Combining ability analysis in complete diallel cross of watermelon (Citrullus lanatus (Thunb.) Matsum. & Nakai).

ABSTRACT

The experiments were carried out in two research stations (MARDI Bukit Tangga, Kedah, and MARDI Seberang Perai, Penang) in Malaysia. The crossings were performed using the four inbred lines in complete diallel cross including selfs and reciprocals. We evaluated the yield components and fruit characters such as fruit yield per plant, vine length, days to fruit maturity, fruit weight, total soluble solid content, and rind thickness over a period of two planting seasons. General combining ability and its interaction with locations were statistically significant for all characteristics except number of fruits per plant across the environments. Results indicated that the additive genetic effects were important to the inheritance of these traits and the expression of additive genes was influenced greatly by environments. In addition, specific combining ability effect was statistically evident for fruit yield per plant, vine length, days to first female flower, and fruit weight. Most of the characters are simultaneously controlled by additive and nonadditive gene effects. This study demonstrated that the highest potential and promising among the crosses was cross P2 (BL-14) × P3 (6372-4), which possessed prolific plants, with early maturity, medium fruit weight and high soluble solid contents. Therefore this hybrid might be utilized for developing high yielding watermelon cultivars and may be recommended for commercial cultivation.

Keyword: Watermelon; Inbred and hybrid lines; Diallel mating design; Combining ability.