تأثير طرق الزراعة والتسميد وبعض معاملات مقاومة الحشائش على إنتاجية محصول القمح

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EFFECT OF SOWING METHODS, FERTILIZATION AND SOME WEED CONTROL TREATMENTS ON WHEAT PRODUCTIVITY

BY

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INTRODUCTION

Wheat (*Triticum aestivum* L.) is the most important cereal crop in the world, as well as in Egypt since it is stable food for humans. The total consumption of wheat is about 13* million tons, while the total wheat production is about 8.27 million tons (produced from 3.00 million fed.) with average grain yield 18.00 ardab/fed. in this season, therefore, there is a gap between the national need and the local wheat production, which means that Egypt still imports about 4.73 million tons annually. So, it is extremely important to search for the best cultural practices, such as sowing methods, fertilization weed control…etc. to increase wheat production.

It is well known that nitrogen is considered as one of the limiting factors to achieve the high yield of wheat crop. With the steadily increasing prices of nitrogen fertilizers and the pollution problems, the use of atmospheric nitrogen fixing microorganisms might reduce financial costs. Fixation as an alternative or supplementary source of nitrogen for wheat has been the major approach in soil fertility management of nitrogen for wheat.

Weeds are considered a great constraint in agriculture, particularly in wheat. Wheat is often infested with numerous types of weeds, which compete with crop plants resulting in grain yield depression. Getting red of weeds is achieved through direct methods such as herbicides application or by hand weeding and other indirect measures, such as agricultural practices as crop rotation, land preparation and sowing methods. Although weed management with herbicides is still dominant in many important agricultural areas of the world, there is strong indication that in the near future this will change. Herbicidal control of weed must be considered in combination with other improved agronomic practice such as sowing method.

Thus, this study aimed to study the effect of sowing methods, fertilization and some weed control treatments on wheat productivity under Upper Egypt conditions.

REVIEW OF LITERATURE

The review of literature about the effect of sowing methods, fertilization and some weed control treatments on wheat productivity divided into the three following parts to be easy reviewed:

I- Wheat associated weeds.

II- Growth, yield and yield attributes.

III- Grain quality.

I- Wheat associated weeds.

Kholosy *et al.* (1991), revealed that hand weeding twice decreased significantly the fresh weight of annual weeds by 91.1% as compared with the unweeded treatment.

Sharma *et al.* (١٩٩١), indicated that two hand weeding at ٣ and ٦ weeks after wheat sowing were most effective in controlling *Phalaris minor*, *Avena ludoviciana* as annual grassy weeds and *Anagallis arvensis, Melilotus indica*, *Chemopodium album* as annual broad leaved weeds.

Raffel and Fluh (1992) using Topik (clodinafop-propargyl) is a new herbicide for post emergence control of annual grasses in cereals at 30-60 g/ha have given good, reliable control of *Alopecurus myosuroides* and *Avena fatua* in winter wheat, durum wheat. The application is best when the weed grasses are at tillering stage Topik is compatible with several broadleaved weed herbicides.

Singh and **Ghosh (١٩٩٢),** revealed that hand-weeding at ٣٠ days after sowing gave insignificant reduction in the counts of *Avena sp.* compared with the weedy cheek.

Hassanien *et al.* (١٩٩٣), reported that the use of Topik ٢٤٪ at the rate of ٠,٢٣٨ l/ha. was promising treatment against wild oat, *Phalaris spp* and *Lolium spp* in wheat.

Salem *et al.* (١٩٩٣), reported that Herati (wet method) significantly decreased number and weight of wild oat in wheat.

Kaspar and **Fischbeck (١٩٩٤),** found that the nitrogen competition between weeds and winter wheat had a clear effect on the nitrogen absorption of winter wheat which was connected to yield losses and with increasing ripening of wheat the influence of nitrogen competition by dicotyledonous weeds is reduced.

Nandal and **Singh (١٩٩٤),** indicated that hand weeding at ٣٠ and ٦٠ days after planting proved significantly superior to weedy check for weed control.

Pandey and **Singh (١٩٩٤),** found that hand weeding at ٣٥ days after wheat sowing decreased the population of the following major weed species: *Avena fatua* from ٢٧ to ٣ plants/$m^{٢}$, *Phalaris minor* from ١٣ to ١ plant/$m^{٢}$, *Melilotus indica* from ٨ to ٣ plant/$cm^{٢}$, *Chenopodium album* from ١٨ to ١٢ plant/$m^{٢}$, *Crisium arvense* from ١٥ to ١٢ plant/$m^{٢}$ and *Anagalis arvensis* from ١٦ to ٤ plants/$m^{٢}$.

Abtali *et al.* (١٩٩٥), found that the use of ٠,٨ and ١,٠ l/ha of Clodinafop-propargyl gave ١٠٠٪ control of wild oat (*Avena spp.*) and canary grass (*Phalaris spp.*).

El-Bially and **Abd El-Samie (١٩٩٥),** noted that increasing nitrogen level from ٥٠ to ٧٥ kg/fed. increased significantly the dry weight of grasses and broad leaved weeds and resulted in significant increases in weed infestation reaching to ٤,٠, ٧,٥ and ٤,٤٪ in the dry weight of broad leaves, grasses and total weeds, respectively. Hand weeding twice (٣٠ and ٦٠ days

after sowing) was the most effective treatment against broad leaved and total weeds by providing ٩١,٢ and ٨٩,٩٪ reductions in the dry weight, respectively, comparing to unweeded control

Montazeri (١٩٩٥), showed that Clodinafop-propargyl at ٠,٠٦, ٠,٨ and ١,٠ ١/ha controlled *Avena Ludoviciana* more than other herbicides. For control of *Phalaris minor* and *Phalaris brachystachys*, Topik was the best.

Ormeno and **Diaz (١٩٩٥)**, found that clodinafop-propargyl at rates ranging from ٦٠ to ٨٠ g/ha, sprayed early or before the full tillering of weeds were effective for controlling wild oats and ryegrass in wheat.

Strachan (١٩٩٥), stated that the addition of Topik (clodinafop-propargyl) at rate of ١٢٥ ml of ٠,٢٤٠ g/l was very good for control black grass (*Alopecurus myosuroides*) and wild oat (*Avena fatua*) as well as annual ryegrass (*Lolium mualtiflorum*) and rough stalked meadow grass (*Poa trivialis*) up to the ٣ tillers stage in cereals.

El-Naggar (1996), showed that drilling wheat grains to a depth of 20 cm was the most successful method for reducing the fresh and dry weight of broad-leaved and grassy weeds, as well as the total number of weeds/m^2 in the first and second stages of crop growth in both seasons.

Angiras and **Vinod (١٩٩٦),** showed that hand-weeding at ٣٠ and ٦٠ days after sowing decreased the weeds dry weight.

Elian *et al.* (١٩٩٦), noted that clodinafop-propargyl (٠,٢٤ l/ha) controlled wild oats by ٩٢,٧-٩٩,٧٪.

Hassanein and **Kholosy (١٩٩٦),** stated that the addition of Topik ٢٤٪ EC at rate of ٠,٢٣٨ l/ha, Grasp at rate of ٢,٣٨ l/ha at ٣-٤ leaf stage of wheat

and hand weeding (twice) significantly reduced the fresh weight of wild oat/m^{2} by ٧١,٢, ٩٥,٩ and ٨٩,٨٪, respectively, compared with unweeded treatment.

Singh and **Singh (1996),** found that the dry weight of weeds was reduced by 45.7, 14.9, 26.9 and 74.6% by broadcast, close, normal and cross sowings, respectively, compared with the unweeded control.

Al-Marsafy *et al.* (1997a), illustrated that Topik 15% WP at 333 g/ha. gave the highest reduction for the annual grassy weeds.

Iqbal and **Wright (١٩٩٧),** indicated that the relative competitive abilities of wheat and weeds were influenced by nitrogen supply. At high nitrogen, *Sonchus arvensis* was more competitive than wheat, whereas *Phalaras minor* was less competitive than wheat. *Chenobodium album* was more competitive than wheat at both nitrogen levels (٦٠ and ١٢٠ kg N/ha). The rank order of competitive ability weed species was *C. album* > *P. minor* > *S. arrensis*.

Singh (١٩٩٧), found that weed density in plots given N (٤٠ or ٨٠ kg/ha) was ١١,٧٪ higher than untreated plots. Weed dry matter increased with increasing N rate.

Elian *et al.* (١٩٩٨), indicated that the percentage of the control of wild oats due to using Topik ٢٤٪ EC at ٠,٢ l/ha was ١٠٠٪, respectively, in wheat.

Abd El-Hamid (١٩٩٨) reported that hand weeding twice reduced the number and fresh weight of grass weeds which *Phalaris spp.* was represented over ٧٠٪ by ٥٠-٧٧٪ and ٦٥-٨٧٪, respectively, compared to unweeded control.

Nassar (1998), found that hand weeding twice at 30 and 45 days of wheat sowing reduced significantly dry weight of the annual weeds. (*Ammi*

majus, Anagallis arvensis, Beta vulgaris, Brassica kober, Chenopodium sp, Emex spinosis, Medicago polymorpha, Melilotus indica, Rummex dentatus), and *Sonchus oleraceus* as annual broad leaf weeds reduced by 61.2-74.8% and 63.5-95.9 % at 60 and 90 days of sowing, respectively. *Avena spp, Polypogen monspliensis, Phalaris minor, Lolium temulentum* and *Setaria sp.* as annual grassy weeds by 22.5-62.0% and 22.2-76.5% at 60 and 90 days of sowing respectively. On the other hand Topik at 100 cc/fed. reduced significantly dry weight of the previous grassy weeds by 84.1-94.3% at 60 days of sowing, as well as 34.4-97.8% at 90 days of sowing.

Salem *et al*. (١٩٩٨**)**, noted that the application of Topik at ٢٤٠ cc/ha gave excellent control for grassy weeds in wheat .

Yehia *et al.* (١٩٩٨**),** reported that the application of Topik EC at ٠,٢٤ l/ha gave the best control of wild oat in wheat.

Fakkar (١٩٩٩), mentioned that application of Topik ٢٤٪ EC at ١٠٠ cc/fed., and hand weeding twice(٣٠ and ٤٥ DAS) reduced significantly dry weight of grass weeds (*Avena fatua, Lolium multiflorum* and *Phalaris spp.*) by ٩٥,٣-٩٧,٧ % and ٨٩,١-٩٣,٠٪ at ٩٠ days of wheat sowing.

Pandey *et al.* (٢٠٠٠), showed that fertilizer levels at ٦٠،٨٠ and ١٦٠ kg/ha recorded significant higher weed count and weed dry biomass than the no fertilizer treatment (control).

Tenaw (٢٠٠٠), found that two hand weedings at ٣٠ and ٦٠ DAS were decreased broad-leaved weeds comprised ٧٣٪ of the total weed population.

Kico and **Ilias (٢٠٠١),** showed that split application of nitrogen (٥٠ and ١٠٠ kg/ha) caused a slightly increase in sterile oats dry weight compared to the control.

Abd El-Hamid and **Ghalwash (2002),** noted that Topik 15% WP at 333 g/ha. was effective against annual grassy weed in wheat fields.

Govindra *et al.* (2002), showed that *Phalaris minor* was controlled effectively due to application of clodinafop-propargyl at 50 and 60 g.a.i/ha.

Acciaresi *et al.* (٢٠٠٣), recorded that the highest N fertilizer (٠, ٥٠ and ١٠٠ kg/ha) rate decreased the weed biomass in wheat fields.

Anaam (2003), stated that drill method decreased significantly the dry weight of grass, broad-leaved weeds and total weeds compared to broadcast method.

Helal (٢٠٠٣), demonstrated that the application of Sinal at ٤٠ cc/fed., Topik ١٥٪ WP at ١٦٠ g/fed., Sinal plus Topik and hand weeding at ٣٠, ٤٥ days after sowing reduced significantly fresh weight of annual weeds.

Nassar (٢٠٠٣), stated that the application of Topik ٢٤٪ EC at rate ١٠٠ cc/fed. gave the highest reduction on fresh weight of grass weeds.

Abd El-Hamid (2004), revealed that sowing methods significantly affected annual weeds as Afir improved (false irrigation, one month before sowing/minimum tillage then afir broadcast) and Afir drilling sowing methods surpassed Afir broadcasting method in their effect on annual weed population. Those two methods reduced fresh weight of grassy weeds by 84.3 and 84.1% respectively as compared to Afir broadcasting method. The fresh weight of board leaf weeds were reduced by these sowing methods by 81 and 88%, respectively as compared to Afir broadcasting method.

Ashok *et al*. (2004), reported that the weed control efficacy of 50 g a. i. clodinafop/ fed. ranged between 78 and 96% on grassy weeds.

Bhullar and **Walia(2004),** revealed that post emergence application of clodinafop at its recommended dose (0.06 kg ha^{-1}) gave selective control *P. minor* and reduced its dry matter accumulation by 79.8%.

Ashok Yadav *et al.* (2005), found that Clodinafop applied 35 days after sowing in wheat at 45 and 60 g/ha. decreased the dry weight accumulation by wild oat by 77.4 - 88.2% during both years.

Ashok Yadav *et al.* (2005), noted that Clodinafop provided efficient control of grassy weeds predominated by wild oat (*Avena ludoviciana*).

Fakkar (2005), indicated that the application of Topik at 100 cc/fed., hand weeding once at 30 DAS, hand weeding twice at 30-45 DAS and hand weeding thrice 45-60-75 DAS decreased significantly the dry weight of grassy, broad-leaved and total weeds in both seasons. Also, the increasing N level from 50 to 75 and 100 Kg/fed. increased significantly the dry weight of grassy, broad-leaved and total weeds in both seasons

Jarwar *et al.* (2005), revealed that Topik [clodinafop] 15 % WP at 250 g/ha showed maximum weed control efficacy of 97.74 and 97.86% during 2001-02 and 2002-03, respectively.

Malik *et al.*(2005a), showed that clodinafop at 50 and 60 g/ha were very effective (85-90 %) against grassy weeds {mainly Avena ludoviciana (*A. sterilis* subsp .*Ludoviciana*) and Canary grass *(Phalaris minor*)}.

Nisha and **Chopra (2005),** reported that Clodinafop and controlled grassy and weeds by (88-90%).

Punia *et al.* (2005), found that of clodinafop + sulfosulfuron (3:1) at 60 g ha-1 provided 85-90% control of (*A .sterilis subsp. Ludoviciana*) and *Phalaris minor,* and 60% control of broadleaved weeds, such as *Chenopodium album, Melilotus indica* and *Rumex retroflexus*.

Bhat and **Mahal (2006),** illustrated that among weed control methods, chemical weed control with clodinafop 0.06 kg/ha and integrated weed

control (clodinafop 0.045 kg/ha + hand/mechanical weeding) proved significantly superior to hand/ mechanical weeding and weedy control**.**

Megahed and Daie (2006), noted that Topik 15% EC at rate of 140 g/fed. gave the lowest fresh weight (g/m^2) of weeds. The value of reduction percentage in fresh weight (g/m^2) due to using Topik was 84.6%.

Ismail *et al.* (2008), found that hand weeding twice reduced dry weight of annual broad, narrow and total weeds by 92.9, 94.7 and 99.3%, respectively in the first season and by 98.8, 99.2 and 93.0%, respectively in second season, compared to unweeded treatment

II-Growth, yield and yield attributes.

Eissa (١٩٩٠), observed that increasing N dose increased grain yield/ ha., number of spikes/m٢, spike length and plant height. Meanwhile, ١٠٠٠- grain weight was reduced.

Ellen (١٩٩٠), reported that increasing N level from ٤٠ to ٨٠ and ١٢٠ kg/ha. increased dry matter production, grain yield and number of grains/spike, but ١٠٠٠- grain weight fell.

Hayam Mahgoub (١٩٩٠), found that addition of ٦٠ kg N/fed. produced the tallest plants and spikes over the other levels in the first season. Also, addition of ٦٠ kg N produced the greatest grain yield/fed. and this was attributed with greatest number of spikes/m٢, number and weight of grains/spike in both seasons.

Walia *et al.*(1990), noted that *Avena sterilis* subsp. *Ludoviciana* proved more competitive than *Melilotus alba* and a little difference in grain yields was evident between the various levels of nitrogen (80, 120 and 180 kg/ha) applied.

Balyan *et al.* (١٩٩١), showed that natural infestations of wild oat (١٤٦–١٦٢ plant/m^{٢}) reduced winter wheat grain yield from control values of ٦٦٦٦ - ٦٩٤٣ kg/ha or by ١٧–٦٢ % depending upon cultivar.

Cudney *et al.* (١٩٩١**),** found that wild oat had a height advantage over wheat in the late season, resulting in shading and consequently yield reductions about ٤١٪ reduction by wild oat densities of ٨–١٢ plant/ft^{٢} compared to ٠,٠ plants).

Kirkland and Hunter (١٩٩١**),** studied the effects of *Avena fatua* density (٠, ١٥, ٣٠, ٥٠ and ١٠٠ plants/m^{٢}) on spring wheat. They found that wheat yield was decreased as *A. fatua* density increased yield in the absence of *A. fatua* competition ranged from ٢,٦٢ to ٣,٨١ t/ha, and in the presence of ١٠٠ *A. fatua* plants/m^{٢} from ١,٣٩ to ٢,٠٩ t/ha.

Omar *et al.* (1991), showed that the inoculation with *Bacillus polymexa* and *A. brasilense* can save 41.6% and 37.5% of nitrogen fertilizer, respectively.

Pandey and **Shende (**١٩٩١**),** stated that wheat grain yield increased significantly by application of nitrogen fertilizers and Azotobacter inoculation.

Fayed (١٩٩٢**),** indicated that grain weight/spike, increased significantly by increasing N level up to ١٦٠ kg/fed.

Ormeno (١٩٩٢**),** indicated that plots treated with clodinafop-propogyl gave best wheat yield compared with untreated plots which gave reduction in yield by ٣٧٪.

Peltenen (١٩٩٢), found that N increased the number of grains/spike, spikes/m^{٢} and ١٠٠٠-grain weight.

Shams El- Din and **El- Habbak (١٩٩٢),** showed that increasing N level from zero to ١٠٠ kg N/fed. increased significantly growth characters, yield components and grain yield/fed. They added that the rate of ٨٠ kg N/fed. recorded the highest values of plant height, number and weight of grains/spike, number of spikes/m^{٢}, and grain yield/fed. in both seasons. They also found that the superiority of ١٠٠ kg N/fed. appeared only on spike length, weight of spike and straw yield/fed. They concluded that the application of ٦٠, ٨٠ and ١٠٠ kg N/fed. increased grain yield/fed. by ٥١,٦, ٦٢,٦ and ٤٨,٨ % respectively compared with the control.

Singh and **Bajpai (١٩٩٢),** found that highest wheat yield was obtained with four hand weeding (٤٠١٨ kg/ha), one hand-weeding at ٥٥ DAS (٣٣٥٨ kg) and at ٧٠ DAS (٣٣٣٣ kg) compared to the weedy control (٣٢٨٥ kg). The number of grains/spike of wheat increased with weeding (٢ HW at ٢٥ and ٤٠ DAS). Hand weeding at ٤٠ days suppressed increases in ١٠٠٠-grain weight.

Vànovà (١٩٩٢), reported that the application of Topik ١٠٪ EC (CGA ١٨٤٩٢٧) at rate of ٨٠ g/ha enhanced yield by ٤,٩٢٪ compared to weedy check.

Abd El- Gawad *et al.* (١٩٩٣), showed that increasing N level from ٦٠ to ٨٠ kg/fed. caused a significant increase in plant height, spike length, ١٠٠٠-grain weight, grain, straw and biological yields.

Eissa *et al.* (1993), reported that broadcasting method decreased plant height and increased spike length, number of grains/spike and grains weight/spike. The highest grain yield/fed. was obtained from seeded plant in rows at 15 cm part.

Fayed *et al.* (١٩٩٣), found that plant height, spike length, spikes number/ $m^{٢}$, number and weight of grains/spike, ١٠٠٠-grain weight, grain and straw yields of wheat/fed. increased significantly with increasing N fertilizer up to ٨٠ kg N/fed. in both seasons. They added that the increases in grain yield/fed. were ١١٧,٥ and ٢١١٪ in the first season and ٢٠٢ and ٢٣٦,٥ % in the second season by raising N level from zero to ٤٠ and from ٤٠ to ٨٠ kg N/fed., respectively.

Hassanein *et al.* (١٩٩٣**),** recorded that the application of Topik ٢٤٪ EC at ٠,٢٣٨ l/ha increased wheat grain yield.

Hussein *et al.* (١٩٩٣), conducted a field experiment on two wheat varieties to investigate the effect of inoculation with *Azospirillum brasilense* as a biofertilizer under different levels of nitrogen fertilizer on yield. He found that grain yield was non-increased significantly due to inoculation of wheat variety Sakha ٦٩ with Azospirillum. Whereas decreases in grain yield were occurred upon biofertilization of wheat variety Sakha ٨.

Jadhao and **Nalamwar (١٩٩٣),** showed that hand weeding twice increased the grain yield by ٣٤,٦٧ and ١٣,٦١ % compared with the weedy control and hand weeding once, respectively.

Mirkamali (١٩٩٣**),** indicated that the application of clodinafop-propargyl at rate of ٠,٠٤٨ and ٠,٠٨ kg/ha. increased wheat grain yields

compared with unweeded control values. clodinafop-propargyl at ٠,٠٨ kg/ha, resulted in greatest yield increase (١٣٠ %).

O`Donovan and **Sharma (١٩٩٣),** reported that wheat yield losses increased with increasing wild oat populations.

Rizk (١٩٩٣), illustrated that the dry method (Afir drill) alone or plus Suffix at ١,٢٥ l/fed. after ٤٣ days from sowing increased significantly plant height, number of spikes/m^{٢}, ١٠٠٠ -grain weight and grain yield compared to (broadcast) method .

Salem *et al.* (١٩٩٣), noted that dry method (Afir drill) increased significantly wheat grain yield compared to wet (Herati) or dry (Afir broadcast) methods.

Satao *et al.* (١٩٩٣), indicated that hand weeding twice at ٢٠ and ٤٠ days after sowing resulted in the greatest yields in both years.

Shalaby *et al.* (١٩٩٣), reported that increasing N level from ٧٠ to ١٤٠ kg N/ha increased significantly grain yield, spike length, number of spikelets/spike and plant height in wheat. On the other hand, ١٠٠٠-grain weight was not significantly affected by N application.

Sulttan *et al.* (١٩٩٣), noticed that the application of ٦٠ kg N/fed. increased grain and straw yields of wheat cv. Sakha ٦٩, while the highest number of spikes/m^{٢} was recorded under ٧٥ kg N/fed. On the other hand, they added that the tallest plants recorded at ٩٠ kg N/fed.

Abd EI-Haleem (١٩٩٤), reported that inoculated wheat plants with Syrialin recorded higher grain and straw yield than uninoculated ones in both silty clay loam and sandy soils.

Abd El-Gawwad *et al.* (١٩٩٤), in demonstration wheat fields cleared that the seed drill treatment and wet method (Herati) gave the highest grain yield by ٧,٣ and ٦,٧ t/ha, respectively.

El-Ganbeehy (١٩٩٤), conducted two field experiments to study the effect of inoculation with N_2-fixing bacteria along with nitrogen fertilization on three wheat cultivars. The results revealed that grain yield from all fertilization treatments were increased significantly over the control. The percent increase in grain yields ranged from ١٨,٤ to ٣٦,٨ % for biofertilizer and/or mineral N-fertilization. Fertilization treatments had significant effects on number of spikelets/spike in the two seasons, and number of grains/spike, spike length and plant height in one season. Number of spike/m^2 and ١٠٠٠-grain weight were not significantly affected by experimental treatments.

Gouda *et al.* (1994), found that the tallest plant height (109.9), the largest number of spikes/m^2 (440.9), and the highest grain yield (14.74) ardab/fed. were obtained by using dry planting methods (Afir).

Hassan and Hassan (1994), reported that seeded wheat grains on sloping of furrows significantly increased number of tillers, fresh and dry weight of plant, spike weight, 1000- grain weight, grain, straw and biological yield as well as harvest index. Whereas number of plans/m^2 was decreased significantly with broadcast methods.

Hoda, Abdel-Azeem (١٩٩٤), found that growth of wheat plant increased grown in different desert soils by inoculation with a biofertilizer containing a P-dissolver (*Bacillus megatherium* var. *phosphaticum*). She found that without P-dissolver caused reduced growth and yield of wheat.

Nandal and **Singh (**١٩٩٤**),** recorded that hand weeding (at **٣٠** and **٦٠** days after planting) increased the grain yield of wheat compared with the weedy check.

Pandey and **Singh (**١٩٩٤**),** indicated that hand-weeding at **٣٥** days after sowing increased weight of grain/spike, **١٠٠٠**-grain weight and grain yield of wheat compared with weedy check.

Salem ***et al.*** **(**١٩٩٤**),** concluded that hand weeding increased significantly number of tillers/plant, number of spikes/m^2, number of spikes/plant, grain weight/spike and grain wheat yield (ardab/fed.).

Satao and **Padole (١٩٩٤),** indicated that hand weeding twice at ٢٠ and ٤٠ days after wheat sowing increased leaf area/plant from ٢,٩ to ٣,٤ dm^2, numbers of leaves/plant from ١٣,٤ to ١٧,١ and tillers/m^2 from ٣٢٠ to ٤٥٥ at ٤٠ DAS, plant height from ٤٩,٨ to ٥٨,٢ cm, total dry matter/plant from ٣,٩ to ٩,٩ g and wheat grain yield from ١٤,٥ to ٢٧,٤ q/ha at harvest.

Sharivastava ***et al.*** **(**١٩٩٤**),** noted that hand weeding at **٣٠** to **٤٥** days after sowing gave slightly grain yield than one weeding at **٣٠** days after sowing (**٢,٨٨** vs .**٢,٧٩** t/ha.)

Weaver ***et al.*** **(**١٩٩٤**),** showed that winter wheat yield losses increased with increasing *Avena fatua* density.

Abo-Shetaia and **Abd El-Gawad (١٩٩٥),** found that plant height, number of blades, dry weight of stems+ sheaths and blades, spike length, number of spikelets/ spike, ١٠٠٠-grain weight, weight of grain/spike and grain

and straw yields/fed. were increased significantly by increasing N doses from ٥٠ to ٧٠ and ٩٠ kg N/fed. for Giza ١٦٣ and Sakha ٦٩ wheat cultivars.

Ahmed (١٩٩٥), found that Azotobacter enhanced wheat plant height, flag leaf area, tillering, yield components and grain and straw yields/fed.

Al-Marsafy *et al*. (١٩٩٥), found that the reduction in wheat grain yield due to wild oat infestation is attributed to the reduction in number of spikes/plant and spikes weight/plant.

El-Far and **Allam (1995),** stated that the drill method increased significantly the 1000-grain weight and grain yield/fed. as compared to broadcast method.

El-Shanshory (1995), studied the interaction among *Azotobacter chroococcum, Azospirillum brasilense, Streptomyces mutabilis* and their effect on wheat development. He concluded that inoculation of the soil with *A. chroococcum, A. brasilense* and *S. mutabilis* could improve early plant growth, N_2-fixing potential, plant growth regulators production and antimicrobial substances production that could be useful against pathogenic organisms.

Kaawther Rabie *et al.* (1995), reported that grain of wheat inoculated with *Azotobacter chroococcum* and/or *Azospirillum brasilense* increased plant height, percentage of fruitful tillers, number of spike/m^2 and grain yield/plant.

Shams El-Din and **Abdrabou (١٩٩٥),** stated that significant increases in spikes number/$m^٢$and number and weight of grains/spike by inoculating wheat grains by $N_٢$-fixing bacteria. ١٠٠٠-grain weight was decreased due to bacterial inoculation.

Soliman *et al.* (١٩٩٥), found that seed inoculation with non-symbiotic N_2-fixing bacteria can save about ٢٥ kg N/fed. without much affecting the grain yield. Also, they reported that inoculation with Azospirillum. and or Azotobacter significantly enhanced N- uptake by both grains and straw under different N application levels and the maximum N uptake was reached at the rate of ٥٠ kg N/fed.

Abd El-Monem (١٩٩٦), showed that percentage increase in straw and grain wheat yield due to nitrogen (٠, ٧٠, ١٤٠ and ٢١٠ Kg N/ha) application ranged from ٥٩ to ٩٥٪ compared to non fertilized plots.

Agrawal *et al.* (١٩٩٦), observed that the grain yield of wheat was significantly higher in hand weeding plots (٤,٢٢٦ t/ha) than in herbicide treated plots (٢,٩٠٥ - ٣,٨٣٧ t/ha).

Al-Marsafy *et al.* (١٩٩٦), indicated that wild oat/canary grass mixture was ٨,٢٥ t/ha in the check (weed competition all season), which gave a reduction in wheat yield of ٤٧,٧٪ compared to the yield of the weed-free treatment.

Eissa (١٩٩٦), showed that N levels had highly significant effects ١٠٠٠- grain weight, plant height, spikes/m^2, spike length, spikelets/ spike, number and weight of grains/spike, harvest index and grain and straw yields.

Elian *et al.* (١٩٩٦), noted that the addition of Topik ٢٤٪ EC at ٠,٢٤ l/ha. and hand weeding twice increased significantly wheat grain yield compared with the check treatment .

Hassanein *et al.* (١٩٩٦), recorded that the integrated wild oat control with the use clover as preceding winter cutting crop with sowing wheat by dry

or wet methods (Afir drilling or Herati) and the addition of Grasp at rate of ٢,٣٨ l/ha. after one month from sowing increased grain yield by ٢,٠٧٨ t/ha. compared with weedy check.

Hassouna and **Hassanein (١٩٩٦),** in Egypt stated that local wheat varieties were grown in the calcareous soil of Burg El-Arab region, west of Alexandria, Egypt, wheat grains were inoculated with the commercial biofertilizer (Halex) in the presence or absence of nitrogen fertilizer. The increase percent of inoculation plus nitrogen fertilizer were ٦٧ and ٨٠٪ for number of tillers and grain yield of Giza ١٥٥, respectively. The increase percent of inoculation plus nitrogen fertilizer, for number of tillers and grain yield of Sakha ٨, were ٢٠ and ١٠٧, respectively. Combination of inorganic and biofertilizers showed best growth and yield components.

Ibrahim and EL-Khanagry (١٩٩٦), found that wild oat species decreased significantly spike weight, ١٠٠٠-grain weight and grain yield of wheat. However, wheat/*Avena spp* competition significantly decreased the number of panicles and tillers of wild oat plant.

Mady (١٩٩٦), concluded that dry matter accumulation at different growth stages in wheat was increased with increase nitrogen levels (٣٠, ٦٠ and ٩٠ kg/fed.). The increase in N level markedly increased LAI, plant height, grain and straw wheat yields, (harvest index in one season), number of spikes/$m^{٢}$, spikes length, number of spikelets/spike, and number and weight of grains/plant.

Mitkees *et al.* (١٩٩٦), in Egypt, conducted four field experiments at four different locations of new lands. The first three were to compare the response inoculated versus uninoculated wheat grown under different

nitrogen fertilization levels, i.e. ١١٩, ٢٣٨, and ٣٥٧ kg N/ha. The inoculation was in the form of commercial biofertilizer Microbin. Results revealed that the inoculation of wheat with Microbin increased grain yield at all nitrogen fertilization levels and different locations.

Omar *et al.* (١٩٩٦), indicated that inoculation with *Bacillus polymexa* and *Azospirillum barsilense* and inorganic nitrogen fertilization had positive effect on grain yield of wheat. He added that inoculation with *B. polymexa* with ٧٥ kg N/fed. increased the grain yield of wheat up to ١٤٪.

Ray *et al.* (١٩٩٦), revealed that hand weeding twice at ٢٥ and ٤٢ days after sowing gave the highest grain yield by ٢,٨٣ t/ha. compared to unweeded check in wheat.

Yehia *et al*. (١٩٩٦), found that the application of Topik at ٠,٢٤ l/ha gave the best results in grain yield than hand weeding twice (٣٠ and ٦٠ DAS) in wheat.

Zaghloul *et al.* (١٩٩٦), revealed that growth and yield parameters of wheat were higher when grains were inoculated with *A. brasilense* than with inorganic fertilizer alone.

Zahir *et al.,* (1996), noted that seed inoculation increased grain yield by 38.5% and straw yield 18.8% compared with the uninoculated control.

Abd El-Ghany (1997), applied 0, 30, 60 and 90 kg N/fed., to wheat. Plant height, number of leaves/plant, leaves area/plant, stems+sheaths, blades and spikes dry weight/plant increased with increasing N level up to 90 kg/fed. Also, he found that spike length, number of spikelets/spike, number of spike/m^2 and 1000-grain weight increased with increasing nitrogen fertilizer level up to 60 kg N/fed only, whereas grain weight/spike, grain, straw and biological yields were significantly increased up to 90 kg N/fed.

Al-Marsafy *et al.* (١٩٩٧a), illustrated that wet method (Herati) was better than dry method (Afir drilling) in increasing wheat grain yield. They added that the application of Grasp at rate of ٢,٣٨ l/ha and hand weeding at ٤٥ and ٦٠ DAS increased grain yield compared to unweeded check.

Attallah and **EI-Karamity (١٩٩٧),** reported that inoculated wheat plants with Syrialin recorded higher grain and straw yields than uninoculated ones in both silty clay loam and sandy soils.

Cheema *et al.* (1997), reported that the crop losses due to weed infestation were estimated by 10-50% or even to complete crop failure based on the type and state of weedy infestation.

Elanchezhian and **Panwar (1997),** found that the photosynthetic rate, chlorophyll content and grain yield were higher in inoculated plants.

Fares (1997), noted that inoculation with N_2-fixers increased significantly wheat plant growth characters i.e plant height, plant dry weight, leaf area and flag leaf area.

Iqbal and Wright (1997), stated that the decrease in grain dry weight at low N (20 Kg N/ha) was mainly due to a significant decrease in the number of spikes/plant. They also, concluded that the effect of low nitrogen was to decrease the relative yield of wheat and increase the relative yield of weeds.

Moharram *et al.* (1997), revealed that the inoculation with *Bacillus polymyxa* together with organic and inorganic nitrogen application increased the dry weight g/plant and N_2-fixed mg/plant.

Ruppel and **Merbach (1997**), illustrated that the bacterial strain inoculated affected plant growth, nitrogen uptake and the amount of biologically fixed nitrogen.

Toro *et al*. (1997), reported that biological fertilization with N2-fixing and phosphate dissolving microorganisms are of great importance in increasing crop production.

Al-Marsafy *et al*. (١٩٩٨), indicated that where rate *Avena spp Phalaris spp*. mixture was ٧,٨٥ t/ha the reduction in wheat yield was estimated by ١٩,٨٪.

Atia and **Aly (١٩٩٨),** indicated that grain, straw and biological wheat yield/fed., responded to nitrogen increments up to ٦٦,٦ kg N/fed. in both seasons, plant height responded to N fertilizer up to highest tested level (١٠٠kg N/fed.), but application of ٦٦,٦ kg N/fed. recorded higher number of spikes/m^{٢}.

Badawy et al. (١٩٩٨), found that significant effect of Azospirilla inoculation was more pronounced on grain yield in the treatment of ٤٠ kg N/fed.

Bhattarai and **Hess(1998)**, noted that Azospirillum inoculation enhanced the development of roots and shoots in the early growth stages of wheat, which may be one of the factors responsible for the yield increases.

Elian *et al.* (١٩٩٨), found that the application of Topik at rate of ٠,٢٤ l/ha and hand weeding gave significant effect in the grain yield of wheat compared to check treatment.

Hamed (١٩٩٨), indicated that inoculation wheat grains with *Azotobacter chroococcum* recorded higher values of plant height, spike weight, number of spikes/m^{٢} and straw and grain yields/fed.

Hasssanein *et al.* (١٩٩٨), noted that sowing methods (Herati and Afir drill) and hand weeding increased grain yield compared to the out demonstration fields.

Khamis and **Metwally (1998)** revealed that yield of wheat and N uptake were increased by incorporation of organic materials inoculated with microbial decomposers and Azotobacter in the soil, but this increase was not significant.

Kotb (١٩٩٨), reported that inoculation of wheat grains with *Azospirillum brasilense* under application of ٥٠ kg N/fed. increased significantly number of spikes/$m^{٢}$, number of grains/spike, grain weight/spike, ١٠٠٠-grain weight and grain and straw yields/fed.

Mitkees *et al.* (١٩٩٨), studied the response of wheat grain yield to different levels of nitrogen applications under biofertilization with $N_{٢}$-fixing bacteria in the form of the commercial product Microbin. Results indicated that biofertilization could save about ٧١-٢١٤ kg N/ha while increasing yield with ٥-٣٧٪. Thus, the recommended nitrogen application under biofertilization may be kept ١١٩-٢٣٨ kg/ha (٤٢-٨٤٪) according to the location and irrigation system.

Nagla (١٩٩٨), cleared that the higher values of plant height, number of tillers/$m^{٢}$, spike length, number of grains/spike, ١٠٠٠-grain weight, grain weight/spike, wheat grain yield and straw yield were obtained from hand weeding twice and bromxynil at ٢٤٠ g plus Clodinafop-propargyl at ١٣٥ g a.i./fed.

Nassar (١٩٩٨), noted that sowing methods (no- tillage, Herati, Afir drill and broadcast) affected significantly on total plant weight, grain weight/plant,

number of tillers/plant, number of spikes/m٢, ١٠٠٠- grain weight and grain yield (ardab/fed.) in the two seasons. Also, the application of Clodinafop-propargyl at ٢٤ g a.i./fed. and hand weeding twice (٣٠, ٤٥ DAS) were significantly affected on number of grain/spike, grain weight/plant and grain yield in both seasons and ١٠٠٠-grain weight in second season compared with unweeded check.

Panwar and **Elanchezhian (1998),** showed that the grain yield/plant was significantly higher Azospirillum treated plants than the uninoculated control.

Sharief *et al.* (١٩٩٨), revealed that inoculation of wheat grain with Azospirillum bacteria (Syrialin) resulted in marked increases in plant height, spike weight, number of grains/spike, ١٠٠٠-grain weight and grain and straw yields/fed.

Walia *et al.* (1998), stated that application of Clodinafop at 120 ml/ha increased the grain yield by 68.7 % over the unweeded control and 34.1% over a hand hoeing twice treatment.

Yehia *et al.* (١٩٩٨**),** indicated that the application of Grasp EC at ٢,٣٨ l/ha., Topik EC at ٠,٢٤ l/ha., Topik WP at ٠,٣٣ Kg/ha. and Topik WP at ٠,٣٨ Kg/ha. gave the highest grain yield compared to the unweeded control.

Brar *et al.* (1999), indicated that application of Clodinafop at 0.1 l/ha increased grain yield of wheat by 54.1 and 238.5 %over two hand hoeing and control treatments respectively**.**

Fakkar (١٩٩٩**),** showed that the application of Grasp ١٠ % EC at ١,٠ l/fed., Topik ٢٤ % EC at ١٠٠ cc/fed. and hand weeding twice at ٣٠, ٤٥ days after sowing had a significant effect on number of tillers/plant, number of spikes/plant, grain weight/spike, spike length, number of grain/spike number

of spikelets/spike, number of spikes/m^{2}, ١٠٠٠-grain weight, straw yield t/fed. and grain yield (ardab/fed.) in wheat. But, sowing methods (Afir drill and Herati) were not significant on yield and yield and yield components.

Gopal Singh *et al*. (1999), noted that inoculation with Azotobacter increased yield from 4.81 to 5.01 t./h.

Nisha *et al.* (1999), estimated that weeds compete with plants for nutrients, water, light and space producing a decrease in grain reduction amounted to 30.7%.

Said *et al.* (١٩٩٩), noted that increasing nitrogen levels from ٣٠ to ٤٥, ٦٠ and ٧٥ kg /fed., increased significantly plant height, flag leaf area, spike length, number of spikelets/spike, number of grains/spike, ١٠٠٠-grain weight, number of spikes/m^{2}, grain and straw wheat yields/fed.

Sultan *et al.,* (1999), concluded that inoculation of wheat grain with *Azospirillum Sp*. markedly increased plant height, No. of grain/spike, grain weight/spike, 1000-grain weight as well as grain and straw yields/fed.

El-Borollosy *et al.* (2000), reported that biofertilizers have the ability to access a major part of nutrients for growing plants along with growth promoting factors, these benefits plays an effective role in reduction of chemical fertilization and also results in higher crop yield.

Kushwaha and **Singh (2000),** found that two hand weedings at 30-60 days after sowing gave a similar crop yield to that obtained when keeping the crop free of weeds for the entire growing season

Panwar and **Singh (2000),** found that both the biofertilizers (*A. brasilense* or *Bacillus subtilis)* increased leaf area, chlorophyll concentration, total biomass production and grain yield compared with untreated control.

Sadek and **Yousef (٢٠٠٠),** indicated that ٢١٤ Kg N/ha (٧٥٪ of recommended dose) in presence biofertilization (Azottin) was sufficient to achieve the highest grain yield and saved ٧١ Kg N/ha., furthermore, this treatment exceeded the control treatment (٢٨٦ Kg N/ha without biofertilization) by ٠,٥٢ ton /ha

Sharief *et al.* (٢٠٠٠), reported that biological fertilization of Syrialin + Phosphorin + ٥٠kg N/ fed. significantly resulted in tallest plants, highest values of flag leaf area, number of grain/spike, heaviest grain weight, grain and straw yield/fed.

