

MANAGE RESISTANCE*Now*

Welcome to the
Manage Resistance Now
newsletter!



This newsletter is designed to keep you updated on the latest information regarding resistance management. In this edition, we are highlighting how ManageResistanceNow.ca can support your network and providing some important off-season reminders.

We appreciate your support in sharing information to raise awareness of pest resistance and promoting the valuable resources available on ManageResistanceNow.ca. We also welcome your suggestions for additional resources that would be helpful for you, your stakeholders, and, of course, Canadian growers.

The Manage Resistance Now website: tools, insights and resources to support resistance management decisions

MANAGE RESISTANCE*Now* FRANÇAIS CONTACT [Facebook] [Twitter] [YouTube] [Search]

ABOUT US WEEDS DISEASE INSECTS EXTERNAL RESOURCES LIBRARY MEDIA KIT

ACT NOW

New Bt Resistant European Corn Borer Resource

[VIEW NOW](#)

CANADIAN CORN PEST COALITION
LA COALITION CANADIENNE CONTRE LES RAVAGEURS DU MAÏS

SCOUT REPORT MITIGATE

SCOUT Look for signs of ECB damage in Bt corn fields in late summer.

REPORT Contact your seed agronomist and provincial specialist, if you find any signs of...

WEEDS **DISEASE** **INSECTS**

Are you dealing with resistance on your farm? Discover effective strategies for managing resistance. This is your one stop shop for expert insights, practical tools, and advice to help you navigate resistance challenges and cultivate resilience in your fields.

Explore topics such as herbicide, fungicide and insecticide resistance, Integrated Pest Management (IPM) and more. Whether you're facing setbacks or striving for development, we're here for you.

Built to support on-farm resistance management decisions

Managing resistance – diseases, insects and weeds – is getting more complex, and trusted, timely and practical information matters more than ever.

As a partner stakeholder you play a critical role in helping growers make informed, sustainable and timely decisions. ManageResistanceNow.ca was developed to support exactly that.

Why promote ManageResistanceNow.ca to your network?

- Canadian-focused, science-based information on resistance management
- Practical tools and insights you can use in grower conversations
- A one-stop resource covering multiple pests, crops, and management strategies

ManageResistanceNow.ca features grower-ready resources:

- Factsheets, case studies, grower testimonials, videos and images
- Advice from leading industry experts
- English and French languages

Top ManageResistanceNow.ca downloads:

Palmer Amaranth factsheet



MANAGE RESISTANCE Now
Protect your land, one field at a time

PALMER AMARANTH (AMARANTHUS PALMERI)

WHY IT'S IMPORTANT

Palmer amaranth is rapidly spreading throughout North America and threatening crop production. What makes Palmer amaranth such a challenge is its prolific seed production (100,000 – 500,000 seeds/plant) and because the small seeds are easily dispersed through the field.

It is one of the most widespread and economically damaging agronomic weeds in the Southeastern U.S. and has been shown to reduce soybean and corn yields by 79% and 91%, respectively. Not only is Palmer amaranth more competitive than other amaranth (pigweed) species, but it is also resistant to multiple herbicide modes of action (Groups 2, 3, 4, 5, 9, 10, 14, 15 and 27).

To date, there are no known established populations of Palmer amaranth in Canada; however it has spread to fields in Northeastern U.S. and other parts of the world from its native origin of Southwestern U.S. and Mexico. The potential range of Palmer amaranth includes southern to central portions of most provinces in Canada. There have been a few Palmer amaranth plants detected in Ontario and Manitoba over the years, all of which have been eradicated.

Palmer amaranth could enter Canada unintentionally as a contaminant of seed, grain, hay, livestock feed, bird feed, horticultural propagules, soil, vehicles and used farm equipment. It grows in crop fields, pastures, gardens, roadsides and a variety of disturbed habitats, and is an aggressive competitor with up to 7 cm of growth per day.

DETECTIONS IN CANADA

Photo credit: Rebecca B. Wallace

Kochia factsheet

Waterhemp factsheet



MANAGE RESISTANCE Now
Protect your land, one field at a time

MANAGING HERBICIDE-RESISTANT WATERHEMP

WHY IT'S IMPORTANT

Waterhemp (*Amaranthus tuberculatus*) is a non-native annual weed rapidly spreading across Canada. Currently found in Ontario, Quebec, and Manitoba, waterhemp prefers moist or wet conditions with full or partial sun, similar to many economically important crops.

DETECTIONS IN CANADA

WHY WATERHEMP IS A PROBLEM

- **Resistant to herbicides** – Most waterhemp in Canada is resistant to at least one herbicide mode of action, with multiple resistance common.
- **Becomes resistant quickly** – Waterhemp can evolve resistance in three cycles of selection (by the same herbicide(s)) due to its extensive genetic diversity.
- **Has a large emergence window** – From spring to early autumn.
- **Fast growth** – 2.5 - 4 cms per day.

