ABSTRACT

Three filed experiments were carried out at Gemmeiza Agricultural Research Station, Gharbia Governorate, in 2001/002,2002/003 and 2003/004 to study the effect of selection on yield and yield components in wheat crosses under three levels of nitrogen fertilizer. These experiments included three crosses or lines of bread wheat P_1XP_4 (NKt's'/ Mai'sX Mayon -1), P_2XP_7 (Chil/2*Star X Gemmeiza$_7$) and P_3XP_6 (Cs/E.GIG X Sids $_7$)in F_2, F_3 and F_4 generations under three levels of nitrogen fertilizer (25, 50 and 75 kg N/ fed).The characters studied were i.e 1-Number of spikes/plant 2- Plant height 3-Spike length 4- Number of grains/spike 5-1000-grain weight 6-Grain yield/plant. The studied parameters included mean variances and coefficient of variability, heritability in broad and narrow senses, predicted and actual gain from selection, correlation and path coefficient analysis.

Results showed that the highest mean values of grain yield/plant in F_2 were (41.63 and 54.16) for the cross P_1XP_4 at the first and second nitrogen fertilizer levels, while cross P_2XP_7 gave the highest mean value (51.76) at the third nitrogen fertilizer level. In F_3 the cross P_1XP_4 showed the highest values (31.31,39.55 and 55.54) under the three levels of nitrogen fertilizer respectively, In F_4 the cross P_3XP_6 gave the highest value at first level, cross P_2XP_7 (40.28) under the second level and P_1XP_4 under the third level of nitrogen fertilizer. Regarding genotypic variances (GV) in F_2, the cross P_2XP_7 gave the highest values (46.62,52.19 and 56.54) under the three levels of nitrogen fertilizer respectively. While (GV) in F_3, the cross P_1XP_4 gave the highest value at the first level ,the cross P_2XP_7 gave the highest values (37.53 and 43.20) at the second and the third levels of nitrogen fertilizer. But (GV) in F_4,the cross P_1XP_4 gave the highest

values (24.34,27.34 and 33.80) under the three levels of nitrogen fertilizer.

Genotypic coefficients of variability (G.C.V.) in F_2 showed that, the cross P_2XP_7 gave the highest value (20.72%) under the first level, cross P_3XP_6 showed the highest values (20.92% and 18.59%) under the second level and the third level of nitrogen fertilizer. In F_3 G.C.V indicated that the cross P_2XP_7 gave the highest values (17.42%,18.38% and 20.49%) under the three nitrogen fertilizer levels in F_4, G.C.V. showed that the cross P_1XP_4 gave the highest values (14.04% and 13.98%) under the first level and the second level, cross P_3XP_6 gave the highest value (11.96%) under the third level nitrogen fertilizer level.

Generally, for grain yield/plant, the values of heritability in broad sense were high and ranged from (0.86) to (0.98) under the first level , from (0.88) to (0.98) under the second level , and from (0.89) to (0.98) under the third level nitrogen fertilization. Regarding to the three investigated crosses, $P_2X\ P_7$ showed the highest heritability in broad sense (0.95) in F_2. While P_2XP_7 and $P_1X\ P_4$ crosses showed (0.95) and (0.98), respectively, in broad sense of F_3 and F_4. In F_2 the cross P_3XP_6 gave the highest heritability in broad sense (0.93) under the third level**.** Generally, for grain yield/plant, the values of heritability in narrow sense were low to moderate and ranged from (0.25) to (0.54) under the first level from (0.28) to (0.63) under the second level, and from (0.22) to (0.58) under the third level nitrogen fertilization. Regarding to the three investigated, crosses, $P_1X\ P_4$ showed the highest heritability in narrow sense (0.63) in F_3. While P_3XP_6 cross showed the highest heritability in narrow sense (0.58) in F_4, also in F_4, the cross P_2XP_7 gave the highest values of heritability in narrow sense (0.34) for the same cross under level (III) of nitrogen fertilizer.

The predicted gain from selection were high and ranged from (43.13) to (6.13) under the first level from (39.62) to (5.87) under the second level and from (37.06) to (4.20) under the third level nitrogen fertilization. Regarding to the three investigated crosses, P_3 XP_6 showed the highest predicted gain (43.13) in F_2. While P_1XP_4 and P_3 XP_6 crosses showed (10.99) and (12.83), respectively, in predicted gain of F_3 and F_4**.** But the cross P_2XP_7 showed the highest predicted gain (33.89) in F_2 for the same cross under the first level. The actual gain from selection were high and ranged from (15.89) to (9.30) under the first level, from (18.52) to (8.71) under the second level and from (19.76) to (6.61) under the third level of nitrogen fertilization. Regarding to the three investigated crosses, P_2 XP_7 showed the highest actual gain (15.89) in F_3. While P_3XP_6 cross showed the highest actual gain (19.76) in F_4.But the cross P_1XP_4 showed the highest actual gain (17.36) in F_4 under the second level for the same cross

The results showed that the significantly positive phenotypic and genotypic correlation coefficients obtained herein between grain yield and each of number of spikes/plant ,number of grains/spike and 1000-grain weight under the three levels of nitrogen fertilizer indicated that the increases of these attributes may considerably increase the grain yield. In addition, it could be attribute the significance of genotypic correlation to the common genetic control and peliotropic or linkage. Therefore, it is possible to increase the efficiency of selection for yield by indirect selection via number of spikes/plant, number of grains/spike and 1000-grain weight which could be used as selection criteria for improving wheat yield. Results obtained from F_4 generation of the three crosses under the three levels of nitrogen fertilizer cleared that number of spikes/plant in P_1XP_4 and P_2XP_7 crosses under the first and second levels nitrogen fertilization showed the highest direct effect beside the highest direct effect of grains/spike and 1000-grain weight in some other cases. Also, the most useful indirect effect was due to number of spikes/plant *via* 1000 grain weight and number of grains/spike via 1000-grain weight.

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