



INTEGRATED PEST MANAGEMENT IN YOUR CANOLA

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INTEGRATED PEST MANAGEMENT IN CANOLA: PROVEN TIPS AND EVIDENCE FOR 10 SOLID TECHNIQUES

Using an integrated approach to managing weeds, diseases and insects in canola needs to make sense from a financial standpoint as well as an environmental point of view. This factsheet summarizes some of the information that is available, and shows growers where integrated pest management makes sense on their farms. Here are 10 techniques where there is evidence (or common sense) indicating that there will be a payoff in using an integrated approach.

What is Integrated Pest Management?

Integrated pest management or IPM uses all the tools that are available for controlling pests. The goal of using IPM is to achieve effective management of pests by using all the tools that are available in the safest manner possible and in a way that enhances the economic viability of the farm. This includes chemical, cultural, mechanical and biological tools. It means not exclusively relying on one technique (e.g., using herbicides exclusively for weed control or tillage exclusively for disease control).

Many growers are already using a number of the IPM techniques described in this factsheet. The challenge for growers is to tie them all together for a complete program that maximizes the effectiveness of their pest management.

Most of any canola IPM program takes place in the timeframe before seeding canola. One estimate of the resources needed for IPM shows that about 70% of the work comes in the seasons leading up to the seeding year. This is because the IPM approach requires forward planning, good knowledge of pest life cycles and is less oriented toward quick fixes.



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For more information on IPM visit our website at: www.canola-council.org

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Weed control in the seasons before you seed canola

Knowing that you will be seeding canola in a given field next year may allow you to ramp up the effectiveness of your weed control in all years. The following is one approach, based on work by Alberta scientists.

Technique 1

Wild Oat Control

Evidence: IPM and wild oat control using economic thresholds

Using economic thresholds for wild oat control makes sense if you take it from a multi-year perspective.

Dr. John O'Donovan ran a two-year study in actual farm fields where he only sprayed wild oats when it paid to spray. He found that cereals (barley especially)

allowed him to skip a spray for wild oats far more often than canola.

Here's how the numbers worked (see Table 1). Note that these actual field cases showed that barley was almost twice as likely to allow for a no-spray year than canola.

It seldom pays to skip a grass control operation in the canola year because:

- (1) canola is not very competitive in the early critical days after emergence relative to wild oats; and
- (2) wild oat control using crop protection chemicals is now cheaper in canola than it is in cereals - it pays to spray less often with a more expensive product.

Table 1: Percentage of fields where farmer could skip a wild oat spray

| Crop | % |
|--------|----|
| Canola | 39 |
| Barley | 77 |
| Wheat | 55 |

Source: Dr. J.T. O'Donovan

Technique 2

Volunteer cereals/crops control through fall tillage

A light tillage in the fall while the soil is still warm (above 6° C) will give close to 90% germination of volunteer cereals. Seed has had the majority of its dormancy bred out and you can use this to your advantage by

encouraging it to germinate in the fall. Let the fall frosts and winter snows control the bulk of your volunteers and save a herbicide decision in the spring.

Technique 9

Good crop establishment

Evidence: Seeding rate, row spacing depth and date help your seedlings grow quickly and fend off weeds, insects and diseases

Good establishment of a crop and fast canopy closure means that weeds will be shaded early. The following data show how bumping up the seeding rate of canola can reduce wild oat competition.

This does not mean that you should bump your seeding rate up by 50% to control wild oats! Use a seeding rate that results in a final plant count of about 80 to 120 plants/yd. But it does demonstrate that a healthy early closure of the crop canopy will help battle pests.

Follow these seeding rules:

- Seed early. Seeding early gives the crop the jump on pests that do better under warmer weather conditions (like wild millet and flea beetles). It also allows the crop to choke out "flushing weeds" that are not controlled by a single herbicide application.
- Seed shallow to moisture. This allows rapid crop establishment.
- Seed near your nutrients. Banding N close to the seed and putting P close to the seed gives the crop better access to nutrients than the weeds.

