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ARABIC SUMMARY

SUMMARY

Two field experiments were laid out at El-Bakatoush Village, Kafr El-Sheikh Governorate, Egypt in 2005/2006 and 2006/2007 seasons to study the effect of two ridge width (40 and 50 cm), three hill distances (15, 20 and 25 cm) and three nitrogen rates (0, 30 and 45 kg N/fed/cut) as well as their interactions on growth, yield and quality of Stevia (*Stevia rebaudiana* Bertoni). The experiments were laid out in split-split plot design with three replications.

I could be summarized the obtained results as follows:

1. Number of branches per plant:

Results showed clearly that ridge width had a significant effect on number of branches per plant at second, third, fourth and fifth cuts in the first season and at first, third and fifth cuts in the second season. However, plants sown on ridge width 50 cm gave the highest number of branches per plant compared to 40 cm ridge width at all cuts in both seasons.

Plants sown on the widest hill distance (25 cm apart) surpassed those sown on the mildest and narrowest hill distance (15 and 20 cm apart) in number of branches per plant at all cuts in both seasons.

Stevia plants received nitrogen fertilizer at the rate of 45 kg N/feddan/cut had increase in number of branches per plant as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts in both seasons.

Planting plants on wide ridge (50 cm width) and wide hill (25 cm apart) gave the highest number of branches per plant compared to all other treatments at second, fourth and fifth cuts in both seasons.

Plants sown on ridge with of 50 cm and fertilized with 45 kg N/feddan cut gave the highest number of branches per plant at all cuts in both seasons, on the other hand, the lowest number of branches per plant

was found without nitrogen added (control) and ridge width 40 cm at almost cuts in both seasons.

Planting Stevia plants on 25 cm hill distance and received 45 kg N/feddan/cut gave maximum number of branches per plant at all cuts in both seasons. While, the lowest number of branches per plant obtained when planting on hill distance 15 cm and no nitrogen added (control) at all cuts in both seasons.

Plants sown on ridge width 50 cm and hill distance 25 cm as well as fertilized with 45 kg N/feddan/cut gave the highest number of branches per plant at all cuts in both seasons, on the contrary, plants sown on ridge width 40 cm, 15 cm apart between hills and did not nitrogen added (control) gave the lowest number of branches per plant at all cuts in both seasons.

2. Number of leaves per plant:

Results show clearly that plants sown on ridge width 50 cm gave the highest number of leaves per plant compared to ridge width 40 cm at first, second, third fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons.

Plants sown on the widest hill distance (25 cm apart) surpassed those sown on the middles and narrowest hill distance (15 and 20 cm apart) in number of leaves per plant at all cuts in both seasons.

Stevia plant received nitrogen fertilizer at the rate of 45 kg N/feddan/cut exceeded unfertilized plants (no N added) in number of leaves per plant at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons.

Planting on wide ridge (50 cm width) and wide hill (25 cm apart) gave the highest number of leaves per plant compared to all other treatments at second and third cuts in 2005/2006 season. Also, at first, third, fourth and fifth cuts in 2006/2007 season,

The highest number of leaves per plant was recorded when used ridge width of 50 cm and nitrogen fertilizer at a rate of 45 kg N/feddan at fifth cut in 2005/2006 and 2006/2007 seasons. On the other hand, the lowest number of leaves per plant was found without nitrogen added (control) and ridge width 40 cm at all most cuts in both seasons.

Planting Stevia plants at 25 cm hill distance and received 45 kg N/feddan/cut gave maximum number of leaves per plant at all cuts in both seasons. While, the lowest number of leaves per plant obtained when planting on hill distance 15 cm and no nitrogen added (control) at all cuts in both seasons.

Plants sown on ridge width 50 cm and hill distance 25 cm as well as fertilized with 45 kg N/feddan/cut gave the highest number of leaves per plants at all cuts in both seasons.

3. Leaf area per plant:

Plants sown on ridge width 50 cm gave the highest leaf area per plant at first, third, fourth and fifth cuts in 2005/2006 season and at first, season, third and fifth cuts in 2006/2007 season.

At all cuts plants sown on the widest hill distance (25 cm apart) surpassed those sown on the middles and narrowest hill distance (15 and 20 cm apart) in leaf area per planting in both seasons.

