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Managing Hairy Nightshade—Challenging, but Not Impossible

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For nearly twenty years I've been hoeing out and never letting go to seed a weed in my garden, common mallow. Yet, there seems to be a never-ending source of common mallow seed continually germinating in my garden. Potato producers may feel the same about some of the weeds they battle in their crop each year, particularly hairy nightshade (*Solanum physalifolium* Rusby).

As producers well know, it's particularly difficult to control hairy nightshade partly because it is closely related to potatoes. With both potatoes and hairy nightshade being in the *Solanum* genus, this limits the choices of herbicides to control hairy nightshade when growing a potato crop. To successfully manage hairy nightshade, producers need to also apply control measures in rotational crops, but more on that later. In part, controlling hairy nightshade is difficult because of the number of seeds it produces and the ability of these seeds to survive.

A single hairy nightshade plant can produce 1,700 berries with each berry containing 10 to 35 seeds. Do the math and you'll quickly see that one plant can produce 17,000 to 59,500 seeds. Evenly spread those seeds from just one plant over one acre, and you'd have the potential to have from 0.4 to 1.4 plants to square foot. That's just from letting one plant go to seed. The number of seeds that can be produced on just one acre from normal potato production practices is almost mind boggling. It can be in the billions!

Besides being a prolific seed producer, hairy nightshade seeds can germinate all season long, not just in the cooler spring months, which is common among many other annual broadleaf weeds. Adding to the ability to germinate all season long, hairy nightshade can also progress from germination through seed production in about six weeks. Consequently, even if hairy nightshade is controlled early in the season, it has the ability to produce plants and more seed from these later germinating seeds. These later produced hairy nightshade plants can be seen in many potato fields after the vines are killed. You'll see green, growing hairy nightshade plants among the dead, brown potato vines.

If what you've read so far doesn't make you think this really is a difficult weed to control, add another factor—seed dormancy and survival. Pamela J. S. Hutchinson at the University of Idaho Aberdeen R & E Center has been studying hairy nightshade seed survival. She has found that hairy nightshade seeds have a built-in dormancy that does not allow the seeds to germinate immediately after maturity. Hutchinson and others in her project have found that it took five months for all the seeds collected in September and October to germinate. Hutchinson says, "This innate dormancy is a survival mechanism allowing the seeds to germinate only after a period of time that usually coincides with spring rather than germinating in the fall and being killed by frosts before seed production occurs."

Although hairy nightshade seeds can germinate five months after maturity, many do not germinate and up to 90 percent can remain alive and capable of germinating for up to five years after they are produced. However, the germination percentage dramatically decreases after 5 years and only 2 percent are viable 8 years after maturity. Even so, the hairy nightshade plants you are trying to control in the current potato crop likely came from seeds produced in the previous potato crop.

Hairy nightshade is a tough competitor with potatoes, but not all potato varieties compete equally well with this weed. Under low light conditions, hairy nightshade will likely not produce berries that eventually produce the seeds. Hutchinson found in her work that Russet Burbank was a good competitor with hairy nightshade during the growing season because after the potato plants close across the rows (row closure) only 6 percent of the light above the crop canopy reached below the canopy. Compare that with Russet Norkotah where after row closure light penetration was only reduced to 60 percent below the canopy compared with the light above. As you might surmise because the hairy nightshade weeds were more vigorous in Russet Norkotah, it took fewer weeds to cause significant yield reductions compared with Russet Burbank.

A foundation to managing hairy nightshade should include growing rotational crops that can vigorously compete with this weed. As seen from the above discussion about competitiveness of nightshade with two different potato varieties, likewise crops that grow and rapidly shade the ground will be more successful in competing with hairy nightshade. The ultimate goal in controlling hairy nightshade is to reduce seed production. You will likely never get rid of all the seed, but reducing the seed supply in the soil is essential.

Fortunately, winter wheat, a common rotational crop in many potato rotations produces a lot of shading so it's a good competitor with hairy nightshade. Fields with heavy hairy nightshade infestations should be planted with winter wheat two or three years of a rotation to help reduce seed production and ultimately decrease hairy nightshade populations. Additionally, small hairy nightshade plants in a grain crop can be controlled with herbicides labeled for small grains.

Hairy nightshade can be a difficult weed to manage, but there are several effective chemicals that can be used in a potato crop and in rotational crops such as winter wheat. The ultimate goal is to have fewer nightshade weeds produce seed each year resulting in fewer plants that will need to be controlled in the future.

Did You Know?

Although the three *Solanum* weeds, hairy, cutleaf and bittersweet share a common name, nightshade, they originally grew in different areas. Hairy nightshade likely originated in South America, cutleaf nightshade in North America, and bittersweet nightshade in Eurasia.

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