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Sunflower production in Colorado

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Quick Facts

- There are two types of sunflowers grown—the oilseed type and the confectionery type.
- The oilseed sunflower appears to hold the most potential for production in Colorado.
- The potential for sunflower production on dryland is best in a three-year rotation of wheat-sunflowers-fallow.
- A market should be located before a grower plants sunflowers.

kernel. Confectionery type sunflowers are used mainly as human food. The bird seed trade is currently providing some market for the confectionery type, but its potential is limited. Confectionery sunflowers generally are larger than oil type sunflowers with a striped seed coat containing a thick, relatively unattached hull allowing easy hulling and exposure of the kernel. The oilseed type appears to hold the most potential for Colorado.

Adaptation

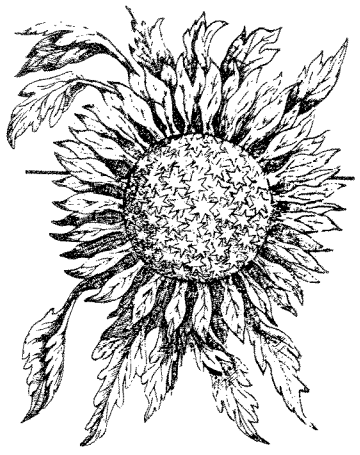
Sunflowers grow quite well on a variety of soils. Soils that are adapted to corn, sorghum or small grain production would be suited to sunflower production. Poorly drained soils along river bottoms should be avoided.

Sunflowers are a long-season crop requiring an adequate moisture supply during the growing season of July, August and September. The amount of water required to produce a pound of dry matter in sunflowers is about twice the amount required in grain sorghum. The young plants will withstand some frost and freezing until they reach the 4- to 6-leaf stage. The fully developed seeds generally are not damaged, but between these stages the plants are quite sensitive to frost.

Sunflowers in the Rotation

The potential for sunflowers on dryland is best in a three-year rotation of wheat-sunflowers-fallow. A suggested practice would be to plant sunflowers on land that would be summer fallowed the next year. This aids in the decomposition of the sunflower stalks and helps in destroying the volunteer plants.

As an irrigated crop, sunflowers have their best potential where the producer can store some of the moisture in the soil profile ahead of the growing season. Sunflowers are good rustlers for moisture and fertilizer and they will root deeper than millet, corn or spring grains. The critical



The sunflower is a native of America and was taken to Spain from Central America before the middle of the 16th Century. It was grown in America by Indians for food. The major sunflower producing countries of the world are the Soviet Union, Argentina, Bulgaria, Romania, Turkey and South Africa. Most sunflower acreage and markets in the United States are located in North and South Dakota, Minnesota, Texas and California.

Two types of sunflowers are grown worldwide—the oilseed and the non-oil varieties (confectionery type). The oilseed sunflower is used mainly for vegetable oil and vegetable oil meal. Oilseed varieties are dark grey to black in color with a thin hull tightly attached to the

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To simplify technical terminology, trade names of products and equipment occasionally will be used. No endorsement of products named is intended nor is criticism implied of products not mentioned.

irrigation period is during bud and bloom stage.

Sunflowers that are planted for a silage crop can be planted as late as July 15. For silage, they must be cut in the bud or first flower stage of growth.

Production Recommendations

Locate a market—Before planting, a producer should know where to market the seed produced. Production contracts are desirable, but any contract should be read and understood before being signed.

Fertilizer requirements—Sunflowers yield best on fertile soil. A soil test is the best guide to fertilizer rates. Research data from other areas suggest that fertilizer requirements for soils planted to sunflowers under dryland conditions are similar to the requirements of soils seeded to small grains.

If fertilizer is used at the time of planting, it should be banded near the rows but not with the seed.

Planting dates and planting depth—Sunflowers can be planted any time from April 15 to July 1. Experience in Colorado indicates that the second or third week in June may be the best time to plant.

Sunflowers require an adequate moisture supply for germination. Planting at a depth of from one to two inches (2.5-5 centimeters) is desired. Seeds will emerge from a greater depth but percentage of plants emerging decreases with deeper seed placement. Planting deeper than necessary slows germination and causes irregular emergence, which makes insect control more difficult.

Plant spacing and planting rate—Sunflowers are planted in rows with row-crop planting equipment. The row width should be the same as other row crops produced on the farm; thirty-inch (76-cm) width row is commonly used. This spacing allows for cultivation and ease of harvest.

Special plates are used in the plate-type planter. The type of plates usually is listed on the seed tag. Sunflower seeds are easily damaged, so planter plates should be correct for the type of seed used.

The plant population under irrigation should be between 20,000 to 24,000 plants per acre (PPA) and 8,000 to 12,000 PPA on dryland. Use a seed drop of 26,000 seeds per acre (SPA) for irrigated land and 13,000 SPA for dryland.

Weed and Pest Control

Weed control—Weed control is very important in sunflower production. Sunflowers do not shade the ground early in the season, therefore weeds start and grow along with the sunflower.

Sunflowers may be cultivated for weed control. The depth should be shallow so as not to prune the roots. Avoid cultivation closer to the

plants than the leaf spread of the plant. Planting with a lister and cultivator may give sufficient weed control on dryland. Chemical weed control should be considered as the major means of controlling weeds on irrigated land with cultivation as a secondary means.