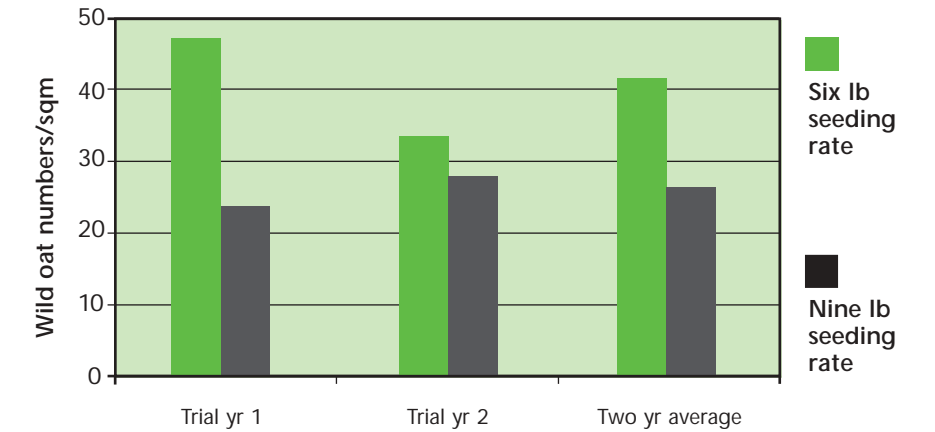
Technique 10

Frequent scouting is crucial

Scouting your canola early is key to making sure you nip problems in the bud. It also can save you the costs of inputs because scouting very often can lead to a reduced number of sprayings.

Provincial pest control guides have excellent scouting instructions. It is important that each time you scout the field, or have a family member do it, stay alert for weeds, diseases and insects (as well as for fertility issues). Table 6 is a summary of what pests to look for and it emphasizes just how frequently you need to be ATVing or walking through your field.

Figure 4: Effect of seeding rate on wild oat levels



Source: J.T. O'Donovan and D. McAndrew, Alberta Research Institute

Table 6: Reasons to do in-season scouting

| Stage of canola at scouting time | What to watch for | Advantages |
|----------------------------------|---|---|
| Emergence to cotyledon stage | Early flushes of cool season weeds Flea beetle damage | May allow you to plan for control of early season weeds before they inflict damage Warm conditions and heavy flea beetle pressures can destroy a crop in hours |
| Cotyledon to six-leaf stage | Weed inventory | May allow you to select lower rates based on species in the field or to skip a spray if economic thresholds are not attained |
| Rosette to early bolting | Check for effectiveness of weed control. Watch for red turnip beetles, diamondback moth larvae and early blackleg lesions | Spot weed control misses early and watch for early insect problems so that control strategies can be planned |
| Bud stage | Begin watching for lygus bug and cabbage seed pod weevil | Early warning so that control strategies decisions can be made |
| Flowering | Check for sclerotinia and early stages of Alternaria blackspot | Examine infection levels and check for the economic benefits of spray/no spray decisions |
| Flowering to late podding | Watch for bertha armyworm and cabbage seedpod weevil | Early warning allows for planning of control and economic threshold decisions |

Disease control in the seasons before you seed canola

Technique 5

Crop Rotation for Disease Control

Crop rotation is a good defence against all canola diseases (See Figure 1 and Table 3). Therefore the key to disease control lies in planning on a multi-year basis.

That's not to say that rotating crops is 100% effective. Disease spores can, in some cases, blow in from adjacent fields or arrive in your field courtesy of infected seed. The reasonable approach is to throw up a complete disease shield on your farm that consists of rotation, clean seed and patrolling of bordering fields the year before seeding to look for disease hosts.

