- Effect of some agricultural treatment on groth and yield of wheat and associated weeds

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Two field experiments were performed at the Research and Experimental center of Moshtohor, Faculty of Agriculture, Zagazig University, during 1993/ 94 and 1994/ 95 seasons to investigate the effect of some agricultural treatments on growth and yield of wheat and associated weeds. The soil texture was clay alluvial with a pH value of 8.17 and 2.3 % organic matter. The preceding summer crop was cotton in both seasons. Wheat variety Sakha 69 was sown on December 8 th and 10 th in the first and second seasons, respectively, Also, all herbicides used in the two experiments applied as post emergence after30 days from sowing.I- The first experiment:Two field experiments were carried out to investigate the effect of five levels of nitrogen fertilization (zero, 30, 60, 90 and 120 kg N/ fed.) and five weed control treatments (Brominal 1.0 L./ fed., Grasip 1.0 L./ fed., Brominal 1.0 L./ fed. + Grasip 1.0 L./ fed., hand-weeding twice after 30 and 60 days from sowing and unweeded control) on wheat growth, yield, yield components, technological properties of grains and the assoicated weeds.Results could be summarized as follows:I- Effect of nitrogen fertilization:1- Increasing nitrogen fertilizer rates caused an increase in weed infestation and increased the fresh and dry weight of weeds/ m2 at 50 and 80 days from sowing and at harvesting. 2-Increasing nitrogen fertilizer up to 120 kg N/ fed. significantly increased the plant height, number of stems and spikes/ m2 and spike length in combined analysis of two seasons.3-The number of grains/ spike was not affected by increasing nitrogen level, whereas the weight of grains/ spike was increased significantly by increasing nitrogen level up to 120 kg N/ fed.4-Increasing nitrogen fertilizer up to 120 kg N/ fed. significantly increased the 1000- grain weight.5-Increasing nitrogen fertilizer from 30, 60, 90 and 120 kg N/ fed. significantly increased grain yield/ fed. by 31.1, 44.7, 59.7 and 67.3 % as compared with the unfertilized control, but there was no significant difference between 90 and 120 kg N/ fed.6-Increasing nitrogen fertilizer up to 120 kg N/ fed. significantly increased straw yield/ fed. whereas, there were no significant differences between 60 and 90 or 90 and 120 kg N/ fed. The straw yield/ fed. was increased by 21.9, 34.8, 43.9 and 59.5 % with increasing the nitrogen level from 30, 60, 90 and 120 kg N/ fed. compared with the control treatment.7-The biological yield was increased by 24.5, 37.6, 48.3 and 61.7 % over the control with increasing the nitrogen level from 30, 60, 90 and 120 kg N/ fed., respectively. whereas, the differences between 60 and 90 kg N/ fed. failed to reach the significance level. 8-The grain moisture percentage markedly increased by increasing nitrogen level, whereas the grain ash percentage was significantly decreased by increasing nitrogen fertilizer.9-Increasing nitrogen fertilizer level from 30, 60, 90 and 120 kg N/ fed. increased grain protein percentage by 11.96, 18.02, 23.05 and 24.08 % and dry gluten percentage by 4.23, 7.53, 14.53 and 15.32 %, respectively as compared with the unfertilized controltreatment.10-Increasing nitrogen fertilizer from 30, 60, 90 and 120 kg N/ fed. increased the gas production by 10.6, 22.1, 29.1, and 33.0 % after 60 min and by 10.2, 15.0, 16.1 and 21.2 % after 120 min from fermentation, respectively as compared with the unfertilized controltreatment.11-Increasing nitrogen fertilizer from 30, 60, 90 and 120 kg N/ fed, increased the dough development time (min) by 7.9, 14.7, 23.0 and 30.9 % and the dough stability (min) by 12.7, 17.3, 29.0 and 34.7 % and the dough strength (cm) by 0.9, 10.4, 19.0 and 30.7 %, respectively as compared with the unfertilized control treatment.II- Effect of weed control treatments:1- All chemical weed control treatments and hand-weeding twice significantly reduced the fresh and dry weights of

