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# RESPONSE OF SOME WHEAT CULTIVARS TO NITROGEN FERTILIZER LEVELS

**Seleem, S. A. and S. M. Abd El -Dayem**
**Wheat Res. Dept., Field Crops Res. Institute, A.R.C., Egypt**

## ABSTRACT

Two field experiments were carried out during 2009/2010 and 2010/2011 seasons at the Agricultural Research Station of Etai El-Baroad, El-Behira Governorate, Egypt, to study the response of five wheat cultivars and its components of four nitrogen fertilizer levels ( 0 , 30 , 60 and 90 kg N/fed). To determines the following traits: number of spikes/m$^2$, plant height (cm), days of heading , physiological maturity , no. of kernels/spike , 1000-kernel weight , grain yield, straw yield and biological yield (ton/fed).

The highest significant value of grain yield was obtained by Gemmeiza 9 , Misr 1 , Sakha 94 and Giza 168 in first season only. *Vice versa*, the lowest ones were observed when the cultivar of Sakha 93 was sown in both seasons.

For the interacted factors under study, in most cases, results demonstrated that the best significant values of grain, straw and biological yields were obtained by adding 60 and / or 90 kg/fed with any wheat cultivars in both seasons. On the other hand, the lowest ones were recorded for the control (without addition of N fertilizer) in both ones. The results show that cultivars differ in their response to applied N, their ability to take up soil N and that the differences can be explained by the interaction of physiological maturity and N fertilizer levels. The reversal of cultivar rankings for yield at the low and high levels of N shows the importance of evaluating cultivars at a representative level of fertility.

## INTRODUCTION

Wheat (*Triticum aestivum L.)* is the main food crop for the Egyptian population. The amount of wheat needed for human consumption, however, is far greater than that produced locally. The most effective way to overcome this problem and to increase production under limited arable lands in Egypt, may be through the use of high yielding cultivars along with application of the best cultural practices such as nitrogen fertilization.

In recent years, the grain filling level, length of grain, filling period and leaf water content prevailing during the growth and maturity are the most important factors in determining the final yield of wheat. Not only nitrogen fertilizer, but also the genotype, could be considered one of the most favorable factors affecting grain yield through their effects on the above mentioned characters. In this concern, many workers reported that increasing nitrogen level caused a significant increase in grain yield of wheat and this increase differed from one to another. Significant effects of increasing nitrogen level on number of days to heading were reported by many investigators, (Rady and Abo El-Zahab, 1990, Mahdy and Teama, 2000 and Ibrahim *et al* 2004). They found that wheat genotypes with short filling period resulted in rapid grain growth and an optimum duration of the vegetative period tended to produce higher grain yield. Martin *et al* 1991, Ali and El-Bana 1994 and Ibrahim *et al* 2004 detected a significant interaction effect for nitrogen fertilizer level X cultivars on the grain filling level of wheat. They only found great differences among cultivars in the response of grain yield to N fertilization.

The effect of N fertilizer or/and genotypes on yield and its components also reported by many investigators.Increasing nitrogen levels had an important and significant role on number of heads/m$^2$ (Sultan *et al*., 1993 and El-Yamany, 1994), number of spikelets/spike (Patel *et al*., 1991, Bulman and Smith 1993 and Shalaby *et al*., 1993), fertile spikelets/spike (Fayed *et al*., 1993) and grain weight/spike (Mahdy and Teama, 2000; Abo-Shataia *et al*., 2001 ; Sims *et al*., 2001 and Wajid *et al*., 2002).

As for the genotype differences, it was found that there was a wide variation among wheat cultivars in number of spikelets/spike (Abd El-Gawad *et al*., 1985a, Mahmoud, 1987 and Ibrahim *et al*., 2004), in number of fertile spikelets/spike (Abo Shataia *et al*., 2001 and Wajid *et al*., 2002), 1000-grain weight and in grain weight/spike.

Hence, this work aimed to evaluate five wheat genotypes under N fertilization levels through some growth, physiological and yielding characters.

## MATERIALS AND METHODS

Two field experiments were carried out at Etai El Baroad station farm, Agriculture Research Center, El-Bohaira Governorate, Egypt during 2009/2010 and 2010/2011 seasons to investigate the response of five wheat cultivars to nitrogen fertilizer on nitrongen use efficient yield and its components. The experimental site is located at lat. 13.02 and 6-7 m above the mean sea level.However the chemical and physical analyses are pesented in Table (1).