Tenaw (2000), evaluated one hand weeding at 30 days after emergence (DAE), one hand weeding at 60 DAE and two hand weedings at 30 and 60 DAE. They found that hand weeding twice increased grain yield in wheat.

Yadav *et al* (2000), showed that yield attributes like plant height, biomass and grain yield increased due to inoculation with Azotobacter strains with and without added nitrogen**.**

Al-Marsafy *et al.* (2001), indicated that the reduction yield of grain wheat due to *Avena fatua* competition for the whole season was 47.7% weedy free for whole season gave the highest significant value of grain yield (17.62 ardab/fed.).

Elwan *et al.* (2001) suggested that adaptability between both non-conventional mineral fertilization and inoculation of Syrialin (B. polymexa) is required to obtain maximum yield under field condition.

Bassal *et al.* (٢٠٠١), indicate that flag leaf area, plant height, number of spikes/$m^{٢}$, spike length, number of spikelets/spike, number of grains/spike, grain weight/spike, ١٠٠٠-grain weight as well as straw and grain yields/fed. were significantly affected by biofertilization.

El-Ganbeehy *et al.* (٢٠٠١), noted that increasing nitrogen rate to ٢١٦ kg N/ha gave the highest grain wheat yield (٩,٣ and ٨,٢٧ t./ha. in both seasons), accompanied with increasing in number of spikes/m٢, number of grains/spike and ١٠٠٠-grain weight in both seasons.

Singh and **Saha (2001),** revealed that two hand weeding resulted in maximum grain yield (2860 Kg/ha).

Abd El-Hameed (2002), noted that plant height, spike length, grain weight/spike, 1000-grain weight and spike number/m^2 showed positive gradual responses to inoculation of Syrialin.

Abd El-Maksoud (2002), reported that the inoculation the biofertilizers increased the productivity of wheat crop from grain yield/fed. by 12.3 % as a result of increasing leaf area/plant, flag leaf area, total dry weight/plant, spike length and number of grain/spike.

Abd El-Razik (2002), estimated that inoculation with (Syrialin) as the source of bacteria *B. polymexa* was significantly affected plant height (cm), number of spike/m^2, spike length (cm), number of spikletes/spike number of grains/spike.

Chhokar and **Malik, (٢٠٠٢),** showed that both *P. minor* and *R. dentatus* are highly competitive weeds and can cause drastic yield reduction under heavy infestation. The yield reduction by weeds in wheat may be up to ٨٠٪ depending upon weed type, density, timing of emergence, wheat density, wheat cultivar and soil and environmental factors.

Dobbelaere *et al.* (2002), obtained that inoculation was found to affect early plant and root development, plant and root dry weight, grain yield and the N-uptake efficiency of plants.

El-Kalla *et al.* (2002), found that the biological fertilizer of Syrialin+

Phosphorin (400 g/fed.) + 40 m3 farmyard manure maximized flag leaf area, plant height, number of tillers and spike/m2, spike length, grain weight/spike, grain and straw yields/fed. compared with other fertilizer treatments.

Galal and **Thabet (2002),** revealed that grain yield of wheat plants was increased significantly by the application of soybean residues and inoculation with *A. brasilense*.

Mohammed (٢٠٠٢), concluded that the moderate level of mineral N-fertilizer (٨٠ kg N/fed.) and appropriate bio-N-fertilization along with application of suitable composted organic manures are satisfied the demands of well crop production without much affecting the optimum crop yield.

Shrief and **Nassar (2002),** indicated that 50 weed/m^2 at one month from sowing decreased number of spikes by 5.4% and wheat production by 6.7% compared to the weed free treatment. Meanwhile, 100 weed/m^2 decreased number of spikes and wheat productivity by 14.6 and 14%, respectively compared to the weed free treatment.

Singh *et al.* (2002), indicated that inoculation of Azospirillum increased the plant vigor, grain yield and total biomass in all wheat varieties as compared with the control.

Anaam (2003), mentioned that drill method increased significantly plant height, number of spike/m^2, weight of grains/spike, 1000-grain weight, grain and straw yields/fed.

Bacilio *et al*. (2003), indicated that inoculation of wheat seeds with *A. brasilense* but not with *A. lipoferum* increased significantly plant growth parameters (height, shoot and root dry weight) over control plants grown in soil-compost mixtures.

Behl *et al.* (٢٠٠٣), revealed that inoculation of *Azotobacter chroococcum* led to increase in flag leaf area, number of grains/spike, ٢٥٠ grain weight, grain and biological yield/plant.

Helal (٢٠٠٣), found that the application of Topik at ١٦٠ g/fed. and hand weeding at ٣٠, ٤٥ days after sowing increased significantly plant height, spike length, ١٠٠٠-grain weight number of spikes/m^{٢}, grain yield /fed., straw yield t./fed. and biological yield /fed., in wheat.

Nassar (٢٠٠٣), indicated that the application of Topik at ١٠٠cc/fed., and hand weeding at ٣٠, ٤٥ days after sowing increased significantly plant height, spike length, number of grains/plant, weight of grains/plant, weight of grains/spike and grain yield.

Abd El-Hamid (2004), found that the highest grain yield were obtained by Afir drilling or Afir improved compared with Afir broadcast.

Bhullar and **Walia(2004),** revealed that post emergence application of Clodinafop at its recommended dose(0.06 kg ha-1) resulting to 128.9% increase in wheat grain yield.

Ibrahim *et al.* (٢٠٠٤), found that inoculation wheat grains with Syrialin at the rate of ٧٥٠ gm/fed. recorded the highest main value of plant height, flag leaf area, No. of tillers/m^{٢}, spike length, No. of spikes/m^{٢}, No. of grains/spike, grains weight/spike ١٠٠٠-grain weight as well as grain and straw yield/fed.

Rathod and **Vadodaria (٢٠٠٤),** indicated that hand weeding at ٢٠ and ٤٠ DAS significantly highest grain wheat yield.

Santa *et al.* (2004), illustrated that maximum grain yield for wheat was

achieved with the treatment inoculated with Azospirillum and supplemented with 100% nitrogen of the recommended dose.

Singh *et al.* (2004), obtained that Clodinafop residues were not detected in any of the wheat straw, grain and the harvest soil samples, treated with clodinafop-propargyl.

Fakkar (2005), showed that the using of Topik at 100 cc/fed., hand weeding once at 30 DAS, hand weeding twice at 30-45 DAS and hand weeding thrice 45-60-75 DAS increased significantly the weight of spike, weight of grain/spike, number of spikes/m2, 1000-grain weight and grain yield/fed. He added that increasing N-level from 50 to 75 and 100 kg/fed. increased significantly the weight of spike, weight of grain/spike, number of spikes/m^2, 1000-grain weight and grain yield/fed.

Hussain *et al.* (2005), found that the inoculation of Azotobacter increased the grain yield by 9.7-19.6%. Biofertilizer application was optimum when applied with 80 kg N/ha, increasing the grain yield by 5.78 and 3.25 quintal/ha over the uninoculated control. [1 quintal=100 kg].

Jarwar *et al.* (2005), revealed that the maximum wheat grain yield of 3285.71 and 3071.42 kg/ha was obtained in Topik 15 WP at 250 g/ha during both years.

Malik *et al.* (2005b), noted that the grain yield of the inoculated plots was increased due to increase in tillering capacity and ear size, producing higher number of grains.

Nisha and **Chopra (2005),** reported that tank mixtures of Clodinafop and Fenoxaprop-P with Carfentrazone increased significantly grain yield of wheat better than the other treatments.

Tippannavar *et al.* (2005), showed that dual seed inoculation with *A. chroococcum* isolates on cultivars on both species of durum wheat cultivars resulted in significant increase in plant height and dry matter content.

El-Afandy (2006), indicated that, sowing wheat grains on sloping of furrows or rows increased significantly spike length, No. of spikletes/spike, No. of grains/spike, grain weight/spike, 1000-grain weight, No. of spikes/m^2, grain yield/fed., straw yield/fed., biological yield/fed. and harvest index as compared with broadcast and drill method.

El-Afandy *et al.*, (2006), indicated that increasing nitrogen fertilization levels increased significantly wheat growth, yield and yield components i.e (plant height, spike length, number of spikelets/spike, 1000- grain weight, number of spikes/m^2, grain, straw and biological yield).

Abd El-hady *et al.* (٢٠٠٦), estimated that applying ٨٠ kg N/fed.+ biofertilization with *Bacillus polymexa* exerted significant effect on no. spikes /$m^٢$ and no. grain/spike. Which surpassed those obtained by applying ٨٠ kg N/fed.

Abd El-Maaboud *et al.* (2006), illustrated that using N biofertilizer (Syrialin) produced about 78% of wheat grain yield compared with using 100 kg N/fed.

Mansour *et al.* (٢٠٠٦), showed that significant increases in plant dry weight, grain and straw yield as well as nitrogen uptake by wheat plants either with increasing the rate of mineral nitrogen or with inoculation by tested $N_٢$-fixers. In addition, the dual inoculation with A*zotobacter chroococcum* and *Azospirillum brasilense* performed significantly greater followed by single inoculation with Azotobacter and Azospirillum. At any level of N- fertilizer, the inoculated treatments gave the much higher straw and grain yields than the uninoculated one.

Omar and **Aioub (2006),** illustrated that treating wheat crop by two herbicides (Topic for narrow leaves and Sinal for broad leaves)

gave the highest value of plant height, number of spikes/m^2, number of grains/spike, grain weight/ spike, 1000-grain weigh, grain and straw yields/fed.

Shaban and Helmy (2006), illustrated that dry weight of straw and grain were significantly increased as a result of applied different nitrogen rates and Serialine.

El-Garhi *et. al.*, (2007), reveled that dry weight of plant after 55 days from sowing increased slightly, by seed inoculation of Serialine. They added that straw yield was positively significantly affected by inoculation alone or with chemical fertilizers.

Gafaar (2007), found that the application of 60 kg N/fed gave the highest value of spikelets/spike, 1000- grain weight, number of grain /spike, grain and biological yields/fed., while 90 kg N/fed. gave the highest value of plant height, spike length, number of spikes/m^2 and straw yield.

Khaled (2007), indicated that the application of 70 Kg N/fed. + Nitroben significantly increased plant height, flag leaf area, number of spikes/m^2, number of grain/spikes, 1000-grain weight, grain weight/spike, straw, grain and biological yields as well as harvest index.

Ismail *et al.* (2008), revealed that sowing methods had significant effect on plant height, spike length, number of spikes/m^2 and grain yield (ard./fed) in both seasons

III- Grain quality.

El-Desoky (١٩٩٠), reported that chemical and mechanical weed control treatments did not significantly affect on protein percentage.

Wimschneider *et al*. (١٩٩٠), found that the protein content of wheat grain was reduced by ٥,٥٪ with high density of wild oat.

Omar et al. (١٩٩١), showed that seed inoculation also increased nitrogen content of grain as compared with un-inoculated control.

Peltenen (١٩٩٢), illustrated that incrassating N levels improved bread-making quality, rated according to protein content in the flour and wet gluten content.

Abd- El- Gawad *et al.* (١٩٩٣), showed that increasing N level from ٦٠ to ٨٠ kg/ fed. caused a significant increase grain protein content.

Sultan *et al.* (١٩٩٣), indicated that nitrogen levels markedly increased crude protein percentage in wheat grain up to ٩٠ kg N/fed.

El-Zein (١٩٩٤**)**, stated that increasing nitrogen rates increased wheat grain protein content.

Salem *et al.* (١٩٩٤**),** found that hand weeding increased significantly protein percentage compared with weedy check.

Ayoub *et al.* (١٩٩٥), found that applying ٠, ٦٠, ١٢٠ and ١٨٠ kg N/ ha to wheat, grain protein concentration and grain protein yield increased consistently with increasing N fertilizer and with split N application.

El-Bially and **El-Samie (١٩٩٥),** stated that the increasing nitrogen level from ٥٠ to ٧٥ kg N/fed. with weed control treatments increased significantlythe protein percentage in grain wheat.

Mady (١٩٩٦), added that the increase in nitrogen levels (٣٠, ٦٠ and ٩٠ kg/fed.) increase protein percentage in grain.

Omar *et al.* (١٩٩٦), indicated that inoculation with *Bacillus polymexa* and *Azospirillum barsilense* and inorganic nitrogen fertilization had positive effect on grain protein content of wheat. He added that inoculation with *B. polymexa* with ٧٥ kg N/fed. increased the grain protein content up to ١٥٪.

Zaghloul *et al,* (١٩٩٦), showed that plant N, P and K concentrations were highest with *A. brtisilense*+٤٥ kg N/fed.

Zaher (١٩٩٦), noted that increasing nitrogen fertilizer levels from ٣٠ to ٦٠, ٩٠ and ١٢٠ kg N/fed., increased significantly protein percentage.

Abdul-Galil *et al.* (١٩٩٧), showed that wheat grain protein content were increased significantly up to ١٠٠ kg N/fed.

Mohamed *et al*. (١٩٩٧**),** indicated that sowing methods (Herati and Afir method) did not gave any significant differences in protein content in grain wheat

Kotb (١٩٩٨), found that the N-fertilization of wheat plants increased the protein quantity in the grain.

Nagla (١٩٩٨), in wheat grain**,** showed that the application of bromoxynil at ٢٤٠ g a.i/fed. plus clodinafop-propargyl at ١٣٥ g a.i./fed. recorded the highest protein contents compared to untreated check.

Sharief *et al.* (١٩٩٨), revealed that inoculation of wheat grain with Azospirillum bacteria (Syrialin) resulted in marked increases in grain protein content.

Fakkar (١٩٩٩), noted that the application of Topic at ١٠٠ + ١٠٠ cc/fed. increased protein percent by ٣٤,٢ and ٢٥,١٪ in the first and second season respectively compared with unweeded treatment.

Said *et al.* (١٩٩٩), found that increasing nitrogen levels from ٣٠ to ٤٥, ٦٠ and ٧٥ kg/fed., increasing wheat grain protein percentage.

Sultan *et al.,* (1999), concluded that inoculation of wheat grain with

Azospirillum Sp. markedly increased protein percentage.

Rodrigues (2000), illustrated that N content in the grain increased significantly in the bacteria-inoculated treatments in which N was not added. This increase in N content in the grain with inoculation was probably due to higher N uptake after anthesis.

Sharief *et al.* (٢٠٠٠), reported that biological fertilization of Syrialin+Phosphorin+٥٠ kg N/ fed. significantly resulted in highest protein percentage and protein yield/ fed.

El-Ganbeehy *et al.* (٢٠٠١), found that increasing nitrogen levels above ١٤٤ kg N/ha increasing wheat grain protein content.

Khalil and **Mirvat (٢٠٠١),** stated that the urea treatment increased crude protein percentage in grain wheat.

Abd El-Razik (2002), showed that inoculation with (Syrialin) as the source of bacteria *B. polymexa* had no significant effect on protein content.

El-Kalla *et al.* (2002), found that the biological fertilizer of Syrialin+Phosphorin (400 g/fed.) 40 m^3 farmyard manure maximized protein percentage in wheat grains.

Anaam (2003), showed that addition of Grasp at 1.0 l/fed. and hand weeding twice (30 and 45 DAS) increased protein content in grain wheat as compared to unweeded treatment.

Jaya and **Bhatnagar (2005),** obtained that the highest protein content of 15.00% on dry matter basis (averaged among cultivars) was obtained with N at 100 kg/ha+Azotobacter treatment.

Shobha and **Mishra (2005),** found that residues of clodinafop-propargyl were not detected in wheat grains samples when the herbicide was

applied at 60 and 120 g/ha. However, when the herbicide was used at 240 g/ha, residue amounting to 0.0089 ppm was detected in wheat grains, although this level did not exceed the permissible amount recommended by FAO/WHO (0.1 and 0.5 ppm for wheat grain and straw, respectively.

Abd El-hady *et al.* (٢٠٠٦), found that crude protein content in grains was increased significantly due to fertilization with ٨٠ kg N/fed. plus biofertilization with *B. polymexa*.

El-Afandy (2006), indicated that, sowing wheat grains on sloping of furrows or rows increased significantly protein %.

Gafaar (2007), reported that the application of 90 kg N/fed gave the highest protein percentage in grains.

Khaled (2007), reported that the protein content in wheat grain increased significantly by applying 70 Kg N/fed. + Nitroben.

MATERIALS AND METHODS

Two filed experiments were conducted at Shandaweel Agricultural Research station, Agricultural Research Center, Sohag Governorate (Upper Egypt) in both successive growing seasons of 2006/07and 2007/08 to investigate the effect of some sowing methods, fertilization and some weed control treatments on wheat productivity and accociated weed species. Wheat variety Giza 168 (*Triticum aestivum* L.) was sown in both seasons. The preceding summer crop was maize (*Zea maize* L.) in both seasons. The soil mechanical and chemical analysis of the experimental sites are presented in Table (1) according to **Jackson (1973).**

Table (1): The properties of the soil analysis (Mechanical and chemical properties).

Soil property		2006/2007	2007/2008
Physical analysis	**Sand %**	55.91	30.64
	Silt%	11.84	24.26
	Clay%	32.25	45.10
	Soil texture	Sand loam	Clay loam
Chemical analysis	**Organic mater %**	1.89	1.32
	Total N(%)	1.26	0.80
	Soluble ions (meq/100g soil (1:5))		
	CO_3^-	2.86	1.72
	HCO_3^-	7.92	9.50
	Cl^-	6.00	2.80
	$SO_4^=$	1.39	1.10
	Ca^{++}	1.55	1.02
	Mg^{++}	1.00	2.90
	Na^+	7.00	4.60
	K^+	0.26	0.35
	EC (ds/m)(1:5)	0.39	0.84
	pH(1:1)	7.60	7.90

The sowing dates were 30th and 26th of November in the first and second season, respectivly, and harvested in 15th and 13th of May in the first and second season, respectivly·

Phosphorus fertilizer was applied as calcium super phosphate (15.5% P_2O_5) during soil preparation at the rate of 150 kg/fed. The other normal agricultural practices of wheat growing were done as recommended.

A split-split-plot design with three replicates was used and the treatments arranged randomly. Sowing methods were allocated in the main plots, the fertilizer in the sub-plots and weed control treatments in the sub-sub plots as follows: -

A-Main plots: Three sowing methods:

١. Afir drill: Soil was blowed twice then wheat grains were hand drilled in rows 15 cm apart rows and irrigation was followed.
٢. Afir braodcast: Soil was blowed twice then grains were broadcasting and compacting was done and irrigation was followed.
٣. Afir in furrows method with 60 cm apart ridge. Planting on double row sloping bed and the top of the ridge.

B-Sub plots: four levels of nitrogen fertilizer :

١. 50 kg Nitrogen/fed.
٢. 75 kg Nitrogen/fed.
٣. Serialin (biofertilizer) + 50 kg Nitrogen/fed.
٤. Serialin (biofertilizer) + 75 kg Nitrogen/fed.

Nitrogen fertilizers were applied in the form of urea (46.5 % N) in three portions (1/5) after planting and befor irrigation, (2/5) before first irrigation (2/5) before the second irrigation in the mineral fertilization treatments and in two equal portions before the first and second irrigation in mineral + biofertilizer (Serialin) treatments.

Wheat grains were inoculated with Serealin (Azotobacter and Azospirillium bacteria as acommercial packet) was inoculated with garins before sowing at rate of 1kg/ 60 kg of grains.

C- Sub-sub plots: five weed control treatments were used as follows:-

١. Derby 17.5% SC at rate of 30 cc*/fed. one day before the first irrigation (21 days after sowing).

٢. Topik 15 % WP at rate of 140 g/fed. at 40 days after sowing.

٣. Derby 17.5% SC at rate of 30 cc/fed. one day before the first irrigation + Topik 15 % WP at rate of 140 g/fed. at 40 days after sowing .

٤. Hand weeding twice (at 30 and 45 days after sowing.)

٥. Unweeded (Control).

The experiment included 180 plots (expermental unit), the plot area was 10.5 m^2 (3.5 m lenght × 3 m width). Seeding rate was used as recommended (60 kg/fed.). Herbicides were sprayed by Cp3 knapsack sprayer with 200 litter of water/fed. Trade, common and chemical names of herbicides used in the experimental plots were presented in Table (2).

Table (2): Trade, common and chemical names of the herbicides used in the experiment.

Trade name	Common name	Chemical name
1-Derby 17.5% SC	A-Florasulam + B- Flumetsulam	A- N-(2,6-difluorophenyl)-8-fluoro-5 methoxy [1,2,4] triazolo [1,5-c] pyrimidine-2-sulfonamide B- 2,6-difluoro-5-methyl [1,2,4]triazolo-[1.5-α] pyrimidine.2-sulfonamide
2-Topik 15% WP	Clodinafop- propargyl	{2-propnil (®-2-[4-(5-chloro-3-fluoro-2-pyridnyloxy)phenoxy]-propionate}

Data recorded:-

*** cc = cubic centemeter.**

The following data were recorded:

I-Weed survey:-

Weed were hand pulled from one square meter randomly of each plot after 75 and 105 DAS (days after sowing), then identified into species and classified into the following two groups:

1- Annual narrow-leaved weeds.

2- Annual broad-leaved weeds.

3- Total annual weeds: combined of annual narrow-leaved weeds (grassy weeds) and annual broad-leaved weeds.

Weeds were air dried for 3 days then oven dried at 70 Cº for 24 hours. Therefor, the dry weight of annual broad, narrow-leaved weeds and total annual weeds were estimated as g/m^2.

Table (3) Family, scientific and commmon names for weeds recorded in wheat crop during 2006/07 and 2007/08, survey in the field experiments.

No	Family	Scientific name	Common name
Annual narrow-leaved weeds			
1	Poaceae	*Avena spp.*L.	Wild oat
2	Poaceae	*Lolium spp.*	Ryegrass
3	Poaceae	*Phalaris spp.*L.	Canary grass
Annual broad-leaved weeds			
4	Cruciferae	*Brassica nigra* L.	Kaber mustrad
5	Chenopodiaceae	*Chenopodium sp.*	Lamb squarters
6	Asteraceae	*Sonchus oleraceus* L.	Annual sowthistle
7	Fabaceae	*Medicago polymorpha* L.	Toothed medik
8	Fabaceae	*Melilotus indica* L.	Sweet clover
9	Polygonaceae	*Emex spinosus* L.	Spiny emex
10	Umbelliferae	*Ammi majus* L.	Common bishop
11	Polygonaceae	*Rumex dentatus L.*	Sheep sorrel

II-Growth characters:

At 90 and 120 days after sowing (DAS), ten plants were randomely taken from each plot to determine the following characters:

١- **Plant height (cm)**: Determined by the length of the main stem from the soil surface up to the top of plant.

٢- **Flag leaf area (cm^2):** Data on length and width of flag leaf were recorded by taking a sample of ten flag leaves per enter in each plot and calculated from (leaf length × maxim width × 0.75), according to **Richards (1983).**

Plants were taken from 1/4 m^2 to determine the following three characters.

٣- **Dry weight of leaves g/m^2.**

٤- **Dry weight of stems g/m^2.**

٥- **Total dry weight g/m^2.**

Plant parts were kept in separate paper bags where the dry weight was recorded after oven drying at 70 C° for 24 hour.

III-Yield and yield attributes: -

١. **Plant height (cm**): determined by the length of stem from the soil surface up to the top of main spike.

٢. **Spike length (cm):** determined by the length of spike.

٣. **Number of spikeletes/spike.**

٤. **Spike weight(g).**

٥. **Number of grains/spike.**

٦. **Grain weight/spike(g).**

٧. **Number of tillers/m^2**:calculated by counting all tillers/m^2.

٨. **Number of spikes/m^2:** number of spikes in one square meter of each plot.

٩. **Number of non fertile tillers/m^2:** calculated by substrating Number of spikes/m^2 from Number of tillers/ m^2.

١٠. **1000-grain weight (g)**.

١١. **Grain yield (ardab/fed):** the grain of each plot (10.5 m^2) was weighted and the mean grain yield (ardab/fed.) was calculated.

١٢. **Straw yield (ton/fed.):** determined by weighting the biological yield in each plot then substrating the grain weight for the whole plants. Results were expressed as ton/fed.

IV-Protein content:-

Protein percentage: Protein determination as carried out by the improved Kjeldhal method of **A.O.A.C (1990)** which modified by distilling the ammonia into sataroted boric solution and titration was carried out by using standard acid (hydrocloric acid). Protein percentage was calculated by multiplying the total nitrogen in wheat meal × 5,7.

V-Correlation analysis.

Statistical analysis:-

All data were statistically analyzed according to technique of analysis of variance (ANOVA) for the split-split plot design as mentioned by **Gomez and Gomez (1984)** by means of "MSTAT-C" computer software package and least significant differences revised (L.S.D.) at 5% level of probability was calculated for compare between treatments means.

RESULTS AND DISCISSION

Occurrence of weeds is becoming a big problem in wheat fields. Weed control can be achieved through improving some agricultural practices (such as crop rotation, land preparation, fertilization and sowing methods), chemical (herbicides) and mechanical methods (hand weeding). Thus, this study aimed to study the effect of some sowing methods, fertilization and some weed control treatments on wheat associated weeds, growth characters, yield, yield components and grain quality in wheat.

The effect of sowing methods, fertilization and weed control treatments as well as their interactions are presented and discussed under the following topics:

I. Associated weeds.
II. Growth characters.
III. Yield and yield components.
IV. Grain quality.
V. Correlation analysis.

I-Associated weeds:

1. First survey (75 DAS):-

1. a. Dry weight of narrow- leaved weeds (g/m^2):-

The effect of sowing methods, fertilization and weed control treatments as well as their interactions on dry weight of narrow- leaved weeds (g/m^2) at 75 days after sowing in 2006/07 and 2007/08 is presented in Table (4).

Sowing methods significantly affected the dry weight of narrow-leaved weeds in both seasons. Afir in furrows and Afir drill sowing methods gave the lowest values of dry weight of narrow-leaved weeds in both seasons, whereas, these methods reduced dry weight of narrow-leaved

weeds by 29.32 and 26.6, respectively in the first season and by 29.8 and 24.7%, in the second season, as compared with Afir broadcast. These results are in harmony with the finding of **Rizk (1993), El-Naggar (1996), Mohamed *et al*. (1997), Singh** and **Singh (1996) and Anaam (2003).**

Fertilization increased significantly the dry weight of narrow-leaved weeds (g/m^2) in both seasons. In the first season, nitrogen levels at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed. + Serialin increased the dry weight of narrow- leaved weeds by 55.8, 31.5 and 19.3%, respectively and by 50.6, 32.2 and 18.3% in the second season as compared with 50 kg N/fed. This increment may be due to the necessity of nitrogen to cell structure, function of protoplasm, cell division and plant growth which lead to increase the dry matter accumulation. These results confirmed the results obtained by **El-Bially** and **Abd El-Samie (1995), Singh (1997), Pandy *et al.* (2000) and Kiko** and **Ilias (2001).**

All weed control treatments gave significant reduction on the dry weight of narrow-leaved weeds (g/m^2) in both seasons. In the first season the reduction percentages of the dry weight of narrow- leaved weeds by Topik, Derby + Topik, and hand weeding twice were 86.0, 84.0 and 82.8%, respectively as compared with untreated plots. In the second season the reduction percentages in the dry weight of narrow- leaved weeds by Topik, Derby + Topik, and hand weeding twice were 91.6, 87.4 and 88.3%, respectively as compared with untreated plots. These results are in agreement with those obtained by **Raffel** and **Flüh (1992), Hassanein *et al*. (1993), Strachan (1995), Nassar (1998), Abd El-Hamid** and **Ghalwash (2002), Helal (2003)** and **Megahed** and **Die (2006).**

The interaction between sowing methods and fertilization was significant on dry weight of narrow- leaved weeds in both seasons. The highest reduction of narrow- leaved weeds obtained from Afir in furrows method under 50kg N/fed. in both seasons.

The interaction between sowing methods and weed control treatments was significant in both seasons. In first season, the lowest value of narrow-leaved weeds (10.18 g/m^2) obtained from Afir drill method with Topik. Meanwhile, in second season, the lowest value of narrow- leaved weeds (7.45 g/m^2) obtained from Afir in furrows method with Topik followed by Afir drill method with Topik at 140 g/fed. (8.65 g/m^2).

Fertilization × weed control interactions significantly affected the dry weight of narrow-leaved weeds at 75 days after sowing in both seasons. The highest reduction of narrow- leaved weeds obtained from 50 kg N/fed. with Topik in both seasons.

1. b. Dry weight of broad- leaved weeds (g/m^2):-

Table (5) show the effect of sowing methods, fertilization, weed control treatments and their interactions on dry weight of broad-leaved weeds (g/m^2) at 75 days after sowing in 2006/07 and 2007/08.

Sowing methods had a significant effect on dry weight of broad- leaved weeds at 75 days after sowing in both seasons. The lowest value for dry weight of broad-leaved weeds (g/m^2) was obtained from Afir in furrows and Afir drill methods in both seasons. The reduction percentages by these methods were 24.0 and 12.6%, respectively as compared Afir broadcast method in the first season. Meanwhile, the reduction percentages by these methods were 22.0 and 16.9%, respectively as compared Afir broadcast method in the second season. These results are in agreement with those obtained by **Rizk (1993), Salem *et al.* (1993), El-Far** and **Allam (1995), Singh** and **Singh (1996), Anaam (2003) and Abd El-Hamid (2004).**

Nitrogen levels with bifertilization increased significantly the dry weight of broad leaved weeds (g/m^2) in both seasons. In the first season nitrogen levels at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed. + Serialin increased the dry weight of broad- leaved weeds by 54.5, 30.5 and 19.7%, respectively as compared with 50 kg N/fed. In the second season the increment percentages were 40.6, 27.8 and 18.5%, respectively as compared with 50 kg N/fed. Same findings were reported by **El-Bially and Abd El-Samie (1995), Pandey *et al.* (2000) and Fakkar (2005).**

All weed control treatments gave a significant effect on reducing the dry weight of broad-leaved weeds (g/m^2) in both seasons. In the first season the application of hand weeding twice, Derby and Derby + Topik reduced the dry weight of broad-leaved weeds by 96.0, 95.6 and 93.6%, respectively as compared with un weeded treatment. In the second season the reduction percentages of the dry weight of broad-leaved weeds were 93.8, 96.0 and 93.5% by hand weeding twice; Derby; and Derby + Topik, respectively as compared with untreated plots. Similar results were also reached by **Kholosy *et al*., (1991), Sharama *et al*., (1991), El-Bially** and **Abd El-Samie (1995), Angrias (1996), Nassar (1998) and Tenaw (2000).**

The interaction between sowing methods and fertilization was significant on their effect on dry weight of broad-leaved weeds in the second season only. The lowest value of broad-leaved weeds obtained from Afir drill method under 50kg N/fed. in the second season.

The interaction between sowing methods and weed control treatments was significant in both seasons. The lowest value of broad- leaved weeds (5.13 g/m^2) obtained from Afir in furrows method with hand weeding twice followed by Afir broadcast method with Derby (5.24 g/m^2) in first season. In the second season the lowest value of broad- leaved weeds (6.27 g/m^2) obtained from Afir in furrows method with Derby followed by Afir drill method with Derby (7.22 g/m^2) as compared with unweeded under Afir

broadcast method.

Fertilization× weed control treatments interaction was significantly affected on dry weight of broad- leaved weeds at 75 days after sowing in both seasons. The highest reduction of narrow- leaved weeds obtained from 50 kg N/fed. with Derby 30 cc/fed. in both season.

Sowing methods× fertilization× weed control treatments interaction was significant in the first season only, the lowest values of broad-leaved weeds (2.20 g/m^2) obtained from Afir in furrows method under 50 kg N/fed. with Derby.

1. c. Dry weight of total annual weeds (g/m^2):-

The effect of sowing methods, fertilization and weed control treatments as well as their interactions on dry weight of total annual weeds (g/m^2) at 75 days after sowing in 2006/07 and 2007/08 are presented in Table (6).

Sowing methods had a significant effect on dry weight of total annual weeds at 75 days after sowing in both seasons. Afir in furrows and Afir drill methods reduced dry weight of total annual weeds by 24.9 and 19.2%, respectively compared with Afir broadcast method in the first season. In the second season, the reduction percentages were 25.0 and 19.9%, respectively as compared with Afir broadcast method. The previous findings of sowing methods on weeds were in agreement with **El-Far** and **Allam (1995), Anaam (2003), Abd El-Hamid (2004) and Ismail *et al.*, (2008)**

Nitrogen levels with bifertilization gave a significant effect on the dry weight of total annual weeds (g/m^2) in both seasons. Increasing

nitrogen fertilization levels increase the dry weight of total weeds (g/m^2). In the first season nitrogen levels at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed. + Serialin increased the dry weight of total annual weeds (g/m^2) by 55.1, 31.0 and 18.9%, respectively compared with 50 kg N/fed. In the second season the increment percentages were 44.2, 29.4 and 18.4%, respectively as compared with 50 kg N/fed. These results are in line with those obtained with **Walia *et al.*(1990), Fayd *et al*., (1993), Singh (1997) and Khalil** and **Mirvat (2001).**

All weed control treatments gave a significant effect on dry weight of total annual weeds (g/m^2) in both seasons. In the first season the application of Topik, Derby, Derby + Topik, and hand weeding twice significantly decreased the dry weight of total annual weeds by 41.7, 54.1, 90.1 and 90.5%, respectively compared to unweeded treatment. In the second season the application of Topik, Derby, Derby + Topik, and hand weeding twice reduced the dry weight of total annual weeds by 28.1, 59.0, 91.4 and 91.9%, respectively compared to weedy check treatment. These results are in agreement with those obtained by **Angrias (1996), Abd El-Hamid (1998)**, **Nassar (1998), Fakkar (1999) Tenaw** and **workayha (2000), Helal (2003) and Bhat** and **Mehal (2006).**

The interaction between sowing methods and fertilization was not significant on dry weight of total annual weeds in both seasons.

The interaction between sowing methods and weed control treatments had a significant effect on reducing the dry weight of total annual weeds in both seasons. All sowing methods with all weed control treatments gave a significant reduction of total annual weeds, compared to broadcast method with untreated plots (305.23 g/m^2). Under all sowing methods, Derby + Topik and hand weeding twice gave the highest value of reduction.

The interaction between fertilization and weed control treatments had significant effect on reducing the dry weight of total annual weeds at 75 days

after sowing in both seasons. The application of Derby + Topik and hand weeding twice gave the best result in respect to the dry weight of total annual weeds under all fertilization treatments.

Sowing methods× fertilization× weed control treatments interaction was significant in the first season only, the lowest values of total annual weeds (11.80 g/m^2) obtained from Afir drill method under 50 kg N/fed. with Derby + Topik.

2- Second survey (105 DAS):

2. a. Dry weight of narrow- leaved weeds (g/m^2):-

The effect of sowing methods, fertilization, weed control treatments and their interactions on dry weight of narrow- leaved weeds (g/m^2) at 105 days after sowing in 2006/07 and 2007/08 is presented in table (7).

Sowing methods had a significant effect on dry weight of narrow-leaved weeds in both seasons. Afir in furrows and Afir drill methods reduced significantly the dry weight of narrow- leaved weeds in both seasons, the reduction percentages were 38.2 and 14.9%, respectively as compared with Afir broadcast methods in the first season. Whereas in the second season the reduction percentages were 18.4 and 7.0% , respectively as compared with Afir broadcast methods. Similar results recorded by **Singh** and **Singh (1996), Hasssanein *et al.* (1998), Anaam (2003), Abd El-Hamid (2004) and Ismail *et al.*, (2008).**

Fertilization had significant effect on the dry weight of narrow- leaved weeds (g/m^2) in both seasons. In the first season, at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed. + Serialin increased significantly the dry weight of narrow- leaved weeds by 34.1, 20.8 and 12.2%,

respectively, as compared with 50 kg N/fed. In the second season the increment percentages were 41.7, 24.2 and 17.5%, respectively, as compared with 50 kg N/fed. Similar results were obtained by **Walia *et al.* (1990), Fayed *et al.* (1993), El-Bially** and **El-Samie (1995), Singh (1997), Khalil** and **Mirvat (2001) and Kiko** and **Ilias (2001).**

Most of weed control treatments decreased significantly the dry weight of narrow- leaved weeds (g/m^2) in both 2006/07 and 2007/08 seasons. The addition of Topik, Derby + Topik and hand weeding twice decreased significantly the dry weight of narrow-leaved weeds by 90.1, 87.7 and 87.1%, respectively, compared with untreated plots (200.8 g/m^2). Meanwhile, in the second season the reduction percentages by Topik, Derby + Topik and hand weeding twice were 92.0, 88.4 and 89.1%, respectively, compared with untreated plots (227.65 g/m^2). These results are in agreement with those obtained by **Singh** and **Ghosh (1992), Hassanein *et al*., (1993), Abtali *et al.* (1995), Montazeri (1995), Ormeno** and **Diaz (1995), Al-Marsafy *et al.*(1997), Elian *et al.* (1998), Abd El-Hamid (1998) and Megahed** and **Die (2006).**

The interaction between sowing methods and fertilization was significant on dry weight of narrow- leaved weeds in second season only. The highest reduction of narrow- leaved weeds obtained from Afir in furrows method under 50kg N/fed.

The interaction between sowing methods and weed control treatments had a significant effect on reducing the dry weight of narrow- leaved weeds in both seasons. All sowing methods with all weed control treatments gave a significant reduction of dry weight of narrow-leaved weeds, compared to broadcast method with untreated plots (238.98 g/m^2). Under all sowing methods, Topik, Derby + Topik and hand weeding twice gave the highest reduction of dry weight of narrow-leaved weeds in 2006/07 and 2007/08 seasons.

The interaction between fertilization and weed control treatments had

significant effect on reducing the dry weight of narrow-leaved weeds (g/m^2). The application of Topik, Derby + Topik and hand weeding twice attained the best result in respect to the dry weight of narrow-leaved weeds under all fertilization treatments.

Sowing methods× fertilization× weed control treatments interactions significant in the second season only, the lowest values of narrow- leaved weeds (6.9 g/m^2) obtained from Afir in furrows method under 50 kg N/fed. with Topik.

2. b. Dry weight of broad- leaved weeds (g/m^2):-

Table (8) shows the effect of sowing methods, fertilization, weed control treatments and their interactions on dry weight of broad-leaved weeds (g/m^2) at 105 days after sowing on 2006/07 and 2007/08.

Sowing methods affected significantly on dry weight of broad- leaved weeds in both seasons. The reduction percentages due to using Afir in furrows and Afir drill methods were 22.9 and 10.1%, respectively, compared with Afir broadcast method, in the first season. Whereas in the second season the reduction percentages were 26.1and 11.54%, respectively, compared with Afir broadcast method. This results are in agreement with the findings of **Singh** and **Singh (1996), Nassar (1998), Fakkar (1999), Anaam (2003), Abd El-Hamid (2004) and Ismail *et al.*, (2008).**

Fertilization had significant effect on the dry weight of broad-leaved weeds (g/m^2) in 2006/07 and 2007/08 seasons. In the first season, increasing nitrogen fertilization level to 75 kg N/fed. + inoculation with Serialin increased the dry weight of broad-leaved weeds by 24.8, 17.4 and

8.4% as compared with 50 kg N/fed., 50 kg N/fed. + Serialin and 75 kg N/fed. respectively. While in the second season the increment percentages were 22.3, 14.1 and 8.3%, respectively. These results are in harmony with those obtained by **Walia *et al.*(1990), El-Bially** and **El-Samie (1995), Singh (1997), Panday *et al*. (2000), Khalil** and **Mirvat (2001) and Fakkar (2005).**

All weed control treatments reduced significantly the dry weight of broad-leaved weeds at 105 days after sowing -except for Topik- in both seasons. The addition of Derby, Derby + Topik and hand weeding twice gave a significant reduction percentages of the dry weight of broad leaved weeds by 88.3, 85.3 and 85.3%, respectively, as compared with untreated plots (253.36 g/m^2), in the first season. In the second season the reduction percentages were 91.6, 89.3 and 88.9%, respectively as compared with untreated plots (293.57 g/m^2). These results are generally in agreement with those obtained by **Sharama *et al.,* (1991), Raffel** and **flüh (1992), Strachan (1995), Angrias (1996), Nassar (1998), Tenaw** and **workayha (2000), Abd El- Hamid** and **Ghalwash (2002) and Megahed** and **Die (2006).**

The interaction between sowing methods and weed control treatments had a significant effect on reducing the dry weight of broad-leaved weeds in both seasons. In general all sowing methods with all weed control interactions significantly reduced the dry weight of broad-leaved weeds, compared to broadcast method with untreated plots (290.07 g/m^2 and 330.20 g/m^2)in first and second season respectively. Under all sowing methods, Derby, Derby + Topik and hand weeding twice gave the highest reduction values in both seasons.

The interaction between fertilization and weed control treatments significantly decreased the dry weight of broad-leaved weeds (g/m^2) in both seasons. Using Derby, Derby + Topik and hand weeding twice gave the highest reduction of the dry weight of broad-leaved weeds under all fertilization treatments.

Sowing methods× fertilization× weed control treatments interactions was significant in the second season only, the lowest value of the dry weight of broad- leaved weeds (9.3 g/m^2) obtained from Afir in furrows method under 50 kg N/fed. with hand weeding twice.

