

# Palmer Amaranth Testing

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# 20/20 Seed Labs History

- Founded in 1989 by Sarah Foster
- Canada's First Fully Accredited, Independently Owned Seed Testing Laboratory
- CFIA, ISTA and ISO accredited

## Services

- Seed physiology and morphology
- Molecular diagnostics
- Microbiology
- Crop Inspection
- Research
- GMO testing
- AP
- Hybridity



# Palmer amaranth crosses the 49<sup>th</sup> parallel into the Prairies

## Palmer Amaranth Discovered In RM Of Dufferin

In September 2021, 2 Palmer amaranth plants were reported growing near Carman in the RM of Dufferin, Manitoba.

Written by Cory Knutt Wednesday, Sep 29 2021, 3:04 PM



Palmer a

### Palmer amaranth found in Manitoba

Experts have been watching as the infamous yield eater has been creeping through fields in Manitoba's neighbour to the south



By Alexis Stockford

Published: September 28, 2021  
Crops, News

Reading Time: 3 minutes



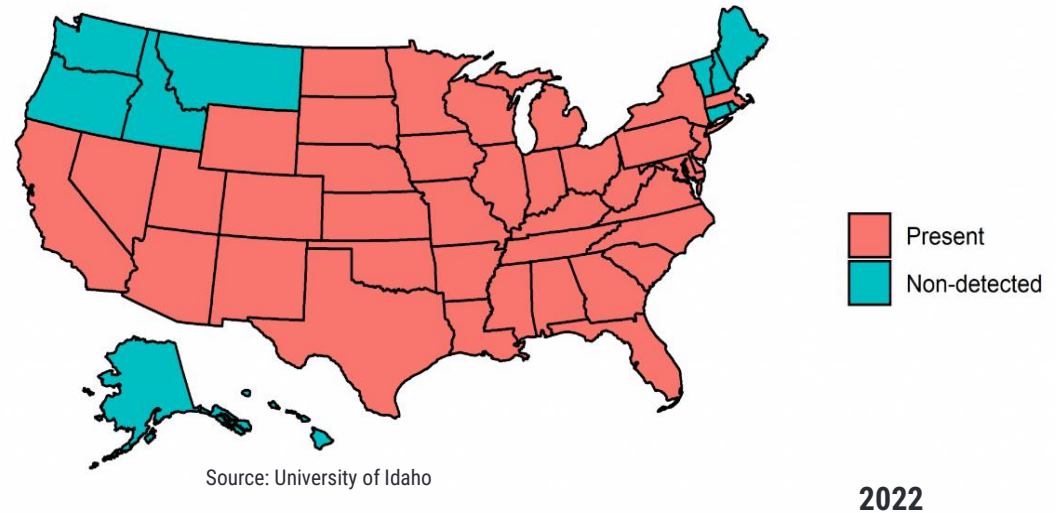
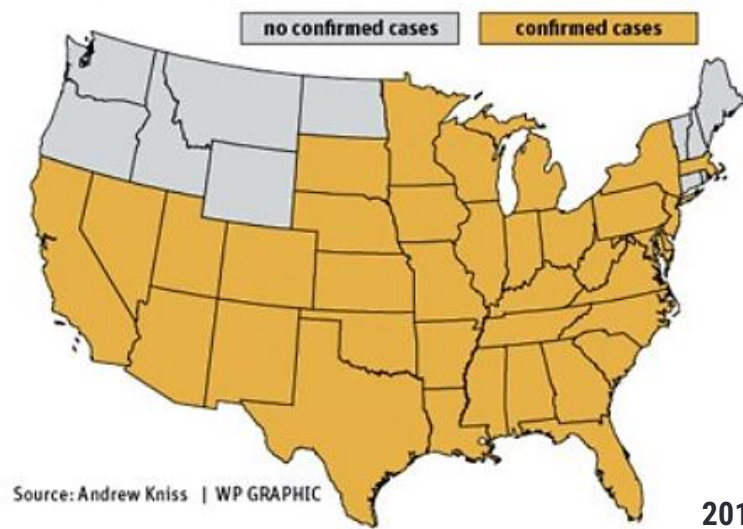
A palmer amaranth plant towers over the stubble in a Manitoba field. Photo: Kim Brown-Livingston





# Big Deal?

- This is the first report of Palmer Amaranth in the Canadian Prairies even though it has been spreading quietly in North Dakota.
- Palmer amaranth is listed as a Prohibited Noxious weed in most states.



