

POTENTIALS AND PROBLEMS OF RAPESEED PRODUCTION IN OREGON

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The purpose of this handout is to provide background information about rapeseed and rapeseed production in Oregon and to speculate about potentials and problems.

BACKGROUND INFORMATION

1. Rapeseed is not a new crop. It has been grown in China for centuries and in Oregon since the turn of the century.
2. Rapeseeds can be grown for forage, birdseed, and/or oil. Some varieties are suited for all uses while others have been bred for a single purpose. Oilseed rapes are grown on the largest acreage world wide and are subdivided into two types based on oil characteristics - high erucic (industrial oil types) and low erucic (edible oil types).
3. All oils are made up of fatty acids. Fatty acids are organic molecules which differ in carbon chain length. Soybean oil is composed primarily of fatty acids that are 16 to 18 carbons long. Erucic acid, a fatty acid found in some rapeseeds, is 22 carbons long. Long fatty acid chains have more potential uses than shorter chain types as they can be used as is or be chemically divided into shorter chain lengths.
4. Erucic acid is undesirable in an edible oil since research has shown it can cause heart lesions in rats. Their effect on humans is uncertain. Edible rapeseeds have to have less than 2 percent erucic acid. Edible rapeseed oils are similar in fatty acid composition to soybean oil. Edible rapeseed oil is not chemically unique and will need to be price competitive in the world market.
5. Industrial rapeseeds have a erucic acid content in excess of 40%.
6. Glucosinolates are sulfur containing compounds found in rapeseed meal, but are not unique to rapeseed. The sharp taste of mustards is due in part to glucosinolates. Glucosinolates depress animal growth through deleterious effects on the thyroid. They also produce toxic thiocyanate and nitrite when digested. Glucosinolate levels vary considerably among varieties. Low levels (less than 30 umol/gram of meal) are desired if residual meal is to be used as livestock feed.
7. Canola is the designation given edible rapeseed varieties that are low in both erucic acid (less than 2%) and glucosinolates (less than 30 u moles per gram). Canola is a name "coined" by the Canola Council of Canada.
8. The designation "double low" means low in erucic acid and glucosinolate. Single low means the variety is low in erucic acid only. The current world export market is for double low (Canola) varieties.
9. Winter rapeseeds can be grown throughout the Pacific Northwest. Winter types have distinct advantages over spring types. Winter varieties will out yield springs by about a two-to-one ratio and tend to have a higher oil content (springs = 40-42%, winters = 42-46% oil). Winter types also mature several weeks earlier than spring types and the crop could be marketed when free stocks would traditionally be at a low point in the marketing season. Thus, PNW growers of winter rapeseeds should have several marketing advantages over other exporters.
10. There is a growing demand for whole rapeseed. Canada is the world's leading exporter and Japan the leading importer. The Japanese are interested in a quality product at a competitive price and winter rape in the Pacific Northwest should be able to meet these market demands.
11. Low rainfall dryland yields of rapeseed have averaged 1000-1500 lb/A in recent years. High rainfall and irrigated yields have ranged from 3000 to over 4200 lb/A. Contract prices in 1991 averaged around 11¢ per lb. At 11¢ per pound and average yield levels, rapeseed is comparable to barley in cash return per acre.

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ANTICIPATED PROBLEMS

Anticipated problems with rapeseed production can be divided into four areas of concern: 1. cross-pollination; 2. volunteer plants; 3. increased disease in other crops; and 4. storage. Each of these concerns is addressed below.

1. Cross-pollination could be a problem at two different levels. First, industrial oil cultivars could cross-pollinate with edible oil types. Resulting seed would likely have an erucic acid content between two and forty percent and would be unsaleable as either an edible or industrial oilseed. If the crop were for seed stock itself, a similar problem would exist.

Cross-pollination may also be a problem at a different level. Winter rape is a *Brassica* species - *Brassica napus*. *B. napus* (n = 19) is genetically a hybrid between *Brassica campestris* (the Swede-turnip rape family; n = 10) and *B. oleracea* (the cabbage family; n = 9).

While crosses between *B. oleracea* and *B. napus* are rare, crosses between *B. campestris* and *B. napus* do occur. Crosses between *B. napus* and *B. chinensis* (Chinese cabbage family), *B. rapa* (turnip), *B. juncea* (brown mustard) and *B. nigra* (black mustard) are also possible.

What this means is that portions of the Willamette Valley vegetable seed industry and *Brassica* seed crop growers elsewhere in Oregon could be adversely affected by uncontrolled rapeseed production. The Willamette Valley vegetable seed industry already has a self-regulating process in place to avoid contamination between cross-compatible seed crops. This process involves identification of seed field sites through a pinning process on maps housed in the Marion and Linn County Extension offices. Other seed producers voluntarily agree to avoid planting cross-compatible crops within the "pollination" zone of pinned fields. To avoid problems, a formal, state regulated pinning system may become necessary.

European seed certifying agencies require that there be at least 400 meters (1/4 mile) between oil and fodder *Brassica* seed crops and 1,000 meters (3/5 mile) between vegetable *Brassica* crops. In Idaho, three mile and one mile separation distances from other oilseed rapes are suggested for seed stock and oilseed crops, respectively.

Idaho, Oregon and Washington have enacted legislation to establish rapeseed production districts. In these districts, only one type of rape (industrial or edible) can be grown unless specific waivers are obtained. In some areas, rapeseed production is prohibited. Districts are successful in

reducing cross-pollination problems between industrial and edible types.

2. Rapeseed harvest is not 100% efficient and substantial amounts of seed are lost during combining. Also, rapeseed produces some hard seed which can remain in the soil for at least five years, if not longer. Volunteer rape is going to be a problem.

Volunteer rape is a concern to vegetable seed growers. Volunteer plants can grow in *Brassica* seed fields or radish seed fields and create problems due to cross-pollination and/or direct contamination of seed if volunteer plants go unnoticed and are harvested with the seed crop.

The sugar beet seed industry is also concerned about volunteer plants as stem and pod pieces cannot be easily separated from beet seed. Foreign material tolerances for beet seed are low and rape contamination could lead to rejection of seed lots.

3. Disease carried by rapeseed is also a concern to vegetable and vegetable seed growers. Rape is susceptible to the diseases common to other *Brassica* species - *Alternaria*, *Pythium*, *Sclerotinia*, and *Phoma*. Incidence of *Alternaria*, *Pythium*, and *Sclerotinia* is not likely to increase as these diseases are already common in the Willamette Valley. Black Leg (*Phoma*), on the other hand, is less common, is seed borne, and could become more widespread.

Disease in back-to-back rape crops is also a problem. The standard recommendation is that fields be out of rape for a three-to-four year period before planting back another rape crop. This rotation requirement may limit utility of the crop for some growers.

4. Storage and handling of rapeseed is a concern, especially where both industrial and edible crops are handled in the same facility. The two types of rapeseed can only be distinguished on the basis of chemical tests - outward appearance is identical. Shippers and handlers will need to be alert for possible seed mixes. Shippers must also be wary of seed loss from uncovered trucks. Trucks hauling rapeseed should be covered to avoid scatter of seed along roadways.

This listing is not intended to be a complete or final list. Its purpose is to inform and to alert interested persons to the potentials and problems of rapeseed production in Oregon. Additional information on rapeseed can be obtained from county extension offices across the state.