

Volunteer Potato Control

Charlotte V. Eberlein, Rick Boydston, and Mike Thornton

Volunteer potatoes compete with rotational crops for light, water, and nutrients and reduce crop yields. In addition, volunteer potatoes are hosts for a number of serious potato diseases, including late blight, early blight, potato leaf roll, and virus Y.

Studies in Washington have shown that about 95,000 potato tubers per acre were left in the field following potato harvest. Of these, 66 percent were up to 2 inches deep, 28 percent were 2 to 4 inches deep, and 6 percent were 4 to 6 inches deep. Shallow disking, paraplowing, or subsoiling after potato harvest does not alter tuber depth in the field, but plowing after potato harvest buries tubers, which may protect them from freezing. In general, tubers in moist soil die when temperatures reach 28°F; tubers in dry soil will supercool to 25°F before freezing. In southwestern Idaho, average daily soil temperatures often are not low enough to freeze more deeply buried potatoes. In southcentral and southeastern Idaho, soil temperatures often are cold enough to freeze tubers, except when soils are insulated by an early blanket of snow.

Controlling volunteer potatoes is difficult and requires an integrated management approach. Using a combination of tactics to control volunteer potatoes will be more successful than using any single tactic. Management strategies include applying maleic hydrazide to the growing crop (commercial potatoes only); minimizing tubers left in the field at harvest by altering chain size, etc.; using post-harvest tillage practices that keep tubers near the soil surface; post-harvest fumigation; post-harvest spraying; rotation to competitive crops; and using herbicides and multiple

cultivations in rotational crops.

Growers producing fresh market or processing potatoes may consider using maleic hydrazide (Royal MH-30). Royal MH-30 is a growth regulator that

delays tuber sprouting when it is applied three to four weeks before normal harvest but at least two weeks before vine kill. Earlier application or application to stressed potatoes may

Volunteer Potato Control in Buried Cull Piles

Herbicides with potential for volunteer potato control in cull piles that are designated non-crop areas. All of these herbicides are registered in Idaho for broadleaf weed control in non-crop areas. Follow environmental precautions on individual herbicide labels, and observe label restrictions on herbicide movement to surface and groundwater.

Herbicide	Soil or foliar application	Probable effectiveness on volunteer potatoes emerging from buried cull piles ^a
Short or no residual herbicides		
2,4-D	foliar	L
Trimec	foliar	L
Expedite Broadleaf Herbicide	foliar	L
Gramoxone Extra	foliar	M (contact defoliation only)
Buctril	foliar	M (contact defoliation only)
Ignite	foliar	M (contact defoliation only)
Roundup Export	foliar	M
Roundup WSD	foliar	M
Roundup Dry Pack	foliar	M
Roundup	foliar	M
Rodeo	foliar	M
Protocol	foliar	M
Expedite Grass and Weed II Herbicide	foliar	M
Moderate to long residual herbicides		
Simazine 80 W	soil	NI
Aatrex 4L; Atrazine 4L;		
Atrazine 90	soil or foliar	M
Non-Selective Herbicide No. 3	soil or foliar	M
Pramitol 5P	soil or foliar	M
Norasac 4G	soil	NI
Surefire	foliar	M
Arsenal	soil or foliar	M
Contain	soil or foliar	M
Topsite	soil	M
Velpar	soil or foliar	NI
Tordon K	foliar	M
Garlon 3A	foliar	L
Banvel	foliar	M
Amitrol-T	foliar	M

^a L = low, M = moderate, H = high; NI = no information. Note that no tests have been run on these herbicides for volunteer potato control in buried cull piles; ratings are based on herbicide effectiveness for controlling other problem broadleaf weeds.

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result in crop injury and reduced tuber size. Using Royal MH-30 properly may result in a 70 to 80 percent reduction in the next season's volunteer problem.

The number of small tubers left in the field as potential volunteers can be reduced by using narrower pitch chain on the harvester. However, the increased soil load may aggravate tuber decay problems if soil is not removed before tubers are placed in storage. Use a collector bin on the trash chain to gather discarded tubers so that they can be spread in a thin layer on the edge of the field where they are more likely to freeze.

