

Response of Sewy Date Palm to Different Application of N-fertilizers

Mustafa, A.A.A.²; M. A. F. Badran²; R. A. Ibrahim¹ and T.K.R., El-Mahdy¹

¹Pomology Department, Fac. Agric., Assiut Univ.,

²Central Lab of org. Agric ARC. Giza

Abstract:

This study was carried out during two consecutive seasons (2011 and 2012) on sewy date palm cultivar growing at the experimental orchard of Faculty of Agriculture, Assiut University. The effect of some organic (Elobore compost) and biofertilization of N (nitrobin) compared to inorganic N fertilization (ammonium sulphate) on some vegetative growth characteristics, yield as well as some physical and chemical fruit properties was studied.

Results showed that use organic N fertilizer either alone or combined with inorganic N fertilizer or biofertilizer significantly increased Leaf length, Leaflets area, No. of Leaflets and No. of new leaves compared to using inorganic-N fertilizer alone. This increment was insignificant with Leaf area.

Yield components (initial fruit set, horticultural fruit set, bunch weight and total yield) were significantly increased by using organic N fertilizer either alone or combined with inorganic-N fertilizer or biofertilizer, in most cases. The best treatment that gave the highest values of yield parameters when using 100% N organic fertilizer treatment compared to the other treatments. The highest values of fruit weight, size, diameter, flesh weight, total soluble solids and sugars were obtained by using 100% N-organic fertilization treatment compared for the other investigated treatments, especially inorganic N fertilization.

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Prof. Elsead I. Baker

Introduction:

Date palm (*Phoenix dactylifera* L.) is one of the most important fruit species grown in Egypt, Date palm culture extends from north to south, from the relatively cool and humid region of the Mediterranean Sea (Lat. 31N) to the extremely hot and dry region of Aswan (Lat. 22 N). Recently, 2000 or more different cultivars are known to exist all over the world, but only a few important ones have been evaluated for their agronomic performance and fruit quality. Date palm can grow well under drastic environmental conditions which may be not suitable for many fruit species and can grow in extreme arid areas to produce many useful products. In Egypt there are about 20 commercial cultivars, which are well adapted to Egyptian ecological condition, more than eleven millions of fruitful female palms were distributed in all governorates, planted on approximately 88083 feddans. Assiut governorates contributed with more than 460000 fruitful female palms on approximately 215 feddans. Soft and semi dry cultivars represented about 5% of the fruitful female date palms, while seedling palms represented 95%. Nitrogen fertilization is an important and limiting factor for growth, nutritional status and fruiting of fruit crops. (Miller *et al.*, 1990).

Adjusting the suitable rate of N via the optimum sources of N namely, inorganic, organic and biofertilizers, was very effective for enhancing vegetative growth characters, yield and quality of fruit (physical and chemical fruit characters).

This study was designed to.

1- Highlight the effect of inorganic, organic and biofertilization of N on physical and chemical fruit

properties of Sewy date palm grown in clay soil.

2- Selecting the best treatment from inorganic N, organic and biofertilization N, which are responsible for producing economical yield and high fruit quality of Sewy date palm grown in clay soil characters,

Materials and Methods:

The current study was imposed during the two successive seasons of 2011 and 2012 on Sewy date palm cultivar cultivated at the experimental farm of faculty of agriculture Assiut university (clay soil). physical and chemical analysis of the tested soils according to Wild *et al.* (1985) and Davis and Ferites (1970) are shown in Table (1).

Effect of N fertilization treatments on mature sewy date palm cultivar grown on clay soil.

Twelve mature palms of Sewy date cultivar (15 years old) grown at the experimental farm of Faculty of Agriculture (clay soil) were selected in randomly to study the effect of some organic and bio N fertilizers compared to inorganic N on vegetative characters, yield as well as physical and chemical fruit properties.

