

PUBLIC INFORMATION SHEET FOR FIELD TRIAL

PROPOSAL FOR THE FIELD TRIAL
OF GENETICALLY ENGINEERED HIGH IRON and ZINC RICE EVENT IRS1030-039
(IR-HIZ039-1)

1. **Name of the Applicant**
Department of Agriculture-Philippine Rice Research Institute (DA-PhilRice)
2. **Address of the Applicant:**
PhilRice Central Experiment Station, Maligaya, Science City of Muñoz, 3119 Nueva Ecija
3. **Telephone Number/Facsimile Number and E-Mail Address of the Applicant**
(044) 456-0277 loc 452/ rlordonio@gmail.com
4. **Name of Project Leader**
Reynante L. Ordonio
5. **Name of Responsible Officer/Authorized Representative**
Reynante L. Ordonio
6. **Description of the Regulated Article for Field Trial (mention the crop, transformation event, new trait conferred, name of the gene transferred, method of transformation, and advantages of the trait conferred)**

Rice (*Oryza sativa* L.) variety NSIC Rc238 was genetically modified by *Agrobacterium*-mediated transformation using plasmid pIRS1030 to express the apple ferritin gene (*Apfer*) and the rice nicotianamine synthase 2 gene (*OsNAS2*). The resulting HIZR event, IR-HIZ039-1, had an increased iron (Fe) and zinc (Zn) trait in the endosperm. This biofortification strategy, the delivery of micronutrients via staple food crops, has been proposed to complement existing efforts for the alleviation of micronutrient deficiency.

7. **Purpose (s) of the Field Trial (state the objectives of the proposed project)**
 - a. to generate data for environmental risk assessment and agronomic performance,
 - b. to collect grains and straw for nutrient composition analysis and protein expression analysis, and
 - c. to harvest seeds that will be used for the next field trial if needed.
8. **Potential Benefits and Risks of the Regulated Article Relative to the Non-Modified Host Organism**
 - a. Potential Benefits (describe how the new trait will benefit farming, the farmer, the environment, and society as a whole)

Rice grains of commonly cultivated varieties contain low levels of Fe when milled, while in brown rice, Fe and Zn in the bran are mostly bound to phytate, hence they are not available for absorption by the human body. Polished (milled) rice grains of commonly cultivated and consumed rice varieties only contain approximately 2 $\mu\text{g g}^{-1}$ Fe and 16 $\mu\text{g g}^{-1}$ Zn (Trijatmiko et al., 2016). To provide 30 percent of the estimated average requirement (EAR) for Fe and Zn in adult women and children, polished rice would have to contain at least 10-13 ppm Fe and 28 ppm Zn, assuming 10 percent and 25 percent bioavailability for Fe and Zn, respectively, and 90 percent retention following cooking. The transgenic approach was pursued because conventionally-bred elevated Fe and Zn rice lines could only reach a maximum of 7-8

$\mu\text{g g}^{-1}$ Fe or $24 \mu\text{g g}^{-1}$ Zn in polished rice grains. We recently developed transgenic indica rice lines using apple ferritin gene in combination with rice Fe homeostasis gene in the background variety of NSIC Rc238.

- b. Potential Risks (summarize human and animal health, and environmental assessments done and studies implemented indicating potential effects on human and animal health, and the environment)

Rice has a long history of safe use as food dating back at least 4000 years and is a staple for nearly half of the world's population. Rice is not a significant source of toxicants and is not considered by allergists to be a common allergenic food. The genetic modification resulting in IR-HIZ039-1 was intended to only increase the production of Fe and Zn in the rice endosperm and is unlikely to alter the potential of rice to cause human, animal, or plant disease.

9. Brief Summary of the Effects of the Regulated Article on the Target Organism, If It is a Pest Protected Plant (add any information known on its effects on the non-target organism)

HIZR, IR-HIZ039-1 is not a pest protected plant. It is intended to complement current strategies in the fight against micronutrient deficiency as it is expected to supply up to 30 percent of the estimated average requirement for adult women and children.

10. Brief Summary on Socio-economic, Cultural and Ethical considerations

High Fe and Zn rice is not yet approved for production in any country. The introduced trait in High Fe and Zn rice was not intended to affect the agronomic performance of rice, including yield. In the future, should IR-HIZ039-1 be approved for propagation and adopted, its production is not anticipated to change current patterns of production and trade. There are no anticipated effects on total rice consumption or utilization.

IR-HIZ039-1 is expected not to have a selective advantage to other rice and plants and would not affect plant biodiversity in the field trial locations. Animal biodiversity would also be not affected since IR-HIZ039-1 would be similar to any other rice and would not have any toxins or allergens that would be harmful to animals. Crop management of this event would be the same as conventional rice that it would have no effect on the cultural practices of rice farmers in the field trial locations.

11. Location (with GPS coordinates) and Size of the Proposed Field Trial Site

Primary site: PhilRice-Central Experiment Station, Brgy. Maligaya, Science City of Muñoz, Nueva Ecija. GPS coordinates: $15^{\circ}40'24.3''\text{N}$, $120^{\circ}53'25.7''\text{E}$. Size = 1,250 sq. meters.

Back-up site: PhilRice-Batac Station MMSU Campus, Batac City, Ilocos Norte. GPS Coordinates: $18^{\circ}03'16.9''\text{N}$, $120^{\circ}32'35.2''\text{E}$. Size = 1,215 sq. meters

12. Duration of the Field Trial

One planting season

13. Method of Disposal of Regulated Article after Field Trial

Proposed method of final disposition:

- Immediately after harvest, the entire area will be flooded to encourage germination of dropped seeds. Plants which germinated from dropped seeds will be destroyed by having the plot plowed and puddled.
- Grains no longer needed for research purposes will be devitalized inside the field trial site by putting them in boiling water for at least 10 minutes. Devitalized grains will then be buried inside the area.
- Rice straw will be disposed of by putting them in a designated compost pit or by burying them.

- d. Grains used in data gathering will be rendered non-viable by autoclaving. The materials will be disposed of by putting them in a designated compost pit or by burying them.

14. Government Agencies Consulted Before Field Trial

- Department of Agriculture - Bureau of Plant Industry
- Department of Environment and Natural Resources
- Department of Health
- Local Government Unit of Science City of Muñoz, Nueva Ecija and Batac City, Ilocos Norte.

For Additional Information on the proposed field trial, please contact:

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PhilRice ID No: 04-0903

The public is hereby invited to submit their comments (within 15 days) on the proposed field trial from the date of posting until the public hearing, to:

Director
Bureau of Plant Industry
San Andres, Malate, Manila
EMail: bpibiotech@buplant.da.gov.ph

Approved for Posting:

George Y. Culaste
GEORGE Y. CULASTE, PhD.
Director
Bureau of Plant Industry
Date: _____

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