**Table (1): The mean of chemical and physical analysis for soil at Etay EL-Baroud sation in 2009/2010 and 2010/2011 seasons.**

| Elements ppm | Macro elements (ppm) | | | Micro elements (ppm) | | | | E.C | PH |
|---|---|---|---|---|---|---|---|---|---|
| | N | P | K | Fe | Cu | Zn | Mn | 0.73 | 8.5 |
| | 48.33 | 21.66 | 213.33 | 14.53 | 6.66 | 0.83 | 17.9 | | |
| Orging mater | 1.5% | | | | | | | | |
| Texture | Clay Loam | | | | | | | | |

The preceding crop was maize (*Zea mays, L.)* in both seasons. Each experiment included 20 treatments which were the combination of four N levels fertilizer and five wheat cultivars as follow:

A) N-levels: 0 , 30 , 60 and 90 kg N/fed as a form of ammonium nitrate ($NH_4NO_3$, 33.5 % N) applied as broadcast in two equal doses before the 1$^{st}$ and the 2$^{nd}$ irrigation.

B) Wheat cultivars used were ; Sakha 93, Sakha 94, Gemmeiza 9, Giza 168 and Misr 1.

seeds of the five wheat cultivars were secured every season from Wheat Research Department, Agriculture Research Center (ARS), Giza, Egypt.

Treatments were replicated four times in the split-plot in a randomized complete block design. The four N levels were allocated to the main plots; the five cultivars were randomly distributed in the sub-plots. Plot size was 10.5 m$^2$ (3 x 3.5) including 15 rows 20 cm apart and 3.5 meter length. Sowing date was $19^{th}$ and $18^{th}$ of November in the first and second seasons, respectively. Phosphorous and potassium fertilizers were added before seeding during land preparation as calcium super phosphate (15.0 % $P_2O_5$) at the level 100 kg/fed and potassium sulphate (48 % $K_2O$) at the level of 50 kg/fed.

The other recommended cultural practices of growing wheat were applied as recommended for the region.

Days to heading was taken at the emergence of 50% of the full spike from each plot,number of days to physioilogical maturity was recorded when 50% of the most upper internods (peduncle)tuened yellow. Plant height was measured as the distance from soil surface to the upper part of the main spike excluding awns ( average of ten measurmentes ).Yield compontnts ,i.e.,number of spikes /$m^2$,number of kernels / spike and 1000 –kernels weight were recoded as number of fertile spikes per square meter , within guarded plantes , number of kernels per spike as average of ten spikes selected randomly and 1000-kernels weight as a weight of 1000-kernels counted randomly after harvesting. Grain yield , straw and biological yield (kg /plot) were detremined on the basis of whole plots.

Data were analyzed using analysis of variance (ANOA) producers by the MSTAT-C statistical software package (Michigan State University, 1983). The least significant differences (L.S.D) test was used for the mean comparisons .

## RESULTS AND DISCUSSION

**1. Plant height (cm), days to heading and days to maturity:**

Data presented in Table 2 show that the highest significant values of plant height (cm), days to heading and maturity were recorded by 90 kg N/fed. in both seasons. The same trend was observed by 60 kg N/fed. on plant height in $2^{nd}$ season only, while the lowest significant of such parameters were obtained when control treatment (N zero). These results may explain the role of nitrogen in motivating cell division and elongation, thus internodes elongation in addition and development. However, the role of N in hopeful metabolic processes in wheat plants, consequently, their growth, spike beginning and grain filling is responsible for the increase of spike length, number of spikelets and grains/spike, 1000-grain weight and ultimately grain yield/fed. Similar results were obtained by Salwau (1994) and Sawires (2000).

For wheat cultivars, Gemmeiza 9 gave the highest significant values of all parameters in table 2 in both seasons. On the other hand, the earliest and the shortest ones were obtained when Sakha 93 was planted in both seasons. No significance differences between Sakha 93 and Giza 168 for maturity in $1^{st}$ season only. This may be ascribed to the differences surrounded by studied cultivars in yield genetical constitution. The results of varietal differences in the above studied traits are in agreement with those reported by EL-Sayed *et al* (2000) who found that the tested wheat cultivars Gemmeiza 5 , 7 and 9 showed significant difference in all characters studied. Gemmeiza 9 surpassed the other two cultivars.

