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SUMMARY

Because grain sorghum (*Sorghum bicolor* L.) is the first time to be cultivated in Toshka Region, South Valley of Egypt, the present investigation was carried out at South Valley Farm Research Station, Agriculture Research Center, during the two successive season of 2001 and 2002. The aim of this investigation was to study the effect of nine planting dates *i.e.* 1st April, 15th April, 1st May, 15th May, 1st June, 15th June, 1st July, 15th July and 1st August, and three plant population densities of 42, 63 and 84 thousand plants/feddan on growth traits, grain yield and its components, and protein content in grain of Dorado variety.

A randomized complete block design with three replications was applied for each planting date. All other field practices were applied as recommended.

The obtained results could be summarized as follows:

I. Vegetative and growth characters

- 1- **Plant height (cm):-** Delaying planting dates caused a significant continuous increase plant height. Also, increasing plant population densities tended to increase plant height in both growing seasons and combined. Although insignificant interactions of planting dates x plant population densities were found for plant height in both seasons and combined data, the tallest plants were obtained from the latest planting date of 1st Aug and the highest plant population density of 84000 plants/fed.
- 2- **Stem diameter:- (cm):-** Planting dates had significant effect on the stem diameter in the second season only. However, planting dates on 1st April, 15th April, 1st May, 15th July and 1st August possessed the

thickest stem diameter. In addition, the highest population density of 84000 plants/fed gave the thinnest stem diameter of 2.60, 2.36 and 2.48 cm in 2001, 2002 seasons and combined, respectively. The interactions of planting dates x plant population densities were insignificantly affected stem diameter in both seasons and combined.

- 3- **Number of green leaves/plant**: -Late plating significantly increased the number of green leaves/plant in both season and combined. Neither plant population densities nor the interactions of planting dates x plant population densities were significantly affected stem diameter in both seasons and combined
- 4- **Leaf area/plant (cm)**: Delaying planting date resulted in a significant increase in leaf area/plant in the two seasons and combined. Moreover, plant population densities cased a significant effect in Leaf area/plant in the second season and combined. The interactions of planting dates x plant population densities were significantly affected leaf area/plant in both seasons and combined. However, The largest leaf area/plant was found from planting sorghum on 1st July, 15th July and 1st August at low plant population density, planting on 1st August at the moderate plant population density and planting on 15th July at the high plant population density.
- 5- **Leaf area index (LAI)**: Planting dates, plant population densities and their interaction in both seasons and combined were significantly affected LAI. Delaying planting date gradually increased LAI. Increasing Plant population density from 42 up to 84 thousand plants/fed increased LAI.

6- **Number of days from planting to 50% of plants reach flowering:**

Planting dates had a pronounced effect on heading emerge in both seasons and combined. Delaying planting date decreased the number of days required from planting till heading. Neither plant population densities nor the interactions of planting dates x plant population densities were significantly affected flowering dates in both seasons and combined.

7- **Number of harvest plants/fed:** Planting dates, plant population densities and their interaction in both seasons and combined were significantly affected the number of harvest plants/fed. Increasing Plant population density from 42 to 63 and 84 thousand plants/fed increased the number of harvest plants/fed. in both season and combined. The highest number of harvested plants was obtained from sowing sorghum on 1st July and 1st August, in the first season, 15th May, 15th June and 1st August in the second season and , 15th May, 1st July, 15th July and 1st August in combined over years, with the highest plant population density.

II. **Grain yield and its components:**

1- **Head length (cm):** The effect of planting dates on head length was significant in both seasons and combined. The longest ears were resulted from late planting. Plant population densities were insignificantly affected head length in both seasons and combined. The interactions of planting dates x plant population densities had significantly affected head length in the first seasons only.

2- **Head diameter (cm):** Planting dates had significant effect on head diameter in the first season only. Late planting manifested the thickest head diameter. Increasing plant population significantly gave the

thinnest head diameter in the first season and combined. The interactions of planting dates x plant population densities were insignificantly affected head length in both seasons and combined.

- 3- **Grain weight/head (gm)**: Significantly differences were detected among planting dates in both season and combined. The highest values for weight/head was obtained from planting on 15th July and 1st August in both seasons and combined. Neither plant population densities nor the interactions of planting dates x plant population densities were significantly affected stem diameter in both seasons and combined.
- 4- **Number of grain/head**: Delaying planting dates significantly increased the number of grain/head in both seasons and combined. However, The highest number of grain/head was observed by planting sorghum on 1st August in both seasons and combined. The effect of plant population densities on number of grain/head was significant only in the second season. The interactions of planting dates x plant population densities were significantly affected number of grain/head in the second season and combined.
- 5- **Seed index (1000-grain weight in gm)**: The effect of planting dates, plant population densities and their interaction were insignificant in both seasons and combined.
- 6- **Grain yield (ard/fed)**: Planting dates, plant population densities and their interaction had significant effect on grain yield (ard/fed) in both seasons and combined. The highest grain yield was obtained by planting sorghum on 15th July (13.19, 12.21 and 12.70 ard/fed) and 1st August (14.11, 12.12 and 13.12 ard/fed) in 2001, 2002 seasons and combined, respectively. For plant population densities, the highest

average grain yield was found at the highest plant population of 84 thousand plants/fed in both seasons and combined. The highest grain yield was observed from sowing sorghum on 15th July with the highest plant population density of 84000 plants/fed in both seasons and combined over years.

7- **Stover yield (Green yield) in Ton/fed:** planting dates and plant population densities had significant effect on stover yield. The highest stover yield was obtained by planting sorghum on 15th July and 1st August in both seasons and combined. The highest average stover yield (11.512, 11.230 and 11.371 ton/fed) was found at the highest plant population of 84 thousand plants/fed in 2001, 2002 seasons and combined, respectively. Planting dates x plant population densities interactions were insignificantly affected stover yield in both season and combined.

III. **Crude protein content in the grain:** Delaying planting date continuously increased protein % in the grain at both seasons and combined. The differences in grain protein percentage were insignificant in both seasons, but it was significant in combined data. However, increasing plant population densities from 42 or 63 to 84 thousand plants/fed significantly decreased grain protein from 9.81 and 9.90 to 9.75%, respectively. The interactions of planting dates x plant population densities were insignificantly affected protein content in both seasons and combined.