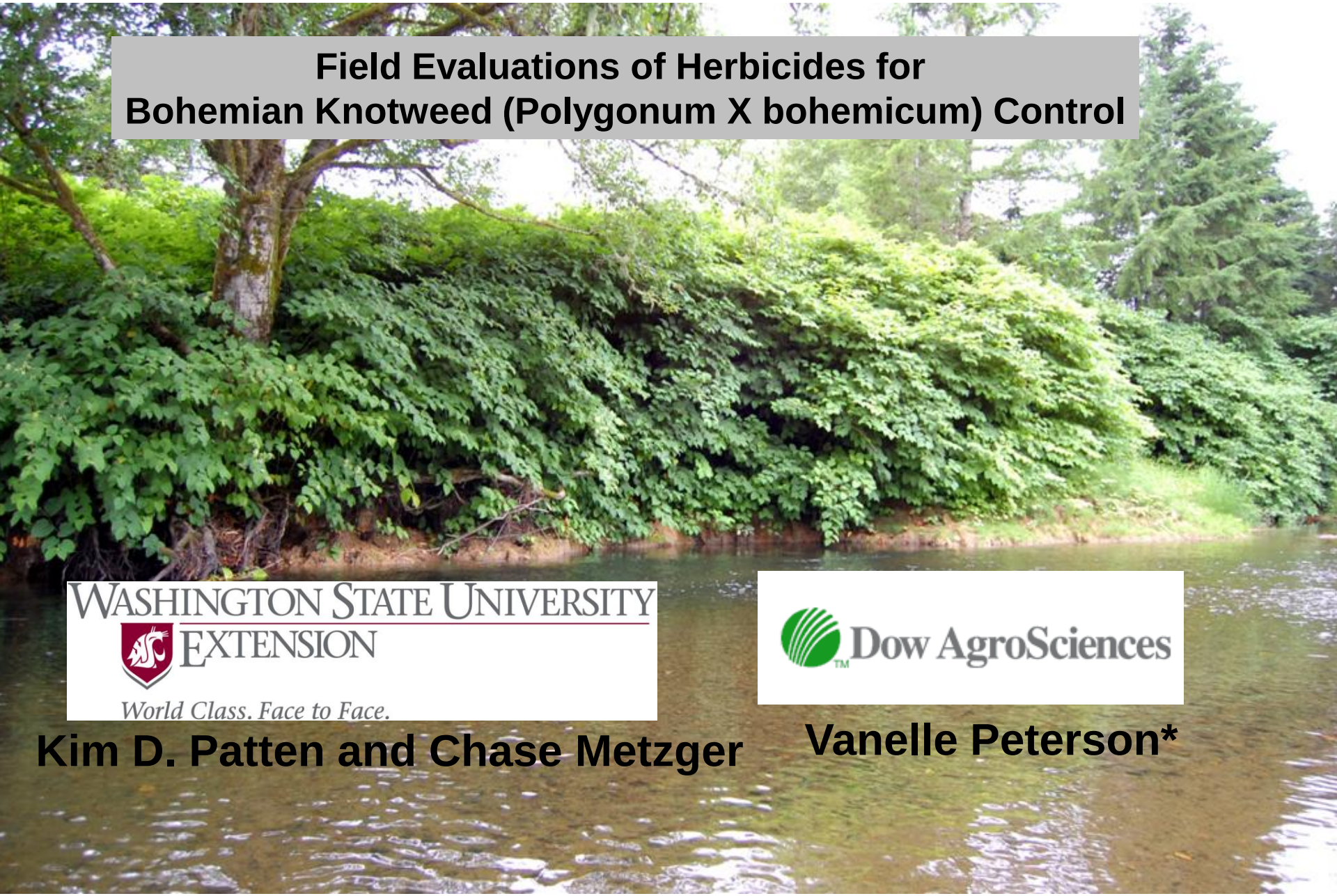
# Field Evaluations of Herbicides for Bohemian Knotweed (Polygonum X bohemicum) Control

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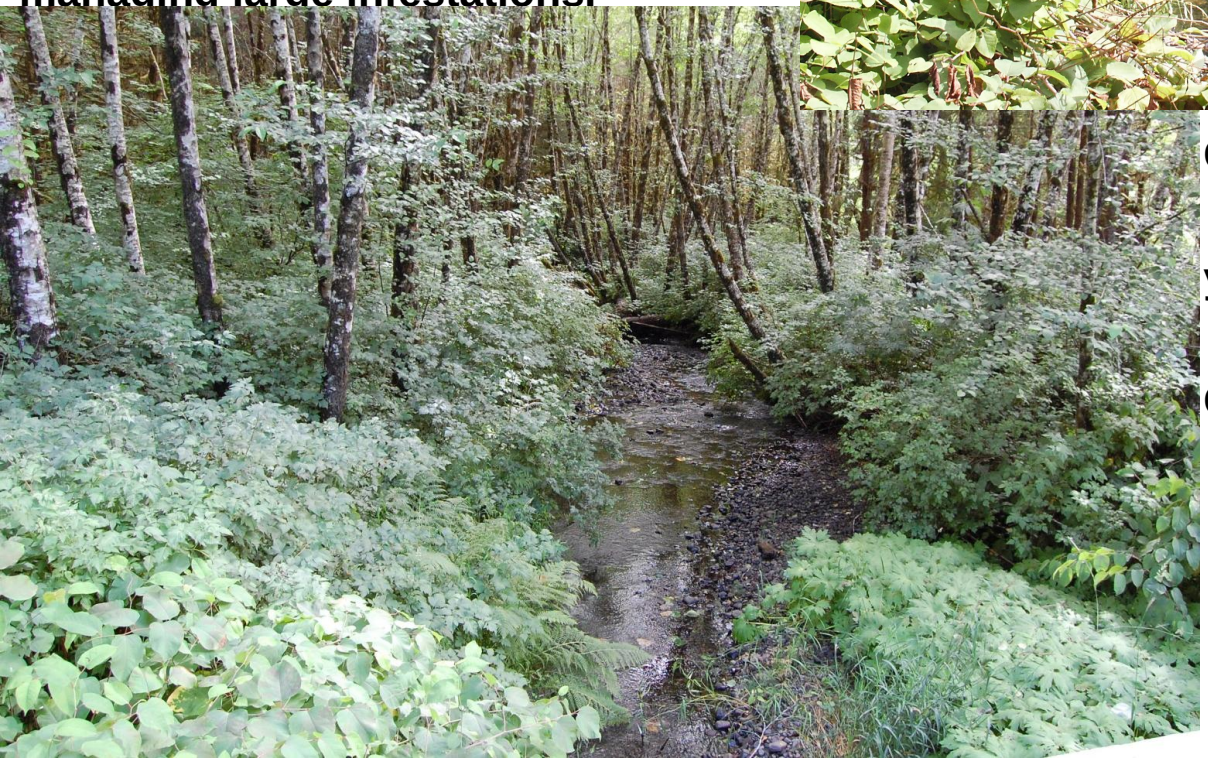
**Bohemian knotweed has infested many of the riparian zones in the PNW.**

