-	-	-	-	-	-	-	-	
EB-31 (AFRICA)	65	-	65	12.0	17.8	2.5	-	-	-	-	-	-	-	-	

O. EICHINGERI

ACC. 101422	90	6	91	10.4	25.5	6.0	-	-	-	-	-	-	3.4	1.3	
ACC. 101429 (UGANDA)	65	-	67	11.0	20.1	1.5	-	-	-	-	-	-	-	-	

O. GLABERRIMA

(AFRICA) *EB-T-11*	65	-	67	10.6	19.4	4.5	-	-	-	-	-	-	-	-	
(AFRICA) *EB-T-13*	65	-	67	8.9	19.3	4.5	-	-	-	-	-	-	-	-	
(AFRICA) *EB-T-6*	65	-	67	9.5	19.4	4.5	-	-	-	-	-	-	-	-	
(*BURKINA* FASO) *ACC. 101299*	65	-	65	12.6	27.2	5.3	-	-	-	-	-	-	-	-	
(BURKINA FASO) *ACC. 101301*	65	-	65	13.1	27.3	5.0	-	-	-	-	-	-	-	-	
(BURKINA FASO) *ACC. 101303*	65	-	65	10.9	26.7	5.0	-	-	-	-	-	-	-	-	
(BURKINA FASO) HG1 *(IITA 7286)*	81	3	82		27.8	5.6	70	-	-	-	-	-	-	-	U
(BURKINA FASO) HG20 *(IITA 7288)*	81	3	82		29.3	6.2	55	-	-	-	-	-	-	-	U
(BURKINA FASO) HG22 *(IITA 7289)*	81	3	82		27.8	6.1	44	-	-	-	-	-	-	-	U

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
(BURKINA FASO) HG24 *(IITA 7291)*	81	3	82	-	27.2	6.1	60	-	-	-	-	-	-	-	U
(BURKINA FASO) HG25 (1) *(IITA 7292)*	81	3	82	-	28.9	6.0	54	-	-	-	-	-	-	-	U
(BURKINA FASO) HG25 (2) *(IITA 7293)*	81	3	82	-	27.7	6.2	46	-	-	-	-	-	-	-	U
(BURKINA FASO) HG28 *(IITA 7294)*	81	3	82	-	27.6	6.0	49	-	-	-	-	-	-	-	U
(BURKINA FASO) HG30 *(IITA 7295)*	81	3	82	-	27.6	6.4	55	-	-	-	-	-	-	-	U
(BURKINA FASO) HG31 *(IITA 7296)*	81	3	82	-	27.4	6.0	47	-	-	-	-	-	-	-	U
(BURKINA FASO) HG32 *(IITA 7297)*	81	3	82	-	28.3	6.1	61	-	-	-	-	-	-	-	U
(CAMEROON) *ACC.* 101263	65	-	65	13.7	29.2	5.3	-	-	-	-	-	-	-	-	
(CAMEROON) KETE KETE *(ACC.104596)*	81	3	82	-	28.6	6.1	66	-	-	-	-	-	-	-	I
(CAMEROON) UG24(1) *(IITA 7268)*	81	3	82	-	26.3	5.9	44	-	-	-	-	-	-	-	U
(CAMEROON) UG24(2) *(IITA 7269)*	81	3	82	-	27.8	6.1	64	-	-	-	-	-	-	-	U
(CAMEROON) UG25(1) *(IITA 7270)*	81	3	82	-	28.8	6.4	46	-	-	-	-	-	-	-	R
(CAMEROON) UG25(2) *(ACC.104581)*	81	3	82	-	27.6	6.0	62	-	-	-	-	-	-	-	R
(CAMEROON) UG26(1) *(IITA 7272)*	81	3	82	-	25.4	6.3	48	-	-	-	-	-	-	-	R
(CAMEROON) UG26(2) *(ACC.104582)*	81	3	82	-	28.4	6.1	49	-	-	-	-	-	-	-	R

