

Methods for Studying Dose-responses of Bohemian Knotweed (*Fallopia x bohemica*) Seeds, Seedlings, and Rhizomes



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What is knotweed?



<http://www.mirror.co.uk/news/japanese-knotweed-everything-you-ever-4328310>



Michigan State University Extension



Do not mow Japanese Knotweed

Japanese Knotweed, a destructive invader, will proliferate if mowed.
Posted on November 3, 2015 by [Monica Day](#), Michigan State University Extension

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MACLEAN'S

The plant that's eating B.C.

Japanese knotweed is in nearly all our provinces. And the threat is real: it can lower house prices, threaten our bridges, and drive men to madness.

Ken MacQueen
June 12, 2015

Macleans

Biggest invader in area is Japanese knotweed

Hogweed not common but a health hazard, experts say

MIKE CHOUINARD / SQUAMISH CHIEF
NOVEMBER 19, 2015 06:00 AM

Squamish Chief

Invasive Japanese knotweed takes root in Burnaby

Foreign weed can push its way through tarmac roads and concrete building foundations
CBC News | Posted: Oct 19, 2015 7:00 AM PT | Last Updated: Oct 19, 2015 7:00 AM PT



CBC

Knotweed Infestations = Higher Taxes and Lower Property Values

by Contributor on 21 Oct 2015

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Dumping of knotweed cuttings just spreads the problem -- they can take root. **Knotweed and other noxious weeds are accepted free of charge at landfills -- so please take your cuttings there; don't spread knotweed infestations around the countryside.**

The Rossland Telegraph

The perfect weed?

- Rapid growth: 4-8 cm/day in sunlight
- Grows in ditches, disturbed sites, and streams
- Large broad leaves + fast growth = great competitor





Japanese knotweed

Fallopia japonica

Highly invasive

Viable pollen: 0-4 grains/flower

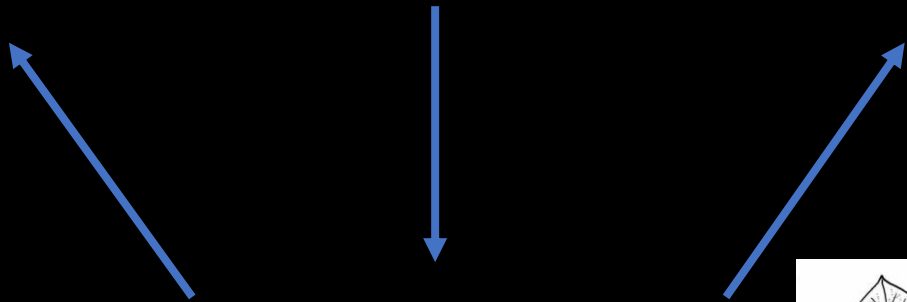


Giant knotweed (less common)

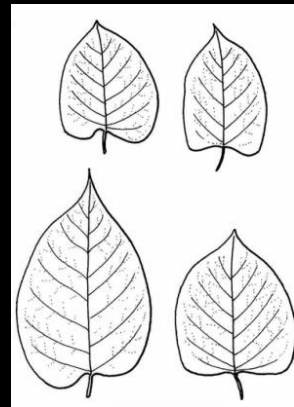
Fallopia sachalinensis

Less invasive than Japanese

Viable pollen: 7306-8072 grains/flower



Bohemian knotweed
through hybridization
Fallopia bohemica



(Gaskin *et al.*, 2014)