2. c. Dry weight of total annual weeds (g/m^2):-

Collected data in Table (9) cleared the effect of sowing methods, fertilization, weed control treatments and their interactions on dry weight of total annual weeds (g/m^2) at 105 days after sowing in 2006/07 and 2007/08 seasons.

Sowing methods significantly affected dry weight of total annual weeds (g/m^2) at 105 DAS in both seasons. The significant reduction percentages on the dry weight of total annual weeds (g/m^2) were 29.9 and 12.2% at Afir in furrows and Afir drill methods, respectively, compared with Afir broadcast method in the first season. Whereas, the reduction percentages on the dry weight of total annual weeds (g/m^2) were 17.16 and 29.40% at Afir in furrows and Afir drill methods, respectively, compared with Afir broadcast method in the second season. These results are in harmony with the findings of **El-Naggar (1996), Singh** and **Singh (1996), Anaam (2003), Abd El-Hamid (2004) and Ismail *et al.,* (2008).**

Nitrogen fertilization levels with biofertilization gave significant increases on dry weight of total annual weeds (g/m^2) in both seasons. In first season nitrogen level at 75 kg N/fed.+ Serialin gave a significant increases on dry weight of total annual weeds by 25.1, 17.0and 9.1% compared with 50 kg N/fed., 50 kg N/fed. + Serialin and 75 kg N/fed.,

respectively. In the second season nitrogen level at 75 kg/fed.+ Serialin significantly increased the dry weight of total annual weeds by 25.5, 15.40 and 10.1% compared with 50 kg N/fed., 50 kg N/fed. + Serialin and 75 kg N/fed., respectively. These results are in harmony with the findings of **Fayed *et al.* (1993), El-Bially** and **El-Samie (1995), Singh (1997), Panday *et al.* (2000), Khalil** and **Mirvat (2001) and Fakkar (2005).**

Weed control treatment decreased significantly the dry weight of total annual weeds (g/m^2) in 2006/07 and 2007/08 seasons. The application of Topik, Derby, Derby + Topik and hand weeding twice decreased significantly the dry weight of total annual weeds by 46.3, 54.5, 86.4 and 86.1%, respectively, compared to untreated plots (454.16 g/m^2) in 2006/07 season. The application of Topik, Derby, Derby + Topik and hand weeding twice reduced significantly the dry weight of total annual weeds by 37.4, 49.2, 88.6 and 89.2%, respectively. These results are in agreement with those obtained by **Sharama *et al.*, (1991), Raffel** and **flüh (1992), Strachan (1995), Angrias (1996), Abd El-Hamid (1998), Tenaw** and **workayha (2000), Abd El- Hamid** and **Ghalwash (2002), Fakkar (2005)** and **Bhat and Mehal (2006) and Megahed** and **Dia (2006),**

The interaction between sowing methods and fertilization was significant on dry weight of total annual weeds in the second season only. The lowest value of dry weight of total annual weeds in 2007/08 season (180.72 g/m^2) obtained from Afir in furrows method with 50 kg N/fed. While the highest value of dry weight of total annual weeds obtained season obtained from Afir broadcast method with 75 kg N/fed. + Serialin (314.88 g/m^2)

The interaction between sowing methods and weed control treatments had a significant effect on reducing the dry weight of total annual weeds in both seasons. All sowing methods with all weed control treatment gave a significant reduction of total annual weeds, compared with broadcast method with untreated plots in both seasons. Under all sowing methods, Derby +

Topik and hand weeding twice gave the highest value of reduction.

The interaction between fertilization and weed control treatments significantly decreased the dry weight of total annual weeds at 105 after sowing in 2006/07 and 2007/08 seasons. The application Derby + Topik and hand weeding twice gave the lowest values of the dry weight of total annual weeds under all fertilization treatments.

Sowing methods× fertilization× weed control treatments interaction was significant in the second season only, the lowest value of total annual weeds (17.80 g/m^2) obtained from Afir drill method under 50 kg N/fed. with hand weeding twice. While the highest value of total annual weeds (644.30 g/m^2) obtained from Afir broadcast method under 75 kg N/fed. + Serialin with untreated plot.

II-Growth characters

1-At 90 days after sowing:

1. a. Plant height (cm):

Data presented in Table (10) showed the effect of sowing methods, fertilization and weed control treatments as well as their interactions on plant height (cm) at 90 days after sowing in 2006/07 and 2007/08 seasons.

Results in Table (10) indicated that sowing methods significantly affected plant height at 90 days after sowing in both seasons. Afir in furrows and Afir broadcast methods surpassed Afir drill methods in their

effect on plant height in both season. These methods increased plant height by 10.7 and 9.8%, respectively, In the first season and by 3.8 and 5.5% respectively, compared with Afir drill method. The previous findings of sowing methods on plant height were in agreement with **Rizk (1993), Gouda *et al.* (1994) and El-Afandy (2006)**

Nitrogen fertilization levels with biofertilization had significant effect on plant height in both seasons. Fertilization at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased plant height by 8.4, 5.2 and 3.7%, respectively, compared with nitrogen at 50 kg N/fed. in 2006/07 season. In 2007/08 season the increment percentages were 5.5, 3.4 and 1.8% 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin, respectively, compared with nitrogen at 50 kg N/fed. The increase in plant height my be due to the increase in meristimatic activity in wheat plant as well as cell elongation. Nitrogen encourages both meristimatic activity and auxin production in plant. These results are in harmony with those obtained by **Hayam Mahgoub (1990), Shams El- Din and El- Habbak (1992), Abd El-Gawad *et al.* (1993), Khalil** and **Mirvat (2001), Abd El-Hameed (2002), Tippannavar *et al.* (2005) and Gaffar (2007).**

Weed control treatments decreased significantly plant height at 90 days after sowing in 2006/07 and 2007/08 seasons. The tallest plants (78.90 cm) obtained from unweeded treatments, whereas the shortest plants (66.45 and 66.98) obtained from Derby + Topik and hand weeding twice, respectively, in the first season. Similar trend was detected for the effect of weed control treatment on plant height in second season, Applying Derby + Topik and hand weeding twice, gave the shortest plant 72.30 and 72.20 respectively, while the tallest plants (80.98 cm) obtained from unweeded treatments. The decrease in plant height by weed control treatments may be due to more intra-specific competition between plants and weeds for light under the highest weed infestation. Consequently plants tended to be directed to the light. These results are agreement with those obtained by **Omar** and **Aioub(2006).**

All interactions between sowing methods, fertilization and weed control treatments did not affect significantly plant height at 90 DAS in 2006/07 and 2007/08 seasons.

1. b. Flag leaf area (cm^2):

Data in Table (11) indicated the effect of sowing methods, fertilization, weed control treatments and their interactions on flag leaf area (cm^2) at 90 days after sowing in 2006/07 and 2007/08 seasons.

It was cleared from Table (11) that sowing methods had significant effect on flag leaf area cm^2 in both seasons. The highest values of flag leaf area (43.36 and 43.34 cm^2) were obtained from Afir in furrows and Afir drill respectively, whereas the lowest value of flag leaf area (38.8 cm^2) obtained from Afir broadcast in the first season. In the second season highest values of flag leaf area (43.21 cm^2) obtained from Afir in furrows method. Whereas the lowest value of flag leaf area (40.05 cm^2) obtained from Afir broadcast method.

Data in Table (11) revealed that increasing nitrogen levels with the inoculation of Serialin significantly increased flag leaf area (cm^2) in both season. In the first season, 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased flag leaf area by 19.8, 14.1 and 8.3%, respectively, as compared with 50 kg N/fed. The increment percentages were 16.4, 9.2 and 6.0% at the application of 50 kg N/fed.+ Serialin, 75 kg N/fed. and 75 kg N/fed.+ Serialin, respectively as compared with 50 kg N/fed., in the second season. This may attributed to elongation in the number and size of the cells blades is due to nitrogen and the addition of

Serialin increased flag leaf area this may be attributed to the nitrogen fixation by non-symbiotic bacteria presence in Serialin which produce growth hormones and consequently increase uptake of nutrient by plants. These results are in agreement with the findings of **El-Bially** and **Abd El-Samie (1995), Ahmed (1995), Mady (1996), Fares (1997) Bassal *et al.* (2001) and Abd El-Maksoud (2002).**

Weed control treatments gave significant effect on flag leaf area at 90 days after sowing in both seasons. In the first season, hand weeding twice, Derby + Topik and Topik gave significant increases in flag leaf area by 34.3, 33.4 and 19.7%, respectively, as compared with untreated plots (34.68 cm^2). The increment percentages in the application of hand weeding twice, Derby + Topik and Topik were 24.9, 24.1 and 14.2%, respectively, compared with unweeded treatment (36.15 cm^2) in the second season. These results may be due to that weed control treatments create a good condition for plant growth in addition to weed elimination, which minimize the competition with the plant crop characters such as plant height, tilliering number of leaves and flag leaf area. Similar results were obtained by **Satao and Padole (1994) and Fakkar (2005).**

The interaction between sowing methods and fertilization was significant in the first season only. The highest values of flag leaf area (47.0 and47.04 cm^2) obtained from Afir in furrows methods with 75 kg N/fed. + Serialin and Afir drill method with 75 kg N/fed. + Serialin, respectively, whereas the lowest value of flag leaf area (35.46 cm^2) resulted from Afir broadcast method with 50kg N/fed.

The interaction between sowing methods and weed control treatments was significant in both season. In general all sowing methods with all weed control interactions gave a significant increases in flag leaf area, compared with broadcast method with untreated plots (30.47 and 34.49 cm^2) in first and second season, respectively. Under all sowing methods, Derby + Topik and hand weeding twice gave the highest values of flag leaf area in both seasons.

The interaction between fertilization and weed control treatments significantly increased flag leaf area (cm^2) in both seasons. Using Derby + Topik and hand weeding twice gave the highest values of flag leaf area (cm^2) under all fertilization treatments in both seasons.

Sowing methods, fertilization and weed control treatments interactions were significant in 2006/07 and 2007/08 seasons. The highest values of flag leaf area (53.3 and 50.40 cm^2) were obtained from Afir in furrows method under 75 kg N/fed. + Serialin with hand weeding twice in first and second season, respectively.

1. c. Dry weight of leaves (g/m^2):

Data presented in table (12) show the effect of sowing methods, fertilization, weed control treatments and their interactions on dry weight of leaves (g/m^2) in 2006/07 and 2007/08 seasons.

It was noticed that, in spite of non-significant effect of sowing methods on dry weight of leaves in the first season, in the second season sowing methods appeared significant effect on dry weight of leaves. The significant percentages on dry weight of leaves were 13.2 and 8.3% at Afir in furrows method and Afir drill method, compared with Afir broadcast method, respectively. The previous findings of sowing methods on dry weight of leaves (g/m^2) were in agreement with those obtained by **Abd El-Hamid (2004)**.

Nitrogen applications + Serialin affected significantly the dry weight of leaves in both seasons. In the first season dry weight of leaves increased gradually by increasing nitrogen level and inoculation with Serialin. The

increment percentages were 28.2, 17.2 and 14.2% at 75 kg N/fed.+ Serialin, 75 kg/fed. and 50 kg/fed. + Serialin, respectively, compared with 50 kg N/fed. In the second season the increment percentages were 23.6, 15.8 and 7.5% at 75 kg N/fed.+ Serialin , 75 kg/fed. and 50 kg/fed. + Serialin, respectively, compared with 50 kg N/fed. Similar results obtained by **Ellen (1990), Shams El- Din** and **El- Habbak (1992), Abo-Shetaia** and **Abd El-Gawad (1995), Bahttaria** and **Hess (1998) and Fakkar (2005).**

The effect of chemical and mechanical weed control treatments on dry weight of leaves was significant in both seasons. Weed control treatments could be arranged in ascending order with regard to their increasing effect in the following order: Topik, Derby + Topik and hand weeding twice, their respective increasing percentages were 27.6, 55.9 and 57.1%, respectively, compared with untreated plots (142.66 g/m^2) in the first season. While in the second season the increment percentages were 14.0, 46.1 and 48.8% at Topik, Derby + Topik and hand weeding twice, respectively, compared to unweeded treatment (161.94 g/m^2). These result in full agreement of with those obtained by **Satao** and **Padole (1994), Abd El-Hamid (1998), and Fakkar (2005).**

The interaction between sowing methods and fertilization was significant on dry weight of leaves at 90 days after sowing in the first season only. Under all sowing the highest values of on dry weight of leaves obtained from 75kg N/fed. + inoculation with Serialin.

The interaction between sowing methods and weed control treatments was significant in both seasons. The highest value of dry weight of leaves (233.40 g/m^2) obtained from Afir in drill method with Derby + Topik followed by Afir in furrows with hand weeding twice (229.53 g/m^2) in first season. In the second season the highest value of dry weight of leaves (260.98 g/m^2) obtained from Afir in drill method with hand weeding twice.

Fertilization× weed control treatments interactions were significantly increased dry weight of leaves 90 days after sowing in both seasons. Under all

fertilization treatments the highest values of dry weight of leaves obtained from Derby + Topik and hand weeding twice in 2006/07 and 2007/08 seasons.

Sowing methods, fertilization and weed control treatments interactions was significant in the first season only, the highest values of dry weight of leaves (253 g/m^2) obtained from Afir in furrows method under 75kg N/fed.+ Serialin with hand weeding twice.

1. d. Dry weight of stems (g/m^2):

The effect of sowing methods, fertilization and weed control treatments as well as their interactions on dry weight of stems (g/m^2) at 90 days after sowing on 2006/07 and 2007/08 is presented in Table (13).

Dry weight of stems significantly affected by sowing methods in both seasons. The highest values of dry weight of stems (316.5 and 369.3 g/m^2) were obtained from Afir drill method in the first and second seasons respectively, whereas the lowest value of dry weight of stems (295.16 323.5 g/m^2) obtained from Afir in furrows method in the first season Afir broadcast method in the second season.

Nitrogen levels + inoculation by Serialin induced significant effect on dry weight of stems (g/m^2) in 2006/07 and 2007/08 seasons. Fertilization at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased dry weight of stems (g/m^2) by 39.2, 29.7 and 26.2%, respectively, compared with 50 kg N/fed. in 2006/07 season. Meanwhile in 2007/08 season the increment percentages were 20.9, 13.4 and 8.1% at

75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin, respectively, compared with 50 kg N/fed. These results are in harmony with the finding of **Abo-Shetaia** and **Abd El-Gawad (1995), Bahttaria** and **Hess (1998), Bacilio *et al.* (2003) and Fakkar (2005).**

All chemical and mechanical weed control treatments led to a significant increment on dry weight of stems (g/m^2) in both season. In the first season hand weeding twice, Derby + Topik and Topik increased dry weight of stems by 61.0, 57.5 and 23.5% respectively, as compared with unweeded treatment (231.09 g/m^2). In the second season hand weeding twice, Derby + Topik and Topik increased dry weight of stems by 60.7, 57.8 and 30.2% respectively, as compared with unweeded treatment (261.64 g/m^2). These results are in harmony with the finding of **Satao** and **Padole (1994) and Fakkar (2005)**

All interactions were not significant-except for sowing methods × weed control in the second season.

The interactions between sowing methods and weed control treatments increased significantly dry weight of stems (g/m^2) in second season only. All sowing methods with all weed control treatments gave the highest significant effect on increasing dry weight of stems (10.6 - 79.4%), compared to Afir broadcast method with untreated plots (218.35 g/m^2).

1. e. Total dry weight of plants (g/m^2):

Results about the effect of sowing methods, fertilization and weed control treatments as well as their interactions on total dry weight of plants (g/m^2) at 90 days after sowing on 2006/07 and 2007/08 seasons are presented in Table (14).

Data in Table (14) revealed that sowing methods significantly affected the dry weight of plants (g/m^2) in both seasons. Afir drill method

surpassed Afir in furrows and Afir broadcast methods on their effects in this trait in both season. The highest value of dry weight of plants (505.69 g/m^2) obtained from Afir drill method, whereas the lowest value of this trait (484.91 g/m^2) obtained from Afir in furrows method. In the second season the highest value of dry weight of plants (580.86 g/m^2) obtained from Afir drill method, while the lowest value of dry weight of plants (519.24 g/m^2) obtained from Afir broadcast method. These results are in harmony with those obtained by **Hassan** and **Hassan (1994) and Nassar (1998).**

Concerning the effect of fertilization (nitrogen level + Serialin) on the dry weight of plants (g/m^2) the presented data revealed a significant effect on this trait in both season. Hence, 75 kg N/fed. + Serialin surpassed 50 kg N/fed., 50 kg N/fed.+ Serialin and 75 kg N/fed. in both seasons. This treatments increased dry weight of plants by 7.5, 9.8 and 19.1%, respectively, compared with 50 kg N/fed. in first season. In the second season the increment percentages were, 6.3, 11.5 and 17.9%, respectively, compared with 50 kg N/fed. The increment in total plants weight by inoculation with Serialin may be due to the inoculation of the soil with *A. chroococcum, A. brasilense* and *S.mutabilis* could improve early plant growth, N_2-fixing potential, plant growth regulators production and antimicrobial substances production that could be useful against pathogenic organisms. These result in full agreement of with those obtained by **Hassouna** and **Hassanein (1996), Fares (1997), Abd El- Maksoud (2002) and Fakkar (2005).**

All studied weed control treatments significantly affected the dry weight of plants (g/m^2) in both seasons, as compared to weedy check. Hence, hand weeding twice, Derby + Topik and Topik increased the total dry weight of plants by 59.6, 56.9 and 25.1%, respectively, compared with weedy check in 2006/07 season. In 2007/08 season weed control treatments could be arranged in descending order with regard to their increasing effect in the following order: hand weeding twice, Derby + Topik and Topik their respective increasing percentages were 55.8, 53.3 and 24.0%. The previous

findings were in agreement with **Satao** and **Padole (1994), Nassar (1998) and Fakkar (2005)**

All interactions were not significant on total dry weight of plants– except for sowing methods × weed control treatments in the second season and fertilization × weed control treatments in first season.

The interaction between sowing methods and weed control treatments was significant in second season only. All interactions gave significant increment on total dry weight of plants. The highest values of total dry weight of plants (712.73 g/m^2) obtained from Afir drill method with the application of hand weeding twice.

Fertilization × weed control treatments interactions were significant on total dry weight of plants in 2006/07 season only. Treatments of hand weeding twice, Derby + Topik gave the highest values of total dry weight of plants under 75 kg N/fed. + Serialin.

2- At 120 days after sowing:

2. a. Plant height (cm):

Collected data in Table (15) show the effect of sowing methods, fertilization, weed control treatments and their interaction on plant height (cm) at 120 days after sowing in 2006/07 and 2007/08 seasons.

Data presented in Table (15) indicated that sowing methods affected significantly plant height at 120 days after sowing. Afir broadcast and Afir in furrows methods surpassed Afir drill method in their effect on plant height in both season. These methods increased plant height by 6.5 and 5.4%, respectively, compared to Afir drill method in first season. In the

second season Afir broadcast and Afir in furrows methods increased plant height by 2.8 and 1.4% respectively, compared to Afir drill method. These results are in harmony with those obtained by **Eissa *et al.* (1993), Nassar (1998), Anaam (2003) and El-Afandy (2006) and Ismail *et al.* (2008).**

Fertilization (nitrogen levels + Serialin) had a significant effect on plant height in both season. In the first season 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased plant height by 6.7, 4.4 and 1.5%, respectively, compared with nitrogen at 50 kg N/fed. in 2006/07 season. In 2007/08 season the increment percentages were 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin,% 5.1, 3.4 and 2.1% respectively, compared with nitrogen at 50 kg N/fed. The superiority of N might be due to the great importance of this element in the physiological process inside plants in early vegetative growth, which probably resulted from increase cell division and elongation of the new growth. These result in full agreement of with those obtained by **Sulttan *et al.* (1993), El-Ganbeehy (1994), Gouda *et al.* (1994), Abo-Shetaia** and **Abd El-Gawad (1995), Ahmed (1995),Sharief *et al.* (2000), Fakkar (2005) and Mansour *et al.* (2006).**

All chemical and mechanical weed control decrease significantly plant height at 120 days after sowing in 2006/07 and 2007/08 season. In the first season, the application of Derby + Topik, hand weeding twice, and Topik reduced significantly plant height by 7.7, 7.6 and 3.9%, respectively, as compared to unweeded treatment. The corresponding increases were and 9.5, 9.4 and 6.9% respectively, compared to weedy check in the second season. This may be due to the increased ability of weed plants to compete severely under unweeded check condition compared with wheat plants. Similar result obtained by **Omar** and **Aioub (2006).**

The interaction between sowing methods and fertilization was significant on plant height in first season only. It could be mentioned from the data that the shortest plants (93.54 cm) obtained from Afir drill with the

application of 50 kg N/fed. while the tallest plants (107.7 cm) resulted from Afir broadcast with the application of 75 kg N/fed. + inoculation with Serialin.

The interaction between sowing methods and weed control treatments was significant on plant height in first season only, treatments of Derby + Topik and hand weeding twice gave shortest plants under all sowing methods.

The effect of interaction between fertilization and weed control treatments was significant in the first season only. All weed control treatments with all fertilization treatment interactions had a significant effect on plant height. The tallest plant obtained (108.91 cm) obtained from untreated plots with 75 kg N/fed.+ Serialin.

Sowing methods, fertilization and weed control treatments interactions was significant on plant height in the first season only. Data obtained indicated that plant height were increased by Afir broadcast, 75 kg N/fed.+ Serialin with untreated plots by 22.1% over Afir drill, 50 kg N/fed. with the application of Derby + Topik.

2. b. Flag leaf area (cm^2):

The effect of sowing methods, fertilization and weed control treatments and their interactions on flag leaf area (cm^2) at 120 days after sowing in 2006/07 and 2007/08 seasons presented in Table (16).

Collected data indicated that sowing methods significantly affected flag leaf area (cm^2) in 2006/07 and 2007/08 seasons. Hence, Afir drill and Afir in furrows methods surpassed Afir broadcast method in their

effect on flag leaf area in both season. Those two methods increased flag leaf area by 3.6 and 1.9% respectively, in first season, compared to Afir broadcast method. Whereas, the increment percentages were 4.7 and 2.9%, respectively, as compared with Afir broadcast method in second season.

Nitrogen levels + inoculation by Serialin induced significant effect on flag leaf area (cm^2) in 2006/07 and 2007/08 seasons. Nitrogen fertilization level at 75 kg/fed. + inoculation with Serialin increased significantly flag leaf area at 120 days after sowing. In first season the increment percentages due to using nitrogen level at 75 kg/fed. + Serialin were 13.5, 8.6 and 3.6%, respectively compared to 50 kg N/fed., 50 kg N/fed.+ Serialin and 75 kg N/fed. In the second season increasing N levels + inoculation with Serialin increased flag leaf area by 3.5, 7.4 and 11.5%, respectively, compared to 75 kg/fed., 50 kg N/fed.+ Serialin and 50 kg N/fed. In general, N encourages growth of flag leaf as an essential element which plays a prominent role in building new merestimic cells, cell elongation and increasing photosynthesis activity of wheat plants. These results are in harmony with the finding of **Mady (1996), Sharief *et al.* (2000), Bassal *et al.* (2001), Abd El-Maksoud (2002), El-Kalla *et al.* (2002) and Khaled (2007).**

All chemical and mechanical weed control treatments increased significantly flag leaf area compared to unweeded treatment in both season. In the first season the application of hand weeding twice, Derby + Topik and Topik, gave significant increment percentages of flag leaf area by 32.1, 31.6, and 19.6%, respectively, compared to untreated plots (33.64 cm^2). The application of hand weeding twice, Derby + Topik and Topik gave significant increment percentages of flag leaf area by 26.9, 26.3, 12.4 and 9.8% respectively, compared to unweeded treatments (32.54 cm^2) in second season. This effect is of great value on the expected productivity of wheat, since flag leaf plays an important role in photosynthetic potentialities of wheat plants. These result in full agreement of with those obtained by **Satao** and **Padole (1994), and Fakkar (2005).**

The interaction between sowing methods and fertilization (nitrogen + inoculation with Serialin) was significant in first season only. Afir drill method with 75 kg N/fed. + Serialin gave the highest value of flag leaf area (44.20 cm^2).

The interactions effect between sowing method and weed control treatments were significant in first season only. Under all sowing methods, the highest values of flag leaf area obtained from hand weeding twice and Derby + Topik.

2. c. Dry weight of leaves (g/m^2):

The affect of sowing methods, fertilization and weed control treatments as well as their interactions on dry weight of leaves (g/m^2) of wheat as in 2006/07 and 2007/08 seasons are presented in Table (17).

Sowing methods significantly affected dry weight of leaves (g/m^2) at 120 days after sowing in both seasons. Afir drill method gave the greatest value dry weight of leaves (230.2 g/m^2), while the lowest value of dry weight of leaves (210.07 g/m^2) obtained from Afir broadcast method in the first season. Similar trend was detected for the effect of sowing methods in the second season. Sowing wheat plant by Afir drill method gave the highest value of dry weight of leaves (241.6 g/m^2), compared to Afir broadcast method, which gave the lowest value (210.1 g/m^2). These result in full agreement of with those obtained by **Hassan and Hassan (1994) and Abd El-Hamid (2004).**

Nitrogen fertilization + inoculation by Serialin gave significant effect on dry weight of leaves at 120 days after sowing in 2006/07 and

2007/08 seasons. Dry weight of leaves was increased under fertilization at 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin by 22.7, 15.4 and 8.2% respectively, compared with 50 kg N/fed. (196.9 g/m^2) in the first season. In the second season dry weight of leaves was increased under fertilization at 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased by 25.5, 17.0 and 9.8%, compared with 50 kg N/fed. (199.8 g/m^2). These results are in harmony with the finding of **Abo-Shetaia** and **Abd El-Gawad (1995), Abd El-Ghany (1997), Fares (1997), Bahttaria** and **Hess (1998) and Fakkar (2005)**.

All studied weed control treatments significantly affected the dry weight of plants (g/m^2) in both seasons, as compared to weedy check. The application of hand weeding twice, Derby + Topik and Topik gave significant increase percentages in dry weight of leaves by 48.4, 46.7 and 31.8% respectively, compared to weedy check (168.27 g/m^2) in the first season. In the second season, similar trend was detected for the effect of weed control treatments. The application of hand weeding twice, Derby + Topik and Topik gave significant increasing percentages on dry weight of leaves by 43.6, 42.3 and 20.7% respectively, compared to unweeded treatment (181.36 g/m^2). These results in full agreement with those obtained by **Satao** and **Padole (1994), Abd El-Hamid (2004) and Fakkar (2005)**.

The interaction between sowing methods and fertilization treatments (N levels + Serialin) had a significant effect on dry weight of leaves (g/m^2) at 120 days after sowing in both seasons. In general all sowing methods with all fertilization treatments interactions increased dry weight of leaves (g/m^2) in both seasons.

The interaction between sowing methods and weed control treatments significantly increased dry weight of leaves in the first season only. Hand weeding twice under Afir drill method gave the highest value of dry weight of leaves (260.45g/m^2), followed hand weeding twice under Afir in furrows

method(259.5). Meanwhile the lowest value of dry weight of leaves (155.28 g/m^2) obtained from untreated plots under Afir broadcast method.

Fertilization × weed control treatments interactions significantly affected on dry weight of leaves in the first season only. Under all fertilization treatments the highest values of dry weight of leaves obtained from hand weeding twice and Derby + Topik.

The interaction between sowing methods, fertilization and weed control treatments were significant in the first season only. The greatest value of dry weight of leaves (284.8 g/m^2) obtained from hand weeding twice with 75 kg N/fed.+ Serialin under Afir drill sowing method. Meanwhile, the lowest value of dry weight of leaves (133.9 g/m^2) obtained from untreated plots with 50 kg N/fed. under Afir broadcast.

2. d. Dry weight of stems (g/m^2):

Dry weight of stems (g/m^2) at 120 days after sowing as affected by sowing methods, fertilization and weed control treatments as well as their interactions in 2006/07 and 2007/08 seasons are presented in Table (18).

Data indicated that Afir drill and Afir in furrows methods significantly superior to Afir broadcast method in both season on their effect on dry weight of stems (g/m^2). Hence, these methods increased dry weight of stems by 7.0 and 4.5%, respectively, compared to Afir broadcast method (517.01 g/m^2) in the first season. In the second the superiority percentages were 9.0 and 6.0% respectively compared to Afir broadcast method (542.01 g/m^2). These result in full agreement with those obtained by **Hassan and Hassan (1993).**

Fertilization (nitrogen levels + Serialin) gave a significant effect on the dry weight of stems (g/m^2) in both seasons. Nitrogen level at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased dry weight of stems (g/m^2) by 24.0, 15.8 and 10.3%, respectively, compared with 50 kg N/fed. (476.35 g/m^2), in the first season. The application of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased dry weight of stems by 24.2, 17.1 and 9.1%, respectively as compared with 50 kg N/fed. (505.26 g/m^2) in the second season. These results are in harmony with the finding of **Ellen (1990), Shams El- Din** and **El- Habbak (1992), Abo-Shetaia** and **Abd El-Gawad (1995), Abd El-Ghany (1997), Fares (1997), Bahttaria** and **Hess (1998) and Fakkar (2005)**.

Weed control treatments effect was significant on dry weight of stems (g/m^2) in both seasons. The application of hand weeding twice, Derby + Topik and Topik increased significantly values of dry weight of stems by 53.9, 52.5 and 29.8%, respectively, compared with weedy check (405.86 g/m^2) In the first season. Whereas, in the second season the application of hand weeding twice, Derby + Topik and Topik increased significantly values of dry weight of stems by 48.4, 45.6 and 21.2%, respectively, compared with weedy check (450.09 g/m^2). Similar results obtained by **Satao** and **Padole (1994) and Fakkar (2005)**

The interaction between sowing methods and fertilization was significant dry weight of stems in both seasons. 75 kg N/fed. + Serialin under Afir drill method gave the highest values of dry weight of stems (615.1 and 660.8 g/m^2) respectively, in first and second season. Meanwhile the lowest values of dry weight of stems (462.7 and 485.3 g/m^2) resulted from 50 kg N/fed. under Afir broadcast method in first and second season respectively.

The interaction between sowing methods and weed control treatments was significant in both season. hand weeding twice and Derby + Topik gave

the highest values of dry weight of stems under all sowing methods in both seasons.

Fertilization (nitrogen levels + Serialin) × weed control treatment interactions were significant in both seasons. In general all fertilization treatment with all weed control treatments interactions increased significantly dry weight of stems compared to 50 kg N/fed. with untreated plots (366.4 and 411.1 g/m^2) in first and second season, respectively. Under all fertilization treatment, hand weeding twice and Derby + Topik gave the highest values of dry weight of stems in both seasons.

Sowing methods, fertilization and weed control treatments interactions were significant in both seasons. The highest values of dry weight of stems (729.6 g/m^2) obtained from Afir drill method under 75kg N/fed.+ Serialin with hand weeding twice, compared to Afir furrows method under 50 kg N/fed. with untreated plots (351.5 g/m^2) in first season. In the second season the highest values of dry weight of stems (785.6 g/m^2) obtained from Afir drill method under 75kg N/fed.+ Serialin with hand weeding twice compared to Afir broadcast method under 50 kg N/fed. with untreated plots (351.5 g/m^2).

2. e. Total dry weight of plants (g/m^2):

Results about the effect of sowing methods, fertilization and weed control treatments as well as their interactions on total dry weight of plants (g/m^2) at 90 days after sowing in 2006/07 and 2007/08 seasons are presented in Table (19).

Data in Table (14) indicated that sowing methods significantly affected the total dry weight of plants (g/m^2) in both seasons. Afir drill

method gave the highest value of dry weight of plants (783.3 and 832.3 g/m^2), respectively, in first and second season. Meanwhile Afir broadcast method gave the lowest values of dry weight of plants (727.1 and 752.1 g/m^2) in first and second season, respectively. **Hassan and Hassan (1994) and Nassar (1998).**

Fertilization (nitrogen level + Serialin) gave significant effect on the dry weight of plants (g/m^2) in both seasons. The application of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased significantly the total dry weight of plants by 23.9, 15.8 and 9.6%, respectively, in first season compared to 50 kg N/fed. Whereas the increment percentages were 24.4, 17.1 and 9.3%, at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin ,respectively, compared with 50 kg N/fed. in the second season. It could be concluded that, nitrogen is one of the macro elements that perform protein molecule, purines, pyrimidines, prophyriens and co-enzymes. Purines and pyrimidines are forming RNA and DNA, while prophyriens contains very important phyto-chimicals substances such as chlorophyll and sytocromes which are so important for photosynthesis and respiration. Co-enzymes are very important for enzymes activation in plant biotic reactions. Nitrogen is aver important component of vitamins as well as which is so important substances for plant metabolism. These result in full agreement of with those obtained by **Shams El- Din and El- Habbak (1992), Abo-Shetaia** and **Abd El-Gawad (1995), Abd El-Ghany (1997), Fares (1997), Bahttaria** and **Hess (1998), Abd El-Maksoud (2002), and Fakkar (2005)**.

Chemical and mechanical weed control treatments significantly affected the total dry weight of plants (g/m^2) in both seasons, as compared to weedy check. Hence, hand weeding twice, Derby + Topik and Topik gave an increase in total dry weight of plants by 52.3, 50.8 and 30.4%, respectively, compared with weedy check in 2006/07 season. In the second season weed control treatments could be arranged in descending order with regard to their increasing effect in the following order: hand weeding twice, Derby + Topik

and Topik their respective increasing percentages were 47.0, 44.7 and 21.1%. These results are in harmony with the finding of **Satao** and **Padole (1994) and Fakkar (2005)**

The interaction between sowing methods and fertilization was significant in the first season only. All sowing methods with all fertilization treatments interactions increased significantly the total dry weight of plants (g/m^2). The highest value of total dry weight of plants (865.3 g/m^2), obtained from 75 kg N/fed. + Serialin under Afir drill method.

The interaction between sowing methods and weed control treatments was significant in 2006/07 and 2007/08 seasons. In general all interactions between sowing methods and weed control treatments gave significant increment on total dry weight of plants. Hand weeding twice under Afir drill method gave the highest value of total dry weight of plants (911.7 and 980.1 g/m^2) in the first and second season, respectively.

The interaction between fertilization and weed control treatments was significant on total dry weight of plants in both seasons. The application of hand weeding twice and Derby + Topik gave the highest values of total dry weight of plants under all fertilization treatment.

Sowing methods, fertilization and weed control treatments (A×B×C) interactions significantly affected total dry weight of plants in first season only. Data obtained indicated the highest value of total dry weight of plants obtained by Afir drill method and 75 kg N/fed.+ Serialin with hand weeding twice (1009.9). Meanwhile the lowest value resulted from Afir in furrows method under 50 kg N/fed. with untreated plots (505.1 g/m^2).

III- Yield and yield components:

1. Plant height (cm):

Results presented in Table (20) show the effect of sowing methods, fertilization and weed control treatments as well as their interactions on plant height at harvest in 2006/07 and 2007/08 seasons.

The results in Table (20) indicated clearly that the differences between sowing methods on plant height were significant in both seasons. The tallest plants were 106.98 and 107.40 cm, resulted from Afir broadcast, in the first and second season, respectively, whereas the shortest plants (105.5 and 105.06 cm) resulted from Afir drill in the first and second season, respectively. Similar results were reported by **Eissa *et al.* (1993), Nassar (1998), Anaam (2003) and El-Afandy (2006)**

The results showed that increasing N levels + inoculation increased significantly plant height at harvest. The application of 75 kg N/fed. + Serialin gave the maximum plant height 109.22 and 108.84 cm in the first and second season, respectively, whereas the shortest plants (105.5 and 105.06 cm) resulted from 50 kg N/fed. in the first and second season, respectively. These findings are in accordance with **Abo-Shetaia** and **Abd El-Gawad (1995), Sharief *et al.* (2000), Abd El-Hameed (2002) Fakkar (2005), Mansour *et al.* (2006) and Gaffar (2007)**

Concerning the effect of chemical and mechanical weed control treatments, data revealed that plant height were significantly affected in both seasons. Hand weeding twice, Derby + Topik, Topik and Derby increased plant height by 10.4, 10.2, 7.5 and 7.1% respectively, compared to unweeded treatment in first season. the corresponding increases were 12.0, 11.3, 8.0 and 6.9% in the second season, respectively. These results in line with those obtained by **Omar** and **Aioub (2006).**

The results in Table (20) showed that the interaction between sowing methods and weed control treatments were significant in both seasons, wheat plants sown by Afir broadcast method with untreated plots gave the tallest plants (114.9 and 115.4 cm) in first and second seasons. respectively. On the other hand the shortest plants were produced from Afir in furrows method and treated with hand weeding twice in the first season and Afir drill method with hand weeding twice.

2. Spike length(cm):

Data presented in Table (21) show the effect of sowing methods, fertilization and weed control treatments as well as their interactions on spike length in 2006/07 and 2007/08 seasons.

Sowing methods significantly affected spike length (cm) in both seasons. In the first season, the greatest value of spike length (11.09 cm) resulted from Afir in furrows method, meanwhile, the lowest value of this trait (10.55) obtained from Afir broadcast method. In the second season, the highest value of spike length (11.25 cm) resulted from Afir in furrows method, whereas, the lowest value of this trait (10.64 cm) obtained from Afir broadcast method. These findings are in accordance with **Eissa *et al.* (1993), Nassar (1998), Fakkar (1999), Anaam (2003) and El-Afandy (2006).**

Data in Table (21) indicated that nitrogen level + Serialin had a significant effect on spike length in both seasons. The application of 75 kg N/fed. + Serialin gave the greatest value of spike length (11.38 and 11.25 cm), in first and second season, respectively, compared with , 75 kg N/fed., 50 kg N/fed.+ Serialin and 50 kg N/fed. These results are in harmony with those obtained by **Shams El- Din** and **El- Habbak (1992), El-Ganbeehy**

(1994), Abo-Shetaia and **Abd El-Gawad (1995), Mady (1996), Bassal *et al.* (2001) and El-Afandy *et al.* (2006).**

The application of weed control treatments increased spike length significantly compared to unweeded treatment in both seasons. In the first season, the highest values of spike length obtained from the following weed control treatments in a descending order: hand weeding twice, Derby + Topik, Topik and Derby treatments. Their respective increasing percentage was 18.6, 17.6, 8.4 and 5.6%, respectively, compared with unweeded treatment (9.86 cm). In the second season, weed control treatments increased spike length significantly as follows: hand weeding twice, Derby + Topik, Topik and Derby by 12.9, 11.9, 6.3 and 3.9%, respectively, compared with unweeded treatment (10.21 cm). These results, generally are in line with those obtained by **Nagla (1998), Nassar (1998), Anaam (2003), Helal (2003), Fakkar (2005) and Ismail *et al*.(2008)**

The interaction between sowing methods and fertilization treatments (N levels + Serialin) had a significant effect on spike length in first season only. In general all sowing methods with all fertilization treatments interactions increase spike length.

The interaction between sowing methods and weed control treatments significantly increased spike length in first season only. Hand weeding twice under Afir drill method gave the highest value of spike length (11.96 cm), followed by hand weeding twice under Afir in furrows method. Meanwhile, the lowest value of spike length (9.43 cm) resulted from untreated plots under Afir broadcast method.

Fertilization × weed control treatments interactions significantly affected on dry weight of leaves in the first season only. Under all fertilization treatment the highest values of spike length obtained from hand weeding twice and Derby + Topik.

The interaction between sowing methods, fertilization and weed control treatments (A×B×C) were significant in the first season only. The greatest value of spike length obtained from hand weeding twice with 75 kg N/fed.+ Serialin under Afir drill method. Meanwhile, the lowest value of spike length (8.87 cm) resulted from untreated plots with 50 kg N/fed. Under Afir broadcast method.

3. Number of spikletes/spike:

The effect of sowing methods, fertilization and weed control treatments as well as their interactions on the mean values of number of spikletes/spike in 2006/07 and 2007/08 seasons are presented in Table (22).

Data presented in Table (22) revealed that sowing methods significantly affected the number of spikletes/spike in the first season only. Hence, Afir drill and Afir in furrows methods surpassed Afir broadcast method in their effect on this trait. The highest value of number of spikletes/spike (20.67) were resulted from Afir drill method, meanwhile the lowest value of this trait (20.26) obtained from Afir broadcast method. Similar results obtained by **El-Afandy (2006)**

Nitrogen fertilization + inoculation by Serialin gave significant effect on number of spikletes/spike in 2006/07 and 2007/08 seasons. Number of spikletes/spike was increased under fertilization at 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin by 4.1, 2.8 and 1.5% respectively, compared to 50 kg N/fed. (19.99) in the first season. In the second season, number of spikletes/spike was increased under fertilization at 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased by 5.3, 3.1 and 2.0% compared to 50 kg N/fed. (21.17). These results are in harmony with

the finding of **El-Ganbeehy (1994), Abo-Shetaia** and **Abd El-Gawad (1995), Bassal *et al.* (2001), El-Afandy *et al.* (2006) and Gaffar (2007).**

All studied weed control treatments significantly affected number of spikletes/spike in both season. The application of hand weeding twice, Derby + Topik, Topik and Derby gave significant increment percentages in number of spikletes/spike by 9.1, 8.3, 5.4 and 4.6% respectively, compared to unweeded treatment (19.37) in the first season. In the second season, similar trend was detected for the effect of weed control treatments. The application of hand weeding twice, Derby + Topik, Topik and Derby gave significant increase percentages in number of spikletes/spike by 8.3, 8.2, 5.2 and 4.1% respectively, compared to unweeded treatment (19.61). These result in full agreement with those obtained by **Nassar (1998), Nagla (1998), Fakkar (1999) Fakkar (2005) and Ismail *et al.*(2008).**

The interaction between sowing methods and fertilization treatment (N levels + Serialin) had significant effect on number of spikletes/spike in first season only. In general all sowing methods with all fertilization treatments interactions increased the number of spikletes/spike.

