# IRRIGATION REGIMES AND NITROGEN FERTILIZATION EFFECT ON SUGAR CANE YIELD AND ITS COMPONENTS

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**Abstract**

Two field experiments were conducted at Shandaweel Research Station (Sohag Governorate) in 1994/95 and 1995/96 seasons to study the effect of irrigation regime and nitrogen fertilization on yield and its attributes of the plant crop of sugar cane. Sugar cane cultivar viz G.T.54-9 was used in this investigation. Each field trial included nine treatments represent the combination between three irrigation regimes [1.Traditional irrigation regime used by sugar cane growers (irrigation at 10-day intervals in summer, a 15-day intervals in spring and autumn, and 20-day intervals in winter season) with a total number of 23 irrigations; 2. Irrigation at 7-day intervals in summer, 14-day intervals in spring and autumn, and 21-day interval in winter seasons with a total number of 28 irrigations and 3. Irrigation at 14-day intervals in summer; 21-day intervals in spring and Autumn 28-day intervals in winter with a total number of 17 irrigations] and three nitrogen levels (120, 180 and 240 kg N/fed).

The obtained results showed that sugar recovery %, number of millable cane and sugar yields were insignificantly affected by the applied irrigation regimes. Cane yield was insignificantly responded to nitrogen fertilization levels. However, number of millable cane and sugar yield were significantly affected by N-levels in the 2$^{nd}$ season only. Sugar recovery % insignificantly affected by N-level in the 1$^{st}$ season only.

## INTRODUCTION

Referring to the traditional practices of sugar cane growers in Egypt, it was noticed that most of growers apply excess amount of water which in turn negatively affects growth, quality and yield of sugar cane plants. Numerous studies carried out in many countries have provided an evidence of some close relation between growth, quality and yield of sugar cane and irrigation regimes. Regarding nitrogen fertilization, mostly all studies cleared that increasing nitrogen doses to sugar cane was accompanied by a reduction in juice quality. Using the optimal amount of nitrogen could be suitable for better yield and quality throughout the enhancing role of nitrogen on growth. Baram *et al.* (1974) used three irrigation frequencies of 7 , 14 and 21 days for sugar cane. They demonstrated that root development in the lower horizon (0 – 35 cm) found to be greater when the crop was irrigated less frequently. They explained that proportionally, deeper root development reduced the effect of possible soil moisture deficits without causing significant decrease in yield. They added that no significant differences were found between yields of cane and/or recoverable sugar/ha in spite of the differences in nitrogen depth. EL-Gibali *et al.* (1978) reported that fixed intervals (every two weeks until September and then every three weeks from the beginning of October till the end of the season (18 irrigations, 8713.1 $m^3$/fed) produced a low yield of cane compared to their new regime (the first irrigation after three days from planting and irrigation every 10 days during April, every 7 days from May to September, every 10 days during October and November, every 15 days during, December and January and no irrigation were practiced in January (34 irrigations, 11156.5 $m^3$/fed) and that frequent irrigation by short intervals resulted in high yield of cane. EL-Geddawy *et al.*(1988) used six levels of nitrogen fertilizer (90, 120, 150, 180 and 210 kg N/fed) at two locations (Mallawi and Kom Ombo). They found that applying 180 kg N/fed produced higher sugar yield at Mallawi. However, the yield of sugar increased positively and gradually by increasing the applied dose up to 240 kg N/fed at Kom Ombo. Ravindra *et al.* (1989) applied nitrogen to sugar cane at rates of 0, 150, 300 and 450 kg N/ha. They found that sugar recovery percentage was not affected.

