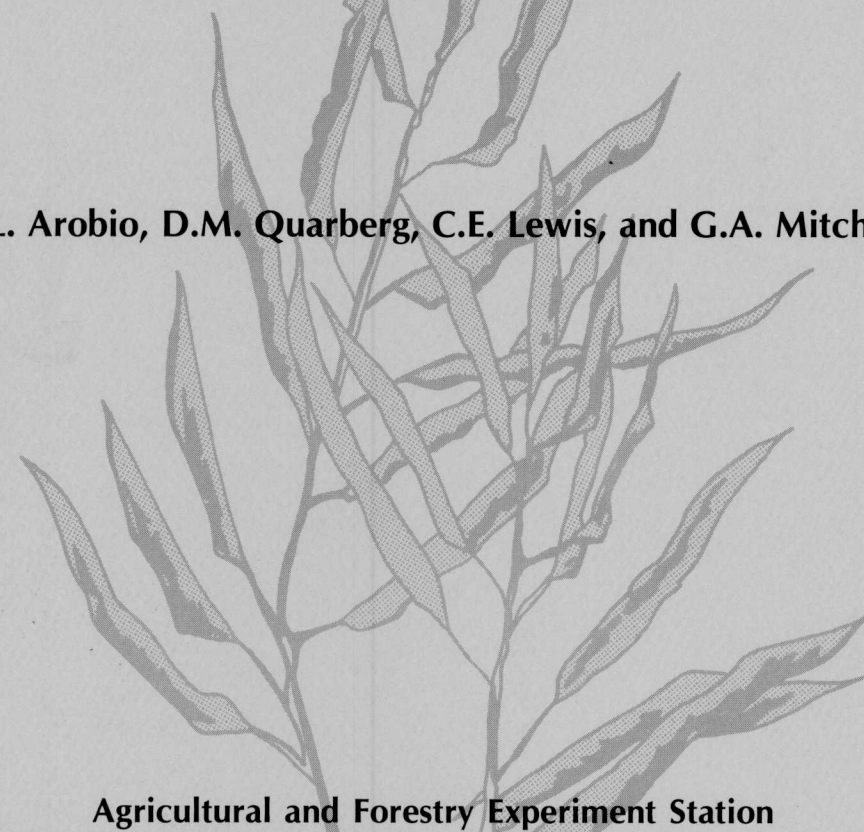




# **RAPSEED PRODUCTION DEMONSTRATION IN INTERIOR ALASKA**

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**James V. Drew, Dean and Director**

**Circular 61**

**July 1987**

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# RAPESEED PRODUCTION DEMONSTRATION IN INTERIOR ALASKA

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no. 61

July 1987



*G.A. Mitchell inspecting the 33-acre rapeseed crop.*

## INTRODUCTION

Rapeseed is the oil-bearing seed from plants of the Brassica genus. It grows well in the cooler agricultural regions of the world and for this reason has long been thought to be a promising crop for interior Alaska.

Rapeseed has been grown in India and China for thousands and in Europe for hundreds of years (Bolton 1980). Its history in North America began in 1943 when a small quantity of seed was imported into Canada. In recent years, its production has been largely that from cultivars bred for production of seed low in erucic acid and glucosinolate content. Seed from these cultivars is referred to by the Canadian Rapeseed Industry as *canola*. Its qualities are desirable in the edible-oil market, the largest market for products from canola seed. Canada is now one of the world's largest producers and is the world's largest exporter of rapeseed.

The meal that remains after oil extraction is high in protein and is used as a supplement in livestock feeds. The whole seed can also be used as a feed supplement. Some cultivars of rapeseed that are high in erucic acid are also grown for use in plastics and industrial oils (Genser and Eskin 1979). In addition, forage rapeseed cultivars can be used as livestock pasture.

Research concerning the production of rapeseed has been addressed by the Agricultural and Forestry Experiment Station (AFES) for several years. Of specific concern has been the selection of appropriate cultivars (Wooding et al. 1978), response to various nitrogen (N) rates, row spacings and seeding rates (Lewis and Knight 1987), performance in reduced-tillage systems in rotation with barley (Knight and Lewis 1986), the potential for frost seeding in late fall and early spring (Knight and Sparrow 1984) and response to boron (B) to enhance early seed ripening (Wooding 1985). In addition, in 1978 the Cooperative Extension Service (CES) began conducting seminars on production of rapeseed for Alaskan farmers. In 1979 and 1980, CES employed Dr. J.L. Bolton, a rapeseed specialist from the University of Alberta, in an extension capacity to give technical assistance to farmers on producing rapeseed (Bolton 1980).

The conclusion has been reached that, agronomically at least, rapeseed can be a viable crop for the interior if the following management practices are used:

- The seed bed must be well prepared, smooth, firm, and moist.

