

Hybrid vigor and correlation for some yield and yield component traits in pumpkin (*Cucurbita moschata* Poir.) at Northern Saudi Arabia conditions

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The main objectives of this investigation were to determine the amounts of heterosis versus the mid-parents and the better parent and genotypic and phenotypic correlation. Four pumpkin varieties belong to the species (*Cucurbita moschata* Poir.), were crossed to obtain 12 F1 hybrids according to a complete diallel crosses mating design system. These parental varieties were: Butternut Pumpkin (P1), Queensland blue pumpkin (P2), Bugle pumpkin (P3) and Long Island cheese pumpkin (P4). The seeds of these parental varieties were obtained from different countries: P1 from Egypt; P2 from USA; P3 from India and P4 from Pakistan. Data were recorded for nine traits: Fruit Length (FL cm), Fruit Diameter (FD cm), Fruit Shape Index (FShI), Total Soluble Solid% (TSS%), Flesh Thickness (FT cm), Weight of Fruit (WFg), Seeds Weight (SW gm), Number of Fruits Per Plant (No.F/P) and Total Yield per Plant (TY/P kg). The results also indicated that the amounts of heterosis versus mid-parents showed highly significant values for all studied traits. The estimates of heterosis versus the better parent showed highly significance for most studied traits. None of the hybrids exhibited maximum heterosis for all the traits, but significant and desirable level of heterosis over mid-parents and better parent was obtained in several hybrids for the different traits. The parents bugle pumpkin and long island cheese pumpkin produce the highest F1 hybrid and the two hybrids (Bugle pumpkin \times Long Island cheese pumpkin) and (Long Island cheese pumpkin \times Bugle pumpkin) appeared the highest values in most studied traits. The experimental design was the Randomized Complete Blocks Design (RCBD) with three replications at two locations in Northern Saudi Arabia conditions. The all genetic populations are evaluated in a field trial at two locations in private farms: Rafha (Northern Boarder government) and Sakaka in (Al-Jouf government) at the summer season 2017. An 7 x 7 complete diallel cross of squash was evaluated with parents for heterotic manifestation and evaluate the genetic behavior of yield and yield component traits. Seven different squash varieties belong to the species (*Cucurbita pepo*, L.), were used in this study. These parental varieties were: Eskandarani (P1); Zucca Patisson custard white (P2); All Green Bush (P3); Courgette Orelia (P4); Sakiz (P5); Copi (P6) and Gapla (P7). The seeds of these parental varieties were obtained from different countries: (P1) and (P6) from Egypt; (P2) from France; (P3) from United Kingdom (U.K.); (P4) from Germany; (P5) from Turkey and (P7) from Syria. These parental varieties were used and their 42 F1,1r hybrids were obtained through complete diallel crosses mating design system. Data were recorded for seven traits: fruit length (F.L.cm); fruit diameter (F.D.cm); fruit shape index (F.Sh.I.); Total Soluble Solid% (T.S.S%); weight of fruit (W.F.g);

number of fruits per plant (No.F./P.) and fruit yield per plant (F.Y./P.kg). The results also indicated that the amounts of heterosis versus mid-parents showed highly significant values for all studied traits. The estimates of heterosis versus the better parent showed highly significance for most studied traits. None of the hybrids exhibited maximum heterosis for all the traits, but significant and desirable level of heterosis over mid-parents and better parent was obtained in several hybrids for the different traits. However, GCA values were larger than their corresponding estimates of SCA for studied yield and yield component traits at both F1,1r hybrids. Reciprocal effects (r) were significant for most studied traits. The results indicated that the parents P1, P3, P4, P5 and P7 were seemed to be the best combiners for fruit length (F.L.cm), fruit shape index (F.Sh.I.) and number of fruits per plant (No.F./P.). Also, P2 was the best combiner for Total Soluble Solid% (T.S.S%). In the same time, the two parents P2 and P6 were the best combiners for fruit diameter (F.D.cm) and weight of fruit (W.F.g). These results indicated that the parents P1, P2 and P4 were seemed to be the best combiners for fruit yield per plant (F.Y./P.kg). All 49 genotypes (seven parents, 21 F1's and 21 reciprocal hybrids) were evaluated in a field trial at the growing summer. The experimental design was the Randomized Complete Blocks Design (RCBD) with three replications of 2010. This study was conducted in the Kaha Research Farm of Vegetables Breeding Department, Horticultural Research Institute, (HRI), Agric. Res. Center (ARC), Giza, Egypt.