Fertilized Stevia plants with nitrogen fertilizer at the rate of 45 kg N/feddan/cut increased leaf area per plant as compared with unfertilized plants (control) in 2005/2006 and 2006/2007 seasons.

Planting Stevia plants on hill distance of 25 cm and ridge with of 40 or 50 cm gave the highest leaf area per plant at all cuts in both seasons. On the contrary, plants sown on ridge with of 40 cm and hill distance of 15 cm gave the lowest leaf area per plant compared to all other treatments at all cuts in both seasons.

Applying nitrogen fertilizer at the rates of 45 kg N/feddan to plants sown on ridge width 40 or 50 cm gave the highest leaf area per plant at all cuts in both seasons. On the other hand, the lowest leaf area per plant was found without nitrogen added (control) and ridge width 40 cm at all most cuts in both seasons.

Planting Stevia plant on 25 cm hill distance and received 45 kg N/feddan/cut gave maximum leaf area per plant at all cuts in both seasons. While, the lowest leaf area per plant obtained when planting on hill distance 15 cm and no nitrogen added (control) at all cuts in both seasons. The highest leaf area per plant was recorded by plants sown on ridge width 50 cm, hill distance 25 cm and fertilized with 45 kg N/feddan/cut at all cuts in both seasons.

4. Leaf area index:

In 2005/2006 season, plants sown on ridge with of 40 cm gave the highest leaf area index compared to ridge with of 50 cm at first, second, fourth and fifth cuts. While, in 2006/2007 season, the narrow ridge (40 cm width) gave higher leaf area index than those obtained at 50 cm apart of ridge at second and third cuts.

At all cuts, plants sown on the narrowest hill distance (15 cm apart) surpassed those sown on the middle and wide hill distance (20 and 25 cm apart) in leaf area index in both seasons.

Stevia plant received nitrogen fertilizer at the rate of 45 kg N/feddan/cut gave 102.33, 112.12, 111.82, 96.66 and 103.77% increase in leaf area index as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts in 2005/2006 season, respectively. The corresponding values in 2006/2007 season were 89.84, 99.78, 105.34, 91.86 and 109.65% in same respect.

Planting on narrow ridge (40 cm width) and closer hill (15 cm apart) gave the highest leaf area index compared to all other treatments at all cuts in both seasons.

Applying nitrogen fertilizer at the rate of 45 kg N/feddan/cut to plants on ridge width 40 or 50 cm gave the highest leaf are index at all cuts in both seasons. On the other hand, the lowest leaf area index was found without nitrogen added (control) and ridge width 50 cm at almost cuts in both seasons.

Planting Stevia plant at 15 cm hill distance and received 45 kg N/feddan/cut gave maximum leaf area index at all cuts in both seasons. While, the lowest leaf area index obtained when planting on hill distance 25 cm and no nitrogen added (control) at all cuts in both seasons.

Plants sown on ridge width 40 cm and hill distance 15 cm as well as fertilized with 45 kg N/feddan/cut gave the highest leaf area index at all cuts in both seasons, on the contrary, plants sown on ridge width 50 cm, 25 cm apart between hills and did not nitrogen added (control) gave the lowest leaf area index at all cuts in both seasons.

5. Stem fresh weight per plant:

Plants sown on ridge width of 50 cm gave the highest stem fresh weight per plant 23.05, 17.84, 16.68 and 23.48 g at first, second, third and fifth cut in 2005/2006 season, respectively, while, in 2006/2007 season it were 25.71, 23.34, 21.67 and 28.15 g at first, third, fourth and fifth cuts, respectively compared to those obtained on 40 cm apart of ridge width.

At all cuts, plants sown on the widest hill distance (25 cm apart) surpassed those sown on the middles and narrowest hill distance (15 and 20 cm apart) in stem fresh weight per plant in both seasons.

Stevia plants received nitrogen fertilizer at the rate of 45 kg N/feddan/cut gave 55.64, 91.39, 186.16, 162.92 and 50.90% increase in stem fresh weight per plant as compared with unfertilized plants (control)

at first, second, third, fourth and fifth cuts in 2005/2006 season, respectively. The corresponding values in 2006/2007 season were 53.58, 51.52, 86.61, 83.20 and 43.52% in the same respect.