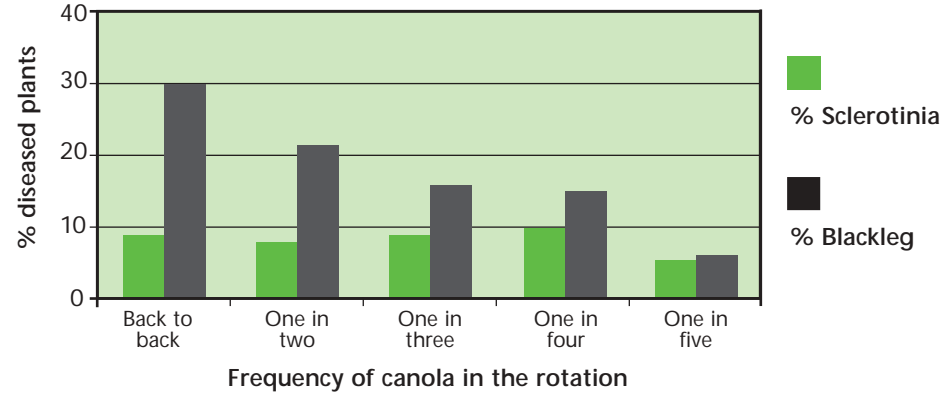
Evidence: Crop rotation does work!

Recent data from the Agriculture and Agri-food Canada Brandon Research Centre shows how effective rotation is in terms of controlling both blackleg and sclerotinia. Note that with blackleg, rotation is very effective in terms of managing the disease. But with sclerotinia rotation is less effective because sclerotinia is more "mobile," entering fields from neighbouring fields via wind.

Does this mean that rotation is ineffective as a sclerotinia control method? Absolutely not. Studies done by Agriculture Canada scientists in Saskatchewan show that sclerotinia risks are higher if growers tighten up their rotation and if moist weather prevails at the time of disease infection.

Table 3 outlines the effectiveness of crop rotation at controlling canola diseases. It also gives you some additional cultural tools that can be used to supplement rotation in managing canola diseases.

Figure 1: Impact of Rotation on Canola Diseases



Source: Tight rotations increase risk of blackleg. Dr. D. McLaren. AAFC Brandon Research Centre.

Table 3: Effect of Rotation on Canola Diseases

| Disease | Rotation recommendation | Limits to the effectiveness of rotation | Additional measures needed |
|-------------------------|--|--|--|
| Blackleg | Three seasons of no canola in the field | Spores can blow in from adjacent fields, can come in as a seed contaminant | Scout adjacent fields for hosts the year before seeding canola, grow resistant varieties |
| Sclerotinia | Three seasons of no sclerotinia susceptible crops | Spores can blow in from adjacent fields | Scout adjacent fields for hosts the year before seeding canola, use test kit to determine problem in crop |
| Alternaria | Three seasons of no canola in the field | Alternaria spores are widespread and can exist on many hosts, can blow in from adjacent fields and can come in as a seed contaminant | Scout adjacent fields for hosts the year before seeding canola. (See recommendations on swathing, variety selection) |
| Brown girdling root rot | Three seasons of no canola in the field. | Four years only reduces the level of infection within a field | (See recommendations on seeding and variety selection) |
| Staghead | Three seasons of no Polish canola varieties in the field | Can come in as a seed contaminant | (See recommendations on variety selection, seed selection) |

Source: Canola Growers Manual

Insect control the years before you seed canola

Technique 6

Scout for insects the year before

Many canola insect pests are difficult to anticipate the year prior to seeding. Some can fly long distances, like diamondback moths, or occur only cyclically, like bertha armyworm.

One insect that is easy to prepare for the year prior to seeding canola is flea beetle. This is especially true if you live in an area that experiences flea beetle problems from time to time. The following gives you an excellent flea beetle control tip that incorporates the full range of IPM tools.

Evidence: You need to manage flea beetles the year before you seed canola

Get your field ready for next year's flea beetles the year prior to seeding canola. Why the year before? Look at the data in Figure 2. Note how quickly flea beetle populations increased in a newly sown canola field. This is evidence that you need to do your IPM work on flea beetles the year before so that you are not reacting to the pest.

Individual canola seedlings can weigh as little as 0.15 grams when they are young and vulnerable to flea beetle attacks. This is not much tissue and this pest can devour it in a single warm afternoon. That's another reason why your IPM work the year before is so crucial.

