



Pigweed species Identification Guide

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Pigweed Species

Canada and U.S.

Redroot pigweed

Green pigweed

Smooth pigweed

Prostrate pigweed

Tumble pigweed

Waterhemp (MB, ON & QC)

U.S.

Spiny amaranth*

Palmer amaranth

*Scattered plants found in Ontario

Pigweed Species

Currently in Ontario the Pigweed family have confirmed resistance to 6 of the 8 Herbicide Groups where resistance occurs – this is the most of any (Groups – 2, 5, 6, 7, 9, 14, 27)

Pigweed Species

Herbicide Resistance in
Ontario

Redroot pigweed	Groups 2, 5, 6, 7
Green pigweed	Groups 2, 5, 7
Smooth pigweed	Group 6
Waterhemp	Groups 2, 5, 9, 14, 27
Tumble pigweed	None reported
Prostrate pigweed	None reported

Pigweed Species

- **Palmer amaranth seedling** - notched tip, no hairs, broad ovate shaped leaves, no waxy sheen.
- **Waterhemp seedling** – egg shaped cotyledons, notched tip, no hairs, narrow lanceolate leaves, waxy sheen.
- **Redroot pigweed seedling** - notched tip, small fine hairs, ovate shaped leaves. Green and smooth pigweed very similar.



