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Spring Rapeseed Culture in Idaho

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Contents

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Trade Names

Trade names are used in this publication to simplify information presented. Use of these names neither implies endorsement of products nor criticism of similar products not mentioned.

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Basic Recommendations

- Obtain a firm contract and limit acreage of spring rapeseed during initial experience with rapeseed production.
- Always use certified seed to assure seed purity and viability. Treat seed with Benlate to help avoid seed-borne spread of Blackleg (*Phoma lingum*).
- Climatic factors such as temperature and moisture levels during July and August will limit spring rapeseed yields. Plant early to avoid stress periods.
- Chemicals to control weeds, diseases and insects are very limited. Major pest problems can greatly reduce yields. Use rotations and cultural practices that minimize these problems.

Increased demand for alternative crops in Idaho has attracted interest in rapeseed production. Both winter and spring rapeseed varieties are available to Idaho producers. The adaptation of spring rapeseed in Idaho has not been researched as well as winter rapeseed, particularly in irrigated areas of eastern Idaho where spring rapeseed may be best adapted. Successful production of spring rapeseed in Idaho will require consideration of risks not associated with winter rapeseed. The purpose of this publication is to clarify the basic production requirements of spring rapeseed and the potential risks a grower might incur with this crop.

Rapeseed Production Districts

The production of winter and spring rapeseed in Idaho is restricted by production districts designed to avoid cross-contamination between edible and industrial varieties. The Idaho Department of Agriculture governs the establishment and enforcement of these rapeseed production districts. For more information, see University of Idaho CIS 819, "Rapeseed Production Districts in Idaho," or contact the Idaho Department of Agriculture in Boise.

Rotational Factors and Field Selection

Recommended rotational restrictions for growing spring rapeseed with other crops in Idaho are listed in Table 1. Most spring rapeseed varieties are susceptible to the triazine herbicides used in corn and potato production. Rhizoctonia root rot, Fusarium root rot and Sclerotinia stem rot and white mold are diseases common to rapeseed, potatoes, field peas, field beans, lentils, mustard, sunflowers and other cruciferous crops. Rapeseed is an alternate host to the sugarbeet cyst nematode (*Heterodera schachtii*).

Table 1. Suggested restrictions for spring rapeseed production in rotation with other crops.

Crops	Wait period	Remarks
	(years)	
Wheat Barley Oats	0	No diseases in common. Control mustard and other annual broadleaf weeds in cereal crop. Do not use herbicides that may carry over.
Buckwheat	1	Volunteer buckwheat can be a serious weed problem.
Corn	1	Atrazine carryover is detrimental to spring rapeseed. No waiting is necessary if triazine resistant rapeseed varieties are used.
Field peas Potatoes Fababeans Clovers	1	Rhizoctonia root rot, Fusarium root rot and Sclerotinia are common disease problems. Less risk associated with these crops than with other crops.
Alfalfa	2	Rhizoctonia root rot, Fusarium root rot and Sclerotinia are common disease problems.
Sugarbeets	3	Rapeseed is alternate host to sugarbeet cyst nematode. Three years separation between rapeseed and sugarbeet crops is recommended in areas where this nematode exists.
Mustard Sunflowers Field beans Lentils	3	Rhizoctonia root rot, Fusarium root rot and Sclerotinia are common disease problems with rapeseed. Mustard is a contaminant that should be avoided. Control mustard during rotation period.

Mustards (*Brassica* spp.) are undesirable contaminants in rapeseed and are difficult to control. Avoid fields where volunteers from previous mustard crops or mustard weed species are expected. The presence of mustard in a rapeseed grain lot can result in dockage penalties.

Spring rapeseed can be grown in rotation with spring-seeded small grains with few restrictions. No common disease problems between rapeseed and small grains are known to exist. Mustards, volunteer rapeseed and other annual broadleaf weed problems can be controlled with herbicides in a small grain crop preceding rapeseed production. Avoid using soil residual herbicides such as dicamba (Banvel), picloram (Tordon) and chlorsulfuron (Glean) that may carry over to the spring rapeseed.

Volunteer cereals may occur in a spring rapeseed crop following winter cereal production. Harvesting techniques that minimize grain loss and proper cultivation will help control winter cereal volunteer problems. Avoid fields where grain shattering has been extensive.

