

Waterhemp on its way in Ontario



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By Ralph Pearce

A growing number of researchers and agronomists have spent the 2003 growing season acquainting themselves with common waterhemp, one of the newest weed species to inhabit fields in Ontario. Preliminary discussions suggest that while it may not be an immediate problem, seeing it for what it is now could help growers avoid in the future what many US producers are currently struggling to control.



Waterhemp at the Brigden site is resistant to atrazine and ALS Group 2 herbicides. The plants have green, purple and white appearances.

In the US midwest, waterhemp has become the scourge of soybean growers, with some fields reporting near 50 percent yield losses under severe pressure. Its impact is greater in soybeans than corn, because corn's height and competitive nature work more effectively against the weed. And waterhemp's infamous stature has come nearly 15 years after it was first identified in fields and has continued its spread from Kansas, Nebraska and Illinois, northeastward into Michigan. When first identified in the midwest, it was dismissed as 'more of a southern weed'.

No longer a question of 'if' it is coming, waterhemp has been found in three fields in Ontario, near Brigden, Cottam, and most recently in a field in the Huron-Bruce region. And it represents some rather daunting challenges in terms of weed management. The first hurdle is proper identification. According to Mike Cowbrough, field crops weed specialist with the Ontario Ministry of Agriculture and Food office at the University of Guelph, common waterhemp could be dismissed as an odd-looking pigweed, albeit a thinner and taller variant.

"From the grower's perspective, they have a lot bigger fish to fry than understanding the intricacies of waterhemp identification," says Cowbrough.

He also says there is still time to develop a management strategy for the new species. "The bigger challenge is identifying what it does in this province versus Illinois, in terms of peak emergence and other factors."

Emergence an important issue

Dr. Susan Weaver, weed crop ecology specialist with Agriculture and Agri-Food Canada's Greenhouse and Processing Crops Research Centre at Harrow, Ontario, echoes Cowbrough's assessment on emergence, particularly that it does so at a later stage. "So, sometimes when herbicides are applied early or aren't residual, you get waterhemp emerging later in the season," explains Weaver.

She looked back on data kept from the 2003 growing season and found that waterhemp started emerging during the first week of June, and continued emerging through the end of July. "If you were putting on your post-emergence product at the end of June, you still may be missing stuff. And the ones

that come up late like that are going to have less impact on yield than the early ones; but they can still produce seed and cause the population to increase in other years.”

In soybeans, the main post-emergence possibility to control waterhemp is Roundup, provided a grower is growing Roundup Ready soybeans. Reflex is another suitable compound, however, neither of these have residual activity. “There are still soil applied herbicides that seem to control it pretty well, except they may not last long enough.”

Cowbrough agrees with Weaver, and points to the management system that reportedly works best in those regions with severe pressure in the US. “Usually the approach is 'I'm going with Frontier or Axiom or Primextra' because they all will have pretty good initial control of waterhemp, and then they'll come back with a post-emergence herbicide to take care of the second flush,” says Cowbrough, naming Distinct and Callisto as the two most successful post-emergence products that can be used against it in corn.

The key to resistance

The second major issue to Weaver and others, is the resistance that has been detected in the two primary plots in southwestern Ontario. She says a relatively new wrinkle in the US is the weed's development of resistance to the diphenyl ether herbicides, like Blazer and Reflex (Group 14) used in soybeans. Dr. François Tardif, a professor in the Plant Agriculture Department at the University of Guelph, has monitored the problem as well, and concedes the Brigden site is resistant to atrazine and all the ALS (Group 2) inhibitors. The Cottam site, based on molecular tests, is also resistant to Group 2 herbicides.