The interaction between sowing methods and weed control treatments significantly increased number of spikletes/spike in the first season only. Hand weeding twice under Afir drill method gave the highest value of dry weight of leaves (21.53), meanwhile the lowest value of number of spikletes/spike (19.35) obtained from untreated plots under Afir drill method.

4. Spike weight (g):

Results about the effect of sowing methods, fertilization and weed control treatments as well as their interactions on spike weight (g) at 90

days after sowing in 2006/07 and 2007/08 seasons are presented in Table (23).

Sowing methods significantly affected the spike weight (g) in both seasons. Afir in furrows method gave the highest values of spike weight (3.06 and 3.01 g), respectively, in first and second season. Meanwhile Afir broadcast method gave the lowest values of spike weight (2.76 and 2.72 g/m^2) in first and second season, respectively. These result in harmony with those obtained by **Hassan and Hassan (1994) and Nassar (1998), Fakkar (1999) and El –Afandy (2006).**

Fertilization (nitrogen level + Serialin) gave significant effect on spike weight (g) in both seasons. The application of75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased significantly spike weight. These treatments increased spike weight by 20.3, 14.2 and 9.2%, respectively, in first season compared to 50 kg N/fed. Whereas the increment percentages were 19.0, 10.3 and 7.2%, at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin ,respectively compared with 50 kg N/fed., in the second season. These result are in full agreement with those obtained by **Hamed (1998), Fakkar (2005).**

Chemical and mechanical weed control treatments significantly affected spike weight (g) in both seasons, as compared to weedy check. Hence, hand weeding twice, Derby + Topik, Topik and Derby gave an increase in spike weight by 37.0, 33.7, 13.6 and 11.1%, respectively, compared with unweeded treatment in 2006/07 season. In the second season weed control treatments could be arranged in descending order with regard to their increasing effect in the following order: hand weeding twice, Derby + Topik, Topik and Derby their respective increasing percentages were 43.8, 42.0, 13.6 and 11.1%. These results are in harmony with the findings of **Al-Marsafy *et al.* (1995), Nagla (1998), Nassar (1998) Fakkar (1999) Fakkar (2005) and Younis (2007).**

The interaction between sowing methods and fertilization was significant in the first season only. All sowing methods with all fertilization treatments interactions increased significantly the spike weight (g). The highest value of spike weight (3.63 g), obtained from 75 kg N/fed. + Serialin under Afir in furrows method.

The interaction between sowing methods and weed control treatments was significant in 2006/07 and 2007/08 seasons. In general all interactions between sowing methods and weed control treatments gave significant increment on spike weight (g). Hand weeding twice under Afir drill method gave the highest value of spike weight (3.61 and 3.62 g) in the first and second season, respectively.

The interaction between fertilization and weed control treatments was significant on spike weight (g) in both seasons. Treatment of hand weeding twice and Derby + Topik gave the highest values of spike weight (g) under all fertilization treatment.

Sowing methods, fertilization and weed control treatments interactions significantly affected spike weight (g) in first season only. Data obtained indicated the highest value of spike weight (g) (4.07 g) obtained by Afir in furrows method and 75 kg N/fed.+ Serialin with hand weeding twice. Meanwhile the lowest value (2.23 g) obtained from Afir broadcast, 50 kg N/fed. with untreated plots.

5. Number of grains/spike:

The effect of sowing methods, fertilization and weed control treatments as well as their interactions on number of grains/spike on 2006/07 and 2007/08 seasons is presented in Table (24).

Sowing methods affected significantly on number of grains/spike in both seasons. Afir in furrows method significantly increased number of grains/spike by 2.3 and 5.8%, as compared with Afir drill and Afir broadcast methods, respectively, in the first season. Whereas in the second season the Afir drill method significantly increased number of grains/spike by 2.4 and 6.4% as compared with Afir in furrows and Afir broadcast method , respectively, These results are in harmony with the finding of **Eissa *et al.* (1993), Nassar (1998) and Fakkar (1999)**

Fertilization affected significantly on number of grains/spike in both seasons. In the first season, nitrogen level at 75 kg/fed. + Serialin, 75 kg/fed. and 50 kg/fed. + Serialin increased significantly the number of grains/spike by 12.0, 6.7 and 3.8% respectively, compared with 50 kg N/fed. In the second season the increment percentages were 17.6, 10.6 and 6.9%, respectively, as compared with 50 kg N/fed. The obtained results could attributed to the role of nitrogen in spike fertility and grains formation of the cereal crops especially wheat and its effect on photosynthesis and the other essential metabolic activities which effect the plant growth and development. These results confirmed the results obtained by **Peltenen (1992) Mady (1996), Said *et al.* (1999), Ibrahim *et al.* (2004), Abd El-Hady *et al.* (2006) and Khaled (2007)**

All weed control treatments had significant effect on the number of grains/spike in both seasons. In the first season the application of Derby, Topik, Derby + Topik and hand weeding twice increased significantly the number of grains/spike by 13.4, 15.8, 29.1 and 32.0%, respectively, as compared with untreated plots (36.08). In the second season the increment percentages of the number of grains/spike were 11.7, 15.8, 29.2 and 30.9% in plots treated with Derby, Topik, Derby + Topik and hand weeding twice, respectively, as compared with untreated plots (36.00). These results could be explained on the height of the effectiveness of each treatment in weed control

and consequently its effectiveness in decreasing weed competition to wheat plants. These results are in harmony with those obtained by **Singh** and **Bajpai (1992), Nassar (1998), Fakkar (1999), Anaam (2003), Fakkar (2005), Younis (2007) and Ismail *et al*. (2008).**

The interaction between sowing methods and fertilization was significant on number of grains/spike in the first season only. The highest values of number of grains/spike (46.56) obtained from Afir in furrows method under 75 kg N/fed. + inoculation with Serialin.

Concerning the effect of interaction between sowing methods and weed control treatments was significant in first season only. In general all sowing methods with all weed control interactions gave a significant increases in number of grains/spike, compared to broadcast method with untreated plots (34.73).

Fertilization × weed control interaction affected significantly on number of grains/spike first season only. In general all fertilization treatments with all weed control interactions gave a significantly increase number of grains/spike, 50 kg N/fed. with untreated plots (33.9). Under all fertilization treatments, hand weeding twice and Derby + Topik gave the highest values of number of grains/spike.

Sowing methods, fertilization and weed control treatments interactions was significant in 2006/07 season only. The highest value of number of grains/spike (57.3) obtained from Afir in furrows method under 75 kg N/fed. + Serialin with hand weeding twice. Whereas the lowest value of number of grains/spike (32.7) were obtained from Afir broadcast method under 50 kg N/fed. with untreated plots.

6. Grains weight/spike (g):

Results of grains weight/spike of wheat as affected by sowing methods, fertilization, weed control treatments and their interactions in 2006/07 and 2007/08 seasons are presented in Table (25).

Regarding the effect of sowing methods on grains weight/spike it was significant both seasons. Afir in furrows method produced the greatest values of grains weight/spike (2.12 and 1.93 g) in first and second season, respectively, compared with Afir in broadcast (1.89 and 1.79g) and Afir drill (1.97 and 1.88g), respectively, in first and second . These result in harmony with those obtained by **Eissa *et al.* (1993), Nassar (1998) and El-Afandy (2006).**

Nitrogen applications + Serialin affected significantly grain weight/spike in both seasons. In the first season grains weight/spike increased gradually by increasing nitrogen level and inoculation with Serialin. The increment percentages were 12.2, 7.7 and 4.5% at 75 kg N/fed. + Serialin, respectively, compared with 50 kg N/fed., 50 kg/fed. + Serialin and 75 kg/fed. In the second season the increment percentages were 11.9, 7.7 and 4.2% at 75 kg N/fed., respectively, compared with 50 kg N/fed., 50 kg/fed. + Serialin and 75 kg/fed. Similar results obtained by **Peltenen (1992) Kotob (1998) Said *et al.* (1999), Abd El-Hameed (2002), Ibrahim *et al.* (2004), Abd El-Hady *et al.* (2006) and Khaled (2007).**

The available data in Table (25) obviously showed that weed control treatments significantly increased grains weight (g)/spike in both seasons. Weed control treatments could be arranged in ascending order with regard to their increasing effect in the following order: Derby, Topik, Derby + Topik and hand weeding twice, their respective increasing percentages were 18.0, 21.1, 38.5 and 41.0% compared with untreated plots (1.61 g) in

the first season. While in the second season the increment percentages were 22.5, 23.8, 42.9 and 43.5% at Derby, Topik, Derby + Topik and hand weeding twice, respectively, compared to unweeded treatment (1.47g). This results my be due to the high competition between crop plants and weeds in growth factors These result in full agreement of with those obtained by **Pandy and Singh (1994), Nassar(2003), Fakkar (2005) Omar** and **Aioub (2006), Younis (2007) and Ismail *et al. (*2008).**

The interaction between sowing methods and fertilization was significant on grain weight/spike in the first season only. The highest value of grains weight/spike obtained from Afir in furrows method under 75kg N/fed.+ Serialin. Under all sowing the highest values of grains weight/spike obtained from 75kg N/fed. + inoculation with Serialin.

The interaction between sowing methods and weed control treatments significantly affected grains weight/spike in first season only. In general, all sowing methods with all weed control treatments interactions gave significant effect on the grains weight/spike compared Afir broadcast method with unweeded treatment. The best treatments were the application of hand weeding twice and Derby + Topik, these treatments gave the highest value of grain weight/spike under all sowing methods.

7. Number of tillers/m^2:

Number of tillers/m^2 as affected by sowing methods, fertilization and weed control treatments as well as their interactions in 2006/07 and 2007/08 seasons are presented in Table (26).

Data indicated that Afir drill and Afir in furrows methods significantly superior to Afir broadcast method in both seasons on their effect on number of tillers/m^2. Hence, these methods increased number of tillers/m^2 by 8.3 and 4.25%, respectively, compared to Afir broadcast method (413.32) in the first season. In the second season the superiority

percentages were 6.6 and 3.7% respectively, compared to Afir broadcast method (397.3). These results in full agreement with those obtained by **Hassan** and **Hassan (1993) and Nassar (1998).**

Fertilization (nitrogen levels + Serialin) gave a significant effect on the number of tillers/m^2 in both seasons. Nitrogen level at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased number of tillers/m^2 by 13.9, 9.4 and 7.4%, respectively, compared to 50 kg N/fed. (399.84), in the first season. The application of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased number of tillers/m^2 by 17.9, 12.17and 8.1%, respectively as compared to 50 kg N/fed. (375.2) in the second season. These results may be due to the essential major elements which are required in fairly large quantities to promote tillering. These results are in harmony with the findings of **Ahmed (1995), Kaawthar Rabie *et al.* (1995), ElKalla *et al.* (2002) and Ibrahim *et al.* (2004).**

Regarding the effect of weed control treatments on number of tillers/m^2 was significant in both seasons. The application of hand weeding twice, Derby + Topik, Topik and Derby increased significantly values of number of tillers/m^2 by 54.1, 50.4, 34.4 and 29.6%, respectively, compared with weedy check (321.83) in the first season. Whereas, in the second season the application of hand weeding twice, Derby + Topik, Topik and Derby increased significantly the number of tillers/m^2 by 64.3, 60.6, 36.8 and 31.6%, respectively, compared with weedy check (296.42). Similar results obtained by **Salem *et al.*(1994), Satao** and **Padole (1994), Nagla(1998), Nassar (1998) and Younis (2007).**

All interactions between sowing methods, fertilization and weed control treatment were not significant on number of tillers/m^2 in both seasons.

9. Number of spikes/m^2:

The mean values of number of spikes/m^2 as affected by sowing methods, fertilization and weed control treatments as well as their interactions are presented in Table (28).

Data illustrated in Table (28) showed that the number of spikes/m^2 significantly increased under Afir drill and Afir in furrows methods as compared with Afir broadcast method in both seasons. The highest means of spikes number/m^2 were 405.6 and 381.75, produced from Afir drill method in the first and second season, respectively. On the contrary, Afir broadcast method gave the lowest number of spikes/m^2 361.4 and 347.8in the first and second season respectively. These results are in harmony with those obtained by **Rizk (1993), Gouda *et al.* (1994), Nassar (1998), Anaam (2003) and El-Afandy (2006).**

Concerning the effect of fertilization treatments (N levels + inoculation with Serialin) on number of spikes/m^2, results indicated that number of spikes/m^2 was significantly affected by fertilization treatments in both seasons as shown in Table (28). The increment in number of spikes/m^2 by fertilization were 19.7, 13.2 and 9.9% at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin, respectively, as compared with 50 kg N/fed. in the first season. In the second season the addition of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased the number of spikes/m^2 by 26.6, 17.7 and 12.0% respectively, compared with 50 kg N/fed. These results are in agreement with the finding of **Sultan *et al.*** (1993)**, Kaawthar Rabie *et al.* (1995), Hassona** and **Hassanein (1996), Abd El-Hameed (2002), El-Afandy (2006), Gaafar (2007) and Khaled (2007).**

The available data in Table (28) obviously showed that weed control treatments significantly increased number of spikes/m^2 , in both seasons.

The application of hand weeding twice, Derby + Topik, Topik and Derby increased significantly number of spikes/m^2 by 78.7, 73.6, 49.1 and 41.3%, respectively, compared with weedy check (258.17), in the first season. Whereas, in the second season the application of hand weeding twice, Derby + Topik, Topik and Derby increased significantly number of spikes/m^2 94.8, 88.9, 55.7 and 46.8%, respectively, compared with weedy check (232.2). The increases in number of spikes/m^2 is mainly due to the increase of plant number per unit area because of the decreased of competition of weeds associated wheat plants Similar results obtained by **Salem *et al.* (1994), Nassar (1998), Fakkar (1999), Anaam (2003) and Younis (2007).**

All interactions between sowing methods, fertilization and weed control treatments were not significant in 2006/07 and 2007/08 seasons-except for the interaction between sowing methods and weed control treatments in both seasons.

Concerning the effect of interaction between sowing methods and weed control treatments was significant on number of spikes/m^2 in both seasons. Hand weeding twice under Afir drill method gave the highest number of spikes/m^2 495.9 and 486.0 respectively, in first and second season. Meanwhile the lowest value of number of spikes/m^2 (244.6 and 210.5) resulted from Afir broadcast method with untreated plots, in first and second season, respectively.

8. Number of non fertile tillers/m^2:

The affect of sowing methods, fertilization and weed control treatments as well as their interactions on number of non fertile tillers/m^2 in 2006/07 and 2007/08 seasons are presented in Table (27).

Sowing methods affected significantly the number of non fertile tillers/m^2 in both seasons. Afir drill method gave the lowest value of

number of non fertile tillers/m^2 (41.97), mean while the highest value of number of non fertile tillers/m^2 (51.93) resulted from Afir broadcast method, in the first season. Similar trend was detected for the effect of sowing methods in the second season. Sowing wheat plant by Afir drill method gave the lowest value of number of non fertile tillers/m^2 (41.8), compared to Afir broadcast method, which gave the highest value of number of non fertile tillers/m^2 (49.55).

Increasing nitrogen level + inoculation with Serialin significantly decreased the number of non fertile tillers/m^2 in 2006/07 and 2007/08 seasons. The application of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin decreased the number of non fertile tillers by 26.5, 15.6 and 8.9% respectively, compared to 50 kg N/fed. (53.17) in the first season. In the second season number of non fertile tillers was decreased under fertilization at 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin by 32.8, 20.5 and 14.6% compared to 50 kg N/fed. (55.33).

All studied weed control treatments decreased significantly the number of non fertile tillers/m^2, as compared to weedy check, in both seasons. The application of hand weeding twice, Derby + Topik, Topik and Derby gave significant decrement percentages on number of non fertile tillers/m^2 by 45.6, 43.8, 24.9 and 18.3% respectively, compared to weedy check (63.67) in the first season. In the second season, similar trend was detected for the effect of weed control treatments. The application of hand weeding twice, Derby + Topik, Topik and Derby decreased significantly number of non fertile tillers/m^2 by 45.9, 41.5, 31.4 and 23.6% respectively, compared to unweeded treatment (181.36 g/m^2).

All interactions between sowing methods, fertilization and weed control treatments were not significant in 2006/07 and 2007/08 seasons- except for the interaction between sowing methods and weed control treatments in both seasons.

The interaction between sowing methods and weed control treatments significantly decreased the number of non fertile tillers/m^2 in both season. Generally, all sowing methods with all weed control treatments interactions decreased significantly the number of non fertile tillers/m^2 in both seasons. Hand weeding twice under Afir drill method gave the lowest values of number of non fertile tillers/m^2 (28.48 and 28.50) in first and second season, respectively. Meanwhile, the highest values of number of non fertile tillers/m^2 (68.86 and 70.0) obtained from untreated plots under Afir broadcast method, in first and second season, respectively.

10. 1000-grain weight (g).

Results in Table (29) show the effect of sowing methods, fertilization, weed control treatments and interaction on 1000-grain weight (g) during 2000/01 and 2001/02 seasons.

Data revealed that sowing methods had a significant effect on the mean values of 1000-grain weight in both seasons. Sowing wheat plants by Afir in furrows method gave the highest values of 1000-grain weight (43.94 and 43.50 g) in the first and second seasons, respectively. Whereas the lowest values of 1000-grain weight (43.22 and 42.68g) resulted from Afir broadcast method in the first and second seasons, respectively. These results are in harmony with the finding of **Rizk (1993), Salem *et al.*(1993), Nassar (1998) , El-Afandy (2006) and Ismail *et al.*(2008)**

Significant differences on 1000-grain weight (g) were detected between fertilization treatments in both seasons. The application of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased 1000-grain weight by 4.1, 3.2 and 1.5% respectively, compared with 50 kg N/fed. in 2006/07 season. While in 2007/08 seasons Applying 75 kg

N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased 1000-grain weight by 4.6, 2.3 and 1.5%, respectively, compared with 50 kg N/fed. This result may be due to the fact that nitrogen is the essential major elements which are required in large quantities to produce the highest number of grains/spike, which led to decrease the 1000- grains weight. These results are in accordance with reported by **Fayed *et al.* (1993), El-Ganbeehy (1994), Abo-Shetaia and Abd El-Gawad (1995), Eissa (1996), Bassal *et al.* (2001), El-Afandy *et al.* (2006) and Khaled (2007).**

Regarding the effect of weed control treatments on 1000-grain weight (g), data cleared that weight of 1000-grain significantly affected by weed control treatments in the both season as compared to weedy check. Hence, hand weeding twice, Derby + Topik and Topik gave an increase in 1000-grain weight by 11.4, 10.3 and 5.2%, respectively, compared with unweeded treatment in the first season. In the second season weed control treatments could be arranged in ascending order with regard to their increasing effect in the following order: hand weeding twice, Derby + Topik and Topik their respective increasing percentages were 8.9, 8.6 and 1.9%. These results are in harmony with the finding of **Singh** and **Bajapi (1992), Pandy** and **Singh (1994), El-Far** and **Allam (1995), Nassar (1998), Fakkar (2005), Younis (2007) and Esmail *et al.* (2008).**

All interactions between sowing methods, fertilization and weed control treatments were not significant in 2006/07 and 2007/08 seasons-except for the interaction between fertilization and weed control treatments in first season.

Data cleared that 1000-grain weight (g) was significantly affected by the interaction between fertilization and weed control treatments in the first season only. The highest value was recorded from plots fertilized by 75 kg N/fed. + Serialin and hand weeded twice.

11- Grain yield ardab/fed.:

The average values of grain yield ardab/fed. as affected by sowing methods, fertilization, weed control treatments and their interactions during 2006/07 and 2007/08 seasons presented in Table (30).

Data indicated that Afir drill and Afir in furrows methods significantly superior to Afir broadcast method in both seasons on their effect on grain yield ardab/fed. Hence, these methods increased grain yield by 6.5 and 3.7%, respectively, compared to Afir broadcast method (18.24 ardab/fed.) in the first season. In the second the superiority percentages were 11.0 and 6.7% respectively, compared to Afir broadcast method (16.39 ardab/fed.) Grain yield was affected by other characters of yield components such as number of spikes/m^2, number of grains/spike and 1000-grain weight which increased under these two methods. These results are in accordance with those obtained by **Eissa *et al.* (1993), Hassan** and **Hassan (1993).Abd El-Gawwad *et al.* (1994), Gouda *et al.* (1994), Abd El-Hamid (2004) , El-Afandy (2006) and Ismail *et al*. (2008).**

With regard to fertilization (N levels + inoculation with Serialin), the results showed that the grain yield ardab/fed. was significantly affected by fertilization in both seasons. It was observed that the application nitrogen levels at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin gave the highest values of grain yield by 19.9, 19.2 and 18.61 (ardab/fed.), respectively compared to nitrogen level at 50 kg/fed. (17.72 ardab/fed.) and increased grain yield ardab/fed. by 12.3, 8.4 and 5.0% respectively, compared with 50 kg N/fed. in 2006/07 season. In the second season the using of nitrogen levels 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin attained grain yield of 18.85, 17.61 and 17.17 (ardab/fed.), compared with nitrogen level at 50 kg/fed. (15.78 ardab/fed.) and increased grain yield by 19.5, 11.6 and 8.8% respectively, compared with 50 kg

N/fed. the increase in grain yield due to the increase in N levels is a result of the effect of N in increasing number of spikes/m^2, number of grains/spike and 1000-grain weight. Also, a good supply of nitrogen increased yield related vegetative growth characters, e.g. plant height, number of spkeletes/spike and grain filling period, consequently. The increment obtained from inoculation may be due to the role of nitrogen fixation bacteria on increasing the endogenous phytohormones (IAA and GAS) which play an important role of formation a big active root system, increasing the nutrient uptake and photosynthesis rate and translocation as well as accumulation within different plant part. These results are in harmony with the finding of **Abo-Shetia** and **Abd El-Gawwad (1995), Ahmed (1995), Abd El-Monem (1996),Eissa (1996), Atia** and **Ali (1998), Kotob (1998), Abd El-Maaboud (2006), El-Garhi *et al.* (2007), Gaafar (2007) and Khaled (2007).**

Regarding the effect of chemical and mechanical weed control treatments on grain yield ardab/fed., data cleared that grain yield significantly affected by weed control treatments in both seasons as compared to weedy check. Hence, hand weeding twice, Derby + Topik, Topik and Derby gave an increase in grain yield ardab/fed. by 36.0, 34.6, 16.3 and 15.4%, respectively, compared with unweeded treatment in the first season. In the second season the increment percentages due to the application of hand weeding twice, Derby + Topik, Topik and Derby were 28.2, 27.4, 15.1 and 12.4%. This may be attributed to decreasing the competition between wheat plants and weeds and consequently increasing the accumulation of assimilates in wheat plants. Addition to, increasing nitrogen decreased the competition between weeds and wheat plants, which in turn caused an increase in plants growth. The contribution of yield improving are mainly due to the improving of yield attributes of plant tillering which increased number of spikes per unit area (m^2), weight of spikes per plant, green weight per plant, number of grains per spike and 1000-grain weight. Similar results were obtained by **Vànovà (1992), Mirkamali (1993), El-Far** and **Allam (1995), Nagla (1998), Nassar**

(1998), Anaam (2003), Omar and **Aioub (2006), Younis (2007) and Ismail *et al.* (2008).**

The interaction between sowing methods and fertilization treatment (N levels + Serialin) was not significant in both seasons.

The results in Table (30) showed that sowing methods × weed control treatments interactions significantly increased grain yield ardab/fed. in both seasons. Hand weeding twice under Afir drill method gave the highest values of grain yield ardab/fed. (22.17 and 20.05 ardab/fed.), respectively in first and second season. Meanwhile the lowest value of grain yield (15.36 and 14.30 ardab/fed.), resulted from untreated plots under Afir broadcast method. respectively, in first and second season.

The effect of interaction between fertilization and weed control treatments affected significantly on grain yield in the first season only. Under all fertilization treatments the highest values of grain yield obtained from hand weeding twice and Derby + Topik.

The interaction between sowing methods, fertilization and weed control treatments were significant in the first season only. The greatest value grain yield ardab/fed. (23.33 ardab/fed.), obtained from hand weeding twice with 75 kg N/fed.+ Serialin under Afir drill method. Meanwhile, the lowest value of grain yield ardab/fed. (14.13 ardab/fed.), resulted from untreated plots with 50 kg N/fed. under Afir broadcast method.

12- Straw yield (ton/fed.):

Data in Table (31) indicate the differences between the mean values of straw yield ton/fed. as affected by sowing methods, fertilization, weed control treatments and their interactions in 2006/07 and 2007/08 seasons.

Sowing methods significantly affected straw yield ton/fed. in both seasons. Afir drill gave the greatest value of straw yield (4.12 ton/fed.), while the lowest value of straw yield (3.96 ton/fed.) obtained from Afir broadcast method in the first season. Meanwhile, in the second season. sowing wheat plant by Afir drill gave the highest value of straw yield (4.68 ton/fed.), compared to Afir furrows, which gave the lowest value (4.40 ton/fed.). These result in full agreement of with those obtained by **Hassan** and **Hassan (1993).Abd El-Gawwad *et al.* (1994), Gouda *et al.* (1994), Abd El-Hamid (2004) , El-Afandy (2006) and Ismail *et al*. (2008).**

The effect of fertilization on straw yield (ton/fed.) was significant in both seasons. Straw yield (ton/fed.) increased significantly with increasing N Levels up to 75 kg N/fed. + inoculation with Serialin This treatment produced maximum values of straw yield 4.19 ton/fed. in the first season, and 4.76 in the second season. The lowest values in this trait were obtained from 50 kg N/fed. which were 3.90 and 4.26 in first and second season, respectively. The response of straw yield to N levels is nearly similar to that grain yield and reflect the effect of nitrogen fertilizer on stimulating the vegetative growth of wheat i.e. plant height, dry weight of plants/m^2 and number of tillers/m^2. These results are in line with those obtained by **Ahmed (1995), Abd El-Monem (1996),Eissa (1996) Atia** and **Ali (1998), Kotob (1998), Abd El-Maaboud (2006), El-Garhi *et al.* (2007), Gaafar (2007) and Khaled (2007).**

With regard to the effect of weed control treatments on straw yield (ton/fed.) it could be concluded that straw yield (ton/fed.) significantly affected in both seasons. Hand weeding twice produced the maximum straw yields of 4.61 and 5.19 ton/fed. in first and second season respectively. Unweeded treatment gave the lowest values in both seasons, which were 3.18 and 3.74 ton/fed., respectively. Appling hand weeding twice increased the straw yield ton/fed. by 45.0% and 38.8% in first and second season, respectively, Compared with un-weeded plots. The increase in straw yield ton/fed. may be due to the recorded increases in plant height, number of tillers/unite area and dry matter/m^2. These results, generally are in agreement with those obtained **by Vànovà (1992), Mirkamali (1993), El-Far and Allam (1995), Nagla (1998), Nassar (1998), Anaam (2003), Omar and Aioub (2006), Younis (2007) and Ismail *et al.* (2008).**

There was a significant difference of the mean values of straw yield/fed. as affected by interaction between sowing methods and weed control treatments in both seasons as shown in Table (31). The highest values of straw yield was 4.67 and 5.4 ton/fed. in first and second season, respectively produced from Afir drill and Afir in furrows methods with hand weeding twice. While the lowest one was 3.05 and 3.62 ton/fed. respectively, resulted from untreated plots with Afir in broadcast method.

Fertilization and weed control treatments interactions affected significantly on straw yield in the first season only. Under all fertilization treatments the highest values of grain yield obtained from hand weeding twice and Derby + Topik.

The effect of interaction between fertilization × weed control was significant on straw yield in first season only. In general all fertilization treatments with all weed control treatment interactions significantly increased straw yield.

All other interactions between sowing methods, fertilization, weed

control treatments were not significant in both seasons.

IV- Grain Quality:-

Protein Percentage:-

The percentage of wheat grain protein as influenced by sowing methods, fertilization and weed control treatments as well as their interactions in 2006/07 and 2007/08 seasons are shown in Table (32).

The results showed clearly that sowing methods significantly affected protein in wheat grains in both seasons. Afir drill method gave the highest value of grain protein% (12.33 and 12.31%), respectively, in first and second season. Mean while Afir broadcast method gave the lowest values of protein% (12.04 and 12.22%) in first and second season, respectively. These results, generally are in agreement with those obtained by **Mohamed *et al*. (1997) and El-Afandy (2006)**

The results also revealed that fertilization had significant effect on protein% in both seasons. In 2006/07 season, nitrogen level at 75 kg/fed. + Serialin increased significantly protein% by 6.6, 7.7 and 12.37% compared with nitrogen levels at 75 kg N/fed., 50 kg N/fed. + Serialin and 50 kg N/fed., respectively. In 2007/08 season, the using of nitrogen level at nitrogen level at 75 kg/fed. + inoculation with Serialin. increased significantly protein% by 7.0, 7.9 and 13.1%, respectively compared with nitrogen levels at 75 kg N/fed., 50 kg N/fed. + Serialin and 50 kg N/fed., respectively. These results could be ascribed to the function of nitrogen in plant metabolism such as, constituents of amino and nucleic acids and cellular components. These results are in line with those obtained by **El-Bially** and **El-Samie (1995), Mady (1996), Zaher (1996), Sultan *et al.,* (1999), Khalil** and **Mirvat (2001), Jaya** and **Bhatnagar (2005) and Gafaar (2007).**

All studied weed control treatments significantly affected the protein%, as compared to weedy check, in both seasons. The application of hand weeding twice, Derby + Topik, Topik and Derby gave significant increase percentages in protein%, by 14.2, 13.7, 9.7 and 8.0% respectively, compared to weedy check (11.9%) in the first season and 12.9, 12.3, 8.9 and 7.4%, in the second season, respectively, compared to unweeded treatment (11.24. These results in full agreement of with those obtained by **El-Desoky (1990), Wimschneider *et al*. (1990)**, **Salem *et al.* (1994), El-Bially** and **El-Samie (1995), Fakkar (1999), Anaam (2003**) **and Younis (2007)**

The result in Table (31) showed that the interaction between sowing methods and fertilization treatments was significant in second season only. The application of 75 kg N/fed. + Serialin under Afir in furrows method gave the highest values of protein percentage (13.8%). Meanwhile the lowest values protein percentage (11.4%) obtained by 50 kg N/fed. under Afir broadcast method.

Data presented in Table (31) revel that protein% in wheat grains was significantly affected by the interaction between sowing methods and weed control treatments in both seasons. Generally, Hand weeding twice and Derby + Topik gave the highest values protein percentage under all sowing methods in both seasons.

Fertilization (nitrogen levels + Serialin) × weed control treatment interactions was significant in first season only. It was observed that the highest percentage of protein in wheat grains was (13.50%) produced from wheat plants received 75 kg N/fed. + Serialin and treated with hand weeding twice. Whereas the interaction between 50 kg N/fed. with weedy check gave the lowest percentage of protein content in wheat grains (10.61%).

V- Correlation analysis

Data presented in Table (33) indicated that grain yield ardab/fed. was positively and significantly correlated with number of grains/spike, 1000-

grain weight, number of spikes/m^2,Moreover, it was. negatively and significantly correlated with broad leaved weeds at 75 DAS, narrow leaved weeds at 75 DAS, total weeds at 75 DAS , broad leaved weeds at 105 DAS, narrow leaved weeds at 105 DAS and total weeds at 105 DAS in both seasons.

Ismail *et al.*, (2008), indicated that grain yield/fed. was positively and significantly correlated with number of grains/spike, 1000-grain weight, number of spikes/m^2,. Moreover, it was negatively highly significantly correlated with dry weight of broad-leaved weeds, narrow-leaved weeds and total annual weeds. Also, similar results were obtained by **Anaam (2003),** revealed that grain yield ardab/fed. was positively and significantly correlated number of spikes/m^2, number and weight of grains/spike. She added that grain yield ardab/fed. was negatively highly significantly, correlated with dry weight of broad-leaved weeds, narrow-leaved weeds and total annual weeds.

Table (4) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of narrow-leaved weeds g/m^2 at 75 DAS in 2006/07 and 20076/08 seasons.

Treatments		2006/07						20076/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	83.2	4.6	6.7	8.7	73.2	**35.3**	96.4	3.1	5.8	4.9	82.6	**38.5**
	2- 75 Kg N/fed.	108.3	11.6	14.2	18.1	98.6	**50.2**	111.2	9.7	14.3	12.5	103.6	**50.3**
	3- Serialin + 50 Kg N/fed.	91.7	6.6	8.5	11.1	87.3	**41.0**	102.1	8.3	12.1	9.6	93.8	**45.2**
	4- Serialin + 75 Kg N/fed.	129.7	17.9	19.6	21.4	111.8	**60.1**	122.3	13.5	17.4	14.9	17.8	**57.2**
	Mean	**103.2**	**10.2**	**12.25**	**14.8**	**92.7**	**46.6**	**108.0**	**8.7**	**12.4**	**10.5**	**99.5**	**47.8**
2- Afir broadcast	1- 50 Kg N/fed.	121.3	11.6	9.7	13.2	112.1	**53.6**	124.3	5.3	6.7	8.3	109.3	**50.8**
	2- 75 Kg N/fed.	135.7	18.4	14.8	23.4	134.0	**65.3**	146.6	12.2	15.3	17.2	139.8	**66.2**
	3- Serialin + 50 Kg N/fed.	129.2	17.3	12.2	19.5	126.9	**61.0**	136.7	9.9	13.3	16.4	128.6	**61.0**
	4- Serialin + 75 Kg N/fed.	156.1	21.8	18.3	28.0	147.1	**74.3**	167.2	16.4	19.8	21.7	153.7	**75.8**
	Mean	**135.6**	**17.3**	**13.8**	**21.0**	**130.0**	**63.5**	**143.7**	**11.0**	**13.8**	**15.9**	**132.9**	**63.4**
3-Afir in furrows	1- 50 Kg N/fed.	69.7	9.2	16.1	12.1	62.3	**33.9**	85.7	2.7	6.3	4.5	75.8	**35.0**
	2- 75 Kg N/fed.	92.5	14.6	21.3	18.3	83.5	**46.0**	103.4	8.2	17.9	13.5	96.7	**47.9**
	3- Serialin + 50 Kg N/fed.	85.1	15.1	19.2	16.4	77.9	**42.7**	91.4	7.5	12.7	9.3	83.9	**41.0**
	4- Serialin + 75 Kg N/fed.	117.4	20.9	26.0	23.1	97.8	**57.0**	117.6	11.4	20.3	18.6	103.6	**54.3**
	Mean	**91.2**	**15.0**	**20.7**	**17.5**	**80.38**	**44.9**	**99.5**	**7.5**	**14.3**	**11.5**	**90.0**	**44.6**
Means of fertilization	1- 50 Kg N/fed.	91.4	8.5	10.7	11.5	82.5	**40.9**	102.1	3.7	6.2	6.0	89.2	**41.5**
	2- 75 Kg N/fed.	112.2	14.9	18.6	18.1	105.4	**53.8**	120.4	10.0	15.0	15.2	113.4	**54.8**
	3- Serialin + 50 Kg N/fed.	102.0	13.0	14.8	14.2	97.4	**48.3**	110.1	8.6	12.6	11.9	102.1	**49.0**
	4- Serialin + 75 Kg N/fed.	134.4	20.2	23.6	21.9	118.9	**63.8**	135.7	13.8	19.2	18.3	125.0	**62.4**
Means of weed control treatments		**110**	**14.1**	**15.6**	**17.4**	**101.0**		**117.1**	**9.0**	**13.5**	**12.6**	**107.4**	

LSD at 5% level	**A**	**٤,٧٠**	**2.68**
	B	**١,٢٩**	**1.44**
	C	**٢,٤٣**	**1.64**
	AB	**٢,٢٣**	**2.50**
	AC	**٤,٢١**	**2.84**
	BC	**٤,٥٢**	**3.28**
	ABC	**NS**	**NS**

Table (5) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of broad -leaved weeds g/m^2 at 75 DAS in 2006/07 and 20076/08 seasons.

Treatments		2006/07						20076/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	3.9	111.6	5.1	3.7	126.3	**50.1**	3.2	163.2	7.7	5.9	151.2	**66.2**
	2- 75 Kg N/fed.	7.3	123.5	9.6	7.9	161.2	**61. 9**	7.4	212.7	13.2	12.1	196.8	**88.4**
	3- Serialin + 50 Kg N/fed.	5.7	135.7	6.9	6.4	146.8	**60.3**	6.1	195.7	11.2	9.7	182.3	**81.0**
	4- Serialin + 75 Kg N/fed.	12.1	163.0	13.5	10.8	160.5	**72.0**	12.2	235.2	17.5	15.9	219.3	**100.0**
	Mean	**7.3**	**133. 5**	**8. 8**	**7.2**	**148.7**	**61.1**	**7.2**	**201.7**	**12.4**	**10.9**	**187.4**	**83.9**
2- Afir broadcast	1- 50 Kg N/fed.	2.4	127.7	2.3	3.3	142.1	**55.6**	4.3	213.2	8.6	9.9	202.7	**87.7**
	2- 75 Kg N/fed.	6.6	169.1	5.3	7.9	177.8	**73.4**	10.7	245.6	15.7	17.1	238.5	**105.5**
	3- Serialin + 50 Kg N/fed.	5.1	148.3	4.7	5.1	163.0	**65.2**	9.5	234.2	12.8	15.1	221.6	**98.6**
	4- Serialin + 75 Kg N/fed.	6.9	182.7	9.1	9.5	217.9	**85.2**	15.4	257.2	19.3	20.7	247.0	**111.9**
	Mean	**5.2**	**157.0**	**5.4**	**6. 5**	**175.2**	**69.8**	**10.0**	**237.6**	**14.1**	**15.7**	**227.5**	**101.0**
3-Afir in furrows	1- 50 Kg N/fed.	2.2	82.3	9.8	4.1	107.7	**41.8**	2.7	155.5	6.3	5.1	143.7	**160.7**
	2- 75 Kg N/fed.	6.6	121.5	16.9	5.2	136.3	**57.3**	6.8	198.3	13.3	11.2	184.6	**180.8**
	3- Serialin + 50 Kg N/fed.	7.7	106.1	11.9	4.9	124.3	**51.0**	5.3	187.4	9.7	7.4	175.2	**77.0**
	4- Serialin + 75 Kg N/fed.	14.9	134.1	21.9	6.3	176.2	**70.7**	10.3	219.7	17.3	15.6	200.0	**92.6**
	Mean	**7.9**	**111.8**	**15.1**	**5.1**	**136.1**	**55.2**	**6.3**	**190.2**	**11.6**	**9.8**	**175.8**	**78.8**
Means of fertilization	1- 50 Kg N/fed.	2.8	108.2	4.2	5.3	125.4	**49.2**	3.4	177.3	7.6	6.9	165.8	**72.2**
	2- 75 Kg N/fed.	6.8	138.0	7.6	10.0	158.4	**64.2**	8.3	218.8	13.8	13.7	206.6	**92.3**
	3- Serialin + 50 Kg N/fed.	6.2	130.1	5.6	7. 7	144.7	**58.8**	7.0	205.8	11.2	10.7	193.0	**85.6**
	4- Serialin + 75 Kg N/fed.	11.3	159.9	9.7	13.9	184.9	**76.0**	12.6	237.4	17.9	17.5	222.1	**101.5**
Means of weed control treatments		**6.8**	**134.1**	**9.7**	**6.3**	**153.3**		**7.8**	**209.8**	**12.7**	**12.1**	**196.9**	

LSD at 5% level	**A**	٣,٧٥	**2.02**
	B	٤,٣٧	**1.86**
	C	٣,٣٢	**2.37**
	AB	**NS**	**3.23**
	AC	٥,٧٧	**4.10**
	BC	٦,٦٦	**4.73**
	ABC	١١,٥٤	**NS**

Table (6) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of total annual weeds g/m^2 at 75 DAS in 2006/07 and 20076/08 seasons.