weeds at different sampling dates (50 and 80 days from sowing and at harvesting time). Treatments could be arranged in a descending order with regard to their effect in reducing the total fresh weight of weeds at harvesting time as follows: Brominal + Grasip, hand-weeding, Brominal and Grasip, where the reduction in the total fresh weight of weeds was 100, 100, 94.8 and 84.7 % and the total dry weight of weeds by 100, 100, 94.2 and 86.9 %, respectively as compared with the unweeded treatment. Brominal + Grasip and Brominal alone as well as hand-weeding were the best treatments for weed control at different growth stages of wheat.2-Chemical weed control treatments increased plant height and spike length compared to the unweeded treatment. Brominal at 1.0 L./ fed. produced the tallest plant (89.95 cm) and spike length (8.91 cm). Hand-weeding and unweeded treatments gave the shortest plants and spike length.3-All weed control treatments significantly increased the number of stems and spikes/ m2 compared with the unweeded treatment. The most effective treatments could be arranged in a descending order with regard to their effect on number of stems and spikes/ m2 as follows: Grasip, Brominal, hand-weeding, Brominal + Grasip and unweeded treatment.4-Weed control treatments had no significant effect on number of grains/ spike in the combined analysis of two seasons.5-All weed control treatments significantly increased the grains weight/ spike and the 1000- grain weight compared to the unweeded treatment in the combined analysis of two seasons. Brominal + Grasip treatment gave the heaviest weight of grains/ spike (1.36 g) and 1000- grain weight (46.19 g).6-All weed control treatments significantly increased grain yield/ fed. as compared with the unweeded treatments. Grasip, Brominal, Brominal + Grasip and hand-weeding twice increased the grain yield by 20, 18.5, 17.1, and 13.1 %, respectively compared with the unweeded treatment.7-Brominal, Grasip, Brominal + Grasip and hand-weeding significantly increased the straw yield by 32.3, 31.0, 26.9and 16.0 %, respectively over the unweeded treatments.8-All weed control treatments significantly increased the biological yield/ fed. as compared with unweeded treatment. Brominal, Grasip, Brominal + Grasip and hand-weeding increased biological yield by 28.1, 27.6, 23.8, and 15.1 %, respectively compared withunweeded treatment.9-All weed control treatments had no significant effect on the percentage of grain moisture, ash and dry gluten of wheat grains.10-All weed control treatments increased grain protein percentage ascompared with unweeded treatment. Brominal + Grasip, Brominal,Grasip and hand-weeding increased the grain protein percentage by10.1, 6.4, 2.9 and 2.0 %, respectively compared with unweededtreatment. 11-All weed control treatments significantly increased the gas production after 60 and 120 min from fermentation. Application of Brominal + Grasip gave higher value of gas production after 60 and 120 min from fermentation (27.85 and 44.63 GU). On the other hand, unweeded treatment gave lower value of gas production (22.83 and 39.18 GU) after 60 and 120 min from fermentation,respectively.12- All weed control treatments significantly increased the mixograph.Weed control treatments could be arranged in descending orderaccording to their effect on mixograph as follows: Brominal +Grasip, Brominal, Grasip, hand-weeding twice and unweeded(control).III- Effect of interaction between nitrogen fertilizer and weed control treatments:The effect of interaction between nitrogen fertilization and weed control treatment had a significant effect on fresh and dry weight of narrow-leaf weeds (after 80 days from sowing and at harvesting time), fresh and dry weight of broad-leaf weeds after 80 days from sowing, spike length, 1000- grain weight and grain technological properties of wheat except moisture percentage. The interaction effect on the other studied characters on both weeds and wheat plants was notsignificant.1- The lowest fresh and dry weight of narrow-leaf weeds per unit area was recorded by weed control treatments under 120 kg N/ fed. and the lowest fresh and dry weight of broad-leaf weeds per unit area was obtained from Brominal + Grasip, Brominal and hand weeding twice under all levels of nitrogen fertilizer.2- The highest spike lenght was obtained from the combination ofBrominal 1.0 L/ fed.under 120 kg N/ fed, whereas the heaviest1000- grain weight was obtained by using the mixed of Brominaland Grasip by the maximum nitrogen fertilizer (120 kg N/ fed.).II- The second experiment:The experiment was carried out to investigate the effect of three seeding rates (45, 60 and 75 kg/ fed.) and five weed control treatments (Brominal 1.0L./ fed. Arelon 1.25 L./ fed., Grasip 1.0 L./ fed., hand weeding twice after 30 and 60 days from sowing and unweeded) on wheat growth, yield, yield components, technological properties ofgrains and the associated weeds.Results could be summarized as follows:I- Effect of seeding rates:1- The fresh and dry weights of weds/ m2

