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Herbek, James H.; Murdock, Lloyd W.; Kirkland, Dan; and Gray, T., "Canola: A New Cash Crop for Kentucky" (1988). *Soil Science News and Views*. 59.

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Department of Agronomy

# Soil Science News & Views



Vol. 9, No. 7, August 1988

## CANOLA: A NEW CASH CROP FOR KENTUCKY

J. H. Herbek, L. W. Murdock, Dan Kirkland, and T. Gray

### BACKGROUND

For the past few years, Kentucky farmers have become more interested in "alternative" cash crops for their farming operations. One such crop that is starting to receive attention is Canola. Classified as an oil crop, Canola is a type of oilseed rape. Rape is a member of the mustard family and is closely related to turnip, cabbage, cauliflower, broccoli and mustards. It is a cool-season annual and an important oilseed crop in many parts of the world that is used for both human consumption and industrial purposes. Major rapeseed production areas are in Europe and Canada. The seed contains approximately 40-45% oil content (dry basis) and 35% protein (oil-free dry basis). Two products are made from processed rapeseed; an oil that has industrial or edible uses and a high protein meal which can be used in animal feed. There are two types of rape. One type is used for industrial purposes and sometimes called industrial rape. The other is Canola which is used for human and animal consumption. The oil from the varieties of industrial rape contains a high amount of erucic acid (50% or more) and is not suitable for human or animal consumption. It is used in the rubber industry, textiles, detergents, leather, plastics and special lubricants. The meal from these varieties contains high levels of glucosinolates which make it unsuitable for livestock consumption.

The current Canola varieties were made possible by breeding improvements which greatly reduced the undesirable components in rapeseed (erucic acid and glucosinolates) and made it suitable for human and animal consumption. The name given to this type of rapeseed is "Canola", which is an international registered trademark of the Canola Council of Canada and the name used to identify the modern rapeseed varieties known as "double low" with 2% or less erucic acid content and less than 30 micromoles of glucosinolates per gram of oil-free meal. One of the strong selling points for Canola oil is its very low saturated fat level and favorable mixture of mono- and polyunsaturated fats. Like other vegetable oils, it contains no cholesterol. Many feel the edible rapeseed oil market will improve as new vegetable oil products made from rapeseed continue to be developed. In addition, there are strong foreign markets, particularly in

Europe and Japan, with demand on the increase. The Canola meal is 35% protein and has an economic worth of about 70% the value of soybean meal (44% protein). The value of the meal is also limited by its high fiber and low lysine content.

#### CROP CHARACTERISTICS

There are two growth habit types of Canola; spring (spring-seeded) and winter (fall-seeded) types. Canola is grown as a spring crop in Canada where winters are cold. In more southernly latitudes, such as in Kentucky, Canola can be fall-seeded (winter crop), similar to soft red winter wheat. Fall planted Canola fits better into Kentucky's cropping sequences. This gives Kentucky farmers an alternative to small grains and offers the same double-cropping potential with soybeans resulting in two vegetable oil crops each year. Canola is supposed to mature earlier than wheat, but this has not been verified in Kentucky. If verified, the earlier harvest would result in a yield advantage for double-cropped soybeans following Canola.

Rape resembles turnip or cabbage when young. Following winter dormancy, new leaves emerge and the rapeseed plant develops a single stalk from the crown. From this central stalk, flowering branches originate exhibiting an indeterminate growth habit. The plants begin to develop bright, yellow flowers in the spring (early April) and continue to grow, bloom and set seed for 5-6 weeks. The pods which are produced from the flowers are 1 1/2 - 3 inches long, 1/8 inch wide and contain 15 to 40 small, round, black seeds each. Pod set occurs from approximately 18 inches above the crown to the top of the plant which is generally 4 to 5 feet tall. Maturity and harvest will occur in June, similar to that of winter wheat. The standards for Canola are a test weight of 50 lbs. per bushel and a moisture content of 10%.

The production practices, requirements, and equipment needs for Canola are similar to those used with small grains. Thus, producers may view Canola as a potential replacement for wheat in their cropping program. Costs of production for Canola are comparable to costs for wheat production. Limited information indicates that average yields of 35-40 bu/acre obtained with Canola would be economically competitive with a wheat yield of 40-45 bu/acre.

#### CANOLA MANAGEMENT PRACTICES FOR KENTUCKY

Although we have had limited experience with the production of Canola, there are certain basic aspects of the crop that need to be recognized:

- 1) Fall plantings of Canola should be made approximately 4-6 weeks before winter wheat (about mid-September). This assures the development of a well established root system and that seedlings emerge and establish adequate crowns in the fall to reduce the risk of winter kill.

