

Apichat Seiyot 2008: Introgression of Drought Resistance from Wild Rice (*Oryza nivara* Sharma et Shastry) to Cultivated Rice (*O. sativa* L.) by Embryo Culture and Backcrossing. Master of Science (Agriculture), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Associate Professor Prapa Sripichitt, D.Agr. 72 pages.

The objective of this study was to improve rice resistance to drought stress by transferring drought resistant character from wild rice (*O. nivara* Sharma et Shastry) to cultivated rice (*O. sativa* L.) varieties RD23 and CN1 using backcross method and immature embryo culture. Firstly, hybridization between cultivated rice and wild species was made to produce 2 interspecific hybrids. It was shown that seed setting of the crosses RD23/*O. nivara* and CN 1/*O. nivara* were 50.00 and 48.00 %, respectively with the average of 49 %. The F<sub>1</sub> hybrid seeds (embryos) obtained were rescued by culturing on ½ MS medium. Germination rate of the F<sub>1</sub> hybrid embryos of the crosses RD23/*O. nivara* and CN 1/*O. nivara* were 61.50 and 61.40 %, respectively with the average of 49 %. The F<sub>1</sub> hybrid seedlings of both crosses were grown until flowering and backcrossed to cultivated rice for 3 times to produce backcross progenies BC<sub>1</sub>F<sub>1</sub>, BC<sub>2</sub>F<sub>1</sub> and BC<sub>3</sub>F<sub>1</sub>. When the number of backcrossing increased, seed setting and germination rate of the seeds of backcross progenies cultured on ½ MS medium tended to increase. Morpho-agronomic characters of the F<sub>1</sub> hybrids and backcross progenies (BC<sub>1</sub>F<sub>1</sub>, BC<sub>2</sub>F<sub>1</sub> and BC<sub>3</sub>F<sub>1</sub>) were investigated. It was found that most of the morpho-agronomic characters of the F<sub>1</sub> hybrids were intermediate between their parent except the awn of seed and easy threshability of panicles were closer to wild parent. Whereas the backcross progenies manifested variation in morpho-agronomic characters due to the segregation of the genotypes. However, the BC<sub>2</sub>F<sub>1</sub> and BC<sub>3</sub>F<sub>1</sub> could restore the good morpho-agronomic characters of the cultivated rice parents such as the awnless of seed. The F<sub>3</sub>, BC<sub>1</sub>F<sub>3</sub>, BC<sub>2</sub>F<sub>3</sub> and BC<sub>3</sub>F<sub>3</sub> F<sub>1</sub> were screened for drought resistance at vegetative growth stage by visual scoring of leaf rolling, leaf drying and plant recovery. Segregation for susceptible and resistant plants were observed among the progenies, however, most of them were not resistant to drought. Drought resistance of the backcross progenies tended to decrease after backcrossing to the cultivated rice parent which were drought susceptible. However, selection was made for 13, 5, 4 and 12 with highly resistant to drought from F<sub>3</sub>, BC<sub>1</sub>F<sub>3</sub>, BC<sub>2</sub>F<sub>3</sub> and BC<sub>3</sub>F<sub>3</sub> progenies of both crosses, respectively.

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Student's signature

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Thesis Advisor's signature