

WIDE-ROW SUNFLOWER PRODUCTION

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Sunflowers are being grown on wheat stubble in rows 8 to 16 feet apart as a substitute for summerfallow in the drier areas of Alberta and Saskatchewan. This practise is making it possible to follow a continuous cropping sequence in areas where lack of sufficient moisture often limits production to a wheat-fallow rotation.

The advantages of using widely spaced rows of standing crop to conserve moisture by trapping snow and reducing evaporation has been demonstrated in these areas before. However, crops formerly used gave no economic returns in the year of planting and did not remain standing over winter the way sunflower stems do.

Economic returns from sunflowers in widely spaced rows can more than offset cultivation costs. Under certain climatic conditions the returns can equal those from a wheat crop grown on fallow. Yields of sunflower seed average 300-400 pounds per acre but double these amounts have also been obtained.

The wheat-sunflower cropping sequence requires little in the line of special equipment. It lets the farmer spread his work load. Sunflowers can be planted with a grain drill and cultivated with equipment generally used in working summerfallow; they can be straight combined after all other grains have been harvested. A stripping attachment on the cutter bar will reduce seed losses and leave longer stalks standing in the field.

In the fall and again in the spring we sampled soil for moisture content in a number of sunflower fields to a depth of 3 feet. We found that in most instances the moisture used by the sunflowers was replenished the following spring.

Fertilizer

When we tested for available nitrate in unfertilized sunflower fields, we found less nitrate in the soil in the rows than in the soil between the rows. Occasionally, we have noticed reduction in height of plants in narrow strips in the following grain crops that appear to coincide with the sunflower rows. We believe this was caused by a nitrate deficiency.

We have also noticed narrow strips in the grain crop following fertilized sunflowers in which the plants appeared to be earlier and more vigorous than in the rest of the field. There is no doubt that the residual effect

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of the fertilizer applied to the sunflowers was responsible.

Our fertilizer tests on sunflowers have shown that, in general, sunflowers respond best to the same kind of fertilizer that would be used for wheat under the same conditions. Although sunflowers are relatively high in potash, we have not been able to obtain a yield response from applying potash fertilizer in southern Alberta.

We recommend the use of fertilizer on sunflowers. It benefits them as well as the following grain crop. The advantages of this practise are most evident on soils of low fertility.

Seeding

The distance between the sunflower rows is often determined either by the width of the cultivator to be used or the length of the cutter bar on the combine. Rows can be far enough apart to allow two passes of the cultivator between the rows. This makes it more convenient to cultivate close to the row. Some growers may like to harvest two rows at a time. However, if the single rows are too far apart for this, double rows, about 9 inches apart, and spaced as before, may be used. Here the fertilizer rate should be increased. To make sure there is enough moisture to produce well developed seed, we recommend that you have no more than 4 plants per foot of row. Actually 1 to 2 plants per foot of row can give equally good seed yields but the stubble will not hold snow as effectively.

Weed Control

Volunteer grain from the previous crop is the major weed problem in sunflowers. We have found that this problem can be greatly reduced by using a lister planter. The shovels clear the surface grain- and weed-seeds from the row area and place the sunflower seeds into a relatively trash-free, moist seed bed. Weeds that subsequently appear in the row are smothered by soil that is pushed back into the row during cultivation.

The wide spacing of the sunflower rows eliminates the necessity for a row crop cultivator as almost any cultivator may be used for controlling weeds between the rows. Also, the problem of maintaining a trash cover on fallow land to control wind erosion is virtually eliminated under this system.

Chemicals have been used successfully to control wild oats in sunflowers. However, sunflowers are susceptible to 2,4-D and are often severely damaged by drift from sprayed fields. For this reason only low volatile formulations of 2,4-D should be used in areas where sunflowers are grown. Precautions should be taken to minimize the chances of drift to sunflower fields. Some sunflower varieties are more tolerant than others to 2,4-D, but all are easily killed when sprayed even with very low rates of 2,4-D. Breeding for greater tolerance to 2,4-D is progressing favourably at the Lethbridge Research Station.

Pollination is an important aspect of sunflower seed production. The capacity of sunflowers to set seed when selfed is quite low. In greenhouse tests approximately 85 per cent of the plants produced significantly more seed following cross-pollination than following self-pollination. Insects are required for cross-pollination because sunflower pollen is too heavy and sticky to be effectively transferred by wind. Since insect populations are quite low in most of the areas under consideration, the wide-row system with its low plant density per acre is less likely to have pollination problems than similar acreages seeded in the conventional manner.

In harvesting sunflowers attempt to harvest all the heads and leave as much standing stubble as possible. We have noticed that sunflower fields that were not harvested till spring held greater depths of snow than sunflower stubble. However, we generally do not recommend delaying harvesting till spring because seed losses due to wind and bird damage are likely to occur.

Sunflower stubble presents no problem during spring cultivation and seeding. The sunflower stubble still present on the soil surface after spring seeding is often a great aid in controlling wind erosion before the wheat emerges.

DISCUSSION

Jensen: In light of your comments regarding insect activity and pollination, would it be advisable to plant two maturity ranges and thereby have a relatively low population in bloom over a longer period than with one level of maturity?

Pawlowski: There is a possibility that this could be done in this wide-row system, alternating the two varieties.

Kinman: If you develop sunflowers resistant to 2,4-D how will you remove volunteers from the following grain crops.

Pawlowski: The idea is to select strains which are resistant to 2,4-D drift but still susceptible to a direct application of spray.

Kinman: What is the source of your resistance?

Pawlowski: It is available to a certain extent in the Russian material and to a more limited extent in Canadian material. You get certain plants that are more tolerant and you start selecting from these as a base.

Kinman: Any specific numbers of the older lines?

Pawlowski: No. Commander or Mennonite is the most tolerant type that exists at present.