- **Produces millions of long-lasting seeds** – Can produce up to 4.8 million seeds per female (300,000 - 1 million under the crop canopy), rapidly increasing the soil seed bank. Seeds become viable as soon as seven days after pollination and can persist in the soil for about eight years.
- **Spreads easily** – Seeds are small (~1 mm), facilitating spread through the movement of plants, farm equipment, migratory animals and birds.

DEVELOPING HERBICIDE RESISTANCE

Waterhemp is dioecious (separate male and female plants), which contributes to high genetic diversity and rapid herbicide resistance development. As a member of the *Amaranthus* (pigweed) family, it resembles related species, including redroot pigweed, green pigweed and Palmer amaranth and may hybridize with other pigweeds. Hybrid pigweeds may inherit herbicide resistance from one or both parents and have mixed morphology making it even more difficult to identify species.

See the [Palmer amaranth fact sheet](#) for identification help.

Most waterhemp found in Canada is resistant to two or more herbicide modes of action – and up to five modes of action in Ontario and Quebec.



Hear from a Grower tip sheet

KOCHIA: A GROWING CONCERN

Kochia (*Rassia scoparia*) is an annual broadleaf noxious weed that is an increasing concern for crop producers throughout Canada.

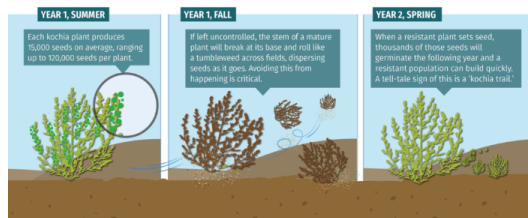
The troublesome weed can significantly impact crop yield. Research shows mean yield losses are greatest in grain corn, followed by sorghum, soybean, sugar beet, silage corn, sunflower, spring wheat, field pea, canola and oat. Near-complete crop failure (~90% yield loss) was observed in corn, sorghum, sugar beet and sunflower.¹

Proper management practices can help growers protect yield and preserve their crop protection options for the future.

WIDELY ADAPTABLE AND PROLIFIC SPREADER

Kochia is difficult to control due to its ability to spread quickly and to thrive in challenging conditions such as heat, drought and high-saline soils.

Preventing kochia from setting seed (in field and non-crop areas) is critical to reducing its spread

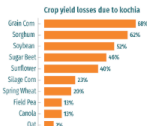


Identifying kochia

Kochia is one of the first weeds to emerge in the spring. The leaves are hairy and elliptical shaped with a trademark pink underside. Without proper weed control, the compact seedling will mature into a bushy plant, up to two metres in height. The colour of the stem, and sometimes the entire plant, changes from green to crimson.

ABOUT HERBICIDE-RESISTANT KOCHIA

Herbicide-resistant kochia is one of the largest weed threats to crop production in Western Canada. Group 2 resistance was first reported in 1988; today, nearly all kochia populations in



Canadian farmers are stewards of the land and have the closest connection to what really happens on the farm when resistance issues arise.

That's why Hear from a Grower, a peer-to-peer information-sharing campaign, is so important. Seven growers from across Canada have shared their experience managing resistant pests in their orchards, row crops, fruits and vegetable crops.

Here's a summary of the top five tips from Hear from a Grower that fellow farmers can easily follow and implement to manage resistance.

Hear from a Grower: top five tips for managing resistance

- Plan diverse crop rotations**
Rotating crops each growing season is essential to managing pest resistance. Crop rotations allow for the combination of crops with different seeding and harvesting dates, reduce pest pressure over time while enabling growers to rotate pest management tools to disrupt pest life cycles and control challenging pests.
- Rotate modes of action, traits and active ingredients**
Rotating seed traits and pesticide active ingredients with different modes of action (e.g. use herbicide mixtures and rotate herbicide groups) make it more challenging for pests to develop resistance to the repeated use of the same mode of action or trait. For instance, using herbicide mixtures in rotation can have an impact within and between growing seasons. It's important to responsibly use all the pest management tools in your toolbox, so be sure to follow the labelled rates and timing for crop protection products.
- Practice Integrated Pest Management**
Integrated Pest Management (IPM) involves a combination of cultural, biological and mechanical controls and techniques to manage pests. These practices make the environment less attractive to insect pests, conserve natural enemies to help reduce pest pressure, manage pests by using physical barriers, and expand the toolbox of products including those created from bacteria, fungi, plants and minerals. Applying pest control products responsibly and implementing the strategies, such as rotating pesticides and scouting fields help mitigate the risk of resistance development.

Whether you're preparing recommendations, answering tough resistance questions, or looking for reliable resources to share, ManageResistanceNow is designed to support your network.

Explore and share the resource: www.manageresistancenow.ca

Let's work together today to help Canadian growers protect our cropping tools and technologies for tomorrow.

What can you do to support Canadian growers?