(CAMEROON) UG26(3) *(ACC.104583)*	81	3	82	-	23.7	6.1	36	-	-	-	-	-	-	-	R
(CAMEROON) UG46(1) *(IITA 7275*)	81	3	82	-	27.9	6.2	70	-	-	-	-	-	-	-	R
(CAMEROON) UG46(2) *(ACC.104584)*	81	3	82	-	27.8	6.0	46	-	-	-	-	-	-	-	R
(CAMEROON) UG56(1) *(IITA 7278*)	81	3	82		27.5	6.1	56	-	-	-	-	-	-	-	R
(CAMEROON) UG56(2) *(IITA 7279)*	81	3	82	-	29.1	6.3	52	-	-	-	-	-	-	-	R
(CAMEROON) UG67(1) *(IITA 7283)*	81	3	82	-	28.0	6.1	66	-	-	-	-	-	-	-	U
(CHAD) GORLO *(ACC.104579)*	81	3	82	-	21.7	6.4	56	-	-	-	-	-	-	-	R
(CHAD) GORLO *(ACC.104580)*	81	3	82	-	27.9	6.5	64	-	-	-	-	-	-	-	R
(CHAD) GOURMOULOUNG *(ACC.104578)*	81	3	82	-	27.8	6.0	61	-	-	-	-	-	-	-	U
(CHAD) TB39(*1*) *(ACC.104597)*	81	3	82	-	27.9	6.0	76	-	-	-	-	-	-	-	I
(CHAD) TB39(2) *(ACC.104598)*	81	3	82	-	27.8	6.0	80	-	-	-	-	-	-	-	I
(CHAD) TG17(1) *(IITA 7255)*	81	3	82	-	28.4	6.0	48	-	-	-	-	-	-	-	U
(CHAD) TG17 *(ACC.104577)*	81	3	82	-	25.4	6.5	41	-	-	-	-	-	-	-	U
(CHAD) TG18 *(IITA 7257)*	81	3	82	-	27.3	6.0	72	-	-	-	-	-	-	-	U
(GAMBIA) *ACC. 100127*	65	-	65	12.3	24.0	5.2	-	-	-	-	-	-	-	-	
(GAMBIA) CG118 *(IITA 7165)*	81	3	82	-	27.3	6.2	68	-	-	-	-	-	-	-	R
(GAMBIA) CG128 *(IITA 7166)*	81	3	82	-	28.4	6.0	62	-	-	-	-	-	-	-	R
(GAMBIA) CG66(*1*) *(IITA 7149)*	81	3	82	-	25.4	6.0	86	-	-	-	-	-	-	-	U
(GAMBIA) CG66(2) *(ACC.104569)*	81	3	82	-	24.6	6.0	87	-	-	-	-	-	-	-	U
(GAMBIA) CG72(*1*) (IITA *7151)*	81	3	82	-	27.8	6.1	83	-	-	-	-	-	-	-	U
(GAMBIA) CG72(2) (ACC.104570)	81	3	82	-	27.8	6.0	79	-	-	-	-	-	-	-	U

