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For Idaho Commercial Onions

INSECT, DISEASE, WEED CONTROL

Hugh W. Homan, Paul J. Torell, Arthur J. Walz

Production of high quality commercial onions requires protection from pests. Though diseases, insects and weeds are not a serious problem each year, they do have the potential to reduce yields or quality. Common problems are discussed in this publication. For specific problems, contact your county Extension agent.

Onion crop residues provide an overwintering place for insects and disease. Cull dumps should be located away from production fields. To prevent thrips, onion maggots and diseases from moving to the new crop, cull onions should be buried or disposed of before new seedlings emerge in the production fields.

INSECT PROBLEMS

Onion thrips — A generation of onion thrips is complete in as little as 2 weeks during the summer. The female thrips lays her eggs in the tender tissue of an onion plant where the eggs hatch in 4 to 10 days. The larvae feed on the foliage for 5 days, then burrow into the soil where they spend about 4 days before emerging as an adult. Watch small plants for infestation and apply an insecticide if you find about 10 thrips per plant. A short residual insecticide will miss controlling the stages that emerge from the egg in the leaf and the pupa in the soil. A longer residual insecticide is more effective and requires fewer applications to control onion thrips.

Onion maggot — Up to 90 percent of the seedling may be killed and late season onions may be ruined for storage by the onion maggot. There are 3 generations of onion maggots each year in Idaho. If the first generation is controlled — with a seedbed treatment — additional treatments are not necessary. If the soil treatment is not made, a foliar spray must be used every 4 or 5 days until the first generation is past, which could take 6 weeks.

Wireworms — Wireworms are difficult to control in onions. Chemicals for this pest must be applied preplant. Since wireworms do not get into the root zone area until the soil temperature is 50°F and the two effective chemicals will last only about 6 weeks in the soil, they are only marginally effective. The best control is to treat the soil during rotation so the field will be relatively free of wireworms before planting onions. This may be done by soil fumigation or by chemical control on the preceeding crop.

Garden symphylan — This small white centipede is difficult to control, but treatment usually allows you to raise a crop in heavily infested soils. Symphylan is controlled best by soil fumigation. However, parathion, applied preplant in a well prepared seedbed, will also allow growth on an onion crop.

Brown wheat mite — The brown wheat mite is a small, light tan-to-brown mite that sometimes damages onion leaves. This mite is usually found on low-growing grasses and grain crops. It usually attacks onions during cooler weather — May and June — so populations would be declining as the early thrips population builds up. Parathion used to control thrips controls the brown wheat mite on onions.

DISEASE PROBLEMS

Purple blotch — Warm, humid weather aids the spread of purple blotch. Dew helps spore germination and the resultant fungus threads invade the onion leaf. The disease appears first as a small, sunken area on the leaf, whitish in color with a purple center. The area enlarges rapidly and may girdle the leaf. The lesions show masses of spores. The light and dark areas have a target-like appearance. The advancing fungus causes the leaf tissues to turn yellow and then purple.

This disease has no known cure so preventive sprays must be used where the disease is a problem. Sprays used to prevent downy mildew also will control purple blotch.

Downy mildew — Cool, moist weather favors the development of downy mildew on onions. A violet, furry growth can be found on infected leaves especially when viewed while the dew is still on the plants. Leaves turn pale green and eventually yellow as the infected

areas dry. The disease usually starts in a small area and spreads throughout the field.

The spores germinate on the leaf surface during damp, cool weather. The germ tube usually enters the leaf through stomata (breathing pores) and the fungus attacks the internal tissues. The fungus absorbs food from the leaf cells and the tissue gradually yellows and dies. Downy mildew spores overwinter in onions and onion residues left in the fields. Plow down refuse as soon as possible after harvest.

Control measures are preventive and sprays should be applied during weather periods are favorable for invasion by the mildew spores. The mildew does not invade the onion plant during dry periods.

Pink root — The fungus that causes pink root of onions survives in the soil and can live on other crops and weeds. The disease is spread by machinery and waste water from infested fields. The fungus invades and kills the individual roots which turn pink in color before rotting away. The onions continually send out new roots and these also are invaded by the fungus and destroyed. Pink root fungus does not kill the onion plant but infected plants do not produce large bulbs. This disease does not invade the onion bulb. Fumigation will help you produce a marketable crop. Light, frequent irrigations also help the onion plant to overcome the attacks of the fungus. Crop rotation on a 4- to 5-year basis is a means of holding the disease in check.

Neck rot — Neck rot is a fungus that can attack onions in the spring and fall of the year. Late-season invasion of onion bulbs can cause serious storage losses. No chemical control is known for neck rot once the disease is in the bulb. Several cultural practices will help suppress the organism:

1. Do not use excessive rates of nitrogen fertilizer that will prolong the active growing stage of the onion plant.
2. Cut off irrigation in mid- to late-August to better force the onion plant into a dormant stage.
3. Harvest early to take advantage of good curing weather.
4. Dry the tops so no free moisture is on the topping knives to spread the disease from bulb to bulb.
5. Store only well-cured, dry onions.

