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Title of the Application	Nucleic Acid Sequences for Conferring High Yield in Rice and Methods of Using Same (hereinafter “OsTPR Patent”)
Application Date	National Phase application date: 21 December 2021 Previous PCT application, for information: 21 June 2020
Application Number	US Application No. 17/557,130. India Application- 202227003472 Philippines Application - 1-2022-500001 European Application - 20826989.4 For information, those applications are related to The PCT: PCT/IB2020/055840
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In continuation of IRRI’s previous application for a PCT patent in 2020 and corresponding public disclosure (http://books.irri.org/ITT-OsTPR-publication_updated-06-06-2021.pdf), IRRI decided to apply for national phase patents in the following countries: India, Philippines, the USA, and the EU.

BRIEF BACKGROUND

Screening 320 diversity accessions from “in trust” germplasm, IRRI previously identified a candidate gene, “OsTPR” that causes grain yield increase via higher upper secondary rachis branches.

Superior haplotypes of OsTPR were identified. Those superior haplotypes are expected to add value to breeding programs and to rice farmers, with new elite varieties that deliver increased yield and good grain quality, thus overcoming the traditional trade-off between yield and grain quality.

In June 2020, a PCT application was filed - see (http://books.irri.org/ITT-OsTPR-publication_updated-06-06-2021.pdf). The application focused on the importance of pre-breeding evidence of introgressing the OsTPR trait in different genetic backgrounds. IRRI planned to proceed to the National Phase after the end of the PCT procedure.

This series of patent applications will allow IRRI to explore partnerships for research, both from the public and private sectors, and to grant access to this innovation on terms that will create incentives for additional research and development as well as investment by downstream partners. IRRI wishes to catalyze the

development and release of improved rice varieties which are superior in yield, grain and nutritional quality, and in the long run will benefit the smallholder farmers.

NEED FOR FURTHER INVESTMENT

IRRI does not have the requisite resources to accelerate such development at the needed speed and scale. IRRI's motivation in seeking the patent is to create incentives for other organizations to partner with us, and to contribute the requisite financial, technological, and technical investments to:

- A) invest in further breeding to produce different varieties that contain the best haplotypes in different genetic background;
- B) invest in further breeding to combine the OsTPR trait with other naturally-occurring traits that improve grain quality - especially when such traits would result in yield penalty when introduced in elite varieties;
- C) test these new OsTPR varieties for yield and grain quality; and
- D) select the best varieties and scale up their use by rice farmers, specifically including smallholder farmers in developing countries in order to contribute to global food and nutrition security.

CURRENT STATUS

In December 2021, IRRI applied for National Phase patents ("NP" patents)_ on same subject matter as the above referenced PCT application - PCT/IB2020/055840, in the following countries/region: USA , Europe , India, and the Philippines. Those regions and countries include significant producers and importers of rice, and were found to maximize the value of the patent, while maintaining the cost of patent applications low.

The National Phase applications focus on the introgression of the favorable OsTPR trait in different elite *Oryza sativa* genetic backgrounds which lack this favorable OsTPR trait, and tools that are useful for such introgression. The patent applications will allow IRRI to explore partnerships for research, both from public and private sector partners interested in improving yield and grain quality of elite rice varieties. Together with those partners, IRRI intends to develop and release improved varieties which are superior in yield, grain and nutritional quality, varieties that are expected to benefit the smallholder rice farmers.

Once the technology is ready for utilization at scale, IRRI will continue reaching additional partners who can distribute and disseminate the innovation at the required scale and scope across various territories. IRRI's licensing strategies are designed to provide royalty-free licenses to NARES partners, and limited-exclusive or non-exclusive commercial licenses for private companies, with a commitment to impact assessment and impact acceleration.

We ensure that our patent applications, and the patent claims, do not extend to farmers access and use of landraces per se. All materials used to develop the patent are from the in-trust collection of the multilateral system (MLS). IRRI will continue to comply with all obligations of the SMTA including the benefit-sharing, where applicable. Future licensees will be bound by the benefit-sharing obligations under the SMTA. In addition, and as per IRRI's policy, royalties paid by future licensees to IRRI shall be shared on a voluntary basis with the benefit-sharing fund of the International Treaty for Plant Genetics for Food and Agriculture.

As per IRRI's Intellectual Property and Commercialization policy:

- 1) IRRI germplasm with the favorable OsTPR trait will be made available to public partners for non-commercial activities, under non-exclusive arrangements and on a no-cost and no-revenue basis
- 2) We intend to make the same IRRI germplasm with the favorable OsTPR trait available to private partners, in the context of research and breeding licenses, and commercial licenses. As part of commercial licenses, IRRI will require private licensees to make a contribution to the Benefit Sharing Fund of the Treaty, even when the obligation to contribute to benefit-sharing is not triggered automatically as per the SMTA terms and conditions.
- 3) In addition, 20% of the royalty received by IRRI from future commercial licensees are to be transferred by IRRI to the Treaty benefit-sharing fund, on a voluntary basis.

As a non-profit international organization, IRRI promotes responsible technology transfer and intellectual property management in accordance with its Intellectual Property and Commercialization Policy (IP&C Policy) and with the CGIAR Principles on the Management of Intellectual Assets ("IA Principles"). This patent application conforms with the IA Principles concerning intellectual property applications, i.e., necessary for the further improvement of the innovation or to enhance the scale or scope of impact on target beneficiaries, in furtherance of the CGIAR Vision.

¹Available at <http://books.irri.org/Approved-IPC-Policy-291017.pdf>

²Available at <https://storage.googleapis.com/cgiarorg/2018/03/CGIAR-IA-Principles.pdf>