Spring rapeseed requires higher soil moisture levels during germination and emergence than either wheat or barley, yet rapeseed does not tolerate waterlogged conditions. Avoid fields with poor drainage and high water tables, and avoid over-irrigation.

Variety Selection

Evaluation of spring rapeseed varieties in Idaho has been quite limited. Spring rapeseed averaged 700 and 2,400 pounds per acre in 1976 trials at Grangeville and Bonners Ferry, respectively (see University of Idaho CIS 380, "Alternative Crops for Northern Idaho"). Seed yields ranged from 0 to 1,790 pounds per acre in trials at Moscow, Bonners Ferry and Coeur d'Alene in 1977 and 1978 (see University of Idaho CIS 524, "Flax, Mustard, Spring Rape: Alternative Crops for Idaho's Cooler Region?"). Sensitivity to high temperatures during peak flowering and a wide range of insect problems substantially reduced yields. Commercial spring rapeseed crops in the Kootenai River Valley of northern Idaho have produced 1,100 to 2,600 pounds per acre.

Most spring rapeseed varieties available for production in Idaho originated in Canada. Canadian varieties have been developed from both the *Brassica napus* and *Brassica campestris* species. *B. napus* varieties are higher yielding, later maturing and more prone to shatter, and have fewer disease problems than *B. campestris* varieties. *B. campestris* varieties resist drought, lodging and shattering better than *B. napus* varieties. Because of their earlier maturity and shorter stature, *B. campestris* varieties can more easily be combined directly. Both edible and industrial types have been developed from each species. Only the major Canadian spring rapeseed varieties are described here.

Westar — Westar is a *B. napus* edible spring rapeseed variety (Canola quality) producing low erucic acid levels in the oil and low glucosinolate levels in the meal. Westar has produced good yields in the rainfed and irrigated areas of Manitoba, Saskatchewan, Alberta and British Columbia provinces of Canada. Westar is currently considered the best yielding variety in Canada under most environmental and management conditions. Westar has late maturity, will lodge and often shatters under high yield conditions. Due to its delayed maturity, Westar is often swathed to facilitate uniform quality and easier threshing. Westar is susceptible to triazine herbicides such as atrazine, cyanazine (Bladex) or metribuzin (Sencor).

Tobin — Tobin is a *B. campestris* edible spring rapeseed variety (Canola quality) producing low erucic acid and glucosinolate levels. Tobin yields 10 to 15 percent less than Westar under irrigated or high rainfall dryland conditions. Tobin possesses better drought resistance and matures 10 to 14 days earlier than Westar. Under moisture stress, yields of Tobin equal those of Westar. Tobin is more resistant to staghead or white rust (*Albugo candida*) than older *B. campestris* varieties. Like Westar, Tobin is susceptible to triazine herbicides.

R-500 — R-500 is a *B. campestris* industrial spring rapeseed variety possessing high erucic acid levels in the oil and high glucosinolate levels in the meal. R-500 yields 20 to 25 percent less than Westar under comparable conditions. Canadian production of R-500 is currently limited to contract acreage by private companies, so seed may be difficult to obtain in Idaho. Like Westar and Tobin, R-500 is susceptible to triazine herbicides.

OAC Triton — OAC Triton is an edible (Canola quality) spring rapeseed derived from *B. napus* and *B. campestris* parents to provide resistance to the triazine herbicides. OAC Triton is later maturing and possesses poorer seedling vigor than Westar, yielding 30 to 35 percent less. OAC Triton is tolerant of triazine herbicides and is only recommended for production under conditions where herbicide residues would exclude other rapeseed varieties. Seed of OAC Triton may be difficult to obtain in Idaho.

Cultural Practices

Seedbed Preparation

Seedbed conditions that promote rapid germination, uniform emergence and early stand establishment are essential for spring rapeseed production. Seed of rapeseed is small and requires a fine but firm seedbed to maximize contact of the seed with soil moisture. The seedbed should be free of weeds and volunteer crop growth. Overworking a seedbed results in a loss of soil surface moisture and promotes soil crusting. A moderate amount of crop residue on the soil surface to reduce

erosion is tolerable. Excessive residues will interfere with proper seed placement. Excessive residues also reduce soil temperatures and therefore will delay emergence. Loose or overworked seedbeds can be firmed with a roller before seeding. In irrigated areas, preirrigation of the seedbed may be required when winter precipitation is limited. Preplant fertilizer and herbicide applications should be made just before final seedbed tillage operations.