Subramaanian *et al.* (1990) irrigated sugar cane at 8 combinations of IW:CPE (irrigation water/cumulative pan evaporation)ratio of 5050 and 0.75 during the tillering (35-100 days), grand growth (101-270 days) and maturity (271-365 days) stages. They noticed that cane yield was greatest with the 0.75-0.75-0.50 regime. Also, they illustrated that sugar yield was highest with 0.75-0.75-0.75 regime. Banger *et al.*(1992) obtaineda significant positive correlation between N-levels (0, 150, 300,or 450 kg N/ha) and number of millable cane/ha. Yadav and Prasad (1992) fertilized sugar cane with 0, 50, or 150 kg N/ha. They found that the cane yields were increased by increasing such nitrogen rates. EL-Sayed (1996) reported that increasing nitrogen levels significantly increased number of millable cane/$m^2$, while insignificant increases were obtained for cane and sugar yields. Ahmed (1998) found that applying 210 kg N/fed gave the highest number of millable cane/$m^2$ and sugar yield in the $2^{nd}$ plant crop.

## MATERIALS AND METHODS

Two field experiments were conducted at Shandaweel Research Station (Sohag Governorate) in two successive growing seasons of 1994/1995 and 1995/1996 to study the effect of irrigation regime, nitrogen fertilizer level and their interactions on cane and sugar yields of sugarcane.

The grown sugarcane cultivar in this study was G.T. 54/9, supplied from Shandaweel Research Station. This cultivar is being recommended for the commercial plantation of sugarcane in Egypt.

Each field trial included six treatments represent the combination between three irrigation regimes and three nitrogen fertilization levels. The levels of the studied factors were as follows:

**I- Irrigation regimes:**

1- Traditional irrigation regime used by sugarcane growers which is irrigation at 10-day intervals in Summer, at 15-day intervals in Spring and Autumn, and at 20-day intervals in Winter seasons. A total number of 23 irrigations/year was given in this treatment.

2- Irrigation at 7-day intervals in Summer, at 14-day intervals in Spring and Autumn, and at 21-day intervals in Winter seasons. A total number of 28 irrigations/year was applied in this treatment.

3 - Irrigation at 14-day intervals in Summer, at 21-day intervals in Spring and Autumn, and at 28-day intervals in Winter seasons. A total number of 17 irrigations/year was given in this treatment.

**The four seasons of the year under the Egyptian environment are**

1. Spring season, starting on March 21 and ending on June 20.
2. Summer season, starting on June 21 and extending till, September 20.
3. Autumn (Fall) season, starting on September 21 and extending till December 20.
4. Winter season, starting on December 21 and extending till March 20.

Spring and Autumn seasons are called " Moderates" since the temperature averages are mild. Irrigation was conducted through a water meter of 0.1 cubic meter accuracy used to be tightly hooked where the wide inlet towards the main permanent canal and the outlet towards the lateral temporary field canal of the irrigated plots. Each sub-plot was irrigated individually by allowing water to flow over the sub-plot through an opening in the temporary field canal. After a complete saturation of the sub-plot, the opening is closed and water was allowed to flow over another sub-plot. Sub-plots were surrounded with borders of 3 meters width to prevent the seepage of water to other plots. The temporary field canals were 1.5 m width.

**II- Nitrogen fertilization:**

1- 120 kg N/fed
2- 180 kg N/fed
3- 240 kg N/fed

Nitrogen fertilizer levels were added in two equal doses; after the 1st hoeing (45-day from planting) and one month later.A split plot design with five replications was used where irrigation regimes were allocated in the main plots and the nitrogen fertilization levels were distributed at random in the sub-plots. The experimental unit area was 35 $m^2$ with 5 ridges of 7 meters in length and 1.0 m apart Sugarcane was planted during the first week of April and harvested after 12 months in both experiments. Fixed doses of phosphorus and potassium fertilizers were applied at the rates of 30 kg $P_2O_5$ and 72 kg $K_2O$/feddan, respectively. Phosphorus was applied during land preparation as calcium super phosphate (15% $P_2O_5$). Potassium fertilizer was applied as potassium sulphate (48% $K_2O$) with the second addition of nitrogen fertilizer.

The amount of water applied was counted and recorded for each sub-plot per irrigation to estimate the actual consumption of water for the three irrigation regimes. No water was applied one month before harvest.