**Table 2: Plant height , days to heading, days to maturity as affected by nitrogen fertilizer levels under different wheat cultivars.**

| Treatments | 2009/2010 | | | 2010/2011 | | |
|---|---|---|---|---|---|---|
| | Days to heading | Days to maturity | Plant height (cm) | Days to heading | Days to maturity | Plant height (cm) |
| Control (No) | 90.87 | 137.2 | 93.51 | 92.53 | 142.0 | 98.37 |
| 30 kg N/fed. | 91.93 | 140.0 | 104.9 | 96.00 | 145.1 | 98.37 |
| 60 kg N/fed. | 93.07 | 142.3 | 106.7 | 97.13 | 146.5 | 113.4 |
| 90 kg N/fed. | 94.00 | 145.3 | 109.9 | 98.07 | 148.9 | 116.3 |
| LSD at 5 % | 0.63 | 1.28 | 1.11 | 0.63 | 0.55 | 3.14 |
| Sakha 93 | 86.83 | 138.7 | 91.43 | 89.92 | 141.7 | 97.12 |
| Sakha 94 | 94.58 | 140.8 | 109.7 | 99.92 | 146.5 | 116.8 |
| Gemmeiza 9 | 96.83 | 146.8 | 112.6 | 101.7 | 149.8 | 119.1 |
| Giza 168 | 89.17 | 139.2 | 97.70 | 92.08 | 144.8 | 102.3 |
| Misr 1 | 94.92 | 140.6 | 107.2 | 96.08 | 145.3 | 112.3 |
| LSD at 5 % | 0.67 | 1.35 | 1.57 | 0.50 | 1.06 | 1.57 |
| No X Sakha 93 | 85.00 | 133.7 | 82.40 | 86.67 | 136.0 | 89.50 |
| No X Sakha 94 | 93.00 | 136.7 | 99.83 | 95.33 | 144.0 | 103.0 |
| No X Gemmeiza 9 | 94.33 | 143.3 | 102.2 | 97.00 | 147.0 | 107.2 |
| No X Giza 168 | 87.67 | 136.3 | 88.50 | 89.00 | 141.3 | 93.83 |
| No X Misr 1 | 94.33 | 136.0 | 94.63 | 94.67 | 141.7 | 98.30 |
| 30 kg N/fed. X Sakha 93 | 86.00 | 136.3 | 92.40 | 90.33 | 142.3 | 98.50 |
| 30 kg N/fed. X Sakha 94 | 94.67 | 140.7 | 111.4 | 100.0 | 146.0 | 118.3 |
| 30 kg N/fed. X Gemmeiza 9 | 95.67 | 146.3 | 113.2 | 101.3 | 148.7 | 118.8 |
| 30 kg N/fed. X Giza 168 | 88.67 | 138.3 | 98.73 | 92.33 | 144.7 | 102.3 |
| 30 kg N/fed. X Misr 1 | 94.67 | 138.3 | 108.6 | 96.00 | 143.7 | 112.5 |
| 60 kg N/fed. X Sakha 93 | 87.33 | 141.3 | 94.40 | 91.00 | 143.0 | 99.30 |
| 60 kg N/fed. X Sakha 94 | 95.33 | 141.0 | 112.3 | 101.7 | 147.0 | 121.7 |
| 60 kg N/fed. X Gemmeiza 9 | 98.00 | 147.7 | 114.0 | 103.0 | 150.3 | 121.6 |
| 60 kg N/fed. X Giza 168 | 90.00 | 140.0 | 101.3 | 93.33 | 146.0 | 106.0 |
| 60 kg N/fed. X Misr 1 | 94.67 | 141.7 | 111.6 | 96.67 | 146.0 | 118.4 |
| 90 kg N/fed. X Sakha 93 | 89.00 | 143.3 | 96.50 | 91.67 | 145.3 | 101.2 |
| 90 kg N/fed. X Sakha 94 | 95.33 | 145.0 | 115.4 | 102.7 | 149.0 | 124.3 |
| 90 kg N/fed. X Gemmeiza 9 | 99.33 | 150.0 | 121.2 | 105.3 | 153.0 | 128.6 |
| 90 kg N/fed. X Giza 168 | 90.33 | 142.0 | 102.2 | 93.67 | 147.0 | 107.3 |
| 90 kg N/fed. X Misr 1 | 96.00 | 146.3 | 114.1 | 97.00 | 150.0 | 120.0 |
| LSD at 5 % | 1.35 | 2.71 | 3.13 | 1.19 | 2.129 | 3.19 |

