PGM Book Prize

**Syazreen Adilah Binti Basharuddin
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Syazreen Adilah was born on 31st May 1999 in Kampung Baru, Kuala Lumpur. She received her early education in Kuala Lumpur and continued her secondary education in Islamic boarding school in Kepong, Kuala Lumpur. Syazreen Adilah recently in final semester of bachelor degree from Universiti Sultan Zainal Abidin in Agricultural Biotechnology with a CGPA of 3.62. She has been very passionate about plant genetics and molecular biology since her first year at UniSZA and it developed even further during her undergraduate years, especially during her attachment at Forest Research Institute Malaysia (FRIM) for her industrial training where she was involved in a project related to plant breeding. And for her final year project, she was attached with Dr. Nur Fatihah to incorporate her interest in genetics to study optimization and screening of SSR markers for genetic diversity of waxy corn inbred lines. Currently, she is undergoing her internship at FRIM before graduating her bachelor degree in UniSZA.

The PGM Book Prize is awarded to final year university students who have accomplished outstanding final year project in the field of genetics. The award, which carries a gift voucher worth RM500, is established to bring increasing recognition of the scholarly interests and to promote the culture of research among students. Universities will be invited to submit their nominations for the winners of the prize. At present, 10 students have been awarded the book prize from various universities since its establishment in 2011.

ABSTRACT

Optimization and screening of SSR markers for genetic diversity of waxy corn inbred lines

Syazreen Adilah Binti Basharuddin and Nur Fatihah Hasan Nudin

Corn is a well-known cereal crop that is commonly cultivated around the world. For the past few years, it has been reported as the third most important cereal crop in the agricultural economy, after wheat and rice. Corn is also known for its industrial uses, including ethanol, oil, and high-amylose starch. Grain corn (*Zea mays* L.) and waxy corn (*Zea mays* L. var. *ceratina*) are the most widely grown and used in East Asia. Waxy corn is a type of corn rich in anthocyanins in kernel and cob, and can be used as a viable source of antioxidants for functional foods. However, it shows poor yield capacity for economic production. Therefore, the selection and breeding of waxy corn for high yield is promising to increase its production. In corn breeding, selecting inbred lines is not easy because the inbred lines are highly homozygous and the morphological characteristics are usually highly dependent on environmental conditions. Thus, it is nearly impossible to distinguish closely related inbred lines using morphological data alone. This study aimed to determine the genetic diversity among six waxy corn inbred lines and three grain corn inbred lines using SSR markers. For PCR optimization, six annealing temperatures were tested and the clearest bands were produced at 58℃. The best annealing temperature was then further used for primers screening and PCR amplification. Out of 20 SSR primers, only five primers (UMC 2077, BNLG 381, UMC 1005, UMC 1196 and PHI 011) produced the clearest and reproducible bands compared to others. The five SSR primers yielded a total 13 bands. The polymorphism of the primers obtained was 50% or 100%. Primers UMC 1005, PHI 011 and BNLG 381 were considered as the best marker to differentiate waxy corn inbred lines with 100% polymorphisms. Dendrogram construction was performed using UPGMA analysis in PAUP* version 4.0 software. Two major clusters were produced, cluster I consisted of all waxy corn accessions and grain corn accessions GWT 46-1 and GWT 46-10. Cluster II consisted of only grain corn GWT 10-17. Identifying genetically distant inbred lines using SSR marker is essential to maximize the yield with a high probability of heterosis. It can be further used to select and breed new and improved waxy corn varieties.