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EFFECT OF DIFFERENT PLANT DENSITIES ON SUNFLOWER VARIETIES IN RED LOAM SOILS

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Plant density is the most important yield-contributory character which can be manipulated to attain the maximum production from a unit land area. In sunflower, closer spacing generally decreased the head diameter but increased the total seed yield per hectare (Pinthus, 1964). Galgoczi (1968) reported that plants grown at 0.28 m apart gave the maximum yield, while at Coimbatore plant density of 55,000 plants per hectare (60 × 30 cm) recorded the highest yield (Ramaswamy, 1973). A spacing of 80x20 cm was optimum for sunflower at Pantnagar (Vikram and Chunmun, 1972). On the other hand at Kovilpatti, a plant population of 2,22,000 per hectare (30 × 15 cm) was the optimum for higher yield (Anon. 1972 a). Works from many countries confirmed that the spacing between plants within rows should be relatively close from 15 to 30 cm to obtain best yields. At Hyderabad a density of 67,000 plants per hectare recorded the highest yield of 1479 kg seeds per hectare (Anon. 1972 b). However studies on optimum spacing in sunflower have not been conducted in Kerala and hence an experiment was conducted to determine the optimum spacing for sunflower.

Materials and Methods

The experiment was conducted during May-August 1974 at the College of Agriculture, Vellayani. The soil of the experimental area was red loam and analysed 0.050 per cent total nitrogen, 0.0085 per cent available P_2O_5 and 0.0018 per cent available K_2O. The pH of the soil was 5.4. Seed materials were obtained from the Agricultural College and Research Institute, Coimbatore. The experiment was laid out in a factorial design. The treatments consisted of three spacings (30x20 cm, 30x30 cm and 30x40 cm). The varieties tried were E C. 68413, E C. 68414 and Sunrise selection. They were grown under 40, 80 and 120 kg nitrogen levels. A uniform dose of 60 Kg P_2O_5 and 60 kg K_2O per hectare was also given. Observations were made on head diameter, number of seeds per head and total yield of seeds.

Results and Discussion

The mean data on the head diameter, number of seeds per head and yield of seeds are given in Tables 1 to 3 respectively.

Significant differences in head diameter were noticed due to spacing The closer spacing of 30 × 20 cm recorded the minimum diameter of head which.

Table 1

Effect of spacing on head diameter of sunflower varieties (in cm)

Spacing	EC.68413	EC.68414	Sunrise selection	Mean
30 x 20 cm	12.11	12.51	11.35	11.99
30 × 30 cm	12.61	13.89	12.10	12.87
30 x 40 cm	1341	13.58	13.05	13.35
Mean	12.72	13.33	12.17	—

C.D. (0.05) for comparing the marginal means : 0.985
" " combinations : 1.706

Table 2

Effect of spacing on number of seeds per head

Spacing	EC.68413	EC.68414	Sunrise selection	Mean
30 x 20 cm	428.00	488.17	437.67	451.28
30 x 30 cm	534.83	487.33	565.83	529.33
30 × 40 cm	472.67	556.83	498.83	509.44
Mean	475.50	510.78	500.78	—

CD (0 05) for comparing the marginal means : 60.68
" " combinations : 105.11

Table 3

Effect of spacing on yield of sunflower seeds in kg per hectare.

Spacing	EC.68413	EC.68414	Sunrise selection	Mean
30 × 20 cm	2430.5	2027.7	2030.9	2163.1
30 x 30 cm	1717.5	1810.1	1481.4	1669.7
30 x 40 cm	1340.3	1332.0	1448.1	1373.5
Mean	1829.5	1723.3	1653.5	—

CD (0 05) for the marginal means :190.5
" " combinations : 330.0

was significantly inferior to the wider spacing of 30x40 cm. However, there was no appreciable difference between 30x20 cm and 30x30 cm or 30x30 cm and 30 × 40 cm. Varieties did not show any difference in this character.

The effect of spacing was significant in the case of number of seeds per head. The closer spacing of 30x20 cm was inferior to 30x30 cm and 30x40 cm. The influence of spacing on the number of seeds per head followed the same pattern as was noticed in the case of head diameter. There was no appreciable variation in the number of seeds per head due to varieties.

Spacing showed significant difference with respect to the yield of seeds. The spacing 30x20 cm was superior to 30 × 30 cm which in turn was superior to 30x40 cm. A maximum yield of 2163.1 kg seeds per hectare was recorded in 30x20 cm spacing and it was followed by 30x30 cm spacing (1669.7 kg per hectare), This might be due to more number of plants per unit area under closer spacing. It was the number of heads per unit area that contributed to the increase in yield rather than the size of individual heads. This had clearly revealed that plant population should be so adjusted as to accommodate more number of plants per unit area. Thus, population adjustments could be regarded as an important means for increasing yields in sunflower. The varieties tried showed no significant difference in yield.

Summary and conclusion

An experiment was conducted at the College of Agriculture, Vellayani to study the effect of different spacings on the yield of sunflower varieties. The results revealed that closer spacing decreased the head diameter and number of seeds per head, but significantly increased the total yield of seed. Closer spacing of 30 × 20 cm gave a maximum yield of 2163.1 kg seeds per hectare. The varieties did not show any difference in yield potential.

സംഗ്രഹം

വിവിധയിനം സൂര്യകാന്തിച്ചെടികൾ പല raraa^eKaroi'lraS നട്ടുപോഴുണ്ടാകുന്ന ഫലം അറിയുന്നതിനായി 1974 ൽ വെള്ളയാണി കാർഷികകോളേജിൽ ഒരു പരീക്ഷണം നടത്തുകയുണ്ടായി. ചെടികൾ കൂടിയ അകലത്തിൽ (30 × 40 സെ:മീ) നട്ടപ്പോൾ, പൂങ്കുലയുടെ വ്യാസവും പൂങ്കുലയിലുള്ള വിത്തുകളുടെ എണ്ണവും വർദ്ധിച്ചെങ്കിലും ffliDOtann.'jiTznlejgg വിത്തുല്പാദനം കുറയുകയാണുണ്ടായത്. 30 × 20 സെ.മീ.raTOt&ej'nToi'IrtiS നട്ടുന്നതാണ് വിത്തുല്പാദനത്തിന് ഏറ്റവും നന്നായി കണ്ടത്. ഈ അകലത്തിൽ ചെടികൾ നട്ടപ്പോൾ ഏറ്റവും കൂടിയവിളവായി ഹെക്ടറിന് 2163.1 കിലോഗ്രാം വിത്തു ലഭിച്ചു.

REFERENCES

Anonymous, 1972a. Tamil Nadu News Letter, January 1972, 25—26. Published by Director of Agriculture, Tamil Nadu.

Anonymous, 1972b. Seminar on sunflower development and research needs. Fertl. News. 18, 6.

Galgoczi, J. 1968. Results of spacing trials combined with fertilisation with Kiswarda sunflower on Szabolies sandy soils. Field Crop Abstr. 17: 463.

Pinthus, M. J. 1964. Some environmental effects on the yield components of sunflower seeds. Field Crop Abstr. 17, 1697.

Ramaswamy, R. 1973. Studies on the response of sunflower varieties to graded doses of nitrogen with different spacings. M. Sc. (Ag.) thesis, TNAU, Coimbatore.

Vikarm Singh and Chunmun Singh, 1972. Sunflower cultivation. Indian Fmg. 22 4 34—35.

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