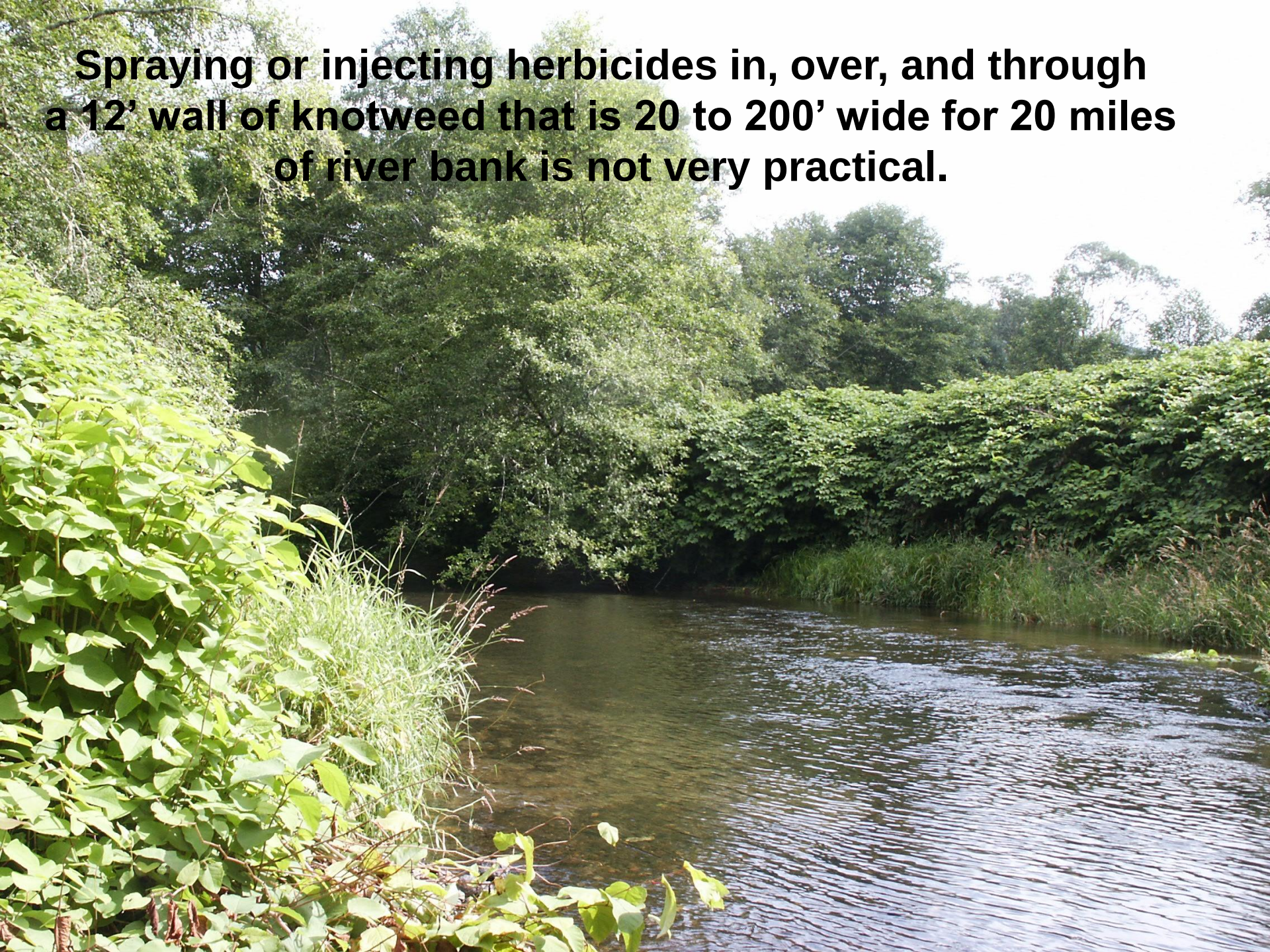
**Millions of dollars have been recently invested in its control.**

**There has been limited research to develop a cost-effective & efficacious control program that can be used for managing large infestations.**