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amy-lose (%)	Alkali spread-ing value	Gel consis-tency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Set-back (Bu)	Amylograph viscosity Consis-tency (Bu)	Instron Hard-ness (kg)	Instron Sticki-ness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
(GUINEA) ACC. 100134	81	3	82	-	27.0	7.0	53	-	-	-	-	-	-	-	U
(GUINEA) ACC. 100135	65	-	65	9.5	28.8	5.0	-	-	-	-	-	-	-	-	U
(GUINEA) ACC. 100136(1)	81	3	82	-	27.1	6.5	77	-	-	-	-	-	-	-	U
(GUINEA) ACC. 100136(2)	81	3	82	-	27.2	7.0	64	-	-	-	-	-	-	-	U
(GUINEA) ACC. 100137(1)	81	3	82	-	27.8	6.2	86	-	-	-	-	-	-	-	U
(GUINEA) ACC. *100137(2)*	81	3	82	-	27.2	6.1	62	-	-	-	-	-	-	-	U
(GUINEA) ACC. 100144	81	3	82	-	27.0	6.9	66	-	-	-	-	-	-	-	U
(GUINEA) ACC. 100145	81	3	82	-	25.4	7.0	76	-	-	-	-	-	-	-	U
(GUINEA) ACC. 100152	65	-	67	11.7	18.9	4.5	-	-	-	-	-	-	-	-	U
(GUINEA) ACC. 100152	81	3	82	-	22.9	6.4	53	-	-	-	-	-	-	-	U
(GUINEA) ACC. 100158	81	3	82	-	27.8	6.8	44	-	-	-	-	-	-	-	U
(IVORY COAST) *ACC. 101297*	65	-	65	13.8	25.8	5.5	-	-	-	-	-	-	-	-	
(IVORY COAST) IG10 *(IITA 7192)*	81	3	82	-	27.9	6.1	42	-	-	-	-	-	-	-	U
(IVORY COAST) IG11 *(IITA 1983)*	81	3	82	-	27.4	6.8	47	-	-	-	-	-	-	-	U
(IVORY COAST) IG14 *(IITA 7194)*	81	3	82	-	26.9	6.8	34	-	-	-	-	-	-	-	U
(IVORY COAST) IG15 *(IITA 7195)*	81	3	82	-	29.2	6.1	68	-	-	-	-	-	-	-	U
(IVORY COAST) IG16 *(IITA 7196)*	81	3	82	-	29.6	6.2	88	-	-	-	-	-	-	-	U
(IVORY COAST) IG17 *(IITA 7197)*	81	3	82	-	27.3	6.0	36	-	-	-	-	-	-	-	U
(IVORY COAST) IG19 *(IITA 7198)*	81	3	82	-	24.0	6.2	70	-	-	-	-	-	-	-	U
(IVORY COAST) IG21 *(IITA 7199)*	81	3	82	-	25.4	6.0	46	-	-	-	-	-	-	-	U

(IVORY COAST) IG22 *(IITA 7200)*	81	3	82	-	23.2	6.0	59	-	-	-	-	-	-	-	U
(IVORY COAST) IG23 *(IITA 7201)*	81	3	82	-	28.8	6.3	72	-	-	-	-	-	-	-	U
(IVORY COAST) IG35 *(IITA 7202)*	81	3	82	-	28.0	6.0	85	-	-	-	-	-	-	-	U
(IVORY COAST) IG36 *(IITA 7203)*	81	3	82	-	27.9	6.0	86	-	-	-	-	-	-	-	U
(IVORY COAST) IG37 *(IITA 7204)*	81	3	82	-	29.4	6.1	79	-	-	-	-	-	-	-	U
(IVORY COAST) IG5 (1) *(IITA 7190)*	81	3	82	-	27.7	6.0	35	-	-	-	-	-	-	-	U
(LIBERIA) *ACC.* 102196	81	3	82	-	25.4	6.9	58	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102208*	81	3	82	-	23.2	6.8	70	-	-	-	-	-	-	-	U
(LIBERIA) *ACC.* 102214	81	3	82	-	23.9	6.8	82	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102218*	81	3	82	-	23.3	6.9	72	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102223* (1)	81	3	82	-	22.8	6.5	52	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102225*	81	3	82	-	24.0	6.5	64	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102230*	81	3	82	-	23.9	6.6	74	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102240*	81	3	82	-	22.9	7.0	40	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102248*	81	3	82	-	23.7	6.8	60	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102257*	81	3	82	-	23.4	6.6	50	-	-	-	-	-	-	-	U
(LIBERIA) *ACC.* 102267	81	3	82	-	23.9	6.1	54	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102273* (2)	81	3	82	-	28.3	6.4	54	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102284*	81	3	82	-	27.3	6.2	72	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102296*	81	3	82	-	23.7	6.0	66	-	-	-	-	-	-	-	U
(LIBERIA) *ACC. 102305*	81	3	82	-	27.1	6.4	36	-	-	-	-	-	-	-	U
(LIBERIA) BAH *(ACC.103937)*	81	3	82	-	23.3	7.0	48	-	-	-	-	-	-	-	U
(LIBERIA) GBAKIAH-2 *(ACC.104549)*	81	3	82	-	27.6	7.0	50	-	-	-	-	-	-	-	
(LIBERIA) GBEKE-1 LATE *(IITA 5775)*	81	3	82	-	27.8	6.8	42	-	-	-	-	-	-	-	U
(LIBERIA) GBEKE-2 EARLY *(ACC.104548)*	81	3	82	-	27.1	6.2	60	-	-	-	-	-	-	-	U
(LIBERIA) GEE *(ACC.103941)*	81	3	82	-	23.6	6.2	75	-	-	-	-	-	-	-	U