With regarding to interacted effect of treatments under study, data tabulated in table 2 reveal that such parameters were increased significantly when the high levels of nitrogen fertilizer (90 kg N/fed.) with cultivar of Gemmeiza 9 was practiced in both seasons. The same trend was observed by 60 kg N/fed. for days to heading and maturity in $1^{st}$ season only. Meanwhile, all parameters were decreased significantly when the control treatments ( 0 kg N/fed.) with cultivar of Sakha 93 in the same ones. The treatment of 30 kg N/fed. under cultivar of Sakha 93 gave a same lowest significant of days to heading and maturity in $1^{st}$ season only. Increasing wheat productivity under Egyptian conditions is one of the main targets of wheat agronomists. The yield of what is a function of many factors among them the cultivars and nitrogen fertilization being the most important ones. Sharshar *et al* (2000) reported that wheat cultivars significantly differed in grain yield and most of measured traits.

**2. Spikes No./$m^2$, Kernels No./spike and 1000- kernel weight:**

Results in Table 3 reveal that, the high level of nitrogen fertilizer (90 kg N/fed.) gave significant increases of spikes No./$m^2$, Kernels No./spike in both seasons and 1000- kernel weight in first season only. Also, the treatment of 60 kg N/fed. has a significant increase of spikes No./$m^2$ and Kernels No./spike in the second season and kernel weight in both seasons. On the contrary, the control treatment led to the lowest significant ones in both seasons. Similar results were obtained by Sowers *et al* (1994), found that the application of high N levels may result in poor N uptake and low N use efficiency due to excessive N losses. The same trend was also reported by Lopez-Bellido *et al.* (1998), Staggenborg *et al*. (2003) and Camara *et al.* (2003). While, Ma *et al*. (2004) used 50 , 100 , 150 and 200 kg N/ha and showed that no significant differences in grain yield were detected among N fertilizer levels although higher N levels generally led to higher yield.

Respecting the effect of wheat cultivars on some yield components in Table 3, results show that in most cases, the cultivars of Gemmeiza 9 and Misr 1 gave the highest significant values of most traits in both seasons. On the contrary, the lowest ones were recorded by Sakha 93 and Giza 168 in both ones.

Regarding the interaction effect of factors under study, the highest significant values of most parameters in Table 3 were observed by adding 90 kg N/fed. with any wheat cultivars in both seasons. The same trend was found by applying 60 kg N/fed. under most cultivars especially in the second season. *Vise versa*, the lowest ones were obtained by control treatment (without addition of nitrogen fertilizer) under all wheat cultivars in both ones.

**3. Grain, straw and biological yield:**

Data presented in Table 4 show that wheat plant parameters (grain, straw and biological yield kg/plot.) responded significantly to the studied parameters, an almost similar manner of yield attributed. Obtained results reveal that the highest significant value of straw yield was recorded by 90 kg N/fed. was added in both seasons, while, 60 kg N/fed. led to a significant increase of grain yield in both seasons. For the biological yield, data show that the highest significant value was achieved by 60 and 90 kg N/fed. in both seasons. On the other hand, the lowest ones were recorded when control treatment (without addition of N) was applied in both seasons.