It is worth mentioning that the amount of water counted here supplied to the experimental plots excluded the amount of water lost in the way from the main irrigation canal through permanent, lateral and temporary field canals. This amount may be estimated as about 20 to 25% of the irrigation water requirements recorded in the present investigation. In the practical application this amount of water should be considered.

Table 1. Actual amount of the applied water ($m^3$fed) according to the used irrigation regime in 1994/95 and 1995/96 growing seasons.

| Growing season | 1994/95 Nitrogen (Kg.N /Fed.) | | | *Mean* | 1995/96 Nitrogen (Kg.N /Fed.) | | | *Mean* |
|---|---|---|---|---|---|---|---|---|
| Irrigation regime (Season & irrigation interval) | 120 | 180 | 240 | | 120 | 180 | 240 | |
| 1. Summer (10-day), Moderates (15-day) and winter (20-day) | 6565.6 | 6518.7 | 6778.1 | 6620.8 | 6964.8 | 6996.8 | 7003.1 | 6982.2 |
| 2. Summer (7-day), Moderate (14-day) and winter (21-day) | 7828.1 | 8049.9 | 7893.7 | 7923.9 | 8649.9 | 8803.1 | 8518.7 | 8657.2 |
| 3.Summer (14-day), Moderate (21-day) and winter (28-day) | 6040.6 | 6174.9 | 6274.9 | 6163.5 | 6524.9 | 6684.3 | 6687.4 | 6632.2 |
| Total average of N levels | 6811.4 | 6914.5 | 6982.2 | 6902.7 | 7373.9 | 7494.7 | 7403.1 | 7423.9 |

The soil was levelled by means of laser grading. The two field trials in both seasons were planted after fallow. Physical analysis of the experimental site showed that soil contained 50.15, 28.45 and 21.40 clay, silt and sand, respectively (clay loam) with pH of 7.6.

The difference between the applied quantities of water of the two seasons mainly due to the variation in the metrological parameters in the following table (A).

Table a. Meteorological data recorded at Shandaweel Agricultural Research Station.

| Month | Temerature C° T-Max. | | Temerature C° T-Min. | | Relative humidity % | | Soil temperature C° Soil T-Max. | | Soil temperature C° Soil T-Min. | | E.T | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1994 | 1995 | 1994 | 1995 | 1994 | 1995 | 1994 | 1995 | 1994 | 1995 | 1994 | 1995 |
| January | 19.7 | 19.6 | 4.9 | 6.0 | 63.0 | 57.0 | 32.5 | 28.8 | 7.5 | 13.3 | 1.3 | 1.9 |
| February | 21.8 | 21.1 | 6.3 | 5.6 | 62.0 | 55.0 | 35.1 | 31.8 | 9.8 | 13.7 | 1.4 | 3.0 |
| Marsh | 22.3 | 27.7 | 7.0 | 11.6 | 58.0 | 59.0 | 23.8 | 26.2 | 14.2 | 10.8 | 2.1 | 2.6 |
| April | 32.0 | 35.4 | 12.8 | 17.8 | 54.0 | 52.0 | 39.3 | 34.3 | 19.9 | 17.1 | 4.7 | 5.3 |
| May | 37.4 | 38.3 | 19.6 | 21.7 | 49.0 | 51.0 | 43.9 | 40.5 | 24.9 | 25.9 | 9.4 | 7.6 |
| June | 34.9 | 39.8 | 19.7 | 24.1 | 52.0 | 52.0 | 42.8 | 39.9 | 25.6 | 23.4 | 10.5 | 9.2 |
| July | 36.4 | 40.6 | 20.2 | 25.7 | 58.0 | 57.0 | 45.6 | 41.9 | 27.8 | 25.2 | 10.4 | 9.8 |
| August | 35.4 | 35.3 | 19.7 | 20.3 | 64.0 | 63.0 | 45.2 | 45.2 | 28.0 | 28.0 | 8.7 | 8.7 |
| September | 34.6 | 34.6 | 18.1 | 18.1 | 58.0 | 58.0 | 43.3 | 43.3 | 26.3 | 26.6 | 7.6 | 7.6 |
| October | 32.5 | 32.5 | 16.5 | 16.5 | 56.0 | 57.0 | 38.9 | 38.9 | 22.5 | 22.2 | 6.8 | 5.8 |
| November | 26.5 | 27.6 | 11.9 | 12.9 | 61.0 | 62.0 | 31.7 | 32.7 | 17.4 | 18.4 | 4.6 | 4.6 |
| December | 20.8 | 24.4 | 6.9 | 10.5 | 63.0 | 44.0 | 26.0 | 23.4 | 14.2 | 8.61. | 2.9 | 2.1 |