- Boron application is often necessary for rapeseed production in the Delta Junction area.
- The crop must be seeded no more than .5 to 1 in deep.
- A herbicide is necessary to control annual broadleaf weeds.
- Because of the limited growing season, the crop will probably have to be swathed or sprayed with a desiccant such as paraquat or diquat to stop plant growth while allowing seeds to ripen.

While researchers at AFES have grown rapeseed, including canola cultivars, for several years, the production has always been on small plots. Farmers in the Delta Junction area have been interested in learning if there would be sufficient time for the crop to mature and be harvested successfully from large acreages since it has a slightly longer growing season than do the barley cultivars they are now using. In addition, they have been interested in observing crop performance on a farm in the area. In order to address these concerns, AFES, CES, and the Division of Agriculture undertook a rapeseed demonstration project on acreage of a commercial size in cooperation with Ed Giese, a farmer in the Delta Junction area of interior Alaska. Mr. Giese provided land, equipment, and most of the labor needed to grow the crop. Materials were provided by the cooperating agencies. Production practices were based on AFES recommendations.

## THE DEMONSTRATION PROJECT

Approximately 33 acres of new land in the Delta Agricultural Project were used for the 1986 rapeseed demonstration project. The land had been root-raked and was disked once in August of 1985. Prior to disking in the spring of 1986, 80 pounds N, 60 pounds phosphate ( $P_2O_5$ ), 40 pounds potash ( $K_2O$ ), 15 pounds sulphur (S), and 2 pounds B were broadcast per acre. Two pints (1 pound active ingredient) of trifluralin<sup>1</sup> (Treflan<sup>®</sup>) per acre were then applied with a ground sprayer to control broadleaf weeds. The ground was immediately disked once following spraying to incorporate the fertilizer and herbicide<sup>2</sup> (fig. 1). The disk was equipped with tine-tooth harrows to smooth the seed bed. Immediately following disking, the seed bed was packed to minimize moisture loss (fig. 2).

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<sup>1</sup>Trifluralin is currently not approved for use on rapeseed in Alaska and was applied under an experimental permit from the Department of Environmental Conservation.

<sup>2</sup>Trifluralin must be incorporated within 24 hours of application.



*Figure 1. The seed bed was prepared using a disk with harrows to incorporate trifluralin and to provide a smooth surface.*



*Figure 2. Immediately following disking, the seed bed was packed to reduce moisture loss.*

Five pounds per acre of certified 'Tobin' (*Brassica campestris*), an early-maturing canola cultivar, were seeded May 22 and 23 using a double-disk seeder equipped with depth bands and press wheels (fig. 3). Seed was planted approximately .5 inch deep. Materials and actual costs incurred for planting and harvesting are provided in Table 1. Costs for equipment repair and maintenance, depreciation and interest on equipment, insurance, and land are not included in this table. These vary from farmer to farmer. A farmer should note his own costs in order to get a total cost of production. The equipment used is listed in Table 2.

The crop emerged on May 28. Germination and emergence were excellent, and an even, vigorous stand resulted. Flowering began on June 26 and terminated in early August.

The trifluralin that was applied in the spring controlled broadleaf weeds except for a few areas along old berm rows. Insects did not appear to affect the crop.



*Figure 3. The seeder used was equipped with depth bands to ensure shallow, uniform depth of seed placement and packer wheels to provide soil-seed contact.*

**Table 1. Material and labor costs for the 33-acre rapeseed demonstration project.**

Cost Category	Total \$	\$/Acre
Seed	565.29	17.13
Fertilizer	2,345.82	71.09
Herbicide	164.75	4.99
Fuel and lubrication <sup>1</sup>	248.81	7.54
Labor <sup>2</sup>	424.67	12.87
Total	3,748.67	113.62

<sup>1</sup>Diesel at \$1.055 per gallon and gasoline at \$1.25 per gallon plus 15% for lubrication.

<sup>2</sup>Labor at \$8.00 per hour.

**Table 2. Equipment complement used on the 33-acre rapeseed demonstration project.**

Make/Model	Type	Size
John Deere 4620	Tractor	140 hp.
John Deere 4430	Tractor	80 hp.
Krause	Cultivator (Disk w/harrows)	34 ft
Barber	Fertilizer Spreader	18 ft
International	Double-disk Drill	12 ft
Fimco	Sprayer	42 ft
Versatile 400	Swather	20 ft
Allis-Chalmers L2	Combine	24 ft
	Packer	24 ft
Dodge	Grain Truck	2½ ton

although limited numbers of flea beetles and turnip beetles were noted. Grasshoppers were also present but did not appear to damage the crop even though they had caused significant problems in adjacent barley fields. No insecticides were used.