Seeding Dates

Spring rapeseed can be planted from early April to early May in most production areas of Idaho. Yields of spring rapeseed usually decline with delayed seeding dates. Early seeding dates help avoid hot summer temperatures detrimental to flower and pod development and provide early competition with potential weed problems (Fig. 1). Extremely early seeding when soil temperatures are too cold can delay stand establishment and reduce seedling vigor. Exposure to spring killing frosts should also be avoided. Plant spring rapeseed at soil temperatures of 50°F or warmer for best germination and rapid emergence.

Seeding Rates

Seed spring rapeseed at 5 to 10 pounds per acre on a pure live seed basis. Higher seeding rates (8 to 10 pounds per acre) are recommended under irrigation, where weed problems exist or when seed placement is affected by surface residues or clods left to reduce soil erosion. Higher seeding rates produce plants with finer stems that can more easily lodge but can also hasten crop maturation. Lower seeding rates (5 to 7 pounds per acre) are recommended in areas where late summer drought is a possibility or late season irrigation is unavailable. Most commercial small grain drills can be set to deliver rapeseed at the recommended seeding rate. Use of certified seed free of seed-borne blackleg (*Phoma lingum*) and Alternaria black spot (*Alternaria* spp.) diseases is always recommended.

Fig. 1. Seed pods of spring rapeseed.

Seeding Depth and Rowspacing

Spring rapeseed should be planted ½ to 2 inches deep. Best germination and emergence of spring rapeseed occurs at seeding depths of ½ to 1 inch under adequate soil moisture conditions. The 6- to 14-inch rowspacings provided by most commercial small grain drills are acceptable for spring rapeseed production. Narrower rowspacings (6 or 7 inches) permit quicker row closure by the crop and reduce weed competition.

Use of double disk openers is the most satisfactory way to plant rapeseed into moisture at a uniform depth. Hoe-type openers are less exact in seed placement but can be used with less seedbed preparation. Use of press wheels, roller-packers or harrows improves seed contact with the soil. Broadcast seeding of rapeseed produces uneven stands and is not recommended.

Fertilizer Management

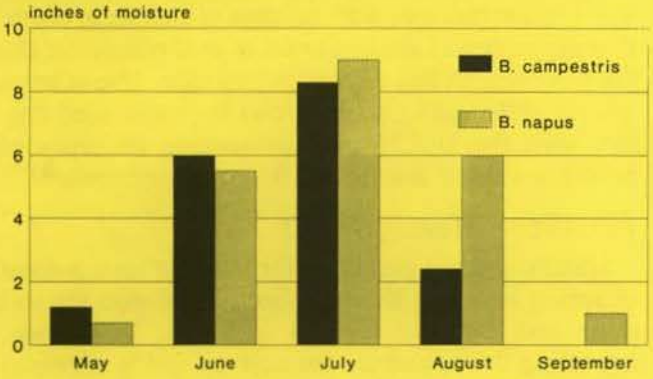
Specific soil test guidelines for fertilizer management of spring rapeseed have not been developed for soil types and moisture regimes in Idaho. In Canada, producing 2,000 pounds per acre of spring rapeseed typically requires 125 to 150 pounds of total nitrogen (N), 40 to 80 pounds of phosphorus (P_2O_5) and 20 to 30 pounds of sulfur (S) per acre. Test soil to determine exact fertilizer needs. Higher fertilizer rates are suggested where irrigation is available. Nitrogen fertilizers can be incorporated either in fall or spring depending on availability of moisture to move N to rooting depths. Under irrigated or rainfed conditions, N should not be topdressed past the rosette stage of growth.

Spring rapeseed is very sensitive to fertilizers applied in furrow with the seed. Nitrogen and sulfur fertilizers applied with the seed should not exceed 10 pounds of N+S per acre with adequate soil moisture present. In-furrow nitrogen and sulfur applications should be eliminated if soil moisture levels are marginal for seed germination. Phosphorus placed with the seed should not exceed 20 pounds of P_2O_5 per acre. In Canada, phosphorus rates of up to 80 pounds of P_2O_5 are banded below and to the side of the seed furrow without damaging stands.