**Data Recorded**

1. Sugar recovery percentage was calculated as follows:

Recovery % = Richness % x Purity %

where Richness = (Sucrose in 100 grams x Factor) /100

Factor = 100 - [Fiber % + physical impurities % + percent water free from sugar].

2- Number of millable cane per feddan was counted.

3- Plants of the three guarded rows were harvested , and cane yield in tons per feddan was calculated.

4- Sugar yield in tons per feddan was estimated according to the following equation:

Raw sugar production = cane yield (tons /feddan) x suger recovery %.

The collected data were subjected to proper statistical analysis of split plot design according to Snedecor and Cochran (1981).

## RESULTS AND DISCUSSION

### 1. Sugar recovery percentage (SR%)

The results in Table (2) revealed no significant influence for irrigation regimes on SR% was recorded in both seasons. However, a general trend was observed where the third regime, with the lowest amount of water applied and the prolonged irrigation intervals (14-21-28 days), recorded the highest SR% in both seasons compared with first (10-15-20 days) and the second (7-14-21 days) regimes.

Table 2. Sugar recovery % as affected by irrigation regime and nitrogen level in 1994/1995 and 1995/1996 growing seasons.

| Growing season | 1994/95 | | | *Mean* | 1995/96 | | | *Mean* |
|---|---|---|---|---|---|---|---|---|
| | Nitrogen (Kg N /Fed) | | | | Nitrogen (Kg N /Fed) | | | |
| Irrigation regime (Season & irrigation interval | 120 | 180 | 240 | | 120 | 180 | 240 | |
| 1. Summer (10-day), Moderate (15-day) and winter (20-day) | 11.6 | 11.45 | 11.01 | 11.37 | 13.24 | 12.77 | 12.73 | 12.91 |
| 2. Summer (7-day), Moderate (14-day) and winter (21-day) | 11.12 | 11.10 | 10.92 | 11.05 | 12.04 | 12.83 | 12.33 | 12.40 |
| 3. Summer (14-day), Moderate (21-day) and winter (28-day) | 11.9 | 11.70 | 11.11 | 11.59 | 12.82 | 13.85 | 12.96 | 13.05 |
| Total average of N levels | 11.57 | 11.42 | 11.01 | 11.34 | 12.70 | 13.00 | 12.67 | 12.78 |

| LSD at 0.05 level of significance | | |
|---|---|---|
| Irrigation regime ( I ) | N.S. | N.S. |
| Nitrogen fertilization ( N ) | 0.327 | N.S. |
| I x N | N.S. | N.S. |

Concerning the effect of N level, results in Table (2) showed that increasing the level of N from 120 to 180 and 240 kg/fed significantly reduced SR% in the first season. In 1995/1996 season, no clear trend was observed and the highest SR% was recorded with the middle N level (180 kg/fed), being 13. % compared with 12.70 and 12.67 % for the lowest (120 kg/fed) and the highest (240 kg/fed) levels, respectively. The negative effect of the higher N level on SR% may be due to its influence on sucrose % and purity %. The present results are in general agreement with those reported by Abd El-Gawad *et al.* (1992-b) who found negative relationships in respect to the effect of N on sucrose, purity and sugar recovery percentages.

The results showed no significant effect of the interactions between all experimental factors on SR% in both seasons.

