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Canola
A Promising Oilseed

J. Alan Weber, Robert L. Myers and Harry C. Minor*

Canola is a promising alternative crop for Missouri because it is relatively easy to produce, requires no new investment of equipment, and offers competitive profits. Canola offers farmers an opportunity to help control soil erosion, produce a high-quality winter oilseed crop, and diversify cropping operations. Missouri grain producers today rely upon a few traditional crops such as corn, grain sorghum, soybeans and wheat. Canola and other alternative crops can help reduce the income risk associated with market fluctuations or weather/pest production losses affecting these primary crops.

History

Canola is a specific type of rapeseed developed in the 1970s. Rapeseed crops have been grown for thousands of years: Sanskrit writings from 2,000 BC refer to their cultivation. Until the 1940s, rapeseed was grown for lamp fuel, cooking oil and as a forage. During World War II, acreage increased dramatically because rapeseed was used as a lubricant for steam ships, but use declined with the advent of the diesel engine.

Rapeseed grown in the past has had moderate levels of a compound called erucic acid. Research in the 1960s indicated the acid could be harmful. A breeding program initiated in Canada began producing rapeseed varieties with low erucic acid content. In 1978, varieties with less than 2 percent erucic acid were trademarked as "Canola."

In 1985, the USDA granted canola oil GRAS (Generally Recognized as Safe) status for use in foods. This led to sales of canola oil in the U.S., with only part of the demand met by U.S. producers. Canola oil has achieved worldwide commodity status, and is extensively used in Japan, Canada, and other countries.

Description

Canola *(Brassica napus L.)* varieties have been developed as both summer and winter annuals. The winter type is best adapted for Missouri conditions and is seeded early in the fall, with two leaf-like cotyledons emerging 5 to 10 days after seeding.

A field of canola in full bloom in early April.

Seedlings go dormant in winter, with loss of the above-ground material. The plant remains alive as long as the crown, a thickened storage structure below the soil line, does not die. New leaf tissue is generated in early spring. A single stalk forms that reaches 12 to 20 inches in height by the start of the flowering stage.

During the flowering stage, the main stem and branches reach 4 to 5 feet in height, with bright yellow flowers forming continuously near the tip of the growing stem and branches. Pods develop upward along the stem, starting about 18 inches above the soil. Pods are narrow and about 1 to 3 inches long, each containing 15 to 40 small round seeds.

Uses of canola

Food. Canola is one of the most efficient oil producing crops available. About 40 percent of the seed weight is oil. Canola produces a high quality edible oil which appears to have superior cooking characteristics compared to other vegetable oils. Canola oil has only 6 percent saturated fat, lower than any other vegetable oil. It is also composed of 58 percent monounsaturated fat, a desirable trait to certain consumers.

Livestock. Canola meal, the part of the seed left after the oil is extracted, is of value to the livestock industry. Unlike meal from high erucic acid rapeseed, canola meal is low in glucosinolates. Large amounts of glucosinolates affect growth rate, cause swelling of the thyroid gland, and make meal less palatable for livestock. Canola, by definition, has less than 30 micromoles of glucosinolates per gram of seed, so its meal is

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*R.L. Myers and H.C. Minor are faculty in The Agronomy Department at the University of Missouri-Columbia and are contacts for further information. J.A. Weber was a senior in Agricultural Economics at the time this guide was written.

How to Grow Canola

The most logical place for canola in a crop rotation is as a replacement for winter wheat. But since canola must be planted by early to mid-September in Missouri, producers may find it difficult to plant it following full season summer grain crops. Canola can follow winter wheat as part of a crop rotation, or it can be planted after corn, grain sorghum, or soybeans, if earlier maturing varieties of those crops are planted or if they are taken off as silage. Soybeans can be double-cropped after canola in a similar fashion to double-cropping after wheat.

Site selection

In general, the best soil for canola is soil that produces high wheat yields. Three main conditions can reduce plant stands and yield potential for canola: (1) lack of soil moisture in the planting zone, (2) soil crusting, (3) waterlogging.

