

Pawonwan Jeenrat 2014: Breeding for Increasing of Anthocyanin in *Opaque-2* Waxy Corn.
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The kernel of purple waxy corn is rich in antioxidants (anthocyanin) while the kernel of *opaque-2* waxy corn contains proteins with a high percentage of tryptophan content. It would benefit consumers if both of these qualities could be combined in one corn variety. So, the objective of this study was to increase the anthocyanin content in the kernel of *opaque-2* waxy corn by using marker-assisted selection (MAS) to detect the *opaque-2* gene in the segregating progenies. Crosses were made between two *opaque-2* waxy corn varieties (Agwo1 and Agwo2) with white kernels and high (about 0.8%) percentage of tryptophan content in protein as the female parent and a purple waxy corn variety (Fancy Purple 111) having high anthocyanin in the kernel as the male parent. In the S_1 progenies the simple sequence repeat (SSR) marker *phi057* was applied to detect the *opaque-2* gene in the young plants, and the purple ears of *opaque-2* plants were selected at harvest. The advanced generation was made by selfing the selected plants until S_4 . Five purple *opaque-2* waxy lines (Agwop2, Agwop3, Agwop4, Agwop5 and Agwop6) and one white *opaque-2* waxy line (Agwow1) were achieved. Four lines and two testers were used for the Line \times Tester design to obtain eight crosses. In S_4 lines results showed that the percentage of tryptophan content in protein of purple *opaque-2* waxy lines ranged from 0.57-0.97% and anthocyanin content ranged from 0.19-0.25 mg/100g, while the white *opaque-2* waxy line had about 0.62% of tryptophan and 0.02 mg/100g of anthocyanin. For the eight F_1 hybrids, green ear weight ranged from 1,195-1,934 kg/1,600 m², percentage of tryptophan content in protein ranged from 0.50-0.79% and anthocyanin content was 0.16-0.32 mg/100g. In the check varieties, Sweet White 853 and Purple Fancy 111 had the same percentage of tryptophan content in protein (0.26%) but the anthocyanin content of Purple Fancy 111 was about 0.18 mg/100g, higher than 0.01 mg/100g in Sweet White 853. Moreover, the amylopectin content of S_4 lines, F_1 hybrid and check varieties was more than 95%. In summary, the combination of these 3 traits (high amylopectin, tryptophan and anthocyanin) in a new genotype of purple *opaque-2* waxy corn was achieved.

Student's signature

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