SS AGR 296

UF UNIVERSITY of FLORIDA
IFAS Extension

Production of Biofuel Crops in Florida: Canola[1]

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Introduction

The rapeseed industry in Canada adopted the name canola in 1978 to identify and separate the cultivars of *Brassica napus* and *Brassica campestris* which are genetically low in erucic acid (<2%) and gluscosinolates. Canola is closely related to turnip, collards, mustard, cabbage, cauliflower and broccoli, all members of the crucifereae family. Canola *(Brassica napus)*, also known as rape, is an annual crop that can be grown throughout north Florida and was grown for several years under many soil conditions when there were markets in the 1990s and early 2000s. Canola needs similar management practices to small grain, yet requires no additional equipment for planting or harvest. Canola is grown in the southeastern U.S. at around the same time as small grains, and canola fits the same cropping system sequences that wheat or other small grains do for Florida. Data from trials in Florida indicate that canola should be planted from late October to early November. However, December plantings have also done well. Harvest for small grain generally starts around mid-May while canola harvest usually starts in late May or early June. This 2-3 week delay in harvest shortens the time interval for double cropping soybeans, peanuts, and/or cotton.

Figure 1. Canola Plant at Flowering Credits: http://www.oznet.ksu.edu

Current Potential for Use as Biofuel

Canola has a wide range of adaptation for the southeastern United States, has high oil content (35-40%) compared to soybean (18-20%) and could produce biofuels in a double-crop system of canola followed by soybean. Little research has focused on canola for the biofuels market but it has potential for that market in the southeast. Canola needs to be rotated with other crops and not be planted in the same fields for at least 2 years to avoid or minimize

1. This document is SS AGR 296, one of a series of the Agronomy Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date January 2008. Revised November 2010. Visit the EDIS website at http://edis.ifas.ufl.edu.
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diseases and nematodes. Even though Florida has not yet contained large acreages of canola, enough has been grown to confirm it as a viable crop compared to other winter crops if demand and prices are high enough.

Biology of Canola

Canola seeds are small and must be planted more shallowly than small grains. Plants resemble turnip or cabbage and grow slowly in the seedling stage. The young plant is very sensitive to freezes but becomes more cold tolerant as it grows through the vegetative stage. Winter types of canola require 2 to 6 weeks of vernalization or cool temperatures, whereas spring types do not have vernalization requirements but flower after the buildup of a certain number of heat units. In variety trials conducted in south Georgia and north Florida, spring types have been more dependable and higher yielding. Therefore, only spring types of canola are recommended in Florida at this time. As canola enters the reproductive stage of growth, a single stalk emerges from the crown. Flowering branches develop around the central stalk exhibiting an indeterminate growth habit. The plant begins to develop bright yellow flowers between mid-February to mid-March, depending on the time of planting and winter temperatures. The plant will continue to grow, bloom, and set seed for a 5-6 week period. The pods are 1 1/2-3 inches long, 1/8 inch wide and contain 15 to 40 small, round, black seeds each. Pod set starts at the bottom of the plant approximately 18 inches above the ground and continues to the top of the plant which is generally 4 to 5 feet tall. Canola varieties used in Florida have generally matured two to three weeks after wheat. However, early planted canola has been harvested in May, allowing time for various summer crops.

Production

Canola has a taproot much like wild radish and has responded to deep tillage much like small grains in Coastal Plain soils. Seeding rates range from 4-8 lbs/A drilled in rows that are 7-10 inches apart. Established plant populations should be from 6-19 plants per square foot. Planting depth should be no deeper than 1/2 inch due to the small size of the seed. Plantings deeper than 1 inch often result in poor stands. Stands can be successfully established with a cultipacker seeder.

Florida trials had a target planting date of late October to early November but often were planted in December. If canola is planted too early, it may flower and set seed early and late freezes may kill developing seed pods. If it is planted too late, the cold sensitive seedlings may be frozen out. While most of the spring types of canola were developed in Canada, several do well in the southeastern United States. There has been breeding research and release of canola varieties in Georgia, although this has recently been discontinued.

Soil tests are the best way to determine the fertility status and pH of the fields where canola is to be grown. Canola may be grown on soils limed to a pH of 5.8-6.2. Fertility trials on canola in north Florida have shown nitrogen responses up to 140 lbs/A. Best yields were obtained when 30-40 lbs N were applied at planting followed by a single top dress application of 80-100 lbs/A in mid-January. Canola has also shown good response to P and K applications when soil test levels were low. Fertility rates for yield goals of 40 bu/A is a good target. It is suggested that 1 lb/A of boron also be applied with nitrogen applications to eliminate possible deficiencies.

Harvest efficiency for canola is a big challenge compared to small grains. A harvest moisture of 10% is desired and it is prone to shattering. However, if seeds are still green, the crop should be allowed to dry for a few more days. This may only be a problem for edible oil since the green color is passed on to the oil when crushed and results in dockage when sold.

Canola can be cut fairly high since seeds do not usually set on the bottom 18 inches of the stem. Even if many seeds are lost when harvested, canola will not become a weed because it does not produce hard seeds as do plants like wild radish.

Potential Yields

Florida and the southeast generally have higher yields of canola than the main canola producing regions in Canada and the northern U.S. Canola yields in Florida will generally average from

2200-3500 lbs/A. Canola yields may also be quoted as bu/A with a bushel of canola weighing 50 lbs/bu. Therefore, yields of 50-70 bu/A can be attained in the southeast. If canola crops are used for biofuels at about 40% oil on 3000 lb yields of seed, as much as 160 gallons of biofuels could be produced. Soybean could then be planted after canola to produce more biofuel from the same acreage.

Production Challenges

There is potential for insect and disease problems for canola grown in Florida. There are few labeled materials for control of these problems at present. As with other cole crops, it is suggested that canola not be planted back on the same land more than once every 3-4 years because of the possibility of black rot, Sclerotina stem rot and various leaf spots. Wild radish can be one of the worst weed problems in canola and should not be planted where fields are known to have severe infestations.

Timely harvests may be more important for canola than for small grains since canola can shatter out of the seed pods very readily if rain causes delays in harvest of more than a week or so after the crop has dried down.

Estimated Production Costs

Production costs for canola are very similar to those for small grain. Fertilizer prices have spiked over the last few years and would be a major expense with canola needing about 120-140 lbs/A of nitrogen. Production costs for canola in the southeast can be found at
(
http://www.ces.uga.edu/agriculture/agecon/budgetsexcel.htm). Harvest, drying, and other costs associated with production are similar to those for small grain.

Environmental Concerns

Canola would make a good winter crop to double-crop with cotton, soybean, and peanut, as well as late-planted corn. Canola needs fertilization according to soil tests, and cotton, peanut, and soybean could benefit from the residual effects of its application. Cotton would still require nitrogen fertilizer but may not need other nutrients. There are no environmental concerns with canola in rotation with other crops, and it can help prevent erosion from heavy winter rains after establishment.

Summary

Canola could contribute significantly to the renewable energy supply in the U.S. It has fairly high oil content and does not compete with land of the traditional southern row crops during the summer. It has a high potential to be grown on significant amount of acreage in the southeast if sufficient facilities and prices are in place to encourage producers to grow it.

Sources of Additional Information

• USDA PLANTS Profile for Brassica napus (rape)
http://plants.usda.gov/java/profile?symbol=BRNA