Treatments		2006/07						20076/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	87.1	116.2	11.8	12.4	199.5	**85.4**	99.6	166.3	13.5	10.8	233.8	**104.8**
	2- 75 Kg N/fed.	115.6	135.1	23.8	26.0	259.8	**112.1**	118.6	222.4	27.5	24.6	300.4	**138.7**
	3- Serialin + 50 Kg N/fed.	97.4	142.3	15.4	17.5	234.1	**101.3**	108.2	204.0	23.3	19.3	267.1	**126.2**
	4- Serialin + 75 Kg N/fed.	141.8	180.9	33.1	32.2	272.3	**132.1**	134.5	248.7	34.9	30.8	237.1	**157.2**
	Mean	**110.5**	**143.6**	**21.0**	**22.0**	**241.4**	**107.7**	**115.2**	**210.4**	**24.8**	**21.4**	**286.9**	**131.7**
2- Afir broadcast	1- 50 Kg N/fed.	123.7	139.3	12.0	16.5	254.2	**109.1**	128.6	218.5	15.3	18.2	312.0	**138.5**
	2- 75 Kg N/fed.	142.3	287.5	20.1	31.3	311.8	**138.6**	157.3	257.8	31.0	34.3	378.3	**171.7**
	3- Serialin + 50 Kg N/fed.	134.3	165.6	16.9	24.6	289.9	**126.3**	146.2	244.1	26.1	31.5	350.2	**159.6**
	4- Serialin + 75 Kg N/fed.	163.0	204.5	27.4	37.5	365.0	**159.5**	182.6	273.6	39.1	42.4	400.7	**187.7**
	Mean	**140.8**	**174.2**	**19.1**	**27.5**	**305.2**	**133.4**	**135.7**	**248.5**	**27.9**	**31.6**	**360.3**	**164.4**
3-Afir in furrows	1- 50 Kg N/fed.	71.9	91.5	25.9	16.2	170.0	**75.7**	88.4	158.2	12.6	9.6	219.5	**97.7**
	2- 75 Kg N/fed.	99.1	136.1	38.2	23.5	219.8	**103.3**	110.2	206.5	31.2	24.7	281.3	**130.8**
	3- Serialin + 50 Kg N/fed.	92.8	121.3	31.1	21.3	202.2	**93.7**	96.7	194.9	22.4	16.7	259.1	**118.0**
	4- Serialin + 75 Kg N/fed.	132.3	155.0	47.9	29.4	274.0	**127.7**	127.9	231.1	37.6	34.2	303.6	**146.9**
	Mean	**99.0**	**126.7**	**35.8**	**22.6**	**216.5**	**100.1**	**105.8**	**197.7**	**26.0**	**21.3**	**265.9**	**123.3**
Means of fertilization	1- 50 Kg N/fed.	94.2	116.7	14.9	16.8	207.9	**90.1**	105.5	181.0	13.8	12.9	255.1	**113.7**
	2- 75 Kg N/fed.	119.0	152.9	26.2	28.1	263.8	**118.0**	128.7	228.9	28.8	28.9	320.0	**147.1**
	3- Serialin + 50 Kg N/fed.	108.2	143.1	20.4	21.8	242.1	**107.1**	117.0	214.3	23.8	22.6	295.1	**134.6**
	4- Serialin + 75 Kg N/fed.	145.7	180.1	33.3	35.8	303.8	**139.8**	148.3	251.1	37.2	35.8	347.1	**163.9**
Means of weed control treatments		**116.8**	**148.2**	**25.3**	**24.0**	**254.4**		**124.9**	**218.8**	**26.2**	**24.8**	**304.3**	

LSD at 5% level	**A**	**6.44**	**3.76**
	B	**4.53**	**1.77**
	C	**4.30**	**2.90**
	AB	**NS**	**NS**
	AC	**7.45**	**5.02**
	BC	**8.61**	**5.80**
	ABC	**14.91**	**NS**

Table (7) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of narrow-leaved g/m^2 at 105 DAS in 2006/07 and 20076/08 seasons.

Treatments		2006/07						20076/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	165.0	14.2	13.8	15.9	182.3	**78.2**	210.8	7.9	13.5	9.7	197.3	**87.8**
	2- 75 Kg N/fed.	193.6	20.4	23.2	27.4	221.1	**97.1**	245.3	24.5	32.7	25.8	241.3	**113.9**
	3- Serialin + 50 Kg N/fed.	187.3	17.1	18.9	22.6	206.2	**90.4**	238.1	16.8	25.9	21.6	226.5	**105.9**
	4- Serialin + 75 Kg N/fed.	210.8	22.1	26.5	31.2	237.7	**105.7**	281.7	26.7	39.4	33.2	263.5	**128.9**
	Mean	**189.2**	**18.5**	**20.6**	**24.3**	**211.8**	**92.9**	**244.0**	**19.0**	**27.9**	**22.6**	**232.2**	**109.1**
2- Afir broadcast	1- 50 Kg N/fed.	198.7	23.9	28.9	30.3	219.4	**100.2**	227.4	10.3	16.4	19.3	211.7	**97.0**
	2- 75 Kg N/fed.	211.1	28.3	34.3	23.8	244.1	**111.1**	261.8	25.6	32.4	29.4	243.1	**118.5**
	3- Serialin + 50 Kg N/fed.	203.8	25.3	31.3	35.2	226.4	**104.4**	252.3	18.4	29.3	35.6	237.5	**114.6**
	4- Serialin + 75 Kg N/fed.	222.6	32.6	39.6	43.7	266.0	**120.9**	291.4	31.4	39.6	46.3	287.0	**139.1**
	Mean	**209.1**	**27.5**	**33.5**	**36.8**	**239.0**	**109.2**	**258.2**	**21.4**	**29.4**	**32.7**	**244.8**	**117.3**
3-Afir in furrows	1- 50 Kg N/fed.	110.5	10.3	14.4	4.5	120.4	**52.0**	197.4	6.9	10.7	8.5	185.2	**81.7**
	2- 75 Kg N/fed.	143.2	13.8	21.6	17.9	154.3	**70.2**	221.6	15.2	24.5	21.9	210.4	**98.7**
	3- Serialin + 50 Kg N/fed.	121.6	12.1	17.5	20.4	149.0	**64.1**	215.3	12.3	18.4	16.3	202.6	**93.0**
	4- Serialin + 75 Kg N/fed.	161.8	17.9	26.4	23.8	182.7	**82.5**	236.5	21.4	35.2	29.5	225.7	**109.7**
	Mean	**134.3**	**13.5**	**20.0**	**16.7**	**151.6**	**67.2**	**217.7**	**14.0**	**22.2**	**19.1**	**206.0**	**95.8**
Means of fertilization	1- 50 Kg N/fed.	158.1	16.1	16.2	19.7	174.0	**76.8**	211.9	8.4	13.8	12.3	198.1	**88.9**
	2- 75 Kg N/fed.	182.6	20.8	26.3	27.8	206.5	**92.8**	242.9	21.8	28.0	27.6	231.6	**110.4**
	3- Serialin + 50 Kg N/fed.	170.9	18.2	24.8	23.8	193.9	**86.2**	235.2	15.8	25.9	23.1	222.2	**104.5**
	4- Serialin + 75 Kg N/fed.	198.4	24.2	31.3	32.4	228.8	**103.0**	269.9	26.5	38.4	36.0	258.7	**125.9**
Means of weed control treatments		**177.5**	**19.8**	**24.7**	**25.9**	**200.8**		**240.0**	**18.1**	**26.5**	**24.8**	**227.7**	

LSD at 5% level	**A**	**2.39**	**3.39**
	B	**3.16**	**1.96**
	C	**3.20**	**2.80**
	AB	**NS**	**3.39**
	AC	**5.54**	**4.85**
	BC	**6.40**	**5.60**
	ABC	**NS**	**9.70**

Table (8) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of broad -leaved weeds g/m^2 at 105 DAS in 2006/07 and 20076/08 seasons.

Treatments		2006/07						20076/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	22.6	210.7	23.7	26.3	221.3	**100.9**	17.9	298.5	21.2	17.2	269.5	**124.9**
	2- 75 Kg N/fed.	33.3	258.4	29.8	25.8	273.5	**126.2**	25.9	313.7	41.5	38.5	296.5	**143.2**
	3- Serialin + 50 Kg N/fed.	28.3	218.6	26.3	31.9	238.0	**108.6**	23.8	291.8	38.7	28.3	284.1	**133.3**
	4- Serialin + 75 Kg N/fed.	39.7	269.3	37.2	40.3	284.3	**134.2**	33.9	337.4	49.5	46.8	321.5	**157.8**
	Mean	**31.0**	**239.3**	**29.3**	**33.6**	**254.3**	**117.6**	**25.4**	**310.4**	**37.7**	**32.7**	**292.9**	**139.8**
2- Afir broadcast	1- 50 Kg N/fed.	27.3	217.3	33.4	36.7	256.3	**114.2**	27.7	309.7	30.3	31.8	293.2	**138.5**
	2- 75 Kg N/fed.	36.9	239.7	46.8	47.5	299.7	**134.1**	38.7	351.2	41.3	47.5	342.6	**164.3**
	3- Serialin + 50 Kg N/fed.	30.8	231.8	40.3	44.5	279.2	**125.3**	29.4	340.4	33.4	35.6	327.7	**153.3**
	4- Serialin + 75 Kg N/fed.	42.6	273.7	51.6	53.6	325.1	**149.3**	42.7	369.5	52.4	56.8	357.3	**175.7**
	Mean	**34.4**	**240.6**	**43.0**	**45.6**	**290.1**	**130.7**	**34.6**	**342.7**	**39.4**	**42.9**	**330.2**	**158.0**
3-Afir in furrows	1- 50 Kg N/fed.	17.1	172.1	30.8	21.6	185.3	**85.4**	10.4	235.6	11.9	9.3	227.7	**99.0**
	2- 75 Kg N/fed.	25.7	201.5	41.9	35.6	223.7	**105.7**	15.9	282.1	22.2	19.2	262.7	**120.4**
	3- Serialin + 50 Kg N/fed.	19.5	183.2	36.9	31.2	209.3	**96.0**	13.4	271.4	18.7	16.4	251.5	**114.3**
	4- Serialin + 75 Kg N/fed.	29.6	218.7	47.7	40.7	244.6	**116.3**	17.3	299.5	31.7	28.5	288.5	**133.1**
	Mean	**23.1**	**193.9**	**39.3**	**32.3**	**215.7**	**100.9**	**14.3**	**272.2**	**21.1**	**18.4**	**257.6**	**116.7**
Means of fertilization	1- 50 Kg N/fed.	22.4	200.0	27.3	30.2	221.0	**100.2**	18.7	281.3	20.7	19.8	263.5	**120.8**
	2- 75 Kg N/fed.	32.0	233.2	37.6	41.5	265.6	**122.0**	26.8	315.7	36.1	34.0	300.6	**142.6**
	3- Serialin + 50 Kg N/fed.	26.2	211.2	34.0	36.4	242.2	**110.0**	22.2	301.2	30.2	26.8	287.8	**133.6**
	4- Serialin + 75 Kg N/fed.	37.3	253.9	43.8	46.5	284.7	**133.3**	31.3	335.5	44.9	43.6	322.4	**155.6**
Means of weed control treatments		**29.5**	**224.6**	**37.2**	**37.2**	**253.4**		**24.6**	**308.4**	**32.7**	**31.3**	**293.6**	

LSD at 5% level	**A**	**2.04**	**3.57**
	B	**2.62**	**3.71**
	C	**2.58**	**2.95**
	AB	**NS**	**NS**
	AC	**4.46**	**5.12**
	BC	**5.15**	**5.91**
	ABC	**NS**	**10.24**

Table (9) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of total annual weeds g/m^2 at 105 DAS in 2006/07 and 20076/08 seasons.

Treatments		2006/07						20076/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	187.6	224.9	37.5	42.2	403.6	**179.2**	228.7	306.4	34.7	26.9	466.8	**212.7**
	2- 75 Kg N/fed.	226.9	278.8	53.0	53.2	494.6	**223.3**	271.2	338.2	74.2	64.3	537.8	**257.1**
	3- Serialin + 50 Kg N/fed.	215.6	235.7	45.2	54.5	444.2	**199.0**	261.9	308.6	64.6	49.9	510.6	**239.1**
	4- Serialin + 75 Kg N/fed.	250.5	291.4	63.7	71.5	522.0	**239.8**	315.6	364.1	88.9	80.0	585.0	**286.7**
	Mean	**220.2**	**257.7**	**49.9**	**57.9**	**466.1**	**210.4**	**269.4**	**329.3**	**65.6**	**55.3**	**525.1**	**248.9**
2- Afir broadcast	1- 50 Kg N/fed.	226.0	241.2	62.3	67.0	475.7	**214.4**	255.1	320.0	46.7	51.1	504.9	**235.6**
	2- 75 Kg N/fed.	248.0	268.0	81.1	71.3	543.8	**245.2**	300.5	376.8	73.7	76.9	585.7	**282.7**
	3- Serialin + 50 Kg N/fed.	234.6	257.1	71.6	79.7	505.6	**229.7**	281.7	358.8	62.7	71.2	565.2	**267.9**
	4- Serialin + 75 Kg N/fed.	265.2	306.3	91.2	97.3	591.1	**270.2**	334.1	400.9	92.0	103.1	644.3	**314.9**
	Mean	**243.5**	**268.2**	**76.6**	**82.4**	**529.1**	**239.9**	**292.6**	**364.1**	**68.8**	**75.6**	**575.0**	**275.3**
3-Afir in furrows	1- 50 Kg N/fed.	127.6	182.4	45.2	26.1	305.7	**137.5**	207.8	242.5	22.6	17.8	412.9	**180.7**
	2- 75 Kg N/fed.	168.9	215.3	63.5	53.5	378.0	**175.8**	237.5	297.3	46.7	41.1	473.1	**219.1**
	3- Serialin + 50 Kg N/fed.	141.1	195.3	54.4	51.6	358.3	**160.1**	228.7	283.7	37.1	230.7	454.1	**207.3**
	4- Serialin + 75 Kg N/fed.	191.4	236.6	74.1	64.5	427.3	**198.8**	253.8	320.9	66.9	58.0	514.2	**242.8**
	Mean	**157.3**	**207.4**	**59.3**	**48.9**	**367.3**	**168.1**	**232.0**	**286.1**	**43.3**	**37.4**	**463.6**	**212.5**
Means of fertilization	1- 50 Kg N/fed.	180.5	216.2	43.5	49.9	395.0	**177.0**	230.5	289.6	34.5	32.1	461.5	**209.7**
	2- 75 Kg N/fed.	214.6	254.0	63.9	69.3	472.1	**214.8**	269.7	337.4	64.1	61.6	532.2	**253.0**
	3- Serialin + 50 Kg N/fed.	197.1	229.4	58.8	60.2	436.0	**196.2**	257.4	317.0	56.2	49.9	510.0	**238.1**
	4- Serialin + 75 Kg N/fed.	235.7	278.1	75.2	78.9	513.5	**236.3**	301.2	362.0	83.3	79.6	581.2	**281.5**
Means of weed control treatments		**207.0**	**244.4**	**61.9**	**63.0**	**454.2**		**264.7**	**326.5**	**59.2**	**56.1**	**521.2**	

LSD at 5% level	**A**	**3.19**	**3.98**
	B	**4.00**	**3.31**
	C	**4.40**	**4.31**
	AB	**NS**	**5.74**
	AC	**7.62**	**7.47**
	BC	**8.80**	**8.63**
	ABC	**NS**	**14.94**

Table (10) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on plant height (cm) at 90 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	63.0	62.9	57.9	59.0	70.7	**62.7**	71.3	70.8	69.2	68.0	76.5	**71.2**
	2- 75 Kg N/fed.	68.0	65.5	58.3	60.7	75.7	**65.6**	73.8	72.9	71.3	70.9	79.3	**73.6**
	3- Serialin + 50 Kg N/fed.	65.0	63.7	61.6	62.7	73.8	**65.4**	72.3	71.6	70.6	69.8	78.6	**72.6**
	4- Serialin + 75 Kg N/fed.	70.3	67.7	66.3	66.3	77.8	**69.7**	74.7	73.9	71.2	72.3	80.7	**74.6**
	Mean	**66.6**	**64.9**	**61.0**	**62.2**	**74.5**	**65.8**	**73.0**	**72.3**	**70.6**	**70.3**	**78.8**	**73.0**
2- Afir broadcast	1- 50 Kg N/fed.	71.1	68.8	66.4	67.1	76.7	**70.0**	75.3	74.9	71.2	72.3	79.6	**74.7**
	2- 75 Kg N/fed.	74.2	73.4	70.2	70.9	78.7	**73.3**	77.8	76.9	73.6	74.1	82.9	**77.1**
	3- Serialin + 50 Kg N/fed.	71.5	72.5	68.9	64.3	81.4	**71.7**	76.9	75.8	72.9	73.6	81.7	**76.2**
	4- Serialin + 75 Kg N/fed.	74.6	73.9	70.9	72.1	81.3	**74.6**	79.3	78.8	75.3	76.8	84.1	**78.7**
	Mean	**72.9**	**72.6**	**69.1**	**68.6**	**79.3**	**72.3**	**77.3**	**76.6**	**73.3**	**74.2**	**82.1**	**76.7**
3-Afir in furrows	1- 50 Kg N/fed.	69.0	69.9	65.5	66.7	77.2	**69.6**	73.7	72.9	71.7	70.7	79.9	**76.7**
	2- 75 Kg N/fed.	72.5	73.9	70.9	71.5	81.7	**74.1**	77.1	76.2	73.2	71.9	82.8	**76.2**
	3- Serialin + 50 Kg N/fed.	71.8	72.9	69.0	70.2	79.8	**72.7**	74.8	74.1	72.1	71.3	81.9	**74.8**
	4- Serialin + 75 Kg N/fed.	73.1	74.6	71.5	72.3	83.8	**75.1**	79.1	78.7	75.3	74.7	83.7	**78.3**
	Mean	**71.6**	**72.8**	**69.2**	**70.2**	**80.6**	**72.9**	**76.2**	**75.5**	**73.1**	**72.2**	**82.1**	**75.8**
Means of fertilization	1- 50 Kg N/fed.	67.7	67.2	63.3	64.2	74.8	**67.5**	73.4	72.8	70.7	70.3	78.7	**73.2**
	2- 75 Kg N/fed.	71.6	70.9	66.4	67.7	78.0	**70.9**	76.2	75.3	72.7	72.3	81.7	**75.6**
	3- Serialin + 50 Kg N/fed.	69.4	69.7	66.5	65.7	78.3	**69.9**	74.7	73.8	71.8	71.6	80.7	**74.5**
	4- Serialin + 75 Kg N/fed.	72.7	72.1	69.6	70.2	81.0	**73.1**	77.7	77.1	73.9	74.6	82.8	**77.2**
Means of weed control treatments		**70.4**	**70.0**	**66.5**	**67.0**	**78.1**		**75.5**	**74.8**	**72.3**	**72.2**	**81.0**	

LSD at 5% level	**A**	**0.79**	**0.89**
	B	**1.21**	**0.53**
	C	**1.40**	**0.87**
	AB	**NS**	**NS**
	AC	**NS**	**NS**
	BC	**NS**	**NS**
	ABC	**NS**	**NS**

Table (11) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on flag leaf area (cm^2) at 90 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	36.80	37.3	45.30	46.00	31.00	**39.32**	37.40	38.20	42.00	43.10	33.40	**38.82**
	2- 75 Kg N/fed.	42.30	43.10	49.20	48.80	42.33	**45.15**	41.80	42.30	45.20	46.30	36.20	**42.36**
	3- Serialin + 50 Kg N/fed.	39.80	41.10	47.40	46.20	43.90	**41.88**	39.60	40.90	44.10	45.20	35.10	**40.98**
	4- Serialin + 75 Kg N/fed.	46.50	47.80	50.80	49.20	40.70	**47.00**	43.10	43.90	48.50	49.60	38.70	**44.76**
	Mean	**41.35**	**42.33**	**48.18**	**47.55**	**37.28**	**43.34**	**40.48**	**41.33**	**44.95**	**46.05**	**35.85**	**41.73**
2- Afir broadcast	1- 50 Kg N/fed.	35.50	36.00	39.90	38.50	27.40	**35.46**	36.23	37.60	39.70	38.10	31.97	**36.72**
	2- 75 Kg N/fed.	39.90	40.60	44.10	43.20	31.60	**39.88**	40.60	41.40	44.90	43.00	35.30	**41.04**
	3- Serialin + 50 Kg N/fed.	36.90	38.03	42.60	41.77	30.27	**37.19**	39.50	40.10	43.30	42.13	34.30	**39.87**
	4- Serialin + 75 Kg N/fed.	42.10	42.7	46.50	45.80	32.00	**41.94**	42.20	42.80	46.20	45.30	36.40	**42.58**
	Mean	**38.60**	**39.33**	**43.28**	**48.32**	**30.47**	**38.80**	**39.63**	**40.48**	**43.53**	**42.13**	**34.49**	**40.05**
3-Afir in furrows	1- 50 Kg N/fed.	34.80	39.00	43.70	45.10	31.10	**38.74**	38.60	39.93	43.90	44.90	35.10	**40.49**
	2- 75 Kg N/fed.	42.70	43.40	48.50	50.30	37.70	**44.52**	41.30	42.80	46.20	47.50	38.60	**43.28**
	3- Serialin + 50 Kg N/fed.	41.70	42.30	47.20	49.53	34.97	**43.14**	40.30	40.80	45.20	46.30	37.90	**42.10**
	4- Serialin + 75 Kg N/fed.	44.10	46.70	49.80	53.30	41.30	**47.04**	43.90	44.80	49.30	50.40	40.40	**45.76**
	Mean	**40.83**	**42.85**	**47.30**	**49.56**	**36.27**	**43.36**	**41.03**	**42.08**	**46.15**	**47.28**	**38.00**	**43.21**
Means of fertilization	1- 50 Kg N/fed.	35.70	37.43	42.97	43.20	29.90	**37.84**	37.41	38.58	41.87	42.03	33.49	**38.68**
	2- 75 Kg N/fed.	41.63	42.37	47.27	47.73	37.21	**43.18**	41.23	42.17	45.43	45.60	36.70	**42.23**
	3- Serialin + 50 Kg N/fed.	39.47	40.48	45.73	45.83	33.38	**40.98**	39.80	40.60	44.20	44.54	35.77	**40.98**
	4- Serialin + 75 Kg N/fed.	44.23	45.73	49.03	49.43	38.20	**45.33**	43.07	43.83	48.00	48.43	37.50	**45.03**
Means of weed control treatments		**40.26**	**41.50**	**46.25**	**46.48**	**34.68**		**40.38**	**41.29**	**44.88**	**45.15**	**36.15**	

LSD at 5% level	**A**	**0.25**	**0.60**
	B	**0.69**	**0.73**
	C	**0.71**	**0.58**
	AB	**NS**	**1.26**
	AC	**1.23**	**1.02**
	BC	**1.42**	**1.18**
	ABC	**2.46**	**2.04**

Table (12) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of leaves (g/m^2) at 90 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	142.3	150.7	180.9	186.9	115.8	**155.3**	168.7	176.8	217.9	232.2	154.3	**190.0**
	2- 75 Kg N/fed.	166.9	196.0	218.0	242.0	143.2	**193.2**	192.9	199.3	260.8	270.4	175.8	**219.8**
	3- Serialin + 50 Kg N/fed.	178.6	179.6	224.0	230.8	125.6	**187.7**	174.6	181.4	234.7	256.5	161.3	**201.7**
	4- Serialin + 75 Kg N/fed.	188.8	191.7	310.7	244.5	166.4	**220.4**	206.4	218.1	271.2	284.8	193.6	**234.8**
	Mean	**169.2**	**179.5**	**233.4**	**226.1**	**137.8**	**189.2**	**185.7**	**193.9**	**246.2**	**261.0**	**171.3**	**211.6**
2- Afir broadcast	1- 50 Kg N/fed.	159.8	169.8	198.1	197.7	127.2	**170.5**	150.4	159.3	201.6	192.5	130.7	**166.9**
	2- 75 Kg N/fed.	174.4	186.3	226.3	217.9	145.3	**190.0**	168.3	178.2	236.2	225.6	153.1	**192.3**
	3- Serialin + 50 Kg N/fed.	180.3	190.9	231.5	207.5	130.4	**188.1**	154.6	160.0	221.7	211.7	148.0	**179.2**
	4- Serialin + 75 Kg N/fed.	188.8	192.9	217.8	244.5	162.9	**201.4**	178.7	191.5	251.2	243.8	178.7	**208.8**
	Mean	**175.8**	**185**	**218.4**	**216.9**	**141.5**	**187.5**	**163.0**	**172.3**	**227.7**	**218.4**	**152.6**	**186.8**
3-Afir in furrows	1- 50 Kg N/fed.	155.5	166.5	186.9	201.7	127.7	**167.7**	169.6	173.8	205.3	212.3	142.5	**180.7**
	2- 75 Kg N/fed.	184.1	187.9	206.1	235.8	159.9	**194.7**	185.4	193.8	249.3	253.9	169.6	**210.4**
	3- Serialin + 50 Kg N/fed.	169.5	178.5	215.1	227.0	150.5	**188.1**	176.2	181.6	234.7	240.0	153.1	**197.1**
	4- Serialin + 75 Kg N/fed.	184.6	193.4	253.7	253.7	157.0	**208.5**	196.8	202.4	253.9	268.8	182.6	**220.9**
	Mean	**173.4**	**181.6**	**215.5**	**229.5**	**148.8**	**189.8**	**182.0**	**187.9**	**235.8**	**243.8**	**162.0**	**202.3**
Means of fertilization	1- 50 Kg N/fed.	152.5	162.3	188.6	195.4	123.6	**164.5**	162.9	160.0	208.3	212.3	142.5	**179.2**
	2- 75 Kg N/fed.	175.1	190.1	216.8	231.9	149.5	**192.7**	182.2	190.4	248.8	250.0	166.2	**207.5**
	3- Serialin + 50 Kg N/fed.	176.1	183.0	223.5	221.8	135.5	**188.0**	168.5	174.3	230.4	236.1	154.1	**192.7**
	4- Serialin + 75 Kg N/fed.	187.4	192.7	260.7	247.6	162.1	**210.9**	194.0	204.0	258.8	265.8	185.0	**221.5**
Means of weed control treatments		**172.8**	**182.0**	**222.4**	**224.2**	**142.7**		**176.8**	**184.7**	**236.5**	**241.0**	**161.9**	
LSD at 5% level		**A**		**NS**				**5.01**					
		B		**3.21**				**4.49**					
		C		**3.26**				**4.43**					
		AB		**5.55**				**NS**					
		AC		**5.64**				**7.67**					
		BC		**6.51**				**8.85**					
		ABC		**11.28**				**NS**					

Table (13) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of stems (g/m^2) at 90 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	247.7	263.6	320.4	356.0	230.3	**284.1**	307.2	321.1	396.8	408.5	243.7	**335.5**
	2- 75 Kg N/fed.	287.0	299.0	398.3	388.7	244.6	**323.5**	343.7	361.9	451.2	469.9	278.9	**381.1**
	3- Serialin + 50 Kg N/fed.	275.2	287.6	371.0	380.7	238.0	**310.5**	326.9	349.3	437.1	441.1	261.9	**363.3**
	4- Serialin + 75 Kg N/fed.	313.2	325.3	403.5	441.7	256.2	**348.0**	361.9	380.8	461.7	487.5	294.3	**397.2**
	Mean	**280.8**	**394.0**	**373.8**	**391.7**	**242.3**	**316.5**	**334.9**	**353.3**	**436.7**	**451.8**	**269.7**	**369.3**
2- Afir broadcast	1- 50 Kg N/fed.	241.3	255.5	306.7	314.3	197.6	**263.1**	276.7	284.8	352.5	349.3	226.9	**298.0**
	2- 75 Kg N/fed.	275.6	283.3	370.2	371.7	226.0	**305.4**	308.2	336.5	397.2	381.9	266.7	**338.1**
	3- Serialin + 50 Kg N/fed.	270.8	292.0	358.7	352.7	213.5	**297.5**	297.6	321.6	388.0	374.3	246.4	**325.6**
	4- Serialin + 75 Kg N/fed.	288.4	298.3	402.1	397.2	236.3	**324.5**	352.0	368.0	429.0	406.5	284.8	**368.1**
	Mean	**269.0**	**282.3**	**359.4**	**359.0**	**218.4**	**297.6**	**308.6**	**327.7**	**391.7**	**378.0**	**256.2**	**332.5**
3-Afir in furrows	1- 50 Kg N/fed.	233.9	268.5	315.2	336.4	213.7	**273.5**	299.6	311.3	369.8	383.5	236.5	**320.1**
	2- 75 Kg N/fed.	194.0	288.2	375.6	389.2	235.0	**296.4**	341.1	352.5	412.9	433.1	270.6	**362.0**
	3- Serialin + 50 Kg N/fed.	254.7	276.0	361.0	347.0	229.7	**293.4**	321.6	330.5	398.2	415.5	245.3	**342.2**
	4- Serialin + 75 Kg N/fed.	283.0	287.0	285.0	290.3	252.2	**319.5**	353.2	368.0	459.3	475.2	283.7	**387.9**
	Mean	**241.4**	**279.9**	**359.2**	**365.7**	**232.7**	**295.2**	**328.9**	**340.6**	**410.1**	**426.8**	**258.0**	**353.1**
Means of fertilization	1- 50 Kg N/fed.	241.0	262.6	314.8	335.6	213.9	**273.6**	294.5	305.7	373.0	380.4	235.7	**317.9**
	2- 75 Kg N/fed.	252.2	290.2	281.4	383.2	235.2	**308.4**	331.0	350.3	42.4	428.3	272.1	**360.4**
	3- Serialin + 50 Kg N/fed.	266.9	285.2	363.6	360.1	227.1	**300.6**	315.4	333.8	407.8	410.3	251.2	**343.7**
	4- Serialin + 75 Kg N/fed.	294.9	303.5	396.9	409.7	248.2	**330.7**	355.7	372.3	450.0	456.4	287.6	**384.4**
Means of weed control treatments		**263.7**	**285.4**	**364.1**	**372.2**	**231.1**		**324.1**	**340.5**	**412.8**	**418.9**	**261.6**	

LSD at 5% level	**A**	**10.20**	**25.53**
	B	**12.90**	**20.45**
	C	**18.62**	**13.34**
	AB	**NS**	**NS**
	AC	**NS**	**23.11**
	BC	**NS**	**NS**
	ABC	**NS**	**NS**

Table (14) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on total dry weight of plants (g/m^2) at 90 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	390.0	414.3	501.3	542.9	346.1	**439.4**	475.9	497.9	614.7	640.7	398.0	**525.4**
	2- 75 Kg N/fed.	453.9	495.0	616.3	630.7	387.8	**516.8**	536.6	561.2	712.0	740.3	454.7	**601.0**
	3- Serialin + 50 Kg N/fed.	453.8	467.2	595.0	611.5	363.6	**498.2**	501.5	530.7	671.8	697.6	423.2	**565.0**
	4- Serialin + 75 Kg N/fed.	502.0	517.0	714.2	686.2	422.6	**568.4**	568.3	598.9	732.9	772.3	487.9	**632.1**
	Mean	**449.9**	**573.4**	**607.2**	**617.8**	**380.0**	**505.7**	**520.6**	**547.2**	**682.9**	**712.7**	**441.0**	**580.9**
2- Afir broadcast	1- 50 Kg N/fed.	401.1	425.3	504.8	512.0	324.8	**433.6**	427.1	444.1	554.1	541.8	357.6	**464.9**
	2- 75 Kg N/fed.	450.0	469.6	596.5	589.6	371.3	**495.4**	476.5	514.7	633.4	607.5	419.8	**530.4**
	3- Serialin + 50 Kg N/fed.	451.1	482.9	590.2	560.2	343.9	**485.7**	452.2	481.6	609.7	586.0	394.4	**504.8**
	4- Serialin + 75 Kg N/fed.	477.2	491.2	619.9	641.7	399.2	**525.8**	530.7	559.5	680.2	650.3	463.5	**576.8**
	Mean	**444.9**	**467.3**	**577.9**	**575.9**	**359.8**	**485.1**	**471.6**	**500.0**	**619.4**	**596.4**	**408.8**	**519.2**
3-Afir in furrows	1- 50 Kg N/fed.	389.4	435.0	502.1	538.1	341.4	**441.2**	469.2	485.1	575.1	595.8	379.0	**500.8**
	2- 75 Kg N/fed.	378.1	476.1	581.7	625.0	394.9	**491.1**	526.5	546.3	662.2	687.0	440.2	**572.4**
	3- Serialin + 50 Kg N/fed.	424.2	454.5	576.1	574.0	380.2	**481.8**	497.8	512.1	632.9	655.5	398.4	**539.3**
	4- Serialin + 75 Kg N/fed.	467.6	480.4	538.7	544.0	409.2	**528.0**	550.0	570.4	713.2	744.0	466.3	**608.8**
	Mean	**414.8**	**461.5**	**574.7**	**595.3**	**381.4**	**484.9**	**510.9**	**528.5**	**645.9**	**670.6**	**420.0**	**555.4**
Means of fertilization	1- 50 Kg N/fed.	393.5	425.0	503.4	531.0	337.5	**438.1**	457.4	475.7	581.3	592.8	378.2	**497.1**
	2- 75 Kg N/fed.	427.3	480.2	498.2	615.1	384.7	**501.1**	513.2	540.7	291.2	678.3	438.2	**567.9**
	3- Serialin + 50 Kg N/fed.	443.0	468.2	587.1	581.9	362.6	**488.6**	483.8	508.1	638.1	646.4	405.3	**536.4**
	4- Serialin + 75 Kg N/fed.	482.3	496.2	657.6	657.3	410.3	**541.6**	549.7	576.3	708.8	722.2	472.6	**605.9**
Means of weed control treatments		**436.5**	**467.4**	**586.6**	**596.3**	**373.8**		**501.0**	**525.2**	**649.4**	**659.9**	**423.6**	

LSD at 5% level	**A**	**14.95**	**21.74**
	B	**13.62**	**20.22**
	C	**18.82**	**13.79**
	AB	**NS**	**NS**
	AC	**NS**	**23.89**
	BC	**37.63**	**NS**
	ABC	**NS**	**NS**

Table (15) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on plant height (cm) at 120 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	95.8	91.4	90.6	91.3	98.6	**93.5**	97.0	96.6	94.1	93.6	104.7	**97.2**
	2- 75 Kg N/fed.	100.2	98.8	93.3	94.2	101.8	**97.7**	100.6	99.3	97.0	96.8	106.8	**100.1**
	3- Serialin + 50 Kg N/fed.	96.3	95.1	91.8	92.7	101.2	**95.4**	98.7	97.7	96.1	95.6	105.5	**98.7**
	4- Serialin + 75 Kg N/fed.	100.3	99.7	96.6	91.3	106.2	**98.8**	101.5	101.1	98.5	97.9	108.0	**101.1**
	Mean	**98.1**	**96.2**	**93.1**	**92.4**	**102.0**	**96.4**	**99.5**	**98.7**	**96.4**	**96.0**	**106.3**	**99.4**
2- Afir broadcast	1- 50 Kg N/fed.	100.9	98.8	94.2	96.1	102.4	**98.5**	99.4	98.4	95.5	96.6	106.6	**99.3**
	2- 75 Kg N/fed.	106.9	105.9	99.1	101.7	108.5	**104.4**	103.1	102.6	99.8	100.9	109.0	**103.1**
	3- Serialin + 50 Kg N/fed.	101.6	100.3	96.5	98.2	103.6	**100.0**	101.7	101.4	97.6	98.7	108.3	**101.5**
	4- Serialin + 75 Kg N/fed.	109.3	108.2	104.5	105.9	110.6	**107.7**	104.7	103.0	101.7	103.0	111.9	**104.9**
	Mean	**104.7**	**103.3**	**98.6**	**100.5**	**106.3**	**102.7**	**102.2**	**101.4**	**98.7**	**99.8**	**109.0**	**102.2**
3-Afir in furrows	1- 50 Kg N/fed.	101.4	100.4	96.2	95.3	103.6	**99.4**	98.5	97.3	94.7	93.9	105.7	**98.0**
	2- 75 Kg N/fed.	103.9	103.0	99.6	98.1	106.1	**102.1**	102.4	101.9	97.6	97.2	108.1	**101.4**
	3- Serialin + 50 Kg N/fed.	101.5	100.6	97.6	96.4	105.6	**100.3**	99.8	101.1	96.9	96.8	107.1	**100.3**
	4- Serialin + 75 Kg N/fed.	106.3	105.8	100.2	99.8	109.9	**104.4**	103.7	102.6	99.9	99.6	110.7	**103.3**
	Mean	**103.3**	**102.5**	**98.4**	**97.4**	**106.3**	**101.6**	**101.1**	**100.7**	**97.3**	**96.9**	**107.9**	**100.8**
Means of fertilization	1- 50 Kg N/fed.	99.4	96.9	93.7	94.2	101.5	**97.1**	98.3	97.4	94.8	94.7	105.7	**98.2**
	2- 75 Kg N/fed.	103.7	102.6	97.3	98.0	105.5	**101.4**	102.0	101.3	98.1	98.3	108.0	**101.5**
	3- Serialin + 50 Kg N/fed.	99.8	98.7	95.3	95.8	103.5	**98.6**	100.1	100.1	96.9	97.0	107.0	**100.2**
	4- Serialin + 75 Kg N/fed.	105.3	104.6	100.4	99.0	108.9	**103.6**	103.3	102.2	100.0	100.2	110.2	**103.2**
Means of weed control treatments		**102.0**	**100.7**	**96.7**	**96.8**	**104.8**		**100.9**	**100.3**	**97.5**	**97.6**	**107.7**	

LSD at 5% level	**A**	**0.25**	**0.37**
	B	**0.41**	**0.65**
	C	**0.71**	**0.65**
	AB	**0.31**	**NS**
	AC	**0.54**	**NS**
	BC	**0.62**	**NS**
	ABC	**1.08**	**NS**

Table (16) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on flag leaf area (cm^2) at 120 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	37.10	39.10	41.60	42.00	30.30	**38.02**	34.70	35.40	39.30	40.30	30.70	**36.08**
	2- 75 Kg N/fed.	41.60	42.10	47.00	48.30	34.10	**42.62**	36.90	37.60	42.60	43.20	33.90	**38.84**
	3- Serialin + 50 Kg N/fed.	38.00	39.20	42.40	43.60	33.20	**39.28**	35.60	36.10	41.30	42.10	32.90	**37.60**
	4- Serialin + 75 Kg N/fed.	42.00	44.10	49.50	50.30	35.10	**44.20**	37.60	38.30	44.10	45.80	35.90	**40.34**
	Mean	**39.68**	**41.13**	**45.13**	**46.05**	**33.18**	**41.03**	**36.20**	**36.85**	**41.83**	**42.85**	**33.35**	**38.22**
2- Afir broadcast	1- 50 Kg N/fed.	36.30	37.00	42.40	41.70	30.00	**37.48**	33.60	34.30	38.20	37.60	29.50	**34.64**
	2- 75 Kg N/fed.	39.10	39.40	45.50	43.10	34.20	**40.26**	35.90	36.60	41.60	39.80	32.40	**37.26**
	3- Serialin + 50 Kg N/fed.	37.80	38.30	43.70	42.30	32.80	**38.98**	34.30	35.90	39.20	38.10	31.50	**35.80**
	4- Serialin + 75 Kg N/fed.	40.10	41.20	46.00	44.80	36.30	**41.68**	36.90	37.40	43.20	41.10	33.30	**38.38**
	Mean	**38.33**	**38.98**	**44.40**	**42.98**	**33.33**	**39.60**	**35.18**	**36.05**	**40.55**	**39.15**	**31.68**	**36.52**
3-Afir in furrows	1- 50 Kg N/fed.	37.40	38.00	40.30	41.10	31.90	**37.74**	34.20	34.90	38.20	39.60	30.40	**35.46**
	2- 75 Kg N/fed.	40.20	41.10	44.20	45.90	34.80	**41.24**	36.30	37.40	41.70	42.50	33.50	**38.28**
	3- Serialin + 50 Kg N/fed.	39.90	41.40	42.50	43.00	34.00	**40.16**	35.00	36.60	39.90	40.70	32.20	**36.88**
	4- Serialin + 75 Kg N/fed.	41.40	41.70	46.20	47.10	37.00	**42.68**	37.60	38.20	43.80	44.60	34.30	**39.70**
	Mean	**39.73**	**40.55**	**43.30**	**44.28**	**34.23**	**40.36**	**35.78**	**36.78**	**40.90**	**41.85**	**32.60**	**37.58**
Means of fertilization	1- 50 Kg N/fed.	36.93	38.03	41.43	41.60	30.73	**37.75**	34.17	34.87	38.57	39.17	30.20	**35.39**
	2- 75 Kg N/fed.	40.30	40.86	45.56	45.76	34.36	**41.37**	36.37	37.20	41.97	41.83	33.27	**38.13**
	3- Serialin + 50 Kg N/fed.	38.56	39.63	42.86	42.96	33.33	**39.47**	34.97	36.20	40.13	40.30	32.20	**36.76**
	4- Serialin + 75 Kg N/fed.	41.16	42.33	47.23	47.40	36.13	**42.85**	37.37	37.97	43.70	43.83	34.50	**39.47**
Means of weed control treatments		**39.24**	**40.22**	**44.26**	**44.43**	**33.64**		**35.72**	**36.56**	**41.09**	**41.28**	**32.54**	

LSD at 5% level	**A**	**0.93**	**1.00**
	B	**0.37**	**0.57**
	C	**0.51**	**0.65**
	AB	**0.63**	**NS**
	AC	**0.88**	**NS**
	BC	**NS**	**NS**
	ABC	**NS**	**NS**