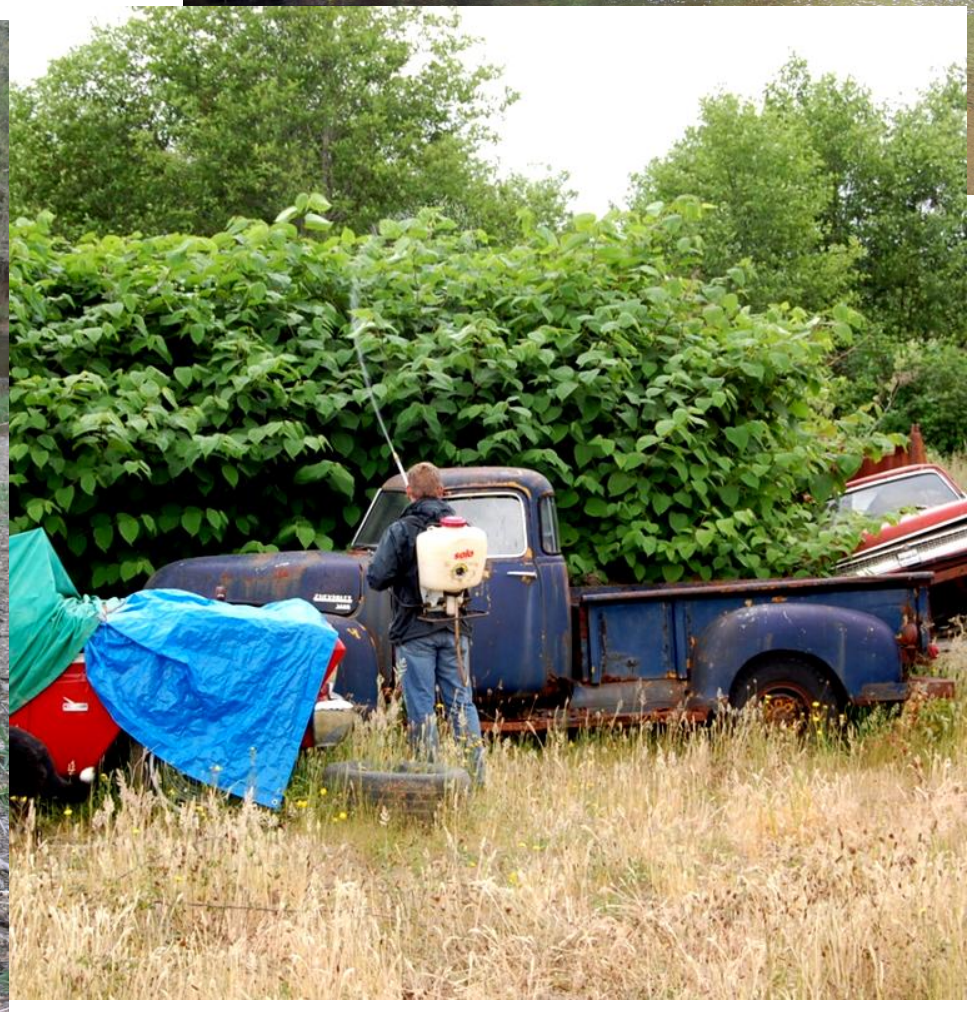


**Glyphosate foliar-based treatments require multiple year re-treatments.**

**Glyphosate injection-based treatments are not practical for large stands.**


Spraying or injecting herbicides in, over, and through a 12’ wall of knotweed that is 20 to 200’ wide for 20 miles of river bank is not very practical.

*Ease of canopy coverage is not an insignificant variable to consider when you have many miles of tall impenetrable canopy 20' to 50' wide to spray*



*Old stands of knotweed have massive crowns. 100 % kill is difficult. Herbicide affected regrowth years after treatment is common.*

# Research Objectives

1. Determine if there is a single-season herbicide treatment that can provide close to 100% long-term control.
2. Determine if there are any effective herbicide treatments that can be used early in the season to a smaller easier-to-spray canopy.
3. Assess if there is an early season treatment that can be used to suppress canopy height, making for ease of access and later season treatment.

# Methods:

**Site:** Naselle River WA,  Bohemian Knotweed well established along 50+ miles of riparian zone for >50 years, mean height 3 to 4 m.

**Experimental design:** RCB, 3 to 4 replications

**Plot size:** 4x4 m to 4x20 m

**Application:** usually MSO @ 0.5 to 1%, Spray volume ~100 gpa, unless otherwise stated,

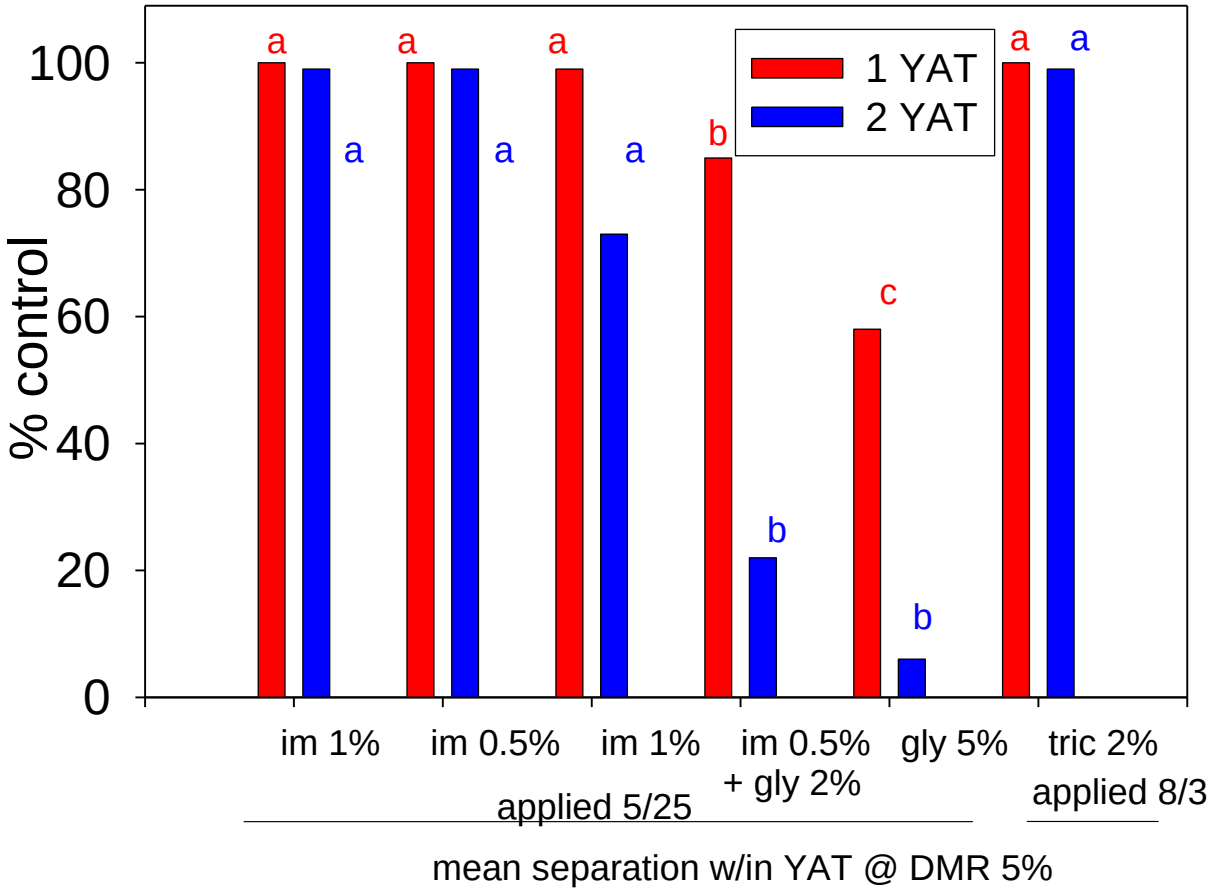
**Ratings:** % control 1 to 2 years after treatment, stem density, succession of site with natives