Planting plants of Stevia at the wide ridge (50 cm) and the wide hill distance (25 cm) gave the highest stem fresh weight per plant 24.88, 19.31 and 15.99 g as well as 27.82, 26.62 and 30.77 g as compared with this interaction treatments at first, second and fourth cuts in 2005/2006 season as well as the first, third and fifth cuts in 2006/2007 seasons, respectively.

Sowing plants on ridge width 50 cm and fertilized by 45 kg N/feddan/cut gave the highest stem fresh weight per plant 29.02, 24.48, 22.58 and 29.13 g at first, third, fourth and fifth cuts in 2005/2006 season, respectively as well as 28.53, 29.06 and 33.38 at second, fourth and fifth cuts in 2006/2007 season, respectively.

Planting Stevia plants at 25 cm hill distance and received 45 kg N/feddan/cut gave maximum stem fresh weight per plant as well as compared to all other treatments at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, while, the lowest stem fresh weight per plant obtained when sown on hill distance 15 cm and unfertilized (no added nitrogen) at all cuts in both seasons.

Sowing plants on ridge width 50, hill distance 25 cm and fertilized by 45 kg N/feddan/cut gave increase in stem fresh weight per plant compared to plants sown on ridge width 40 cm, hill distance 15 cm and unfertilized (control, without nitrogen added) at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons.

6. Leaves fresh weight per plant:

Plants sown on ridge width 50 cm surpassed those sown on ridge width 40 cm in leaves fresh weight per plant by 21.18% and 23.07% at second and fifth cuts in 2005/2006 season, respectively as well as by

7.65%, 5.44% and 12.08% at first, second and fifth cut in 2006/2007 season, respectively.

Plants sown on hill distance 25 cm gave 16.36, 36.96, 18.91, 27.78 and 58.12% as well as 14.18, 15.00, 16.52, 21.21 and 16.56% increase in leaves fresh weight per plant as compared with those having hill distance of 15 cm at first, second, third, fourth and fifth cuts in the first and second seasons, respectively.

Stevia plant received nitrogen fertilizer at the rate of 45 kg N/feddan gave 157.75, 171.59, 242.14, 195.46 and 136.68% as well as 95.26, 84.38, 117.29, 119.41 and 125.61% increase in leaves fresh weight per plant as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, respectively.

Sowing Stevia plants on wider ridge (50 cm) and far hill (25 cm) gave 65.84%, 22.20%, 46.41% and 89.19% as well as 21.29%, 24.90% and 78.05% increase in leaves fresh weight as compared with those sown on narrow ridge (40 cm) and closer hill (15 cm) at second, third and fifth cuts in 2005/2006 season as well as at second, third, fourth and fifth cuts in 2006/2007 season, respectively.

Applying nitrogen fertilizer at the rates of 45 kg N/feddan/cut to plants sown on ridge width 40 or 50 cm gave the highest leaves fresh weight per plant at all cuts in both seasons.

On the contrary, plants sown on ridge width 40 cm and unfertilized (control) gave the lowest leaves fresh weight as compared with all other treatments at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons.

Sowing plants on hill distance 25 cm and fertilized by 45 kg N/feddan/cut gave 271.92% and 266.2% increase in leaves fresh weight per plant as compared to plants sown on hill distance 15 cm and didn't received

nitrogen (control) at fifth cut in 2005/2006 and 2006/2007 seasons, respectively.

Planting Stevia plants on ridge width 50 cm and hill distance 25 cm as well as fertilized by 45 kg N/feddan/cut gave the highest leaves fresh weight per plant, on the other hand, plants sown on ridge width 40 cm and hill distance 15 cm as well as unfertilized by nitrogen gave the lowest leaves fresh weight compared to all other treatments at first, second, third fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, respectively.

7. Leaves/stem ratio:

At 2005/2006 season, plants sown on ridge width 50 cm gave the highest leaves/stem ratio per plant 1.44, 1.79 and 1.63 at first, fourth and fifth cuts, respectively, but, in 2006/2007 season it were 1.53, 1.72 and 1.56 compared to those obtained at 40 cm apart of ridge width at first, third and fifth cuts, respectively.

Plants sown on the highest hill distance (25 cm apart) surpassed those sown on the mildest and narrowest hill distance (20 and 15 cm apart) in leaves/stem ratio per plant at all cuts in both seasons.

Fertilized Stevia plant with nitrogen fertilizer at the rate of 45 kg N/feddan gave 56%, 50%, 23%, 37% and 66% as well as 48%, 47%, 45%, 40% and 67% increase in leaves/stem ratio per plant as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, respectively.