**2. Number of millable cane:**

The results in Table (3) showed that the shorter irrigation intervals of the second regime (7-14-21 days` during Summer, Moderates and Winter, respectively) insignificantly increased number of millable cane/fed compared with the first (10-15-20 days) and the third (14-21-28 days) regimes in both seasons.

The results in Table (3) indicate that an increase in millable cane of 7.90 and 12.55% was recorded in 1994/1995 season due to applying the second regime compared with the first and third regime, respectively. The corresponding increases due to applying the second regime in 1995/1996 season were 8.27 and 15.07% over the two other regimes. These considerable incrases were, however, below the level of significance.

Table 3. Number of millable cane (thousands/fed ) as affected by irrigation regime and nitrogen level in 1994/1995 and 1995/1996 growing seasons.

| Growing season | 1994/95 | | | *Mean* | 1995/96 | | | *Mean* |
|---|---|---|---|---|---|---|---|---|
| | Nitrogen (Kg N /Fed) | | | | Nitrogen (Kg N /Fed) | | | |
| Irrigation regime (Season & irrigation interval | 120 | 180 | 240 | | 120 | 180 | 240 | |
| 1. Summer (10-day), Moderate (15-day) and winter (20-day) | 28.200 | 58.800 | 60.600 | 59.200 | 64.125 | 65.835 | 62.985 | 64.315 |
| 2. Summer (7-day), Moderate (14-day) and winter (21-day) | 63.000 | 66.400 | 60.733 | 63.378 | 63.840 | 74.670 | 70.395 | 69.635 |
| 3. Summer (14-day), Moderate (21-day) and winter (28-day) | 54.064 | 58.400 | 56.467 | 56.311 | 50.160 | 68.115 | 63.270 | 60.515 |
| Total average of N levels | 58.422 | 61.200 | 59.267 | 59.630 | 59.375 | 68.540 | 65.550 | 64.822 |

| LSD at 0.05 level of significance | 1994/95 | 1995/96 |
|---|---|---|
| Irrigation regime ( I ) | N.S. | N.S. |
| Nitrogen fertilization ( N ) | N.S. | 8.417 |
| I x N interaction | N.S. | N.S. |

The increase in millable cane is mainly due to the increase in the applied water in the second regime by 19.68 and 23.98% over the first regime in 1994/1995 and 1995/1996, respectively, and over the third regime by 28.56 and 30.53 % in the two successive seasons.

The irrigation at shorter intervals led to an increase in number of cane plants/m$^2$ at different growth stages due to the increase in tillering in cane plants.

The present results are in line with those obtained by El-Gibali *et al.* (1978) and Subramanian *et al.* (1991).

Concerning the effect of N fertilizer level, results in Table (3) showed that the increase in N level from 120 to 180 kg significantly increased number of millable cane by 17.12 % in 1995/1996 season corresponding to an insignificant increase of 4.76% in 1994/1995 season.

Increasing N level from 180 to 240 kg/fed insignificantly decreased number of millable cane/fed by 3.16 and 5.73% in the first and second season, respectively. This finding may be due to the increase in the vigorous characteristics of plant grown which let to more competition between them consequently increased plant mortality . It could be concluded that the 180 kg/fed N level was quite satisfactory to produce the maximum number of millable cane plants in both seasons. The results are in agreement with those reported by Ahmed (1995).

**3. Cane yield**

The results in Table (4) indicated that scheduling irrigation at shorter intervals of the second regime (7-14-21 days in Summer, Moderates and Winter) increased cane yield compared with the traditional irrigation regime of the first treatment (10-15-20 days) and the third regime in which irrigation intervals were prolonged to reach 14-21 and 28 days (in Summer, Moderates and Winter, respectively).

The second regime insignificanly increased cane yield by 5.54 and 4.45% over the yield of the first regime in 1994/1995 and 1995/1996 season, respectively. The superiority of the second regime was more evident on the third regime where yield increases of 8.64 and 6.27% were recorded in the two successive seasons. The increase in cane yield of the second regime is mainly due to the increase in the amount of irrigation water applied in that regime which was 19.68 and 23.98% higher compared with the first regime in 1994/1995 and 1995/1996 season, respectively. Also, the applied water in the second regime was 28.56 and 30.53% higher than that in the third regime in the two successive seasons.