# The Palmer Amaranth threat is real

- Palmer Amaranth (*Amaranthus palmeri*) belongs to the pigweed family and it is an invasive species that is native to the North American continent.
- It is currently the largest weed problem in the U.S due to its fast growth, large size and significant impact on yield.
- Yield losses as high as 71% and 91% have been reported in soybean and corn production systems respectively.



# Superweed in a class of its own

- The weed grows aggressively and competes with crops for light, water and nutrients.
- Palmer Amaranth is very prolific and a single plant is known to produce over 4.8 million seeds in a growing season.
- The weed is highly adaptable to a wide range of environmental conditions.
- The weed is also known to have evolved resistance to several herbicides and modes of action (MOA).



© University of Minnesota Extension



# Modes of spread

The weed is believed to be spread from farm to farm by;

- a. contaminated forages and straw,
- b. feed and seed purchases,
- c. waterways,
- d. contaminated combines or farm equipment
- e. digestive tracts of ducks, geese and other wildlife.



# Importance of seed testing

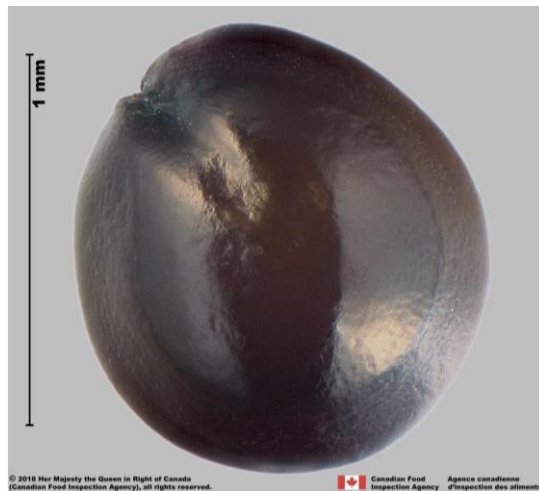
- Seed labs are an important part of the phytosanitary approach to stop the spread of Palmer Amaranth into new areas.
- Physical purity analysis of seed lots help identify any noxious weed seeds that may be problematic.





# ID Tools available to the Seed Analyst

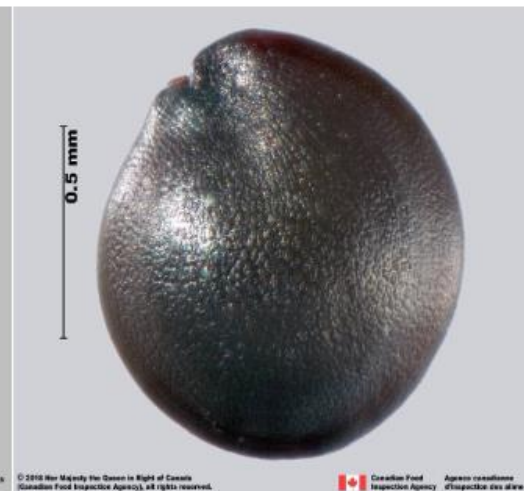
- Seed morphology
  - Utricle
  - Rim characteristics
  - Hilum
  - Presence or absence of reticulations