**Table 3: Spikes No./m$^2$, kernels No./spike and 1000 kernel weight as affected by nitrogen fertilizer levels under different wheat cultivars.**

| Treatments | 2009/2010 | | | 2010/2011 | | |
|---|---|---|---|---|---|---|
| | Spikes No./m$^2$ | Kernels No./spike | 1000 kernel Weight (g) | Spikes No./m$^2$ | Kernels No./spike | 1000 kernel Weight (g) |
| Control (No) | 254.2 | 42.57 | 38.01 | 280.7 | 41.55 | 39.08 |
| 30 kg N/fed. | 349.8 | 50.81 | 47.23 | 379.1 | 50.53 | 47.73 |
| 60 kg N/fed. | 389.9 | 53.11 | 48.59 | 411.5 | 56.11 | 49.62 |
| 90 kg N/fed. | 410.2 | 56.17 | 48.06 | 414.3 | 56.84 | 48.89 |
| LSD at 5 % | 16.80 | 2.26 | 0.84 | 17.12 | 2.53 | 0.51 |
| Sakha 93 | 343.5 | 48.78 | 45.46 | 352.0 | 48.75 | 47.22 |
| Sakha 94 | 347.2 | 51.82 | 44.33 | 387.2 | 51.17 | 45.70 |
| Gemmeiza 9 | 355.5 | 52.75 | 47.04 | 380.7 | 53.47 | 45.66 |
| Giza 168 | 341.2 | 50.62 | 42.72 | 350.6 | 52.38 | 45.29 |
| Misr 1 | 367.8 | 49.37 | 47.82 | 386.6 | 50.52 | 47.78 |
| LSD at 5 % | 12.87 | 1.94 | 0.65 | 15.24 | 2.74 | 0.83 |
| No X Sakha 93 | 260.7 | 41.40 | 39.00 | 275.7 | 40.60 | 40.03 |
| No X Sakha 94 | 253.3 | 43.07 | 38.07 | 282.0 | 40.33 | 36.67 |
| No X Gemmeiza 9 | 245.7 | 43.33 | 37.23 | 274.0 | 42.27 | 37.60 |
| No X Giza 168 | 246.0 | 42.47 | 36.53 | 272.7 | 41.73 | 39.23 |
| No X Misr 1 | 265.3 | 42.60 | 39.20 | 299.3 | 42.80 | 41.87 |
| 30 kg N/fed. X Sakha 93 | 348.0 | 48.67 | 46.33 | 364.0 | 49.27 | 47.27 |
| 30 kg N/fed. X Sakha 94 | 340.0 | 52.40 | 45.60 | 406.7 | 50.33 | 47.67 |
| 30 kg N/fed. X Gemmeiza 9 | 345.7 | 52.67 | 49.40 | 380.7 | 50.80 | 47.57 |
| 30 kg N/fed. X Giza 168 | 348.7 | 50.00 | 44.73 | 345.0 | 50.93 | 46.93 |
| 30 kg N/fed. X Misr 1 | 366.7 | 50.33 | 50.07 | 399.0 | 51.33 | 49.23 |
| 60 kg N/fed. X Sakha 93 | 370.0 | 50.60 | 50.10 | 379.0 | 51.87 | 51.27 |
| 60 kg N/fed. X Sakha 94 | 392.7 | 53.87 | 46.30 | 425.3 | 54.53 | 49.63 |
| 60 kg N/fed. X Gemmeiza 9 | 397.0 | 55.60 | 50.10 | 440.3 | 61.47 | 48.43 |
| 60 kg N/fed. X Giza 168 | 385.3 | 53.87 | 44.97 | 394.7 | 58.80 | 48.17 |
| 60 kg N/fed. X Misr 1 | 404.7 | 51.60 | 51.50 | 418.0 | 53.87 | 50.60 |
| 90 kg N/fed. X Sakha 93 | 395.3 | 54.47 | 46.40 | 389.3 | 53.27 | 50.30 |
| 90 kg N/fed. X Sakha 94 | 402.7 | 57.93 | 47.33 | 434.7 | 59.47 | 48.83 |
| 90 kg N/fed. X Gemmeiza 9 | 433.7 | 59.40 | 51.43 | 427.7 | 59.33 | 49.03 |
| 90 kg N/fed. X Giza 168 | 384.7 | 56.13 | 44.63 | 390.0 | 58.07 | 46.83 |
| 90 kg N/fed. X Misr 1 | 434.7 | 52.93 | 50.50 | 430.0 | 54.07 | 49.43 |
| LSD at 5 % | 25.74 | 3.87 | 1.29 | 30.48 | 5.47 | 1.66 |