It could be concluded that irrigation at shorter intervals increased cane yield. The present results are in general agreement with those outlined by El-Gibali *et al.* (1978) who showed that the frequent irrigation by shorter intervals resulted in higher cane yield.

Regard to the effect of N level, the results in Table (4) indicated no significant effect on cane yield in both seasons. However, a marked increase in cane yield was observed when the N level was raised from 120 to 180 kg/fed where an increase of 5.43 and 8.22% was recorded in the first and second season, respectively. It is worth

Table 4. Cane yield (tons/fed.) as affected by irrigation regime and nitrogen level in 1994/1995 and 1995/1996 growing seasons.

| Growing season | 1994/95 | | | *Mean* | 1995/96 | | | *Mean* |
|---|---|---|---|---|---|---|---|---|
| | Nitrogen (Kg N /Fed) | | | | Nitrogen (kg N /Fed) | | | |
| Irrigation regime (Season & irrigation interval | 120 | 180 | 240 | | 120 | 180 | 240 | |
| 1. Summer (10-day), Moderate (15-day) and winter (20-day) | 68.667 | 72.550 | 66.983 | 69.400 | 67.962 | 76.863 | 68.500 | 71.108 |
| 2. Summer (7-day), Moderate (14-day) and winter (21-day) | 73.183 | 73.350 | 73.200 | 73.244 | 81.438 | 75.625 | 75.763 | 74.275 |
| 3. Summer (14-day), Moderate (21-day) and winter (28-day) | 63.500 | 70.600 | 68.150 | 67.417 | 69.525 | 73.612 | 66.550 | 69.896 |
| Total average of N levels | 68.450 | 72.167 | 69.444 | 70.020 | 69.642 | 75.367 | 70.271 | 71.760 |

| LSD at 0.05 level of significance | 1994/95 | 1995/96 |
|---|---|---|
| Irrigation regime ( I ) | N.S. | N.S. |
| Nitrogen fertilization ( N ) | N.S. | N.S. |
| I x N interaction | N.S. | N.S. |

mentioning that increasing N level from 180 to 240 kg/fed insignificantly reduced cane yield by 3.92 and 7.25% in the first and second season, respectively, indicating a negative effect of the highest N level on cane yield.

It could be concluded that 180 kg N/fed was quite satisfactory to produce the highest cane yielld/fed under the conditions of the experiment. The results are expected since 180 kg N/fed positively affected number of cane plants/m$^2$

Similar results were also obtained by El-Geddawi *et al.* (1988) , and Yadav and Prasad (1992).

**4. Sugar yield**

The results in Table (5) showed no significant effect for irrigation regime on sugar yield in both seasons. However, the second irrigation regime produced higher sugar yield which was 2.81 and 1.91% higher than that of the first and third irrigation regime, respectively, in the first season, corresponding to 0.15 and 7.87% in the second one.

The insignificant effect of the applied irrigation regimes may be due to non-significant effect of irrigation regime on cane yield, sugar recovery %. It is well known that sugar recovery % and cane yield are the two wings of sugar production.

The present results are in line with those reported by Baram *et al.* (1974) who found no siginificant differences in recoverable sugar yields/ha as a result of applying three irrigation frequencies of 7, 14, 21 days.

As for the effect of N level, results in Table (5) indicated that the highest sugar yield was obtained by using 180 kg N/fed in both seasons. The 180 kg N/fed level increased sugar yield over the lower level (120 kg/fed) by 4.39 and 10.45% in the first and second season, respectively. Also, the 180 kg N/fed level increased sugar yield over the highest level (240 kg/fed) by 6.07 and 19.14% in 1994/1995 and 1995/1996 season, respectively. The differences in sugar yield in the second season were quite clear to reach the level of significance.

