Taking Canola from Research to Production in Arkansas

John Kelly[1], Charles Parsons[2], Robert Bacon[1], and Michael Popp[3]

[1]Department of Crop, Soil, and Environmental Sciences, [2]Cooperative Extension Service, [3]Department of Agricultural Economics and Agribusiness
University of Arkansas

Introduction

With the cost of crude oil escalating and the challenge to replace 75 percent of oil imports from the Middle East by 2025 there has been an increasing interest in renewable fuel sources. Biodiesel plants are being built in Arkansas which currently are utilizing soybean oil and animal fat as the feedstock. As more biodiesel plants are being built and the production of biodiesel increases, more oil will be needed to meet the demand.

Canola may be the crop to help satisfy the feedstock demand of the biodiesel plants. Canola is better suited for biodiesel than soybean due to its higher oil content and more desirable fatty acid profile. Canola, which is a winter crop in Arkansas, would be harvested in early June and may allow for doublecropping with soybean. Not only would the oil be utilized by biodiesel plants, but the meal can be utilized by the large animal industry in the state. The University of Arkansas has been evaluating canola lines for more than 12 years. With the advent of two operational biodiesel plants in Arkansas, there is demand for more canola production.

Materials and Methods

The breeding program has evaluated canola lines at three Arkansas locations; University of Arkansas Main Agricultural Experimental Station in Fayetteville on a Captina silt loam, the Vegetable Substation near Kibler on a Roxana silt loam and the Lon Mann Cotton Research Station at Marianna on a Loring silt loam. In addition to breeding nurseries, canola cultivars and experimental lines were evaluated by cooperating with regional nurseries coordinated by the University of Georgia and Kansas State University.

Cultural practices have been evaluated empirically in the field breeding test. Economic potential was evaluated by developing farm budgets using the Mississippi State Budget Generator in conjunction with experiment station yield information.

Table 1. Canola Production Practices, Costs and Sequence of Operations in Arkansas

OPERATION/ OPERATING INPUT	SIZE/ UNIT	DIRECT COST: OP INPUT	FUEL	R&M	LABOR	INTER	TOTAL	FIXED COST	TOTAL COST
		dollars							
Disk & Incorporate	24'		1.85	1.11	1.05	0.26	4.27	4.01	8.28
Treflan HFP	1 pt	2.56				0.17	2.73		2.73
Land Plane	50'x16'		2.61	0.60	0.99	0.27	4.47	3.76	8.23
Cstm Ap Grd Fert	acre	4.75				0.31	5.06		5.06
Phoshate	100 lb	14.14				0.91	15.05		15.05
Field Cultivate	24'		1.34	0.50	0.51	0.15	2.50	3.09	5.59
Grain Drill	20'		1.82	1.20	1.54	0.29	4.85	4.16	9.01
Canola Seed	5.5 lb	6.88				0.44	7.32		7.32
Roller	32'		0.79	0.21	0.38	0.08	1.46	1.48	2.94
Ditcher	3'		0.15	0.04	0.10	0.02	0.31	0.21	0.52
Cstm Ap Grd Fert	acre	4.75				0.15	4.90		4.90
Amm Sulfate	75 lb	9.00				0.29	9.29		9.29
Urea, Solid	85 lb	10.88				0.35	11.23		11.23
Cstm Ap Air Fert	acre	5.00				0.13	5.13		5.13
Urea, Solid	100 lb	15.95				0.41	16.36		16.36
Combine	32'		2.78	2.21	0.83	0.64	5.86	8.96	14.82
Custom Haul	2000 lb	7.50				0.05	7.55		7.55
TOTALS		81.41	11.34	5.87	5.40	4.32	108.34	25.67	134.01

Results and Discussion

Cultural Practices:

Experience from varying planting dates indicates that the optimum date needs to be early enough to achieve proper plant growth (7-8 leaf rosette) and establishment to ensure adequate winter survival. Determining the optimum planting date for Arkansas was a major challenge. To achieve the proper growth stage entering the winter months we found that planting the last 10 days of September and the first 10 days of October provided the best results in our area. This optimum planting time also coincides with a dry period when the soil moisture levels at the surface are usually low which may cause poor germination.

