

HIGH YIELD CULTURE TECHNIQUES ON SUNFLOWER

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Abstract

The optimum sowing time(ST), plant density(PD) and sowing method(SM) for "Hungary 4", the principal sunflower variety sown in Jilin Province, were studied during 1991-1993. The results showed that the optimum sowing time was 20th of May, the optimum plant density 20000 plants / ha and the best sowing method sowing in hole on new hill with hole irrigation(SHNHHI). Compared with the conventional culture techniques(sowing time of the beginning of May, plant density of 15000 plants /ha and sowing in old furrow), the techniques made the yields of the variety increased by more than 32.6% in line with the mean of the three years.

Key-words: Sowing time, Plant density, Sowing method

Introduction

The western part of Jilin Province is one of the principal sunflower production areas of China and the crop is one of the main oil crops in the province with total growing areas of 91200 ha and total seed yields of 178358 tons per year. In the area , it is very dry in the spring time and the total rainfall is only 40 mm during April to May. And the soils are very poor and salinized. Therefore the sunflower seed yields are low and instable. The culture techniques are also the important factors that influence the yields of sunflower. This paper reports on the optimum sowing time(ST), plant density(PD) and sowing method(SM) for the open pollinated sunflower variety "Hungary 4" which is mainly grown by the farmers in the area.

Materials and Methods

The open pollinated sunflower variety "Hungary 4" was used in the entire trials which were conducted in the plots with the light chernozem that was lightly salinized . For the ST trials , 20th of April, 30th of April, 10th of May, 20th of May, 30th of May, 10th of June were selected and served as six treatments. Each of them was arranged in a 39

square meter plot in a completely randomized block design with 3 replicates for testing the relation with the yields during 1991-1993. For the PD trials , 15000 plants/ha, 17500 plants/ha , 20000 plants/ha , 22500 plants/ha and 25000 plants/ha were selected as 5 treatments and each of them was arranged in the same way with the ST trials during 1992 and 1993. For the SM trials, sowing in old furrow(SOF) and sowing in hole on new hill with hole irrigation(SHNHHI) served as two treatments and each of them was arranged in a 2000 square meter plot in which three locations were selected for testing the plant survival percentage and yields during 1992 and 1993. The means of the two/three year results were used for the yield analyses.

Results and discussion

The ST for sunflower depends on the frost-free period in the growing areas and the growing period duration(GPD) of a variety . And the GPD of "Hungary 4" is 118 days. The results showed that the variety normally matured in the range of 20th of April to 10th of June but the highest seed yields were given in the ST of 20th of May(Table 1).

Table 1. Effect of the sowing time(ST) on the sunflower seed yields(kg/ha)

Years	ST of 20/4	ST of 30/4	ST of 10/5	ST of 20/5	ST of 30/5	SF of 10/6
1991	1928.0	1974.5	2213.0	2432.5	2307.2	2153.2
1992	2075.5	2140.0	2238.0	2320.0	2174.0	2105.0
1993	2132.0	2325.0	2243.0	2578.0	2492.0	2231.0
Means	2045.2	2146.5	2231.3	2443.5	2324.4	2163.1

The average seed yield of the three years in the ST of 20th of May was increased by 19% and 13% compared with that in the ST of 20th of April and that in the ST of 10th of June, respectively. That was mainly because the ST made the flowering stage avoid the period of high temperature and rich rainfall and the period of disease infection so that the seed setting rates were high.

The PD of the crop is closely related to the variety, soil type, climate, fertilizer application and irrigation conditions. The results of the PD trials showed that the optimum PD for "Hungary 4" was 20000 plants per ha and other PD gave the reduced seed yields(Table 2).

Since it is of severe drought in Spring in the area, the SM affects directly the plant survival percentage and then the seed yields. With the comparison of the two methods, the SHNHHI method insured the planned PD and the SOF method did not so that the seed yield difference was significant between the two(Table 3). The average seed yield

Table 2. Effect of plant density(PD)(plants/ha) on the sunflower seed yields(kg/ha)

Years	PD of 15000	PD of 17500	PD of 20000	PD of 22500	PD of 25000
1992	2045.0	2102.0	2512.5	2372.0	2515.0
1993	2313.0	2475.0	2834.0	2537.0	2408.0
Means	2179.0	2288.5	2673.3	2454.5	2461.5

Table 3. Effect of the sowing methods(SM) on the sunflower seed yields(kg/ha) and plant survivals(PS)(plants/ha)

SM	1992		1993	
	SY	PS	SY	PS
SOF	1725.3	14720	1934.5	16200
SHNHHI	2323.5	19859	2565.2	19931

and plant survival of the two years in the SHNHHI method were increased by 34.0% and 4435 plants, respectively, compared with the SOF method. In the semi-arid area, using the SHNHHI method can insure the plant density and increase the seed yields.