Post-harvest fumigation with metham sodium (Busan, Vapam, others) also can be effective in reducing volunteer potato problems. Vapam is converted to the active ingredient, methyl isothiocyanate (MITC) in the soil. MITC penetrates the tuber about 0.75 inch and kills the potato eyes and surface cells. In California research trials, volunteer potato control with Vapam at 40 to 80 gallons per acre (32 percent formulation) was excellent. To achieve high levels of control, fields must be pre-irrigated and properly tilled to loosen soil and break up compaction zones and clods before application of Vapam via sprinkler irrigation. In Idaho, the potential for success with a post-harvest Vapam application also will depend on fall weather conditions, because the minimum temperature for Vapam efficacy is 40°F. When weather is favorable, fall application of Vapam may be more effective than spring application for reducing volunteer potato problems.

Grazing potato fields after harvest also can reduce the number of tubers near the soil surface. Studies in Tasmania have shown that sheep are effective tuber scavengers, particularly if they are kept hungry and not allowed onto other pasture. Cattle also will eat tubers, but are more prone to choking.

Growing competitive crops is another line of defense against volun-

teers. Canola and small grains (especially winter wheat) are more competitive with volunteer potatoes than sugarbeets, dry beans, and onions. In addition, a number of small grain herbicides will suppress volunteer potatoes, although none will completely kill the plants. Volunteer potatoes have a large carbohydrate reserve in the tuber and can resprout after the foliage has been destroyed. Herbicides such as Buctril and Bronate usually will burn down potato foliage long enough for a vigorous grain crop to out-compete the potatoes. Other herbicides, such as Banvel, Curtail, and Harmony Extra, also injure potatoes, causing leaf malformations and stunted growth, but do not kill the plants. Late season control of volunteer potatoes in wheat (not wheat grown for seed) can be achieved with a pre-harvest application of Roundup after the hard dough stage (30 percent or less grain moisture) or with a post-harvest application of Roundup. Research in Oregon has shown that Roundup applied when daughter tubers were over 2 ounces greatly reduced seed tuber viability.

A combination of cultivation and herbicides can provide fairly good volunteer potato control in conventionally-tilled corn. In Washington studies, the best treatment for volunteer potato control was a combination of cultivation and a sequential application of atrazine at 1 lb per acre a.i. preemergence followed by 2,4-D + Banvel postemergence. Postemergence application of 2,4-D + Banvel; Banvel + Accent or Beacon; or a sequential application of Bladex preemergence followed by 2,4-D + Banvel postemergence also provided control of volunteer potatoes, but did not reduce tuber production as effectively as the atrazine sequential treatment. The disadvantage of the atrazine treatment is that it limits crop rotation options.

In many late-planted crops, Roundup can be used before planting to suppress volunteer potatoes. Roundup applied to plants that are small will kill

emerged shoots, but new shoots will come up about two to three weeks later, and viable daughter tubers can be produced.

In row crops where herbicides that suppress volunteer potatoes are not available, frequent cultivation can provide volunteer potato control. In Washington, cultivating four times during the season beginning when volunteer potatoes were at the 6 to 8 leaf stage and hooking, and repeating each time they regrew to this stage, reduced potato competitiveness and nearly eliminated production of new tubers.

Volunteer potatoes also can be a problem in cull piles, even when piles have been buried with 18 inches of soil. No research on controlling volunteer potatoes in cull piles has been conducted in Idaho. However, if cull piles are designated as non-crop areas, there are a number of herbicides that can be used for general broadleaf weed control. Several of these compounds have activity on volunteer potatoes (see Table). Note that soil-applied herbicides will need to be activated by rainfall or irrigation in order to be effective. Consult individual product labels for the amount of water needed for activation.

In summary, there are no simple solutions for volunteer potato control when tubers are not winter-killed. In these situations, multiple cultural and chemical tactics are needed to prevent problems with volunteer potatoes.

Authors

Charlotte Eberlein is a weed scientist at the Aberdeen Research and Extension Center, Idaho. Rick Boydston is a weed scientist with the United States Department of Agriculture Agriculture Research Service in Prosser, Washington, and Mike Thornton is an extension crop management specialist at the Parma Research and Extension Center, Idaho.

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