Genetic studies on vicia faba

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The present investigation amid to study the potentially of heterosis expression for seed yield and its components of eight varieties of Faba bean, the magnitude of both general and specific combining ability and their interaction at two locations (Moshtohor and Nobaria). Also, determined the total and soluble protein as well as trypsin inhibitors contents seeds, and detection the variant of trypsin inhibitors by SDS-PAGE.The importance which should be given to these materials in breeding program by evaluating, according to their general and specific combining ability effects, also correlation coefficient and selection index.A. Field experiment:Egyptian and foreign varieties of Vicia faba L. were chosen based on their variation in seed yield and its components, protein and trypsin inhibitor contents as well as their origin. A half diallel cross were set between the different genotypes (Rina Blanca, Triple White, Tinova, Tina, Giza2, Giza716, Giza46 1 and Giza429) at green house at department of Genetics, Faculty of Agriculture at Moshtohor, Zagazig University and El —Nobaria region to produce a total of 28 Ficrosses combination.Parents and its hybridization's were arranged in a randomised complete block designs with three replications to evaluate in the second season at two locations " field of Faculty of Agricultural at Moshtohor and Nobaria region".The results for field experiment recorded in forms ofmean as follows:1- plant height (cm). 2- No. branches/plant.3- No. pods/plant. 4- First pod position (cm).5-Pod length(cm). 6- Seed yield/plant (gm).7- No. seeds/plant 8- No. seeds/pod. 9- 100-seed weigh (gm).The obtaining data can be summarized as follows:
-1-The various types of interactions, i.e. genotypes with locations, parents with locations and crosses with locations were found to be significant for all studied traits for seed yield and its components except No. Seeds/pod with parents interactions. Also, parents VS. Crosses with locations were significant interactions except plant height and No. branches /plant.2-Some crosses were found to be superior to their respective better parents for most of the seed yield and attributes under investigation.3-The most desirable heterosis and use 5.11 heterosis for seed yield and its components were detected by nine crosses, three of these superior crosses comprised Rina Blanca at Moshtohor also thirteen crosses at Nobaria, and four of these comprised Rina Blanca.4-Both general and specific combining ability variances were found to be highly significant for all trait attributes at the two locations and their combined except No. branches at Nobaria for GCA and No. seeds/pod at the two location for SCA5-The interactions of locations with both types of combining ability were found to be significant for alltraits.6-Rina Blanca followed by G716 proved to be good combinors at the two locations, while Triple White was lowest combinor flowed by Tinova for seed yield andits components.7-The cross Rina Blanca x G461 was the taller cross at the two location, while Triple White x Tinova was the shorter cross at Moshtohor and Tinova x Tina atNobaria.8-For No. branches/plant , Rina Blanca x Tinova was the highest while Triple White x G2 was the lowest at thetwo locations..9-The lowest number of pods per plant detected by cross Rina Blanca x G716 at Moshtohor location and cross Rina Blanca x G2 at Nobaria location.10-The highest number of pods per plant detected by cross Triple White x Tinova at Nobaria location and TW x G461 at Moshtohor.11-The highest seed yield detected by Rina Blanca x G716 at Nobaria location and Rina Blanca x G4291 at Moshtohor, while the lowest Triple White x Tinova.12-Plant height detected positive correlation coefficient over all traits except total and soluble protein at two locations, while seed yield detected highly positive correlation with No. seed/plant, No. branches and 100-seed weight at two locations.13- Selection index showed the best crosses due tocontribute the seed yield and its components with total and soluble protein as well as trypsin inhibitor contents.14- The best

entries arranged according to their highest content for protein and their lowest contents for trypsin inhibitor contents as following; cross Rina Blanca x Triple White, Rina Blanca x Tinova, Ri na Blanca x Tina and Triple White x Tina at Nobaria location. While Moshtohor location detected crosses Rina Blanca x Tinova, Rina Blanca x Triple White, Triple White :1(G2, and Triple White x Tina. B. Laboratory experiment:This section of the investigation carried out at the laboratory of Plant Physiology, Bayreuth University, Germany, on the plant material (parents and their out dialle crossing F2 seeds) as following:1-Determination for total protein percentage by Kjeldahl procedure.2-Extraction for soluble protein and measuring at 562 nm using spectrophotometer.3-Evaluated trypsin inhibitor activity [TIA] as (TIU/gDW) by measuring at 253 nm at spectrophotometer according to modify of method Fillipetti et al. (1999).4-Detection TIA among copolymerized SD S-PAGE by analytical Electrophoresis and screening the digestive gel to achieve the bands for inhibitor and their molecular weight. The obtaining results recorded as following:1-Total protein percentage detected highly significant variant between parents and its crosses at Moshtohor andNobaria location.2-Tina variety was the highest total protein content comparison for parents and its crosses at the two locations, while the lowest was Giza 429 variety at Nobaria and Triple White x Giza716 cross at Moshtohor.3-Soluble protein mg/ml detected highly significant variant between parents and its crosses at Moshtohor and Nobarialocation.4-Rina Blanca x Giza2 was highest cross for soluble protein at Moshtohor, while parental Triple White at Nobaria.5-Giza2 x Giza 461 was lowest cross at Moshtohor and parental Giza 461 at Nobaria for soluble protein.6-Trypsin inhibitor contents [TIU/gDW] detected highly significant variant between parents and its crosses at Moshtohor and Nobaria location.7-Parental Tinova was the lowest entries for [TIU/gDW], while Giza2 was the highest parents at Moshtohor and Nobaria location.8-The best crosses detected the lowest content for trypsin inhibitor and highest contents for protein as well as seed yield and its components such as; Rina Blanca x Tinova, Rina Blanca x Giza 429 and Triple White x Giza2 and worst cross was Giza2 x Giza 716 at Moshtohor location.9-The best crosses for over all studied traits especially trypsin inhibitor and protein contents were Rina Blanca x Tina, Rina Blanca x Triple White and Rina Blanca x Tinova and the worst cross was Giza2 x Giza716 at Nobaria location.10-The protein banding for trypsin inhibitor detected at 20-22 KDa at electrophoresis SDS-gel for studied parents at Nobaria location.11-The digested copolymerized SDS- gel electrophoresis detected a variant intensity of represented trypsin inhibitor bands for over all parents and its crosses at Nobaria location.