Genetic potentiality of some bread wheat genotypes under low input conditions in newland

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The present investigation was carried out during 2002/2003 and 2003/2004 growing seasons at Nubaria Agriculture Research Station, Agricultural Research Center, at North Tahrir under calcareous soil and surface irrigation.The main objectives of this investigation were to evaluated some different bread wheat genotypes for high yielding ability under normal and low input systems and selecting some wheat genotypes to be adapted to low nitrogen fertilizer levels and water stress conditions and to study the use efficiency of applied nitrogen and nitrogen uptake response to N fertilizer under lowinput system.The experimental design was split-split plot, the irrigation treatments were allocated to the main plot, nitrogen fertilizer levels to the sub-plot and bread wheat genotypes to the sub-sub-plot. The irrigation treatments were two, three and five irrigations, the nitrogen fertilizer was applied at rates of 72, 144 and 216 Kg N/ha and bread wheat genotypes were eight genotypes.The data were recorded on number of spikes /m2, number of kernels / spike, 1000-kernel weight, grain yield (t/ha), straw yield (t/ha), biological yield. (t/ha), harvest index, total nitrogen uptake, nitrogen use efficiency, nitrogen utilization efficiency, and nitrogen uptake efficiency. The data were subjected to proper statistical analysis of variance according to Snedecor and Cochran (1967) and the combined analysis was conducted according to Cochran and Cox (1957).Also Correlation coefficient and path analysis were calculated between all pairs of the studied traits under differenttreatments. Grain yield response index was calculated to spearedwheat genotypes into four groups according to their response and efficiency to nitrogen supply.The results can be summarized as follows:1- Seasons mean squares were significant for all traits under study.2-The effect of genotype mean squares was s nificant for all traits under study .Also the interaction between heat genotypes and seasons was significant.3-The genotypes No. 1 (Bhrikuti), 5 (CM85836) and 6 (ICW92)were recorded the highest mean values for grain y eld and nitrogen use efficiency.4-The variance of the effect of the irrigation treatments was significant for all the studied traits under study ex i ept for nitrogen utilization efficiency. Also the interaction be een irrigation treatments and seasons was significant for all t e studied traitsunder study except for nitrogen utilization efficie cy and harvest index.5-The highest mean values of the studied trait were detected when wheat plants received full irrigation (five in igations) in the thy season, compared with those received one or o irrigations, but at wet season (when rainfall was about 150 200 mm) two supplementary irrigations applied at tillering and at booting stage or at filling period were satisfactory. The distribution of rainfall was very important in this case.6-Mean Squares associated with interaction between genotypes and the number of irrigation treatments were significant for all thestudied traits. Grain yield and biological yield were noticeably increased by increasing irrigation treatments.7-Mean Squares associated with the effect of nitrogen fertilizer levels were significant for all the studied traits under study except for harvest index. Also the interaction between nitrogen fertilizer levels and seasons was significant for all the studied traits under study except for 1000-kernel weight and total nitrogen.8-Increases the nitrogen fertilizer levels from 72 to 216 Kg N/ha increased the total nitrogen in plant. but decrease the nitrogen use efficiency and its components.9-Mean Squares associated with the effect of interaction between irrigation treatments and nitrogen fertilizer levels were significant for all the studied traits under study except for number of kernels / spike and the interaction between irrigation treatments, nitrogen fertilizer levels and seasons was significant for all

the studiedtraits under study except for number of spikes /m2 and 1000-kernel weight.10-The interaction between genotypes and the number of irrigation treatments was significant for all the studied traitsexcept for number of spikes /m2. Grain yield and biological yield were noticeably increased by increasing irrigation treatments. The interaction between genotypes, the number of irrigation treatments and seasons was significant for all the studied traits except for number of kernels / spike.11-Genotypes No.1 (Bhrikuti), No.5 (CM85836), No.6 (1CW92) and 7 (Gemmiza 7) recorded the highest mean values for grain yield when the plants received five irrigations (6.798, 6.679, 6.584 and 6.445 t/ha respectively). Under low input irrigation thegenotypes No 5 and 6 were recorded the highest m an values for grain yield (5.482 and 5.578 t/ha).12- The interaction between wheat genotypes an the nitrogen fertilizer levels was significant for all the studied tr its except for number of spikes / m2 and the interaction be een wheatgenotypes, nitrogen fertilizer levels and seasons w s significant for all the studied traits.13-The highest mean values for grain yield were recorded by wheat genotypes No. 5 (CM85836), No.1 (Bluiku i), and No.6 (1CW92) when wheat plants were fertilizer with N3 (216 Kg/ha), whereas the genotypes No.1 (Bhrikuti), and No. 2 (CMBW90)gave the highest mean values for grain yield at N 1 •ates (72 Kg N/ha).14- The path coefficient analysis indicated that and r high input system the direct effect of number of spikes /m2 gay the highest values for variation in grain yield, followed by numb r of kernels / spike and 1000-kernel weight. Also under low inp t system the direct effect of number of spikes /m2 gave the h ghest valuewhereas the direct effect of number kernels /spike and 1000-kernel weight were equal values.15- For nitrogen use efficiency and its compone is the path coefficient analysis indicated that under all nitrogen fertilizer levels the direct effect of nitrogen uptake efficiency gave the highest values for variation in nitrogen use efficie cy but theeffect could be decreased with increasing nitrog n fertilizer levels.16-Grain yield response index calculated to clas ify wheat genotypes for their efficiency to absorbed nitroge into fourgroups, the results indicated that wheat genotypes No.1(Bhrikuti), No.2 (CMBW90), No.5 (CM85836), and No.6 (1CW92) can be used in breeding program to improving nitrogen use efficiency under low input system.