Spring rapeseed should not require supplemental micronutrients on most soil types in Idaho. Without proper guidelines, applying micronutrients poses a greater chance of creating toxicity problems than correcting deficiencies. Rapeseed requires high boron (B) levels. Broadcast 1 to 2 pounds of boron per acre if soil tests indicate less than 0.5 ppm B. Never band boron. Rapeseed growers in the Kootenai River Valley of northern Idaho should watch for potential zinc and manganese deficiencies.

Irrigation Management

Each additional inch of plant-available moisture above threshold requirements roughly translates to an additional 140 pounds of rapeseed produced per acre. Peak water use occurs during the hot summer months of July and August when consumption can amount to 0.3 inch of water per day. Seasonal water use for maximum yields is 18 to 22 inches for *B. napus* varieties and 16 to 18 inches for *B. campestris* varieties (Fig. 2). Irrigation should be timed to avoid 50 percent depletion of the available soil moisture from the root zone. Exact timing and amount of water required will depend on stage of crop growth, soil texture, rate of use, precipitation levels and type of irrigation system used.



Source: Canola Growers Manual, 1984.

Fig. 2. Monthly water use by *Brassica campestris* and *Brassica napus* varieties under irrigation.

Weed Control

All volunteer crops and weeds must be killed by tillage before seeding. No herbicides are registered for preplant control of vegetation before spring rapeseed production. On irrigated ground, preirrigate the seedbed to promote germination of volunteer crop and weed seed and to provide adequate moisture for germination and emergence of the spring rapeseed. Trifluralin (Treflan) is the only herbicide registered for use in spring rapeseed production. Application rates vary with soil texture (Table 2). Trifluralin must be applied in accordance with label instructions and should be incorporated 3 to 4 inches deep as part of the last seedbed tillage operation. Trifluralin will not control mustard species (see section on Rotational Factors) and will provide poor control of wild oats (*Avena fatua*) and volunteer cereals.

Table 2. Rates of trifluralin (Treflan)[1] for weed control in spring rapeseed.

Soil texture	Rate
	(lb a.i./acre)
Coarse	0.50
Medium	0.75
Fine	1.00

[1]Incorporate in top 3 to 4 inches of soil with equipment specified on the label.

Diseases

Seed Rot, Seedling Blight and Root Rot Complex

Seed rot and seedling blight can reduce spring rapeseed stands in Idaho. The fungus *Rhizoctonia solani* is the primary cause of seed rot and seedling blight in Canada, but *Fusarium* and *Pythium* species also can cause this problem. Seed is infected shortly after planting, and seedlings fail to emerge. Planting too early into cold, wet soils or planting too deep increases stand losses from these fungi. Proper seedbed preparation and seed placement reduces the impact of seed rotting fungi by encouraging rapid germination and emergence. Several commercial formulations of the fungicide captan are registered for use as a seed treatment on rapeseed in Idaho. The use of captan will help avoid seed rot but will not protect the developing seedlings. No systemic fungicides are currently registered on spring rapeseed to control seedling blight problems.

Root rot complex in spring rapeseed is caused by the same fungi that cause seed rot and seedling blight. Lesions are formed on roots and stem bases, producing stunted, nonvigorous plants that yellow from the base upward. Proper rotation and management to establish a vigorous crop can reduce the impact of root rot on yield. *B. napus* varieties are usually less susceptible to root rot problems than *B. campestris* varieties. No fungicides are available for root rot control.

Blackleg

Blackleg in spring rapeseed, caused by the fungus *Phoma lingum*, is one of the diseases most devastating to rapeseed production in Canada. The fungus attacks the entire above-ground portions of the plant. Blackleg is spread either by infected seed stocks or by air-borne spores into neighboring fields. Lesions formed from early infections often grow into cankers that girdle the stem. Seed-borne or early-season foliar infections can reduce spring rapeseed yields more than 50 percent. Late-season foliar infections can have minimal impact on yield but can contribute to further seed-borne spread of the disease. No fungicides are available to control foliar infections.

