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EXPLORING HETEROSIS IN MELON (*CUCUMIS MELO* L.) HYBRIDS

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Heterosis, or hybrid vigour, describes the phenotypic superiority of a F_1 hybrid over its parents with respect to traits such as growth rate, biomass production and fertility. Identification of lines with superior cross performance is the most costly and time consuming step in hybrid development programs due to the need for yield trial. Genetic Distance between parents, estimated by molecular markers, has been proposed as a useful tool for heterotic effect prediction. Since this relationship is not well understood in melon (*Cucumis melo* L.), in this study, morphological evaluation and comparison of the productivity of 8 parental lines and 28 F_1 hybrids generated by their half diallel crosses was carried out in two locations for three years. Seven traits of breeding interest were analysed: Total Fruit Weight, Total Soluble Solids, Earliness, Single Fruit Weight, Fruit Length, Fruit Diameter and Fruit Shape. Molecular fingerprinting previously assessed genetic relatedness among parents. In the field trials specificity of heterosis for each cross/trait/environment was recorded. Total Fruit Weight, Single Fruit Weight, Fruit Length and Fruit Shape showed variable levels of Best Parent Heterosis ranging from highly positive to negative with some differences among the trials, while Total soluble solids displayed mainly additive phenotypic effect, although with large variability across trials. Fruit Diameter displayed mainly dominant phenotypic effect and Earliness showed large differences between locations, suggesting that it greatly depends on environment. Finally, heterotic effect was correlated to Genetic Distances between parental lines. Strong correlations could not be detected and the positive correlations, mainly not significant, between GD and heterosis were largely cross, environment and year specific. Total Fruit Weight displayed highly significant positive correlation in Perugia, but not in Latina trials, while Single Fruit Weight and Fruit Length showed significant positive correlation in both locations. In Fruit Shape, positive trend was recorded but the correlation was too low and not significant. Genetic Distances appear to be a low predictor of heterotic effect for all the traits analysed, although a positive trend is almost always displayed.