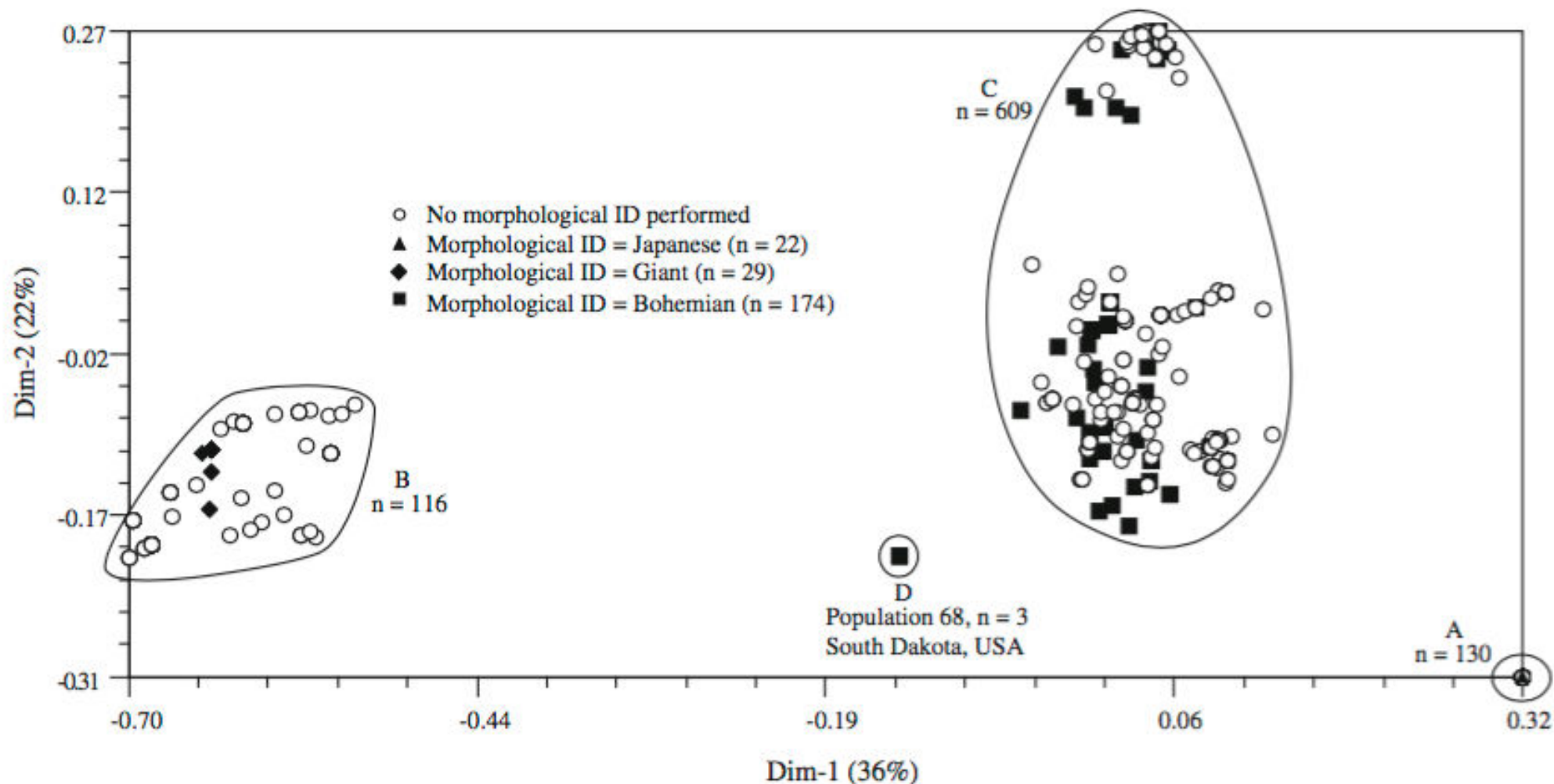
