

THE SUPERFICIAL VIEWS ON THE INTEGRATIVE HIGH-YIELD CULTIVATION TECHNOLOGY FOR SUNFLOWER IN THE WESTERN AREA OF JILIN PROVINCE

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Abstract

The western sandy and semi-arid area of Jilin Province is the principal sunflower production area with about 100 000 ha of the crop per year. Because of the problems of extensive farming, degenerated varieties, less use of fertilizer, low plant density and serious disease and insect pests, the average yields per ha was only about 1 800-2 900 kg. For solving the above mentioned problems, the following integrative measures should be put into use in line with the investigations: 1) rotations in good order; 2) utilization of the improved seeds; 3) utilization of fertilizers according to the soil conditions; 4) late sowing on the basis of the weather conditions; 5) reasonable plant density; 6) good field management and 7) integrative controls of the diseases and insect pests.

Key-words: Sunflower, integrative cultivation technology

Introduction

The western area of Jilin Province belongs to the sand-covered alluvial plain with the yearly average precipitation of 400 mm and the cumulative temperature (more than or equal to 10 C) of 2 800- 3 000 C. The natural characteristics there are frequent wind and drought and sandy, saline and alkaline soil. In the view of the utilization for the natural resources, it is suitable for developing the sunflower production and the principal sunflower production area with total growing areas of 100 000 ha per year and seed yields of 1 800-2 900 kg per ha. The yields are low and unstable. More factors effects the yields. Besides the lower selling price and growing the crop in the poor lands and poor invest by the farmers, the problems of extensive farming, less hybrid, utilization of the local varieties, less utilization of fertilizers, use of single variety, no use of potassium fertilizer, missing plants, poor density and more and serious diseases, insect pests and weeds exist in the in the production. In 1987, the incidence of Sclerotinia rot of sunflower was as high as 70-80% in Najin Township of Taonan City and the frequency of the sunflower plants attacked by sunflower broomrape was averagely 36%.

The integrative cultivation technology

Sunflower is one of the important oil crops in China and it is necessary for us to develop the crop. In the future, our main target for the crop will be raising the seed yields per unite and the main work will be extending the integrative high-yield cultivation technology. On the basis of the trials, demonstrations and experiences of the high-yield modals for years, following technical measures should be in the production:

1. Reasonable rotation

Because sunflower is grown in the relatively concentrated areas, if the land selection is not correct or successive cropping, the diseases, insects and weeds will be more serious and the yields will decrease. According to the investigation in Fangzhi Village of Qian'an County, about 67% sunflower plants were attacked by the sunflower broomrape and the yields were reduced by 30% in the three year successive cropping lands. Therefore, four-year rotation should be taken in the common lands and five to seven-year rotation taken in the lands infected by Sclerotinia rot and broomrape.

2. Utilization of good seeds

The hybrids Baikuiza 1 and Baikuiza 2 and the regenerated rejuvenated open pollinated varieties Hungary 4 and Changlingdake should be put into the use to bring the yield increasing role of the good seeds in the production.

3. Scientific utilization of fertilizer

Sunflower needs more potassium during the growth period. Though the soil contains more potassium in the western part of the province, it still can not meet the requirement of the sunflower development so that the K and N fertilizers should be applied together. The trial results in Changling County showed that the yields were increased by 22.4-29.6% in the lands that N, P, K were applied together in ratio compared with that only N, K were applied. In the present production conditions, 15-30 cubic meters manure, 150 kg urea, 150 kg calcium superphosphate and 100 kg potassium sulphate should be applied together per ha or 400 kg of the specific compound fertilizer with the ratio of N:P:K=1:1:1(1:0.6:1) per ha.

4. Late sowing

On the basis of the trials for years, the survival percentage of the sunflower seedlings, seed setting rates and the yields are higher with the late sowing than the early sowing and the diseases and insects are also less serious. The optimum sowing time in the area is during early to middle of May.

5. Reasonable plant density

The plant density should be decided in line with the soil conditions and varieties used. The higher density can be taken for the short varieties and in the poor lands and lower density for the high varieties and in the rich lands. The density for Hungary 4 and other

local varieties can be 24 000-30 000 plants per ha and that for Baikuiza 2 and 3 can be 33 000-36 000 plants per ha.

6. Good field management

The field management must be taken early and carefully. The thinning must be done during two true leaves old and final thinning of the seedlings done during four leaves old. Hoeing and ridging should be done for three times, respectively. Debranching should be done if necessary. During flowering time, bee pollination and artificial pollination may be used to improve the seed setting rates.

7. Integrative control of the main diseases, insects and weeds

As for the main diseases, insects and weeds, the integrative measures combining the agricultural methods and chemical should be taken for controlling them.

7.1. Agricultural methods

Reasonable rotation, utilization of the resistant varieties (Baikuiza 1) and late sowing should be taken.

7.2. Chemical control

With 1 000 time solution, 50% procymidone water dispersible powder or 40% dimethochlon can be sprayed on the back of sunflower heads for controlling Sclerotinia rot. With 500 time solution, 70% thiophonate methyl can be sprayed on the plants for controlling Alternaria leaf spot. With 500 time solution, 90% trichlorphon or BT can be sprayed on the surface of the heads during flowering time to control sunflower moth. With 1 000-1 500 time solution, 25% methamidophos can be sprayed on the leaves for controlling the black velvety chafer during its adult stage. With 10 000 time solution, 48% trifluralin can be used as soil treatment for controlling sunflower broomrape.