- Follow and share Manage Resistance Now content on your channels
- Request printed copies of factsheets and postcards for your next event
- Looking for a speaker, or need an expert on pest resistance? Manage Resistance Now has a team that can support you and your growers. Just reach out.
- Share your feedback – are you looking for a new resource? Want to partner on a project? We'd love to hear from you.



Off-season reminders: leverage field and weed history for better results

Why weed history matters more than a single season – Reviewing field history is one of the most underused tools in resistance management. Weed pressure does not reset each spring. It accumulates, shifts, and responds to management decisions over time.

Patterns often emerge when viewing weed maps from multiple seasons together. Small patches that persist year after year, expand along equipment paths, or survive repeated treatments are early indicators of elevated resistance risk. In contrast, areas that respond consistently to control suggest current strategies remain effective.

Looking back across several seasons allows growers and agronomists to link weed pressure with crop rotation, herbicide programs, and application timing. It also

helps determine where focused treatments may be helpful to recover productive land from a bad weed patch, or where alternative tools such as different modes of action, cultural practices, or targeted approaches are warranted.

Recording and reviewing weed history turns resistance management from a single season decision into a long-term strategy.

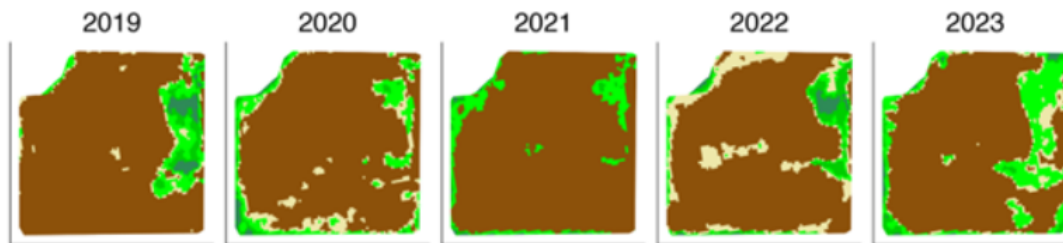


Figure 1: A set of weed maps (created by [Geco Strategic Weed Management](#)) showing how the shape and size of a kochia patch changes over a five-year period. In some years, such as 2021, favorable weather conditions result in a smaller visible infestation, even though the underlying weed seedbank remains present.

Recommended reading

- [Challenges facing the management of pesticide resistance in weeds, diseases and insect pests in European agriculture and the future of effective IPM implementation](#) – how EU regulations limiting available modes of action influence resistance management and agricultural sustainability.
- [Herbicide resistance sprouts in Manitoba's wild oats](#) – wild oat resistance is on the rise in Manitoba
- [The Agronomists, Ep 221: Corn rootworm challenges with Dr. Jocelyn Smith and Greg Stopps](#) – everything you need to know about the rising risk of corn rootworm
- [Crop Rotation Increases Yields and Revenue by 20%, Major Global Study Finds](#) – understanding the economic value of crop rotation
- [Tame Wild Oats with Early-Maturing Crop Rotations and Harvest Weed Seed Control in the Canadian Prairies](#) – why growers should consider early-maturing crops to manage wild oats
- [Glufosinate resistant waterhemp found in U.S. Midwest](#) – weed experts suspect glufosinate-resistant waterhemp.

Events | Where we've been

Sponsorship: Canadian Weed Science Society AGM



Manage Resistance Now was proud to sponsor the 2025 CWSS Annual Meeting in Gatineau, Quebec. Our sponsorship supported custom tote bags designed by Sandra Flores-Mejia featuring several of “Canada’s Yield Robbers”. The bags included Manage Resistance Now promotional materials, and additional materials were available at registration. Manage Resistance Now was also recognized throughout the meeting via the conference room slideshow.

Check out the new [Manage Resistance Now postcard](#) – available for your next event.

MANAGE RESISTANCE Now

Is fungicide resistance threatening your yields?
Discover how to manage fungicide resistance in crops.

Are you dealing with herbicide resistant weeds?
Find tips for managing herbicide-resistant weeds, like kochia, wild oats and waterhemp.

Have resistant insects taken over your pest control strategy?
Get new ideas about integrated pest management.

Do you have a tradeshow, speaking engagement or event coming up? Manage Resistance Now can support you with resources for [weeds](#), [insects](#), and [diseases](#), including factsheets, postcards and promotional materials.

You can also contact the [Manage Resistance Now Team](#) to learn how they can help you spread the word about pest resistance and best management strategies.

Please feel free to share this newsletter with colleagues in your organization. If you have colleagues who would benefit from these updates, please email [Manage resistance Now](mailto:ManageResistanceNow@constantcontact.com) to have them added to the distribution list.



MANAGE
RESISTANCE *Now*

Manage Resistance Now | 1201-350 Sparks St. | Ottawa, ON K1R 7S8 CA

[Unsubscribe](#) | [Update Profile](#) | [Constant Contact Data Notice](#)



Try email marketing for free today!