Blackleg of spring rapeseed is not known to occur in Idaho. The disease likely will be introduced into Idaho as increased rapeseed production encourages movement of seed stocks from areas where this disease now occurs. Spread of seed-borne diseases like blackleg are usually favored by the reuse of common seed lots with unknown infection levels. Benomyl (Benlate) fungicide is registered in Idaho for use as a seed treatment on rapeseed (4 ounces a.i./cwt) to control seed-borne *Phoma lingum*. Using certified seed stocks properly treated with benomyl will reduce the likelihood of introducing blackleg.

Sclerotinia Stem Rot or White Mold

Stem rot in spring rapeseed is caused by the fungus *Sclerotinia sclerotiorium*. This fungus survives in the soil for years as small, hard, black bodies called sclerotia. It has many alternate host crops in Idaho (see Rotational Factors section). Stem, branch, pod and leaf tissues can become infected, producing soft watery lesions. The lesions expand and become grayish white in color. Severely infected plants appear bleached and stand out from surrounding healthy plants. Black sclerotia are often found in the center cavities of these bleached stems. Yield losses of 50 percent can result from this disease.

High inoculum levels, high plant populations, high humidity and excessive nitrogen favor the development of stem rot. Proper rotation with nonsusceptible crops and deep plowing can reduce sclerotia levels. Use certified seed lots free of sclerotia. No fungicides are currently registered for control of Sclerotinia stem rot in spring rapeseed.

Alternaria Black Spot

Caused by the fungi *Alternaria brassicae* and *A. raphani*, Alternaria black spot is one of the most common rapeseed diseases in Canada. All above-ground portions of the plant are susceptible to infection. Leaves, stems and pods develop spots that vary in size and in color from all grey to grey with black or purplish borders to all black. Infected pods may contain shrunken seed infected with the fungi. Yield losses may exceed 20 percent.

B. napus varieties are more resistant to Alternaria black spot than *B. campestris* varieties. No fungicides are available to control either foliar or seed-borne infections. Three year rotations to non-cruciferous crops, control of cruciferous weeds and plowing infected crop residue will reduce field inoculum levels. Proper seed cleaning will remove most shrunken infected seed, reducing seed-borne levels of the fungi. Use of seed from disease-free fields is preferred.

Other Diseases

Several other disease problems are either not as prevalent or do not significantly impact yield. White leaf spot or gray stem (*Pseudocercosporella capsellae*) occurs throughout Canada but usually develops too late in the growing season to affect yields. Staghead or white rust (*Albugo candida*) only attacks *B. campestris* varieties. The occurrence of staghead has diminished as production of Tobin spring rapeseed has increased. Downy mildew (*Peronspora parasitica*) also attacks *B. campestris* varieties. Downy mildew infects seedlings and leaves of the rosette stage, producing a white mealy growth on the undersides of affected leaves. Rotation and control of alternate hosts are the only control measures available for downy mildew. Impact of these diseases is unknown on Idaho spring rapeseed.

Insect Pests

Spring rapeseed insect pests have not been studied extensively in Idaho. Flea beetles are of primary concern to spring rapeseed producers in Canada, and limited experience indicates flea beetles will be a significant pest problem on spring rapeseed in Idaho as well. The economic importance of the other insect pests associated with spring rapeseed production in Canada are unknown in Idaho. No seed treatment and few foliar insecticides are registered to control insect pests of spring rapeseed in Idaho. Research needs to be conducted to evaluate the proper timing, effectiveness and necessity of insecticides against these spring rapeseed insects.

Pests of Seedling Plants

Flea Beetles — Flea beetles are small insects, about 2 to 3 millimeters long, which jump quickly when disturbed. They may be black in color with a blue metallic luster or may have two yellow stripes along the length of the body (Fig. 3A). No insecticides are currently registered for control of flea beetles in spring rapeseed in Idaho.

In western Canada, one generation of flea beetles occurs per year. Adult beetles overwinter in leaf litter and wooded areas, emerging from hibernation sites in April and May. Adults first feed on wild mustards and later migrate to newly emerged spring rapeseed seedlings where they continue feeding and lay their eggs in the soil near the plants. The larvae feed on the roots of spring rapeseed for 3 or 4 weeks. The effects of larval feeding upon the roots is not known.