# Methods:

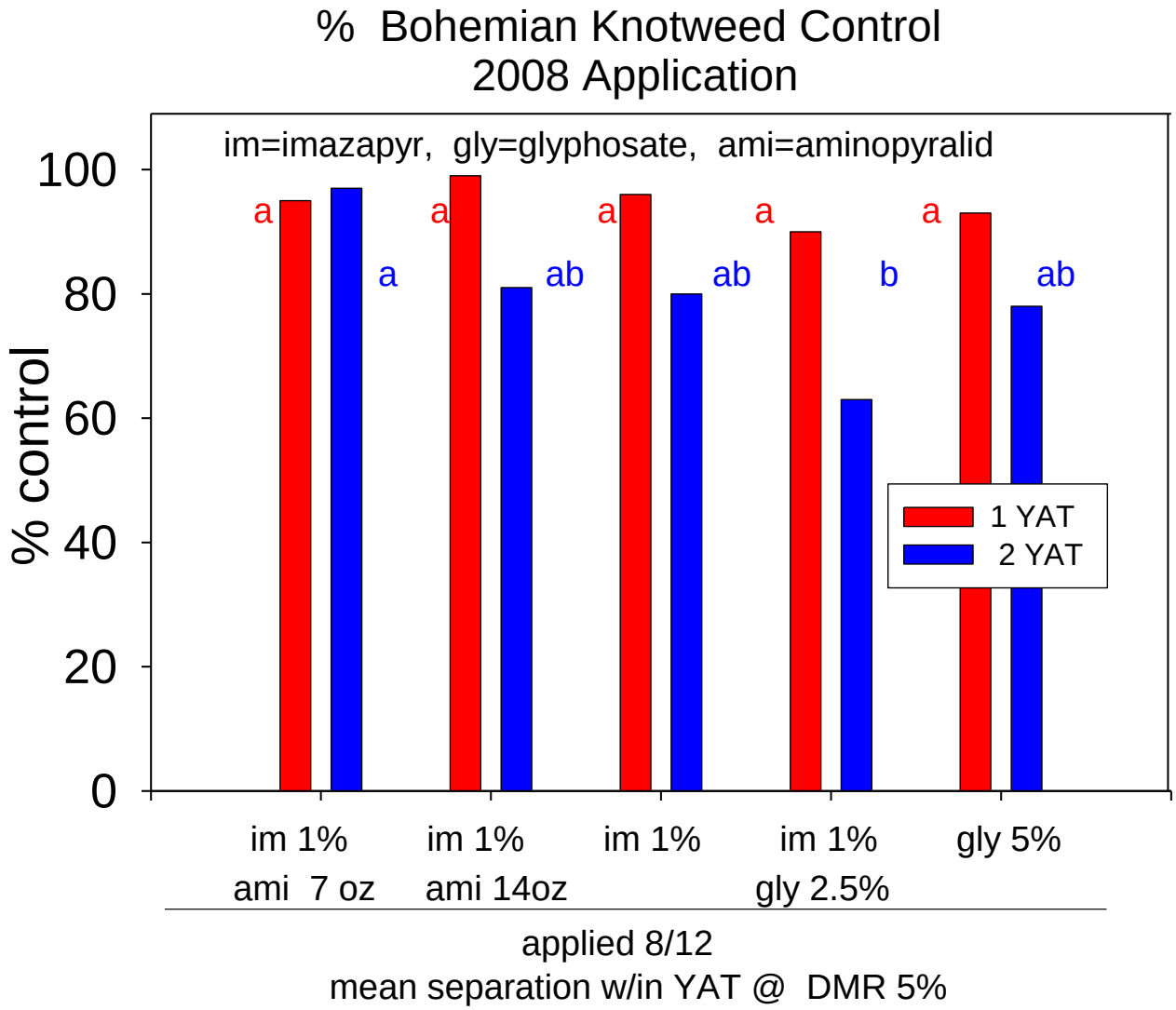
- **Mature canopy (2005 to 2008)**
  - *Herbicides:* imazapyr, imazamox, penoxsulam, glyphosate, triclopyr and aminopyralid and various combinations
  - *Timing*: Late May to August when canopy was 8’ to 12’ in height.
- **Young canopy (2007 to 2009)**
  - *Herbicides:* imazapyr, glyphosate, triclopyr and aminopyralid
  - *Timing:* Mid-April to mid-May when canopy ranged from 1’ to 8’ in height
- **Early season + mid season (2007 to 2009)**
  - *Treatment:* aminopyralid - mid-May + imazapyr - summer