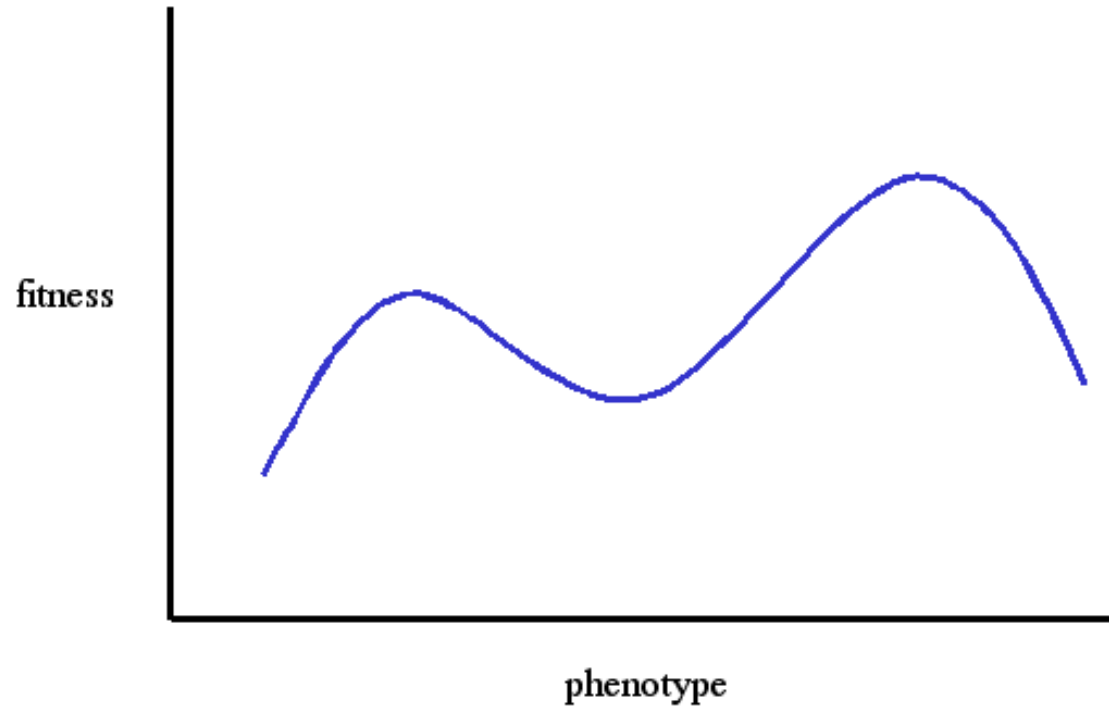


