USDA United States Department Of Agriculture
Agricultural Research Service

Exotic & Invasive Weeds Research Unit
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NM STATE UNIVERSITY

Management of camelthorn along the Virgin River

Southwest Vegetation Management Association Conference
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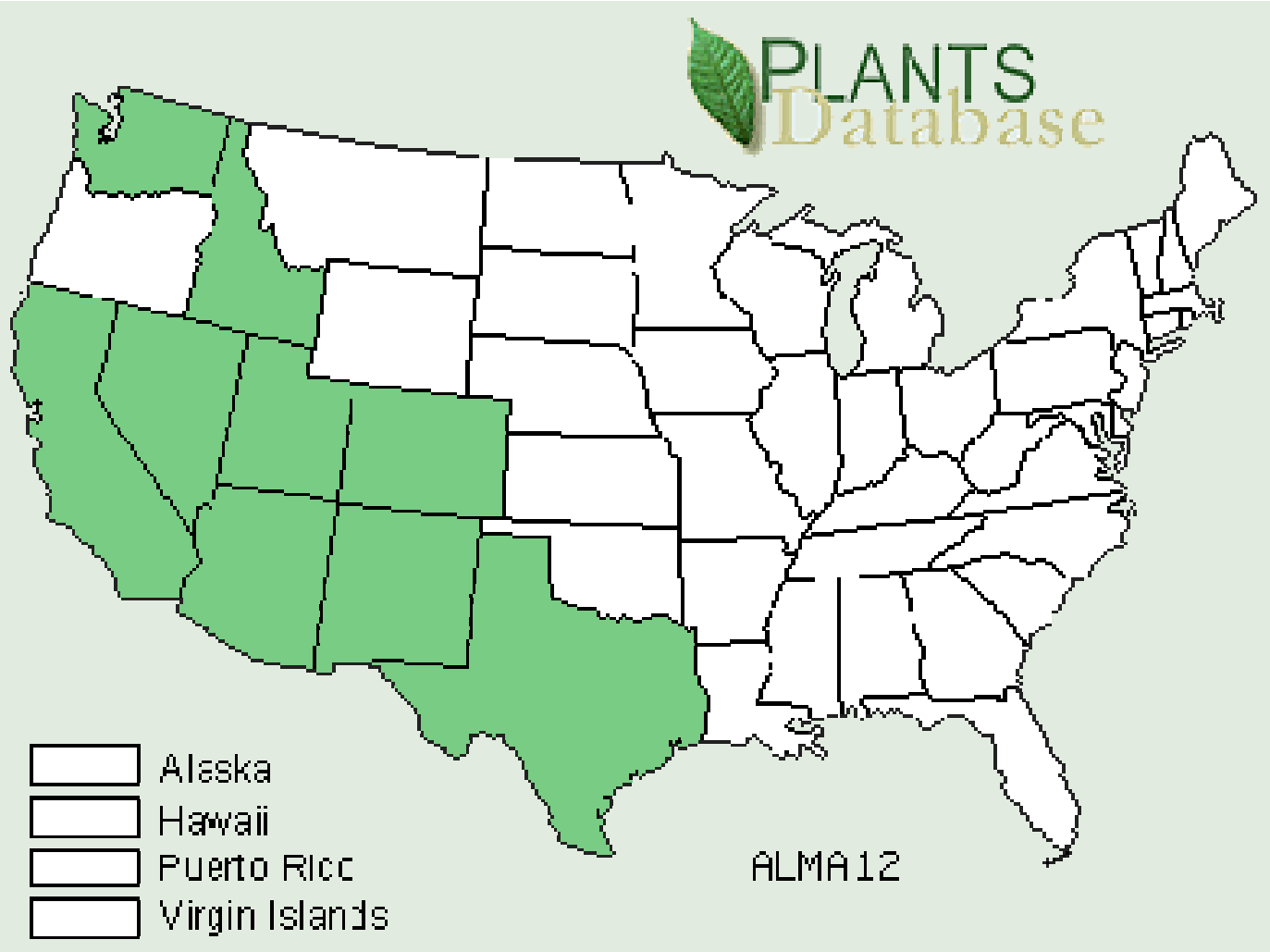
Camelthorn
(*Alhagi maurorum*)

- Herbaceous perennial weed
- Native to the middle east
- Introduced in 1915
  - as alfalfa seed contaminant
  - and camel dung packing around date palm offshoots
- Can infest wide range of areas (arid)
  - Riparian areas, floodplains and other areas with access to a water-table

Distribution in United States

- Listed as noxious weed in 8 states:
  - WA, OR, CA, AZ, CO, NV, NM, TX



Perennial roots

Management tools tested

- **Mechanical**
  - Unsuccessful unless integrated with other techniques
- **Biological**
  - CLASSICAL*: None*
  - COMPETITION: Healthy, competitive plant community
    - NOTE: MOST INFESTATIONS ARE IN HIGHLY DISTURBED AREAS (natural & unnatural)
- **Herbicides**
  - Several tested, but none tested that can be used near water