The present work is including four treatments as follow:-

1. 100% mineral (1000) g N per palm as 5 kg ammonium sulphate.(control).
2. 50% organic N as (25 kg compost) + 50% biofertilizer (500 g Nitroben).
3. 50% organic N as (25 kg compost) + 50% inorganic N (2.5 kg ammonium sulphate).
4. 100% organic N fertilization (50kg) compost Elobore.

The analysis of Elobore compost is shown in Table (2). Elobore compost and nitrobin were added once a year during the first week of January.

While ammonium sulphate (mineral source) was added at three equal doses, at the first week of March, May and July of each season.

1. Soil analysis:

Table (1): Mechanical, physical and chemical analysis of the tested orchard soil (clay soil)

| Characters | Values |
|---|--------|
| Practical size distribution: | |
| Sand% | 15.63 |
| Clay% | 51.33 |
| Silt% | 33.21 |
| Soil Texture | Clay |
| pH (1:1 water suspension) | 8.10 |
| E.C (1: 2.5 extract) mmhos/ 20C/cm [°] | 2.69 |
| Organic matter% | 1.32 |
| CaCO ₃ % | 3.65 |
| Field capacity | 48.43 |
| Available macronutrients: | |
| Total N% | 0.16 |
| P (ppm, Olsen method) | 21.6 |
| K (ppm, ammonium acetate) | 401.3 |
| Mg (ppm) | 6.3 |
| Aavailable Zn, Fe, Mn and Cu (EDTA extractable, ppm) | |
| Zn | 2.35 |
| Fe | 14.12 |
| Mn | 15.13 |
| Cu | 2.12 |

Table (2): Mechanical, physical and chemical analysis of Elobore compost.

| Characters | Values |
|--------------------------------------|--------|
| Moisture% | 30 |
| pH | 8.5 |
| E.C (1: 2.5 extract) mm hos/ 20C/cm) | 4 |
| Total N% | 1.9 |
| P % | 0.6 |
| K % | 1 |
| Organic matter% | 30 |
| C/N % | 18 |
| Mg (ppm) | 15 |
| Mn ppm | 120 |
| Cu ppm | 150 |
| Zn ppm | 50 |
| Fe ppm | 180 |

The tested palms were nearly similar in vigor. These palms were subjected to the same horticulture managements and performed to maintain leaf/bunch ratio at 8:1; thus 72 leaves and 9 bunches were maintained according to Sayed (2002). The palms received the P, K fertilization that recommended by the ministry of agriculture during the two experimental seasons. Pollination of the experimental palms was uniformly performed in respect of the same pollen source, date and method to avoid residues of metaxinia. Pollination was achieved by inserting five male strands into the female bunch using known high activity pollen source throughout 2- 3 days after female spathe cracking. (Hussein *et al.*, 1993 and Dammas, 1998).

Three date palms (3 replicates) were subjected to each treatment, 3 spathes of each replicate were chosen to determine the properties of fruits.

2- Experimental measurements:

Generally, the following measurements were determined during the two seasons.

- Vegetative growth characteristics:-

All growth characteristics were measured at the middle of Sept. for both seasons.

1- Average Number of new leaves/ palm.

2- Leaf morphology:

Morphology of leaves was studied on four full sized leaves/palm (one leaf at each side). Measurements are included leaf length, number of leaflets/leaf and Leaflet area (cm²) which was determined using Ahmed and Morsy (1999) equation: Leaflet area = (W × L) × 0.84 + 10.29, in which W and L are the maximum width and length of leaflet. Then leaf

area (m²) of the leaf was calculated by multiplying the number of leaflets / leaf on the leaf area of leaflet

3- Yield and quality parameters:

3-1 Initial and Horticultural fruit set%:

The number of initial fruit set or retained fruits per strand were counted using 10 strands per spathe after thirty days from pollination. As well as at harvest time ten attached strands were randomly selected including inner or outer strands.