Planting plants of Stevia at the widest ridge 50 cm and the wider hill distance 25 cm gave the highest leaves/stem ratio per plant 1.50, 1.85, 1.84 and 1.95 as well as 1.75 and 1.76 as compared with all other this interaction treatments at first, third, fourth and fifth cuts in 2005/2006 as well as at fourth and fifth cuts in 2006/2007 seasons, respectively.

The highest leaves/stem ratio per plant 1.91 and 1.88 was recorded when sown on ridge width of 50 cm and nitrogen rate of 45 g N/feddan at fifth cut in 2005/2006 and 2006/2007 season respectively. On the other hand, plants sown on ridge width 40 cm and unfertilized (control) gave the lowest leaves/stem ratio per plant 1.11 and 1.15 compared to all other treatments fifth cut in 2005/2006 and 2006/2007 seasons, respectively.

The highest leaves/stem ratio per plant 1.70, 2.05, 1.97 and 2.22 as well as 1.77, 1.90, 1.92, 1.83 and 2.23 were obtained when hill distance was 25 cm and nitrogen rate 45 kg N/feddan/cut as compared to all this interaction treatments at first, second, fourth and fifth cuts in the first season as well as at first, second, third, fourth and fifth cuts in the second season, respectively.

The highest leaves/stem ratio per plant 1.81, 1.87 and 1.90 as well as 1.79, 1.97, 1.98 and 1.93 were obtained when used ridge width 50 cm, hill distance 25 cm and nitrogen fertilizer at the rates of 45 kg N/feddan/cut compared to all other treatments in this interaction at first, second, and third cut in 2005/2006 season as well as at first, second, third and fourth cuts in 2006/2007 season, respectively.

8. Leaves dry weight per plant

Plants sown on ridge width 50 cm gave the highest leaves dry weight per plant compared to 40 cm ridge width at all cuts in both seasons.

At all cuts, plants sown on the widest hill distance (25 cm apart) surpassed those sown on the middlest and narrowest hill distance (15 and 20 cm) in leaves dry weight per plant in both seasons.

Stevia plants received nitrogen fertilizer at the rate of 45 kg N/feddan/cut gave 74.39, 83.24, 143.70, 141.22 and 92.35% increase in leaves dry weight per plant as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts at 2005/2006 season, respectively.

The corresponding values in 2006/2007 season were 102.75, 135.41, 167.01, 161.21 and 104.73%, respectively.

Planting plants on wider ridge (50 cm width) and wide hill (25 cm apart) gave the highest leaves dry weight per plant 11.27, 10.66 and 16.00 g compared to all other treatments at all cuts in both seasons.

On the contrary, plants sown on ridge width of 40 cm and hill distance of 15 cm gave the lowest leaves dry weight per plant compared to all other treatments at all cuts in both seasons.

Applying nitrogen fertilizer at the rate of 45 kg N/feddan/cut to plants sown on ridge with 40 or 50 cm gave the highest leaves dry weight per plant at all cuts in both seasons.

Planting Stevia plant at 25 cm hill distance and received 45 kg N/feddan/cut gave maximum leaves dry weight per plant at all cuts in both seasons. While the lowest leaves dry weight per plant obtained when planting on hill distance 15 cm and nitrogen added (control) at all cuts in both seasons.

Plants sown on ridge width 50 cm and hill distance 25 cm as well as fertilized with 45 kg N/feddan/cut gave the highest leaves dry weight per plant at all cuts in both seasons, on the contrary, plants sown on ridge width 40 cm, 15 cm hill a part and did not nitrogen applied (control) gave the lowest leaves dry weight per plant at all cuts in both seasons.

9. Stevioside percentage

The obtained results indicated that the highest stevioside percentage (17.79 and 16.97%) were giving by the narrow ridge (40 cm width) compared to those of ridge 50 cm apart at fifth cut in 2005/2006 and 2006/2007 seasons, respectively.

Hill distance 15 cm caused 9.70, 19.61, 7.92, 9.95 and 11.82% as well as 11.33, 13.85, 9.16, 14.45 and 11.77% increase in stevioside percentage as compared with the widest hill distance (25 cm) at first,

second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, respectively.