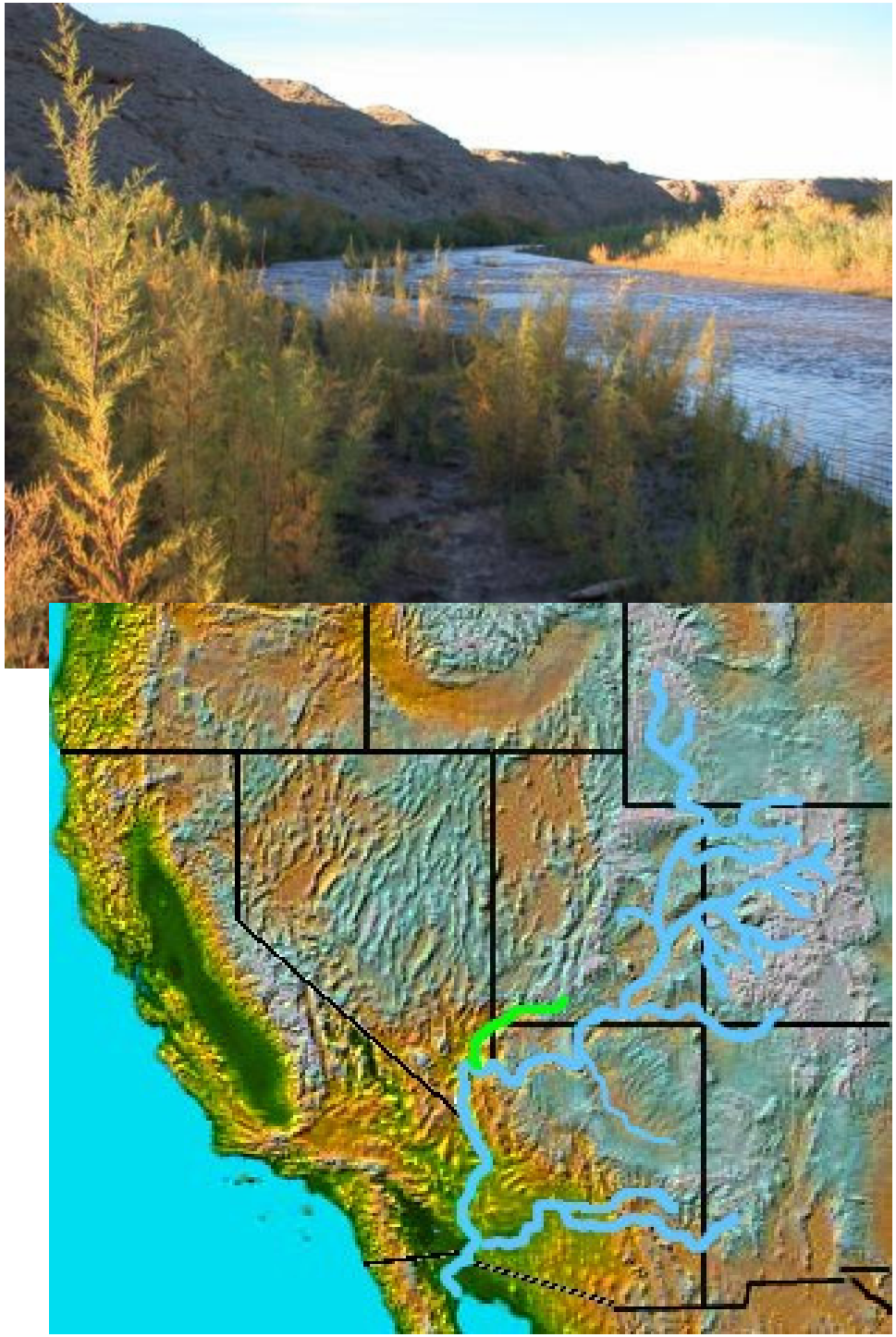
Goals

- To quantify the effectiveness of various herbicide treatments on camelthorn in riparian habitat

- To document the response of resident plant populations to these various treatments along the Virgin River's riparian and floodplain areas

Virgin River
SE Nevada

- Access to site was difficult
- Near water
  - Tools limited
- T & E species
  - southwestern willow flycatcher
  - Virgin River chub
  - Virgin River spinedace
- Mixed community of weeds and desirable plants