Producers should pay close attention to their field selection and base their decisions on soil characteristics such as moisture content, texture, structure, etc. Canola prefers loam type soils that are well-drained, and will not tolerate waterlogged conditions. A poorly drained soil can result in root disease and increased winter kill. Canola will tolerate a wide range of pH conditions, but it does best with soil pH between 5.3 and 7.5. Finally, select fields that are free of wild garlic and mustard because these weeds will result in a lower quality product and possible dockage.

Choosing a variety

Growers should use only certified seed. Certified seed has tested germination and purity which will help ensure a proper stand. Proper populations of canola quickly cover the soil and will suppress weeds. Certified seed also will prevent problems caused by weed seeds, mustard seeds, and rapeseed with a high erucic acid content. New varieties are being released by private companies each year, with generally better adaptation to specific regions. Winter survival ability is probably the key factor to consider when selecting a variety for Missouri conditions. Check with seed companies that sell canola to obtain their recommendations for varieties suitable to your situation (see table on seed sources).

Field preparation

Canola requires special considerations for seedbed preparation. The seedbed should be essentially weed-free. Excessive trash on the field can cause poor stands and result in weed problems. No-tilling canola in corn or wheat stubble is not recommended. The final seedbed should be firm and well-packed. A coarse soil can cause poor seed placement, but a soil that is too fine can contribute to soil crusting. Canola is a small-seeded crop and has difficulty breaking through a crusted soil. In order to retain soil moisture, the soil should not be tilled excessively.

Fertilizer should be applied according to soil test results. Canola and winter wheat have comparable fertility needs, except that canola requires more nitrogen, roughly 90 to 150 lbs./acre. It is recommended to apply 30 poun preplant during the fall and topdressing the remair nitrogen (60-120 lbs./acre) in the spring. If too much ni gen is applied in the fall, canola can grow excessively ar be more susceptible to winter freezing.

Phosphorus and potassium should be applied in t fall. Rates usually range from 50 to 60 lbs./acre. Canc may be sensitive to sulfur deficiencies. Soils that are low organic matter may require up to 20 lbs./acre of sulfu These levels should be monitored because excessive sulf can increase the glucosinolate content of the meal, reduci marketing opportunities. Canola is also sensitive to t amount of boron in the soil. Soil tests indicating less thar ppm of boron should prompt a small application of borc It should be noted that most fields in Missouri are unlike to need sulfur or boron for canola production.

Planting

Canola is generally planted between late August ar mid-September in Missouri. Sept. 15 appears to be optimum planting date in central Missouri. Date of pla ing is critical for canola, because the plant must reach t 8 to 11 leaf stage before a killing frost to develop wint hardiness, yet it must not grow excessively. Seedb preparation and good seed-to-soil contact are also impc tant factors to a good establishment of canola.

Existing small grains equipment can be used to pla canola, but the seedbed must be more uniform and tr free than for wheat. Excessive trash can cause uneven g mination and weed problems. Canola is a small-seed crop and should be planted shallow. While it can emer from depths of 1-1/2 inches, MU research suggest planting depth of around 1/2 inch. A seeding rate of 6 t pounds per acre is recommended. Row spacing is usua 7 to 10 inches. The narrow rows and high seeding ra allow the plant canopy to cover the soil quickly and p vide better competition for weeds.

Weed control

When a good stand of canola is established, the der growth of leaves usually makes the crop a strong co petitor against weeds. A population of four to five pla per square foot provides a canopy that can suppress m broadleaf weeds, especially summer annual weeds.

There is only one herbicide currently registered for u with canola, trifluralin (Treflan), which controls comm

Companies that sell canola varieties

Pioneer Hybrid International, Inc.
(Allelix Crop Technologies)
Executive Plaza Suite 307, 1800 Business Park Drive
Clarksville, TN 37040. ph. 1-800-525-3319

Ameri-Can Pedigreed Seed Company
7664 Moore Road, Memphis, TN 38119. ph. 1 -800-322-6

Canola, Inc.
8910 Purdue Road, Suite 150, Indianapolis, IN 46268.
ph. 1-800-365-3461

broadleafs and grasses. Proper tillage and crop rotations, along with a preplant herbicide such as Treflan, help minimize the amount of damage caused by weeds. It is important to note that canola is sensitive to atrazine, and yield reductions can occur in fields with atrazine carryover.