Palmer amaranth



Waterhemp



Redroot pigweed

Pigweed Species Cotyledons to 2-Leaf Stage



Palmer



Waterhemp



Smooth



Palmer



Waterhemp



Smooth



Spiny



Redroot



Green



Spiny



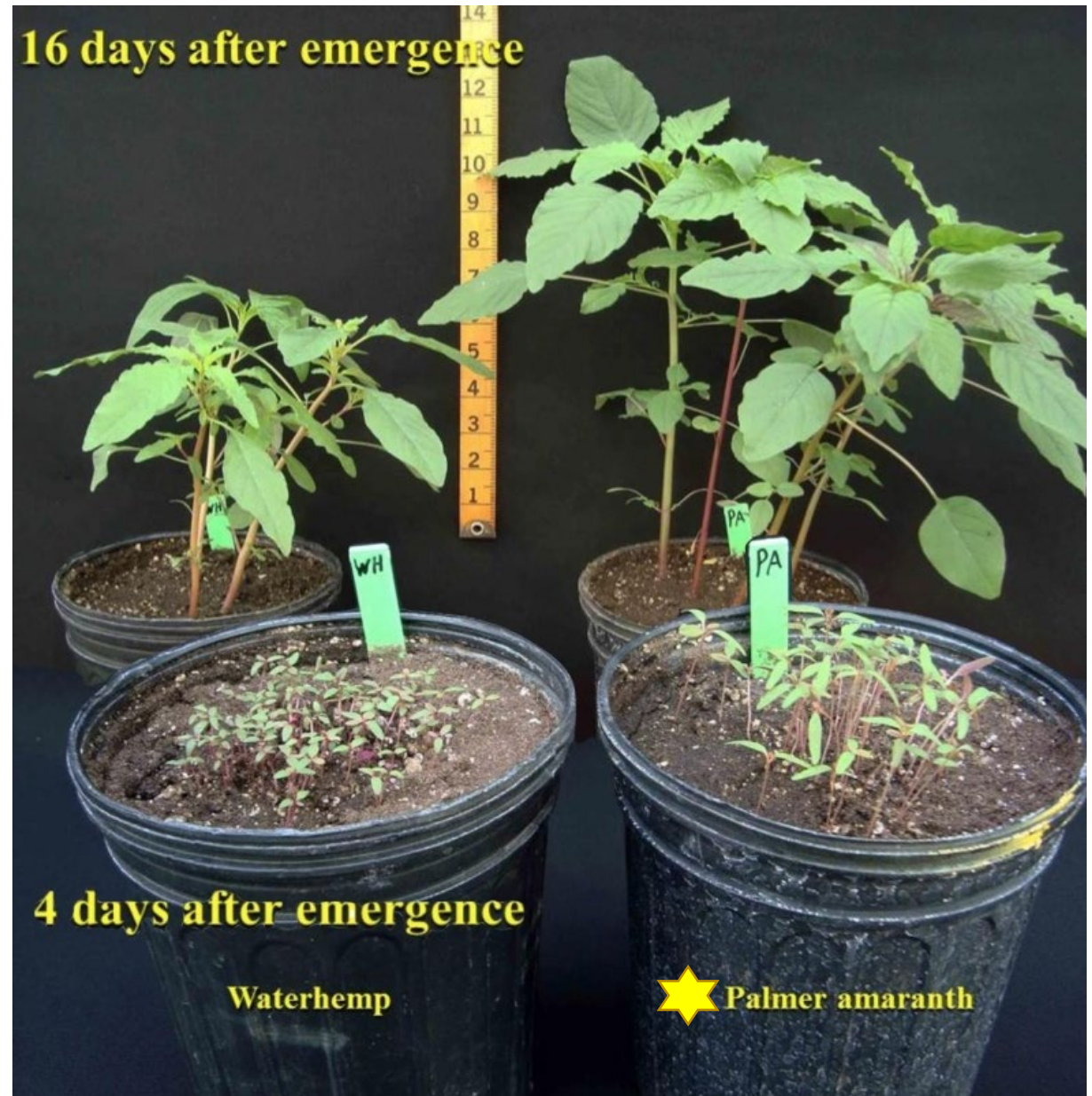
Redroot



Green

Pigweed Species

Seedlings and young plants of Waterhemp and Palmer amaranth



Palmer amaranth can grow up to 7cm a day



Palmer amaranth female plant



Waterhemp



Green pigweed



Redroot pigweed

© C. Shropshire

Pigweed Species Stems |



Palmer amaranth



Waterhemp



Redroot pigweed

Pigweed Species Inflorescence

Pigweed Species

Pigweed species seed is not distinguishable...

- **Palmer amaranth** - 100,000-500,000 seeds/plant
- **Waterhemp** - can produce over a million seeds without competition. Seeds can be viable 7-12 days after pollination.
- **Redroot and Green pigweed** - can produce 100,000 – 600,000 mature seeds



Pigweed Species

Pigweed species
seed is not
distinguishable



**Over 1 million seeds
from a single
female!**

Pigweed Species
Palmer amaranth

Pigweed Species

Palmer Amaranth

(a serious problem weed)

- Adapts quickly (Dioecious plants – male and female)
- Prolific seed producer (100,000-500,000 seeds/plant)
- Small seed (easily dispersed, thrives in no-till)
- Aggressive competitor (growth up to 7 cm/day)
- Herbicide resistance – Groups 2, 3, 4, 5, 9, 14, 15, 27
- Multiple resistance – populations with 2, 4, 5, 9, 14 and 27
- Extended emergence (May to September)
- Pulled plants can re-root to produce seed
- Palmer amaranth is a desert plant that grows well in high heat and low moisture environments



Pigweed Species

Palmer Amaranth (a serious problem weed)