Fig. 2 Principal coordinates analysis of knotweed plants from western North America (n = 858). *Squares* plants morphologically identified as Bohemian knotweed, *diamonds* morphologically identified as giant knotweed, *triangles* morphologically

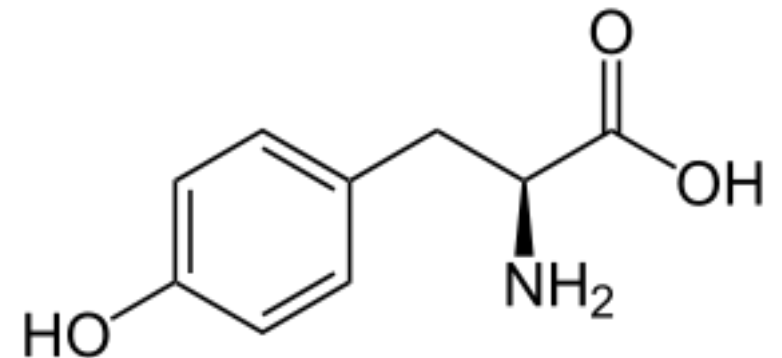
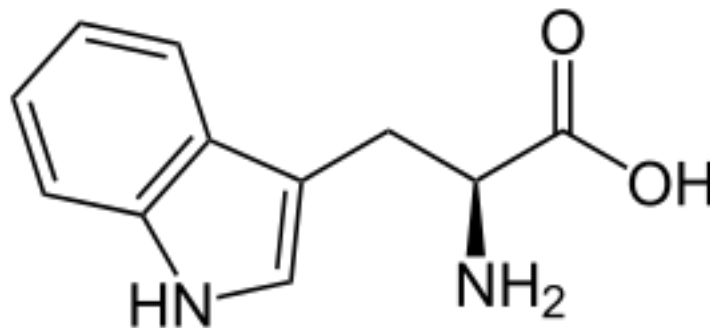
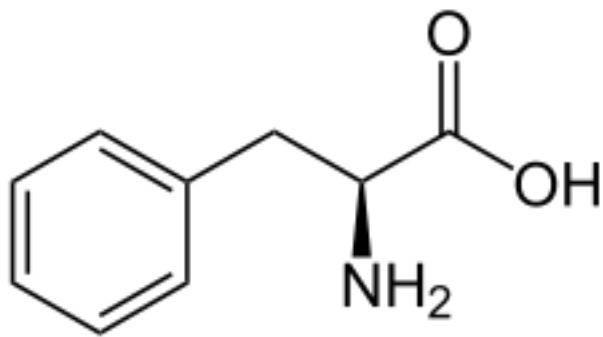
identified as Japanese knotweed, *circles* plants that were not morphologically identified. Four genetic clusters each with 100 % bootstrap support in a UPGMA analysis are identified by closed curves marked as A, B, C and D