Stevia plants received nitrogen fertilizer at the rate of 45 kg N/feddan/cut gave 38.35, 17.00, 18.76, 33.28 and 23.96% as well as 37.71, 32.18, 23.22, 39.37 and 29.49% increase in stevioside percentage as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, respectively.

Plants sown on narrow ridge (40 cm) and close hill (15 cm apart) gave the highest stevioside percentage compared to all other treatments at all cuts in both seasons. On the contrary, planting on ridge width 50 cm and hill distance 25 cm gave the lowest stevioside percentage.

The highest stevioside percentage 19.23, 19.40, 19.21, 18.38 and 19.46% as well as 18.89, 18.74, 18.87, 18.75 and 19.06% were obtained when sown plants on ridge 40 cm width and fertilized with 45 kg N/feddan/cut, on the other hand, the lowest values 13.18, 14.32, 15.37, 12.85 and 15.18% as well as 12.76, 13.61, 14.80, 12.40 and 14.18% were recorded with 50 cm ridge width and added nitrogen fertilizer (control) at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, respectively.

Plants sown on ridge width 40 cm and hill distance 15 cm as well as fertilized with 45 kg N/fed/cut gave the highest stevioside percentage at all cuts in both seasons, on the contrary, plants sown on ridge width 50 cm, 25 cm apart between hills and did not nitrogen added (control) gave the lowest stevioside percentage at all cuts in both seasons.

10. Leaves fresh weight per feddan (ton)

Plants sown on ridge width 40 cm gave the highest leaves fresh weight per feddan 1.42, 0.76 and 1.10 ton compared to ridge width of 50 cm at first, fourth and fifth cuts, respectively. While, at 2006/2007 season,

it gave values 1.62, 1.13, 1.14 and 1.30 ton than those obtained at 50 cm apart of ridge width at first, second, third and fifth cuts, respectively.

At all cuts, plants sown on the narrowest hill distance (15 cm apart) surpassed those sown on the middle and wider hill distance (20 and 25 cm apart) in laves fresh weight per plant in both seasons.

Fertilized Stevia plants by nitrogen fertilizer at the rate of 45 kg N/feddan/cut gave 98.92, 125.92, 178.72, 217.14 and 157.14% increase in leaves fresh weight per feddan as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts in 2005/2006 seasons, respectively. The corresponding values at 2006/2007 season were 59.22, 135.38, 179.31, 195.65 and 163.63% in same respect.

Planting Stevia plants on hill distance of 15 cm and ridge width of 40 or 50 cm gave the highest leaves fresh weight per feddan at all cuts in both seasons. Planting on narrow ridge (40 cm width) and closer hill (15 cm apart) gave the highest leaves fresh weight per feddan. On the contrary, plants sown on ridge width of 50 cm and hill distance of 25 cm gave the lowest leaves fresh weight/feddan compared to all other treatments at all cuts in both seasons.

The highest leaves fresh weight per feddan 1.96 and 2.25 ton recorded when used ridge width of 40 cm and nitrogen fertilizer at a rate of 45 kg N/feddan/cut at first cut in 2005/2006 and 2006/2007 seasons, respectively. On the other hand, the lowest leaves fresh weight per feddan 0.39 and 0.90 ton was found without nitrogen added (control) to plants sown on ridge width 50 cm at fifth cut in 2005/2006 and 2006/2007 seasons, respectively.

Planting Stevia plant at 15 cm hill distance and received 45 kg N/feddan/cut gave the maximum leaves fresh weight per feddan at all cuts in both seasons. While, the lowest leaves fresh weight per feddan obtained

when planting on hill distance 25 cm and no nitrogen added (control) at all cuts in both seasons.

Plants sown on ridge width 40 cm and hill distance 15 cm as well as fertilized with 45 kg N/fed/cut gave the highest leaves fresh weight per feddan at all cuts in both seasons, on the contrary, plants sown on ridge width 50 cm, 25 cm apart between hills and did not nitrogen added (control) gave the lowest leaves fresh weight per feddan at all cuts in both seasons.

11. Leaves dry weight per feddan/cut:

Plants sown on ridge width 40 cm gave the highest leaves dry weight per feddan/cut 0.66, 0.46, 0.51, 0.47 and 0.79 as well as 0.72-0.60, 0.59, 0.58 and 0.77 ton as compared with those sown on ridge 50 cm at first, second, third, fourth and fifth cut in 2005/2006 as well as 2006/2007 seasons.