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amy-lose (%)	Alkali spread-ing value	Gel consis-tency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Set-back (Bu)	Amylograph viscosity: Consis-tency (Bu)	Instron: Hard-ness (kg)	Instron: Sticki-ness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
(LIBERIA) KELEI *(ACC.103949)*	81	3	82	-	25.4	6.2	78	-	-	-	-	-	-	-	U
(LIBERIA) MAIWO-I *(ACC.104551)*	81	3	82	-	23.7	7.0	38	-	-	-	-	-	-	-	U
(LIBERIA) MAIWO-III *(ACC. 103943)*	81	3	82	-	23.6	6.7	36	-	-	-	-	-	-	-	U
(LIBERIA) MAWOU-1 *(ACC. 103935)*	81	3	82	-	23.5	6.8	55	-	-	-	-	-	-	-	U
(LIBERIA) MAYWAR-II *(ACC. 103951)*	81	3	82	-	23.2	7.0	74	-	-	-	-	-	-	-	U
(LIBERIA) NAJABOH *(ACC.104550)*	81	3	82	-	25.4	6.9	52	-	-	-	-	-	-	-	U
(LIBERIA) QUE *(IITA 5815)*	81	3	82	-	27.3	6.9	58	-	-	-	-	-	-	-	U
(LIBERIA) ROK-CHU-SONE-CON-1	81	3	82	-	27.4	6.2	50	-	-	-	-	-	-	-	U
(LIBERIA) SHAWHON *(IITA 5725)*	81	3	82	-	27.5	6.1	58	-	-	-	-	-	-	-	U
(LIBERIA) SILIBUY *(IITA 5892)*	81	3	82	-	27.0	6.6	76	-	-	-	-	-	-	-	U
(LIBERIA) SOKPONG *(ACC.103946)*	81	3	82	-	23.7	6.8	76	-	-	-	-	-	-	-	U
(LIBERIA) CLAREE PANKLET *(ACC.103948)*	81	3	82	-	25.4	6.8	50	-	-	-	-	-	-	-	U
(MALI) LG34 *(IITA 7116)*	81	3	82	-	23.8	6.0	90	-	-	-	-	-	-	-	D
(MALI) LG35 *(IITA 7117)*	81	3	82	-	27.3	6.0	86	-	-	-	-	-	-	-	D
(MALI) MG25 *(IITA 7249)*	81	3	82	-	27.3	6.0	66	-	-	-	-	-	-	-	R
(MALI) MG26(1) *(IITA 7250)*	81	3	82	-	28.7	6.1	70	-	-	-	-	-	-	-	R
(MALI) MG26(2) *(ACC.104574)*	81	3	82	-	27.2	6.1	70	-	-	-	-	-	-	-	R

