# Canola Production for Southeast Agriculture

By N.R. Usherwood

*Canola presents some interesting opportunities as a new crop for the southeastern U.S. Reasons for interest in the crop and some critical aspects of canola management are presented.*

**FARMERS** in North America produce food for themselves and more than 100 others. Such productivity provides a major dividend to every consumer. It allows U.S. and Canadian families to spend less than 12 percent of their take-home pay for food. It provides a dependable and abundant variety of safe and high quality food.

Yet, even with such productivity, many farmers are in a struggle for economic survival. There are several reasons. Crop yields rise or fall due to external influences such as climate. Farmers have limited control over the number of acres that can be planted to major crops and even less over the market value of their products. To cope with these challenges, farmers are searching for innovative and creative ways to: 1) improve productivity, 2) lower the unit cost of production, 3) become more skilled at marketing, and 4) evaluate and develop the potential of crops such as canola.

## Canola Background

Canola is an internationally registered trademark of the Canola Council of Canada. Canola is a type of rapeseed which has been modified by plant breeders to lower the content of erucic acid in the oil and of glucosinolates in the meal. These modifications have resulted in a type of rapeseed having oil satisfactory for consumption by humans and meal acceptable for use as a feed protein source for poultry and livestock.

Canola is a member of the mustard family of plants which includes turnips, radishes and cabbage. All of these crops contain high concentrations of the amino acids which contain sulfur (S), creating a high crop demand for S, nitrogen (N) and potassium (K). Each of these nutrients is essential for plant protein synthesis.

The seed contains 40 to 45 percent oil on a dry weight basis. This cholesterol-free vegetable oil contains only 6 percent saturated fat and is in growing demand for human consumption. Other high quality cholesterol-free vegetable oils such as soybean, peanut, cottonseed, corn and olive contain from 11 to 27 percent saturated fat. Canola meal contains about 35 percent crude protein and is well-suited for use in livestock and poultry feed.

Canola, a cool season annual, fits well as a winter crop in the southeastern U.S. and other areas where doublecropping can be practiced. It serves as a companion crop with wheat, triticale and other small grains and fits well with soybeans, grain, millet, tropical corn or other summer crops in doublecrop systems.

Rapeseed is an established major crop in Asia and Europe. In North America, Canadian farmers are the major producers of canola with about 10 million acres grown each year. Less than 200,000 acres are harvested in the U.S. However, some anticipate rapid adoption of the crop. Predictions are that canola could develop into a multi-million acre crop within the next 10 years.

Interest in canola production in the U.S. began in earnest when low glucosinolate varieties containing less than 2 percent erucic acid were developed. Then, in 1985, the U.S. Food and Drug Administration (FDA) approved canola as a source of

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**CANOLA plants are shown at bolting stage.**

**CANOLA varieties at flowering.**

**MATURING canola seed pods.**

vegetable oil for human consumption. Scientists in industry, university and government have recently devoted more attention to establishing science-based best management practices (BMPs) for improving crop yield, quality and profitability.

## Canola Responds to Good Management

Canola is a first class crop deserving first class production management. It is "equipment friendly" . . . requiring the same planting and harvesting equipment as wheat, but with some adjustments. It responds well to production inputs such as N, phosphorus (P), K, S and boron (B).

Expectations from canola during the first few years of production should be realistic. Yields will improve and production problems will decline as experience is gained with growing, harvesting, storing and marketing this new crop. With most alternative crops, a grower will initially know little about its production and marketing and can become discouraged if the crop is not highly profitable. This problem can be overcome, however, if the producer recognizes the critical nature of timeliness in certain BMPs.

## BMPs for Canola

**Variety Selection**. Review canola variety performance results from regional field trials. Select and plant two or more of the best varieties based upon disease resistance, cold temperature requirement for flowering, seedling vigor, grain yield potential, seed oil percentage, seed shatter at harvest, and winter hardiness.

**Field Selection**. Select a well-drained, fertile soil which has not been planted to canola for the past three years. Avoid fields heavily infested with weeds such as wild mustard, garlic or radish. Make a major effort to control these weeds in the crop grown just prior to canola.

**Soil and Seedbed Preparation**. Soil test and then incorporate lime and build-up P and K into the root zone for optimum soil water and nutrient use efficiency. A firm, well-prepared seedbed is needed for canola. Remember, the seed is small . . . about the size of alfalfa. Avoid tillage that causes soil compaction which restricts seedling root growth.

**Crop Establishment**. Getting a good stand of canola is a top priority. It depends on several practices. Seed treatment with a fungicide is essential. The planting window is narrow and critical for success, so check with your local Extension agent. Recent research suggests these guidelines:

- Be prepared to plant on time . . . Seed at a rate of about 5 to 7 lb/A.
- Drill seed one-half inch deep and in 7 to 8-inch rows.
- Use starter fertilizer to stimulate seedling growth.
- Prevent aphid damage to seedlings.
- Use packer wheels to firm the seedbed for soils without crusting problems.

Preliminary results look promising where seed is broadcast and lightly incorporated into soil with good moisture and fertility levels.

**Fertilization and Liming**. Soil testing continues to be the best tool for determining lime requirements and the availability of nutrients in the soil reservoir. Build and maintain soil fertility levels for P and K in the medium to high range. Georgia research indicates canola soils should be limed to pH of about 6.2 for optimum production.

Fertilizer needs for high-yielding canola can vary considerably from one field to another. The reasons vary, but soil fertility levels, total crop requirements, timeliness of application, nutrient interactions with other production practices, and response to climatic influences are all involved.