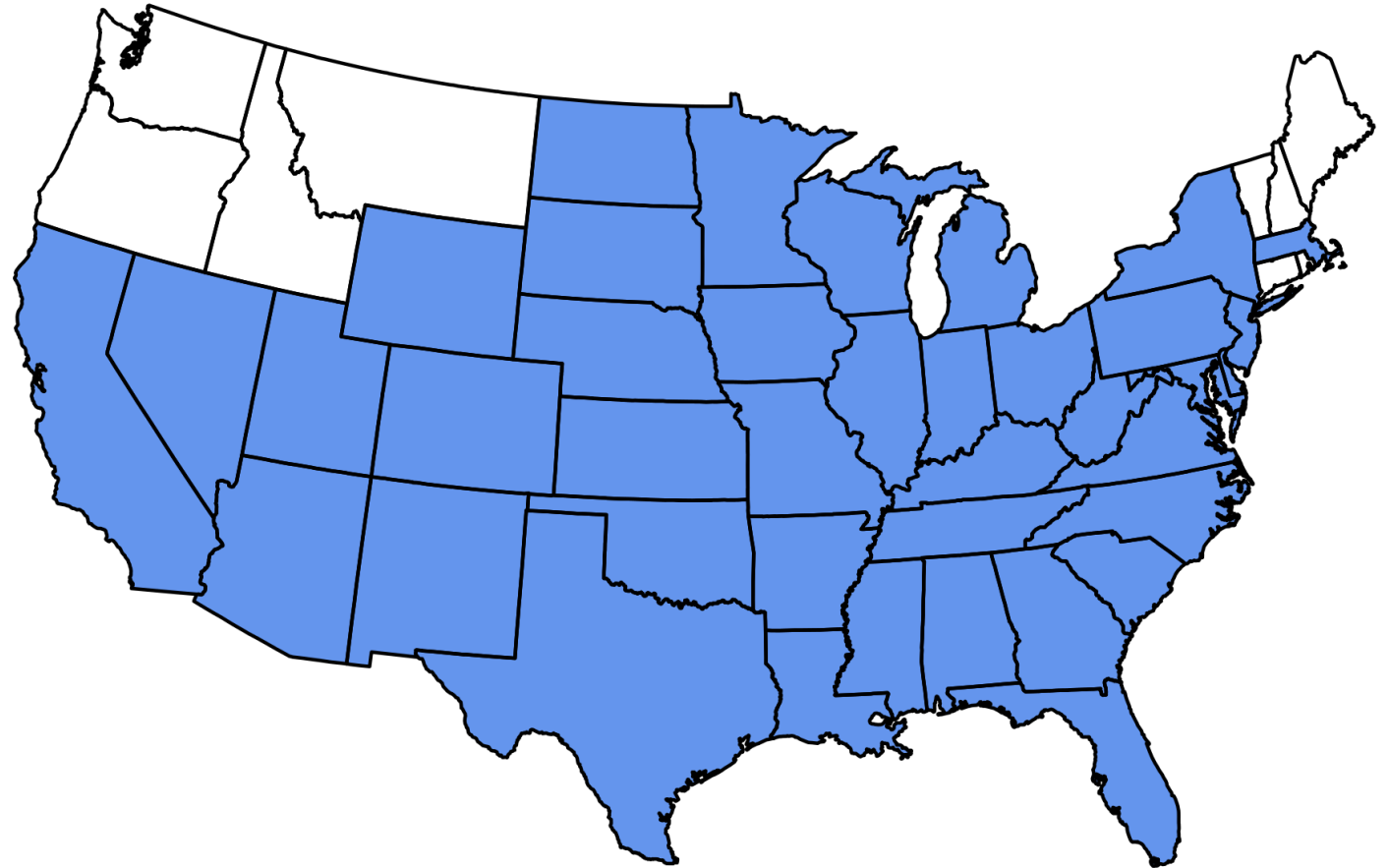
Proper identification is the first line of defense...

- Palmer amaranth looks similar to other pigweeds (especially seedlings).
- Palmer leaves, stems and petioles are hairless.
- Petioles are usually longer than the leaf blade.
- Sometimes leaves will also have a “V” mark or dark red/purple patch (watermark) on the leaf blade (spiny and other pigweeds can sometimes also have this mark).
- Seed heads are 6 – 24 inches in length, the female flower bracts are sharp and can be painful to handle. Only females produce seed.



Palmer amaranth distribution in the continental US

Pigweed Species
—
Palmer Amaranth
(a serious
problem weed)



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Pigweed Species Palmer amaranth

Palmer amaranth seedling:

- notched tip
- no hairs
- broad ovate shaped leaves
- no waxy sheen



© C. Shropshire

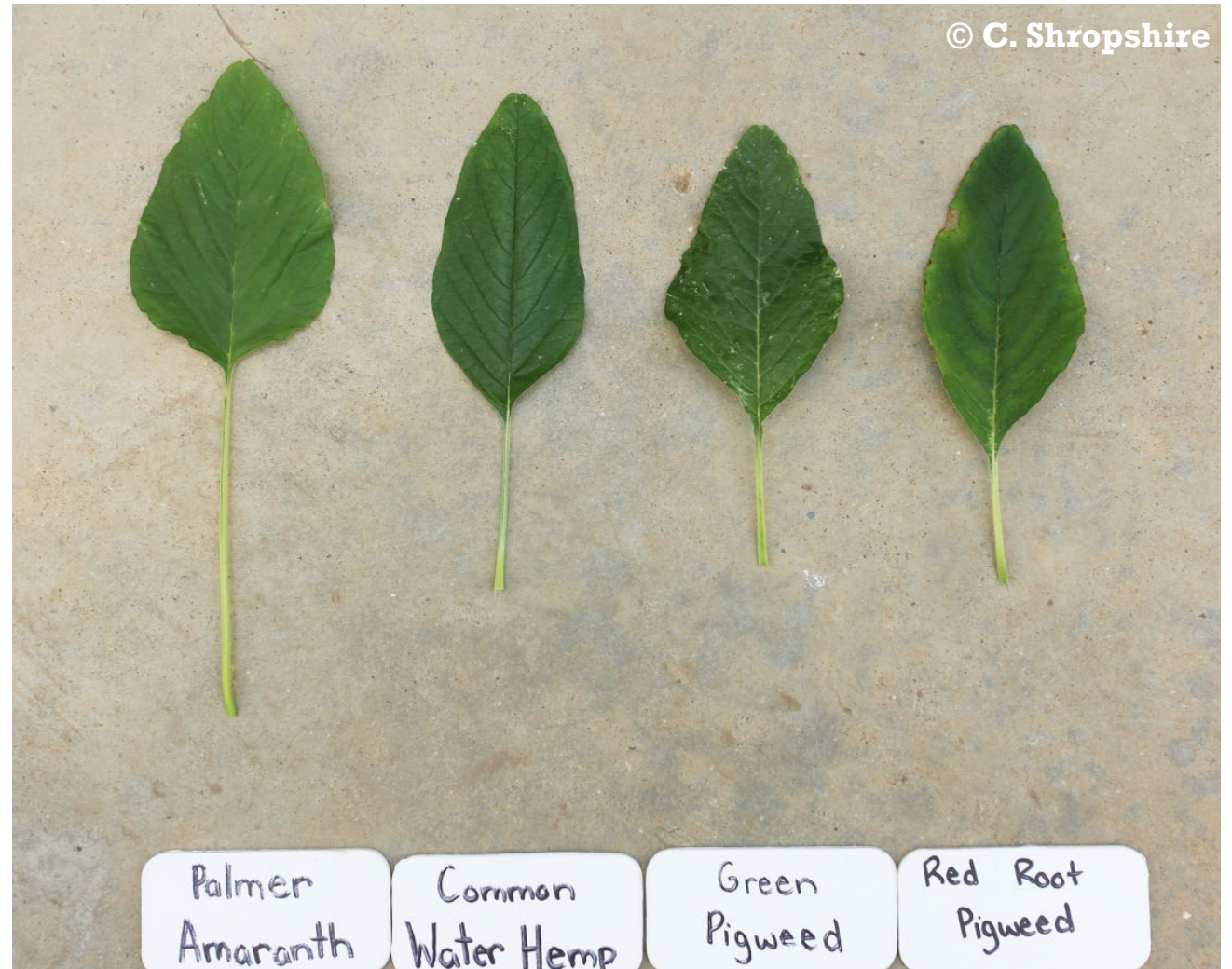
Pigweed Species Palmer amaranth

- A key diagnostic feature is the long petiole of **some** leaves on the plant.
- The petiole when folded over is longer than the leaf.



Pigweed Species Palmer amaranth

- This picture shows the longer petiole of Palmer amaranth.
- The petiole is longer than the leaf when folded over.



Pigweed Species Palmer amaranth

- The stems and leaves have no or few hairs and the stems feel smooth to the touch.
- Leaves are alternate on the stem and are generally lance-shaped or egg-shaped with prominent white veins on the underside.
- As plants become older, they often assume a poinsettia-like appearance and sometimes have a white or purple chevron on the leaves.



Photos by R. Hatzler

Pigweed Species Palmer amaranth

Key diagnostic features are:

- Hairless stem
- Sharp and pointed 'bracts' on the female plant.