(MALI) MG26(3) *(ACC.104575)*	81	3	82	-	29.4	6.0	70	-	-	-	-	-	-	-	R
(MALI) MG27 (1) *(IITA 7253)*	81	3	82	-	28.7	6.0	77	-	-	-	-	-	-	-	R
(MALI) MG27(2) *(ACC.104576)*	81	3	82	-	28.6	6.0	68	-	-	-	-	-	-	-	R
(MALI) ORYZA *BARTHII (IITA 7308)*	81	3	82	-	28.2	6.2	65	-	-	-	-	-	-	-	R
(NIGERIA) ACC. *100982*	65	8	65	13.7	25.1	5.2	-	-	-	-	-	-	-	-	
(NIGERIA) ACC. *100984*	65		65	12.6	27.2	5.2	-	-	-	-	-	-	-	-	
(NIGERIA) ACC. *104539*	81	3	82	-	27.0	6.5	48	-	-	-	-	-	-	-	U
(NIGERIA) *ACC. 104540*	81	3	82	-	27.2	6.2	72	-	-	-	-	-	-	-	U
(NIGERIA) ACC. *104541*	81	3	82	-	23.5	6.0	52	-	-	-	-	-	-	-	U
(NIGERIA) ACC. *104542*	81	3	82	-	23.5	6.7	62	-	-	-	-	-	-	-	H
(NIGERIA) ACC. *104543*	81	3	82	-	23.6	6.2	43	-	-	-	-	-	-	-	H
(NIGERIA) ACC. *104544*	81	3	82	-	25.5	6.4	62	-	-	-	-	-	-	-	H
(NIGERIA) *ACC. 104545*	81	3	82	-	28.1	6.1	60	-	-	-	-	-	-	-	I
(NIGERIA) *ACC. 104546*	81	3	82	-	27.9	6.2	59	-	-	-	-	-	-	-	I
(NIGERIA) *ACC. 104547*	81	3	82	-	27.8	6.0	72	-	-	-	-	-	-	-	H
(NIGERIA) *ACC. 104553*	81	3	82	-	24.0	6.1	39	-	-	-	-	-	-	-	H
(NIGERIA) *ACC. 104554*	81	3	82	-	23.6	6.0	63	-	-	-	-	-	-	-	H
(NIGERIA) *ACC. 104555*	81	3	82	-	28.1	6.5	33	-	-	-	-	-	-	-	U
(NIGERIA) *ACC. 104556*	81	3	82	-	22.7	6.1	58	-	-	-	-	-	-	-	H
(NIGERIA) *ACC. 104557*	81	3	82	-	22.2	6.0	52	-	-	-	-	-	-	-	U
(NIGERIA) *ACC.* 104558	81	3	82	-	27.3	6.3	78	-	-	-	-	-	-	-	U
(NIGERIA) *ACC.* 104559	81	3	82	-	27.8	6.1	76	-	-	-	-	-	-	-	U
(NIGERIA) BIYA GERO *(IITA 5442)*	81	3	82	-	23.5	6.1	51	-	-	-	-	-	-	-	U
(NIGERIA) BIYAU *(ACC. 103929)*	81	3	82	-	27.2	6.2	70	-	-	-	-	-	-	-	U
(NIGERIA) DAN GANDE *(ACC.104538)*	81	3	82	-	27.8	6.1	63	-	-	-	-	-	-	-	D
(NIGERIA) DAN MANU *(ACC.104535)*	81	3	82	-	28.3	6.1	67	-	-	-	-	-	-	-	D
(NIGERIA) DAN MANU *(ACC.104536)*	81	3	82	-	28.3	6.2	67	-	-	-	-	-	-	-	D
(NIGERIA) DAN MANU *(IITA 5474)*	81	3	82	-	23.6	6.2	39	-	-	-	-	-	-	-	D

	Crop year	Date analyzed (mo)	(yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu)[a]	Set-back (Bu)	Consistency (Bu)	Instron: Hardness (kg)	Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
(NIGERIA) FARIN DAN BOTO *(IITA 5456)*	81	3	82	-	23.6	6.8	43	–	–	–	–	–	–	–	R
(NIGERIA) HAKURI MONTOL *(ACC.103969)*	81	3	82	-	27.5	6.7	62	–	–	–	–	–	–	–	H
(NIGERIA) HAKURI MONTOL *(ACC.103970)*	81	3	82	-	25.4	6.4	70	–	–	–	–	–	–	–	H
(NIGERIA) *IITA 5634*	81	3	82	-	27.4	6.2	70	–	–	–	–	–	–	–	U
(NIGERIA) *IITA 5640*	81	3	82	-	23.5	6.3	56	–	–	–	–	–	–	–	U
(NIGERIA) *IITA* 5674	81	3	82	-	28.4	6.2	72	–	–	–	–	–	–	–	I
(NIGERIA) *IITA* 5678	81	3	82	-	29.2	6.0	82	–	–	–	–	–	–	–	I
(NIGERIA) *IITA 5695*	81	3	82	-	28.2	6.5	74	–	–	–	–	–	–	–	H
(NIGERIA) *IITA 5980*	81	3	82	-	25.4	6.8	60	–	–	–	–	–	–	–	
(NIGERIA) KASHIN SHANU *(IITA 5430)*	81	3	82	-	27.3	6.0	55	–	–	–	–	–	–	–	R
(NIGERIA) KYANGA *(ACC.164532)*	81	3	82	-	28.6	6.4	61	–	–	–	–	–	–	–	D
(NIGERIA) KYANGA *(ACC.104533)*	81	3	82	-	27.3	6.5	74	–	–	–	–	–	–	–	D
(NIGERIA) KYANGA *(ACC.104534)*	81	3	82	-	27.8	6.2	76	–	–	–	–	–	–	–	D
(NIGERIA) RAKIN DANBOTO *(ACC. 104528)*	81	3	82	-	27.1	6.5	63	–	–	–	–	–	–	–	R
(NIGERIA) TANBA *(ACC.104530)*	81	3	82	-	27.6	6.1	49	–	–	–	–	–	–	–	R
(NIGERIA) TATTARA *(ACC.10453T)*	81	3	82	-	27.6	6.5	61	–	–	–	–	–	–	–	D
(NIGERIA)DAN GYARAN-SHE *(ACC.104531)*	81	3	82	-	27.7	6.6	74	–	–	–	–	–	–	–	R
(SENEGAL) CG10 *(IITA 7131)*	81	3	82	-	25.4	6.1	69	–	–	–	–	–	–	–	U