One of the more intriguing and unique traits in waterhemp, notes Tardif, is its male and female plants. Unlike most weeds, waterhemp's male and female plants must cross-pollinate to reproduce. That difference might lead some to believe waterhemp would be easier to control than a self-pollinating weed. Not so, says Tardif; cross-pollinated plants can lose some of their short-term adaptability as gene 'shuffling' takes place between generations. “But the big benefit of gene shuffling is that they have more genetic variability and can respond more rapidly to environmental changes or management changes,” says Tardif. “So, I see the same type of pattern in waterhemp, the fact that you have multiple cross-pollination, you may get mixtures of populations more rapidly.”

Creating awareness the first step

Much about waterhemp is still unknown. Tardif contends that it is still a weed that can be managed. “It has not become a huge infestation and there are probably alternatives that we can use,” he says, adding that Ontario plants may not be as competitive as they are in Illinois. “That's something that reassures me: it may not be as powerful, but it could have a capacity to evolve and slowly adapt to conditions if we let it go and it becomes more competitive.”

For Cowbrough, it is still too early to call waterhemp a problem. “I don't see it as being a case of every field in Ontario is going to have waterhemp in two to three years, but it should be on the radar screen because I wouldn't be surprised if in five to 10 years, it is a problem,” he says. “It's just one of those species that tends to germinate over a long period of time, it has multiple flushes and is extremely variable.”

For Weaver, the concern is linked back to identification. Growers sometimes mis-diagnose a condition or weed; soybean cyst nematode can be attributed to problems with fertility, manganese deficiency or sudden death. The same, says Weaver, could be true with waterhemp. Growers might dismiss it as a type of pigweed. “We are a little concerned that there are probably growers out there who have it now and don't know it,” explains Weaver. “Different people won't really take notice of it until the population gets fairly large in the field, and a couple of escapes when it first comes in will be easy to overlook.” -30-

How new is waterhemp?

The Bottom Line

Since common waterhemp cross-pollinates, it has the ability to adapt at a greater rate to environment and management changes. This makes it essential to scout your fields for this weed species and its identification. This will allow for early detection and eradication measures to prevent the species from adapting to its environment. **Elwin Vince, Merlin, Ontario.**

A few years ago when we first saw velvetleaf, it became a huge problem very quickly, especially in the US. The chemical companies soon had a solution, with Group 2 herbicides. We're fortunate that most new weed species become a problem in the US first because there is more chance of a solution. However, now that we're all using Roundup Ready technology, the companies are not putting so much effort on developing new products and it seems that waterhemp is fairly tolerant to glyphosate.

We need to watch this one very carefully: the first year you might think you did something wrong and missed a weed. By the time you know you have waterhemp, you'll have a huge problem! **Lennie Aarts, Wainfleet, Ontario.**

Although common waterhemp is new to Ontario, records that date back to the 19th Century suggest a close relative, tall waterhemp, has been part of the landscape for many years. As Mike Cowbrough, from the Ontario Ministry of Agriculture and Food office at the University of Guelph, points out, the provincial Herbarium of 1895 mentions a species of tall waterhemp that grew along watercourses and in wetlands in small numbers.



This is acknowledged by Dr. Susan Weaver of Agriculture and Agri-Food Canada's Greenhouse and Processing Crops Research Centre at Harrow, Ontario. She adds that tall waterhemp can be found in those same locations, but there is still much to learn about the relationship between the two. Tall waterhemp, identified as *Amaranthus tuberculatus*, is a wild cousin of common waterhemp, or *Amaranthus rudis*, the growing concern for researchers and agronomists.

Dr. François Tardif, from the University of Guelph, adds the two may be closer in relationship than cousins and they may be more like brothers and sisters. "In Illinois, where both common and tall are very abundant, it's difficult to find plants that look like 'typical' tall waterhemp or common waterhemp," says Tardif. Taxonomy work between Tardif and Dr. Mihai Costea has led to the recognition that they are probably the same species, the weedy type being a variety that has evolved from the wild type.

Waterhemp is a huge seed producer with great genetic variability.

Concerns over whether tall waterhemp has been the cause of common waterhemp's arrival is now moot; although found in only three locations, the common waterhemp populations are significantly larger and they are herbicide resistant. -30-