Tillage to a depth of 10 inches or more is needed to disrupt any hardpans that may exist to allow for adequate root penetration. Arkansas often faces saturated soils during the winter months. Field selection and adequate surface drainage is essential to alleviate this problem. To plant at the proper depth of 1/2 inch and to maintain adequate soil moisture for seed emergence, we have found that the seedbed should be rolled prior to planting to increase firmness. In Arkansas it is recommended that canola be sown with a drill in 7-inch row spacings at 6 to 7 pounds per acre.

Results and Discussion

Economic Potential:

The cost of production for canola in Arkansas is presented in Table 1. These figures were based on the recommendations provided by the Cooperative Extension Service for canola production. A cost of production summary and breakdown for cost estimates for producing canola in Arkansas are presented in Table 2.

Data collected from the three Arkansas testing sites form 1999-2004 was used to generate a percent of likelihood of obtaining a certain level of yield (Figure 1). The yield data was also used to estimate the percent likelihood of obtaining a revenue from each testing location (Figure 2). The break-even point for canola is $134.01. The Fayetteville location is the only location where there is any substantial risk of not reaching the break-even point. The lowest yields recorded for Marianna were above$134.01 indicating that there is a high likelihood of obtaining a revenue from producing canola.

Table 2. Cost of Production Summary and Breakeven Estimates for Arkansas

	Canola	
FERTILIZERS	49.97	These numbers do not
HERBICIDES/INSECTICIDES	2.56	include potassium
CROP SEED	6.88	fertilizer which would
CUSTOM HIRE	22.00	add another $15/acre.
LABOR		One or two passes of
Hours	0.66	insecticide may also
Dollars	5.40	be required ($7-20/acre).
DIESEL FUEL		
gal	5.14	Even with these changes
dollars	1.34	canola looks promising from
REPAIR & MAINTENANCE	5.87	a breakeven perspective (see
INTEREST ON OP. CAP.	4.32	Figure 2, below)
TOTAL DIRECT EXPENSES	108.34	Numbers in parentheses are
	(946)	breakeven yields in lb/acre
TOTAL FIXED EXPENSES	25.67	assuming a canola price of
TOTAL SPECIFIED EXPENSES	134.01	$11.45/cwt (a price that
	(1170)	historically leaves sufficient
TARGET RETURNS	94.99	margin for processing to
		compete with soybean oil/meal

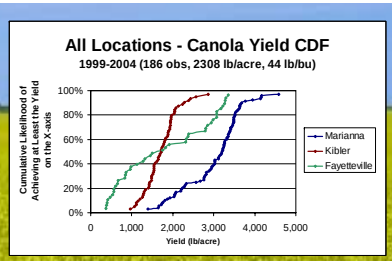

Figure 1. Observed Yields at Three Arkansas Locations

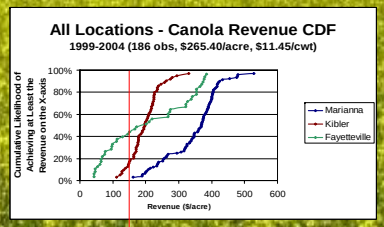

Figure 2. Likelihood of Covering Specified Production Costs

Conclusions and Outlook

- Yields of adapted winter canola genotypes have averaged over 2,000lbs/acre the last 5 years.
- Economic analysis indicates that yields are beyond the breakeven point most of the time.
- Ownership charges include only depreciation and capital costs of equipment. No charges for land rent or management have been assessed.
- Southern locations (Marianna and Kibler) had higher grain yields.
- Both biodiesl plants in Arkansas have initiated programs to encourage farmers to grow canola.
- For the first time in the past 20 years commercial canola fields have been planted in the state.
- Current estimates are that 15 producers have planted approximately 400 acres.