(SENEGAL) CG112(1) *(IITA 7161)*	81	3	82	-	27.7	5.8	68	-	-	-	-	-	-	-	R
(SENEGAL) CG112(2) *(IITA 7162)*	81	3	82	-	27.8	6.0	83	-	-	-	-	-	-	-	R
(SENEGAL) CG112(3) *(IITA 7163)*	81	3	82	-	26.8	6.0	80	-	-	-	-	-	-	-	R
(SENEGAL) CG112(4) *(IITA 7164)*	81	3	82	-	29.1	6.1	79	-	-	-	-	-	-	-	R
(SENEGAL) CG13(2) *(IITA 7135)*	81	3	82	-	25.4	6.0	41	-	-	-	-	-	-	-	U
(SENEGAL) CG156(1) *(IITA 7167)*	81	3	82	-	30.0	6.0	74	-	-	-	-	-	-	-	R
(SENEGAL) CG156(2) *(ACC.104572)*	81	3	82	-	28.4	6.0	76	-	-	-	-	-	-	-	R
(SENEGAL) CG166(1) *(IITA 7169)*	81	3	82	-	28.3	6.2	72	-	-	-	-	-	-	-	R
(SENEGAL) CG27(1) *(IITA 7138)*	81	3	82	-	26.8	6.5	34	-	-	-	-	-	-	-	U
(SENEGAL) CG27(2) *(ACC.104567)*	81	3	82	-	22.7	6.7	36	-	-	-	-	-	-	-	U
(SENEGAL) CG27(3) *(ACC.104568)*	81	3	82	-	23.6	6.2	52	-	-	-	-	-	-	-	U
(SENEGAL) CG32(1) *(IITA 7141)*	81	3	82	-	27.2	6.8	40	-	-	-	-	-	-	-	U
(SENEGAL) CG4 *(IITA 7126)*	81	3	82	-	25.4	6.0	58	-	-	-	-	-	-	-	U
(SENEGAL) CG86(2) *(IITA 7158)*	81	3	82	-	27.9	6.2	78	-	-	-	-	-	-	-	R
(SENEGAL) CG86(3) *(ACC.104571)*	81	3	82	-	28.4	6.0	86	-	-	-	-	-	-	-	R
(SENEGAL) CG9(1) *(ACC.104565)*	81	3	82	-	23.7	6.0	50	-	-	-	-	-	-	-	U
(SENEGAL) CG9(2) *(ACC.104566)*	81	3	82	-	27.3	6.2	55	-	-	-	-	-	-	-	U
(SENEGAL) CG9(3) *(IITA 7129)*	81	3	82	-	23.6	6.0	72	-	-	-	-	-	-	-	U