Hill distance 15 cm caused 56.00, 68.57, 61.11, 47.50 and 19.40% as well as 47.36, 47.91, 48.88, 37.77 and 25.75% increase in leaves dry weight per feddan as compared with the widest hill (25 cm apart) at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons.

Stevia plants received nitrogen fertilizer at the rate of 45 kg N/feddan/cut gave 84.44, 117.85, 153.84, 142.85 and 72.55% as well as 69.23, 100.00, 86.84, 52.77 and 77.35% increase in leaves dry weight per feddan/cut as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, respectively.

Planting Stevia plants on hill distance 15 cm and ridge width 40 or 50 cm gave the highest leaves dry weight per feddan cut at all cuts in both seasons. On the contrary, plants sown on ridge width of 50 cm and hill

distance of 25 cm gave the lowest leaves dry weight per feddan compared to all other treatments at all cuts in both seasons.

The highest leaves dry weight per feddan/cut was found with plants sown on ridge width 40 cm and fertilized with 45 kg N/fed/cut at all cuts in both seasons. On the other hand, the lowest laves dry weight per feddan/cut was found without nitrogen added (control) and ridge width 50 cm at second, third fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, respectively.

Planting Stevia plants at 15 cm hill distance and received 45 kg N/feddan/cut gave maximum leaves dry weight per feddan at all cuts in both season. While, the lowest leaves dry weight per feddan obtained when planting on hill distance 25 cm and no nitrogen added (control) at all cuts in both seasons.

Plants sown on ridge width 40 cm and hill distance 15 cm as well as fertilized with 45 kg N/feddan/cut gave the highest leaves dry weight per feddan at all cuts in both seasons. On the contrary, plants sown on ridge width 50 cm, 25 cm apart between hills and did not nitrogen added (control) gave the lowest leaves dry weight per feddan at all cuts in both seasons.

12. Plants fresh weight per feddan (ton/cut)

The obtained results indicated that the highest plants fresh weight per feddan 2.24 and 2.49 ton were given by the narrow ridge (40 cm width) compared to those of ridge width 50 cm, at first cut in 2005/2006 and 2006/2007 seasons, respectively.

Plants sown on the narrowest hill distance (15 cm apart) surpassed those sown on the middlest and widest hill distance (20 and 25 cm apart) in plants fresh weight per feddan (ton) in both seasons.

Stevia plants received nitrogen fertilizer at the rate of 45 kg N/feddan/cut gave 68.35, 122.98, 113.53, 137.36 and 105.95% as well as

84.75, 117.48, 119.63, 141.99 and 112.02% increase in plant fresh weight per feddan (ton) as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 season, respectively.

Plants sown on narrow ride (40 cm) and close hill (15 cm) surpassed all treatments in plants fresh weight per feddan at all cuts in both seasons. On the contrary, planting on ridge width 50 cm and hill distance 25 cm gave the lowest in the 2006/2007, season.

Sowing plants on ridge width 40 cm and received nitrogen at the rate of 45 kg N/feddan gave the highest plants fresh weight per feddan 2.84, 2.11, 1.63 and 2.22 ton as well as 3.29, 2.51, 2.38, 1.93 and 2.51 ton as compared with all other treatments at first, third, fourth and fifth cuts in 2005/2006 season as well as at first, second, third, fourth and fifth cuts in 2006/2007 seasons, respectively.

The highest plants fresh weight per feddan were obtained with hill distance 15 cm and nitrogen fertilizer at a rate of 45 kg N/feddan at first, second, third and fifth cuts as well as at first, second, third and fourth cuts.

The highest plants fresh weight per feddan 3.20 and 3.96 ton/fed. were recorded by plants sown on ridge width 40 cm, hill distance 15 cm and fertilized by 45 kg N/fed/cut, but the lowest plants fresh weight per feddan 0.77 and 0.89 ton/fed. were obtained from plants sown on ridge width 40 cm, hill distance 15 cm and unfertilized with nitrogen (control) in 2005/2006 and 2006/2007 seasons, respectively.