The major damage is caused by flea beetle adults feeding on the cotyledons and young leaves. During cool weather, flea beetles concentrate their feeding around field margins next to hibernation sites. As temperatures become warmer, the beetles will disperse across the field. Their feeding damage then will be less concentrated and less noticeable. Flea beetle damage typically causes a "shot-holed" appearance as the tissue dies around the feeding sites in the cotyledons and leaves (Fig. 3B). Feeding damage is greatest during warm, dry, sunny days and is diminished during cool, damp weather which slows beetle activity and promotes plant growth.

Seedlings can tolerate up to 50 percent leaf area removal during the cotyledon stage and can outgrow moderate flea beetle damage under good growing conditions with no significant yield reductions. Extensive feeding that defoliates the leaves and cotyledons will kill seedlings, particularly during hot, dry weather. Severe feeding damage may also cause stunting and uneven maturity. Greatest feeding usually occurs from late May to late June when the plants are small and most

susceptible. Significant damage usually does not occur beyond the seedling stage as adult flea beetle populations begin to decline.

Cutworms — The red-backed cutworm (*Euxoa ochrogaster*) and the pale western cutworm (*Agrotis orthogonia*) are pests of spring rapeseed seedlings. Adult moths lay their eggs in weedy stubble or fallow fields during late summer and early fall. The cutworm larvae hatch the following spring and chew holes and notches in the seedling leaves. Older larvae will eat into the stems and sever them near the soil surface. These cut plants can be found drying up and lying on the soil surface. The first signs of damage usually appear on south-facing hillsides, on the tops of hills or in areas of light soil where surface temperatures warm faster. Bare hilltops are often dismissed as a poor germination problem rather than cutworm damage. Examine the soil around plants in these areas to determine if cutworms are present. An average of three to four cutworms per square yard can destroy a spring rapeseed stand. No insecticides are currently registered to control cutworms in spring rapeseed in Idaho.

Pests of Flowering and Podding Plants

Cabbage Seedpod Weevil — Cabbage seedpod weevil (*Ceutorhynchus assimilis*) is the major pest of winter rapeseed in Idaho (see University of Idaho CIS 782, "Cabbage Seedpod Weevil Control in Winter Rapeseed"), but its potential as a pest of spring rapeseed is unknown. Only one generation of cabbage seedpod weevils occurs per year. Overwintering adults normally lay eggs in developing winter rapeseed pods from mid-May through June, while spring rapeseed is in the rosette to flowering stage. Few spring rapeseed pods are available for weevils to lay eggs. Although adult weevils emerging from winter rapeseed or other mustard crops during July may migrate to spring rapeseed, they are not capable of laying eggs until the next season. Summer generation adults may feed on the developing pods and seeds of spring rapeseed, but the impact on crop yield and quality is unknown.

Parathion and endosulfan (Thiodan) are labeled for the control of cabbage seedpod weevils in rapeseed. Recommendations for timing chemical control of cabbage seedpod weevils in spring rapeseed based on pest population levels do not exist. Consult the current "PNW Insect Control Handbook" (available at county offices of the Idaho Cooperative Extension Service), and always read the label before using a registered insecticide.

Caterpillars — The Bertha armyworm (*Mamestra configurata*), clover cutworm (*Scotogramma trifolii*), alfalfa looper (*Autographa californicus*) and beet webworm (*Loxostege sticticalis*) are defoliators of spring rapeseed. Bertha armyworm larvae feed by chewing irregular holes in the leaves. The larvae attain their largest size and cause the most damage at the last two larval instars (developmental stages). Heavy infestations can defoliate enough leaves and consume enough seed pods to reduce yields substantially.

Beet webworms first feed on leaves and then on stems and pods, stripping the surface tissue and giving the crop a whitish appearance. Rapeseed yields may be reduced from pod peeling, which leads to incomplete formation and filling of pods. Clover cutworm damage is similar to that of beet webworms but they can also consume the entire plant. Alfalfa loopers feed on leaves and also clip flowers and small seed pods. Yield losses caused by caterpillars feeding on pods will be the greatest if there are few leaves. No insecticides are currently registered to control caterpillars in spring rapeseed in Idaho.