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity: Peak (Bu) [a]	Amylograph viscosity: Setback (Bu)	Amylograph viscosity: Consistency (Bu)	Instron: Hardness (kg)	Instron: Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime [b]
(SENEGAL) CG9(4) *(IITA 7130)*	81	3	82	-	23.6	6.0	74	-	-	-	-	-	-	-	U
(SENEGAL) CG93 *(IITA 7160)*	81	3	82	-	28.9	6.2	78	-	-	-	-	-	-	-	R
(SIERRA LEONE) GBESSAMA *(ACC.103994)*	81	3	82	-	25.4	6.0	76	-	-	-	-	-	-	-	U
(SIERRA LEONE) MALA KPAKIWA *(ACC.103987)*	81	3	82	-	23.6	6.1	50	-	-	-	-	-	-	-	U
(SIERRA LEONE) TUNKA -FORO *(ACC.104563)*	81	3	82	-	24.0	6.4	52	-	-	-	-	-	-	-	
(SIERRA LEONE)GBALAN-KATAN *(ACC.103995)*	81	3	82	-	26.2	6.9	73	-	-	-	-	-	-	-	U
(SIERRA LEONE)GBALAN-KATAN *(ACC.104564)*	81	3	82	-	27.2	6.8	60	-	-	-	-	-	-	-	U
(SIERRA LEONE) *ACC. 100980*	65	-	65	13.2	25.7	5.0	-	-	-	-	-	-	-	-	
(SIERRA LEONE) *ACC. 100987*	65	-	65	13.7	26.4	5.0	-	-	-	-	-	-	-	-	
(SIERRA LEONE) *ACC. 100988*	81	3	82	-	27.2	6.2	58	-	-	-	-	-	-	-	
(SIERRA LEONE) *ACC. 103991*	81	3	82	-	23.3	6.1	88	-	-	-	-	-	-	-	U
(SIERRA LEONE) GBEN -SEMA *(ACC.104562)*	81	3	82	-	25.4	6.2	83	-	-	-	-	-	-	-	U
(SIERRA LEONE) GENE--KOI *(ACC.103992)*	81	3	82	-	23.7	6.3	82	-	-	-	-	-	-	-	H
(SIERRA LEONE) GINDAH *(ACC.103988)*	81	3	82	-	23.2	6.2	80	-	-	-	-	-	-	-	U
(SIERRA LEONE) MAKASSA *(ACC.103953)*	81	3	82	-	23.3	6.3	69	-	-	-	-	-	-	-	U

(SIERRA LEONE) MALA *(ACC. 103986)*	81	3	82		22.4	6.3	38	-	-	-	-	-	-	-	U
(SIERRA LEONE) MALA *(ACC.104561)*	81	3	82		23.4	6.6	70	-	-	-	-	-	-	-	U
(SIERRA LEONE) MALA *(IITA 6907)*	81	3	82		25.4	6.5	44	-	-	-	-	-	-	-	U
(SIERRA LEONE) PEDIKUM *(ACC.103989)*	81	3	82		27.3	6.0	72	-	-	-	-	-	-	-	U
(SIERRA LEONE) PENDEKUN *(ACC.103990)*	81	3	82		23.9	6.6	76	-	-	-	-	-	-	-	U
(SIERRA LEONE) SALI-/ *(ACC.103993)*	81	3	82		23.1	5.6	65	-	-	-	-	-	-	-	U
(ZAIRE) ACC. 100854	81	3	82		27.2	6.8	46	-	-	-	-	-	-	-	H
(ZAIRE) ACC. 100975	81	3	82		24.0	6.2	56	-	-	-	-	-	-	-	H
O. GRANDIGLUMIS															
ACC. 101405 (TAIWAN, CHINA	65		67	7.4	23.5	6.5	-	-	-	-	-	-	-	-	
ACC. 101405 (TAIWAN, CHINA)	90	6	91	13.3	23.3	7.0	-	-	-	-	-	-	6.1	1.6	
O. LATIFOLIA															
ACC. 100914	90	6	91	8.6	25.0	5.0	-	-	-	-	-	-	4.1	1.8	
ACC. 101392 (USA)	65		67	7.0	22.9	2.5	-	-	-	-	-	-	-	-	
O. MINUTA															
ACC. 101141	90	6	91	12.0	23.6	5.0	-	-	-	-	-	-	2.9	1.5	
O. NIVARA															
ACC. 100905 (INDIA)	65		67	8.4	20.7	6.5	-	-	-	-	-	-	-	-	
ACC. 100951 (INDIA)	65		67	14.0	18.4	2.5	-	-	-	-	-	-	-	-	
ACC. 101145 (AUSTRALIA)	65		67	9.0	20.2	2.5	-	-	-	-	-	-	-	--	