Insects

Insects have not yet caused economic losses of canola in Missouri. This fact could change, however, as more acres of canola are planted. Insects can attack the plant both in the fall and spring. Common pests include flea beetles, cutworms, aphids, grasshoppers, lygus bugs and various caterpillars.

Diseases

Several diseases pose potential problems for canola in the future. Sclerotinia stem rot is identified by premature death of the plant. Avoiding excessive nitrogen applications and rotating with crops that are not hosts to sclerotinia help reduce this disease. Alternaria black spot, blackleg stem canker, the root rot complex and downy mildew may also prove to be problems. Control of these diseases can be enhanced by planting certified seed and establishing a crop rotation. Continuously planting canola on the same land is not recommended.

Harvesting

Winter canola generally matures at about the same time as winter wheat, typically in late June or early July. Canola matures from the bottom pods to the top of the plant. Although this process is not uniform, it occurs quickly. Therefore, timing is very important in order to prevent shattering and minimize the number of green seeds and dockage at the elevator.

The moisture content and the color of seeds and stems can be used to determine when the crop is ready. Most modern moisture testers can be used to determine the moisture content of canola. If the moisture is above 10 percent, harvest should be delayed. It is important to monitor fields closely because moisture content can drop by 1 percent per day during normal summer conditions. Ideally, canola should be harvested between 8 and 10 percent moisture.

Canola should be combined directly with a grain head. In some areas it is swathed and combined at a later date, but Missouri's weather conditions are not usually conducive for swathing.

Before harvest, the combine should be checked thoroughly for any small holes in the grain table, grain tank, and augers. Holes can be fixed with either duct tape or a caulking compound. Combine cylinder speed, grain table reel speed and ground speed should be reduced to minimize shattering losses and to handle the large volume of material. The concave should be set to allow the crop to be threshed without breaking up too much of the stem. Excessive threshing of the stems will cause the sieves to be overloaded and result in improperly cleaned grain.

Single stalk of canola showing flower and pod development.

Because of the small size of the canola seed, the cleaning operation depends more upon the shaking of the pans, rather than the amount of air. Therefore, screen settings should be set narrow and the fan speed should be reduced. The lower sieves should be closed down to 1/8 to 1/4 of an inch.

Handling and storage

Regular grain handling equipment can be used with canola, but truck beds need to be checked for cracks or any holes which would allow the small seeds to escape. The canola seed is only 3/64 to 3/32-inch in diameter and is very light in weight. Holes should be taped or caulked and tarps are essential during transport.

If canola is stored for more than a few days, the moisture must be below 9 percent. Producers may also need to cover the bin floors with a screen mesh to prevent canola seeds from falling through the floor. Proper aeration is essential since canola will typically heat up after harvest. Bins should only be filled 2/3 full.

Canola should be stored at 8 to 9 percent moisture for a long storage life. The storage life of canola will double for every 10-degree temperature drop below 77 degrees F or 1 percent moisture reduction below 9 percent moisture. Drying is possible, but high temperature during drying can change the seed composition and reduce its quality. Seeds also will become brittle and can be damaged during handling if the moisture content is below 6 percent. Storage problems such as mites and mold can be prevented by close inspection and proper bin treatment prior to harvest.

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a safe protein source in animal feeds. Canola meal contains from 32 to 38 percent protein. Feeding trials suggest that canola meal can be substituted into animal feeds with comparable feed value to soybean meal.

Industrial Uses. Canola is not used for specific industrial purposes at present. Advancements in technology, however, could develop new uses for canola oil, as has happened for soybeans and other oilseed crops (see Special Note).