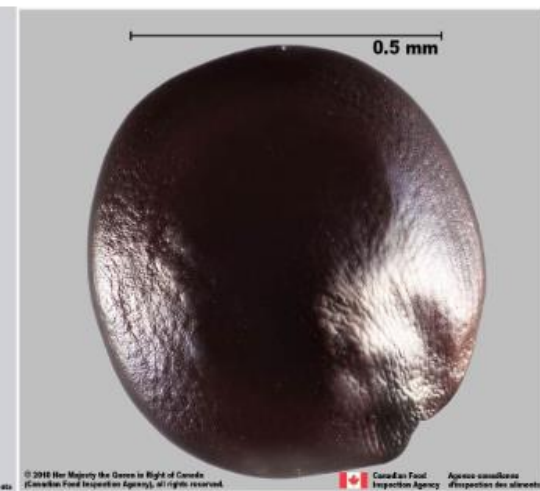
*Amaranthus retroflexus*



*Amaranthus albus*



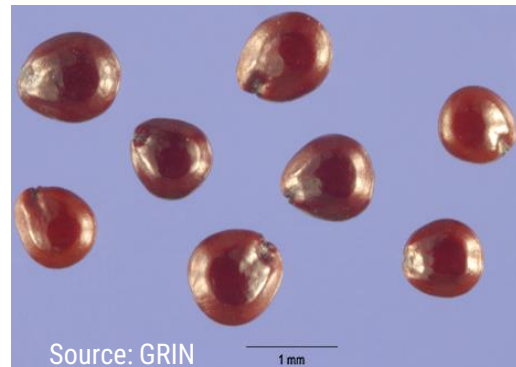
*Amaranthus viridis*



*Amaranthus spinosus*

# Identifying Amaranthus species by seed

- Palmer Amaranth seeds are difficult to distinguish from other pigweed seeds.
- If found in a purity analysis in samples destined for export, they are collectively listed as 'Amaranthus sp.' with the number of seeds found.
- Palmer Amaranth has been classified as noxious in most states in the US states and in some states “*Genetic testing of any Amaranthus contaminant must be conducted to determine if Palmer Amaranth is present*”.



Palmer amaranth

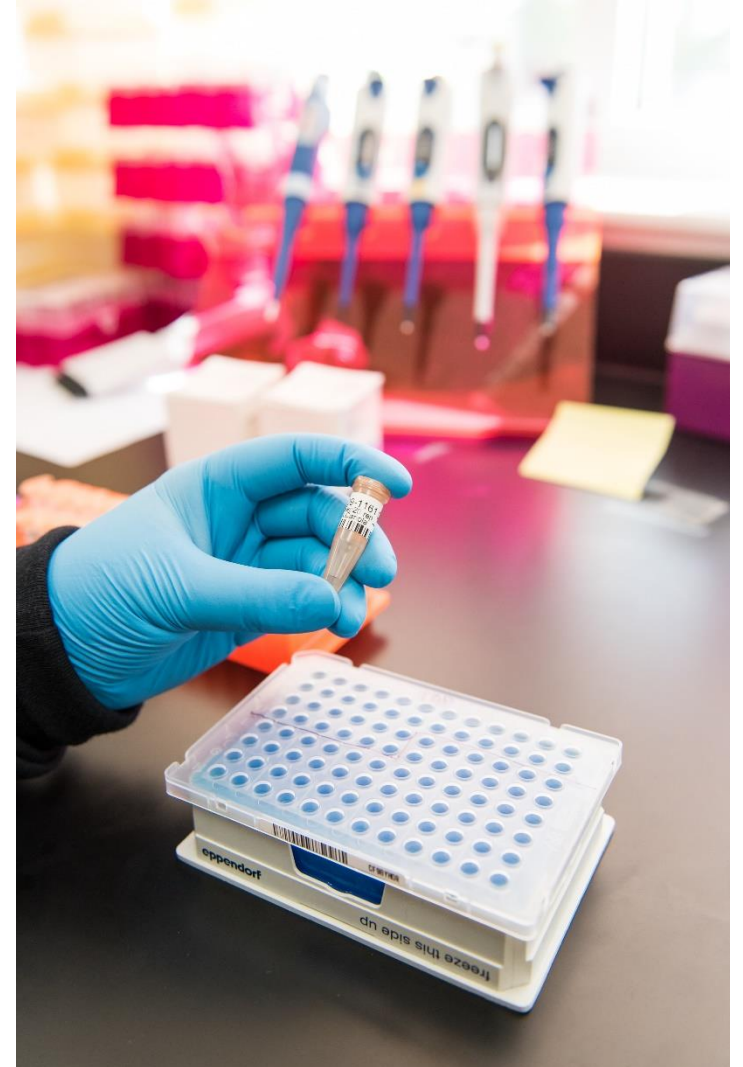


Redroot pigweed



# Palmer amaranth Genetic Testing

- In May 2022, 20/20 Seed Labs Inc. launched our Palmer Amaranth PCR test (PA.1) to identify the weed in seed lots.
- The Palmer amaranth test allows us to identify Palmer amaranth as a single seed or in a seed mixture of 25 seeds.
- Amaranth seeds retrieved during purity analysis are collected into an Eppendorf tube and submitted for DNA extraction.



# Exciting Opportunities

- This test can also be used for Palmer Amaranth tissue
- The Palmer Amaranth test offers new opportunities to adopt genetic testing to everyday purity analysis.
- It enables a more precise identification than previously possible for seed.
- Still a long way from replacing physical purity analysis with genetic testing alone.





# Questions