Lygus Bugs — Lygus bugs (several species) are potential pests of spring rapeseed. Lygus bugs initially enter rapeseed fields when the plants are in the bud stage. Adult lygus bugs feeding at the base of flower

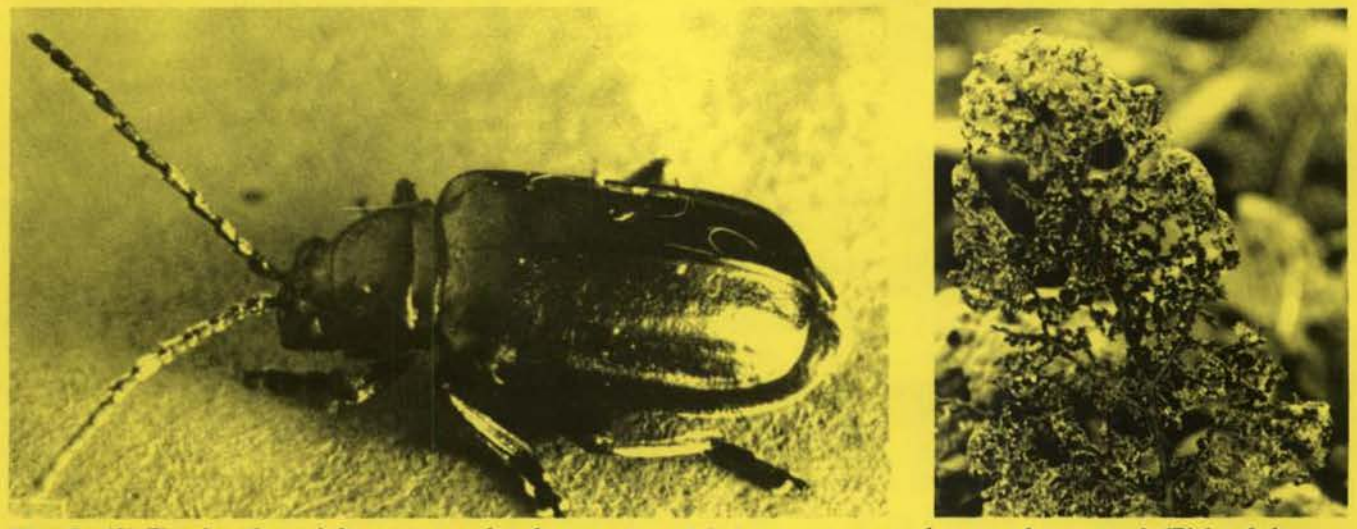


Fig. 3. (A) Flea beetles adults cause major damage to cotyledons and young leaves of rapeseed. (B) Leaf damage from flea beetle adults results in a "shot-holed" appearance as the tissue dies around the feeding sites in the cotyledons and leaves.

buds often cause bud blasting, which appears similar to the damage caused by high temperatures. Lygus bug nymphs may feed on pods during the latter part of summer, resulting in damaged seed. Yield loss from bud blasting and seed injury has been estimated as great as 20 percent during severe lygus bug infestations in Canada. No insecticides are currently registered to control lygus bugs in spring rapeseed in Idaho.

Aphids — The turnip aphid (*Lipaphis pseudobrassicae*) and cabbage aphid (*Brevicoryne brassicae*) occasionally become abundant during the late summer, with populations concentrated near the top of the plant. Feeding damage to small pods at the top of the plant during late summer is rarely significant. Almost all of the pod formation has been completed at this time and these small pods contribute very little to the crop yield. No insecticides are currently registered to control the turnip aphid and cabbage aphid in spring rapeseed in Idaho.

Other Insects — Other insects associated with spring rape include cabbageworms (*Pieris* spp.), root maggots (*Delia* spp.) and the diamondback moth (*Plutella xylostella*). These insects cause little injury to spring rapeseed and are not considered economically important.

Harvesting and Storage

Spring rapeseed can be direct combined, or swathed for uniform maturity and later threshed from windrows. *B. campestris* varieties mature earlier and resist shattering, permitting direct combining of the crop with fewer problems than with *B. napus* varieties. *B. napus* varieties or rapeseed fields with green weeds often require swathing. Swath for optimum yield and quality when average seed moisture is between 30 and 35 percent. At this moisture level, 30 to 40 percent of seeds in pods on the mainstem will have darkened or changed color. Seed moisture will substantially vary from top to bottom portions of the plants. Combining and threshing can begin at 10 percent seed moisture, but seed moisture should not exceed 8 percent for long term storage. Most combine and swather manufacturers publish adjustments and settings for rapeseed.