13. Stevioside yield per feddan (kg)

Plants sown on ridge width 40 cm gave the highest stevioside yield per feddan (kg) in both as compared with those sown on ridge 50 cm in both seasons. Plants sown on ridge width 40 increased stevioside yield per feddan by 39.24, 6.95 and 20.16% as well as 11.29, 16.80, 23.40 and 6.36% compared to ridge width 50 cm at third, fourth and fifth cuts in

2005/2006 season as well as at first, third, fourth and fifth in 2006/2007 season, respectively.

Hill distance of 15 cm caused 61.17, 85.48, 71.11, 63.51 and 26.11% as well as 74.64, 68.26, 62.17, 54.44 and 39.34% increase in stevioside yield per feddan as compared with the widest hill distance of 25 cm at first, second, third, fourth and fifth cuts in 2005/2006 and 2006/2007 seasons, respectively.

Stevia plants received nitrogen fertilizer at the rate of 45 kg N/feddan/cut gave 149.33, 170.64, 188.72, 222.05 and 112.25% as well as 117.65, 166.57, 125.12, 179.39 and 130.44% increase in stevioside yield per feddan as compared with unfertilized plants (control) at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007 seasons, respectively.

Planting plants of Stevia at the narrow ridge 40 cm and the narrow hill distance 15 cm gave the highest stevioside yield per feddan. On the contrary, planting on ridge width 50 cm and hill distance 25 cm gave the lowest stevioside yield per feddan.

Applying nitrogen fertilizer at the rate 45 kg N/feddan to plants sown on ridge width 40 or 50 cm gave the highest stevioside yield per feddan at all cuts in both seasons.

The highest stevioside yield per feddan were obtained when hill distance was 15 cm and nitrogen fertilizer rate was 45 kg N/feddan at 186.26, 154.10, 166.96, 173.08 and 186.40 kg/feddan as well as 181.89, 170.35, 156.05, 154.15 and 196.65 kg/feddan as compared to all this interaction treatments at first, second, third, fourth and fifth cuts in 2005/2006 as well as 2006/2007.

Plants sown on ridge width 40 cm and hill distance 15 cm as well as fertilized with 45 kg N/feddan/cut gave the highest stevioside yield per feddan at all cuts in both seasons, on the contrary, plants sown on ridge

width 50 cm, 25 cm apart between hill and did not nitrogen added (control) gave the lowest stevioside yield per feddan at all cuts in both seasons.

14. Total leaves dry weight per feddan:

Plants sown on narrow ridge (40 cm width) exceeded those sown on wider ridge (50 cm width) in total leaves dry weight per feddan by 6.87% and 5.86% in 2005/2006 and 2006/2007 seasons, respectively.

Plants sown on closer hill (15 cm apart) gave 40.61% and 42.63% increase in total leaves dry weight per feddan compared to those sown on wider hill (25 cm apart) in 2005/2006 and 2006/2007 seasons, respectively.

Fertilized plants with nitrogen at the rate of 45 kg N/feddan/cut increased total leaves dry weight per feddan by 104.51% and 33.08% as well as 83.87% and 19.46% as compared with unfertilized plants (control) and fertilizer by 30 kg N/feddan/cut in 205/2006 as well as 2006/2007 seasons, respectively.

Planting Stevia plants on ridge width 40 cm and hill distance 15 cm gave the highest total leaves dry weight per feddan 3.38 and 3.83 t/fed., on the other hand planting on ridge width 50 cm and hill distance 25 cm gave the lowest values 2.18 and 2.55 t/fed. as compared with all the other treatments in 2005/2006 and 2006/2007 seasons, respectively.

The highest total leaves dry weight per feddan 3.76 and 4.07 t/fed. was obtained when plants sown on narrow ridge (40 cm apart) and fertilized by 45 kg N/fed/cut, on the other hand, the lowest values 1.76 and 2.05 ton was found when sown plants on ridge width 50 cm and unfertilized with nitrogen (control) compared to all other this interaction treatments in 2005/2006 and 2006/2007 seasons, respectively.

Plants spaced on hill 15 cm apart and received 45 kg N/fed/cut gave 2.86 and 2.80 ton increase in total leaves dry weight per feddan compared to plants spaced on hill 25 cm apart and did not received nitrogen fertilization (control) in 2005/2006 and 2006/2007 seasons, respectively.

Fertilized Stevia plants sown on ridge width 40 cm and hill distance 15 cm by 45 kg N/fed/cut gave the highest total leaves dry weight per feddan 4.60 and 4.41 t/fed., on the other hand, the lowest value 1.60 and 1.64 t/fed. was recorded by plants sown on ridge width 50 cm, hill distance 25 cm and unfertilized (no added N) compared to all other this interaction treatments in 2005/2006 and 2006/2007 seasons, respectively.

