

ABSTRACT

THE ESTIMATION OF GENETIC VARIABILITY AND HERITABILITY OF SEVERAL VEGETATIVE AND YIELD CHARACTERS ON FOUR PARENTAL LINES OF SWEET MAIZE

By

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A plant breeding through selection on a population will be successful when the genetic variability is high. Genetic variability is needed to ensure a success while heritability measures the ability of the parents to pass superior characters onto progeny. In sweet maize, round seed (segregation) type will segregate for vegetative and yield characters like non-sweet parents while expressing a sweet taste as the character of the yield.

The aim of this research were to (1) identify the difference of the vegetative and yield characters among the four parental lines of sweet maize as compared to a commercial standard; (2) identify the magnitude of genetic variability and broad-sense heritability indicated in the four parental lines of sweet maize; (3) acquire epistasis on alleles controlling the sweetness in the form of round seeds segregate ratio of 12 round: 4 wrinkle and 9 round: 7 wrinkle; and (4) acquire a segregation ratio of 9 Yellow-Round: 3 Yellow-wrinkle: 3 white-Round: 1 white-wrinkle for a Two-color cultivar.

The research was accomplished at the Politeknik Negeri Lampung Research Station in September 2009 to January 2010. The research used Randomized Complete-Block Design (RCBD) non factorial with three replications. Parental lines as treatment were consisting of (1) LASS Yellow-Round; (2) LASS Yellow-wrinkle; (3) LASS white-Round; and (4) LASS Two-Color. Data taken for the vegetative characters were plant height, ear height, and leaf number. Data for yield characters were panicle number, female flower number, ear number, ear diameter, ear length, seed row number, and sucrose content. Data were analyzed for variances, and parental lines were ranked using Tukey's HSD 5 %. Genetic variability (σ^2_g), broad-sense heritability (h^2_{BS}), and genetic coefficient of variance (CVg) were analyzed by using a mathematical model of Hallauer and Miranda. The segregate on of seed shapes was analyzed with a goodness of fit χ^2 test.

The research results showed that (1) the four parental lines differed in vegetative characters: plant height and leaves number; and the yield characters: ear diameter and ear length; (2) the genetic variability and broad sense heritability were different from zero for: plant height, leaf number, ear diameter, and ear length; (3) the ears segregated in their seeds following epistasis in the ratio of 12:4 were obtained in the LASS Yellow-Round self-1. Lines of LASS Yellow-Round, LASS Yellow-wrinkle, and LASS Two-color were important as wrinkle-seed producer (true type sweet maize); and (4) the ear segregated in their seeds following epistasis in the ratio of 9:3:3:1 were obtained in the LASS Two-Color self-1.