- Growth
 - Heterosis
- Adaptation
 - Genetic variation
- Selection
 - Low competitors/predators



Herbicide

- Phenolic amino acids are essential to protein synthesis
- The key intermediate chorismate leads to phenols
- Glyphosate (Roundup) inactivates 5-enolpyruvylshikimate 3-phosphate synthase



Resistance testing

- Dose-response while examining different modes of reproduction
 - Rhizomes (asexual)
 - Nodes (asexual)
 - Seeds/seedlings (sexual)







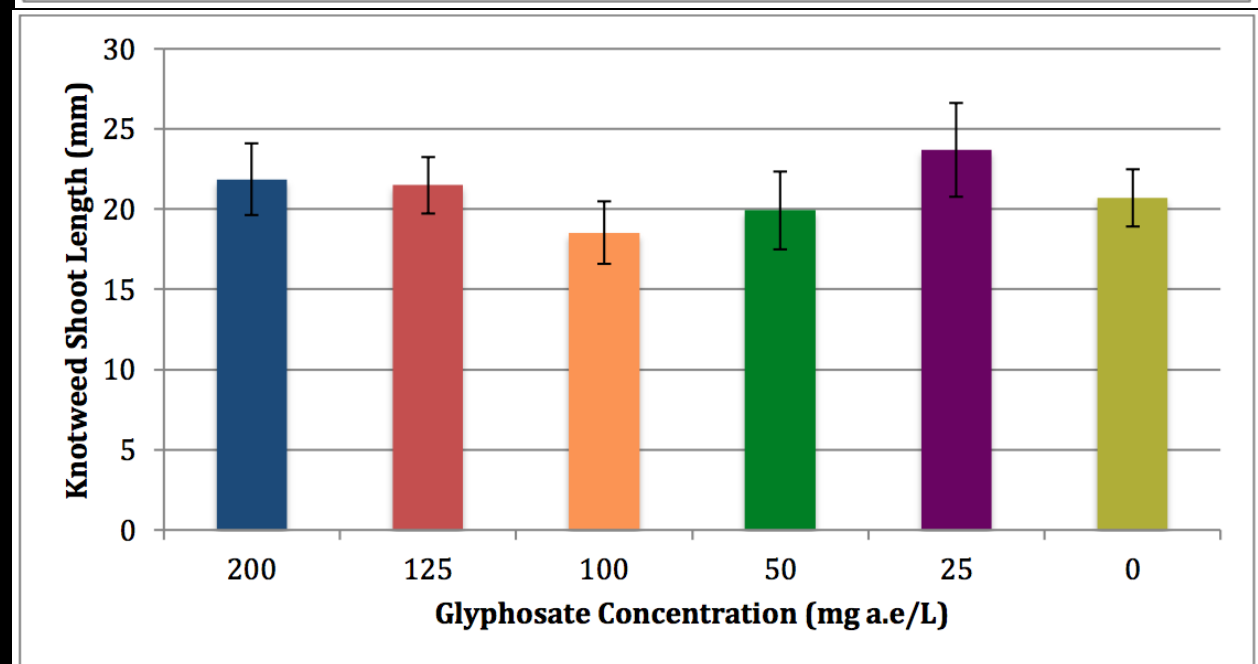
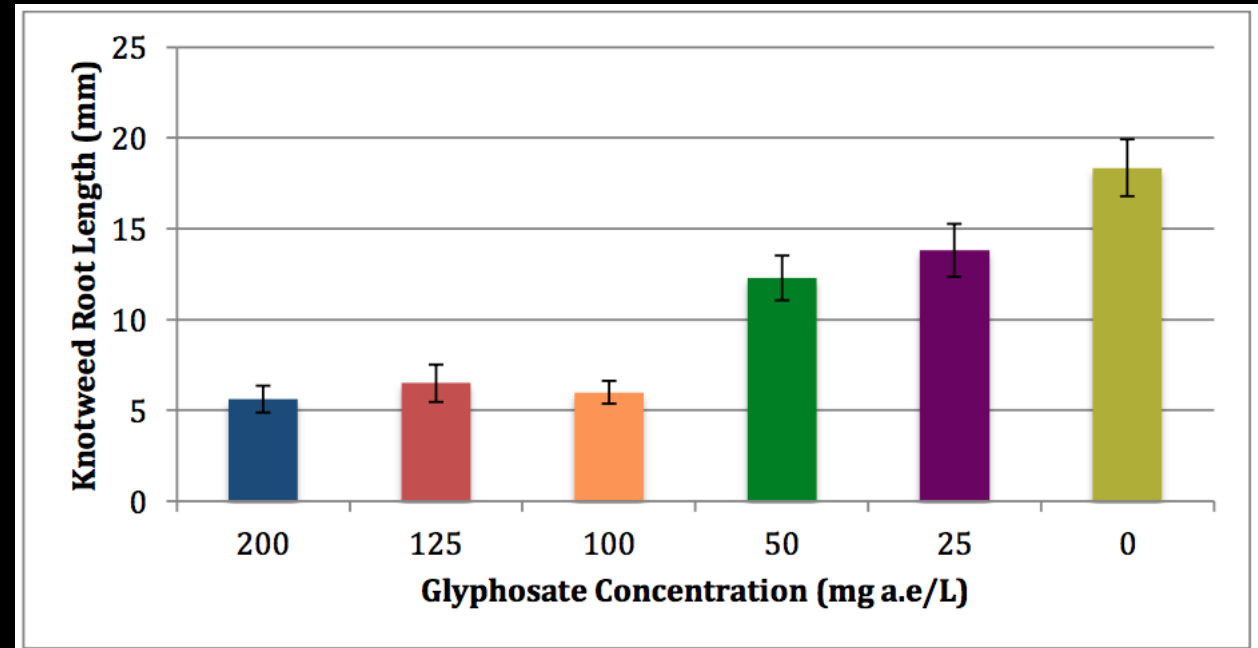


