Bunyarit Sinkangam 2012: Marker-Assisted Selection for Quality Protein in Waxy Corn (*Zea mays* var. *ceratina*). Doctor of Philosophy (Plant Breeding), Major Field: Plant Breeding, Faculty of Agriculture at Kamphaeng Saen. Thesis Advisor: Associate Professor Choosak Jompuk, Dr.sc.nat. 79 pages.

Waxy or amylopectin maize (*Zea mays* var. *ceratina*) is an important staple food and vegetable in Southeast and East Asia. Its insufficient protein quality can be remedied by the *opaque-2* gene mutation, demanding the combination of two recessive endosperm quality genes, *opaque-2* (o_2o_2) and *waxy* (*wxwx*). Crosses were made between waxy and opaque-2 maize as female and male parents, respectively. In the segregating progenies of two crosses, Kwi#1 $\times$ AgQ53 and Kwi#9 $\times$ AgQ53, immediate selfing or one-time backcrossing to the waxy parent before selfing were used to achieve the combination o_2o_2wxwx, associated with marker-assisted selection of *opaque-2* by *phi057* and of *waxy* by *phi022*. Eleven of waxy-opaque-2 (o_2o_2wxwx) lines were achieved from initial backcrossing and selfing methods. Furthermore, high variation in grain quality traits is an incentive for further improvement by breeding. Consumption of high-quality protein maize will improve the diets of children, a good reason to produce double-quality vegetable waxy maize. The percentage of tryptophan content in endosperm of these lines was high about 0.95% while the normal maize was about 0.5%. Moreover, amylopectin was high as waxy maize. The results indicating that the goal of combining two quality traits within one grain was achieved. The best green weight of hybrid was about 2,127 kg/rai while the check variety was about 1,798 kg/rai. Total protein content of fresh seed was 12.3% for hybrids and 11.11% for checks. The average of tryptophan content in endosperm of F_1 hybrid was 0.68 and 0.65% from backcrossing and selfing methods, respectively while the check variety was about 0.52%.

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