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SUMMARY

Two field experiments were carried out at the Experimental Farm of Sakha Agricultural Research Station,(ARC) during the two summer season 2001 and 2002. The experiments were conducted to study the response of three sunflower hybrids i.e., (Vidoc, Eruflore and H-20) to twelve treatments, which were the combination of different nitrogen fertilizer sources (mineral, bio-fertilizer and FYM). The effects of these twelve treatments on yield and yield components and oil content of the three sunflower hybrids at North Delta region were studied.

A split plot design with four replication was used. The hybrids were randomly allocated in the main plots and nitrogen fertilizer sources were distributed in the sub plots. Samples ,each of five guarded sunflower plants from each plot were taken at 35,45 and 55 days after sowing (DAS) for growth analysis determinations.

The obtained results can be summarized as follows:-

A. Growth analysis and growth attributes:

A-1. Plant height:

Vidoc hybrid produced tallest sunflower plants at all sampling dates(35,45 and 55 DAS) in both seasons.

Application of mineral nitrogen at the rate of 45 kg N/fed. gave tallest plants in the two seasons.

A.2. Dry matter accumulation:

Vidoc hybrid accumulated more dry weight than the other hybrids at all growth stages in both seasons.

Sunflower plants received mineral fertilizer at the rate of 45 kg/fed. having great and significant dry matter accumulated at all sampling dates.

The interaction between hybrid and fertilizer source had only a significant effect on dry matter accumulation at 55 DAS in the first season.

A.3. Dry matter distribution:

Sunflower hybrids exhibited no significant effect on dry matter distribution in form of available roots, stems and heads at most growth stages in both seasons, while in form of leaves there were significant differences at most sampling dates in the two seasons of study.

Adding fertilizer from different sources at different doses had no significant effects on dry matter distribution in different plant organs at all sampling dates in both seasons.

A.4. Leaf area/plant (LA):

Vidoc hybrid exceeded all other hybrids in LA at all growth stages in the two seasons followed by Eruflore.

The largest LA/plant was recorded at 45 kg N /fed. as mineral fertilizer. The interaction between hybrid and fertilizer source had a significant effect on LA/plant at growth stage of 55 DAS in the second season.

A.5. Leaf area index (LAI):

Sunflower hybrids significantly affected LAI at sampling date of 45 DAS as well as at 35 and 45 DAS in the first and second season, respectively.

Obtained results indicate that LAI was gradually increased with increasing nitrogen level alone or with bacteria inoculation at the most sampling dates in both seasons.

A.6. Growth attributes:

CGR, RGR and NAR were significant affected by hybrids at all growth periods in both seasons.

Vidoc hybrid significantly surpassed the other hybrids in CGR,RGR and NAR at all growth periods in the two seasons.

CGR,RGR and NAR of sunflower plants were significantly affected by fertilizer sources at the most growth periods in both seasons. Application of mineral fertilizer at the rate of 45 kg N/fed. or at the rate of 30 kg N/fed. And seed inoculation with Azotobacter and Azospirillum substantially increased CGR and NAR, but it decreased RGR.

B. Agronomic characters:

B.1. Number of days to first and full flowering:

Number of days to first and full flowering were significantly affected by sunflower hybrid during the two seasons of this study. Vidoc hybrid was the earliar, while H-20 was the leater.

The effect of fertilizer source on number of days to first and full flowering was significant, except that in the second season in respect to number of days to first flowering. Generally, increasing nitrogen fertilizer as a mineral source alone or with bioferitizer delayed flowering date in sunflowering date in sunflower plants.

B.2. Plant height

Sunflower hybrid had a significant effect on plant height at harvest in both seasons, wheares Vidoc hybrid had the tallest plants and H-20 hybrid had the shortest one.

Application of 45 kg N/fed. gave the tallest sunflower plants in the two seasons.

B.3. Stem diameter:

Vidoc hybrid had the thickest sunflower stems, while H-20 hybrid had the thinnest one in the both seasons. Stem diameter was gradually increased by increasing nitrogen fertilizer rate.

Sunflower plants received 45 kg/fed. as mineral source surpassed substantially in stem diameter those received less rates of mineral nitrogen with biofertilizer or FYM.

The interaction between hybrid and fertilizer source had a significant effect on stem diameter in the first season only.

B.4. Head diameter:

Sunflower hybrid affected head diameter significantly in both seasons. Vidoc hybrid recorded the largest head, while H-20 hybrid had the smallest ones.

Increasing mineral nitrogen level alone or with biofertilizer and FYM significantly increased head diameter in the two seasons.

The interaction between the two factors under study had a significant effect on head diameter in the second season.

C. Yield and its components:

C.1. seed yield:

Obtained data show that differences in seed yield per plant and per feddan between hybrids were significant in the two seasons. Vidoc hybrid recorded significantly the highest seed yield per plant and per feddan, while H-20 hybrid gave the lowest one.

Obtained results show that seed yield per plant and per feddan were affected significantly by fertilizer source in both seasons. The highest

seed yield was obtained when sunflower plants received mineral nitrogen at the rate of 45 kg N/fed. Followed by those fertilized by 30 kg N/fed. and inoculated with Azotobacter and Azospirillum. This trend is true in the two seasons.

The interaction among hybrid and fertilizer source had a significant effect on seed yield/plant in the second seasons.

C.2. 100-Seed weight:

The effect of sunflower hybrid in 100-seed weight was evident in the two seasons. Vidoc hybrid had significantly the heavier seeds, while H-20 hybrid gave the lighter one.

Sunflower plants received mineral nitrogen at rate of 45 kg N/fed. alone or 30 kg N/fed. + seed inoculation with Azotobacter and Azospirillum having great weight of 100-seed. 20 m³ FYM + seed inoculation with Azotobacter and Azospirillum recorded the lowest weight of 100-seed.

The interaction of hybrid and fertilizer source affected significantly 100-seed weight in the first season.

C.3. Seed husk percent:

Vidoc hybrid had significantly less seed husk percent than other two hybrids, while H-20 hybrid recorded significantly more seed husk percent in the two seasons.

The highest seed husk percentage was recorded by application mineral nitrogen at rate of 45 kg N/fed. Followed by adding 30 kg N/fed. And seed inoculation with Azotobacter + Azospirillum in both seasons.

The interaction between sunflower hybrid and fertilizer source significantly affected seed husk percent only in the second season.

C.4. Seed oil content:

Obtained data show that sunflower hybrid exhibited significant differences in seed oil content in both seasons. Vidoc hybrid was superior to all other hybrids in seed oil content.

Seed oil content was negatively and significantly affected by increasing the rate of nitrogen from 15 to 45 kg N/fed. Or by any of nitrogen level with biofertilizer or FYM.

C.5. Oil yield/fed:

The differences in oil yield/fed. Between sunflower hybrids were significant in both seasons. Vidoc hybrid recorded the highest seed oil yield/fed., while H-20 hybrid gave the lowest one in the two seasons.

There were significant increases in oil yield/fed. Accompanied each increment of applied mineral nitrogen alone or with seed inoculation by Azotobacter and Azospirillum or with FYM.

It can be stated that sowing of Vidoc hybrid and application of mineral fertilizer at the rate of 45 kg N/fed. or at the rate of 30 kg N/fed. +seed inoculation with Azotobacter and Azospirillum were the recommended for raising sunflower productivity and reducing the environmental pollution under the conditions of the present study.