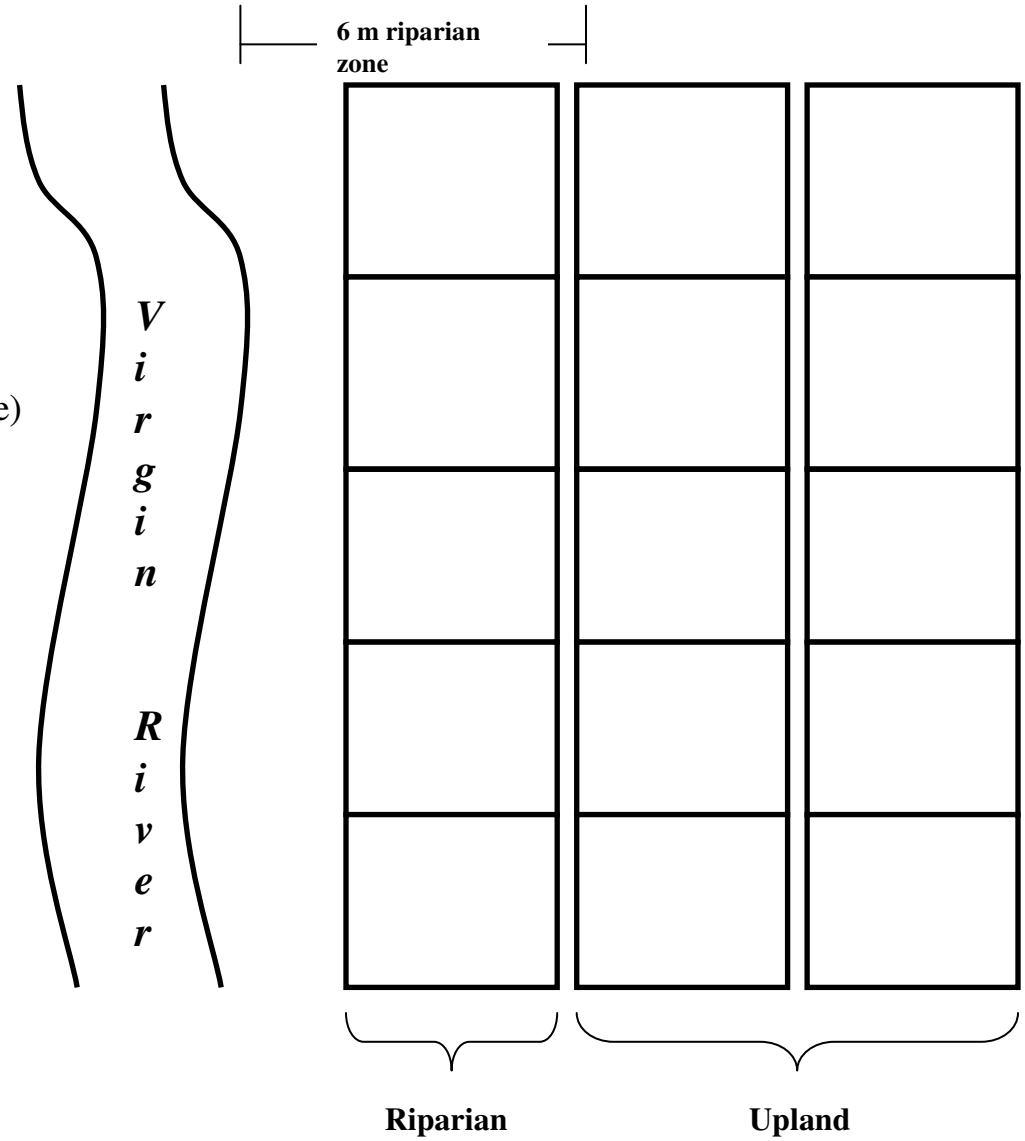


Solutions to problems in weed management
Virgin River, NV

- Partnering and consulting BEFORE project
  - National Park Service (Curt Deuser)
  - Nevada Cooperative Extension (Maria Ryan)
  - BLM (Brian Hamilton & Christina Nelson)
  - USFWS (Las Vegas District)