Glyphosate use

Site/source	Percent active ingredient
North Vancouver	7%-10%
Surrey	5%-10%
Fraser Valley	8%
Haida Gwaii	1.35%
NCWMA (Wisconsin)	2%
Burnaby	5%
Okanagan	1.5%-2%

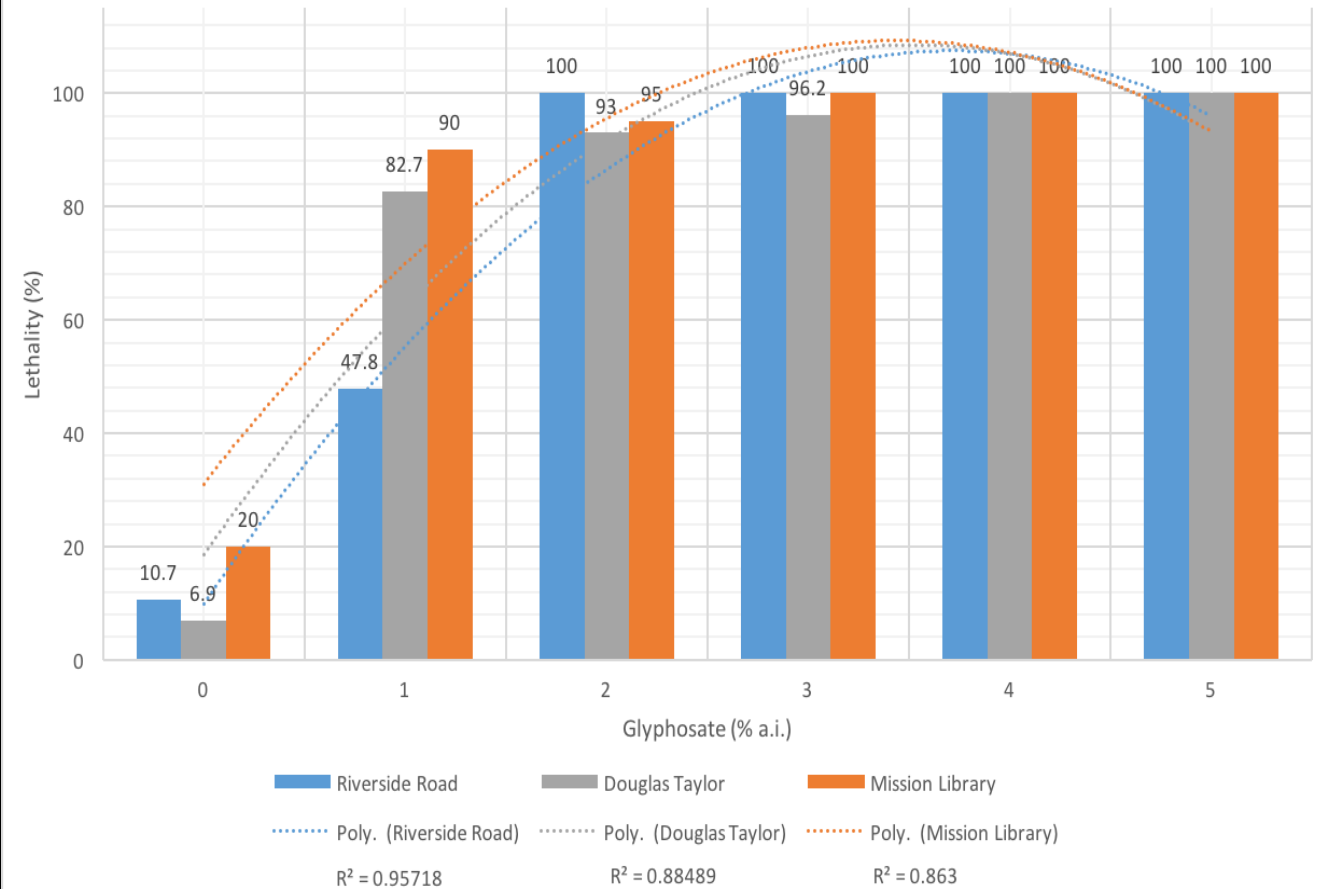
Seeds

- Root length showed a difference when sprayed with varied glyphosate concentrations
- Shoot length did not show a difference when sprayed with varied glyphosate concentrations