The percentage of initial fruit set (I.F.S.) was calculated using the following equation:

$$\text{Initial fruit set (\%)} = \frac{\text{Av. number of set fruit per strand}}{\text{Av. number of set fruit} + \text{Av. number of flower scars}} \times 100$$

The fruit retention percentages were determined at the harvest time using the following equation:

$$\text{Fruit retention (\%)} = \frac{\text{Av. number of retained fruit}}{\text{Av. number of retained fruit} + \text{Av. number of flower scars}} \times 100$$

All bunches of the selected palms were harvested at the full fruit color stage, bunch weight was recorded then yield per palm was calculated as an equation of: Yield/palm (kg) = number of bunches × average bunch weight

3-2 Quality parameters:

Samples of fifty ripe dates from each palm were taken randomly and the following physical and chemical characteristics were measured:

3-2-1- Physical characteristics:

Physical characteristics included the determination of:

- a- Fruit, seed and flesh weights (g.) were also estimated by using a top pan balance of 0.01 g. sensitivity. Fruit volume (cc) was determined by water displacement

b-Fruit length (L) and fruit diameter (D) were measured by vernier caliper

3-2-2 Chemical characteristics:

3-2-2-1 Total soluble solids % (TSS.%):

Total soluble solids % was determined by using the hand refractometer.

3-2-2-2 Total, reducing and non-reducing sugars:

The percentages of total, reducing and non-reducing sugars were determined according to Lane and Eynon (1965) volumetric method that outlined in A.O.A.C. (1995). Non-reducing sugars percentage was determined by calculating the differences between total sugars and reducing sugars.

3-2-2-3 Total acidity:

Twenty-five grams of fresh flesh were mixed with 100 ml distilled water in an electric blender, the extract was filtrated and twenty ml of it were titrated against 0.1 N sodium hydroxide using phenolphthalein as an indicator according to A.O.A.C., (1995).

And Expressed as g malic acid per 100 g pulp (Hussein *et al.*, 1993)

4-Statistical analysis:

The obtained data were tabulated and subjected to the proper statistical analysis of variance according to the complete randomized design using New L.S.D. test for recognizing the significance differences among the various treatment means according to the method outlined by Snedecor and Cochran (1980); Gomez and Gomez (1984) and Mead *et al.* (1993).

Results and Discussion:

This experiment aimed to compare the effect of some bio, organic

and mineral N fertilization on Sewy date cultivar grown in clay soil to improve fruit yield and quality of Sewy date palm cultivar.

A- Vegetative parameters:

1- Leaf length, Leaflet area, Leaf area, length of Spin zone, No. of Leaflets. No .of new leaves

Table (3) showed the effect of using 100% N organic, 50% N organic + 50% N biofertilizer (Nitrobin), 50% N organic + 50% N mineral fertilizer compared to using 100% inorganic N fertilizer(as control) on Leaf length, Leaflet area, Leaf area, length of Spin zone, No. of Leaflet and No .of new leaves of Sewy date palm cultivar during the two experimental seasons of 2011 and 2012.

1-1. Leaf length

Data showed that, leaf length significantly increased by using 100% organic N fertilization treatment during the two experimental seasons, comparing with inorganic treatment. The maximum values of leaf length were obtained from 100% organic N fertilization treatment (4.373, 4.463 m) during 2011 and 2012 seasons, respectively, while the lowest values of such character were obtained under (T₁) 100% N mineral fertilization (3.87, 3.96 m) during the two experimental seasons 2011 and 2012, seasons, respectively

These result are nearly in the same line with Diab (2006) on Sewy date palm who reported that increasing organic N fertilization followed by increasing in leaf length, comparing to using inorganic N fertilization (mineral), Al-wasfy and El-Khawaga (2008) on zaghoul date cv.

1-2. Leaflet area

Data in the previous table showed that, there was a gradual sig-

nificant promotion in leaflet area by using 100% N organic fertilizer, 50% N organic + 50% inorganic (mineral) and 50% N organic + biofertilizer treatments comparing with 100% N inorganic fertilizer only. The treatment of 100% organic N fertilization gave the highest leaflet area values (54.32, 58.23 cm²) during 2011 and 2012 seasons, respectively.