Treflan (trifluralin) at 0.5 to 0.75 pound active ingredient (ai) per acre (.57-.85 kilograms/hectare) is applied before planting and incorporated 4 to 6 inches (10-15 cm) deep. In order to avoid bringing up untreated soil, proper chemical incorporation should be deeper than sunflower planting depth and should be in two directions. Treflan gives control of most annual broadleaf and grassy weeds. Follow label instructions.

Prowl (penoxalin) at 0.5 to 1.25 pounds ai per acre (.56-1.4 kg/ha). Apply Prowl in water or liquid fertilizer and incorporate into soil within seven days after application. Follow label directions.

Amiben (chloramben) at 2 to 3 pounds per acre (2.3-3.4 kg/ha) usually is applied in a band to control most annual grassy and broadleaf weeds including wild mustard. Amiben is a preemergence surface-applied herbicide that is well adapted to band application for in-the-row weed control with cultivation for between-the-row control. Follow label directions.

Volunteer control—Volunteer plants can be a problem in future crops. On irrigated land, follow sunflowers with corn using Atrazine as a weed control herbicide.

Dryland sunflowers should be fallowed for a year for weed control and moisture accumulation. An application of 2,4-D will control volunteer sunflowers in non-susceptible crops.

Insect control—There are at least 12 to 15 insect species that attack sunflowers. The head moth and stem weevil have been the most troublesome so far in Colorado. One should be particularly watchful for the head moth when the crop is in bloom. Two aerial sprayings often are required if the moth is present. Two insecticides commonly recommended are Thiodan and Supracide at one-half pound of actual insecticide per acre (.56 kg/ha) rate.

Disease control—There are more than 30 known diseases of sunflowers. Abundant stands of native sunflowers are reservoirs from which endemic diseases can spread into cultivated sunflower plantings, so Alternia leaf spot and other disease potential is present. Disease-resistant varieties and rotation are the best methods of control.

Bird control—Blackbirds and other birds eat a tremendous amount of seed on some maturing fields while other fields may not be bothered. The amount of bird damage often is related to the acreage of sunflowers in the area. Small, scattered fields receive greater damage than fields located near other fields. Feeding starts shortly after blooming and continues to maturity. Sunflowers should be harvested as soon as ripe and in a suitable stage for combining.

Harvesting, Storage and Drying

The crop usually is ready to harvest in about 120 days. Combine headers must be modified to salvage shattering seed and reduce the amount of stem cut. Reduce cylinder speed to 300 RPM and open concave so that the heads come through almost intact. Under ideal harvest conditions and proper machine adjustment, harvest losses can be reduced to less than 5 percent.

The moisture standard for sunflowers is 10 percent or less. Seed moisture must be reduced to at least 9 percent before sunflowers are safe to store.

The availability of owned or custom operated grain drying equipment is important to the sunflower grower. Harvesting at moisture content higher than the 9 percent moisture content required for storage normally results in higher yields. Less bird damage, head dropping and head shattering occur with high moisture harvesting.

Sunflower seeds dry easily. Bin batch and continuous flow dryers have been used successfully. The large kernels allow air to pass easily and because of its low bushel weight, relatively small quantities of moisture need to be removed per bushel.

Continuous-flow dryers and recirculating batch dryers should be operated at 160°F (71°C). Batch and bin dryers should be operated at 140°F (60°C) and 110°F (43°C), respectively.

A severe fire hazard exists in dryers being used on sunflowers. Very fine hairs and fibers from the seed coat are rubbed loose during handling and are found floating in the air around dryers. The hairs or fibers ignite when drawn through the dryer fan and open burner. Unless these small flaming particles or sparks burn themselves out before hitting the sunflower seed, fire may result. The fire hazard is *increased* by higher drying temperatures, which result in drier sunflowers against the inside plenum wall. For this reason, lower drying temperatures should be used.

The fire hazard is *decreased* when the fan can draw clean air not containing fine hair or fibers.

This may be accomplished with portable dryers by turning the fans toward the wind. On stationary dryers an intake duct may be built above the top of the dryer to cut down the amount of material drawn into the dryer.

Guidelines for drying sunflowers.

1. Keep good housekeeping practices. Clean around the dryer and in the plenum chamber.
2. Do not overdry.
3. Keep in mind that not only are hairs and fibers from the seed coat flammable, but once the crop is heated to the flash point the oil in the sunflowers provides a source of ready fuel for a hot fire.
4. Insure continuous flow for all sections of recirculating batch and continuous flow dryers.
5. *Do not* leave drying equipment unattended.

Recommended Varieties

Use a variety that is recommended by a seed dealer in your area. James W. Read, county extension director, Logan County, conducted both irrigated and dryland sunflower variety tests in 1981. The average yield and oil content for the 44 varieties in the irrigated sunflower test was 1,795 pounds/acre and 613 pounds/acre respectively. The average yield and oil content for the 38 varieties in the dryland sunflower test was 1,145 pounds/acre and 443 pounds/acre.

More Information

- Sunflower Production and Marketing.* 1978. Extension Bulletin 25, North Dakota State University, Fargo, ND 58102, 73 pp, Price \$3.00.
- Sunflower Production in Kansas.* 1978. Extension Bulletin No. L-509, Kansas State University, Manhattan, KS 66506, 6 pp.
- Sunflower Production in Wyoming.* 1979. Bulletin No. RJ-145, Agricultural Experiment Station, University of Wyoming, University Station, Laramie, WY 82071, 13 pp.