# % Bohemian Knotweed Control
# 2005 Application

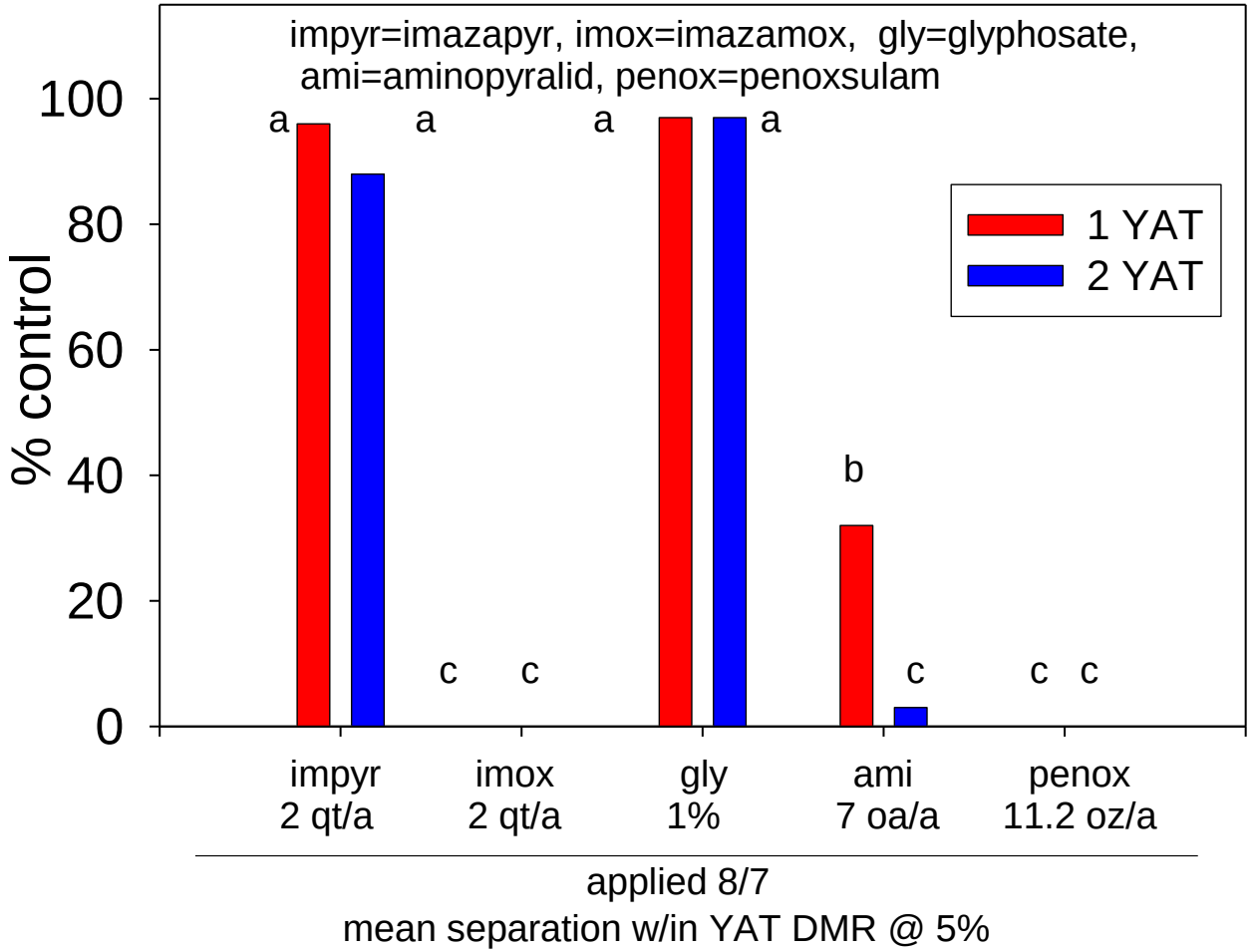
im=imazapyr, gly=glyphosate, tric=triclopyr