These results are in partial agreement with those reported by

Abdel Hamed and Ragab (2004) and Mansour *et al.* (2004) who stated that increasing the percentage of organic N from 12.5% to 50% of the recommended nitrogen rate caused a gradual promotion on leaflet area. Diab (2006) on Sewy date palm, reported that using organic N form either alone or in combined with inorganic N form significantly increased pinna area, comparing to use inorganic N form alone.

Table (3): Effect of organic, bio and inorganic N fertilization on - Leaf length, Leaflet area, Leaf area, length of Spin zone, No. of Leaflet and No .of new leaf of Sewy date palm (2011 and 2012 seasons.).

| Characters Treatments | Leaf length(m) | | Leaflet area (cm ²) | | Leaf area (cm ²) | | length of Spin zone (cm) | | No. of Leaflet | | Average No .of New leaves | |
|--------------------------------|----------------|------|---------------------------------|-------|------------------------------|------|--------------------------|-------|----------------|-------|---------------------------|------|
| | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| T ₁ Mineral 100% | 3.87 | 3.96 | 46.75 | 47.12 | 92 | 96 | 79.83 | 77.33 | 196.3 | 202.7 | 3.33 | 3.66 |
| T ₂ Organic + bio | 4.12 | 4.21 | 47.92 | 49.61 | 96 | 102 | 78.00 | 77.00 | 199.3 | 206.6 | 3.66 | 4.33 |
| T ₃ Mineral+organic | 4.22 | 4.30 | 48.02 | 49.66 | 101 | 107 | 72.16 | 71.00 | 211.0 | 216.3 | 4.33 | 5.33 |
| T ₄ Organic 100% | 4.37 | 4.46 | 54.32 | 58.23 | 120 | 136 | 61.00 | 59.00 | 221.0 | 227.0 | 4.67 | 5.67 |
| LSD at 5% | 0.41 | 0.42 | 6.27 | 7.32 | NS | NS | 8.13 | 13.05 | 23.30 | 19.78 | 1.14 | 1.56 |

1-3. Leaf area

Data showed a remarkable promotion in leaf area under organic N fertilization either alone or combined with mineral or biofertilization treatments, compared to use inorganic N form alone. The maximum values of leaf area were obtained from the palm that supplied with 100% N organic alone (120, 136 cm²) during 2011 and 2012 seasons, respectively, while the application of inorganic N form gave the minimum values of this trait (92-96 cm²) during 2011 and 2012 seasons, respectively. In general, the leaf area increasing due to increase the number and area of leaflets.

These results are in agreement with those obtained by Al-Wasfy and El-Khawaga (2008) stated that increasing the organic N levels resulted a gradual significant promotion in leaf area Abdel Hamed and Ragab

(2004) and Mansour *et al.* (2004) stated that increasing percentage of organic N form from 12.5% to 50% of the recommended nitrogen rate caused a gradual promotion on leaf area.

1-4. Length of spin zone

The obtained data declared that 100% N organic fertilization, 50% N organic +50% biofertilizer and 50% N organic + 50% N inorganic treatments significantly decreased the length of spin zone compared with 100% N inorganic (mineral) fertilization treatment. The lowest values of spin zone length were found by using 100% N organic fertilization only (61 and 59 cm) during 2011 and 2012 seasons, respectively. Similar results were reported by (Diab, 2006). He mentioned that using organic N either alone or combined with inorganic N sources decreased the length of spin

zone and consequently increase the zone and percentage of pinna.

1-5. Number of leaflets

The results tabulated in the previous table showed that using organic N fertilizer either alone or in combined with inorganic N fertilizer or biofertilizer increased number of leaflets compared with inorganic N form alone. The highest number of leaflets was obtained under the treatment of 100% N organic fertilization treatment (221, 227) during 2011, 2012 seasons, respectively, followed by (50% N organic + 50% N mineral) treatment which recorded number were (211, 216.3) during the two experimental season respectively.