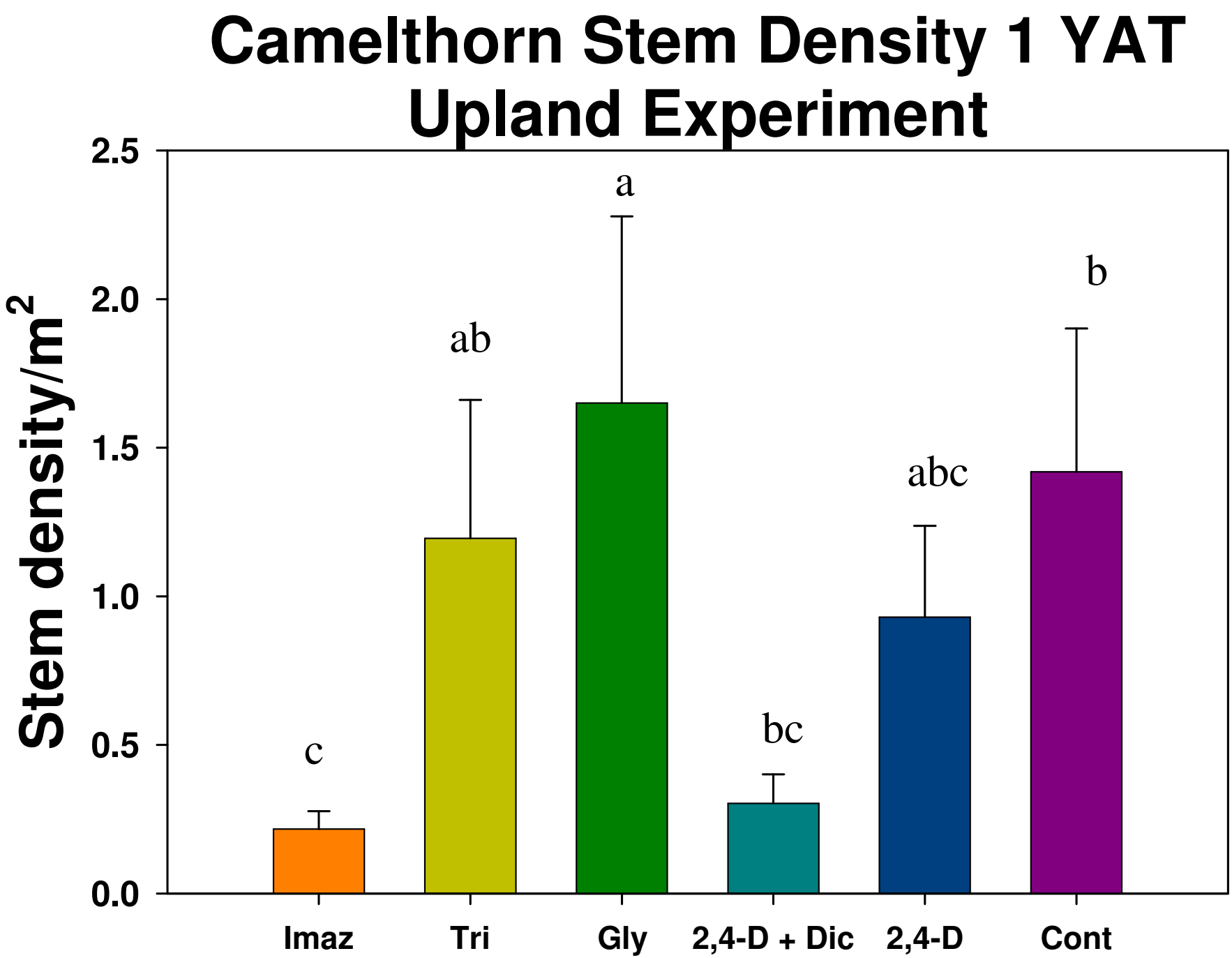
Experimental design

- Required a 6 m buffer zone for some herbicides so separated into 2 experiments
  - Riparian
    - aquatically approved herbicides only
      - Rodeo @ 1.5% (glyphosate)
      - Weedar 64 @ 2 % (2,4-D)
  - Upland
    - 1 % Garlon 3A (triclopyr)
    - 1 % Arsenal (imazapyr)
    - 1 % Veteran 720 (2,4-D & Dicamba)
    - 1.5% Rodeo (glyphosate)
    - 2 % Weedar 64 (2,4-D)
- RCB with 4 replications
- Spot Treated two times in 2003
  - Spring (FB stage) (4/7)
  - Fall regrowth (11/24)