- 2) With the seed being very small, seeding rates are relatively low compared to wheat. Current recommendations range from 4-7 lbs/acre depending on the method of planting.

- 3) Seedings can be made with a drill or broadcast seeded followed by a cultipacker.

- 4) Seed should be planted shallow (one inch or less). This can cause problems if depth control is not monitored on drills or if there is little moisture in the soil surface.

5) Fertilizer requirements are similar to winter wheat except for the possible need for an additional 20 to 40 lbs/A more nitrogen and potassium.

6) Harvesting time is critical. Rapeseed must be harvested when the seeds are ripe or the pods will shatter. A harvest moisture content of 10% or less is suggested.

7) The potential for disease and insect problems exist, particularly as acreages increase. Presently, however, no pesticides are labeled for use on Canola in the U.S.

8) Crop rotations of 3-4 years are suggested to avoid pest problems.

#### CURRENT STATUS OF CANOLA IN KENTUCKY

Sufficient Canola acreage will be needed to justify well-established markets and a local processing plant. Relatively few industries are equipped to handle rapeseed processing although oil processing mills could be readily adapted. Because there are no processing facilities located in the central U.S., Canola is currently being sent to Canada to be processed. This results in considerably higher costs for handling and transportation, lowering prices received by about \$0.50 - \$1.00/bu. Canola prices received in Kentucky were in the range of \$3.70 - \$3.90 and \$6.50 - \$7.50/bu in 1987 and 1988, respectively.

Canola has been grown on a very limited acreage in West Kentucky during the last three years. It is estimated that there were approximately 2000 acres harvested in the state in 1987 with about 8000 acres planted for 1988. Reported yields ranged from 25 to 50 bu/acre in 1987 and from 30-60+ bu/acre in 1988. In Canola studies conducted at the West Kentucky Research and Education Center, yields ranged from 38 to 57 bu/acre and from 55-95 bu/acre in 1987 and 1988, respectively.

Although existing agronomic and economic information suggest that Canola offers potential as a crop in Kentucky, there are a number of questions that need to be answered and limitations to overcome before it is fully adopted in Kentucky. Some of these are:

- 1) Yield potential and winter adaptability.
- 2) More precise management and agronomic cultural practices needed in Kentucky.
- 3) Can we get pesticides labeled for emerging and future insect, disease, and weed problems for the crop?
- 4) Can we reduce the shattering loss at harvesting?
- 5) Can the market and price situation be improved in Kentucky?

Canola studies will be continued to further define the potential of this crop in Kentucky. The University of Kentucky is currently conducting research to obtain information on varieties, nitrogen rates, planting date, seeding rate, planting methods, double-cropping, insect, and disease problems.

RAPSEED/CANOLA FERTILIZER AND LIME RECOMMENDATIONS

- I. LIME - If a buffer pH test has been made, recommend the amount of lime indicated to raise soil pH to 6.4 (see AGR-1, page 4). If a buffer pH is unavailable, follow the rates shown below:

Soil-Water pH	Tons Limestone/A
Above 6.4	0
6.4 - 5.8	0-2
5.8 - 5.2	2-4
Below 5.2	4

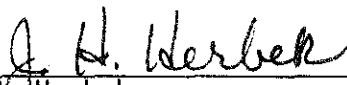
- II. NITROGEN - Fall Application: Only enough N to provide for good ground cover and good root growth is necessary to aid in winter survival. Seedlings following tobacco, soybeans, or well-fertilized corn, will likely have enough carry-over N for fall growth. For optimum fertilizer N efficiency, the total fall application should not exceed 40 lb N/A for seedlings in fields with insufficient N carry-over.
- Spring Application: Application from late February to late March is the most effective time. This coincides with spring "green up". All N should be applied prior to stem elongation.

<u>Spring Rates</u>	
Previous Crop:	Lb N/A
Corn, small grain, soybeans fallow, set-aside	120
Grass-legume or legume sod	90

III. PHOSPHATE AND POTASH

Soil Test Level	Lb/A to P <sub>2</sub> O <sub>5</sub>	Apply K <sub>2</sub> O
High (above 60P, 300K)	0	0
Med. (60-30P, 300-200K)	0-85	0-60
Low (below 30P, 300K)	85-120	60-120

Double Cropping of Canola and Soybeans - In the absence of research, the small grain recommendation philosophy is adopted. The phosphate recommendation should be taken from Canola and the potash recommendation should be taken from Soybeans. This recommendation can be applied in the fall prior to seeding the Canola.

  
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