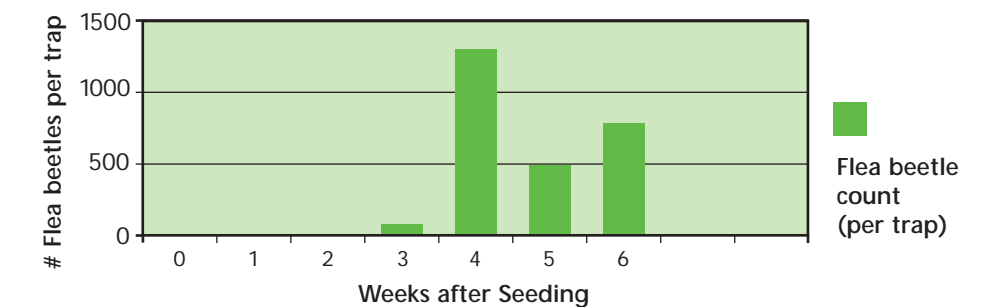
The following practices will help shield you against flea beetle invasions in next year's canola:

- Leave standing stubble in the fall in the field you plan to seed canola. The stubble will trap snow, maximize moisture and allow early seeding date. The earlier you seed canola, the better the plant will withstand flea beetle activity. This insect eats and moves much more slowly in cool weather.
- Check the areas adjacent to the field for flea beetle populations in late summer and early fall. Lots of flea beetles on wild mustard plants or other mustard family weeds is a signal that there are going to be flea beetles overwintering in leaf litter and around the field.
- If you had flea beetles in the past in your area, and if the fall populations signal potential trouble ahead, plan to seed canola first. The canola will get off to an early start thanks to the extra moisture trapped by the stubble. The canola will be past the five to six leaf stage before the beetles will become the most active. Beetle feeding will be less of a problem.

Plan for other insects the year before you seed canola

Insects like diamondback moth fly great distances. Bertha armyworm and grasshopper infestations follow cycles of several years. Thus the best early work you can do to manage these pests is to simply read up on the biology and control of each insect. Also keep in touch with your extension services and agricultural research community to watch for forecasts of how serious these pests are likely to be in the coming year.

Figure 2: Flea Beetle Trap Counts



Source: Review of flea beetle season. 1999. Burke Co. Ext. Ag. North Dakota Extension Services.

Following through on IPM: The year you seed your canola

In the seeding year, follow through on in-crop IPM techniques. Approach pests as a group or basket of pests (weeds, diseases and insects) and pull together all of your tools—in an integrated way—to manage the pests.

Technique 7

Choose your seed variety and source carefully

Evidence: Seed selection and source counts!

There are marked differences between varieties in terms of resistance to blackleg. Choose varieties with at least an “MR” rating for at least some of your fields if you are in a blackleg zone. Choose varieties that offer you the best package of options for weed control as well as yield potential.

Buy certified seed and then check the specifications on the lot purchased to

make sure that you are not choosing lots with blackleg infections or with high levels of cleavers or other weeds.

Recently, two studies (one Canadian and one Australian) looked at the performance of bin-run versus certified seed (Table 4). In both canola-growing areas, there was a rise in the use of bin-run seed as seed

Table 4: Comparison of bin-run seed performance

| Source | Certified seed | Bin-run (% of certified yield) | \$ loss/ac* |
|-----------------------|----------------|--------------------------------|-------------|
| Australian data | 100 | 92 | \$13.48 |
| Western Canadian data | 100 | 93 | \$13.48 |

*At 30 bu/ac and \$5.00/bu canola Source: S.J. Marcroft. Victoria Institute of Dryland Agriculture.

costs rose. Both studies show a remarkably similar loss in net profit averaged over a number of sites. This was due to variable quality and seedling vigour. This says nothing about the catastrophic losses that would occur should bin-run seed contain hidden levels of blackleg inoculum or cleavers seeds.

Technique 8

Fertilizer placement helps manage weeds.