Table 5. Sugar yield (tons/fed) as affected by irrigation regime and nitrogen level in 1994/1995 and 1995/1996 growing seasons.

| Growing season | 1994/95 | | | *Mean* | 1995/96 | | | *Mean* |
|---|---|---|---|---|---|---|---|---|
| | Nitrogen (Kg N /Fed) | | | | Nitrogen (Kg N /Fed) | | | |
| Irrigation regime (Season & irrigation interval | 120 | 180 | 240 | | 120 | 180 | 240 | |
| 1. Summer (10-day), Moderate (15-day) and winter (20-day) | 7.868 | 8.291 | 7.630 | 7.873 | 8.942 | 9.728 | 8.689 | 9.120 |
| 2. Summer (7-day), Moderate (14-day) and winter (21-day) | 8.145 | 8.169 | 7.968 | 8.094 | 8.605 | 9.666 | 7.128 | 8.467 |
| 3. Summer (14-day), Moderate (21-day) and winter (28-day) | 7.576 | 8.269 | 7.984 | 7.943 | 8.928 | 9.847 | 8.627 | 9.134 |
| Total average of N levels | 7.896 | 8.243 | 7.771 | 7.970 | 8.825 | 9.747 | 8.148 | 8.907 |

| LSD at 0.05 level of significance | 1994/95 | 1995/96 |
|---|---|---|
| Irrigation regime ( I ) | N.S. | N.S. |
| Nitrogen fertilization ( N ) | N.S. | 1.153 |
| I x N interaction | N.S. | N.S. |

The negative effect of the highest N level on sugar yield is due to its negative effect on sugar recovery% as well as cane yield.

It could be concluded that the application of 180 kg N/fed was quite satisfactory to produce the highest sugar yield under the conditions of the present experiment.

The present results are quite expected since the 180 kg N/fed level/fed produced the highest cane yield and recorded the best recovery %. The present results are in agreement with the results reported by El-Geddawi *et al.*(1988).

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## تأثير مقررات الرى والتسميد الأزوتى على محصول قصب السكر

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اقيمت تجربتان حقليتان بمحطة البحوث الزراعية بشندويل ( محافظة سوهاج) فى موسمى ١٩٩٤ /٩٥ و ١٩٩٥/٩٦ لدراســة تأثير المقررات المائية والتسميد الأزوتى على محصول القصب الغرس ومكوناتــه اســتخدم فى هذه الدراسة الصنف التجارى G.T.54-9 . وقد اشتملت الدراسة على تسع معــاملات تمــثل التوافق بين ثلاث مقررات مائية { (١– الرى التقليدى كما يستخدمه المزارع وهو عــبارة عــن الرى كل ١٠ يوما فى الصيف ، كل ١٥ يوما فى الربيع والخريف وكل ٢٠ يوما فى الشتاء ويصل عدد الريات فى هذا المقرر الى ٢٣ رية/ الموسم) ، (٢– الرى كل ٧ ايام فى الصيف ، كل ١٤ يوما فى الربيع والخريف وكل ٢١ يوما فى الشتاء ويصل عدد الريات فى هذا المقرر الى ٢٨ ريــة/ الموسم) و (٣– الرى كل١٤ يوما فى الصيف ، كل ٢١ يوما فى الربيع والخريف وكل ٢٨ يوما فى الشتاء ويصل عدد الريات فى هذا المقرر الى١٧ رية/ الموسم) .

وتوضــح النتائج المتحصل عليها ان كل من نسبة ناتج السكر وعدد العيدان القابلة للعصير /فدان وكذلــك محصــولى العيدان والسكر لم يتأثروا معنويا بالمقررات المائية المدروسة . كما لم يستجيب محصــول العــيدان معــنويا لمعدلات السماد الأزوتى تحت الدراسة بيد انه تأثر معنويا كل من عدد العيدان القابلة للعصير/فدان ومحصول االسكر فى الموسم الثانى فقط. كما لم تتأثر نسبة ناتج السكر بالمقررات السمادية فى الموسم الأول فقط.