were significantly affected by seeding rates in combined analysis of two seasons in the early stages of wheat growth (50 and 80 days from sowing). The fresh and dry weights of weeds decreased by increasing the seeding rate. Increasing seeding rate from 45 to 75 kg/ fed. decreased the fresh and dry weights of weeds by 52.4 and 57.1 % at 50 days from sowing and by 72.7 and 76.2 % at 80 days from sowing and by 50.7 and 51.3 ',It) at harvesting time, respectively. 2-Seeding rates had no significant effect on plant height, spike length, number and weight of grains/ spike and 1000- grain weight atharvesting time.3-Increasing seeding rate from 45 to 75 kg / fed. increased significantly the number of stems and spikes/ m2 by 12 and 11.8 % in combined analysis of two seasons, respectively.4-Increasing seeding rate from 45 to 75 kg/ fed. caused insignificant increases in grains, straw and biological yield/ fed. in combined analysis of two seasons. The percentage of increases were 7.3, 4.3and 5.2 %, respectively.5-Seeding rates had no significant effect on grain moisture percentage and ash percentage in combined analysis of twoseasons.6-Increasing seeding rate from 45 to 75 kg/ fed. significantly increased grains protein and dry gluten percentages by 6.8 % and 28.1 %,respectively.7-Increasing seeding rate from 45 to 75 kg/ fed. significantly increased the gas production and mixograph.II- Effect of weed control treatments:1- The results showed clearly that Grasip at 1.0 L./ fed. was more efficient in controlling the narrow-leaf weeds than the other treatments at different growth stages. whereas, Brominal, at 1.0 L./ fed. was more efficient in controlling the broad-leaf weeds than the other treatments at 80 days from sowing and at harvesting time. On the other hand, Arelon at 1.25 L./ fed. surpass other treatments on controlling the weeds in the early growth stage of wheat (50 days from sowing). Treatments as to their effect at latter stage of growth could be arranged in a descending order as follows: hand-weeding, Brominal, Arelon and Grasip, the reduction in total fresh weight of weeds were 100, 98.3, 96.4 and 93.3 % and the total dry weight of weeds were 100, 98.2, 96.1 and 94.5 %, respectively compared with the unweeded treatment (control).2-Weed control treatments had no significant effect on plant height, spike length, number of stems and spikes/ m2, number and weightof grains/ spike and 1000- grain weight.3-Weed control treatments also had no significant effect on grains yield/ fed. compared with the control treatment (unweeded). However, these treatments increased grains yield/ fed. compared with unweeded treatment. The percentage of increases were 11.8, 8.0, 3.0, and 3.0 % by using Brominal, Arelon, Grasip and hand-weeding, respectively as compared with unweededtreatment.4-Controlling weeds in wheat field caused a significant increase in straw yield in combined analysis of two seasons as compared with the unweeded treatment. The percentage of increases in straw yield/ fed. were 12.9, 10.0 and 4.5, 2.8,% by using Arelon, Grasip, hand-weeding, and Brominal, respectively as compared withunweeded treatment. 5-All weed control treatments significantly increased the biologicalyield/ fed. as compared with the unweeded treatment. Thepercentage of increases in biological yield/ fed. were 20.8,12.9, 10.0 and 4.5 % by using Brominal, Arelon, Grasip andhand- weeding, respectively as compared with the unweededtreatment.6-Weed control treatments had no significant effect on grains moisturepercentage.7-All weed control treatments significantly increased the percentages of grain protein and dry gluten as compared with the control treatment (unweeded) in combined analysis of two seasons.8-All weed control treatments significantly increased the gas production (gasograph) after 60 and 120 min from fermentation. Brominal 1 L./ fed. gave the highest values (24.58 and 44.13 GU) after 60 and 120 min from fermentation. On the other hand, the unweeded treatment gave the lowest values of gas production (18.29 and 36.38 GU) after 60 and 120 min, respectively.9-All weed control treatments increased the mixograph. The weedcontrol treatments could be arranged in a descending orderaccording to their effect on mixograph as follows: Brominal,Arelon, Grasip, hand-weeding and unweeded (control).HI- Effect of interaction between seeding rates and weed control treatments: The effect of interaction between seeding rates and weed control treatments on wheat characters studied and associated weeds was not significant at 5 % level of significance, except on the fresh and dry weight of narrow-leaf weeds at 80 days from sowing, number of spikes/ m2, grains ash percentage, protein percentage, dry gluten percentage, gasograph and mixograph (dough development time, stability andstrength).