Evidence: Fertilizer planning helps in wild millet control

A fast growing, healthy crop can fend off pests in the early few leaf stages where the seedling is vulnerable to insect damage or weed competition. Getting your crop out of the ground quickly and through the first leaf stages is key. Apply a balanced

package of plant nutrients—it’s the best way to stimulate rapid growth. Band these nutrients to give the crop preferential access and help the crop battle pests.

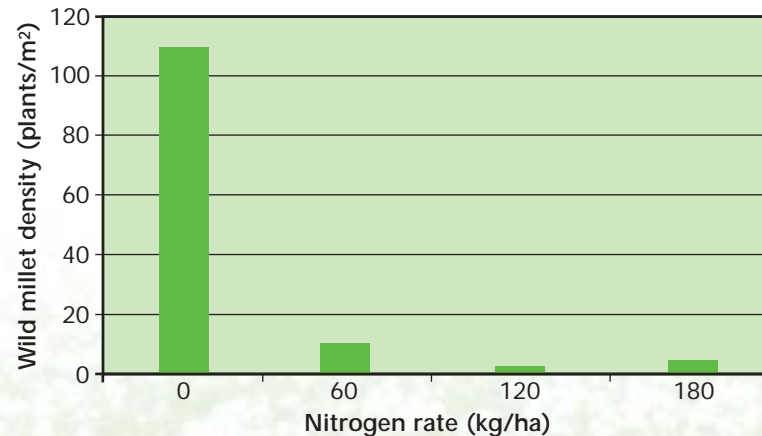
Figure 3 illustrates how banding nitrogen actually decreases the level of wild millet in your field. You would expect wild millet to increase as you crank up the fertility.

But in this case the weed was manipulated into oblivion by using minimum disturbance seeding and banding the

fertilizer close to the crop so that it could out compete the weed.

Strategic placement of fertilizer makes sense from a weed control point of view because it produces healthy, fast growing crops more rapidly than broadcast fertilizer. The combination of a healthier crop and less healthy pests can be seen in Table 5. Notice how side banding N and drilling your phosphorus (P) in with your seed produces a completely different yield.

Figure 3: Effect of fertilizer banding on wild millet levels



Source: J.T. O'Donovan and D. McAndrew, Alberta Research Institute

Table 5: Effect of fertilizer placement on yield

| Fertilizer placement | Yield (bu/ac) |
|------------------------------|---------------|
| Both P and N broadcast | 22.0 |
| N broadcast and P drilled in | 24.4 |
| N banded and P drilled in | 34.8 |

Source: Five Year Summary, Canola Production Centres

Technique 3

Winter annuals including cleavers, stinkweed, shepherd's purse

These are “canola unfriendly” broadleaf weeds because they either have no control methods in canola or are expensive to control in the crop. Light tillage in the fall will give 80 to 90% control of fall germinated weeds.

Technique 4

Canada thistle control through partial-field treatments

Canada thistle is in the top five weeds found in canola fields. The latest weed surveys on thistle are shown in Table 2. Note that thistle is in about half of all fields and it generally only covers a little over 20% of the land within a field, normally within patches or on headlands.

In crop, map thistle patches as you do field operations through the seasons before seeding canola. Check headlands in June and mow in the pre-bud stage to maximize the impact on root carbohydrates. You also can spot treat with glyphosate or with a product containing clopyralid (such as Lontrel in canola or Curtail M in cereals). As harvest approaches, check the field to see if the infestation is wide enough across the field to warrant using the pre-harvest rate of glyphosate as per label.

Pre-harvest or patch treatments of thistle the year before canola will save you from blanket spraying the entire canola field with in-crop thistle mixes. It may allow you to entirely leave out a thistle spray in your canola herbicide tank mix.

Table 2: Canada Thistle Survey (Averages)

| Thistle infestation characteristics | Alberta | Saskatchewan | Manitoba |
|--|---------|--------------|----------|
| Percentage of total fields where thistle is found | 53 | 46 | 59 |
| Percentage of individual field infested with thistle | 24 | 22 | 21 |
| Number of shoots within the patch | 2.5 | 2.7 | 2 |

Source: Weed Survey Series, Dr. A.G. Thomas, AAFC Saskatoon Research Centre.