Table (17) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of leaves (g/m^2) at 120 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	197.8	209.6	235.8	245.3	163.0	**210.3**	193.8	202.3	242.7	245.7	171.2	**211.1**
	2- 75 Kg N/fed.	236.7	241.1	264.8	257.8	186.7	**237.4**	239.7	250.3	271.2	284.6	197.9	**248.7**
	3- Serialin + 50 Kg N/fed.	213.1	219.7	249.3	258.4	173.7	**22.8**	218.3	231.4	263.2	273.2	188.2	**234.9**
	4- Serialin + 75 Kg N/fed.	242.3	252.5	284.8	280.3	190.7	**250.1**	254.2	269.3	294.3	312.7	228.4	**271.8**
	Mean	**222.5**	**230.7**	**258.7**	**260.5**	**178.5**	**230.2**	**226.5**	**238.3**	**267.9**	**279.1**	**196.4**	**241.6**
2- Afir broadcast	1- 50 Kg N/fed.	181.9	193.8	209.8	197.3	133.9	**183.3**	179.1	188.4	222.8	205.2	147.2	**188.5**
	2- 75 Kg N/fed.	214.9	227.0	244.5	233.3	164.7	**216.9**	196.2	218.7	262.6	241.7	174.8	**218.8**
	3- Serialin + 50 Kg N/fed.	198.4	203.4	238.6	227.4	148.2	**203.2**	187.4	194.5	245.5	227.3	158.3	**202.6**
	4- Serialin + 75 Kg N/fed.	238.2	245.6	267.9	258.3	174.3	**136.9**	217.4	203.8	274.1	265.6	191.6	**230.5**
	Mean	**208.4**	**217.5**	**240.2**	**229.1**	**155.3**	**210.1**	**195.0**	**201.4**	**251.3**	**235.0**	**168.0**	**210.1**
3-Afir in furrows	1- 50 Kg N/fed.	181.7	192.4	216.3	241.1	153.6	**197.0**	184.9	196.9	224.3	237.8	154.5	**199.7**
	2- 75 Kg N/fed.	213.7	228.0	249.3	268.5	178.1	**227.5**	214.8	226.3	264.3	275.6	186.2	**233.4**
	3- Serialin + 50 Kg N/fed.	198.7	212.2	234.4	250.3	168.9	**212.9**	199.9	211.7	251.3	262.3	178.7	**220.8**
	4- Serialin + 75 Kg N/fed.	224.4	236.0	266.4	278.1	183.0	**237.7**	241.8	232.6	281.2	293.8	199.3	**249.7**
	Mean	**204.6**	**217.2**	**241.6**	**259.5**	**171.0**	**218.8**	**210.4**	**216.9**	**255.3**	**267.4**	**179.7**	**225.9**
Means of fertilization	1- 50 Kg N/fed.	187.1	198.6	220.6	227.9	150.2	**196.9**	185.9	195.9	229.9	229.7	157.6	**199.8**
	2- 75 Kg N/fed.	221.8	232.0	252.9	253.2	176.5	**227.3**	216.9	231.8	266.0	267.3	186.3	**233.7**
	3- Serialin + 50 Kg N/fed.	203.4	211.8	240.8	245.4	163.6	**213.0**	201.9	212.5	253.3	254.3	175.1	**219.4**
	4- Serialin + 75 Kg N/fed.	235.0	244.7	273.0	272.2	182.8	**241.6**	237.8	235.2	283.2	290.7	206.4	**250.7**
Means of weed control treatments		**211.8**	**221.8**	**246.8**	**249.7**	**168.3**		**210.6**	**218.9**	**258.1**	**260.5**	**181.4**	

LSD at 5% level	**A**	**1.73**	**13.76**
	B	**2.25**	**10.75**
	C	**1.78**	**12.48**
	AB	**3.90**	**18.61**
	AC	**3.08**	**NS**
	BC	**3.56**	**NS**
	ABC	**6.17**	**NS**

Table (18) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on dry weight of stems (g/m^2) at 120 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	460.5	473.5	561.2	590.7	373.5	**491.9**	494.8	509.3	585.2	610.7	430.9	**526.2**
	2- 75 Kg N/fed.	539.7	551.2	646.4	663.7	433.8	**567.0**	550.9	575.2	689.3	729.1	484.2	**605.7**
	3- Serialin + 50 Kg N/fed.	517.2	535.7	608.8	620.8	410.9	**538.7**	528.5	562.7	627.2	678.9	452.6	**570.0**
	4- Serialin + 75 Kg N/fed.	583.6	600.3	693.7	729.6	468.5	**615.1**	602.7	634.1	757.9	785.6	523.7	**660.8**
	Mean	**525.3**	**540.2**	**627.5**	**651.2**	**421.7**	**553.2**	**544.2**	**570.3**	**664.9**	**701.1**	**472.9**	**590.7**
2- Afir broadcast	1- 50 Kg N/fed.	434.2	448.3	531.0	526.0	374.1	**462.7**	454.4	468.8	575.2	540.3	387.7	**485.3**
	2- 75 Kg N/fed.	489.1	526.4	637.8	612.3	401.6	**533.4**	528.5	535.2	689.3	657.2	421.3	**566.3**
	3- Serialin + 50 Kg N/fed.	459.7	493.2	600.2	585.0	393.6	**506.3**	490.7	502.2	627.2	602.7	404.0	**525.4**
	4- Serialin + 75 Kg N/fed.	522.1	529.6	687.8	654.9	434.2	**565.7**	542.6	554.7	702.1	687.2	468.8	**591.1**
	Mean	**476.3**	**499.4**	**614.2**	**594.6**	**400.9**	**517.1**	**504.1**	**515.2**	**648.5**	**621.9**	**420.5**	**542.0**
3-Afir in furrows	1- 50 Kg N/fed.	457.1	462.9	538.7	562.1	351.5	**474.5**	473.2	490.7	556.0	587.0	414.7	**504.3**
	2- 75 Kg N/fed.	529.3	562.1	630.6	638.9	413.9	**555.0**	553.2	587.0	696.0	708.3	468.8	**602.7**
	3- Serialin + 50 Kg N/fed.	513.9	538.7	608.8	620.8	371.5	**530.7**	513.6	522.1	639.5	669.6	454.4	**556.8**
	4- Serialin + 75 Kg N/fed.	584.3	598.1	684.2	691.2	443.2	**600.2**	579.2	604.3	721.6	756.3	490.0	**630.3**
	Mean	**521.2**	**540.5**	**615.6**	**628.3**	**395.0**	**540.1**	**529.8**	**551.0**	**653.3**	**680.3**	**457.0**	**574.3**
Means of fertilization	1- 50 Kg N/fed.	450.6	461.6	543.6	559.6	366.4	**476.4**	474.1	489.6	572.1	579.3	411.1	**505.3**
	2- 75 Kg N/fed.	519.4	546.6	638.3	638.3	416.4	**551.8**	544.2	565.8	691.5	698.2	458.1	**591.7**
	3- Serialin + 50 Kg N/fed.	496.9	522.5	605.9	608.9	392.0	**525.3**	510.9	529.0	631.3	650.4	437.0	**551.7**
	4- Serialin + 75 Kg N/fed.	563.3	576.0	688.6	691.9	448.6	**593.0**	574.8	597.7	727.2	743.0	494.2	**627.4**
Means of weed control treatments		**507.6**	**526.7**	**619.1**	**624.7**	**405.9**		**526.0**	**545.5**	**655.5**	**667.7**	**450.1**	

LSD at 5% level	**A**	**5.11**	**7.87**
	B	**2.13**	**4.27**
	C	**3.01**	**4.76**
	AB	**3.68**	**7.39**
	AC	**5.22**	**8.25**
	BC	**6.02**	**9.52**
	ABC	**10.43**	**16.49**

Table (19) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on total dry weight of plants (g/m^2) at 120 DAS in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	658.3	683.1	797.0	836.0	536.5	**702.2**	688.6	711.6	827.9	856.4	602.1	**737.3**
	2- 75 Kg N/fed.	776.4	792.3	911.2	921.5	620.5	**804.4**	790.6	825.5	960.5	1013.7	682.1	**854.5**
	3- Serialin + 50 Kg N/fed.	730.3	755.4	858.1	879.2	584.6	**761.5**	746.8	794.1	890.4	952.1	640.8	**804.8**
	4- Serialin + 75 Kg N/fed.	825.9	852.8	978.5	1009.9	659.2	**865.3**	856.9	903.4	1052.2	1098.3	752.1	**932.6**
	Mean	**747.7**	**770.9**	**886.2**	**911.7**	**600.2**	**783.3**	**770.7**	**808.7**	**932.8**	**980.1**	**669.3**	**832.3**
2- Afir broadcast	1- 50 Kg N/fed.	616.1	642.1	740.8	723.3	508.0	**646.1**	633.5	657.2	798.0	745.5	534.9	**673.8**
	2- 75 Kg N/fed.	704.0	753.4	882.3	845.6	566.3	**750.3**	724.7	753.9	951.9	898.9	596.1	**785.1**
	3- Serialin + 50 Kg N/fed.	658.1	696.6	838.8	812.4	541.8	**709.5**	678.1	696.7	872.7	830.0	562.3	**728.0**
	4- Serialin + 75 Kg N/fed.	760.3	775.2	955.7	913.2	608.5	**702.6**	760.0	758.5	976.2	952.8	660.4	**821.6**
	Mean	**684.6**	**716.8**	**854.4**	**823.6**	**556.2**	**727.1**	**699.1**	**716.6**	**899.7**	**856.8**	**588.4**	**752.1**
3-Afir in furrows	1- 50 Kg N/fed.	638.8	655.3	755.0	803.2	505.1	**671.5**	658.1	687.6	780.3	824.8	569.2	**704.0**
	2- 75 Kg N/fed.	743.0	790.1	879.9	907.4	592.0	**782.5**	768.0	813.3	960.3	983.9	655.0	**836.1**
	3- Serialin + 50 Kg N/fed.	712.6	750.9	843.2	871.1	540.4	**743.6**	713.5	733.8	890.8	931.9	633.1	**777.6**
	4- Serialin + 75 Kg N/fed.	808.7	834.1	950.6	969.3	626.2	**837.9**	821.0	836.9	1002.8	1050.1	689.3	**880.0**
	Mean	**725.8**	**757.6**	**857.2**	**887.8**	**566.0**	**758.9**	**740.2**	**767.9**	**908.6**	**947.7**	**636.7**	**800.2**
Means of fertilization	1- 50 Kg N/fed.	637.7	660.2	764.3	787.5	516.5	**673.2**	660.1	685.5	802.1	809.0	568.7	**705.1**
	2- 75 Kg N/fed.	741.1	778.6	891.2	891.5	592.9	**779.1**	761.1	797.6	957.6	965.5	644.4	**825.3**
	3- Serialin + 50 Kg N/fed.	700.3	734.3	846.7	854.2	555.6	**738.2**	712.8	741.5	884.6	904.7	612.1	**771.1**
	4- Serialin + 75 Kg N/fed.	798.3	820.7	961.6	964.1	631.4	**834.6**	812.6	832.9	1010.4	1033.7	700.6	**878.1**
Means of weed control treatments		**719.4**	**748.5**	**865.9**	**874.4**	**574.1**		**736.7**	**764.4**	**913.7**	**928.2**	**631.5**	
LSD at 5% level		**A**			**4.98**					**20.56**			
		B			**2.81**					**12.64**			
		C			**2.41**					**13.30**			
		AB			**4.87**					**NS**			
		AC			**5.90**					**23.05**			
		BC			**6.81**					**26.60**			
		ABC			**11.80**					**NS**			

Table (20) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on plant height (cm) at harvest in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	103.60	102.00	101.10	98.70	110.70	**103.22**	103.40	102.60	98.90	97.70	110.90	**102.70**
	2- 75 Kg N/fed.	105.10	104.30	103.50	102.90	113.50	**105.86**	106.50	105.10	101.70	100.30	113.10	**105.34**
	3- Serialin + 50 Kg N/fed.	104.90	103.60	102.10	102.00	111.50	**104.82**	105.20	104.60	100.90	99.10	112.80	**104.52**
	4- Serialin + 75 Kg N/fed.	108.80	107.10	104.60	105.80	114.10	**108.08**	108.50	107.40	104.90	102.50	115.00	**107.66**
	Mean	**105.60**	**104.25**	**102.83**	**102.35**	**112.45**	**105.50**	**105.90**	**104.93**	**101.60**	**99.90**	**112.95**	**105.06**
2- Afir broadcast	1- 50 Kg N/fed.	104.00	104.30	99.20	101.50	112.30	**104.26**	105.20	104.10	100.60	101.20	112.30	**104.68**
	2- 75 Kg N/fed.	107.10	105.10	103.10	104.40	115.30	**107.00**	108.10	106.20	104.70	105.20	116.20	**108.20**
	3- Serialin + 50 Kg N/fed.	106.70	105.30	102.90	103.00	114.70	**106.52**	107.30	105.30	102.30	103.40	115.10	**106.68**
	4- Serialin + 75 Kg N/fed.	110.40	109.50	106.20	107.30	117.30	**110.14**	110.30	109.50	105.70	106.70	118.00	**110.04**
	Mean	**107.05**	**106.05**	**102.85**	**104.05**	**114.90**	**106.98**	**107.73**	**106.43**	**103.33**	**104.13**	**115.40**	**107.40**
3-Afir in furrows	1- 50 Kg N/fed.	103.57	102.60	100.20	98.10	110.20	**102.93**	104.60	103.90	100.00	99.20	111.30	**103.80**
	2- 75 Kg N/fed.	104.20	107.10	104.20	103.10	114.40	**106.60**	107.50	106.60	104.10	102.30	115.50	**107.20**
	3- Serialin + 50 Kg N/fed.	103.90	106.80	103.90	102.90	112.50	**106.00**	106.70	105.40	102.20	101.70	113.80	**105.96**
	4- Serialin + 75 Kg N/fed.	110.50	110.10	105.80	104.60	116.20	**109.44**	109.00	108.10	105.50	104.80	116.70	**108.82**
	Mean	**105.54**	**106.65**	**105.53**	**102.18**	**113.33**	**106.24**	**106.95**	**106.00**	**102.95**	**102.00**	**114.33**	**106.45**
Means of fertilization	1- 50 Kg N/fed.	103.72	102.97	100.17	99.43	111.07	**103.47**	104.40	103.53	99.83	99.37	111.50	**103.73**
	2- 75 Kg N/fed.	105.47	105.50	103.60	103.47	114.40	**106.49**	107.37	105.17	103.50	102.60	114.93	**106.91**
	3- Serialin + 50 Kg N/fed.	105.17	105.23	102.97	102.63	112.90	**105.78**	106.40	105.10	101.80	101.40	113.90	**105.72**
	4- Serialin + 75 Kg N/fed.	109.90	108.90	105.53	105.90	115.87	**109.22**	109.27	108.33	105.37	104.67	116.57	**108.84**
Means of weed control treatments		**106.06**	**105.65**	**103.07**	**102.86**	**113.56**		**106.86**	**105.78**	**102.63**	**102.01**	**114.23**	

LSD at 5% level	A	0.42	0.27
	B	0.71	0.71
	C	0.57	0.60
	AB	NS	NS
	AC	0.99	1.05
	BC	1.14	NS
	ABC	NS	NS

Table (21) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on spike length (cm) in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	9.90	10.22	11.20	11.50	9.13	**10.39**	10.10	10.30	10.90	11.10	9.50	**10.38**
	2- 75 Kg N/fed.	10.60	10.80	11.80	12.10	9.93	**11.05**	10.70	10.90	11.50	11.70	10.40	**11.40**
	3- Serialin + 50 Kg N/fed.	10.30	10.40	11.50	11.70	9.53	**10.69**	10.40	10.50	11.20	11.40	9.90	**10.68**
	4- Serialin + 75 Kg N/fed.	10.90	11.47	12.33	12.53	10.30	**11.51**	11.00	11.30	11.90	12.30	10.90	**11.48**
	Mean	**10.43**	**10.72**	**11.71**	**11.96**	**9.73**	**10.91**	**10.55**	**10.75**	**11.38**	**11.63**	**10.18**	**10.90**
2- Afir broadcast	1- 50 Kg N/fed.	9.80	10.20	10.80	10.70	8.87	**10.07**	9.80	10.10	10.70	10.60	9.20	**10.08**
	2- 75 Kg N/fed.	10.30	10.63	11.50	11.33	9.63	**10.68**	10.50	10.80	11.40	11.10	10.10	**10.78**
	3- Serialin + 50 Kg N/fed.	10.03	10.40	11.23	10.90	9.33	**10.38**	10.20	10.60	11.20	10.90	9.70	**10.52**
	4- Serialin + 75 Kg N/fed.	10.30	10.90	12.23	11.97	9.9	**11.06**	10.90	11.20	11.80	11.60	10.30	**11.16**
	Mean	**10.11**	**10.53**	**11.44**	**11.23**	**9.43**	**10.55**	**10.35**	**10.68**	**11.28**	**11.05**	**9.83**	**10.64**
3-Afir in furrows	1- 50 Kg N/fed.	10.40	10.50	11.10	11.20	10.10	**10.66**	10.50	10.60	10.90	11.20	10.10	**10.66**
	2- 75 Kg N/fed.	10.70	10.90	11.90	11.90	10.40	**11.16**	11.00	11.30	11.80	12.10	10.80	**11.40**
	3- Serialin + 50 Kg N/fed.	10.63	10.70	11.40	11.60	10.50	**10.97**	10.90	11.10	11.40	11.70	10.50	**11.12**
	4- Serialin + 75 Kg N/fed.	11.00	11.20	12.20	12.90	10.63	**11.59**	11.30	11.50	12.50	12.70	11.10	**11.82**
	Mean	**10.68**	**10.83**	**11.65**	**11.90**	**10.41**	**11.09**	**10.93**	**11.13**	**11.65**	**11.93**	**10.63**	**11.25**
Means of fertilization	1- 50 Kg N/fed.	10.03	10.31	11.03	11.13	9.37	**10.38**	10.13	10.33	10.83	10.97	9.60	**10.37**
	2- 75 Kg N/fed.	10.53	10.78	11.73	11.78	9.99	**10.96**	10.73	11.00	11.57	11.63	10.43	**11.07**
	3- Serialin + 50 Kg N/fed.	10.32	10.50	11.38	11.40	9.79	**10.68**	10.50	10.73	11.27	11.33	10.03	**10.77**
	4- Serialin + 75 Kg N/fed.	10.73	11.19	12.26	12.47	10.280	**11.38**	11.07	11.33	12.07	12.20	10.77	**11.49**
Means of weed control treatments		**10.41**	**10.69**	**11.60**	**11.69**	**9.86**		**10.61**	**10.85**	**11.43**	**11.53**	**10.21**	

LSD at 5% level	**A**	**0.06**	**0.28**
	B	**0.06**	**0.31**
	C	**0.07**	**0.21**
	AB	**0.10**	**NS**
	AC	**0.11**	**NS**
	BC	**0.13**	**NS**
	ABC	**0.23**	**NS**

Table (22) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on number of spikelets/spike in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	19.90	20.10	20.70	21.00	19.10	**20.16**	20.40	20.60	20.90	21.20	19.30	**20.48**
	2- 75 Kg N/fed.	20.70	21.03	21.50	21.70	19.40	**20.92**	20.70	21.00	21.70	21.90	19.90	**21.04**
	3- Serialin + 50 Kg N/fed.	20.30	20.70	20.90	21.30	19.30	**20.50**	20.60	20.70	21.50	21.70	19.70	**20.84**
	4- Serialin + 75 Kg N/fed.	20.80	21.20	21.50	22.10	19.60	**21.04**	21.10	21.40	22.10	22.20	20.20	**21.40**
	Mean	**20.43**	**20.83**	**21.15**	**21.53**	**19.35**	**20.67**	**20.70**	**20.93**	**21.55**	**21.75**	**19.78**	**20.94**
2- Afir broadcast	1- 50 Kg N/fed.	19.80	20.10	20.50	20.30	19.20	**19.98**	19.70	19.80	20.40	20.10	18.90	**19.78**
	2- 75 Kg N/fed.	20.10	20.30	21.00	20.90	19.40	**20.30**	20.10	20.40	21.10	20.90	19.50	**20.40**
	3- Serialin + 50 Kg N/fed.	20.00	20.23	20.70	20.60	19.37	**20.22**	20.00	20.30	20.80	20.60	19.20	**20.18**
	4- Serialin + 75 Kg N/fed.	20.30	20.50	21.30	21.10	19.50	**20.54**	20.80	21.00	21.70	21.60	19.90	**21.00**
	Mean	**20.05**	**20.28**	**20.88**	**20.73**	**19.37**	**20.26**	**20.15**	**20.38**	**21.00**	**20.80**	**19.38**	**20.34**
3-Afir in furrows	1- 50 Kg N/fed.	19.50	19.80	20.30	20.40	19.10	**19.82**	19.90	20.00	20.50	20.70	19.20	**20.06**
	2- 75 Kg N/fed.	20.00	20.10	20.10	21.40	19.50	**20.42**	20.50	20.70	21.30	21.50	19.70	**20.74**
	3- Serialin + 50 Kg N/fed.	19.90	20.00	20.60	20.80	19.40	**20.14**	20.40	20.50	20.90	21.10	19.70	**20.52**
	4- Serialin + 75 Kg N/fed.	20.50	20.70	21.50	21.90	19.60	**20.84**	20.80	21.10	21.70	21.80	20.10	**21.10**
	Mean	**19.98**	**20.15**	**20.88**	**21.13**	**19.40**	**20.31**	**20.40**	**20.58**	**21.10**	**21.28**	**19.68**	**20.61**
Means of fertilization	1- 50 Kg N/fed.	19.73	20.00	20.50	20.57	19.13	**19.99**	20.00	20.13	20.60	20.67	19.13	**20.11**
	2- 75 Kg N/fed.	20.23	20.57	21.20	21.33	19.43	**20.55**	20.43	20.70	21.37	21.43	19.70	**20.73**
	3- Serialin + 50 Kg N/fed.	20.10	20.31	20.73	20.90	19.36	**20.28**	20.33	20.50	21.07	21.13	19.53	**20.51**
	4- Serialin + 75 Kg N/fed.	20.53	20.80	21.43	21.70	19.57	**20.81**	20.90	21.17	21.83	21.87	20.07	**21.17**
Means of weed control treatments		**20.15**	**20.42**	**20.97**	**21.13**	**19.37**		**20.42**	**20.63**	**21.22**	**21.23**	**19.61**	

LSD at 5% level	A	0.16	NS
	B	0.13	0.36
	C	0.19	0.47
	AB	0.22	NS
	AC	0.32	NS
	BC	NS	NS
	ABC	NS	NS

Table (23) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on spike weight (g) in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	2.43	2.60	2.47	3.10	2.27	**2.57**	2.43	2.51	2.98	3.13	2.19	**2.65**
	2- 75 Kg N/fed.	2.83	2.87	3.33	3.33	2.47	**2.97**	2.68	2.72	3.30	3.39	2.37	**2.89**
	3- Serialin + 50 Kg N/fed.	2.70	2.73	3.13	3.23	2.33	**2.83**	2.60	2.67	3.23	3.28	2.33	**2.82**
	4- Serialin + 75 Kg N/fed.	2.93	2.97	3.50	3.47	2.53	**3.08**	2.77	2.81	3.76	3.87	2.48	**3.14**
	Mean	**2.72**	**2.79**	**3.11**	**3.28**	**2.40**	**2.86**	**2.62**	**2.68**	**3.32**	**3.42**	**2.34**	**2.88**
2- Afir broadcast	1- 50 Kg N/fed.	2.27	2.33	2.97	2.93	2.23	**2.55**	2.39	2.43	2.81	2.77	2.01	**2.48**
	2- 75 Kg N/fed.	2.77	2.60	3.17	3.13	2.33	**2.80**	2.55	2.61	3.21	3.17	2.26	**2.76**
	3- Serialin + 50 Kg N/fed.	2.53	2.63	3.13	3.07	2.27	**2.73**	2.51	2.56	3.07	2.96	2.19	**2.66**
	4- Serialin + 75 Kg N/fed.	2.83	2.90	3.47	3.23	2.40	**2.97**	2.63	2.69	3.63	3.53	2.48	**2.99**
	Mean	**2.60**	**2.62**	**3.18**	**3.09**	**2.31**	**2.76**	**2.52**	**2.57**	**3.18**	**3.11**	**2.24**	**2.72**
3-Afir in furrows	1- 50 Kg N/fed.	2.57	2.63	3.00	3.03	2.30	**2.71**	2.53	2.57	3.15	3.27	2.25	**2.75**
	2- 75 Kg N/fed.	2.83	2.87	3.70	3.77	2.68	**3.17**	2.71	2.75	3.61	3.67	2.46	**3.04**
	3- Serialin + 50 Kg N/fed.	2.70	2.73	3.40	3.57	2.53	**2.99**	2.69	2.71	3.49	3.57	2.41	**2.97**
	4- Serialin + 75 Kg N/fed.	3.03	3.20	3.70	4.07	2.81	**3.36**	2..84	2.97	3.84	3.91	2.73	**3.26**
	Mean	**2.78**	**2.86**	**3.45**	**3.61**	**2.58**	**3.06**	**2.69**	**2.75**	**3.52**	**3.62**	**2.46**	**3.01**
Means of fertilization	1- 50 Kg N/fed.	2.42	2.52	2.81	3.02	2.27	**2.61**	2.45	2.50	2.98	3.06	2.15	**2.63**
	2- 75 Kg N/fed.	2.81	2.78	3.40	3.41	2.49	**2.98**	2.65	2.69	3.37	3.41	2.36	**2.90**
	3- Serialin + 50 Kg N/fed.	2.64	2.70	3.22	3.29	2.38	**2.85**	2.60	2.65	3.26	3.27	2.31	**2.82**
	4- Serialin + 75 Kg N/fed.	2.93	3.02	3.56	3.59	2.58	**3.14**	2.75	2.82	3.74	3.77	2.56	**3.13**
Means of weed control treatments		**2.70**	**2.76**	**3.25**	**3.33**	**2.43**		**2.61**	**2.67**	**3.34**	**3.38**	**2.35**	

LSD at 5% level	**A**	**0.03**	**0.08**
	B	**0.06**	**0.08**
	C	**0.07**	**0.07**
	AB	**0.23**	**NS**
	AC	**0.12**	**0.12**
	BC	**0.14**	**0.14**
	ABC	**0.23**	**NS**

Table (24) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on number of grains/spike in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	38.20	40.40	44.70	45.50	34.40	**40.64**	38.10	39.60	44.10	44.90	32.90	**39.92**
	2- 75 Kg N/fed.	41.40	42.80	47.50	48.10	37.40	**43.44**	41.70	43.30	48.70	49.90	38.00	**44.32**
	3- Serialin + 50 Kg N/fed.	39.50	40.90	45.60	46.30	35.70	**41.60**	40.20	42.40	47.20	48.70	36.90	**43.08**
	4- Serialin + 75 Kg N/fed.	44.00	44.50	48.20	51.20	38.00	**45.18**	43.50	45.20	51.10	53.80	40.10	**46.74**
	Mean	**40.78**	**42.15**	**46.50**	**47.78**	**36.38**	**42.72**	**40.88**	**42.63**	**47.78**	**49.35**	**36.98**	**43.52**
2- Afir broadcast	1- 50 Kg N/fed.	38.43	39.30	43.30	42.70	32.70	**39.29**	36.90	38.20	41.70	40.00	31.50	**37.66**
	2- 75 Kg N/fed.	41.10	41.80	45.50	45.30	34.50	**41.64**	38.70	41.00	46.30	45.70	34.70	**41.28**
	3- Serialin + 50 Kg N/fed.	40.30	40.70	44.50	43.70	34.50	**40.74**	38.10	39.30	45.90	44.70	34.00	**40.40**
	4- Serialin + 75 Kg N/fed.	42.50	42.70	48.20	47.90	37.20	**43.70**	41.40	43.90	49.10	48.20	38.80	**44.28**
	Mean	**40.58**	**41.13**	**45.38**	**44.90**	**34.73**	**41.34**	**38.78**	**40.60**	**45.75**	**44.65**	**34.75**	**40.91**
3-Afir in furrows	1- 50 Kg N/fed.	40.10	40.30	44.80	45.40	34.60	**41.04**	38.20	39.40	42.10	43.60	32.10	**39.08**
	2- 75 Kg N/fed.	41.50	42.60	48.70	49.50	37.90	**44.04**	42.10	42.60	47.10	48.10	37.40	**43.46**
	3- Serialin + 50 Kg N/fed.	41.20	41.80	47.80	48.40	36.90	**43.22**	39.90	41.10	44.10	45.20	36.00	**41.26**
	4- Serialin + 75 Kg N/fed.	42.80	43.50	50.10	57.30	39.10	**46.56**	43.70	44.10	50.70	52.80	39.60	**46.18**
	Mean	**41.40**	**42.05**	**47.85**	**50.15**	**37.13**	**43.72**	**40.98**	**41.80**	**46.00**	**47.43**	**36.28**	**42.50**
Means of fertilization	1- 50 Kg N/fed.	38.91	40.00	44.27	44.53	33.90	**40.32**	37.73	39.07	42.63	42.83	32.17	**38.89**
	2- 75 Kg N/fed.	41.33	42.40	47.23	47.63	36.60	**43.04**	40.83	42.30	47.37	47.90	36.70	**43.02**
	3- Serialin + 50 Kg N/fed.	40.33	41.13	45.97	46.13	35.70	**41.85**	39.40	40.93	45.73	46.20	35.63	**41.58**
	4- Serialin + 75 Kg N/fed.	43.10	43.57	48.83	52.13	38.10	**45.15**	42.87	44.40	50.30	51.60	39.50	**45.73**
Means of weed control treatments		**40.92**	**41.78**	**46.58**	**47.61**	**36.08**		**40.21**	**41.68**	**46.51**	**47.13**	**36.00**	

LSD at 5% level	**A**	**0.41**	**0.78**
	B	**0.32**	**0.26**
	C	**0.43**	**0.82**
	AB	**0.56**	**NS**
	AC	**0.75**	**NS**
	BC	**0.87**	**NS**
	ABC	**1.50**	**NS**

Table (25) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on grain weight (g)/spike in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	1.75	1.83	2.06	2.10	1.56	**1.86**	1.76	1.79	2.03	2.05	1.37	**1.80**
	2- 75 Kg N/fed.	1.94	1.97	2.21	2.23	1.61	**1.99**	1.81	1.85	2.16	2.18	1.49	**1.90**
	3- Serialin + 50 Kg N/fed.	1.85	1.93	2.15	2.18	1.58	**1.94**	1.77	1.81	2.10	2.13	1.45	**1.85**
	4- Serialin + 75 Kg N/fed.	2.02	2.05	2.31	2.42	1.64	**2.09**	1.90	1.93	2.25	2.26	1.57	**1.98**
	Mean	**1.89**	**1.95**	**2.18**	**2.23**	**1.60**	**1.97**	**1.81**	**1.85**	**2.14**	**2.16**	**1.47**	**1.88**
2- Afir broadcast	1- 50 Kg N/fed.	1.67	1.72	2.05	2.08	1.52	**1.81**	1.67	1.71	1.85	1.82	1.34	**1.68**
	2- 75 Kg N/fed.	1.85	1.87	2.19	2.17	1.57	**1.93**	1.77	1.79	2.07	2.04	1.43	**1.82**
	3- Serialin + 50 Kg N/fed.	1.73	1.81	2.13	2.09	1.56	**1.86**	1.73	1.75	1.97	1.92	1.39	**1.75**
	4- Serialin + 75 Kg N/fed.	1.89	1.90	2.23	2.18	1.60	**1.96**	1.81	1.86	2.17	2.13	1.53	**1.90**
	Mean	**1.79**	**1.83**	**2.15**	**2.13**	**1.56**	**1.89**	**1.75**	**1.78**	**2.02**	**1.98**	**1.42**	**1.79**
3-Afir in furrows	1- 50 Kg N/fed.	1.83	1.96	2.26	2.28	1.57	**1.98**	1.74	1.75	2.02	2.09	1.38	**1.8**
	2- 75 Kg N/fed.	2.07	2.10	2.37	2.49	1.63	**2.13**	1.88	1.92	2.19	2.26	1.56	**1.96**
	3- Serialin + 50 Kg N/fed.	1.99	2.03	2.32	2.43	1.58	**2.07**	1.83	1.86	2.13	2.17	1.48	**1.89**
	4- Serialin + 75 Kg N/fed.	2.20	2.28	2.53	2.56	1.85	**2.28**	1.92	1.97	2.28	2.31	1.69	**2.03**
	Mean	**2.02**	**2.09**	**2.37**	**2.44**	**1.66**	**2.12**	**1.84**	**1.88**	**2.16**	**2.21**	**1.53**	**1.93**
Means of fertilization	1- 50 Kg N/fed.	1.75	1.84	2.12	2.15	1.55	**1.88**	1.72	1.75	1.97	1.99	1.36	**1.76**
	2- 75 Kg N/fed.	1.95	1.98	2.26	2.30	1.60	**2.02**	1.82	1.85	2.14	2.16	1.49	**1.89**
	3- Serialin + 50 Kg N/fed.	1.86	1.92	2.20	2.23	1.57	**1.96**	1.78	1.81	2.07	2.07	1.44	**1.83**
	4- Serialin + 75 Kg N/fed.	2.04	2.08	2.36	2.39	1.70	**2.11**	1.88	1.89	2.23	2.23	1.60	**1.97**
Means of weed control treatments		**1.90**	**1.95**	**2.23**	**2.27**	**1.61**		**1.80**	**1.82**	**2.10**	**2.11**	**1.47**	

LSD at 5% level	**A**	**0.04**	**0.05**
	B	**0.03**	**0.05**
	C	**0.03**	**0.05**
	AB	**0.05**	**NS**
	AC	**0.05**	**NS**
	BC	**NS**	**NS**
	ABC	**NS**	**NS**

Table (26) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on number tillers/m^2 in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	406.33	420.67	456.33	479.67	300.33	**412.67**	372.00	384.00	401.00	476.00	280.00	**382.60**
	2- 75 Kg N/fed.	437.33	461.33	510.00	524.33	348.67	**456.33**	402.00	417.00	506.00	524.00	319.00	**433.60**
	3- Serialin + 50 Kg N/fed.	428.67	446.67	493.33	511.00	325.33	**441.00**	391.00	408.00	493.00	502.00	293.00	**417.40**
	4- Serialin + 75 Kg N/fed.	456.33	468.33	532.33	582.33	363.00	**480.47**	428.00	439.00	534.00	556.00	346.00	**460.60**
	Mean	**432.17**	**449.25**	**498.00**	**524.33**	**334.33**	**447.62**	**398.25**	**412.00**	**483.50**	**514.50**	**309.50**	**423.55**
2- Afir broadcast	1- 50 Kg N/fed.	476.33	386.33	428.33	445.67	369.67	**381.27**	348.00	360.00	425.00	418.00	248.00	**359.80**
	2- 75 Kg N/fed.	411.67	424.33	478.67	467.67	303.30	**417.13**	397.00	409.00	479.00	467.00	288.00	**408.00**
	3- Serialin + 50 Kg N/fed.	402.33	413.00	467.67	456.33	361.00	**420.07**	377.00	390.00	464.00	453.00	277.00	**392.20**
	4- Serialin + 75 Kg N/fed.	433.33	441.00	496.33	484.33	319.00	**434.8**	418.00	438.00	497.00	484.00	309.00	**429.20**
	Mean	**405.92**	**416.17**	**467.75**	**463.50**	**313.25**	**413.32**	**385.00**	**399.25**	**466.25**	**455.50**	**280.50**	**397.30**
3-Afir in furrows	1- 50 Kg N/fed.	391.00	417.00	445.67	463.00	291.33	**400.60**	358.00	374.00	450.00	464.00	270.00	**383.20**
	2- 75 Kg N/fed.	417.67	435.00	499.00	511.00	329.0	**438.33**	398.00	418.00	487.00	499.00	303.00	**421.00**
	3- Serialin + 50 Kg N/fed.	408.33	426.33	487.33	501.00	313.00	**427.20**	384.00	399.00	474.00	488.00	290.00	**407.00**
	4- Serialin + 75 Kg N/fed.	434.00	446.67	513.33	523.33	338.33	**451.13**	407.00	430.00	502.00	512.00	334.00	**437.00**
	Mean	**412.75**	**431.25**	**486.33**	**499.58**	**317.92**	**430.57**	**386.75**	**405.25**	**478.25**	**490.75**	**299.25**	**412.05**
Means of fertilization	1- 50 Kg N/fed.	391.22	414.67	443.44	462.78	287.11	**399.84**	359.33	372.67	425.33	452.67	266.00	**375.20**
	2- 75 Kg N/fed.	422.22	440.22	495.89	501.00	327.00	**437.27**	399.00	414.67	490.67	495.67	303.33	**420.87**
	3- Serialin + 50 Kg N/fed.	413.11	428.67	482.78	489.44	333.11	**429.42**	384.00	399.00	477.00	481.00	286.67	**405.53**
	4- Serialin + 75 Kg N/fed.	441.22	452.00	514.00	530.00	340.11	**455.47**	417.67	435.67	511.00	517.33	329.67	**442.27**
Means of weed control treatments		**416.94**	**432.59**	**484.03**	**495.81**	**321.83**		**390.00**	**405.50**	**476.00**	**486.92**	**296.42**	
LSD at 5% level		**A**			**15.80**					**10.33**			
		B			**8.85**					**12.28**			
		C			**8.82**					**12.80**			
		AB			**NS**					**NS**			
		AC			**NS**					**NS**			
		BC			**NS**					**NS**			
		ABC			**NS**					**NS**			

Table (27) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on number of non fertile tillers/m^2 in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	53.30	50.10	41.30	35.30	65.30	**49.06**	54.00	51.00	43.00	37.00	68.00	**50.60**
	2- 75 Kg N/fed.	44.70	41.80	28.60	26.00	56.00	**39.42**	46.00	42.00	33.00	27.00	55.00	**40.60**
	3- Serialin + 50 Kg N/fed.	48.70	43.80	34.60	31.30	62.70	**44.22**	48.00	44.00	35.00	29.00	57.00	**42.60**
	4- Serialin + 75 Kg N/fed.	41.80	37.20	22.37	21.30	53.30	**35.19**	37.00	35.00	26.00	21.00	48.00	**33.40**
	Mean	**47.13**	**43.23**	**31.72**	**28.48**	**59.33**	**41.97**	**46.25**	**43.00**	**34.25**	**28.50**	**57.00**	**41.80**
2- Afir broadcast	1- 50 Kg N/fed.	62.73	56.40	46.10	47.70	76.00	**57.79**	62.00	57.00	49.00	53.00	81.00	**60.40**
	2- 75 Kg N/fed.	54.30	50.20	39.20	41.80	66.70	**50.44**	50.00	42.00	35.00	39.00	69.00	**47.00**
	3- Serialin + 50 Kg N/fed.	58.10	53.10	41.20	43.90	72.00	**53.66**	53.00	47.00	39.00	42.00	72.00	**50.60**
	4- Serialin + 75 Kg N/fed.	49.10	47.20	35.30	37.50	60.00	**45.82**	45.00	38.00	29.00	31.00	58.00	**40.20**
	Mean	**56.06**	**51.73**	**40.45**	**42.73**	**68.68**	**51.93**	**52.50**	**46.00**	**38.00**	**41.25**	**70.00**	**49.55**
3-Afir in furrows	1- 50 Kg N/fed.	58.70	52.60	42.90	39.80	96.30	**52.66**	57.00	51.00	49.00	42.00	76.00	**55.00**
	2- 75 Kg N/fed.	50.20	47.30	37.87	28.60	60.00	**44.79**	44.00	39.00	41.00	32.00	66.00	**44.40**
	3- Serialin + 50 Kg N/fed.	54.60	49.20	35.70	33.80	64.00	**47.46**	51.00	47.00	40.00	36.00	69.00	**48.60**
	4- Serialin + 75 Kg N/fed.	48.30	45.30	24.30	26.90	58.70	**40.70**	42.00	36.00	32.00	28.00	52.00	**38.00**
	Mean	**52.95**	**48.60**	**35.19**	**32.28**	**63.00**	**46.40**	**48.50**	**43.25**	**40.50**	**34.50**	**65.75**	**46.50**
Means of fertilization	1- 50 Kg N/fed.	58.24	53.03	43.43	40.93	70.20	**53.17**	57.67	53.00	47.00	44.00	75.00	**55.33**
	2- 75 Kg N/fed.	49.73	46.43	35.22	32.13	60.90	**44.88**	46.67	41.00	36.33	32.67	63.33	**44.00**
	3- Serialin + 50 Kg N/fed.	53.80	48.70	37.17	36.33	66.23	**48.45**	50.67	46.00	38.00	35.67	66.00	**47.27**
	4- Serialin + 75 Kg N/fed.	46.40	43.23	27.32	28.57	57.33	**39.06**	41.33	36.33	29.00	26.67	52.67	**37.20**
Means of weed control treatments		**52.04**	**47.85**	**35.79**	**34.49**	**63.67**		**49.08**	**44.08**	**37.58**	**34.75**	**64.25**	

LSD at 5% level	**A**	**1.55**	**2.78**
	B	**1.45**	**1.96**
	C	**1.63**	**1.64**
	AB	**NS**	**NS**
	AC	**2.82**	**2.83**
	BC	**NS**	**NS**
	ABC	**NS**	**NS**