**Table 4: Straw, grain and biological yield (t/fed.) as affected by nitrogen fertilizer levels under different wheat cultivars.**

| Treatments | 2009/2010 | | | 2010/2011 | | |
|---|---|---|---|---|---|---|
| | Straw yield | Grain yield | Biological yield | Straw yield | Grain yield | Biological Yield |
| Control (No) | 2.820 | 1.387 | 4.207 | 2.973 | 1.460 | 4.433 |
| 30 kg N/fed. | 5.927 | 3.447 | 9.373 | 6.007 | 3.867 | 9.873 |
| 60 kg N/fed. | 6.887 | 4.293 | 11.18 | 6.253 | 4.367 | 10.62 |
| 90 kg N/fed. | 7.167 | 3.813 | 10.98 | 7.493 | 3.987 | 11.48 |
| LSD at 5 % | 0.117 | 0.0126 | 0.196 | 0.198 | 0.109 | 0.284 |
| Sakha 93 | 5.483 | 3.000 | 8.483 | 5.450 | 3.183 | 8.633 |
| Sakha 94 | 5.475 | 3.350 | 8.825 | 5.792 | 3.533 | 9.325 |
| Gemmeiza 9 | 5.917 | 3.208 | 9.125 | 6.050 | 3.458 | 9.508 |
| Giza 168 | 5.650 | 3.283 | 8.933 | 5.633 | 3.342 | 8.977 |
| Misr 1 | 5.975 | 3.333 | 9.308 | 5.483 | 3.583 | 9.067 |
| LSD at 5 % | 0.220 | 0.160 | 0.295 | 0.271 | 0.142 | 0.281 |
| No X Sakha 93 | 2.833 | 1.433 | 4.267 | 3.033 | 1.400 | 4.433 |
| No X Sakha 94 | 2.833 | 1.400 | 4.233 | 2.967 | 1.533 | 4.500 |
| No X Gemmeiza 9 | 2.867 | 1.300 | 4.167 | 2.700 | 1.400 | 4.100 |
| No X Giza 168 | 2.767 | 1.500 | 4.267 | 3.333 | 1.500 | 4.833 |
| No X Misr 1 | 2.800 | 1.300 | 4.100 | 2.833 | 1.467 | 4.300 |
| 30 kg N/fed. X Sakha 93 | 5.633 | 3.400 | 9.033 | 5.833 | 3.567 | 9.400 |
| 30 kg N/fed. X Sakha 94 | 5.900 | 3.767 | 9.667 | 6.400 | 3.933 | 10.33 |
| 30 kg N/fed. X Gemmeiza 9 | 6.167 | 3.433 | 9.600 | 6.333 | 3.933 | 10.27 |
| 30 kg N/fed. X Giza 168 | 5.933 | 3.433 | 9.367 | 6.000 | 3.900 | 9.900 |
| 30 kg N/fed. X Misr 1 | 6.000 | 3.200 | 9.200 | 5.467 | 4.000 | 9.467 |
| 60 kg N/fed. X Sakha 93 | 6.767 | 3.900 | 10.67 | 5.900 | 3.967 | 9.867 |
| 60 kg N/fed. X Sakha 94 | 6.167 | 4.433 | 10.60 | 6.233 | 4.533 | 10.77 |
| 60 kg N/fed. X Gemmeiza 9 | 7.333 | 4.267 | 11.60 | 4.167 | 4.500 | 11.67 |
| 60 kg N/fed. X Giza 168 | 6.867 | 4.167 | 11.03 | 6.133 | 4.133 | 10.27 |
| 60 kg N/fed. X Misr 1 | 7.300 | 4.700 | 12.00 | 5.833 | 4.700 | 10.53 |
| 90 kg N/fed. X Sakha 93 | 6.700 | 3.267 | 9.967 | 7.033 | 3.800 | 10.83 |
| 90 kg N/fed. X Sakha 94 | 7.000 | 3.800 | 10.80 | 7.567 | 4.133 | 11.70 |
| 90 kg N/fed. X Gemmeiza 9 | 7.300 | 3.833 | 11.13 | 8.000 | 4.000 | 12.00 |
| 90 kg N/fed. X Giza 168 | 7.033 | 4.033 | 11.07 | 7.067 | 3.833 | 10.90 |
| 90 kg N/fed. X Misr 1 | 7.800 | 4.133 | 11.93 | 7.800 | 4.167 | 11.97 |
| LSD at 5 % | 0.440 | 0.320 | 0.590 | 0.542 | 0.283 | 0.562 |

