

**【Workshop 2】 Crop Production under Heat Stress**  
**Identifying Heat-tolerant Rice Genebank Accessions**

Edilberto D. Redoña (1), Marcelino A. Laza (1) (3), Sheryl N. Sierra (1), Oliver E. Manangkil (2), and  
Wilhelmina V. Barroga (2)

(1) Plant Breeding, Genetics, and Biotechnology Division, International Rice Research Institute (IRRI),  
DAPO Box 7777, Metro Manila, Philippines. (2) Plant Breeding and Biotechnology Division,  
Philippine Rice Research Institute (PhilRice), Science City of Muñoz, Nueva Ecija, Philippines,  
(3) Presenting author.

(m.laza@cgiar.org / Fax: +63(2) 580-5699 / Phone: (049) 536-2701 ext. 2286)

Global warming is a threat to the world's rice production. High temperature (>35°C) during flowering induces grain sterility which in turn reduces rice yield. At the moment, very few donors of heat stress tolerance are known from the rice germplasm collection stored at the IRRI Genebank. So far, N22 has been identified as the most heat-tolerant accession. As part of the IRRI's initiative to develop improved breeding lines tolerant to high temperature, studies were conducted to identify more genetic donors of the heat tolerance trait from the IRRI Genebank and ultimately provide information and seeds of these accessions to breeders worldwide thru the International Network for Genetic Evaluation of Rice (INGER; <http://seeds.irri.org/inger/>). A series of trials were conducted using a set of 455 IRRI Genebank accessions coming from 'hot' countries (Pakistan, India, Afghanistan, Iran, and Iraq). In the 2008 dry season (DS), all the entries were planted in single and unreplicated 5-meter rows. The materials were grouped according to their flowering duration and staggered seeding of the entries was done to have their flowering coincide with the hottest period at IRRI (mid April – mid May). The time of anthesis of the materials was recorded and the best 200 accessions with the least grain sterilities were selected. In 2008 wet season (WS), the best 200 selections were further tested under controlled phytotron conditions using 38/21°C day/night temperature and 75/85% day/night relative humidity (RH) settings. Pollen and grain sterilities were recorded and the 28 best accessions with the least grain sterilities were selected. In 2009 DS, another field trial involving these 28 accessions along with 12 new promising germplasm were conducted in two sites in the Philippines: IRRI, Los Baños and PhilRice Nueva Ecija. Based on historical weather data, the temperature in Nueva Ecija is hotter than that in Los Baños during mid-April to mid-May. In this trial, some of the best entries that were equal or better than N22 for traits like grain sterility, pollen sterility, early time of day anthesis, and grain yield were Darbari Roodbar (IRGC Acc. 66238), Larome (IRGC Acc. 32312), and Mulai (IRGC Acc. 32315). Other entries were equal to or better than N22 in some but not all traits. Genotyping of all promising germplasm with SSR markers and crossing of the selected accessions with mega-varieties are on-going. Breeding lines produced from these crosses will be tested in high temperature conditions both in the field and the phytotron.