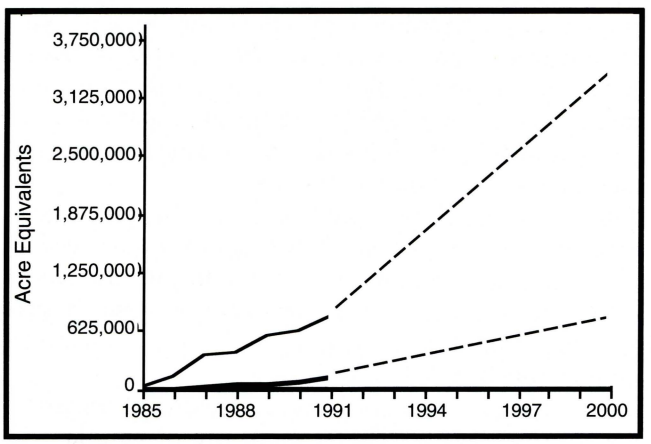
Marketing canola

For a new crop to be successful, markets must be established. The marketing system for canola is still relatively young, but many steps have been taken to put the necessary infrastructure into place. Several elevators in Missouri have agreed to take canola seed from farmers. Approximately 2,000 acres of canola were planted in the state in the fall of 1990.

Missouri's agroclimatic conditions are considered to have excellent potential for canola. The state also has a ready market for meal as a livestock feed. Producers should consider forward contracting as a marketing alternative until more local markets are developed.

Canola offers producers several benefits. It is excellent for double-cropping and is potentially more profitable than wheat, although more risk is associated with growing canola at this stage of development. Canola also spreads labor needs, provides a cash flow in June or July and requires no extra production equipment.

Canola offers Missouri farmers the opportunity to grow a superior-quality oilseed with a high market value. Input costs are slightly higher compared with winter wheat, in part because nitrogen and seed costs can be greater. Research indicates that yields with current varieties would probably average 30 to 40 bu/acre in actual farm production. Gross revenues will usually be $200 or less per acre ($5/bushel x 40 bu/acre yield).



The lower line represents current and projected acreage of canola in the U.S. The upper line represents the number of acres required to equal current and projected domestic consumption.

Special Note on Industrial Rapeseed

Industrial rapeseed and canola have very similar growth characteristics, but industrial rapeseed has large amounts of erucic acid. Erucic acid is an inedible seed oil component of value in industry. Many uses of industrial rapeseed have been developed for the marketplace. Erucamide, a derivative of erucic acid, has a unique lubricating property which allows its use as an "anti-block" agent and also a "slip agent". Paints and coatings sometimes include brassylic acid, which can be produced as another derivative of industrial rapeseed oil. Rapeseed oil also can be manufactured into lightweight durable plastics such as Nylon 1313 for use in industry.

Industrial rapeseed and canola have specific uses based on their erucic acid content. Growing canola near industrial rapeseed can alter both crops' erucic acid content. Insects can cross-pollinate them and produce a seed that is too high in erucic acid to be marketed as canola and too low to be used in industry. Expanded acreage in Missouri may require creating production zones for the two types of rapeseed to prevent cross-pollination problems.

Future outlook

Prospects for canola appear to be very good. Market analysts predict up to a tenfold expansion in U.S. consumption. The 1990 Farm Bill also enhances opportunities for growing canola. Under the new Farm Bill provisions, canola can be planted on triple base or nonpayment acres. It also allows canola to be grown on 0/92 acres. Under the 0/92 option, canola or any other minor oilseed can be planted on base payment acres and the producer will still be eligible for deficiency payments on the enrolled acreage.

At current rates, 500,000 acres of canola would have to be planted in the U.S. merely to replace the nation's annual imports. An adequate number of U.S. processing plants does not yet exist to crush this amount of canola seed (less than 100,000 acres were grown in the U.S. in 1990-91).

As with most new crops, problems do exist. At present there is no established grower base for canola. Only a limited number of varieties are available, and most are not perfectly adapted to the regions where they are being grown. Problems also exist with storage and handling. Most storage problems are related to air-flow problems and lack of experience. Handling problems are due to the lack of an established system for delivery to processing facilities.

If these problems are overcome and consumer and industry interest increases, some optimistic projections predict up to 5 million acres of canola could be grown annually in the U.S. by the end of this decade.

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