Nitrogen is the most important plant nutrient needed to obtain high wheat yields in Egypt. Essa (1996) and Zahran *et al*. (1997) reported that plant height, flag leaf area and tillers number as well as dry weight per unit area of wheat were increased with increasing N level. Several investigators (Sorour *et al*. 1998 and Sobh *et al*. 2000) reported a beneficial effect of nitrogen application on wheat. They reported that number of tillers and spikes/$m^2$, plant height, number of spikelets and grains/spike, grain and straw yields of wheat increased with increasing N level.

With the respect to N for the interacted factors under study, in most cases, results demonstrate that the best significant values of grain, straw and biological yield were obtained by adding 60 and/or 90 kg N/fed. with any wheat cultivars in both seasons. On the other hand, the lowest ones were recorded by control (without addition of nitrogen fertilizer) under all wheat cultivars in both ones. The results show that cultivars differ in their response to applied N, their ability to take up soil N and N fertilizer levels. The reversal of cultivar rankings for yield at the low and high levels of N shows the importance of evaluating cultivars at a representative level of fertility. Also Ali *et al*, (2011) concluded that among nitrogen levels , highest grain yield (3.848 tons/ ha) was obtained by an application of (180Kg N/ ha).Ataur Rahmani *et al* (2011): stated that for high yield goal, the recommendation of nitrogen at the level of 120Kg/ ha applied as three equal three splits are the appropriate to improve wheat production in Bangladesh.

**Conclusions and Recommendations**

Application of N had improved the yield and yield components of wheat compared to control. In genral, the added of 60 kg/fad increased yield and its components.

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## استجابة بعض أصناف القمح لمستويات التسميد الأزوتي

**صبري أحمد سليم و صبحي محمد عبد الدايم**
**البرنامج القومي لبحوث القمح- معهد المحاصيل الحقلية- مركز البحوث الزراعية- مصر**

أجري هذا البحث في موسمين زراعيين 2009/2010 و2010/2011 بمحطة البحوث الزراعية بإيتاي البارود-البحيرة علي خمسة أصناف من قمح الخبز وهي سخا 93- سخا94- مصر 1- وجيزة168 وجميزة9 وذلك لدراسة تأثير أربع معدلات من التسميد الأزوتي وهي ( صفر- 30-60-90) وحدة أزوت للفدان على الصفات التالية:عدد السنابل في المتر المربع- طول النبات -عدد الأيام حتي طرد السنابل و 50% من النضج الفسيولوجي السنابل – وزن ألف حبة - محصول الحبوب- محصول القش للفدان والمحصول البيولوجي .

**كانت أهم النتائج كما يلي:**

١ - استجابة معنوية في كلا الموسمين للتسميد الأزوتي بمعدل 60و90 وحدة أزوت للفدان وكانت الاستجابة أعلي لمعدل التسميد 90وحدة لجميع الأصناف والصنف جميزة 9 كان أكثر الأصناف استجابة ثم مصر1 وجيزة168 وكان أقلها استجابة الصنف سخا 93 .

٢ - أشارت النتائج الى ان صفات طول النبات – صفة طرد السنابل وكذلك صفة النضج الفسيولوجي عالية المعنوية تحت كلا مستوى التسميد الازوتى 60 -90كجم / فدان.

٣ - أوضحت النتائج أن صفات عدد السنابل فى م2 وعدد الحبوب في السنبلة ووزن الالف حبة وكذالك محصول القش والحبوب معنوية تحت مستوى التسميد 60 -90 كجم أزوت للفدان.

توصى النتائج بالتسميد بمعدل 60 – 90 كجم / ن ازوت وزراعة الصنف جميزة 9 لتعظيم انتاجية القمح تحت ظروف محافظة البحيرة

**قام بتحكيم البحث**

| | |
|---|---|
| **أ.د / احمد ابو النجا قنديل** | **كلية الزراعة – جامعة المنصورة** |
| **أ.د / السيد حامد الصعيدى** | **كلية الزراعة – جامعة طنطا** |