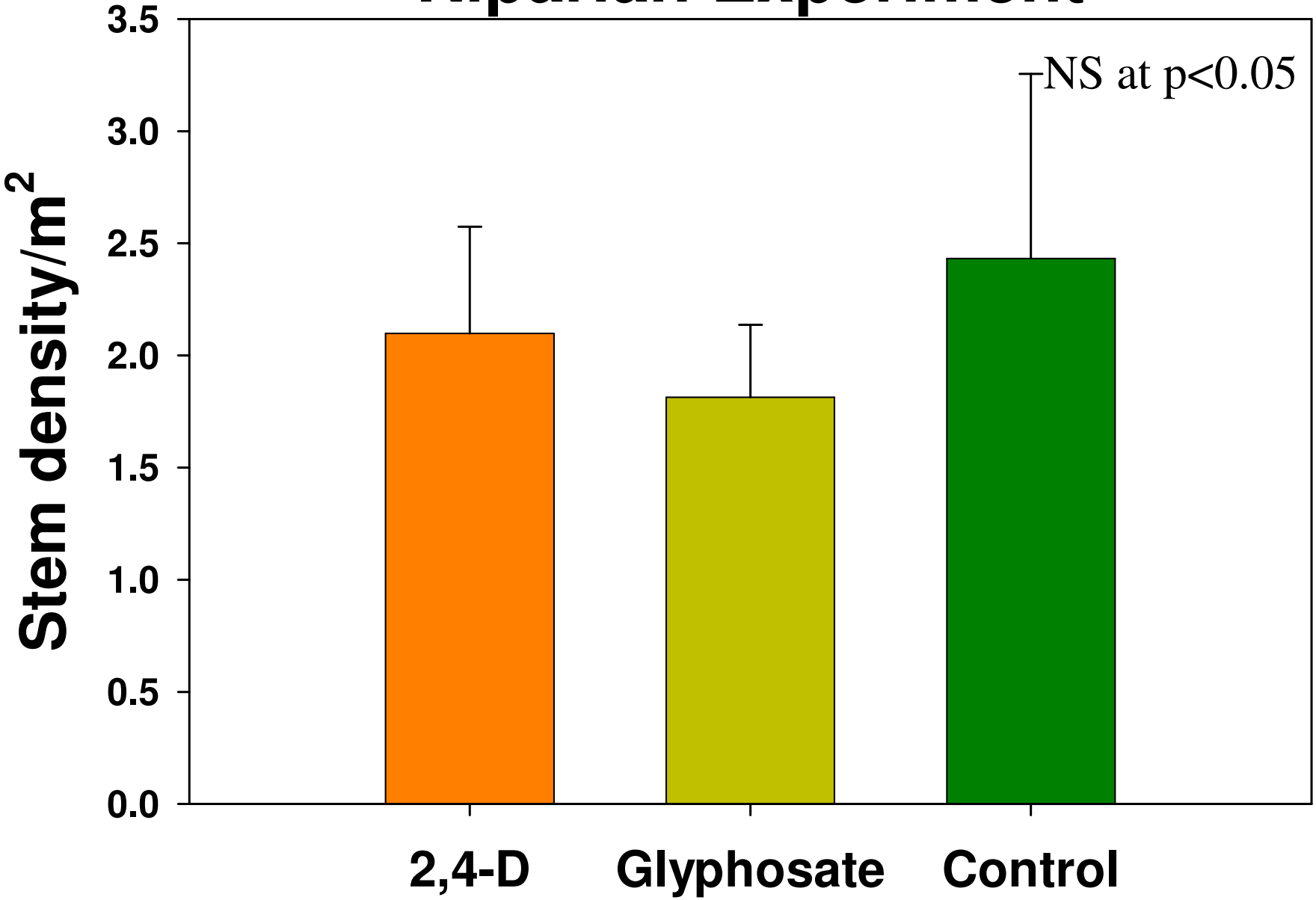


Measurements taken

- Took measurements prior to first treatments and at various intervals after
  - Camelthorn density
  - % cover of plants
    - permanent transects
  - Species richness
- Data evaluation
  - ANOVA
  - Means separation LSD
    - $P<0.05$