Table (28) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on number of spike/m^2 in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	352.87	370.57	415.03	444.37	235.03	**363.57**	318.00	333.00	358.00	439.00	212.00	**332.00**
	2- 75 Kg N/fed.	392.63	419.53	481.40	498.33	292.67	**416.91**	356.00	375.00	473.00	497.00	264.00	**393.00**
	3- Serialin + 50 Kg N/fed.	379.97	402.87	458.73	479.70	262.63	**396.78**	343.00	364.00	458.00	473.00	236.00	**374.20**
	4- Serialin + 75 Kg N/fed.	414.53	431.13	509.97	561.03	309.70	**445.27**	391.00	404.00	508.00	535.00	298.00	**427.20**
	Mean	**385.00**	**406.03**	**466.28**	**495.86**	**275.01**	**405.64**	**352.00**	**369.00**	**449.25**	**486.00**	**252.50**	**381.75**
2- Afir broadcast	1- 50 Kg N/fed.	313.60	329.93	382.23	397.97	193.67	**323.48**	286.00	303.00	376.00	365.00	167.00	**299.40**
	2- 75 Kg N/fed.	357.37	374.13	439.47	425.87	236.63	**366.69**	347.00	367.00	444.00	428.00	219.00	**361.00**
	3- Serialin + 50 Kg N/fed.	344.23	359.90	426.47	412.43	289.00	**366.41**	324.00	343.00	425.00	411.00	205.00	**341.60**
	4- Serialin + 75 Kg N/fed.	384.23	393.80	461.03	446.83	259.00	**388.98**	373.00	400.00	468.00	453.00	251.00	**389.00**
	Mean	**249.86**	**364.44**	**427.30**	**420.78**	**244.58**	**361.39**	**332.50**	**353.25**	**428.25**	**414.25**	**210.50**	**347.75**
3-Afir in furrows	1- 50 Kg N/fed.	332.30	364.40	402.77	423.20	222.03	**347.94**	301.00	323.00	401.00	422.00	194.00	**328.20**
	2- 75 Kg N/fed.	367.47	387.70	461.13	482.40	269.00	**397.74**	354.00	379.00	446.00	467.00	237.00	**376.60**
	3- Serialin + 50 Kg N/fed.	353.73	377.13	451.63	467.20	249.00	**379.74**	333.00	352.00	434.00	452.00	221.00	**358.40**
	4- Serialin + 75 Kg N/fed.	385.70	401.37	489.03	496.43	279.63	**410.43**	365.00	394.00	470.00	484.00	282.00	**399.00**
	Mean	**359.80**	**382.65**	**451.14**	**467.31**	**254.92**	**383.16**	**338.25**	**362.00**	**437.75**	**456.25**	**233.50**	**365.55**
Means of fertilization	1- 50 Kg N/fed.	332.92	361.63	400.01	421.84	216.91	**346.66**	301.67	319.67	378.33	408.67	191.00	**319.87**
	2- 75 Kg N/fed.	372.49	393.79	460.67	468.87	266.10	**392.38**	352.33	373.67	454.33	464.00	240.00	**376.87**
	3- Serialin + 50 Kg N/fed.	359.31	379.97	445.61	453.11	266.88	**380.98**	333.33	353.00	439.00	445.33	220.67	**358.27**
	4- Serialin + 75 Kg N/fed.	394.82	408.77	486.68	501.43	282.78	**414.90**	376.33	399.33	482.00	490.67	277.00	**405.07**
Means of weed control treatments		**364.89**	**385.04**	**448.24**	**461.31**	**258.17**		**340.72**	**361.42**	**438.42**	**452.17**	**232.17**	
LSD at 5% level		**A**			**17.43**						**11.52**		
		B			**8.93**						**13.36**		
		C			**8.95**						**13.13**		
		AB			**NS**						**NS**		
		AC			**15.50**						**22.74**		
		BC			**NS**						**NS**		
		ABC			**NS**						**NS**		

Table (29) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on 1000-grain weight (g) in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	42.33	42.50	43.80	44.20	40.70	**42.71**	41.17	41.60	44.10	44.60	40.40	**42.37**
	2- 75 Kg N/fed.	42.70	43.50	45.90	46.53	41.10	**43.95**	42.00	42.30	45.20	45.40	41.30	**43.24**
	3- Serialin + 50 Kg N/fed.	42.60	42.90	43.80	45.20	41.00	**43.10**	41.90	42.40	44.90	45.10	41.10	**43.08**
	4- Serialin + 75 Kg N/fed.	43.17	43.60	46.40	46.90	41.30	**44.27**	42.80	43.30	46.10	46.30	41.90	**44.08**
	Mean	**42.70**	**43.13**	**44.98**	**45.71**	**41.03**	**43.51**	**41.97**	**42.40**	**45.08**	**45.35**	**41.18**	**43.19**
2- Afir broadcast	1- 50 Kg N/fed.	41.90	42.20	43.30	43.50	40.50	**42.28**	40.90	41.00	43.40	43.20	40.10	**41.72**
	2- 75 Kg N/fed.	42.50	43.07	45.97	45.50	40.90	**43.59**	41.40	41.80	45.27	44.70	41.40	**42.91**
	3- Serialin + 50 Kg N/fed.	42.20	42.70	44.60	44.80	40.70	**43.00**	41.30	41.60	44.40	44.10	40.90	**42.46**
	4- Serialin + 75 Kg N/fed.	43.0	43.60	46.00	46.30	41.20	**44.02**	42.20	42.60	45.90	45.60	41.90	**43.64**
	Mean	**42.40**	**42.89**	**44.97**	**45.03**	**40.83**	**43.22**	**41.45**	**41.75**	**44.74**	**44.40**	**41.08**	**42.68**
3-Afir in furrows	1- 50 Kg N/fed.	42.10	42.60	44.30	44.50	40.80	**42.86**	41.60	41.90	44.40	44.40	40.80	**42.62**
	2- 75 Kg N/fed.	43.00	43.90	46.60	47.47	41.30	**44.45**	42.30	42.70	45.20	45.60	41.30	**43.42**
	3- Serialin + 50 Kg N/fed.	42.80	43.10	45.20	45.80	41.20	**43.62**	42.00	42.40	44.80	45.20	41.00	**43.08**
	4- Serialin + 75 Kg N/fed.	43.60	44.20	47.10	47.60	41.60	**44.82**	42.70	43.20	46.40	47.10	45.00	**44.88**
	Mean	**42.88**	**42.45**	**45.80**	**46.34**	**41.23**	**43.94**	**42.15**	**42.55**	**45.20**	**45.58**	**42.03**	**43.50**
Means of fertilization	1- 50 Kg N/fed.	42.11	42.43	43.80	44.07	40.67	**42.62**	41.22	41.50	43.97	44.08	40.43	**42.24**
	2- 75 Kg N/fed.	42.73	43.49	46.16	46.50	41.10	**44.00**	41.90	42.27	45.22	45.23	41.33	**43.19**
	3- Serialin + 50 Kg N/fed.	42.53	42.90	44.53	45.27	40.97	**43.24**	41.73	42.13	44.70	44.80	41.00	**42.87**
	4- Serialin + 75 Kg N/fed.	43.26	43.80	46.50	46.33	41.37	**44.37**	42.57	43.03	46.13	46.33	42.93	**44.20**
Means of weed control treatments		**42.66**	**43.16**	**45.25**	**45.69**	**41.03**		**41.86**	**42.23**	**45.01**	**45.11**	**41.43**	

LSD at 5% level	**A**	**0.33**	**0.29**
	B	**0.42**	**0.40**
	C	**0.44**	**0.53**
	AB	**NS**	**NS**
	AC	**NS**	**NS**
	BC	**0.88**	**NS**
	ABC	**NS**	**NS**

Table (30) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on grain yield ardab/fed. in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	17.60	18.00	20.40	21.23	14.30	**18.31**	15.80	16.20	17.70	17.90	14.20	**16.36**
	2- 75 Kg N/fed.	18.70	19.20	22.10	22.40	16.30	**19.74**	18.20	18.60	20.10	20.40	15.40	**18.54**
	3- Serialin + 50 Kg N/fed.	18.40	18.60	21.30	21.70	15.80	**19.16**	17.70	18.10	19.50	19.80	15.10	**18.04**
	4- Serialin + 75 Kg N/fed.	19.23	20.00	22.90	23.33	16.90	**20.47**	18.90	19.80	21.70	22.10	16.60	**19.82**
	Mean	**18.48**	**18.95**	**21.68**	**22.17**	**15.83**	**19.42**	**17.65**	**18.18**	**19.75**	**20.05**	**15.33**	**18.19**
2- Afir broadcast	1- 50 Kg N/fed.	16.63	16.90	18.90	18.73	14.13	**17.06**	14.70	14.90	16.30	16.10	13.20	**15.04**
	2- 75 Kg N/fed.	17.60	18.20	20.80	20.67	15.70	**18.59**	15.70	16.30	18.10	17.70	14.60	**16.84**
	3- Serialin + 50 Kg N/fed.	17.10	17.30	20.20	20.10	15.20	**17.98**	15.50	15.90	17.80	17.30	14.30	**16.16**
	4- Serialin + 75 Kg N/fed.	18.30	18.80	21.70	21.40	16.40	**19.32**	17.50	17.70	19.90	19.20	15.10	**17.88**
	Mean	**17.41**	**17.80**	**20.40**	**20.23**	**15.36**	**18.24**	**15.85**	**16.20**	**18.03**	**17.58**	**14.30**	**16.39**
3-Afir in furrows	1- 50 Kg N/fed.	17.40	17.70	19.60	19.90	14.40	**17.80**	15.20	15.60	17.30	17.80	13.80	**15.94**
	2- 75 Kg N/fed.	18.43	18.90	21.20	21.70	16.10	**19.27**	16.90	17.20	19.60	20.10	15.30	**17.82**
	3- Serialin + 50 Kg N/fed.	18.00	18.40	20.60	21.00	15.50	**18.70**	16.70	16.90	18.80	19.40	14.70	**17.30**
	4- Serialin + 75 Kg N/fed.	18.70	19.50	22.30	22.50	16.50	**19.90**	18.00	18.40	20.60	21.10	16.20	**18.86**
	Mean	**18.13**	**18.63**	**20.93**	**21.28**	**15.63**	**18.92**	**16.70**	**17.03**	**19.08**	**19.60**	**15.00**	**17.48**
Means of fertilization	1- 50 Kg N/fed.	17.21	17.53	19.63	19.96	14.28	**17.72**	15.23	15.57	17.10	17.27	13.73	**15.78**
	2- 75 Kg N/fed.	18.24	18.77	21.37	21.59	16.03	**19.20**	16.93	17.37	19.27	19.40	15.10	**17.61**
	3- Serialin + 50 Kg N/fed.	17.83	18.10	20.70	20.93	15.50	**18.61**	16.63	16.97	18.70	18.83	14.70	**17.17**
	4- Serialin + 75 Kg N/fed.	18.74	19.43	22.30	22.41	16.60	**19.90**	18.13	18.63	20.73	20.80	15.97	**18.85**
Means of weed control treatments		**18.01**	**18.46**	**21.00**	**21.22**	**15.60**		**16.73**	**17.13**	**18.95**	**19.08**	**14.88**	

LSD at 5% level	**A**	**0.10**	**0.20**
	B	**0.14**	**0.32**
	C	**0.17**	**0.37**
	AB	**NS**	**NS**
	AC	**0.29**	**0.64**
	BC	**0.33**	**NS**
	ABC	**0.57**	**NS**

Table (31) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on straw yield ton/fed. in 2006/2007 and 2007/2008 seasons.

Treatments		2006/2007						2007/2008					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	3.83	3.89	4.39	4.35	3.09	**3.91**	4.05	4.29	4.90	5.16	3.67	**4.41**
	2- 75 Kg N/fed.	3.95	4.03	4.76	4.85	3.44	**4.20**	3.38	4.50	5.26	5.46	4.01	**4.71**
	3- Serialin + 50 Kg N/fed.	3.85	3.93	4.39	4.49	3.34	**4.00**	4.28	4.43	5.10	5.36	3.45	**4.60**
	4- Serialin + 75 Kg N/fed.	4.12	4.19	4.83	5.00	3.63	**4.35**	4.68	4.75	5.54	5.65	4.24	**4.97**
	Mean	**3.94**	**4.01**	**4.59**	**4.67**	**3.37**	**4.12**	**4.35**	**4.49**	**5.20**	**5.41**	**3.94**	**4.68**
2- Afir broadcast	1- 50 Kg N/fed.	3.82	3.90	4.48	4.40	2.86	**3.89**	4.02	4.13	5.00	4.73	3.39	**4.25**
	2- 75 Kg N/fed.	3.83	3.86	4.57	4.50	3.11	**3.98**	4.15	4.28	5.26	5.00	3.68	**4.47**
	3- Serialin + 50 Kg N/fed.	3.80	3.90	4.40	3.37	3.01	**3.90**	3.92	4.19	5.14	4.98	3.61	**4.36**
	4- Serialin + 75 Kg N/fed.	3.87	3.99	4.75	4.65	3.21	**4.09**	4.29	4.52	5.30	5.27	3.82	**4.64**
	Mean	**3.81**	**3.92**	**4.54**	**4.48**	**3.05**	**3.96**	**4.09**	**4.28**	**5.17**	**4.99**	**3.62**	**4.43**
3-Afir in furrows	1- 50 Kg N/fed.	3.79	3.87	4.36	4.49	2.98	**3.90**	3.79	3.94	4.55	4.88	3.46	**4.12**
	2- 75 Kg N/fed.	3.89	3.94	4.58	4.71	3.15	**4.06**	4.08	4.29	4.93	5.23	3.68	**4.44**
	3- Serialin + 50 Kg N/fed.	3.78	3.88	4.44	4.50	3.03	**3.93**	3.93	4.18	4.87	5.17	3.63	**4.35**
	4- Serialin + 75 Kg N/fed.	3.55	4.01	4.76	4.97	3.36	**4.13**	4.42	4.57	5.12	5.41	3.90	**4.68**
	Mean	**3.75**	**3.93**	**4.54**	**4.67**	**3.13**	**4.00**	**4.05**	**4.24**	**4.87**	**5.17**	**3.67**	**4.40**
Means of fertilization	1- 50 Kg N/fed.	3.82	3.89	4.40	4.42	2.98	**3.90**	3.95	4.12	4.81	4.92	3.51	**4.26**
	2- 75 Kg N/fed.	3.89	3.94	4.64	4.69	3.23	**4.08**	4.20	4.36	5.15	5.23	3.79	**4.54**
	3- Serialin + 50 Kg N/fed.	3.81	3.90	4.41	4.45	3.12	**3.94**	4.04	4.26	5.04	5.17	3.69	**4.44**
	4- Serialin + 75 Kg N/fed.	3.85	4.07	4.78	4.87	3.40	**4.19**	4.46	4.61	5.32	5.44	3.99	**4.76**
Means of weed control treatments		**3.84**	**3.95**	**4.56**	**4.61**	**3.18**		**4.16**	**4.34**	**5.08**	**5.19**	**3.74**	

LSD at 5% level	**A**	**0.09**	**0.05**
	B	**0.09**	**0.10**
	C	**0.08**	**0.09**
	AB	**NS**	**NS**
	AC	**0.14**	**0.16**
	BC	**0.16**	**NS**
	ABC	**NS**	**NS**

Table (32) Effect of sowing methods, fertilization and some weed control treatments as well as their interactions on protein content% in 2006/07 and 2007/08 seasons.

Treatments		2006/07						2007/08					
		Weed control treatments (C)					Mean	Weed control treatments (C)					Mean
Sowing methods (A)	Fertilization (B)	Derby	Topik	Derby + Topik	Hand weeding	Control		Derby	Topik	Derby + Topik	Hand weeding	Control	
1- Afir drill	1- 50 Kg N/fed.	11.59	11.72	12.12	12.30	10.74	**11.69**	11.47	11.64	12.06	12.26	10.77	**11.64**
	2- 75 Kg N/fed.	12.21	12.34	12.93	13.02	11.26	**12.36**	12.26	12.39	12.78	12.91	11.39	**12.35**
	3- Serialin + 50 Kg N/fed.	12.14	12.26	12.72	12.96	11.09	**12.23**	12.23	12.28	12.69	12.79	11.10	**12.22**
	4- Serialin + 75 Kg N/fed.	12.88	13.01	13.54	13.72	12.11	**13.05**	12.93	13.09	13.50	13.71	12.02	**13.05**
	Mean	**12.20**	**12.33**	**12.83**	**13.00**	**11.30**	**12.33**	**12.22**	**12.35**	**12.76**	**12.91**	**11.32**	**12.31**
2- Afir broadcast	1- 50 Kg N/fed.	11.14	11.45	12.25	12.12	10.58	**11.51**	11.10	11.30	11.96	11.98	10.64	**11.40**
	2- 75 Kg N/fed.	11.84	12.07	12.61	12.35	11.05	**11.98**	11.77	11.98	12.35	12.16	11.10	**11.87**
	3- Serialin + 50 Kg N/fed.	11.64	11.93	12.38	12.19	10.90	**11.81**	11.69	11.87	12.28	12.13	11.06	**11.80**
	4- Serialin + 75 Kg N/fed.	12.82	13.01	13.33	13.13	12.00	**12.86**	12.83	13.01	13.39	13.07	12.05	**12.87**
	Mean	**11.68**	**12.11**	**12.64**	**12.45**	**11.13**	**12.04**	**11.84**	**12.04**	**12.49**	**12.33**	**11.21**	**11.98**
3-Afir in furrows	1- 50 Kg N/fed.	11.23	11.57	12.15	12.29	10.53	**11.55**	11.22	11.42	12.02	11.99	10.60	**11.45**
	2- 75 Kg N/fed.	12.18	12.31	12.62	12.95	11.24	**12.26**	12.18	12.31	12.47	12.87	11.29	**12.22**
	3- Serialin + 50 Kg N/fed.	12.27	12.37	12.56	12.73	10.88	**12.16**	12.14	12.28	12.48	12.79	11.00	**12.14**
	4- Serialin + 75 Kg N/fed.	13.19	13.31	13.46	13.64	11.94	**13.11**	13.14	13.30	13.49	13.62	11.83	**13.8**
	Mean	**12.22**	**12.39**	**12.70**	**12.90**	**11.14**	**12.27**	**12.17**	**12.32**	**12.61**	**12.82**	**11.18**	**12.22**
Means of fertilization	1- 50 Kg N/fed.	11.32	11.58	12.17	12.24	10.61	**11.58**	11.26	11.45	12.01	12.07	10.67	**11.49**
	2- 75 Kg N/fed.	12.07	12.24	12.72	12.77	11.19	**12.20**	12.07	12.23	12.53	12.65	11.26	**12.15**
	3- Serialin + 50 Kg N/fed.	12.01	12.18	12.55	12.62	10.95	**12.07**	12.02	12.14	12.48	12.57	11.05	**12.05**
	4- Serialin + 75 Kg N/fed.	12.96	13.11	13.442	13.50	12.02	**13.00**	12.97	13.13	13.46	13.46	11.96	**13.00**
Means of weed control treatments		**12.09**	**12.28**	**12.72**	**12.78**	**11.19**		**12.08**	**12.24**	**12.62**	**12.69**	**11.24**	

LSD at 5% level	A	**0.15**	**0.03**
	B	**0.11**	**0.06**
	C	**0.10**	**0.09**
	AB	**NS**	**0.10**
	AC	**0.12**	**0.16**
	BC	**0.13**	**NS**
	ABC	**NS**	**NS**

Table (33) Correlation analysis 2006/07 and 2007/08 seasons.

Correlation analysis 2006-2007 season									
Characters	**Broad leaved weeds 75 DAS**	**Total annual weeds 75 DAS**	**Narrow leaved weeds 105 DAS**	**Broad leaved weeds 105 DAS**	**Total annual weeds 105 DAS**	**No. of Grains/spike**	**No. of Spike/m^2**	**1000-grain weight**	**Grain yield**
Narrow leaved weeds 105 DAS	0.192**	0.663**	0.968**	0.182 *	0.671**	- 0.544**	-0.593**	- 0.055**	- 0.589**
Broad leaved weeds 75DAS		0.862**	0.282**	0.985**	0.831**	- 0.573**	-0.593**	- 0.546**	- 0.597**
Total annual weeds 75 DAS			0.715**	0.845**	0.981**	- 0.718**	-0.759**	- 0.701**	- 0.759**
Narrow leaved weeds 105 DAS				0.279**	0.756**	- 0.608**	- 0.660**	- 0.607**	- 0.647**
Broad leaved weeds 105 DAS					0.840**	- 0.564**	- 0.587**	- 0535**	- 0.593**
Total annual weeds 105 DAS						- 0.728**	-.0773**	- 0.708**	- 0.770**
No. of Grains/spike							0.912**	0.880**	0.936**
No. of Spike/m^2								0.834**	0.950**
1000-grain weight									0.877**
Correlation analysis 2007-2008 season									
Narrow leaved weeds 105 DAS	0.095 NS	0.535**	0.983**	0.097 NS	0.647**	- 0.517**	- 0.594**	- 0.466**	- 0.452**
Broad leaved weeds 75DAS		0.892**	0.100 NS	0.994**	0.807**	- 0.448**	- 0.537**	- 0.445**	- 0.417**
Total annual weeds 75 DAS			0.532**	0.887**	0.979**	- 0.616**	- 0.726**	- 0.590**	- 0.559**
Narrow leaved weeds 105 DAS				0.104 NS	0.663**	- 0.556**	- 0.627**	- 0.510**	- 0.477**
Broad leaved weeds 105 DAS					0.814**	- 0.452**	- 0.539**	- 0.448**	- 0.411**
Total annual weeds 105 DAS						- 0.665**	- 0.772**	- 0.636**	- 0.588**
No. of Grains/spike							0.892**	0.805**	0.891**
No. of Spike/m^2								0.780**	0.865**
1000-grain weight									0.746**

SUMMARY

Two filed experiments were conducted at Shandaweel Agricultural Research station, Agricultural Research Center, Sohag Governorate (Upper Egypt) in both successive growing winter seasons of 2006/2007and 2007/2008. Each experiment aimed to find out the effect of sowing methods, fertilization and some weed control treatments on wheat productivity. Wheat variety Giza 168 (*Triticum aestivum* L.) was sown in both seasons. The preceding summer crop was maize (*Zea maize* L.) in both seasons. A split-split-plot design was used and the arrangement of treatments in a completely randomized blocks design with three replicates was used. Sowing methods were allocated to the main plots, the fertilizer in the sub plots and weed control treatments in the sub-sub plots as follows: -

A-Main plots: Three sowing methods:

٤. Afir drill with 15 cm apart rows.
٥. Afir in furrows method with 60 cm apart ridge. Planting on double row sloping bed and the top of the ridge.
٦. Afir braodcast.

B-Sub plots: four levels of nitrogen fertilizer :

٥. 50 kg Nitrogen/fed.
٦. 75 kg Nitrogen/fed.
٧. Serialin (biofertilizer) + 50 kg Nitrogen/fed.
٨. Serialin (biofertilizer) + 75 kg Nitrogen/fed.

C **–Sub- sub plots**: five weed control treatments :

٦. Derby 17.5% SC at rate of 30 cc/fed.
٧. Topik 15 % W P at rate of 140g/fed.
٨. Derby 17.5% SC at rate of 30 cc/ fed + Topik 15 % W.P at rate of 140g/fed.
٩. Hand weeding twice.
١٠. Un weeded (Control).

I-Associated weeds:

1. a. Dry weight of narrow- leaved weeds (g/m^2):-

Sowing methods affected significantly on dry weight of narrow-leaved weeds at 75 and 105 DAS in both seasons. Afir in furrows and Afir drill methods gave the lowest values of dry weight of narrow- leaved weeds at 75 and 105 DAS in both seasons.

Fertilization affected significantly on dry weight of narrow-leaved weeds (g/m^2) at 75 and 105 DAS in both seasons. The application of nitrogen levels at 75 kg N /fed. + Serialin, 75 kg N/fed and 50 kg N/fed. + Serialin increased significantly the dry weight of narrow- leaved weeds, as compared with 50 kg N/fed. in both seasons.

All weed control treatments gave a significant reduction on the dry weight of narrow-leaved weeds (g/m^2) at 75 and 105 DAS in both seasons. The application of Topik at 140 g/fed., Derby +Topik and hand weeding twice gave the highest reduction on dry weight of narrow-leaved weeds (g/m^2) at 75 and 105 DAS, compared with untreated plots, in both seasons.

1. b. Dry weight of broad- leaved weeds (g/m^2):-

Sowing methods had a significant effect on dry weight of broad- leaved weeds at 75 and 105 DAS in both seasons. The lowest values for dry weight of broad-leaved weeds (g/m^2) were obtained from Afir in furrows and Afir drill methods, as compared with Afir broadcast method in both seasons

Nitrogen levels with biofertilization increased significantly the dry weight of broad leaved weeds (g/m^2) at 75 and 105 DAS in both seasons. The highest values of dry weight of broad leaved weeds obtained from nitrogen levels at 75 kg N/fed. + Serialin, in both seasons

All weed control treatments gave a significant effect on reducing the dry weight of broad-leaved weeds (g/m^2) at 75 and 105 DAS in both seasons. The application of hand weeding twice, Derby and Derby + Topik gave the highest reduction on dry weight of broad- leaved weeds (g/m^2) at 75 and 105 DAS, compared with unweeded treatment.

1. c. Dry weight of total annual weeds (g/m^2):-

Sowing methods had a significant effect on dry weight of total annual weeds at 75 and 105 DAS in both seasons. Afir in furrows and Afir drill methods reduced the dry weight of total annual weeds at 75 and 105 DAS, compared with Afir broadcast method in both seasons

Nitrogen levels with biofertilization gave a significant effect on the dry weight of total annual weeds (g/m^2) at 75 and 105 DAS in both seasons. Increasing nitrogen fertilization levels + inoculation with Serialin increased the dry weight of total annual weeds (g/m^2) at 75 and 105 DAS. The application of nitrogen levels at 75 kg N/fed. + Serialin, 75 kg N/fed and 50

kg N/fed. + Serialin increased the dry weight of total annual weeds (g/m^2) 75 and 105 DAS compared with 50 kg N/fed. in both seasons

All weed control treatments gave a significant reduction on dry weight of total annual weeds (g/m^2) at 75 and 105 DAS in both seasons. The application of Derby, Topik, Derby + Topik, and hand weeding twice significantly decreased the dry weight of total annual weeds, at 75 and 105 DAS in both seasons compared to unweeded treatment.

II-Growth characters:-

1. Plant height (cm):

Sowing methods significantly affected plant height at 90 and 120 days after sowing in both seasons. Afir drill method gave the shortest plants, meanwhile, the tallest plants obtained from Afir broadcast and Afir in furrows methods in both season.

Nitrogen fertilization levels with biofertilization had significant effect on plant height at 90 and 120 DAS in both seasons. The application of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased plant height compared with nitrogen at 50 kg N/fed.

All weed control treatments decreased significantly plant height at 90 and 120 days after sowing in both seasons. The tallest plants obtained from un weeded treatments, whereas the shortest plants obtained from Derby + Topik and hand weeding twice at 90 and 120 DAS

2. Flag leaf area (cm^2):

It was cleared that sowing methods had significant effect on flag leaf area (cm^2) at 90 and 120 DAS in both seasons. The highest values of flag leaf area were obtained from Afir in furrows and Afir drill methods. Whereas the lowest value of flag leaf area obtained from Afir broadcast method in both seasons.

Increasing nitrogen levels with inoculation of Serialin significantly increased flag leaf area (cm^2) at 90 and 120 DAS in both seasons. The highest values of flag leaf area at 90 and 120 DAS obtained from the application of 75 kg N/fed.+ Serialin in both seasons. Meanwhile the lowest values of flag leaf area resulted from 50 kg N/fed., in both seasons.

Significant differences between on flag leaf area at 90 and 120 in both seasons due to the effect of weed control treatments in both seasons. The application of hand weeding twice, Derby + Topik and Topik gave the highest values of flag leaf area as compared with untreated plots in both seasons.

3. Dry weight of leaves (g/m^2):

Sowing methods affected significantly on dry weight of leaves in the second season only at 90 and both seasons at 120 DAS. Afir drill and Afir in furrows methods gave the highest values of dry weight of leaves, compared with Afir broadcast method.

Nitrogen levels + Serialin affected significantly the dry weight of leaves at 90 and 120 DAS in both seasons. Dry weight of leaves increased gradually by increasing nitrogen level and inoculation with Serialin in both seasons.

The effect of chemical and mechanical weed control treatments on dry weight of leaves at 90 and 120 DAS was significant in both seasons. Weed control treatments could be arranged in ascending order with regard to their increasing effect in the following order: Topik, Derby + Topik and hand weeding twice, compared with untreated plots.

1. d. Dry weight of stems (g/m^2):

Dry weight of stems significantly affected by sowing methods at 90 and 120 DAS in both seasons. The highest values of dry weight of stems obtained from Afir drill method at 90 and 120 DAS whereas the lowest value of dry weight of stems obtained from Afir in furrows method at 90 DAS in the first

season and Afir broadcast method at 90 DAS in the second season and at 120 DAS in both seasons.

Nitrogen levels + inoculation by Serialin induced significant effect on dry weight of stems (g/m^2) at 90 and 120 DAS in 2006/2007 and 2007/2008 seasons. Fertilization at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased dry weight of stems (g/m^2) in 2006/2007 season, compared with 50 kg N/fed.

All chemical and mechanical weed control treatments led to a significant increment on dry weight of stems (g/m^2) at 90 and 120 DAS in both season. The application of hand weeding twice; Derby + Topik; and Topik increased dry weight of stems at 90 and 120 DAS as compared with unweeded treatment.

1. e. Total dry weight of plants (g/m^2):

Data revealed that sowing methods significantly affected the total dry weight of plants (g/m^2) at 90 and 120 DAS in both seasons. Afir drill method surpassed Afir in furrows and Afir broadcast methods on their effects in this trait in both season.

Concerning the effect of fertilization (nitrogen level + Serialin) on the dry weight of plants (g/m^2) at 90 and 120 DAS the presented data revealed that significant effect on this trait in both season. Hence, 75 kg N/fed. + Serialin surpassed 50 kg N/fed., 50 kg N/fed.+ Serialin and 75 kg N/fed. in both seasons.

All studied weed control treatments significantly affected the dry weight of plants (g/m^2) at 90 and 120 DAS in both season, as compared to weedy check. Hence, hand weeding twice, Derby + Topik and Topik

increased the total dry weight of plants, compared with weedy check in both seasons

III- Yield and yield components:

1. Plant height (cm):

The results indicated clearly that the differences between sowing methods on plant height were significant in both seasons. The tallest plants were 106.98 and 107.40 cm, resulted from Afir broadcast, in the first and second season, respectively, whereas the shortest plants (105.5 and 105.06 cm) resulted from Afir drill in the first and second season, respectively.

The results showed that increasing N levels + inoculation increased plant height at harvest the application of 75 kg N/fed. + Serialin gave the maximum plant height 109.22 and 108.84 cm in the first and second season, respectively, whereas the shortest plants (105.5 and 105.06 cm) resulted from 50 kg N/fed. respectively, in the first and second season.

Concerning the effect of chemical and mechanical weed control treatments, data revealed that plant height were significantly affected in both seasons. Hand weeding twice, Derby + Topik, Topik and Derby increased plant height by 10.4, 10.2, 7.5 and 7.1 % respectively, compared to unweeded treatment in first season and 12.0, 11.3, 8.0 and 6.9 %, respectively, in the second season, compared to un weeded treatment.

2. Spike length(cm):

Sowing methods significantly affected spike length (cm) in both seasons. The greatest values of spike length (11.09 and 11.25 cm) resulted from Afir in furrows method in first and second seasons, respectively, meanwhile, the lowest value of this trait (10.55 and cm) obtained from Afir broadcast method in first and second seasons, respectively.

Data indicated that nitrogen levels + Serialin had a significant effect on spike length in first and second season. The application of 75 kg N/fed. + Serialin gave the greatest value of spike length (11.38 and 11.25 cm), in first

and second season, respectively, compared with , 75 kg N/fed., 50 kg N/fed.+ Serialin and 50 kg N/fed.

The application of weed control treatments increased spike length significantly compared to unweeded treatment in both seasons. The highest values of spike length obtained from hand weeding twice, Derby +Topik, Topik and Derby treatments, their respective increasing percentages were 18.6, 17.6, 8.4 and 5.6%, respectively, compared with unweeded treatment in the first season., and by 12.9, 11.9, 6.3 and 3.9 %, respectively, in the second season, compared with un weeded treatment**.**

3. Number of spikletes/spike:

Obtained data revealed that sowing methods significantly affected the number of spikletes/spike in the first season only. Hence, Afir drill and Afir in furrows methods surpassed Afir broadcast method in their effect on this trait. The highest value of number of spikletes/spike (20.67) obtained from Afir drill method.

Nitrogen fertilization + inoculation by Serialin gave significant effect on number of spikletes/spike in 2006/2007 and 2007/2008 seasons. Number of spikletes/spike was increased under fertilization at 75 kg N/fed.+ Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin by 4.1, 2.8 and 1.5 % respectively, compared to 50 kg N/fed. in the first season, and by 5.3, 3.1 and 2.0 % compared to 50 kg N/fed. . in the second season

All studied weed control treatments significantly affected number of spikletes/spike in both season, as compared to weedy check, in both seasons. The application of hand weeding twice, Derby + Topik, Topik and Derby gave significant increases percentages in number of spikletes/spike by 9.1, 8.3, 5.4 and 4.6% respectively, compared to unweeded treatment in the first season. and by 8.3, 8.2, 5.2 and 4.1 % respectively, in the second season, compared with un weeded treatment.

4. Spike weight (g):

Sowing methods significantly affected the spike weight (g) in both seasons. Afir in furrows method gave the highest value spike weight (3.06 and 3.01 g), respectively, in first and second season. Meanwhile Afir broadcast method gave the lowest values of spike weight (2.76 and 2.72 g/m^2) in first and second season, respectively.

Fertilization (nitrogen levels + Serialin) gave significant effect on spike weight (g) in both seasons. 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased significantly spike weight. These treatments increased spike weight by 20.3, 14.2 and 9.2%, respectively, in first season and by 19.0, 10.3 and 7.2 %, at 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin ,respectively, in second season compared to 50 kg N/fed.

Chemical and mechanical weed control treatments significantly affected spike weight (g) in both seasons, as compared to weedy check. The application of hand weeding twice, Derby + Topik, Topik and Derby gave an increase in spike weight by 37.0, 33.7, 13.6 and 11.1 %, respectively, in 2006/2007 season. and by 43.8, 42.0, 13.6 and 11.1 %, respectively in the second season, compared with unweeded treatment

5. Number of grains/spike:

Sowing methods affected significantly on number of grains/spike in both seasons. Afir in furrows method significantly increased number of grains/spike 2.3 and 5.8 %, respectively, in the first season. and by 2.4 and 6.4 % , respectively, in the second seasons, as compared with Afir in furrows and Afir broadcast

Fertilization affected significantly on number of grains/spike in both seasons. In the first season, nitrogen level at 75 kg/fed. + Serialin, 75 kg/fed. and 50 kg/fed. + Serialin increased significantly the number of grains/spike by 12.0, 6.7 and 3.8 % respectively, as compared with 50 kg N/fed. In the second season the increment percentages were 17.6, 10.6 and 6.9 %, respectively, as compared with 50 kg N/fed.

All weed control treatments had significant effect on the number of grains/spike in both seasons. In the first season the application Derby, Topik, Derby + Topik. and hand weeding twice increased significantly the number of grains/spike by 13.4, 15.8, 29.1 and 32.0 %, respectively, as compared with untreated plots. In the second season the increment percentages of the number of grains/spike were 11.7, 15.8, 29.2 and 30.9 %, respectively, as compared with untreated plots.

6. Grain weight/ spike (g):

Regarding the effect of sowing methods on grain weight/ spike it was significant both seasons. Afir in furrows method produced the greatest values of grain weight/spike (2.12 and 1.93 g) in first and second seasons, respectively, compared with Afir in broadcast (1.89 and 1.79g) and Afir drill (1.97 and 1.88g), respectively, in first and second .

Nitrogen applications + Serialin affected significantly grain weight/ spike in both seasons. In the first season grain weight/ spike increased gradually by increasing nitrogen level and inoculation with Serialin. The increment percentages were 12.2, 7.7 and 4.5 % at 75 kg N/fed. + Serialin, respectively, compared with 50 kg N/fed., 50 kg/fed. + Serialin and 75 kg/fed. In the second season the increment percentages were 11.9, 7.7 and 4.2 % at 75 kg N/fed., respectively, compared with 50 kg N/fed., 50 kg/fed. + Serialin and 75 kg/fed.

Data showed that weed control treatments significantly increased grain weight (g)/spike in both seasons. The application of Derby, Topik, Derby + Topik and hand weeding twice increased grain weight/spike by 18.0, 21.1, 38.5 and 41.0% compared with untreated plots (1.61 g) in the first season. and by 22.5, 23.8, 42.9 and 43.5%, respectively, compared to un weeded treatment (1.47g).

7. Number of tillers/m^2:

Data indicated that Afir drill and Afir in furrows methods significantly superior to Afir broadcast method in both season on their effect on number of tillers/m^2, these methods increased number of tillers/m^2 stems by 8.3 and 4.25%, respectively, in the first season. In the second season the superiority percentages were 6.6 and 3.7 % respectively compared to Afir broadcast method (397.3).

Fertilization (nitrogen levels + Serialin) gave a significant effect on the number of tillers/m^2 in both seasons. Nitrogen level at 75 kg N/fed. + Serialin,

75 kg N/fed. and 50 kg N/fed.+ Serialin increased number of tillers/m^2 by 13.9, 9.4 and 7.4%, respectively, in the first season and by 17.9, 12.17and 8.1%, respectively, in the second season, as compared to 50 kg N/fed. in the second season.

Regarding the effect of weed control treatments on number of tillers/m^2 was significant in both seasons. The application of hand weeding twice, Derby + Topik, Topik and Derby increased significantly values of number of tillers/m^2 by 54.1, 50.4, 34.4 and 29.6%, respectively, compared with weedy check in the first season. Whereas, in the second season the increment percentages were 64.3, 60.6, 36.8 and 31.6%, respectively, compared with weedy check.

8. Number of non fertile tillers/ m^2:

Sowing methods affected significantly the number of non fertile tillers/ m^2 in both seasons. Afir drill gave the lowest value of number of non fertile tillers/ m^2 (41.97 and 41.8), respectively, in first and second season, meanwhile, the highest value of number of non fertile tillers/ m^2 (51.93 and 49.55) resulted from Afir broadcast method, respectively, in first and second season.

Increasing N level + inoculation with Serialin significantly decreased the number of non fertile tillers/ m^2 in 2006/2007 and 2007/2008 seasons. The application of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin decreased the number of non fertile tillers by 26.5, 15.6 and 8.9% respectively, in the first season and by 32.8, 20.5 and 14.6 % In the second season compared to 50 kg N/fed.

All studied weed control treatments decreased significantly number of non fertile tillers/ m^2, as compared to weedy check, in both seasons. The application of hand weeding twice, Derby + Topik, Topik and Derby gave significant decrement percentages on number of non fertile tillers/ m^2 by 45.6,

43.8, 24.9 and 18.3% respectively, in the first season and by 45.9, 41.5, 31.4 and 23.6 % respectively, in the second season as compared with un weeded treatment (181.36 g/m^2).

9. Number of spikes/m^2:

Data showed that number of spikes/m^2 significantly increased under Afir drill and Afir in furrows methods as compared with Afir broadcast method in both seasons. The highest means of spikes number/m^2 was 405.6 and 381.75 produced from Afir drill method in the first and second season, respectively.

Concerning the fertilization treatments (N levels + inoculation with Serialin), results indicated that number of spikes /m^2 was significantly affected by fertilization treatments in both seasons. The application of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased number of spikes /m^2 by 19.7, 13.2 and 9.9% respectively, as compared with 50 kg N/fed in the first season and by 26.6, 17.7 and 12.0 % respectively, compared with 50 kg N/fed. in the second season.

All weed control treatments significantly increased spikes number/m^2, in both seasons. The application of hand weeding twice, Derby + Topik, Topik and Derby increased significantly number of spikes /m^2 by 78.7, 73.6, 49.1 and 41.3%, respectively, compared with weedy check, in the first season and by 46.8, 55.7, 88.9 and 94.8%, respectively, compared with weedy check in the second season.

10. 1000-grain weight (g).

Data revealed that sowing methods had a significant effect on the mean values of 1000-grain weight in both seasons. Sowing wheat plants by Afir in furrows method gave the highest value of 1000-grain weight (43.94 and 43.50 g) in the first and second seasons, respectively.

Significant differences on weight of 1000-grain (g) were detected between fertilization treatments in both seasons. The application of 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin increased 1000-grain weight by 4.1, 3.2 and 1.5% respectively, compared with 50 kg N/fed. in the first season. and by 4.6, 2.3 and 1.5%, respectively, compared with 50 kg N/fed. in the second season.

Regarding the effect of weed control treatments on weight of 1000-grain (g), data cleared that weight of 1000-grain significantly affected by weed control treatments in the both season as compared to weedy check. The application of hand weeding twice, Derby + Topik and Topik increased 1000-grain weight by 11.4, 10.3 and 5.2 %, respectively, compared with unweeded treatment in the first season. and by 8.9, 8.6 and 1.9 %, respectively, compared with unweeded treatment in the second season.

11- Grain yield ardab/fed.:

Data indicated that Afir drill and Afir in furrows methods significantly superior to Afir broadcast method in both seasons on their effect grain yield ardab/fed. Hence, these methods increased grain yield by 6.5 and 3.7%, respectively, compared to Afir broadcast method (18.24 ardab/fed.) in the first season. In the second the superiority percentages were 11.0 and 6.7% respectively, compared to Afir broadcast method (16.39ardab/fed).

It was observed that the application nitrogen levels at 75 kg N/fed. + Serialin, 75 kg N/fed and 50 kg N/fed.+ Serialin gave the highest values of grain yield (19.9, 19.2 and 18.61 ardab/fed.), respectively compared to nitrogen level at 50 kg/fed (17.72 ardab/fed) in 2006/2007 season. In the second season the using of nitrogen levels 75 kg N/fed. + Serialin, 75 kg N/fed. and 50 kg N/fed.+ Serialin attained grain yield of 18.85, 17.61 and 17.17 (ardab/fed.), compared with nitrogen level at 50 kg/fed (15.78 ardab/fed.).