1-6. Number of new leaves:

Data showed that increasing the average number of new leaves was

associated with fertilizing with organic N form either alone or in combined with mineral or biofertilizer treatments. The maximum values of new leaves were recorded by 100% N-organic followed by 50% N organic + 50% N mineral comparing to the control (100% mineral).

These results are in a harmony with those obtained by Diab (2006) who reported that, the maximum values of leaves-No were recorded in the palm fertilized with organic N only. Whereas the lowest values were recorded in the palm received inorganic N form only (control).

B- Yield components:

2- Initial fruit set, horticulture fruit set, bunch weight and total yield:

Table (4): Effect of organic, bio and inorganic N fertilization on Initial fruit set % horticulture fruit set %, bunch weight and total yield of Sewy date palm during 2011 and 2012 seasons.

| Characters Treatments | Initial fruit set % | | Hor. Fruit set% | | Bunch weight(kg) | | Total yield (kg) | |
|--|---------------------|-------|-----------------|-------|------------------|-------|------------------|-------|
| | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| T₁ Mineral 100% | 53.34 | 62.86 | 39.13 | 36.32 | 9.47 | 9.60 | 85.00 | 86.50 |
| T₂ Organic + bio | 62.37 | 70.00 | 41.14 | 42.50 | 9.61 | 9.83 | 86.50 | 88.50 |
| T₃ Mineral + organic | 64.73 | 71.00 | 45.63 | 47.50 | 9.747 | 10.11 | 87.75 | 91.00 |
| T₄ Organic 100% | 71.00 | 75.50 | 46.13 | 54.01 | 10.217 | 10.54 | 91.88 | 94.87 |
| LSD at 5% | 4.70 | 10.17 | 6.39 | 2.03 | 0.65 | 0.559 | 5.70 | 5.11 |

2-1. Initial and horticulture fruit set percentages

According to the data in table (4), it's clear that all of 100% N organic fertilizer, (50% N organic + 50% N mineral) and (50% N organic + biofertilizer N) treatments, increased initial fruit set and horticulture fruit set compared with control(100% inorganic mineral N fertilization treatment). Application of 100% N organic fertilizer treatment gave the highest significant values of initial and horticulture fruit set % (71.00

and 75.00) and (46.13 and 54.01) during the two experimental seasons, respectively compared to the control.

2-2. Bunch weight and total yield (kg):

Result tabulated in the aforesaid table showed that, the highest values of bunch weight and total yield (10.22, 10.54 kg) and (91.89, 94.87 kg) during 2011, 2012 season respectively, were obtained under 100% organic N fertilization treatment followed by 50% organic N + 50% mineral treatment (9.74 and 10.1 kg) and

(87.75 and 91 kg) during the two seasons of investigation. Likewise, a positive relationship was found between bunch and total yield on the hand and initial and horticultural fruit set on the other hand. So increasing initial and horticultural fruit set% was parallel with increasing the bunch weight and total yield.

The obtained data are in a agreement with those of Shahein *et al.* (2003) who found that the yield of Zaghloul and Samany date palm cvs

tend to be higher as a result of fertilizing with some organic nitrogen sources. Also, Abdel-Hameed and Ragab (2004) and Mansour *et al.* (2004) who noticed an increase in bunch weight and yield of Sewy date palm in response to increasing percentage of organic fertilizer from 12.5 to 75% of the recommended nitrogen dose.

3- Fruit weight, volume, length, and diameter, Pulp and Seed weights.