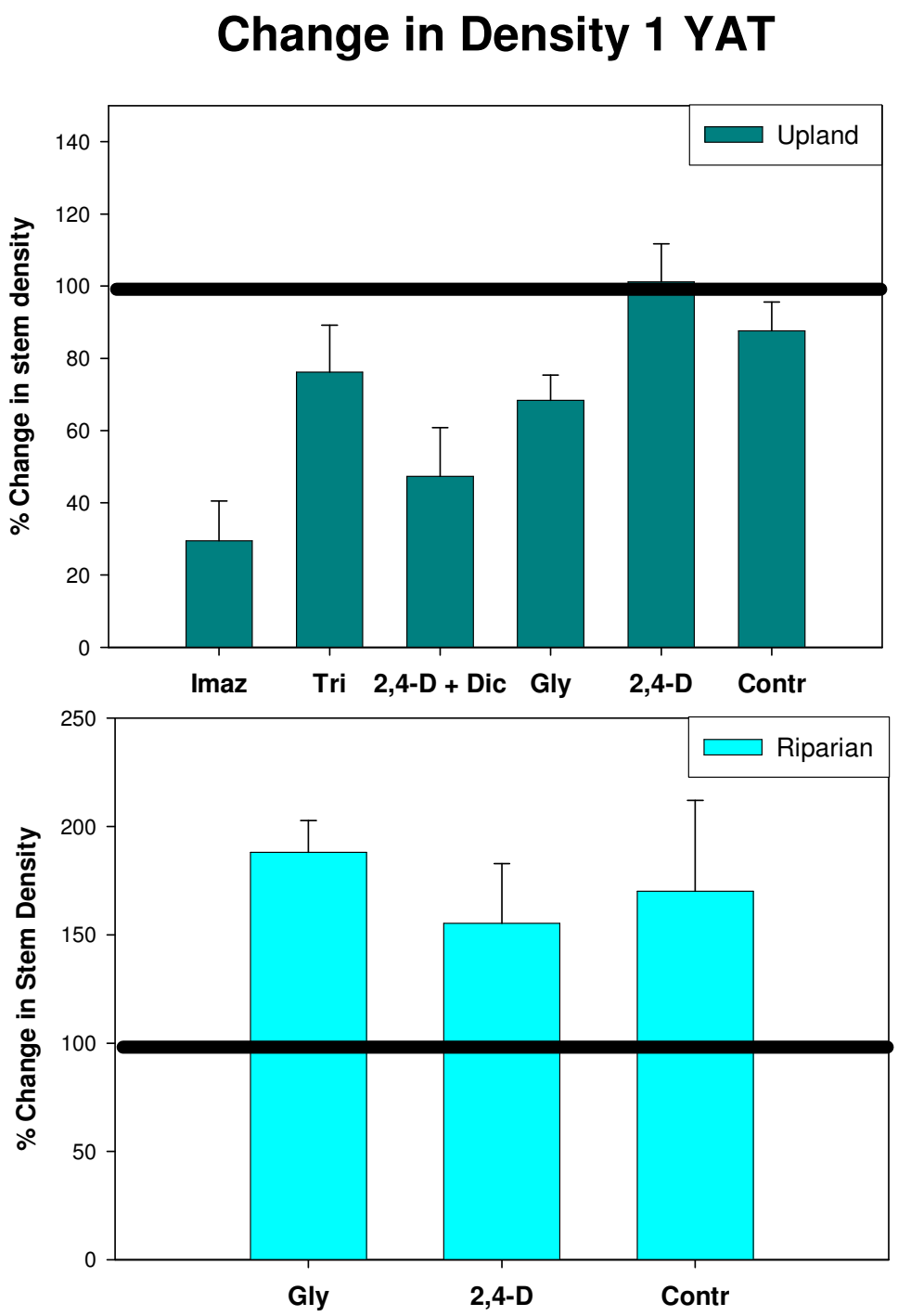

Camelthorn Stem Density 1 YAT
Upland Experiment
Stem density/m2
2.5
2.0
1.5
1.0
0.5
0.0
c
ab
a
bc
abc
b
Imaz
Tri
Gly
2,4-D + Dic
2,4-D
Cont