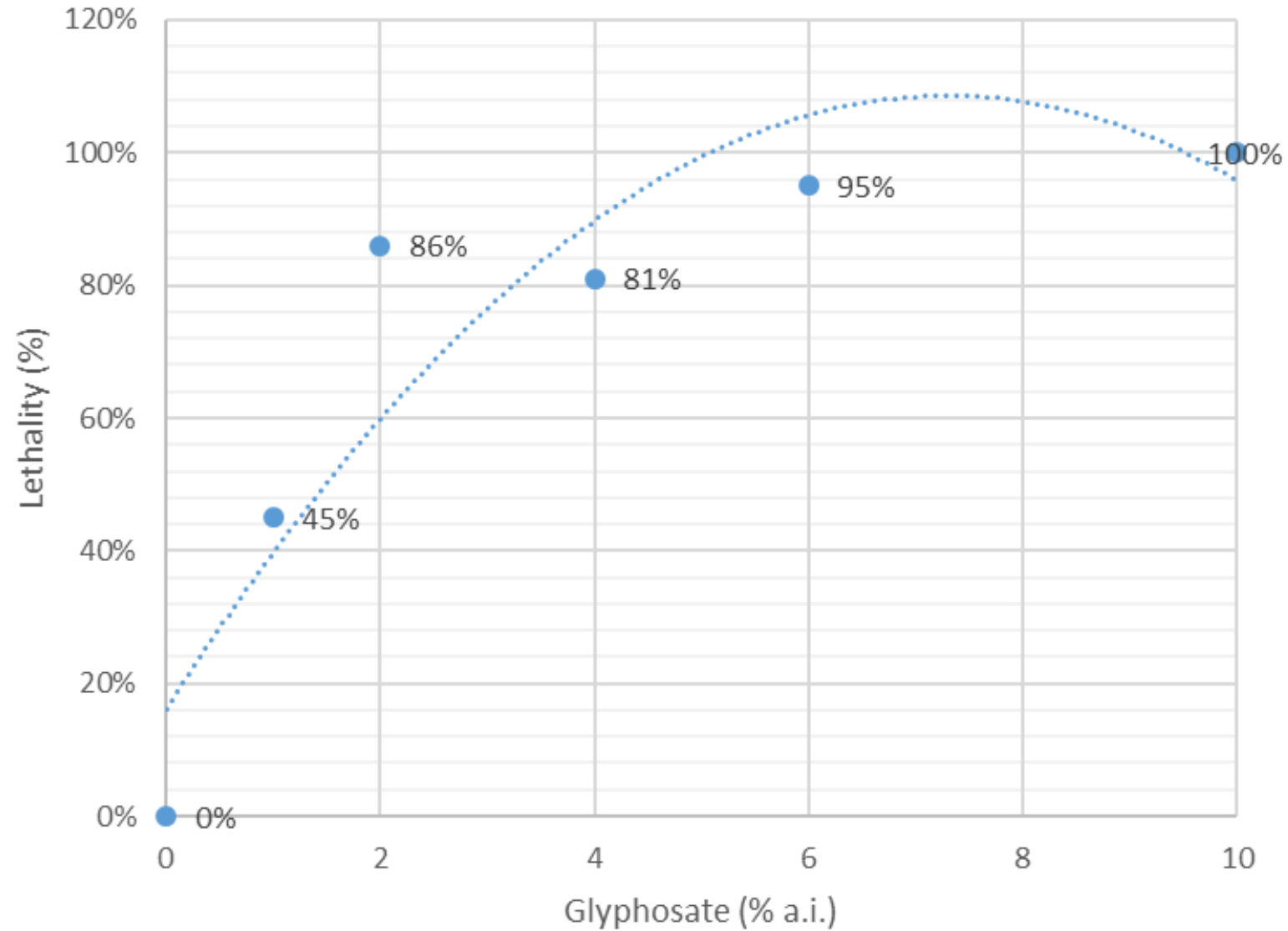
Seedlings

- Differences in populations
- 2nd degree polynomial trend-line



Rhizome fragments

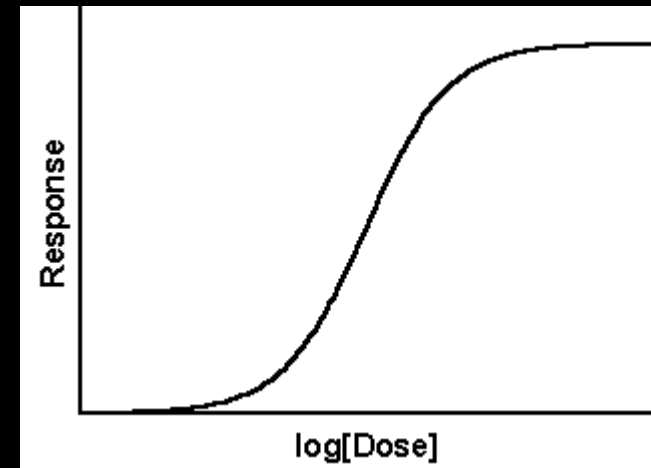
- 2nd degree polynomial trend-line
- Difficulty defining lethal stage
- Susceptible and resistant populations



$R^2 = 0.8409$

How to move forward

- Test: dose-response
- Mode of reproduction: rhizome fragments
- Measurements: dry-weight (biomass) to obtain continuous rather than discrete data
- Timeline: collection and testing in June-August by Matthew Strelau and Micaela Janse Van Rensburg



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Any
questions?