Table (5): Effect of organic, bio and inorganic N fertilization on fruit weight, size length, and diameter, Pulp and Seed weights of Sewy date palm during 2011 and 2012 seasons.

| Characters Treatments | Fruit weight (g) | | Fruit volume (cm ³) | | Fruit length (cm) | | Fruit diameter (cm) | | Pulp weight (g) | | Seed weight (g) | |
|--------------------------------|------------------|-------|---------------------------------|-------|-------------------|------|---------------------|------|-----------------|-------|-----------------|------|
| | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| T ₁ Mineral 100% | 19.18 | 17.56 | 16.27 | 16.00 | 4.08 | 4.07 | 2.75 | 2.55 | 16.70 | 15.20 | 2.48 | 2.00 |
| T ₂ Organic + bio | 17.91 | 17.23 | 16.90 | 15.36 | 4.08 | 4.14 | 2.63 | 2.62 | 15.50 | 15.40 | 2.34 | 2.11 |
| T ₃ Mineral+organic | 19.23 | 18.32 | 17.32 | 17.57 | 4.15 | 4.09 | 2.68 | 2.59 | 16.60 | 16.20 | 2.49 | 2.10 |
| T ₄ Organic 100% | 21.19 | 21.07 | 18.03 | 18.33 | 4.21 | 4.25 | 2.75 | 2.76 | 18.70 | 18.80 | 2.41 | 2.19 |
| LSD at 5% | 2.40 | 1.79 | 1.70 | 2.59 | NS | NS | NS | 0.09 | 1.45 | 1.58 | NS | NS |

3-1. Fruit weight (g) and volume cm³)

Data presented in table (5) showed that, there were differences between the fertilization treatments during the two seasons. Treatment of 100% organic N (T₄) gave the highest values of fruit weight (21.19 and 21.07g) during 2011 and 2012 season, respectively compared with the other treatments. These result are in a harmony with those of Furr and Armstrong (1958) on Deglet Noor palm, Hussien and Hussien (1983) on Sakkoti cv, El Morshedy (1996) on Zaghloul cv. they mentioned that organic fertilization treatments resulted in an increase of average fruit weight of some date palm cultivars. Shahein *et al.* (2003) and El-Assar (2005) stated that Zaghloul and Samany fruit

weights increased as response to fertilizing with some organic nitrogen sources either alone or combined with inorganic nitrogen sources. The effect of 100% N organic fertilization, 50% N organic + 50% N biofertilizer, 50% N organic + 50% N inorganic and 100% N mineral fertilizer treatments on fruit volume in 2011, 2012 seasons are presented in table (5). There were significant differences between the treatments, in addition the data showed that 100% organic N treatment gave the highest fruit volume values (18.03, 18.33 cm³) during 2011 and 2012 seasons, respectively, followed by the treatment of 50% organic N + 50% mineral (17.32, 17.57 cm³) during the two seasons.

3-3. Fruit length (cm) and diameter (cm)

Data revealed that, different experimental fertilization (mineral, bio and organic) treatments had an insignificant effect on fruit length. Also data showed that 100% organic N treatment gave the highest fruit length compared to the other treatments during the two experimental seasons. Concerning the fruit diameter, data showed that using 100% N organic fertilization and (50% N organic + 50% N mineral) treatments significantly increased the fruit diameter compared to using 100% inorganic (mineral) treatment during the second season, this increment was insignificant during the first season 2011. The highest values of the fruit diameter (2.82, 2.76 cm) during 2011, 2012, seasons were obtained under 100% N organic, followed by 50% N organic + 50% N mineral (2.67, 2.59 cm) during the two seasons, respectively.

3- 5 pulp weight (g)

Regarding to the previous results, T₄ (100%organic N fertilizer) gave the highest values of pulp weight, followed by T₃ (50% organic + 50% mineral) while the lowest pulp weight values were under T₂ (50% organic + 50% biofertilization) treatment. The differences between T₄ and the other treatments were significant during the two experimental seasons.