INSECT CONTROL RECOMMENDATIONS FOR COMMERCIAL ONION PRODUCTION

Insect	Insecticide	Dosage per acre formulated material	Remarks
Wireworms Nematodes Symphylan	Telone	12-20 gal.	Fall application: Place chemical 8 inches deep in soil. Plow in or inject into fallow soil every 12 inches. Soil temperatures must be between 50°F and 85°F at the 6-inch depth. Do not apply when soil is very wet or very dry. When following grain, stubble should be removed. Poor soil insect control may be expected when temperatures are below 50°F. Do not use any formulations of methyl bromide or ethylene dibromide for 2 years before planting onions. Use lower rates on light soils and higher rates on heavier soils.
	Telone II	9-15 gal.	
	Telone C17	10.3-17.1 gal.	
	DD	18-25 gal.	
	Terrocide 30D	15-25 gal.	
	Terrocide 15D	15-25 gal.	

Insect	Insecticide	Dosage per acre active ingredient	Remarks
Wireworms	diazinon	4 lb.	Broadcast over soil surface in spring as close to planting as practical and immediately incorporate into soil by discing, plowing and cross-discing or by rotary tilling. Soil temperature should be above 50°F at the 6-inch level. Use granular formulations.
	parathion	6 lb.	
Onion maggot	Ethion	0.8-2.0 lb.	Apply as a furrow treatment at the time of planting. 8% granular: 25 lb. per acre on 15-inch row spacing 20 lb. per acre on 20-inch row spacing 15 lb. per acre on 24-inch row spacing 10% granular: 20 lb. per acre on 15-inch row spacing 16 lb. per acre on 20-inch row spacing 12 lb. per acre on 24-inch row spacing
	Trithion	1.0-1.5 lb.	Apply as a furrow treatment at time of planting. 10% granular: 10 to 15 lb. per acre on 18-inch row spacing
	Dasanit	1 lb.	Apply as a furrow treatment at time of planting. 15% granular: 3.2 ounces per 1000 foot row unless rows are closer than 6 inches.
Onion Thrips	malathion	2 lb.	Apply to foliage as needed. Coverage is essential for a good thrips control. Use a spreader-sticker unless specified differently on the container label. Apply all insecticides late evening or early morning to prevent damage to pollinators on adjacent crops.
	methyl parathion	1/2 lb.	
	parathion	1/2 lb.	
	toxaphene	1lb.	
	diazinon	1/2 lb.	
Brown wheat mite	parathion	1/2 lb.	Apply only when problem occurs.

Onion white rot — This disease is not known to occur in Idaho although it is found in southern Washington and in a small outbreak in the western Oregon onion growing area. Onion white rot is worldwide in distribution and seriously limits onion production. It is a disease caused by a fungus and can cause wilt and death of the plant. The outside leaves die first. When bulbs are lifted, the outer scales are rotted and the whole lower portion is covered with white fungal strands and may produce many black sclerotia about 1/50th of an inch in diameter.

The disease is spread by importing infected transplants and can be spread by dirty farming equipment. All imported transplants must be inspected by the State Department of Agriculture before planting in southwestern Idaho or eastern Oregon. Once a soil is infected the disease will persist for more than 10 years in the absence of a host plant. No known control is available at this time.

Nematodes — Several varieties of nematodes invade onion plants and cause serious yield and quality losses. These microscopic worms are visible only with high magnification. A laboratory can analyze soil samples from your fields to determine if nematodes are present. Soil fumigation is the only control presently known.

DISEASE CONTROL RECOMMENDATIONS FOR COMMERCIAL ONION PRODUCTION

Disease	Fungicide	Dosage per acre formulated material	Remarks
Pink root	Telone C17	24-27.5 gal.	Follow label instructions.
	Terrocide 15D	28-32 gal.	Fall application — Place material 8 inches deep in soil. Plow in or inject into fallow soil every 12 inches. Soil temperatures must be between 50°F and 80°F at the 6-inch depth. Do not apply when soil is very wet or very dry. When following grain, stubble should be removed. Poor control may be expected when temperatures are below 50°F.
			Do not use formulations of methyl bromide or ethylene dibromide for 2 years before planting onions. Use lower rates on light soils and higher rates on heavier soils.

Disease	Fungicide	Dosage per acre active ingredient	Remarks
Purple blotch Downy mildew Neck rot	Dithane M-45	2 lb.	Apply as needed. Follow label instructions for use of spreader-stickers on onion foliage. Thorough coverage is essential for disease prevention.
	Difolation	1 1/4 lb.	
	Maneb	2 lb.	
	Zineb	2 lb.	Zineb not registered for neck rot.
	Dyrene	3 lb.	Dyrene not registered for downy mildew.
Sprout inhibitor	Maleic Hydrazide (Sprout Stop, MH-30, etc.)	2 lb.	Apply in 100 to 150 gal. water per acre with a ground sprayer. Use 10 gal. water per acre for aerial applications. Bulbs should be fully mature before application. Best results occur when 25 to 50% of the tops have fallen, but all of the tops are still green.
			Follow label instructions for use of a spreader-sticker.