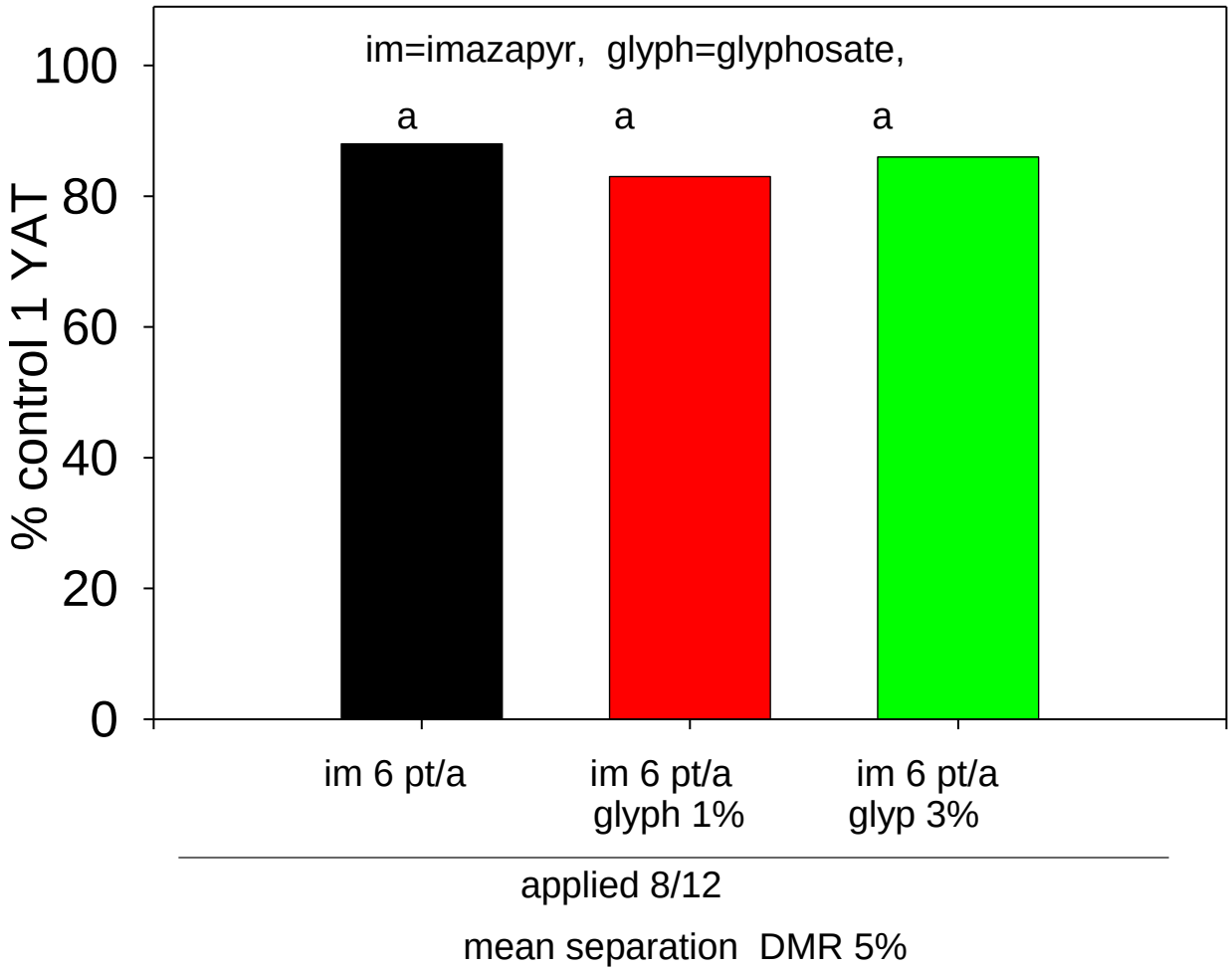

mean separation w/in YAT @ DMR 5%


% Bohemian Knotweed Control
2008 Application
im=imazapyr, gly=glyphosate, ami=aminopyralid
% control
100
80
60
40
20
0
a
a
a
ab
a
ab
a
b
a
ab
1 YAT
2 YAT
im 1%
ami 7 oz
im 1%
ami 14oz
im 1%
im 1%
gly 2.5%
gly 5%
applied 8/12
mean separation w/in YAT @ DMR 5%

# % Bohemian Knotweed Control
# 2006 Application



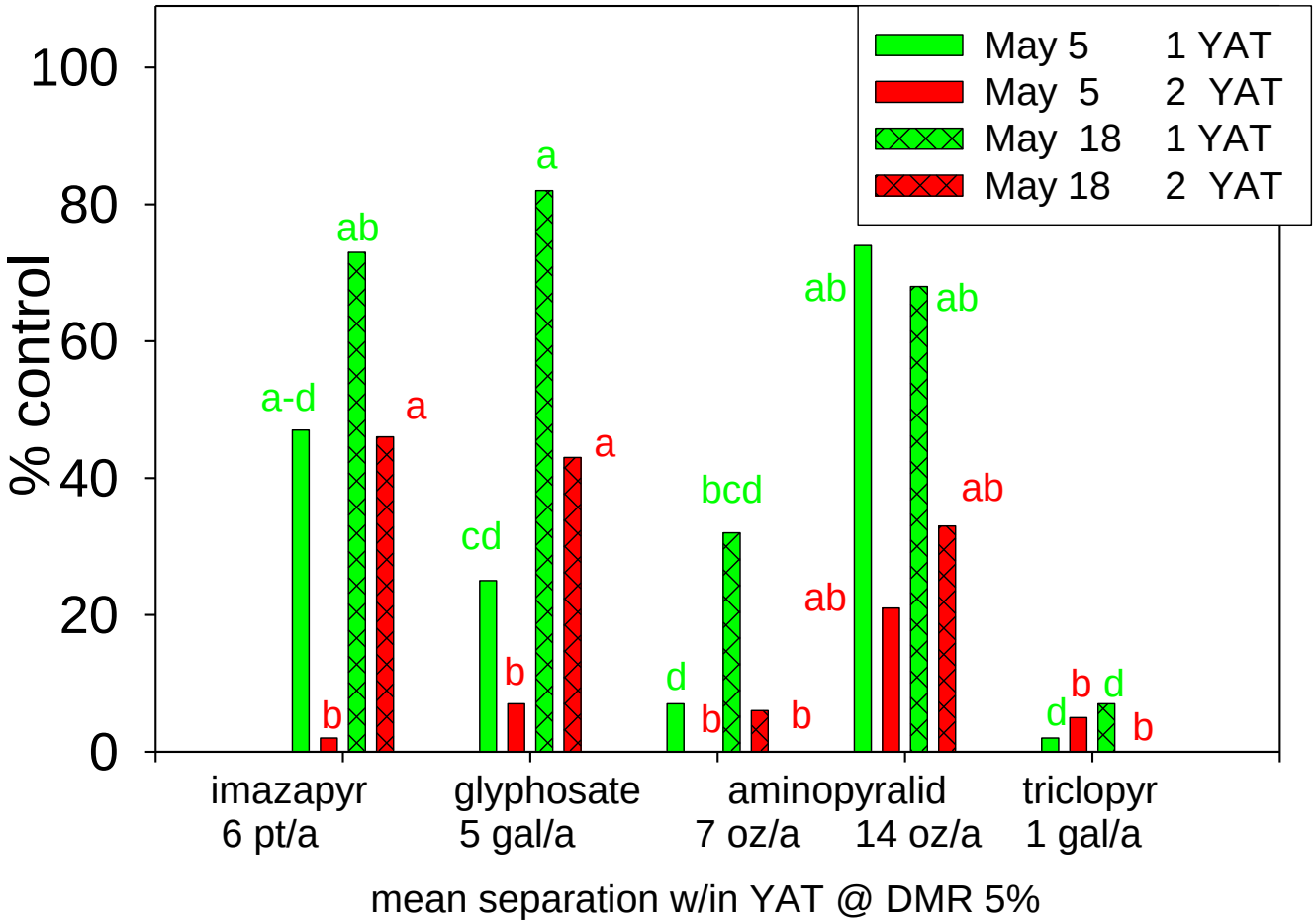
# % Bohemian Knotweed Control
# 2007 Application