15. Total stevioside yield per feddan:

Plants sown on narrow ridge (40 cm width) exceeded those sown on wider ridge (50 cm width) in total stevioside yield per feddan by 13.14% and 12.94% in 2005/2006 and 2006/2007 seasons, respectively.

Plants sown on closer hill (15 cm apart) gave 54.91% and 58.40% increase in total stevioside yield per feddan as compared with wider hill (25 cm apart) in 2005/2006 and 2006/2007 seasons, respectively.

Fertilized plants with nitrogen at the rate of 45 kg N/feddan/cut increased total stevioside yield per feddan by 154.74% and 46.02% as well as 139.65 and 34.15% as compared with unfertilized plants (control) and fertilizer by 30 kg N/feddan/cut in 2005/2006 as well as 2006/2007 seasons, respectively.

Planting Stevia plants on ridge width 40 cm and hill distance 15 cm gave the highest total stevioside yield per feddan 621.00 kg and 684.68 kg, on the other hand, planting on ridge width 50 cm and hill distance 25 cm gave the lowest values 337.42 kg and 384.15 kg as compared with other treatments in 2005/2006 and 2006/2007 seasons.

The highest total stevioside yield per feddan was recorded by planting on ridge width 40 cm and applied 45 kg N/feddan/cut, but the lowest total stevioside yield per feddan was obtained when plants sown on ridge with 50 cm and unfertilized with nitrogen (control) compared to all other treatments in 2005/2006 and 2006/2007 seasons, respectively.

Plants spaced 15 cm apart and received 45 kg N/fed/cut gave 634.62 kg and 640.26 kg increase in total stevioside yield per feddan compared to plants spaced 25 cm apart and did not received nitrogen fertilization (control) in 2005/2006 and 2006/2007 seasons, respectively.

Fertilized Stevia plants sown on ridge width 40 cm and hill distance 15 cm by 45 kg N/feddan/cut gave the highest total stevioside yield per feddan 925.14 kg and 932.38 kg, on the other hand, the lowest value 219.57 kg and 204.40 kg was recorded by plants sown on ridge width 50 cm, hill distance 25 cm and unfertilized (No added N) compared to all other treatments in 2005/2006 and 2006/2007 seasons, respectively.

16. Total plants fresh weight per feddan

Results indicated that plants sown on narrow ridge (40 cm width) exceeded those sown on wider ridge (50 cm width) in total plants fresh weight per feddan by 7.89% and 8.22% in 2005/2006 and 2006/2007 seasons, respectively.

Plants sown on closer hill (15 cm apart) gave 37.51% and 34.50% increase in total plants fresh weight per feddan in 2005/2006 and 2006/2007 seasons, respectively.

Fertilized plants with nitrogen at the rate of 45 kg N/feddan/cut increased total plants fresh weight per feddan as compared with unfertilized plants (control) and fertilizer by 30 kg N/feddan/cut in 2005/2006 as well as 2006/2007 seasons.

Planting Stevia plants on ridge width 40 cm and hill distance 15 cm gave the highest total plants fresh weight per feddan, on the other hand, planting on ridge width 50 cm and hill distance 25 cm gave the lowest values as compared with other treatments in 2005/2006 and 2006/2007 seasons, respectively.

Fertilized plants sown on ridge width 40 or 50 cm with 45 kg N/fed/cut surpassed all treatments in this interaction in both seasons.

Plants spaced 15 cm apart and received 45 kg N/fed/cut gave 7.82 and 9.10 ton/fed. increase in total plants fresh weight per feddan compared to spaced 25 cm apart and did not received nitrogen fertilization (control) in 2005/2006 and 2006/2007 seasons, respectively.

Fertilized Stevia plants sown on ridge width 40 cm and hill distance 15 cm by 45 kg N/fed./cut gave the highest total plants fresh weight per feddan 13.17 and 15.10 ton/feddan, on the other hand, the lowest value 4.54 and 4.96 ton/feddan was recorded by plants sown on ridge width 50 cm, hill distance 25 cm and unfertilized (No added N) compared to all other treatments in 2005/2006 and 2006/2007 seasons, respectively.