Regarding the effect of chemical and mechanical weed control treatments on grain yield ardab/fed, data cleared that grain yield significantly affected by weed control treatments in the both season as compared to weedy check. Hence, hand weeding twice, Derby + Topik, Topik and Derby gave an increase grain yield ardab/fed by 36.0, 34.6, 16.3 and 15.4 %, respectively, compared with unweeded treatment in the first season. In the second season the increment percentages due to the application of hand weeding twice, Derby + Topik, Topik and Derby were 12.4, 15.1, 27.4 and 28.2 %.

The highest values of grain yield 23.33 and 22.10 ardab/fed obtained from hand weeding twice under 75 kg N/fed.+ Serialin with Afir drill method in the first and second seasons respectively.

12- Straw yield (ton/fed.):

Sowing methods significantly affected straw yield ton/fed in both seasons. Afir drill gave the greatest value of straw yield (4.12 ton/fed), while the lowest value straw yield (3.96 and 4.68 ton/fed) obtained from Afir broadcast method in the first season and second season.

The effect of fertilization on straw yield (ton/fed.) was significant in both seasons. Straw yield (ton/fed.) increased significantly with increasing N Levels up to 75 kg N/fed. + inoculation with Serialin This treatments produced maximum values of straw yield 4.19 ton/fed in the first season, and 4.76 in the second season.

With regard to the effect of weed control treatments on straw yield (ton/fed.) it could be concluded that straw yield (ton/fed.) significantly affected in both seasons. Hand weeding twice produced the maximum straw yields of 4.61 and 5.19 ton/fed. in first and second season respectively. Appling hand weeding twice increased the straw yield ton/fed by 45.0% and 38.8% in both seasons, respectively, compared with un-weeded plots.

IV- Grain Quality:-

Protein Percentage:-

The results showed clearly that sowing methods significantly affected protein in wheat grains in both seasons. Afir drill method gave the highest value of grain protein% (12.33 and 12.31%), respectively, in first and second

season. Meanwhile Afir broadcast method gave the lowest values of grain protein% (12.04 and 12.22%) in first and second season, respectively.

The results also revealed that fertilization had significant effect on protein % in both seasons. In 2007/2008 season, nitrogen level at 75 kg/fed + Serialin increased significantly protein % by 6.6, 7.7 and 12.37% compared with nitrogen levels at 75 kg N/fed., 50 kg N/fed. + Serialin and 50 kg N/fed., respectively, in the first season and by 7.0, 7.9 and 13.1%, compared with nitrogen levels at 75 kg N/fed., 50 kg N/fed. + Serialin and 50 kg N/fed., respectively, in the second season.

All studied weed control treatments significantly affected the grain protein %, as compared to weedy check, in both seasons. The application of hand weeding twice, Derby + Topik, Topik and Derby gave significant increases percentages in grain protein % by 14.2, 13.7, 9.7 and 8.0% respectively, compared to weedy check, in the first season and by 12.9, 12.3, 8.9 and 7.4, respectively, compared to unweeded treatment (11.24%) in second season.

V- Correlation analysis

Data presented in Table(33) indicated that grain yield ardab/fed. was positively and significantly correlated with number of grains/spike, 1000-grain weight, number of spikes/m^2,Moreover, it was. negatively and significantly correlated with broad leaved weeds at 75 DAS, narrow leaved weeds at 75 DAS, total weeds at 75 DAS , broad leaved weeds at 105 DAS, narrow leaved weeds at 105 DAS and total weeds at 105 DAS in both seasons.

CONCLUSION:

From this study it could be concluded that sowing wheat plants by drill method, fertilizing by 75 kg N/fed. + inoculation with Serialin and control weeds by hand weeding twice or Derby 17.5% SC at rate of 30cc/fed. + Topik 15% WP at rate of 140 g/fed. to achieve the greatest income per area unit and decrease environmental pollution.

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الملخص العربي

تأثير طرق الزراعة والتسميد وبعض معاملات مقاومة الحشائش علي إنتاجية القمح

يُعتبر محصول القمح من محاصيل الغذاء الرئيسية في العالم بصفة عامة وفى مصر بصفة خاصة حيث يُعد الغذاء الرئيسي لكافة طبقات الشعب وتقوم عليه كثيراً من الصناعات الغذائية. ونظراً لأن إنتاج مصر من القمح والبالغ ٨,٢٨ مليون طن من مساحة ٣,٠٠ مليون فدان وهذا لا يكفي الاستهلاك المحلي المتزايد سنوياً والبالغ ١٣,٠ مليون طن عام ٢٠٠٧، ولما كانت هناك فجوة كبيرة بين الكمية المنتجة محلياً من القمح وبين ما يتم استيراده من الخارج. ولما كانت مصر تستورد سنوياً حوالي ٣٦,٤% من جملة استهلاكها من القمح مما يشكل عبئاً كبيراً علي ميزانية الدولة لذا فإن القائمين على إنتاج وزراعة القمح في مصر لا يألون جهداً ولا يدخرون وسعاً إلا بذلوه في سبيل الحصول على محصول وفير يحقق قدراً كبيراً من الاكتفاء الذاتي لعصب الغذاء في مصر.

ولذا فقد أجريت تجربتان حقليتان في محطة البحوث الزراعية بشندويل والتابعه لمركز البحوث الزراعية- بمحافظة سوهاج خلال موسمي٢٠٠٧/٠٦, ٢٠٠٨/٠٧ لدراسة تأثير طرق الزراعة والتسميد وبعض معاملات مقاومة الحشائش علي الحشائش المصاحبة للقمح وكذلك المحصول ومكوناته ونسبة البروتين في صنف القمح جيزة ١٦٨.

وكانت طرق الزراعة المستخدمة هي: (الزراعة عفير بدار- الزراعة عفير تسطير-الزراعة عفير في جور علي خطوط).

وكانت معاملات التسميد هي:

١. التسميد الآزوتي بمعدل ٥٠ كجم نيتروجين/فدان.
٢. التسميد الآزوتي بمعدل ٧٥ كجم نيتروجين/فدان.
٣. سماد حيوي سيريالين + التسميد الآزوتي بمعدل ٥٠ كجم نيتروجين/فدان.
٤. سماد حيوي سيريالين + التسميد الآزوتي بمعدل ٧٥ كجم نيتروجين/فدان.

وكانت معاملات مقاومة الحشائش المستخدمة هي:

١. دربي ١٧,٥% SC بمعدل ٣٠ سم^{٣}/فدان قبل رية المحاياة بيوم (بعد ٢١ يوم من الزراعة).
٢. توبيك ١٥% WP بمعدل ١٤٠ جم/فدان خلال شهر من رية المحاياة (بعد ٤٠ يوم من الزراعة).
٣. دربي ١٧,٥% SC بمعدل ٣٠ سم^{٣}/فدان + توبيك ١٥% WP بمعدل ١٤٠ جم/فدان.
٤. النقاوة اليدوية مرتين بعد ٣٠ و ٤٥ يوم من الزراعة.
٥. المقارنة (بدون معاملة).

وقد أستخدم في هذه الدراسة تصميم القطع المنشقة مرتين في ثلاث مكررات حيث وزعت طرق الزراعة عشوائياً في القطع الرئيسية، ومعاملات التسميد عشوائياً في القطع الشقية ووزعت معاملات الحشائش عشوائياً في القطع تحت الشقية.

وفيما يلي ملخص لأهم النتائج المتحصل عليها:

أولا: تأثير طرق الزراعة والتسميد ومعاملات الحشائش علي الحشائش المصاحبة للقمح:

١. الوزن الجاف للحشائش الحولية ضيقة الأوراق (جم/م^{٢}):

أظهرت النتائج أن طرق الزراعة أثرت معنوياً علي الوزن الجاف للحشائش ضيقة الأوراق عند ٧٥ و ١٠٥ يوم من الزراعة خلال موسمي ٠٧/٢٠٠٦ و ٠٨/٢٠٠٧. ولقد أعطت طريقة الزراعة العفير علي خطوط أقل قيمة من الوزن الجاف للحشائش الحولية ضيقة الأوراق عند عمر ٧٥ و ١٠٥ يوم من الزراعة في كلا الموسمين.

أثرت معاملات التسميد معنوياً علي الوزن الجاف للحشائش الحولية ضيقة الأوراق عند ٧٥ و ١٠٥ يوم من الزراعة خلال موسمي الزراعة وكانت أعلي قيم الوزن الجاف للحشائش ضيقة الأوراق أمكن الحصول عليها من تلقيح حبوب القمح بالسماد الحيوي سيريالين مع إضافة ٧٥ كجم نيتروجين/للفدان في كلا الموسمين.

كما أوضحت النتائج أن الوزن الجاف للحشائش الحولية ضيقة الأوراق تأثر معنوياً بمعاملات مقاومة الحشائش في كلا موسمي الزراعة. ولقد أعطت معاملات التوبيك والدربي+التوبيك والنقاوة اليدوية أقل قيم للوزن الجاف للحشائش الحولية ضيقة الأوراق عند عمر ٧٥ و ١٠٥ يوم من الزراعة خلال موسمي ٠٧/٢٠٠٦ و ٠٨/٢٠٠٧. بالمقارنة بالقطع الغير معاملة.

٢. الوزن الجاف للحشائش الحولية عريضة الأوراق:

أوضحت النتائج أن طرق الزراعة أثرت معنوياً علي الوزن الجاف للحشائش ضيقة الأوراق عند ٧٥ و ١٠٥ يوم من الزراعة خلال موسمي الزراعة. ولقد أعطت طريقة الزراعة العفير بدار أعلي وزن للحشائش الحولية عريضة الأوراق عند عمر ٧٥ و ١٠٥ يوم من الزراعة في كلا الموسمين. بينما أعطت طريقة الزراعة العفير علي خطوط أقل قيم من الوزن الجاف للحشائش الحولية عريضة الأوراق في كلا الموسمين.

أدت زيادة معدل التسميد من ٥٠ إلي ٧٥ كجم نيتروجين/فدان مع التلقيح بالسريالين إلي زيادة الوزن الجاف للحشائش الحولية عريضة الأوراق عند ٧٥ و ١٠٥ يوم من الزراعة خلال الموسمين وكانت أعلي قيم الوزن الجاف للحشائش عريضة الأوراق أمكن الحصول عليها من تلقيح حبوب القمح بالسماد الحيوي سيريالين إضافة ٧٥ كجم نيتروجين/للفدان في كلا الموسمين.

كما أوضحت النتائج أن الوزن الجاف للحشائش الحولية عريضة الأوراق تأثر معنوياً بمعاملات مقاومة الحشائش في كلا موسمي الزراعة. ولقد أعطت معاملات الدربي والنقاوة اليدوية والدربي+التوبيك أقل قيم للوزن الجاف للحشائش الحولية عريضة الأوراق حيث أدت هذه المعاملات إلي خفض في الوزن الجاف للحشائش عريضة الأوراق بنسبة ٩٦، ٩٥,٦ و ٩٣,٦%، علي الترتيب، في الموسم الأول وبنسبة، ٩٣,٨, ٩٦,٠ و٩٣,٥% في الموسم الثاني عند عمر ٩٠ يوم. بينما عند عمر ١٠٥ يوم كانت نسب الخفض في الوزن الجاف للحشائش الحولية عريضة الأوراق نتيجة لإستخدام الدربى والدربي+ التوبيك والنقاوة اليدوية مرتين هي ٨٨,٣، ٨٥,٣ و ٨,٥% في الموسم الأول و ٩١,٦, ٨٩,٣ و ٨٨,٩% علي الترتيب في الموسم الثاني مقارنة بالقطع المعاملة.

٣. الوزن الجاف للحشائش الحولية الكلية (جم/م^{٢}):

أثرت طرق الزراعة تأثيراً معنوياً علي الوزن الجاف للحشائش الكلية عند ٧٥ و ١٠٥ يوم من الزراعة خلال الموسمين ولقد أعطت طريقتي الزراعة العفير علي خطوط والعفير تسطير أقل قيمة من الوزن الجاف للحشائش الحولية ضيقة الأوراق عند عمر ٧٥ و ١٠٥ يوم من الزراعة في كلا الموسمين, مقارنة بطريقة الزراعة العفير بدار.

كما أثرت معاملات التسميد (معدلات السماد الآزوتي + السيريالين) معنوياً علي الوزن الجاف للحشائش الحولية الكلية عند ٧٥ و ١٠٥ يوم من الزراعة خلال موسمي الزراعة وكانت أعلي قيم الوزن الجاف للحشائش الكلية أمكن الحصول عليها من تلقيح حبوب القمح بالسماد الحيوي سيريالين مع إضافة ٧٥ كجم نيتروجين/للفدان في كلا الموسمين.

كما أوضحت النتائج أن الوزن الجاف للحشائش الحولية الكلية تأثر معنوياً بمعاملات مقاومة الحشائش في كلا موسمي الزراعة. ولقد أعطت معاملات الدربي+التوبيك والنقاوة اليدوية أقل قيم للوزن الجاف للحشائش الحولية ضيقة الأوراق عند عمر ٧٥ و ١٠٥ يوم من الزراعة خلال موسمي الزراعة. بالمقارنة بالقطع الغير معاملة.

ثانياً: تأثير طرق الزراعة والتسميد ومعاملات الحشائش علي صفات النمو للقمح:

١- طول النبات(سم):

أظهرت النتائج أن طرق الزراعة كان لها تأثيراً معنوياً علي طول النبات عند ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين. حيث أعطت طريقة الزراعة العفير تسطير أقصر طول للنبات عند عمر ٩٠ و ١٢٠ يوم من الزارعة في كلا الموسمين, بينما أطول النباتات تم الحصول عليها من طريقة الزراعة العفير علي خطوط في الموسم الأول والعفير بدار في الموسم الثاني.

كان تأثير التسميد معنوياً علي طول النبات عند عمر٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين. حيث أدي إستخدام السماد الآزوتي بمعدل ٧٥ كجم ن/فدان مع التلقيح بالسريالين إلي الحصول علي أطول النباتات بينما أدي إستخدام السماد الآزوتي بمعدل ٥٠ كجم ن/فدان إلي الحصول علي أقصر النباتات في كلا الموسمين.

كما أوضحت النتائج أن معاملات الحشائش كان لها تأثيراً معنوياً علي طول النبات عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين. حيث أعطت معاملة الدربي + التوبيك، النقاوة اليدوية مرتين إلي الحصول علي أقصر النباتات في كلا الموسمين مقارنة بالقطع الغير معاملة.

٢- مساحة ورقة العلم (سم^{٢}):

أثرت طرق الزراعة معنوياً علي مساحة ورقة العلم عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين. حيث أعطت طريقة الزراعة العفير علي خطوط أكبر مساحة لورقة العلم عند عمر ٩٠ يوم بينما أعطت طريقة الزراعة العفير تسطير أكبر مساحة لورقة العلم عند عمر ١٢٠ يوم من الزراعة في كلا الموسمين. بينما أعطت طريقة الزراعة العفير بدار أقل مساحة للورقة عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين.

أدت زيادة معدل التسميد النيتروجيني من ٥٠-٧٥ كجم ن/فدان مع التلقيح بالسيريالين إلي زيادة معنوية في مساحة ورقة العلم عند عمر ٩٠, ١٢٠ يوم من الزراعة في كلا الموسمين. وأعطي معدل ٧٥ كجم ن/فدان + سيريالين أعلي معدلات زيادة في مساحة ورقة العلم مقارنة عند عمري ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين.

أثرت معاملات الحشائش (الكيماوية والميكانيكية) تأثيراً معنوياً علي مساحة ورقة العلم حيث أدت معاملات النقاوة اليدوية والدربي + التوبيك إلي الحصول علي أعلي مساحة لورقة العلم عند ٩٠-١٢٠ يوم من الزراعة في كلا الموسمين.

٣- الوزن الجاف للأوراق (جم/م^{٢}):

أوضحت النتائج أن طرق الزراعة كان لها تأثيراً معنوياً علي الوزن الجاف للأوراق عند عمر ٩٠ يوم من الزراعة في الموسم الثاني فقط, بينما كان تأثير طرق الزراعة معنوياً في كلا الموسمين علي الوزن الجاف للأوراق. وكانت أعلي القيم للوزن الجاف للأوراق تم الحصول عليها من طريقة الزراعة العفير تسطير في كلا الموسمين. بينما تم الحصول علي أقل القيم لهذه الصفة من طريقة الزراعة العفير بدار في كلا الموسمين.

أثرت معاملات التسميد معنوياً علي الوزن الجاف لأوراق القمح (جم/م^{٢}) عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين. وقد تم الحصول علي أعلي القيم لهذه الصفة من تلقيح حبوب القمح بالسريالين كسماد حيوي مع التسميد بـ٧٥ كجم ن/فدان بينما أقل القيم تم الحصول عليها من التسميد بمعدل ٥٠ كجم ن/فدان في كلا الموسمين.

كان لمعاملات الحشائش تأثيراً معنوياً علي الوزن الجاف للأوراق (جم/م^{٢}) عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين. حيث أدت النقاوة اليدوية مرتين والرش بمبيدي الدربي+ التوبيك إلي الحصول علي أعلي القيم للوزن الجاف للأوراق, مقارنة بالقطع الغير معاملة في كلا الموسمين.

٤-الوزن الجاف للسيقان (جم/م^{٢}):

أشارت النتائج أن طرق الزراعة كان لها تأثيراً معنوياً علي الوزن الجاف للسيقان(جم/م^{٢}) عند عمر ٩٠ و ١٢٠ يوم من الزراعة خلال موسمي ٢٠٠٦/٠٧, ٢٠٠٧/٠٨. حيث أعطت طريقة الزراعة العفير تسطير أعلي وزن جاف للسيقان عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين مقارنة بطريقة الزراعة العفير بدار.

تأثر الوزن الجاف للسيقان(جم/م^{٢}) معنوياً بزيادة معدل السماد الآزوتي من ٥٠-٧٥ كجم ن/فدان مع التلقيح بالسريالين، حيث أدي التسميد بمعدل ٧٥ كجم ن/فدان+ سيريالين, ٧٥ كجم ن/فدان و ٥٠ كجم ن/فدان + سيريالين إلي زيادة معنوية في الوزن الجاف للسيقان عند عمر ٩٠ و ١٢٠ يوم من الزراعة مقارنة بمعدل التسميد ٥٠ كجم ن/فدان، في كلا الموسمين.

أثرت معاملات الحشائش معنوياً علي الوزن الجاف للسيقان (جم/م^{٢}) عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين حيث أعطت النقاوة اليدوية و الدربي+ التوبيك إلي الحصول علي أعلي القيم للوزن الجاف للسيقان عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين.

٥-الوزن الجاف الكلي للنباتات (جم/م^{٢}):

أوضحت النتائج أن الوزن الجاف الكلي للنباتات (جم/م^{٢}) عند عمر ٩٠ و ١٢٠ تأثر معنوياً بطرق الزراعة في كلا الموسمين. وكانت أعلي القيم من الوزن الحاف الكلي قد تم الحصول عليها من طريقة الزراعة العفير تسطير والتي أعطت أقل القيم في كلا الموسمين.

أشارت النتائج أن زيادة معدل التسميد النيتروجيني مع التلقيح بالسيريالين أدي إلي زيادة معنوية في الوزن الجاف الكلي للنباتات (جم/م^{2}) عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين.حيث أعطت معاملة ٧٥ كجم ن/فدان أعلي القيم من الوزن الجاف الكلي للنباتات (جم/م^{2}) عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين.

كما أوضحت النتائج أن معاملات الحشائش كان لها تأثيراً معنوياً علي الوزن الجاف الكلي للنباتات (جم/م^{2}) عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين. حيث أعطت النقاوة اليدوية و الدربي+ التوبيك إلي الحصول علي أعلي القيم الوزن الجاف الكلي للنباتات (جم/م^{2})عند عمر ٩٠ و ١٢٠ يوم من الزراعة في كلا الموسمين. مقارنة بالقطع الغير معاملة

ثالثاً: تأثير طرق الزراعة والتسميد ومعاملات الحشائش علي المحصول ومكوناته:

طول النبات (سم):

أوضحت النتائج أن طرق الزراعة كان لها تأثيراً معنوياً علي طول النبات عند الحصاد حيث أعطت طريقة الزراعة العفير بدار أطول النباتات (١٠٩,٢٢ و ١٠٨,٨٤ سم) في الموسم الأول والثاني علي التوالي, بينما أعطت طريقة الزراعة العفير تسطير أقصر النباتات (١٠٥,٥ و ١٠٥,٠٦) في الموسم الأول والثاني علي التوالي.

تأثر طول النبات معنوياً بزيادة التسميد الآزوتي من ٥٠-٧٥ كجم ن/فدان والتلقيح بالسماد الحيوي السيريالين في كلا الموسمين. حيث أعطي التسميد الآزوتي بمعدل ٧٥ كجم ن/فدان + السيريالين أطول النباتات (١٠٩,٢٢ و ١٠٨,٨٤ سم) في الموسم الأول والثاني علي التوالي بينما أقصر النباتات (١٠٣,٤٧ و ١٠٣,٧٣ سم) فقد تم الحصول عليها من التسميد بمعدل ٥٠ كجم ن/فدان في الموسم الأول والثاني علي التوالي.

أثرت معاملات الحشائش معنوياً علي طول النباتات في كلا موسمي الزراعة حيث أدت معاملتي النقاوة اليدوية مرتين و المعاملة بمبيدي الدربي + التوبيك إلي الحصول علي أقصر النباتات في كلا الموسمين مقارنة بمعاملة المقارنة التي أعطت أطول النباتات.

٢- طول السنبلة (سم):

أظهرت النتائج أن طرق الزراعة أثرت معنوياً علي طول السنبلة خلال موسمي الزراعة وكانت أكبر القيم لطول السنبلة (١١,٩ و ١١,٢٥ سم) أمكن الحصول عليها من طريقة الزراعة العفير علي خطوط في الموسم الأول والثاني علي التوالي. بينما كانت أقل القيم لطول السنبلة (١٠,٥٥ و ١٠,٦٤ سم) والتي تم الحصول عليها من طريقة الزراعة العفير بدار في الموسم الأول والثاني علي التوالي.

أدت معاملات التسميد إلي زيادة معنوية في طول السنبلة في كلا الموسمين حيث أعطي مستوي التسميد ٧٥ كجم ن/فدان + سيريالين أعلي طول للسنبلة في كلا الموسمين. بينما أعطي المعدل ٥٠ كجم ن/فدان أقل طول للسنبلة في كلا الموسمين.

أوضحت النتائج أن معاملات الحشائش أدت إلي زيادة معنوية في طول السنبلة خلال موسمي الزراعة. حيث أدت النقاوة اليدوية مرتين والرش بمبيدي الدربي+ التوبيك إلي زيادة قدرها ١٨,٦, ١٧,٦% في الموسم الأول و ١٢,٩, ١١,٩% في الموسم الثاني علي التوالي. مقارنة بمعاملة الكنترول.

٣- عدد السنيبلات/سنبلة:

كان لطرق الزراعة تأثيراً معنويا علي عدد السنيبلات/سنبلة في الموسم الأول فقط. حيث أدت طريقة الزراعة العفير تسطير إلي الحصول علي أعلي قيمة لعدد السنيبلات/سنبلة مقارنة بطريقة الزراعة العفير بدار والتي أعطت أقل القيم لهذه الصفة.

أظهر التسميد النيتروجيني تأثيراً معنوياً علي عدد السنيبلات/سنبلة في كلا الموسمين. حيث أعطي التسميد النيتروجيني زيادة وقدرها ٤,٧, ٢,٨ و ١,٥% في الموسم الأول, ٥,٣, ٣,١ و ٢% في الموسم الثاني مقارنة ٧٥ كجم ن/فدان, ٥٠ كجم ن/فدان + سيريالين, ٥٠ كجم ن/فدان علي التوالي.

أظهرت معاملات الحشائش تأثيراً معنوياً علي صفة عدد السنيبلات/سنبلة في كلا الموسمين حيث أدت معاملة النقاوة اليدوية مرتين و الدربي+ التوبيك إلي زيادة وقدرها ٩,١ و ٨,٣% في الموسم الأول، ٨,٣ و ٨,٢% في الموسم الثاني علي التوالي مقارنة بالقطع الغير معاملة.

٤- وزن السنبلة(جم):

أوضحت النتائج أن طرق الزراعة أثرت معنوياً علي صفة وزن السنبلة في كلا الموسمين. حيث أدت طريقة الزراعة العفير علي خطوط إلي الحصول علي أعلي القيم لهذه الصفة(٣,٠٦ و ٣,٠١ جم) في الموسم الأول والثاني علي التوالي. بينما أعطت طريقة الزراعة العفير بدار أقل القيم لوزن السنبلة (٢,٧٦ و ٢,٧٢ جم) في الموسم الأول والثاني علي التوالي.

زاد وزن السنبلة معنوياً بزيادة التسميد الآزوتي والتلقيح بالسيريالين في كلا الموسمين حيث أدى التسميد بمعدل ٧٥ كجم ن/فدان+ سيريالين, ٧٥ كجم ن/فدان, ٥٠ كجم ن/فدان+ سيريالين إلي زيادة قدرها ٢٠,٣, ١٤,٢ و ٩,٢% في الموسم الأول, ١٩,٠, ١٠,٣ و ٧,٢% في الموسم الثاني علي التوالي.

أشارت النتائج إلي أن وزن السنبلة تأثر معنوياً بمعاملات مقاومة الحشائش في كلا الموسمين حيث أدي إستخدام النقاوة اليدوية مرتين و المعاملة بمبيدي الدربي + التوبيك إلي زيادة في وزن السنبلة بمقدار ٣٧,٠، ٣٣,٧% في الموسم الأول ، ٤٣,٨ و ٤٢,٥% في الموسم الثاني علي التوالي، مقارنة بمعاملة الكنترول.

٥- عدد حبوب السنبلة:

أوضحت النتائج أن طرق الزراعة أثرت معنوياً علي عدد حبوب السنبلة في كلا الموسمين حيث أدت طريقة الزراعة العفير علي خطوط للحصول علي أعلي القيم لعدد حبوب السنبلة في الموسم الأول. بينما أدت طريقة الزراعة العفير تسطير إلي الحصول علي أعلي القيم في الموسم الثاني. بينما أدت طريقة الزراعة العفير بدار إلي الحصول علي أقل القيم لهذه الصفة في كلا الموسمين.

تأثر عدد حبوب السنبلة معنوياً بمعاملات التسميد في كلا الموسمين. حيث أدي التسميد بمعدل ٧٥ كجم ن/فدان + سيريالين إلي الحصول علي أعلي نسبة زيادة في عدد حبوب السنبلة والتي كانت ١٢,٠, ٦,٧ و ٣,٨% في الموسم الأول، ١٧,٦, ١٠,٦, ٦,٦% في الموسم الثاني علي التوالي, مقارنة بمعدلات ٧٥ كجم ن/فدان، ٥٠كجم ن/فدان + سيريالين و ٥٠كجم ن/فدان.

أظهرت جميع معاملات الحشائش تأثيراً معنوياً علي عدد حبوب السنبلة في كلا الموسمين حيث أدت معاملات النقاوة اليدوية والدربي + التوبيك إلي أكبر زيادة في عدد حبوب السنبلة بمقدار ٣٢,٠ و ٢٩,١% في الموسم الأول ، ٣٠,٩ و ٢٩,٢% في الموسم الثاني علي التوالي، مقارنة بمعاملة الكنترول.

٦-وزن حبوب السنبلة(جم):

أوضحت النتائج أن طرق الزراعة أثرت معنوياً علي صفة وزن حبوب السنبلة في كلا الموسمين حيث أمكن الحصول علي أعلي القيم لهذه الصفة تحت طريقة الزراعة العفير علي خطوط (٢,١٢ و ١,٩٣ جم) في الموسم الأول والثاني علي التوالي بينما أدت طريقة الزراعة العفير بدار للحصول علي أقل القيم (١,٨٩ و ١,٧٩ جم) في الموسم الأول والثاني علي التوالي.

أثرت معاملات التسميد معنوياً علي وزن حبوب السنبلة حيث أدت معاملة ٧٥ كجم ن/فدان + سيريالين للحصول علي أعلي قيمة لوزن حبوب السنبلة في كلا الموسمين. حيث أدت هذه المعاملة إلي زيادة قدرها ١٢,٢, ٧,٧ و٤,٥% في الموسم الأول، ١١,٩ و ٧,٧, ٤,٢% في الموسم الثاني علي التوالي مقارنة بمعدلات ٧٥ كجم ن/فدان، ٥٠كجم ن/فدان + سيريالين و ٥٠كجم ن/فدان.

أشارت النتائج أن معاملات مقاومة الحشائش (الكيماوية والميكانيكية) أدت إلي زيادة معنوية في وزن حبوب السنبلة في كلا الموسمين. حيث أدت معاملتي النقاوة اليدوية والدربي + التوبيك إلي أعلي زيادة معنوية في وزن حبوب السنبلة مقارنة بمعاملة الكنترول في كلا الموسمين.

٧- عدد الأشطاء/م^{٢}:

أوضحت أن طرق الزراعة أثرت معنوياً علي عدد الأشطاء/م^{٢} في كلا الموسمين حيث تفوقت طريقتي العفير تسطير والعفير علي خطوط علي طريقة العفير بدر في عدد الأشطاء/م^{٢} حيث أدت هاتين الطريقتين إلي زيادة معنوية في عدد الأشطاء/م^{٢} إلي زيادة قدرها ٨,٣, ٤,٣% في الموسم الأول، ٦,٦, ٣,٧% في الموسم الثاني علي التوالي مقارنة طريقة العفير بدار.

كان لمعاملات التسميد تأثيراً معنوياً علي صفة عدد الأشطاء/م^{٢} في كلا الموسمين. حيث أحدث زيادة معدلات التسميد مع التلقيح بالسماد الحيوي سيريالين، زيادة معنوية في عدد الأشطاء/م^{٢} في كلا الموسمين وحققت معاملة التسميد ٧٥ كجم ن/فدان + سيريالين أعلي زيادة في عدد الأشطاء في كلا الموسمين.

أدت معاملات مقاومة الحشائش إلي زيادة معنوية في عدد الأشطاء/م^{٢} في كلا الموسمين وكانت أعلي القيم لهذه الصفة قد تم الحصول عليها من معاملتي النقاوة اليدوية مرتين، المعاملة بمبيدي الدربي + التوبيك في كلا موسمي الزراعة.

٨- عدد الأشطاء الغير حاملة للسنابل/م^{٢}:

أثرت طرق الزراعة معنوياً علي عدد الأشطاء الغير حاملة للسنابل/م^{٢} خلال موسمي ٠٧/٢٠٠٦ و ٠٨/٢٠٠٧. ولقد أشارت النتائج أن طريقة الزراعة العفير تسطير أحدث نقصاً معنوياً في عدد الأشطاء الغير حاملة للسنابل في كلا موسمي الزراعة بينما أدت طريقة الزراعة العفير بدار للحصول علي أعلي القيم لهذه الصفة في كلا موسمي الزراعة.

أدت زيادة معدلات التسميد الآزوتي والتلقيح بالسيريالين إلي نقص معنوي في عدد الأشطاء الغير حاملة للسنابل/م^{٢} في كلا موسمي الزراعة. حيث أعطي معدل التسميد ٧٥ كجم ن/فدان أقل القيم بينما أدي معدل التسميد ٥٠ كجم ن/فدان أكبر القيم لهذه الصفة في كلا موسمي الزراعة.

أشارت النتائج أن معاملات مقاومة الحشائش أثرت معنوياً علي عدد الأشطاء الغير حاملة للسنابل/م^{٢} خلال موسمي ٠٧/٢٠٠٦ و ٠٨/٢٠٠٧. حيث أحدثت معاملات النقاوة اليدوية مرتين و الدربي+ التوبيك أكبر نقص في عدد الأشطاء الغير حاملة للسنابل في كلا مويمي الزراعةوأدت هاتين المعامليتين إلي نقص مقدارة ٤٥,٦ و ٤٣,٨% في الموسم الأول، ٤٥,٩ و ٤١,٥% في الموسم الثاني علي التوالي مقارنة بالقطع الغير معاملة.

٩- عدد السنابل/م^{٢}:

أوضحت النتائج أن صفة عدد السنابل/م^{٢} إزدادت معنوياً تحت طريقتي الزراعة عفير تسطير وعفير علي خطوط مقارنة بطريقة الزراعة العفير بدار والتي أعطت أقل القيم لهذه الصفة.

أشارت النتائج أن صفة عدد السنابل/م^{٢} إزدادت معنوياً بزيادة معدل التسميد من ٥٠- ٧٥ كجم ن/فدان مع التلقيح بالسيريالين خلال موسمي ٠٧/٢٠٠٦ , ٠٨/٢٠٠٧. ولقد أعطي التسميد بمعدل ٧٥ كجم ن/فدان + التلقيح بالسيريالين، ٧٥ كجم ن/فدان, ٥٠ كجم ن/فدان+ سيريالين إلي زيادة عدد السنابل/م^{٢} بمقدار ١٩,٧, ١٣,٢ و ٩,٩% في الموسم الأول, ٢٦,٦، ١٧,٧، ١٢,٠% في الموسم الثاني علي التوالي، مقارنة ٥٠كجم ن/فدان.

أوضحت النتائج أن معاملات مقاومة الحشائش (الكيماوية والميكانيكية) أدت إلي زيادة معنوية في عدد السنابل/م^{٢} في كلا الموسمين. حيث أدت معاملتي النقاوة اليدوية مرتين والدربي + التوبيك إلي الحصول علي زيادة معنوية في عدد السنابل/م^{٢} بمقدار ٧٨,٧ و ٧٣,٦% في الموسم الأول, ٩٤,٨ و ٨٨,٩% في الموسم الثاني علي التوالي, مقارنة بالقطع الغير معاملة.

١٠- وزن الألف حبة (جم):

أوضحت النتائج أن طرق الزراعة كان لها تأثيراً معنوياً علي وزن الألف حبة في كلا الموسمين حيث أعطت طريقة الزراعة علي خطوط أعلي وزن للألف حبة (٤٣,٩٤ و ٤٣,٥ جم) في الموسم الأول والثاني علي التوالي. بينما أعطت طريقة الزراعة العفير بدار أقل وزن للألف حبة (٤٣,٢٢ و ٤٢,٦٨ جم) في الموسم الأول والثاني علي التوالي.

تأثر وزن الألف حبة معنوياً بزيادة معدل التسميد من ٥٠- ٧٥ كجم ن/فدان مع التلقيح بالسيريالين خلال موسمي ٠٧/٢٠٠٦ , ٠٨/٢٠٠٧. حيث أعطي معدل التسميد ٧٥ كجم ن/فدان + سيريالين أعلي وزن للألف حبة, بينما أعطي مستوي التسميد ٥٠ كجم ن/فدان أقل وزن للألف حبة في كلا الموسمين.

أثرت معاملات الحشائش معنوياً علي وزن الألف حبة في كلا الموسمين حيث أدت معاملتي النقاوة اليدوية مرتين والدربي + التوبيك إلي الحصول علي أكبر زيادة في وزن الألف حبة (١١,٤ , ١٠,٣% في الموسم الأول, ٨,٩ و ٨,٦% في الموسم الثاني علي التوالي مقارنة بالقطع الغير معاملة).

١١- محصول الحبوب أردب/فدان:

أشارت النتائج إلي تفوق طريقتي الزراعة العفير تسطير والعفير علي خطوط معنوياً علي طريقة الزراعة عفير بدار في محصول الحبوب أردب/فدان في كلا الموسمين حيث زاد محصول الحبوب في هاتين الطريقتين بمقدار ٦,٥ و ٣,٧% في الموسم الأول , ١١,٠ و٦,٧% في الموسم الثاني علي التوالي مقارنة بطريقة الزراعة العفير بدار.

إزداد محصول الحبوب أردب/فدان بزيادة التسميد الآزوتي مع التلقيح بالسيريالين في كلا الموسمين حيث أعطت معاملات التسميد ٧٥ كجم ن/فدان + التلقيح بالسيريالين، ٧٥ كجم ن/فدان و ٥٠ كجم ن/فدان+ سيريالين أعلي إنتاجية والتي كانت ١٩,٩, ١٩,٢, ١٨,٦ أردب/فدان في الموسم الأول, ١٨,٨٥, ١٧,٦١, ١٧,١٧ أردب/فدان في الموسم الثاني.

أدت معاملات الحشائش إلي زيادة معنوية في محصول الحبوب أردب/فدان في كلا الموسمين. حيث أدي إستخدام النقاوة اليدوية مرتين، الدربي + التوبيك ، التوبيك و الدربي إلي زيادة معنوية في محصول الحبوب بمقدار ٣٦,٠, ٣٤,٦، ١٦,٣ و ١٥,٤% في الموسم الأول، ٢٨,٤، ٢٧,٤، ١٥,١ و ١٢,٤% في الموسم الثاني علي التوالي مقارنة بالقطع الغير معاملة.

كما أوضحت النتائج أن أعلي القيم لصفة محصول الحبوب ٢٣,٣٣, ٢٢,١٠ أردب/فدان تم الحصول عليها من زراعة القمح بطريقة العفير تسطير مع تلقيح حبوب القمح بالسريالين والتسميد بمعدل ٧٥ كجم نيتروجين ونقاوة الحشائش يدويا.

١٢-محصول القش (طن/فدان):

أثرت طرق الزراعة معنوياً علي محصول القش في كلا الموسمين حيث أدت طريقة الزراعة العفير تسطير إلي الحصول أعلي القيم لهذه الصفة في كلا الموسمين. بينما أدت طريقة الزراعة العفير بدار للحصول علي أقل القيم لهذه الصفة فيالموسم الأول, وطريقة الزراعة العفير علي خطوط في الموسم الثاني.

تأثر محصول القش معنوياً بزيادة التسميد الآزوتي من ٥٠ – ٧٥ كجم ن/فدان والتلقيح بالسيريالين خلال موسمش ٢٠٠٦/٠٧ , ٢٠٠٧/٠٨ حيث أعطي معدل التسميد ٧٥ كجم ن/فدان + سيريالين أعلي القيم لهذه الصفة. بينما أعطي التسميد بمعدل ٥٠ كجم ن/فدان أقل القيم في كلا الموسمين.

أشارت النتائج أن معاملات مقاومة الحشائش أثرت معنوياً علي محصول القش طن/فدن في كلا الموسمين حيث أدت معاملة النقاوة اليدوية إلي الحصول علي أعل القيم لهذه الصفة وقد أدت هذه المعاملة إلي أعلي زيادة في محصول القش قدرها ٤٥,٠، ٣٨,٨% في الموسم الأول والثاني علي التوالي مقارنة بالقطع الكنترول.

رابعاً: تأثير طرق الزراعة والتسميد ومعاملات الحشائش علي جودة الحبوب:

١- نسبة البروتين%:

أوضحت النتائج أن طرق الزراعة أثرت معنوياً علي نسبة البروتين في الحبوب في كلا الموسمين. حيث أدت طريقة الزراعة العفير تسطير إلي الحصول علي أعلي نسبة برتين في الحبوب (١٢,٣٣ و ١٢,٣١%) في الموسم الأول والثاني علي التوالي.

أثرت معاملات التسميد معنوياً علي نسبة البروتين في الحبوب في كلا الموسمين. حيث أعطت معاملة ٧٥ كجم ن/فدان أعلي نسبة بروتين (١٣,٠%) في الموسم الأول والثاني بينما أعطت معاملة التسميد ٥٠ كجم ن/فدان أقل نسبة بروتين ١١,٥٨، ١١,٤٩% في الموسم الأول والثاني علي التوالي.

أشارت النتائج إلي أن معاملات مقاومة الحشائش أدت إلي زيادة معنوية في نسبة البروتين في كلا الموسمين حيث أدت معاملات النقاوة اليدوية مرتين ، الدربي + التوبيك , التوبيك والدربي إلي زيادة معنوية في صفة البروتين وقدرها ١٤,٢, ١٣,٧، ٩,٧ و ٨% في الموسم الأول ، ١٢,٩، ١٢,٣، ٨,٩ و ٧,٤% في الموسم الثني علي التوالي مقارنة بالقطع الغير معاملة.

خامساً: تحليل الإرتباط:

أشارت النتائج إلي وجود إرتباط معنوي سالب بين صفة المحصول وصفات الحشائش عند ٧٥- ١٠٥ يوم من الزراعة في كلا الموسمين كما أشارت النتائج إلي وجود إرتباط معنوي موجب بين محصول الحبوب أردب/فدان وكلا من عدد حبوب السنبلة ووزن حبوب السنبلة ووزن الالف حبة.

التوصية:

من خلال هذه الدراسه يمكن التوصية بزراعة القمح بطريقة التسطير والتسميد بمعدل ٧٥ كجم ن/فدان مع تلقيح حبوب القمح بالسماد الحيوي سيريالين ومعاملة الحشائش بالنقاوة اليدوية مرتين عند ٣٠ و ٤٥ يوم من الزراعة أو الرش بمبيدي الدربي + التوبيك لتحقيق أعلي عائد من وحدة المساحة وتقليل خسائر المحصول من الحشائش وتقليل تلوث البيئة.