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# Growing Winter Canola for Biodiesel Production

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Canola was bred from the rapeseed plant by Canadian scientists to provide erucic acid and glucosinolate levels that were low enough to be palatable for animals and humans. Hence, the name canola is derived from CANadian Oil of Low Acid. The oil from canola is used as a healthier cooking oil due to its low saturated fat content and high omega-3 fatty acid content (Marianchuk et al., 1995). The oil can also be used by farmers to produce biodiesel for their own use.

## Current production

According to the USDA National Agricultural Statistics Service, there were 1.7 million acres (2.9 billion pounds) of canola harvested in the U.S. in 2015. U.S. canola production is dominated by North Dakota which currently produces 87% of U.S. canola (Table 1). In 2015, Tennessee planted over 5,600 acres of winter canola (USDA-FSA, 2016).

**Table 1. Harvested acres of canola in 2015 (USDA-NASS, 2016).**

| State | Canola (harvested acres) |
|---|---|
| Idaho | 27,000 |
| Minnesota | 21,500 |
| Montana | 78,000 |
| North Dakota | 1,400,000 |
| Oklahoma | 115,000 |
| Oregon | 1,800 |
| Washington | 34,000 |

## Types of canola

There are two main types of canola; winter and spring canola. The majority of canola grown in the U.S. is the spring type, however, winter canola is best suited to states in the southern U.S. like Tennessee. Spring canola is planted in spring and harvested in fall while winter canola is planted in late summer/early fall (September/October in Tennessee) and harvested in late spring (around June in Tennessee). Winter canola can produce 20-30% greater yields than spring canola (Boyles et al., 2007).

## Production recommendations

It is important to take soil tests prior to planting. There are currently no recommended fertilizer rates for growing winter canola in Tennessee. In Georgia, recommended nitrogen (N) rates are 135 - 180 lbs N/acre. In Virginia, is is 100 lbs N/acre. The recommended N rate in Missouri is 90 - 150 lbs N/acre. Nitrogen should be split applied (50:50) before planting in fall and before bolting in spring. Recommended phosphorus and potassium applications range from 50 to 100 lbs/acre. Sulfur is required at 20-30 lbs/acre and boron may also be necessary (~1 lb/acre). Soil pH should be maintained around 5.8 - 6.5 (Weber et al., 1993; Bhardwaj, 2007; Buntin et al., 2010). A pre-plant herbicide, like trifluralin, can be incorporated in the soil prior to planting. In cases where the planted seedbed needs further cleanup, paraquat or glyphosate, can be used prior to germination.

It is recommended to plant canola about six weeks before the first killing frost. This will allow the plant to produce enough biomass to overwinter successfully but not too much where stem elongation occurs. In Tennessee, planting usually falls around mid-September and mid-October. A grain drill can be used to plant canola and since it is a small seed (Fig. 1) it requires a firm seedbed and shallow planting (1/4" depth).

Fig. 1. Canola seed is small and requires a firm seedbed and shallow planting depth.

A 6-8" row spacing can help to control weed competition

(Buntin et al., 2010). Grass-type weeds can be managed with herbicides once canola has germinated. Some broadleaf weeds can be managed using clopyralid or tillage in wide rows. Broad spectrum post-emergence weed control can be found in Roundup Ready and CLEARFIELD herbicide tolerant cultivars.

The major plant diseases for canola are blackleg disease and *Sclerotinia* stem rot. The best way to avoid blackleg disease is to select resistant varieties. To avoid *Sclerotinia*, it is best to plant on well-drained soils and use crop rotation. The major insect pests include aphids and the cabbage seedpod weevil. Both insects can be controlled using insecticides depending upon the number of insects present and the growth stage of the canola (Buntin et al., 2010).

## Harvesting seed

In Tennessee, winter canola will usually begin to bloom in April and be ready to harvest in early June (Fig. 2). Canola is planted and harvested around the same time as winter wheat and can therefore be part of a winter rotation. It is important for canola to be harvested as soon as it is ready as the seed pods will shatter if left in the field too long. Seed should be harvested once seed moisture has reached 8-10% and green seeds have turned black (<2% green seeds present) (Buntin et al., 2010). Canola can be harvested directly using a combine with the concave nearly wide open and slower cylinder/rotor speeds. Chaffer and shoe sieves are usually closed more than for wheat. It is also a good idea to patch any holes with duct tape to reduce losses in yield.

Fig. 2. As canola matures, the moisture decreases and the seeds change from green to black.

## Grain yield and canola meal

In the 2014-2015 season, 40 winter canola varieties were planted on 3 different planting dates (Sept. 10, Sept. 24, Oct. 9). The winter canola for all 3 planting dates survived and yields were evaluated. In a previous publication (Illukpitiya and de Koff, 2014), it was concluded that the value of canola meal (material remaining after oil is removed) as an animal feed allowed on-farm biodiesel production to be economically viable. Therefore, canola meal was produced using an oilseed handpress and the meal protein concentrations from the 5 highest-yielding varieties were measured (Fig. 3).

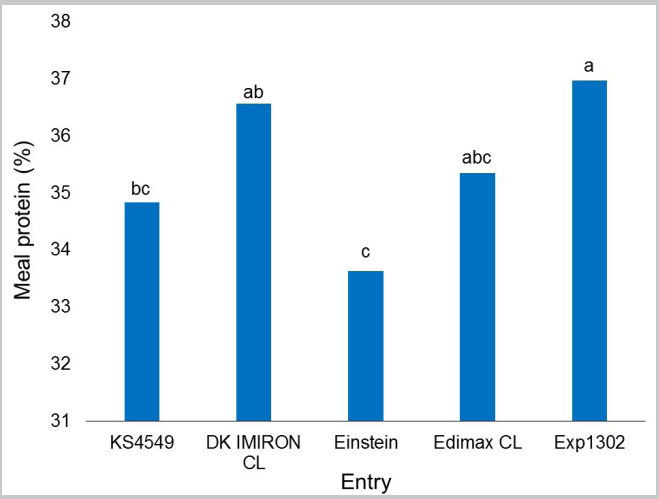


Fig. 3. Canola meal protein content for the five highest-yielding varieties from the first planting date (Sept. 10).

The Exp1302, DK IMIRON CL, and Edimax CL varieties had the greatest grain yields and protein contents with values ranging from 35-37%. Since these are used as protein sources in animal feed, it is assumed that winter canola meal with greater protein may receive greater prices.

## References and resources


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