

# Invasive plants in an urban landscape on the Tempe campus of Arizona State University

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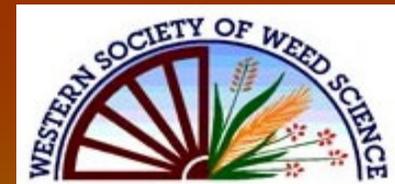
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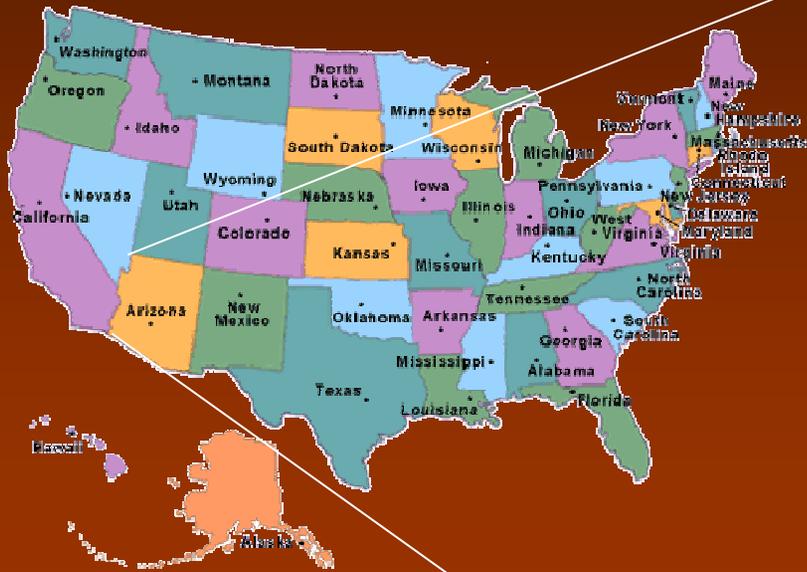
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# USA and Arizona



# Premise

Urban landscapes serve as sites for plant introductions and are potential sources of invasive species for spread to adjacent natural lands.

“ The 10 % rule ”



# Objectives

To document plants displaying invasive habits in an urban landscape.

To provide base information for predicting plant invasions (Wade 1995) and for people doing invasion risk assessments (Powell 2004)

To compare invasive tree species on the ASU Tempe campus site with a Sonoran desert urban riparian site (Brock and Farkas 1995)