3-6. Seed weight (g)

The results indicated that, no significant differences between the treatments during the two experimental seasons were noticed as the significant differences of fruit and pulp weights. However highest values of seed weight occurred under 50% organic + 50% mineral (2.49 g) followed by 100% mineral (2.48g) during 2011 season. According to 2012 season the highest seed weight values were obtained under 100%organic treatment (2.18 g) followed by 50% organic +50% biofertilization treatment (2.11 g). These result are in agreement with those of Shahin *et al.* (2003) and ElAssar (2005) who stated that the fruit and flesh weights of Zaghoul and Samany cvs increased as response to fertilizing treatments with some organic nitrogen sources either alone or combined with inorganic nitrogen sources. The same findings were emphasized by Abdel Hamid and Ragab (2004) and Mansour *et al.* (2004) who reported that increasing the organic N level substantially from 12.5 to 75% of recommended nitrogen dose was followed by a gradual enhancing of fruit weight and pulp/seed ratio of Sewy dates.

4- Acidity, total soluble solids (TSS), total sugars, reducing – sugars and Non red-sugars

Table (6): Effect of organic, bio and inorganic N fertilization on- Acidity, total soluble solids (TSS), total sugars, reducing – sugars and Non red-sugars of Sewy date palm during 2011 and 2012

| Characters Treatments | Acidity % | | TSS | | Total sugars | | Red - sugars | | Non red-sugars | |
|--------------------------------|-----------|------|-------|-------|--------------|-------|--------------|-------|----------------|-------|
| | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| T ₁ Mineral 100% | 0.46 | 0.37 | 38.44 | 39.00 | 35.97 | 35.80 | 16.98 | 14.38 | 18.99 | 21.42 |
| T ₂ Organic + bio | 0.43 | 0.33 | 42.33 | 45.60 | 39.30 | 40.42 | 18.65 | 17.92 | 20.65 | 22.50 |
| T ₃ Mineral+organic | 0.42 | 0.32 | 40.50 | 42.90 | 38.12 | 36.37 | 17.28 | 15.66 | 20.84 | 20.71 |
| T ₄ Organic 100% | 0.34 | 0.31 | 43.10 | 46.60 | 41.32 | 42.93 | 18.89 | 17.99 | 22.43 | 24.92 |
| LSD at 5% | NS | NS | 4.27 | 2.96 | 2.18 | 1.53 | 1.41 | 2.038 | 1.60 | 3.36 |

4-1. Acidity

According to obtained data in table (6), the N organic fertilization either alone or combined with mineral fertilizer or biofertilizer slight decreased the total acidity, compared to 100% N mineral fertilization. Moreover it is cleared that values of acidity during the second season were favorable less than those of the first season, especially that obtained by 100%N organic fertilizer. These results are in a partial agreement with those of Diab (2006) on Sewy date palm, who reported that increasing organic N levels was followed by a gradual decrease in the total acidity percentage

4-2 Total soluble solids (TSS)

The obtained data clearly showed that the total soluble solids of dates, was remarkably enhanced when the palm was fertilized with organic fertilization either alone or combined with mineral or biofertilization. The highest values of TSS were obtained by 100%N organic fertilization (43.1, 46.6) during 2011 and 2012 seasons, respectively, followed by 50% N organic + 50% biofertilization (42.33, 45.60) which were varied significantly than those of inorganic fertilization (38.44,39.00).

These result are in general agreement with those of Shahein *et al.* (2003) and ElAssar (2005) who declared that total soluble solids in Zaghloul and Samany dates tended to increase due to fertilizing with organic nitrogen sources either alone or combined with artificial nitrogen sources compared to mineral nitrogen only.

Abdel-Hamid and Ragab (2004) and Mansour *et al.* (2004) on Sewy date palm indicated that application

of nitrogen in both of organic and inorganic sources was favorable than using inorganic nitrogen form only in improving dates quality.

4-3. Reducing and total sugars:

Table (6) shows reducing, non red and total sugars as influenced by different N fertilization treatments. According to the result, using 100% N organic fertilization significantly increased total and reducing sugars, compared to the inorganic treatment during the two seasons.