Summary

Spring rapeseed yields in Canada range from 800 to 3,000 pounds per acre depending on location, irrigation and management. Spring rapeseed yields in northern Idaho have varied from 0 to 2,600 pounds per acre. The poor adaptation of spring rapeseed in northern Idaho is due to numerous weed and insect pests, hot temperatures during flowering and a lack of late season moisture under dryland conditions. Spring rapeseed is probably best adapted to the Kootenai River Valley of northern Idaho and the upper Snake River Plain of eastern Idaho, where irrigation is available and cooler temperatures are less likely to impact flowering.

Basic cultural requirements of spring rapeseed are similar to those of spring wheat and barley. Equipment used to establish and harvest small grains can be used to produce spring rapeseed with little or no modification. Weed and insect problems not usually associated with winter rapeseed production will impact spring rapeseed yields. The fact that few pesticides are registered for use on rapeseed in the United States may pose the greatest limitation to production of spring rapeseed in Idaho. Markets for spring rapeseed are limited, and growers are encouraged to produce spring rapeseed only on a contract basis.

Further Information

The information provided in this publication has been derived from winter and spring rapeseed research conducted in northern Idaho and Canada. Growers interested in more detailed information about spring rapeseed production should consult the Canola Growers Manual published by the Canola Council of Canada, 301-433 Main Street, Winnipeg, Canada R3B 1B3. Cost is $10 Canadian. Interested growers can also refer to University of Idaho Bulletin 634, "Winter Rape Production Practices in Northern Idaho."

Chemical Disclaimer

All insecticides, herbicides, pesticides and fungicides are poisonous and must be handled with care to protect the operator, adjacent crops, livestock and property. Read and follow the label carefully each time a chemical is used. Keep records of what you use and where it is applied.

The chemical recommendations are based on the best information currently available for each chemical listed. If followed carefully, residues should not exceed the tolerance established for any particular chemical. To avoid excessive residues, follow suggestions carefully with respect to dosage levels, number of applications and minimum internal between application and reentry or harvest.

The grower is responsible for residues on his crop as well as for problems caused by drift from his property to other properties or crops.

Other publications on rapeseed production practices and vegetable oil research from the University of Idaho are available:

CIS 782	Cabbage Seedpod Weevil Control in Winter Rapeseed	.35
CIS 785	Northern Idaho Fertilizer Guide: Winter Rapeseed	.25
CIS 818	Production, Processing and Marketing Potential for Rapeseed in the Pacific Northwest	.35
CIS 819	Rapeseed Production Districts in Idaho	N/C
EXT 401	List of Available Publications	N/C
EXP 598	Vegetable Oil as an Agricultural Fuel	.50
EXP 620	Oilseeds for the Pacific Northwest: Economic Considerations	1.00
EXP 634	Winter Rapeseed Production Practices in Northern Idaho (Pending Revision 8/88)	1.00
EXT 660	An International Market Profile: Rapeseed	1.00
MS 111	Use of Vegetable Oil as a Fuel in Time of Emergency ...	.50
PNW ---	Pacific Northwest Winter Rapeseed Production Conference Proceedings	5.00

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Research . . . Agricultural Research scientists are located at the campus in Moscow, at Research and Extension Centers near Aberdeen, Caldwell, Parma, Tetonia and Twin Falls and at the U. S. Sheep Experiment Station, Dubois and the USDA/ARS Soil and Water Laboratory at Kimberly. Their work includes research on every major agricultural program in Idaho and on economic activities that apply to the state as a whole.

Teaching . . . Centers of College of Agriculture teaching are the University classrooms and laboratories where agriculture students can earn bachelor of science degrees in any of 20 major fields, or work for master's and Ph.D. degrees in their specialties. And beyond these are the variety of workshops and training sessions developed throughout the state for adults and youth by College of Agriculture faculty.

Issued in furtherance of cooperative extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, H. R. Guenthner, Director of Cooperative Extension Service, University of Idaho, Moscow, Idaho 83843. We offer our programs and facilities to all people without regard to race, creed, color, sex or national origin.

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