Camelthorn Stem Density 1 YAT Riparian Experiment

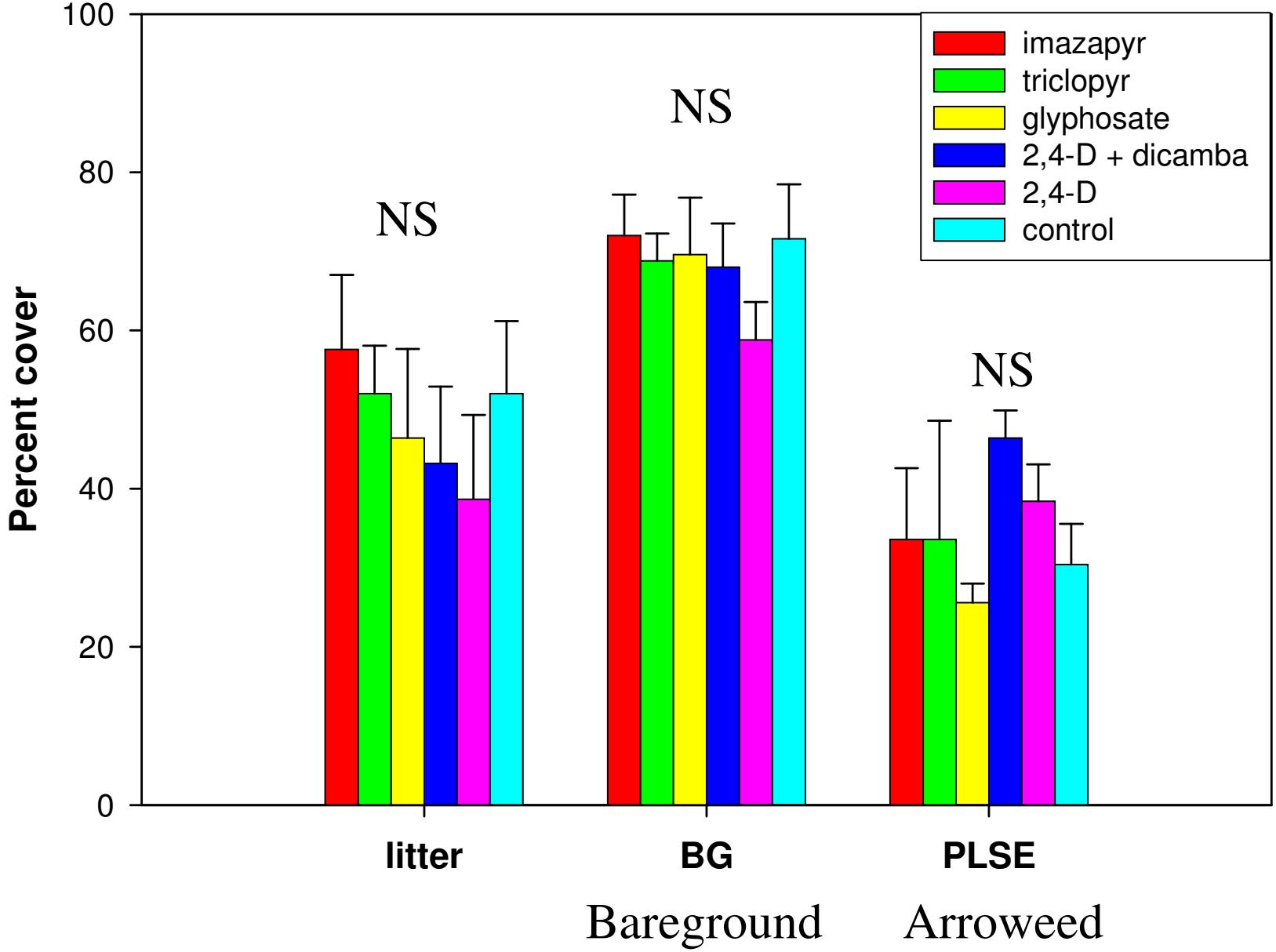


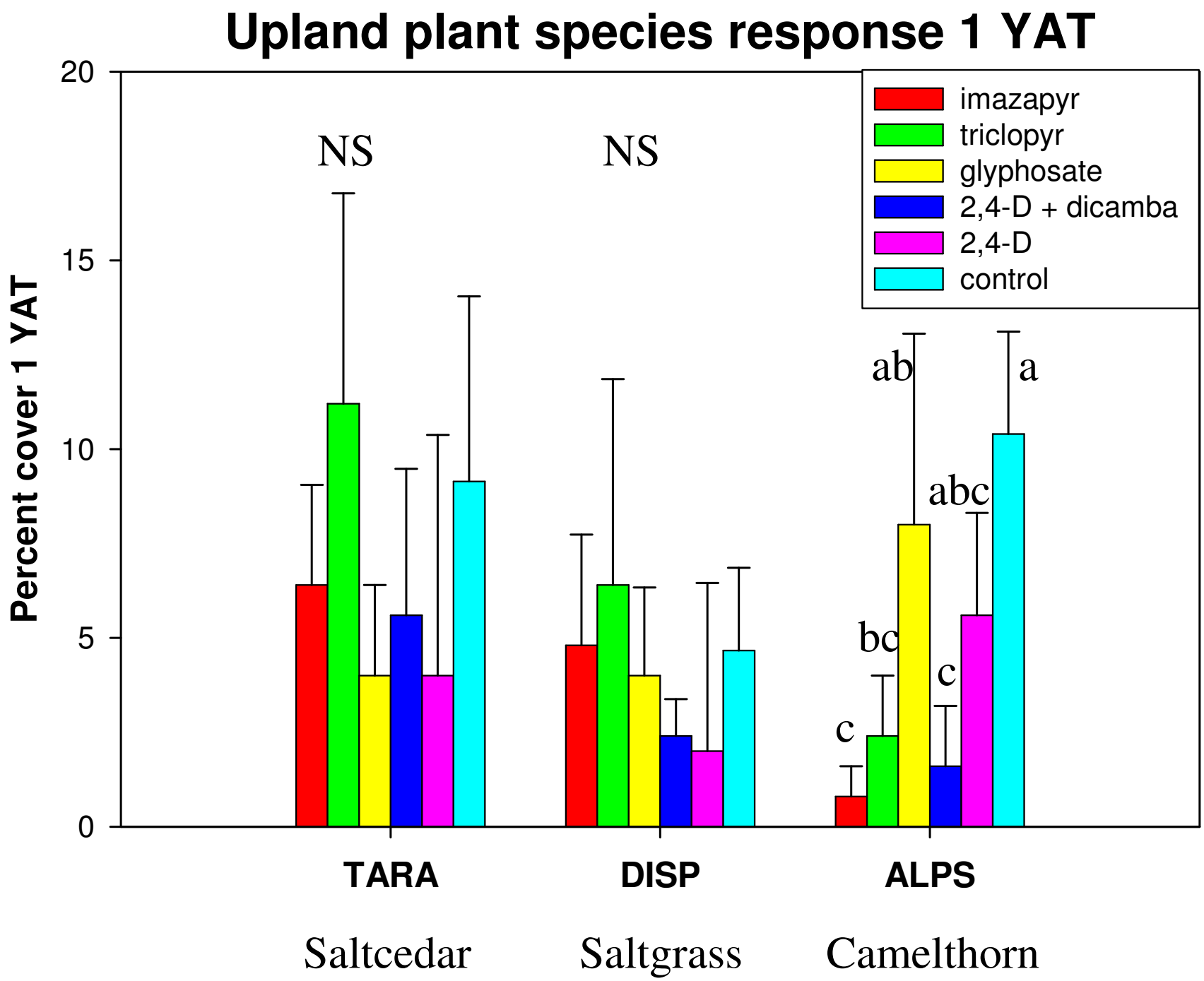
- Upland:
  - General reduction in stem density