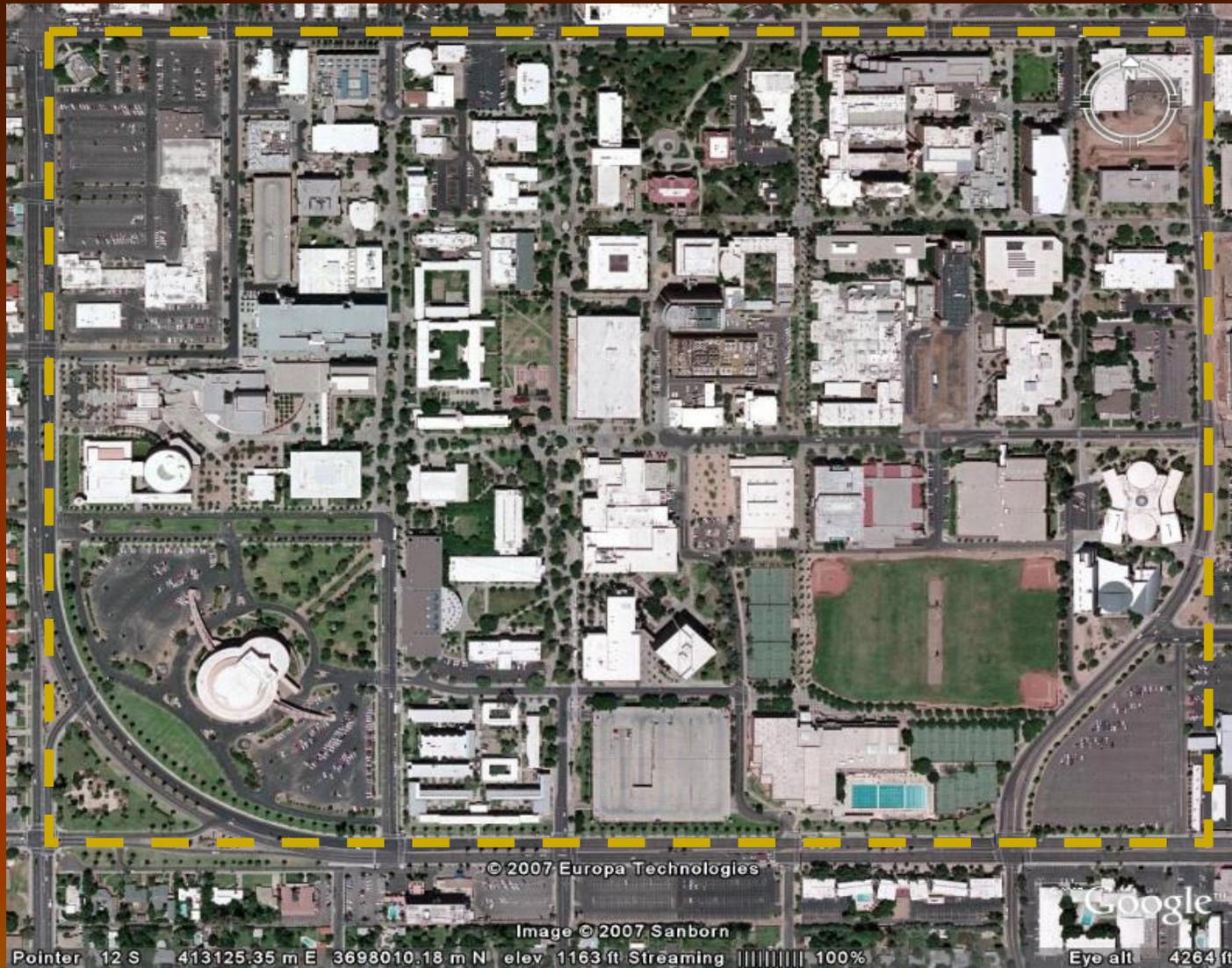


## Study Site

- Elevation  
354 m
- Site  
dimensions  
1000 x 835 m
- Area of site  
85 ha



North



# Methods

Sites across the ASU Tempe campus were surveyed for invasive species (plants growing out of place) between mid March and early May 2007.

The coordinates of each site was recorded using a GPS device.

At each site the identity of the invasive plant(s) and the number present was recorded, except for sod forming grasses and sedges which were rated as to total surface cover using cover classes of sparse, moderate and dense.

These data were uploaded to ArcGIS 9.2 software for display of the invasive species distribution across campus.



# Methods

Horticultural plantings near buildings, walkways, and raised planters were assessed for invasive species.

Areas of turf were not included in the survey.

Landscape maintenance has improved on the campus in the recent past, since many invasive plants that were observed growing in areas of shrubbery had been removed when this work was undertaken. Most notably were numerous African sumac tree saplings removed from areas planted with *Juniperus* sp.



# Results

Number of observations of potential invasive plant species on the ASU Tempe campus

N= 629

7.4 observations per ha

Total number of invasive plants recorded

N = 2587\*

30.4 plants per ha

*\*Cynodon dactylon and Cyperus sp were not counted as individuals*



# Results – Species List

Family	Scientific name	Common name
Anacardiaceae	<i>Pistacia chinensis</i>	Chinese pistacia
	<i>Rhus lancea</i>	African sumac
Arecaceae	<i>Washingtonia filifera</i>	fan palm
Asteraceae	<i>Baccharis sarathroides</i>	desert broom
	<i>Lactuca sp.</i>	wild lettuce
	<i>Sonchus oleraceus</i>	sow thistle
Brassicaceae	<i>Brassica tournefortii</i>	Sahara mustard
	<i>Sisymbrium irio</i>	London rocket
Chenopodiaceae	<i>Chenopodium sp.</i>	lamb's quarter
Cyperaceae	<i>Cyperus sp.</i>	nutgrass
Fabaceae	<i>Acacia sp.</i>	wattle
	<i>Leucaena leucocephala</i>	lead tree
	<i>Lysiloma microphylla</i>	desert fern
	<i>Parkinsonia florida</i>	blue palo verde
	<i>Prosopis sp.</i>	Mesquite
Juglandaceae	<i>Carya illinoinesis</i>	pecan
Moraceae	<i>Morus ruba</i>	mulberry
Poaceae	<i>Bromus rubens</i>	red brome grass
	<i>Cynodon dactylon</i>	Bermuda grass
	<i>Pennisetum setaceum</i>	fountain grass
Tamaricaceae	<i>Tamarix ramosissima</i>	salt cedar
Ulmaceae	<i>Ulmus parvifolia</i>	Chinese elm
Verbenaceae	<i>Lantana x</i>	lantana