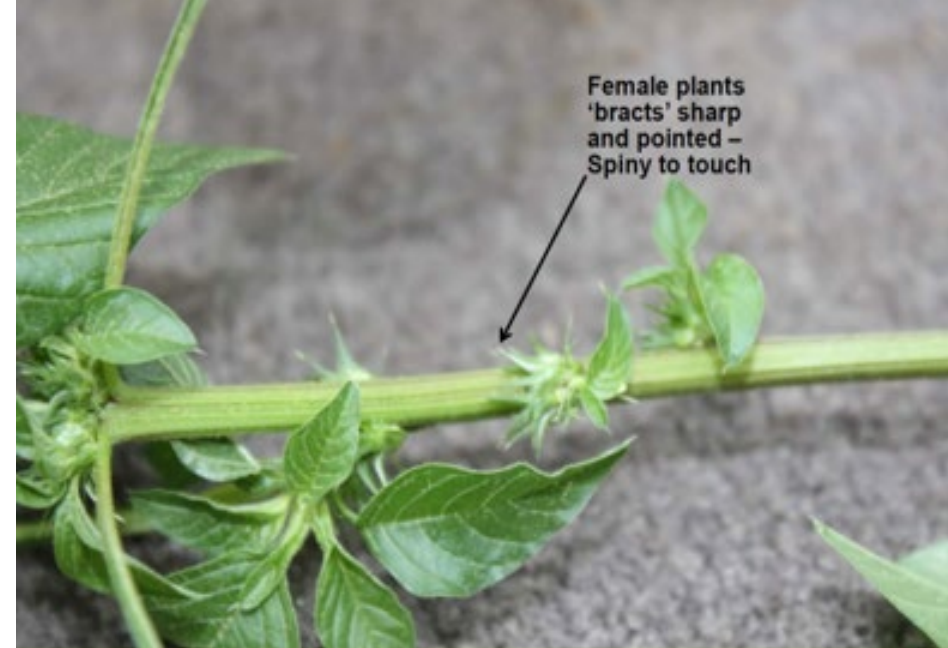
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Pigweed Species Palmer amaranth

- A key diagnostic feature is the sharp and pointed 'bracts' on the female plant.
- Leaves of Palmer amaranth sometimes have white or purple chevrons ("V" shaped watermark). This is not a main diagnostic feature.



Palmer amaranth stem



Pigweed Species Palmer amaranth

Like all *Amaranthus* species, the true leaves of Palmer amaranth have a small notch in the tip. Occasionally, a single hair can be found in the leaf notch of Palmer amaranth. This hair may not be present in each leaf notch of Palmer amaranth, and tends to be less common on leaves of waterhemp.





Pigweed Species
Palmer amaranth

The female seed heads are quite spiny



Pigweed Species

Palmer amaranth in the field at maturity

Pigweed Species

Waterhemp

Redroot pigweed

Green pigweed

Smooth pigweed

Tumble pigweed

Prostrate pigweed

Spiny amaranth

Pigweed Species

Waterhemp

- egg shaped cotyledons
- notched tip
- no hairs
- narrow lanceolate leaves
- waxy sheen



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Pigweed Species Waterhemp

- Waterhemp and Palmer amaranth are dioecious which means they have male and female plants.
- The stem is hairless like green pigweed.



Pigweed Species

Waterhemp



- Left: Group 2, 9 and 14 resistant waterhemp in soybeans
- Right: Male waterhemp shedding pollen