- Riparian:
  - Increase in stem density

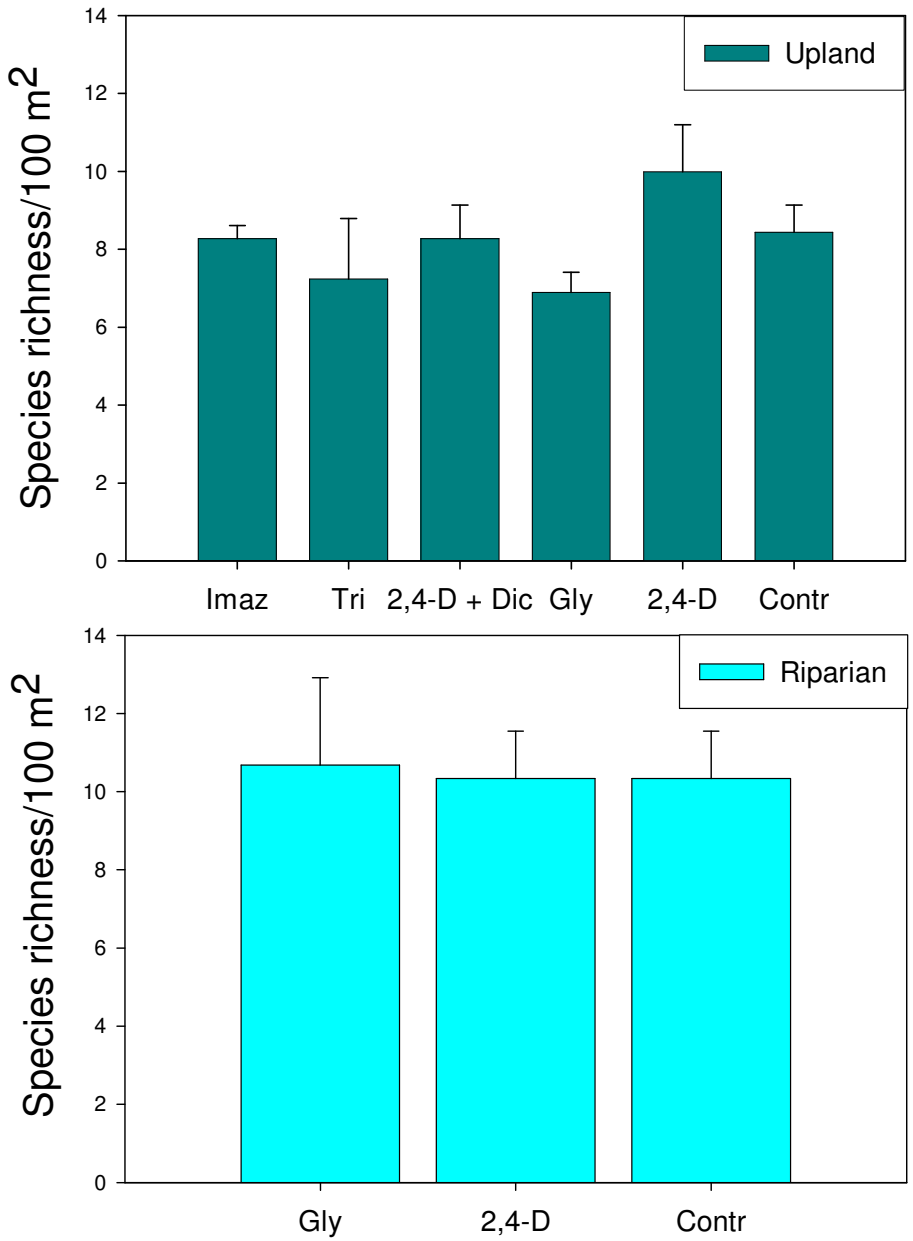


Upland plant species response 1 YAT




Upland plant species response 1 YAT
Percent cover 1 YAT
20
15
10
5
0
imazapyr
triclopyr
glyphosate
2,4-D + dicamba
2,4-D
control
NS
NS
c
bc
ab
c
abc
a
TARA
DISP
ALPS
Saltcedar
Saltgrass
Camelthorn

Species richness 1 YAT



Conclusions

- Spot applications had limited impact on desirable species
  - No herbicides detected in water
- Management **<u>can be variable</u>** across riparian terrain
  - No treatments eliminated camelthorn
- Long-term monitoring and management is needed to provide effective control

Current management recommendations

- 2,4-D + Dicamba
- Imazapyr
  - Habitat aquatic label
- Observations on adjacent areas indicated fall only applications may provide even improved control

Plot Photos

Treatments