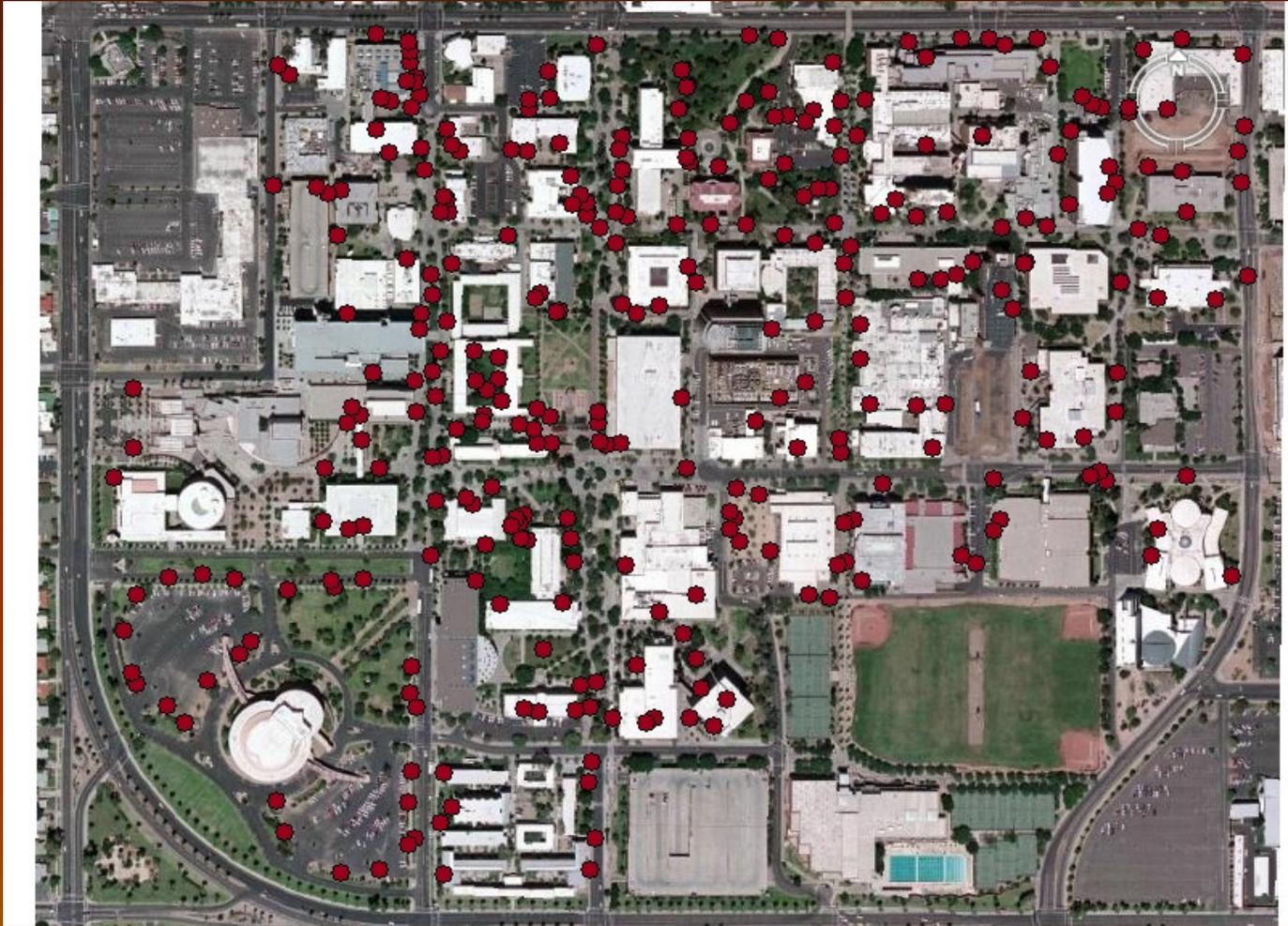
13 Families

23 species

5 Continents



# Total Invasive Plant Distribution



# Results – Occurrence Top 5

Frequency of occurrence

<u>Plant species</u>	<u>Number of locations</u>	<u>Percentage</u>
<i>R. lancea</i>	139	22.1
<i>W. filifera</i>	115	18.3
<i>C. dactylon</i>	108	17.2
<i>Cyperus</i>	62	9.8
<i>B. sarathroides</i>	32	<u>5.1</u> 72.5

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# Results – Relative Density Top 5

<u>Plant species</u>	<u>Number</u>	<u>Relative density (%)</u>
<i>W. filifera</i>	977	37.7
<i>R. lancea</i>	472	18.2
<i>B. sarathroides</i>	212	8.1
<i>L. leucocephala</i>	144	5.5
<i>B. tournefortii</i>	135	<u>5.2</u> 74.7