Pigweed Species

Waterhemp

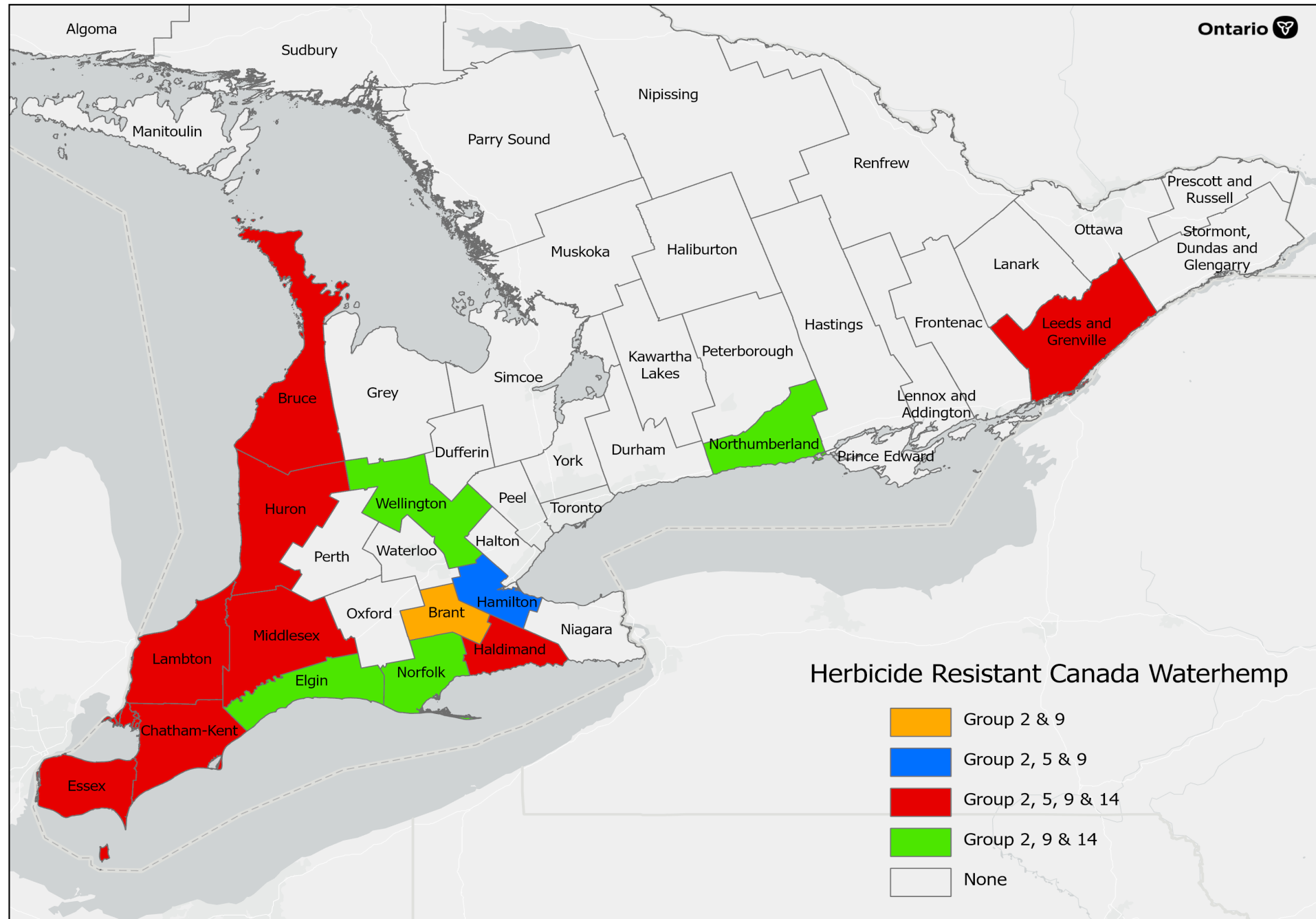


Left – Group 2 and 9
resistant waterhemp in
soybeans

Right - Group 2
resistant waterhemp in
peppers

© France Coutu, agronomist,
Meunerie Mondou

Herbicide Resistant Waterhemp in Ontario January 2021



Pigweed Species Redroot pigweed

Redroot pigweed seedling

- notched tip
- small fine hairs
- ovate shaped leaves

Green and smooth pigweed very similar



Pigweed Species Redroot pigweed



Redroot pigweed has a very hairy stem that can be seen with the naked eye.

Pigweed Species Green pigweed

- notched tip
- small fine hairs
- ovate shaped leaves.

Redroot and smooth pigweed very similar





Pigweed Species Green pigweed

Green pigweed has a hairless, smooth stem.



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Amaranthus hybridus L.
Vall d'Ebo (Alicante)
© Santiago González Torregrosa
www.apatita.com

Pigweed Species

Smooth pigweed



Pigweed Species

Smooth pigweed



Pigweed Species
Tumble pigweed

Tumble pigweed has the ability to break off at the plant base and spread seeds as the plant rolls in the wind.

Pigweed Species
Prostrate
pigweed



© illinoiswildflowers



© R. W. SMITH



Pigweed Species

Prostrate pigweed

Prostrate pigweed can be easily confused with purslane and various types of spurge



Pigweed Species

Spiny amaranth

Spiny amaranth is a day neutral plant and is unaffected by shortening day length to trigger flowering like other pigweed species



Genetic Testing is Available

Genetic testing is currently available in Ontario to:

1. Identify pigweed species – is it waterhemp or green pigweed?
2. Test for resistance:
 1. Redroot and green pigweed – Herbicide Groups 2, 5 and 7
 2. Waterhemp – Herbicide Groups 2, 5, 9 and 14

Contact: kristen.obeid@ontario.ca for sampling protocols, sample collection kits and the procedure for sample submission to Harvest Genomics
www.harvestgenomics.ca