These result are nearly in the same line with Shahein *et al* (2003) and El Assar (2005) who found that total sugars were improved on Zaghloul and Samany dates as a response to organic N application partial or totally of whole N. Diab (2006) on Sewy date palm found that increasing the organic N level was followed by a gradual promotion in total sugars.

4-4. Non-reducing sugars:

According to the obtained results of non-reducing sugars, a significant differences were found among treatments .Using 100% N organic fertilizer treatment gave the highest non- reducing sugars percentage (22.43 and 24.92) followed by using 50% N organic + 50% N inorganic fertilizer treatment (20.84 and 20.71) and finally using 100% N mineral fertilizer treatment gave the significant lowest values (18.99 and 21.42) during the tow seasons, respectively

Result of this study could lead to the following recommendation:

- 1- The positive effect of the applied N organic fertilization (compost El obore) and N biofeertilizer (Nitrobin) may be leads to achieved sustainable soil charac-

teristics and positively reflected on the grown date palms.

- 2- The treatment of soil application of 100% N organic fertilization in clay soil seems to be the promising treatment to produce the highest vegetative growth of Sewy date palm and obtained an economical yield and good fruit quality.

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استجابة أشجار نخيل البلح السيوي لمصادر مختلفة من التسميد الأزوتي
أحمد عبد الحليم أحمد^٢، طلعت كامل المهدي^١، محمد أحمد فؤاد بدران^٢، رشاد عبد الوهاب إبراهيم^١
^١ قسم الفاكهة - كلية الزراعة - جامعة اسيوط
^٢ المعمل المركزي للزراعة العضوية - مركز البحوث الزراعية - الحيزة

الملخص:

أجريت هذه الدراسة خلال موسمي ٢٠١١ و٢٠١٢ على نخيل البلح السيوي المزروع في المزرعة التجريبية بكلية الزراعة جامعة اسيوط (تربة طينية) وذلك لدراسة تأثير بعض الازمدة العضوية (كمبوست العبور) والأسمدة الحيوية (نيتروبيين) مقارنة بالتسميد النيتروجيني الغير عضوي (سلفات النشادر) على بعض صفات النمو الخضري والمحصول وكذلك بعض الصفات الطبيعية والكيميائية للثمار. أوضحت النتائج أن استخدام الأسمدة العضوية منفردا أو في خليط مع الأسمدة المعدنية والحيوية أدى إلى زيادة في طول الورقة ومساحة الوريقة وعدد الوريقات وأيضا عدد الأوراق الحديثة مقارنة باستخدام التسميد المعدني وكانت هذه الزيادة ضئيلة بالنسبة لمساحة الورقة. كما زادت خصائص المحصول (العقد الإبتدائي والنهائي ووزن السوباطة والمحصول الكلي) مع استخدام التسميد العضوي منفردا أو في خليط مع الأسمدة المعدنية والحيوية. وكانت أفضل معاملة والتي أعطت أعلى قيم بالنسبة لمكونات المحصول هي استخدام التسميد العضوي بنسبة ١٠٠% مقارنة مع باقي المعاملات. كما أن أعلى قيم لوزن الثمار وحجمها وقطرها ووزن اللحم والمواد الصلبة الكلية والسكريات الكلية والمختزلة والغير مختزلة كانت عند استخدام التسميد العضوي الكامل بالمقارنة مع باقي المعاملات.

نتائج هذه التجربة يمكن أن تؤدي إلى التوصية التالية:

- ١- التأثير الإيجابي لإضافة الأسمدة العضوية (كمبوست العبور) والأسمدة الحيوية (نيتروبيين) حيث يؤدي إلى تحسين خصائص التربة والتي تنعكس على نمو أشجار النخيل المزروعة.
- ٢- استخدام النيتروجين في صورة عضوية بنسبة ١٠٠% أدى للحصول على أشجار بلح سيوي ذات نمو خضري عالي ومحصول اقتصادي وثمار ذات جودة عالية.