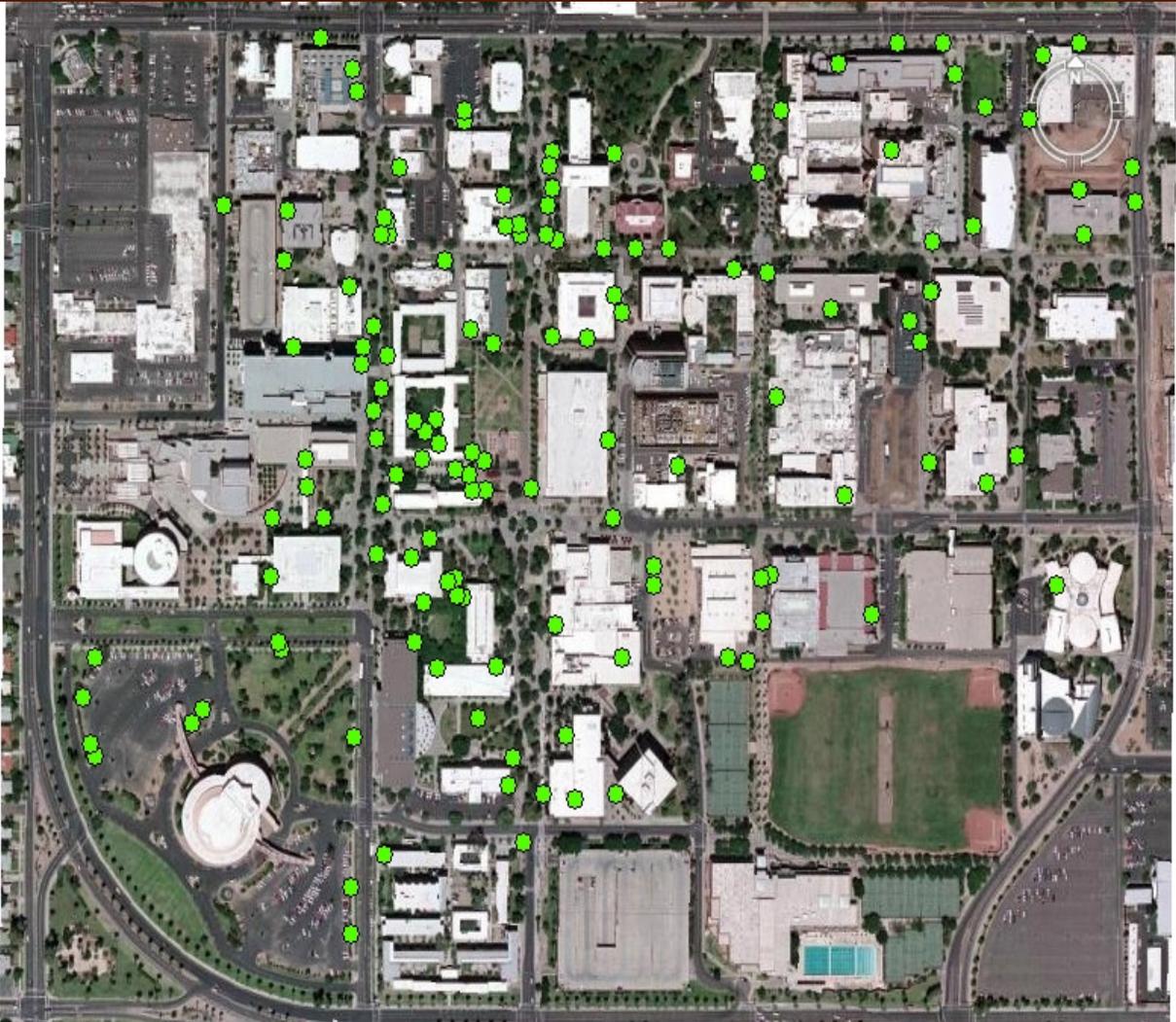
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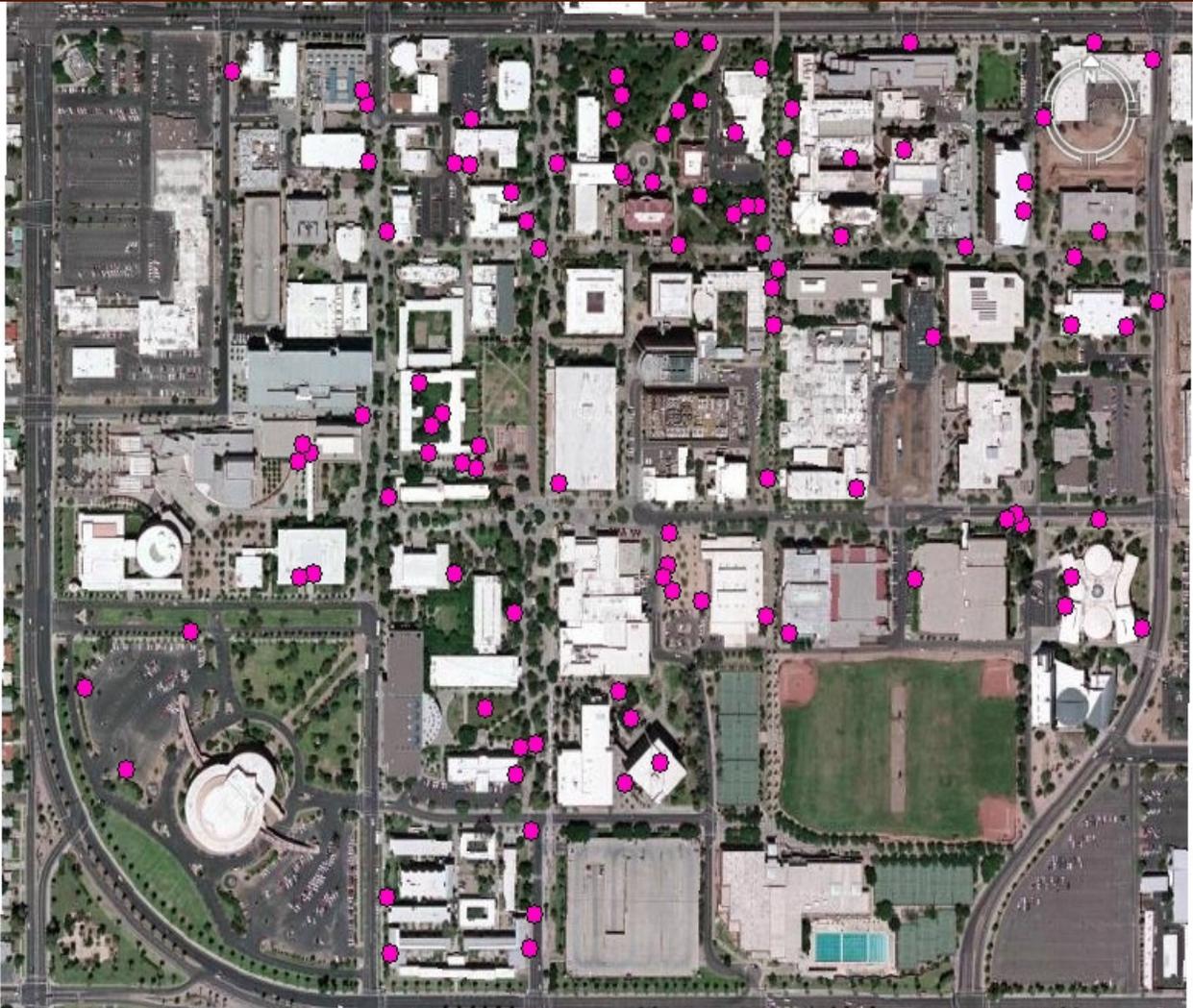
*Washingtonia filifera* (115/977)