	Crop year	Date analyzed (mo)	Date analyzed (yr)	Protein (%)	Amylose (%)	Alkali spreading value	Gel consistency (mm)	Amylograph viscosity Peak (Bu)[a]	Amylograph viscosity Setback (Bu)	Amylograph viscosity Consistency (Bu)	Instron Hardness (kg)	Instron Stickiness (g-cm)	Length (mm)	Width (mm)	Water regime[b]
ACC. 101507 (INDIA)	65	-	67	9.8	20.8	2.5	-	-	-	-	-	-	-	-	
ACC. 101520 (INDIA)	65	-	67	11.5	18.4	4.5	-	-	-	-	-	-	-	-	
ACC. 101973	90	6	91	11.0	25.4	6.0	-	-	-	-	-	-	5.6	2.6	
ACC. 103422	90	6	91	13.1	15.6	4.7	-	-	-	-	-	-	5.8	2.5	
ACC. 103826	90	6	91	13.1	23.6	5.0	-	-	-	-	-	-	5.7	2.8	
ACC. 103839	90	6	91	12.0	25.4	5.0	-	-	-	-	-	-	5.7	2.3	
O. OFFICINALIS															
ACC. 100878 (THAILAND)	89	12	89	-	31.5	6.4	100	-	-	-	-	-	3.1	1.6	
ACC. 100896 (THAILAND)	89	12	89	-	30.8	4.5	63	-	-	-	-	-	3.1	1.7	
ACC. 100896 (THAILAND)	90	6	91	12.2	24.6	5.0	-	-	-	-	-	-	3.4	1.9	
ACC. 101072 (PHILIPPINES)	65	-	67	9.7	19.5	6.5	-	-	-	-	-	-	-	-	
O. PERENNIS															
ACC. 103848	90	6	91	13.1	22.4	6.0	-	-	-	-	-	-	6.3	2.0	
O. PUNCTATA															
ACC. 101409 (GHANA)	65	-	67	11.1	18.8	2.5	-	-	-	-	-	-	-	-	
O. RIDLEYI															
ACC. 100821	90	6	91	12.3	23.0	7.0	-	-	-	-	-	-	6.1	1.	

							O. RUFIPOGON							
ACC. 100910 (THAILAND)	65	-	67	13.8	19.0	2.5	-	-	-	-	-	-	-	-
ACC. 100912 (THAILAND)	65	-	67	11.4	19.8	4.5	-	-	-	-	-	-	-	-
ACC. 100916 (CHINA)	65	-	67	13.3	19.3	2.5	-	-	-	-	-	-	-	-
ACC. 100917 (CAMBODIA)	65	-	67	10.5	19.3	2.5	-	-	-	-	-	-	-	-
ACC. 100923 (MYANMAR)	65	-	67	10.8	19.6	2.5	-	-	-	-	-	-	-	-
ACC. 100944 (INDIA)	65	-	67	12.0	19.9	4.5	-	-	-	-	-	-	-	-
ACC. 100945 (INDIA)	65	-	67	11.3	19.0	2.5	-	-	-	-	-	-	-	-
ACC. 100946 (INDIA)	65	-	67	11.2	-	4.5	-	-	-	-	-	-	-	-
ACC. 101398 (INDIA)	65	-	67	12.6	19.4	2.5	-	-	-	-	-	-	-	-
ACC. 101448 (INDIA)	65	-	67	8.3	21.8	6.5	-	-	-	-	-	-	-	-
ACC. 101449 (INDIA)	65	-	67	9.2	20.8	6.5	-	-	-	-	-	-	-	-
							O. STAPFIE							
ACC. 100934 (SUDAN)	65	-	65	17.3	27.2	5.0	-	-	-	-	-	-	-	-
ACC. 100936 (NIGER)	65	-	65	13.7	30.4	5.0	-	-	-	-	-	-	-	-
ACC. 100939	65	-	65	15.9	30.3	5.0	-	-	-	-	-	-	-	-

[a]BU = Brabender units. [b]Water regime: U = upland, I = Irrigated. D = deepwater, R = red lowland, T = tidal/swampy, H = hydromorphic.