Total nutrient uptake data for canola are presented in **Table 1**. These quantities must be absorbed by the crop from soil reserves and fertilizer.

**Table 1. Total nutrient uptake for canola and for wheat.**

| Yield level, bu/A | N | $P_2O_5$ | $K_2O$ | S |
|---|---|---|---|---|
| | ---------- lb/A ---------- | | | |
| **Canola** | | | | |
| 40 | 260 | 80 | 240 | 60 |
| **Wheat** | | | | |
| 80 | 135 | 55 | 160 | 20 |

Timing fertilizer applications with specific nutrient requirements by growth stage is difficult. Another challenge is to make in-season adjustments to the fertilization program due to unpredictable climatic conditions. For canola growing on sandy soils subject to intense rainfall, special attention is needed for N, K, S and B . . . each is subject to partial loss from the root zone by leaching.

University field study results provide guidelines for optimum yield and nutrient use efficiency. For example, the guidelines might suggest a preplant application of about 40 lb N/A and all the P, K, S and B (except for sandy soils subject to leaching). Then, the remaining 120 to 140 lb N would be split, with half applied as plant growth begins in the spring and the remainder as plants begin to bolt. For the very sandy soils, K and B might be applied half preplant and the remainder with first growth in early spring. Canola is highly responsive to both S and B. About 30 lb S/A and 1 to 2 lb B/A should be adequate in most years.

Starter fertilizer is often recommended to get the crop off to a fast start and ahead of the weed competition. It stimulates early row closing which gives soil protection against loss by erosion. Another benefit is that P also improves plant winter hardiness and stand survival.

## Economics

The economic outlook for canola is promising for growers who are willing to carefully study the market, adjust production practices, plant the crop on highly productive soils, and recognize the importance of timely operations.

Georgia scientists compared canola with wheat at two of the three canola production centers. Top canola varieties and good management practices resulted in profitable canola at all locations. As shown in **Table 2**, top varieties of canola yielded 47 bu/A and wheat 44.6 bu/A under comparable levels of production management. The total cost of production was $159 (canola) and $154 (wheat) per acre. Due to a higher market price, canola profitability was superior, with $64 per acre profit for canola and a loss of $20 for wheat.

## Pest Control

Few chemicals have been cleared for weed control in canola. Trifluralin can be applied preplant and incorporated to control most winter annual grasses as well as chickweed and henbit.

Table 2. Production economics of canola and wheat.

| | Canola[1] | Wheat[1] |
|---|---|---|
| Grain yield, bu/A | 47.0 | 44.6 |
| Market price, $/bu | 4.75 | 3.00 |
| Total prod. cost $/A | 159 | 154 |
| Gross income, $/A | 223 | 134 |
| Unit prod. cost, $/bu | 3.38 | 3.46 |
| Net profit, $/A | 64 | (-20) |

[1]Canola average from three production centers, wheat average from two production centers in Georgia, 1992/93 growing season.

The major insect pests are aphids and cabbage seedpod weevil. Nematodes such as root knot can sometimes contribute to early stand loss. Healthy, well-nourished plants have the highest tolerance to such stress and can recover more quickly from injury by insects.

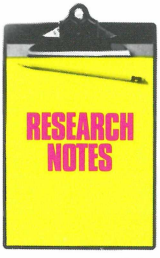
The soilborne diseases such as *Rhizoctonia solani* can sometimes cause damping-off problems when canola is planted after peanuts. Powdery mildew, *Sclerotinia* and *Alternaria* can also be a problem. Use only certified seed which is treated for seedborne diseases.

### Summary

Canola production is expected to increase dramatically in the Southeast. There are several reasons for this view. Profitability of canola continues to be favorable and can improve with marketing and production experience. Equipment needs for canola and wheat are similar. Both crops have good fit into existing cropping systems. Consumer demand for canola oil continues to increase and now represents oil production from about 1.5 million acres. U.S. farmers produce less than one out of each five acres of canola needed in this country. New food labeling laws favor canola as a low saturated fat vegetable cooking oil. These reasons illustrate that increased strength exists not only in production but also in marketing and utilization of canola to supply consumer needs.

As farmers search for alternative crops with realistic profit potential, canola deserves an evaluation for best fit into the crop production system. Persons interested in furthering their knowledge of canola production should contact their local Extension specialist. A copy of the Proceedings of the First International Canola Conference (1990) may be obtained by contacting PPI Circulation Department, 655 Engineering Drive, Suite 110, Norcross, GA 30092-2821. Cost is $15.00. ■

## Alabama




# Cotton Root Growth as Affected by Phosphorus Fertilizer Placement

**GROWTH** chamber studies were conducted to determine how cotton root growth is affected by the proportion of soil volume treated by fertilizer phosphorus (P). Cotton was grown in pots, using two soils: Dewey silty clay loam (low P) and Marvyn loamy sand (high P). Phosphorus was added at a constant base rate, but mixed with decreasing proportions of soil volume: 1.0, 0.5, 0.25 and 0.125.

Results showed that P uptake and root growth of cotton seedlings are affected by P placement. When a constant rate of P was applied per pot, P uptake by cotton shoots reached a maximum when 0.25 and 0.50 of the soil volume was treated with P on the Marvyn and Dewey soils, respectively. Root growth was also stimulated by fertilizer P, the degree of stimulation being similar for both soils. ■

Source: Mullins, G.L. 1993. *Fertilizer Research* 34: 23-26