

Supattana Bureerat 2009: Mass Selection for Increasing Oil Content in Maize Populations. Master of Science (Agriculture), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Assistant Professor Vichien Keeratinijakal, Ph.D. 86 pages.

This research was aimed at increasing oil content in two maize populations; High Oil Dent DMR (HODDMR) and High Oil Flint DMR (HOFDMR). High oil corns are generally considered to have a kernel oil concentration greater than 6 percent. The two populations were improved by means of mass selection with self-families selection. The two-step selection procedure involved a stratified mass selection system that included two seasons per cycle. In the first season, the good agronomic performance plants were selected to self-pollinate, then kernel oil content from each ear was measured using a near infrared spectrometer. Oil value was predicted by using the calibration model. Afterwards, the ears with the highest oil level were recombined in the second season. Two cycles of selection were applied to both populations. The better calibration model was used in the later cycle since it was more accurate compared to the previous one. The oil content of corn kernels were analyzed by soxhlet extraction (AOAC method) with 15 percent moisture content. It was shown that the oil content of the base population in HODDMR and HOFDMR were  $5.81 \pm 0.05$  and  $5.45 \pm 0.13$  percent, respectively. After the two maize populations were selected, the first cycle (C1) oil content of HODDMR and HOFDMR were  $5.65 \pm 0.12$  percent (decreasing of 2.75 percent C0) and  $5.56 \pm 0.11$  percent (increasing of 2.02 percent C0), respectively. For the second cycles (C2), oil content of HODDMR and HOFDMR were  $6.10 \pm 0.28$  percent (increasing of 7.99 percent C1) and  $5.77 \pm 0.25$  percent (increasing of 3.78 percent C1), respectively. Mass selection with self-families selection can effectively increase oil content in the C2 of HODDMR population with kernel oil concentration greater than 6 percent. However, measurement accuracy of a kernel oil concentration was the main factor affecting the response to selection of both populations where C2 was improved better than C1.

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