

Abstract

The objectives of this study were to evaluate and select local rice for photoperiod insensitivity and tolerance to gall midge infestation in local areas and to select and improve local rice varieties with special quality. The study was carried out in two consecutive growing seasons, dry season 2015 and wet season 2015.

In dry season 2015, the study was done at faculty of Agriculture, Chiang Mai University. Two sets of populations were studied and multiplied. The first was the production of progeny populations for Royal Project Extension areas in Nan. Five sets of F_1 seeds between local rice from highland of Nan province, Ble A and Jao Pluek Dum, and two advanced lines with gall midge tolerance plus cross between Jao Pluek Dum and Pathumtani 1 rice and parents were sown in pot experiment at Chiang Mai University. Plants were recorded form morphological and agronomical characters. F_1 plants between wet land rice and dry land rice in this study set seed poorly. At maturity, plants from each pot of the same cross were harvested and bulked at equal amount of seeds to form a composite cross. Seeds were separated into two sets. The first represented F_2 population to be sown in wet season in 2015. The second set was subjected to analysis for Fe, Zn and aroma. It was found that Fe, Zn in grain of F_1 was higher than parents. For aroma, 2AP fragrance substance in grain was detected in only in Pathumtani 1 parent and its hybrid.

The second set sown in dry season 2015 was the production of progeny populations for Royal Project Extension areas (Huay Pong, Le Tor and Loang Khod). Four F_4 populations derived from crossed between local rice from highland of Chiang Mai province, and two advanced lines with photoperiod insensitivity and gall midge tolerance and parents were sown in pot experiment at Chiang Mai University. Plants were recorded form morphological and agronomical characters... Variation within local rice parents and F_4 progenies were found for hull and pericarp colors, tiller and grain shapes. Plants which were flowering in dry season then set grains but have morphological characters similar to local rice parents were harvested. Seeds were bulked and represented F_5 populations for sowing in farmers' fields during wet season 2015.

In wet season, five F_2 populations and parents of Set 1 from dry season 2015 were evaluated in farmers' fields in Nam Kwaeng Royal Project Extension area. Populations were sown in two conditions, wet land rice and dry land rice. Gall midge infestations were inspected at 40 and 80 days after transplanting. Gall midge infestation was not detected in both areas. Under wet land condition, all population was able to grow regularly. F_2 plants were segregating between parents. At maturity, plants were selected in participating with farmers. Selected panicles were bulked, threshed and seeds represented F_3 populations. These F_3 populations will be evaluated for photoperiod sensitivity in dry season 2016. The F_3 seeds were sampling and analysed for Fe, Zn or other special quality in rice grain. When grown under dry land condition, all population gave very poor grain yield due to severe drought and lack of rainfall during post anthesis. Ble A local rice parent did not survive in this field. Cross between Ble A and CMU-B2 gave very poor yield. Slight amount of grains were obtained from Ble A crossed with CMU-L2 (17-19 g/m²) and higher yield (50-114 g/m²) were obtained from those crosses derived from Jao Pluck Dum. Fe concentrations in rice grain of F_2 populations were similar to parents. For grain Zn, those of F_2 populations were as high as local rice parents and seeds obtained from wet land condition were higher than dry land condition. Fragrance substance in grain was detected in Pathumtani 1 parent and cross between Jao Pluck Dum x Pathumtani 1.