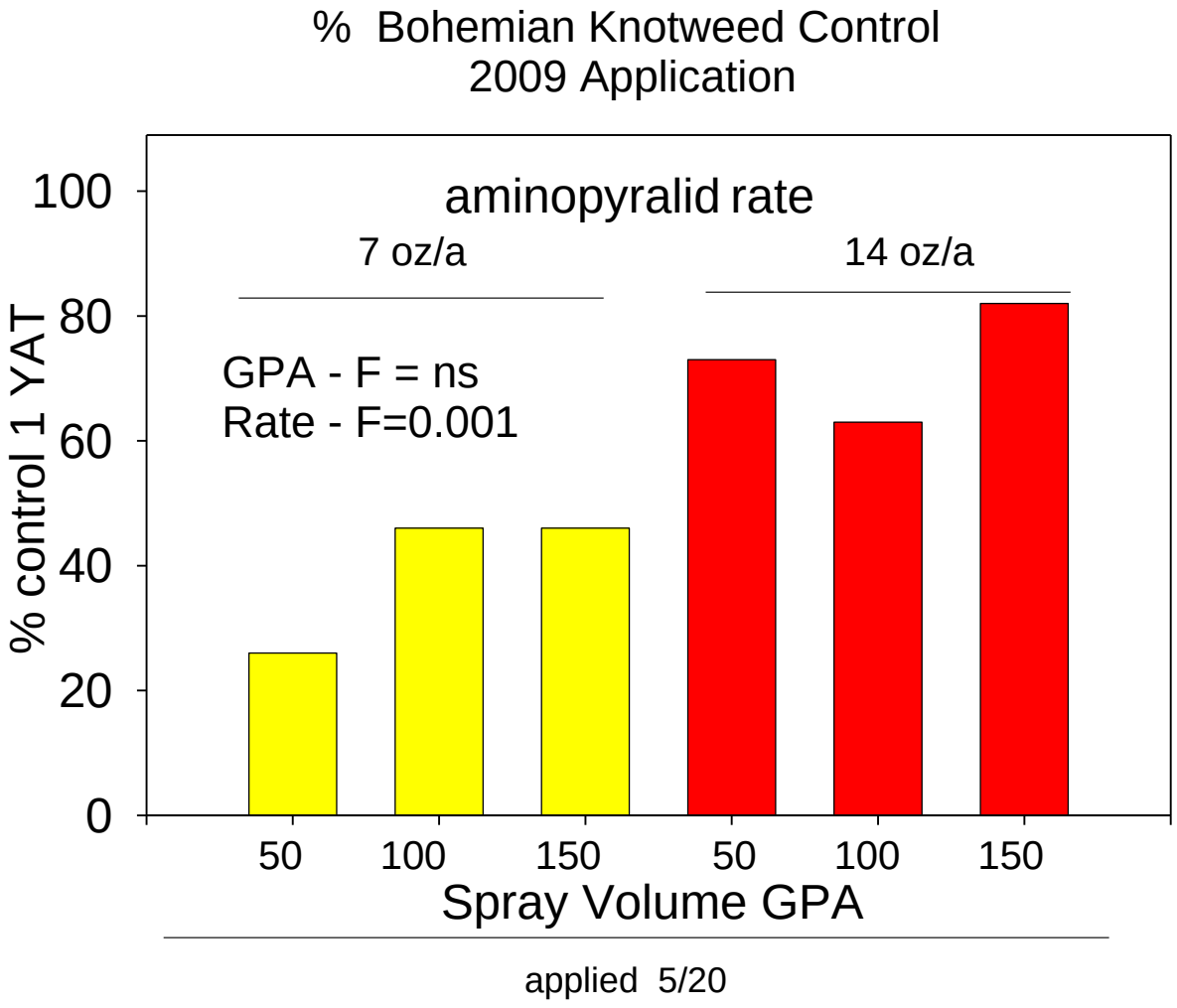



applied 8/12

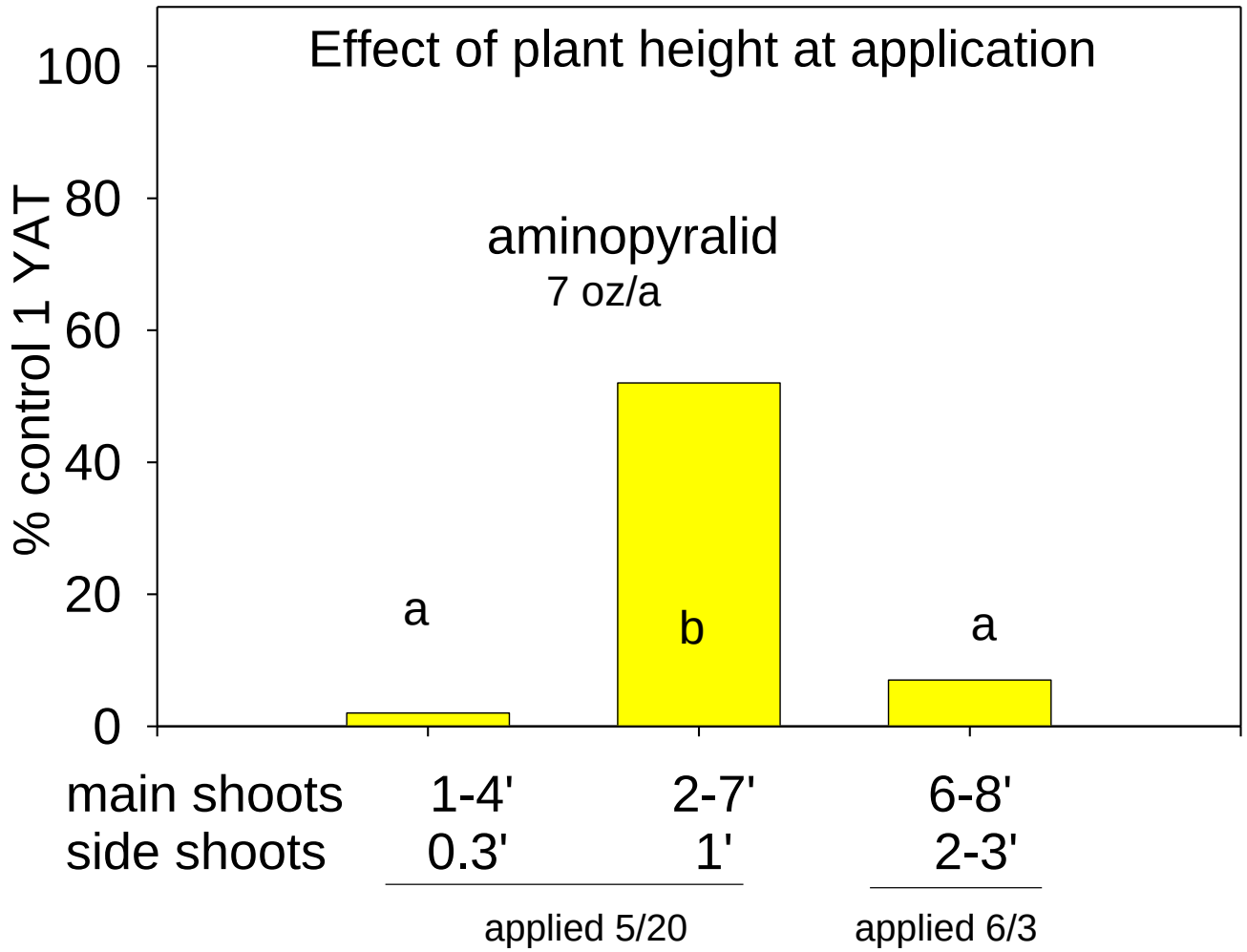
mean separation DMR 5%

# % Bohemian Knotweed Control
# 2006 Application

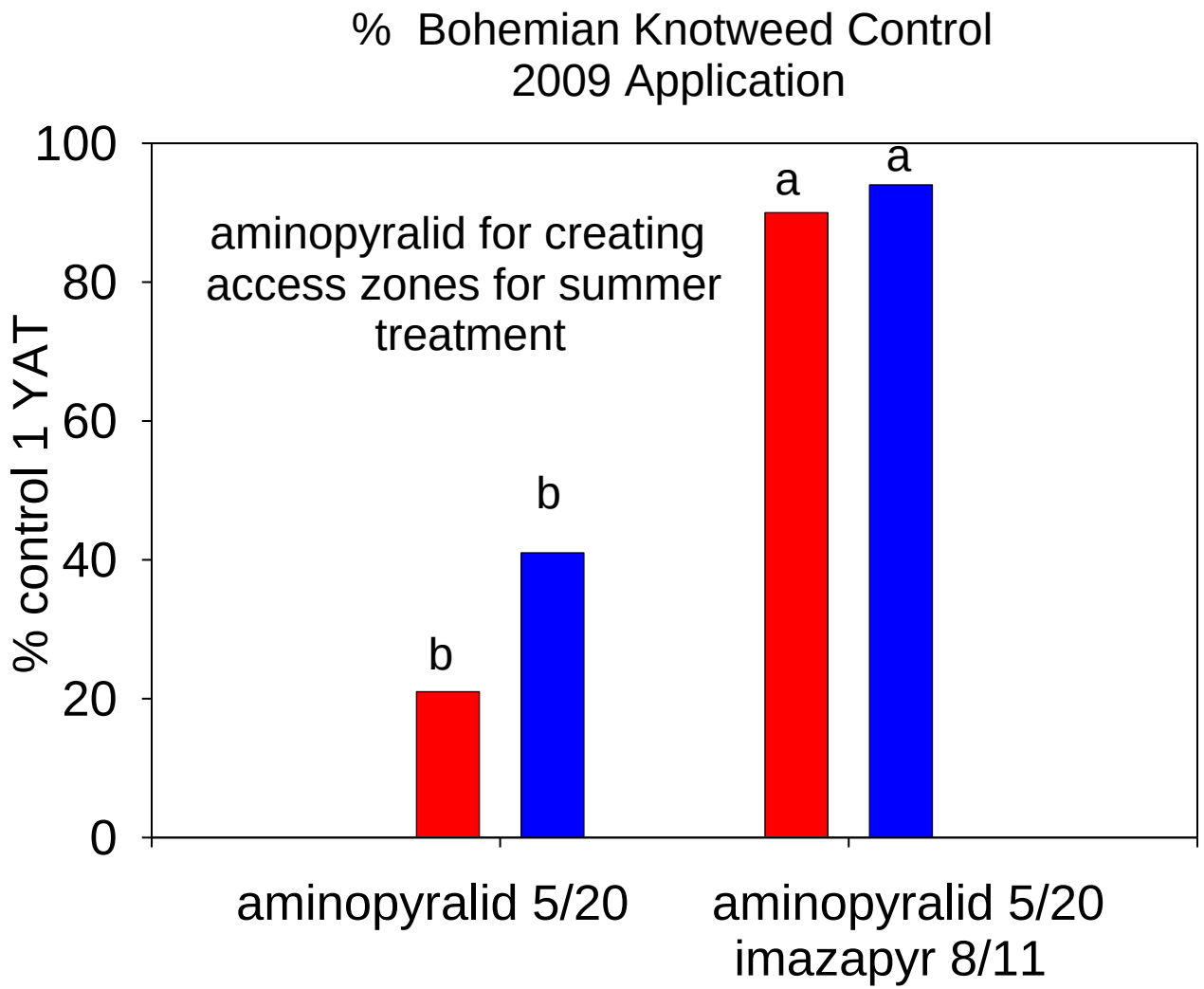



% Bohemian Knotweed Control
2009 Application
aminopyralid rate
7 oz/a
14 oz/a
GPA - F = ns
Rate - F=0.001
% control 1 YAT
100
80
60
40
20
0
50
100
150
50
100
150
Spray Volume GPA
applied 5/20

% Bohemian Knotweed Control
2009 Application



*Need to wait until all side shoots have emerged to 1-2’*


% Bohemian Knotweed Control
2009 Application
% control 1 YAT
100
80
60
40
20
0
aminopyralid for creating access zones for summer treatment
b
b
a
a
aminopyralid 5/20
aminopyralid 5/20
imazapyr 8/11


Aminopyralid created spray access zone

*Oct 2009*
*May aminopyralid*
*August Imazapyr*

*Ht at imazapyr treatment 3-6’*

*Oct 2010*

*Spring aminopyralid to suppress growth when knotweed is the understory may help reduced non-target impacts of  imazapyr.*


Conclusions

# Conclusions

1. For treatment of full-size plants, the most consistent control 2 YAT was obtained with imazapyr.
2. Combinations of imazapyr with glyphosate or aminopyralid did not improve control over imazapyr alone.
3. No herbicide was overly effective when applied to a rapidly growing canopy in the spring.
4. An early application of aminopyralid, targeting knotweed where all shoots had emerged and shoot height was 1-2.5 m, provided reasonable suppression/control.
5. An early season aminopyralid application to suppress canopy growth, creating easily accessed spray paths & zones followed by a mid-season imazapyr treatment, maybe a cost-effective alternative management plan for large swaths of Bohemian Knotweed.


Questions