USE CARE WITH CHEMICALS

1. **Be certain of the economic need before applying any chemical.**
2. **Read and follow label instructions on all chemicals.**
3. **Where hazardous chemicals are used, follow label instructions for handling the chemical.**
4. **When band treating in the onion row, calculate for actual area treated at the broadcast rate for a chemical.**

$$\frac{\text{band width in inches}}{\text{row width in inches}} \times \text{broadcast rate per acre} = \text{amount needed per acre}$$

5. **A full record should be kept on all chemical applications on a farm.**
6. **Protect honeybees, beneficial insects and wildlife from pesticide injury not only on the onion crop, but also on adjoining crops where drift may occur.**
7. **These recommendations for use 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 label recommendations carefully with respect to dosage levels, number of applications and minimum interval between applications and harvest.**
8. **The grower is responsible for residues on his crops as well as for problems caused by drift from his property to other properties or crops.**

WEED CONTROL

No problem of weed control is more difficult than that associated with onion production. The crop is planted before soil temperatures are high enough to germinate weed seeds that might be killed by cultivation before seeding the onions. Thus, the onions are subjected to the whole spectrum of annual weeds — kochia, lambsquarters, nightshade and barnyardgrass to consider a few. During early spring the onions grow slowly and are liable to injury from most herbicides until they reach the 2-leaf stage. However, the weeds have a much faster relative growth rate. For example, when onions are in the 2-leaf stage, lambsquarters and nightshade can be 4 to 6 inches tall. They are then too large for control by either herbicides or cultivation. They can be removed only by expensive hand weeding in the row and with considerable damage to the seedling onions.

Consequently, the essential purpose of early season onion weed control is to kill the weeds when they are small or at least to use herbicides that will help keep them small until such time as the onions are in the 4-leaf stage and able to tolerate more severe herbicide treatments. This amounts to a series of multiple treatments that might involve as many as four distinct weed control operations.

The first is a preemergence treatment. Shortly after planting the onions, apply Dacthal at 10 pounds per acre of actual material. With Dacthal and all other herbicide treatments the dosage is stated on a broadcast basis. For band treatments, reduce the rate proportionate to the area actually covered. Incorporate the Dacthal lightly with an implement that will not disturb the onion seed. Do not allow the Dacthal to contact the onion seed as serious injury might result.

If weeds emerge before the onions, and if weather permits, propane flaming is an effective method to kill small weeds. Broadcast flame at an intensity that will cause weed leaves to appear water-soaked.

For postemergence weed control the herbicide TOK is now labeled for multiple applications that include the sensitive flag-stage of onions. Apply TOK according to the following schedule:

TOK WP-50

1. Use only TOK WP-50 in the flag to 2-leaf stage, otherwise serious onion injury might result.
2. Start applications when onions are in the fully emerged flag-stage of growth.
3. Apply 4 pounds active ingredient of TOK WP in a volume of at least 40 gallons of total spray per acre with a spray pressure in the range of 25 to 50 psi.

TOK E-25

1. Start application when onion plants are at least in the 2-leaf stage. Weeds present should not be past the 2- to 3-leaf stage.
2. Apply 4 pounds active ingredient of TOK E-25 in a volume of at least 40 gpa and a spray pressure in the range of 25 to 50 psi.
3. Additional application of TOK might be made, but do not use more than 4 pounds active ingredient per any one application nor more than 12 pounds active ingredient for all applications.
4. Stop applications 45 days before harvest. **Caution**: Do not make a TOK application after an irrigation when rain is apt to occur.

THE AUTHORS — Hugh W. Homan is Extension Entomologist, University of Idaho Cooperative Extension Service headquartered at Moscow. Paul J. Torell is Extension Weed Specialist and Research Professor of Agronomy and Arthur J. Walz is Area Extension Potato Specialist, both headquartered at the University's Research and Extension Center, Parma.

WEED CONTROL RECOMMENDATIONS FOR COMMERCIAL ONION PRODUCTION

Situation	Treatment per acre	Remarks
Preemergence weed control	Dacthal 10 lb.	Apply after planting but before onion germination. Incorporate lightly with nailboard or implement that will not disturb the onion seed. Will give fair control of grass weeds; some broadleaf weeds will not be controlled effectively but others will be stunted and delayed, making them more amenable to later postemergence treatments. Do not use more than 10 1/2 lb. actual Dacthal per acre/year.
Weed emerging before onions	Propane flaming	Broadcast flame at a speed and intensity that will cause weed leaves to appear water-soaked.
Postemergence weed control	TOK E.C. 4 lb.	Apply after onions have 2 to 3 true leaves; use a spray volume of at least 40 gpa. Will give fair to good control of broadleaf weeds that are less than 3 inches tall; only very small grass weeds will be satisfactorily controlled. Spray a 6 inch band in water furrow just before the last cultivation but no longer than 14 weeks after planting onions. Incorporate herbicide with last cultivation.

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