The spring was dry with only .34 inch of rain from May 25 through June 25. The remainder of the growing season (after June 25) was unseasonably wet with 9.26 inches of rain through August 17.<sup>3</sup> Temperatures were quite variable during the period, resulting in 31 degree days (a 9 percent increase) above normal. The first frost, 27 degrees Fahrenheit occurred on August 13 followed by a severe

<sup>3</sup>The average growing-season (April 1 to September 30) precipitation in Delta Junction is 9.2 inches. There are 55 days with air temperatures remaining above 32 degrees Fahrenheit and 104 days with air temperatures above 27 degrees Fahrenheit. The average first date for a killing frost in fall is August 25 (Lewis 1983; Sparrow 1986).



frost, 19 degrees Fahrenheit, on August 23. As a result, the growing season was 77 days long from emergence to frost.

The crop was swathed (fig. 4) on September 1 and combined on September 8 and 9 (fig. 5). Moisture at the time of combining was 8.5 percent. Since rapeseed is stored at 10 percent or less moisture, no additional drying was required.

## RESULTS

Yield, as calculated by the quantity of rapeseed placed in storage, was approximately 25 bushels per acre. This is considered an average to good yield. Minor losses due to shattering in the swath were noted. Test weights ranged from 49.8 to 50.3 pounds per bushel. Standard test weight is 50 pounds per bushel.



*Figure 4. Swaths of rapeseed were loose and provided a mechanism for seed drying.*



*Figure 5. The fan speed and screen adjustment on the combine must be set accurately to minimize loss of seed during the operation.*

Samples of the seed were sent to Canada to be analyzed for crushing quality. The overall samples graded as Canada #3 Rapeseed (Canada #1 Rapeseed is the highest quality). The seed contained approximately 47.4 percent oil which is higher than average for canola. Chlorophyll content was 54 parts per million (ppm), about 12 ppm higher than average for #3 Rapeseed and 39 ppm higher than average for #1 Rapeseed. This was the major factor contributing to a low grade. The high level of chlorophyll indicated that the chlorophyll had been locked in by frost which prevented seed in late-maturing pods from maturing after harvest. Without frost damage, green seed will mature in the swath (Alberta Agriculture 1979). The three samples graded contained 20, 16, and 9 percent distinctively green seeds. A 2 percent count is necessary for #1 rapeseed. The protein level, 29.7 percent for meal at 10 percent moisture and 3 percent oil content, was 5 to 6 percent lower than desirable. The levels of erucic acid and glucosinolates were acceptable.

Because of its grade, the 1986 rapeseed crop was only marginally acceptable for crushing. However, as an alternate use, this grade of rapeseed can be used in livestock feeds. It is high in energy and can be fed as whole seed (grinding required), not to exceed 10 to 20 percent of the ration depending on livestock species. In Canada, rapeseed that has suffered frost damage has a value of 125 to 150 percent of the current market price for feed barley.

## CONCLUSIONS

The most important result of the rapeseed project was confirmation that a crop can be harvested from a commercial-size acreage with an acceptable yield. More specifically:

- Early seeding is important. The crop should be seeded as early as possible to minimize autumn frost damage.
- Canola quality will vary from year to year. In some years, there will be damage from autumn frost.
- Care is necessary in determining when to swath. A guide is to swath the crop when seeds are ripe on the bottom one-third of the main stem, 90 percent green on the middle third, and all green on the top third.
- Speed and screen adjustment on combines must be set accurately to minimize losses during combining.

Yields of rapeseed and oil content of the seeds were satisfactory in this demonstration of rapeseed production in interior Alaska, but quality was not. If rapeseed

is of high quality, it can be exported. Markets do exist in Alaska for damaged seed as a livestock feed supplement. However, for rapeseed to be grown successfully, an herbicide is required to control broadleaf weeds. In Canada, trifluralin is the material of choice. Unfortunately, trifluralin is not approved for use on rapeseed in Alaska, even though it has been approved for use on other crops. The reason is not that it is unsafe or inefficient, but that there is a lack of interest by manufacturers in taking the necessary steps to gain approval for its use on rapeseed in Alaska (Conn 1984). Until trifluralin is approved for use (or until other, approved herbicides are found to be equally as effective) seed from an Alaskan rapeseed crop produced with the use of trifluralin cannot be sold as feed nor can it be exported to any other state in the U.S.

If trifluralin were to be cleared for use on rapeseed in Alaska, the decision concerning whether it is economical to produce the crop would rest with the farmer. This decision will depend on market prices which vary widely from year to year, available markets, and an individual farmer's production costs and management ability. Economist and agronomists cannot predict future prices nor develop markets. They can help, however, by providing information to the farmer concerning production costs and crop management. Future demonstration projects can refine the information provided here.

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### ACKNOWLEDGMENTS

The authors wish to thank William Burgoyne, pesticide specialist with the Department of Environmental Conservation, who provided and continues to provide much needed assistance in the use of trifluralin in the production of rapeseed in Alaska.

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