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**INHERITANCE OF TOLERANCE TO HIGH TEMPERATURE
STRESS IN PEA (*Pisum sativum* L.)
BY**

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ABSTRACT

Crosses in both directions were made between two pea cultivars, *i.e.* Wando which is known for its heat tolerance and Early Perfection, to study the inheritance of heat tolerance. Plants of parents, and F_1 of both crosses were evaluated under both the conditions of optimum temperatures associated with the regular planting date (November 1, 1997) and those conditions of high temperatures associated with the delayed planting date (February 10, 1998) at Moshtohor, Kaluobia, Egypt. In addition, plants of parents, F_1 , F_2 , BC_1 and BC_2 populations of both crosses were evaluated under the conditions of high temperatures associated with the delayed planting date (February 10, 1998) at the same location. The number of heat units required for the individual plants of parents and F_1 populations of both crosses from germination to reach harvesting stage of green pods was significantly less in case of regular planting date than that recorded for the same populations under the conditions of high temperatures associated with late planting date. However, the increase in number of heat units associated with the parental cultivar Wando under high temperature conditions was much less than that associated with cultivar Early Perfection. Under the conditions of high temperatures, the parental cultivar Wando had significantly higher number of pods/plant, average pod weight, green pod yield/plant, number of seeds/pod, number of seeds/plant, average green seed weight and green seed yield/plant than those of the other parental cultivar Early Perfection, while the differences between the two parental cultivars were not significant under the conditions of optimum temperatures associated with the regular planting date. Heat stress degree-day sums (HSDDS) was found to be an efficient measurement for excess heat above several base temperatures. Significant negative linear relationship was found between excess heat measured by HSDDS and green pod yield per plant. The relative potence of gene set ratio (P) indicated partial dominance for high number of days from planting to flowering and from planting to green pod harvest, number of seeds per pod and average seed weight, under high temperature conditions. Indications for the presence of maternal effect on the inheritance of number of pods/plant, average pod weight, green pod yield/plant, number of seeds/plant, and green seed yield/plant were detected under high temperature conditions. The narrow sense heritability estimates for number of pods/plant, and number of seeds/pod were very low, while those calculated for