*Rhus lancea* (139 / 472)



*Cynodon dactylon* (108/NA)



*Leucaena leucocephala* (11 / 144)



# Conclusion

- The Arizona State University Tempe campus landscape contains several invasive species that are moving into adjacent natural lands, most notably *R. lancea* and *L. leucocephala*. Both of these species were indicated to have a high invasive potential in the Brock and Farkas 1995 paper about invasive species in a Sonoran desert urban riparian landscape. The invasive nature of these species is supported by this study and other observations (Martin 2007 personal communication).
- GIS technology, as assumed, provided a good means to display invasive species distribution across the landscape.
- The horticultural industry needs to be mindful of its inputs to urban landscapes and possible effects to adjacent wildlands to aid in the management of plant invasions.



# Literature Cited

Brock, J. H. and M. C. Farkas. 1995. Alien Woody Plants in a Sonoran Desert Urban Riparian Corridor: An Early Warning System About Invasiveness? *Plant Invasions: Studies from North America and Europe*. P. 19 - 35. Backhuys Publishing, Leiden, The Netherlands.

Powell, M. R. 2004. Risk Assessment for Invasive Plant Species. *Weed Technology*. 18:1305 - 1308.

Wade, M. 1995. Predicting Plant Invasions: Making a Start. *Plant Invasions: Studies from North America and Europe*. p. 1 - 18. Backhuys Publishing, Leiden, The Netherlands.



# Questions ?

Thank you for your attention!

