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RUNAWAY Biocontrol
Catch her if you can.



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Grand Canyon
Seminar

a Lea Pollack
production

What makes a species “invasive”?

A non-native species is not necessarily a “bad” species

(Davis et al. 2011, Gurevitch & Padilla 2004)

Invasion: “The establishment and spread of an introduced species”

(Wonham 2005)

Characterized by:

1. Rapid population increase
2. Range expansion or spread
3. Local dominance/high abundance

(Gurevitch et al. 2011)

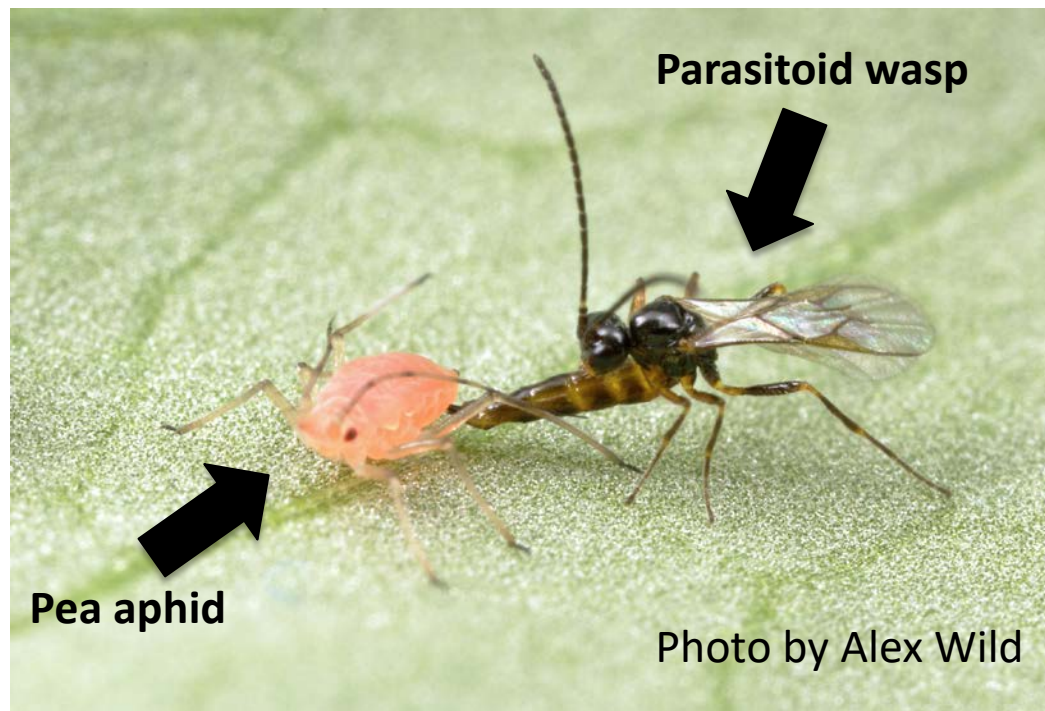


Invasive species have the potential to harm biodiversity, human health, ecological services

What is biocontrol?

The enhancement of native species or the introduction of nonnative predators, parasites, or diseases for the removal of unwanted species, including invasive species

(Wonham 2005)



When biocontrol works



(Cock et al. 2016, USDA APHIS Biological Control Program)

When biocontrol fails, **spectacularly**

Nontarget effects have historically been the rule rather than the exception



Photo by Bill Waller

The ethics of biocontrol

Classical biological control is just another intended invasion (Heimpel & Mills 2017)

- What are the goals of this biocontrol program?
- Is biocontrol worth the effort?
- Is there a way to make biocontrol more ethical?

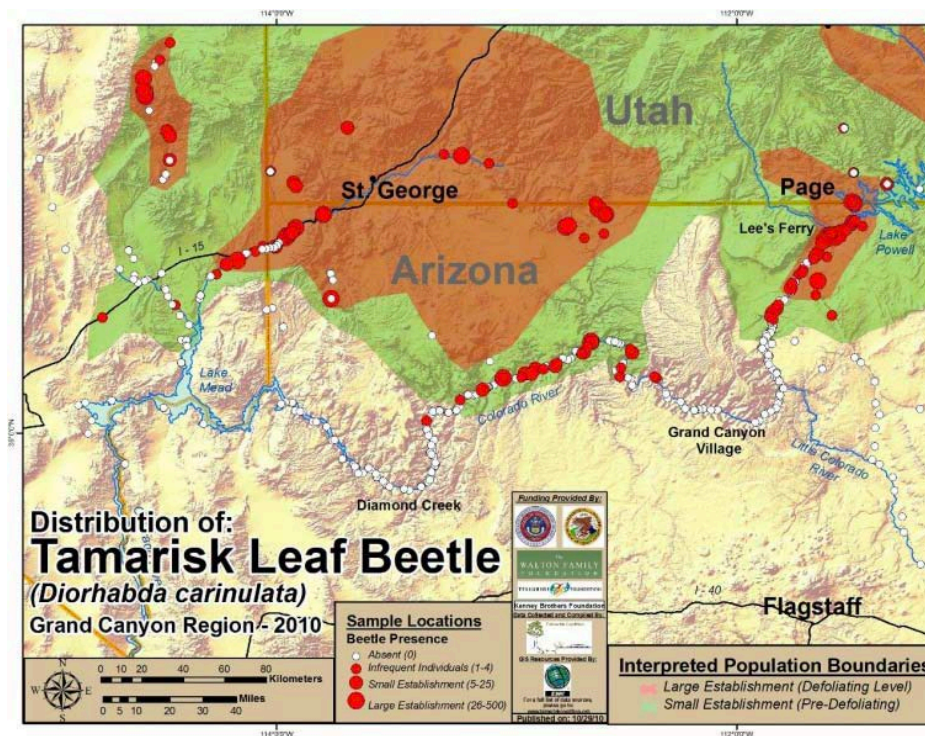
Case Study: Tamarisk in the Grand Canyon



Tamarisk Beetle in the Grand Canyon

Open release of beetles in some areas of the U.S. in 2001

(Bean et al. 2009)



(Image from NPS Update, 2011)

Beetles found in Grand Canyon National Park by 2009

(Makarik 2011)

How the biocontrol of Tamarisk ran away

Rapid range expansion of the beetle lead to conflict between the tamarisk biocontrol program and southwestern willow flycatcher management

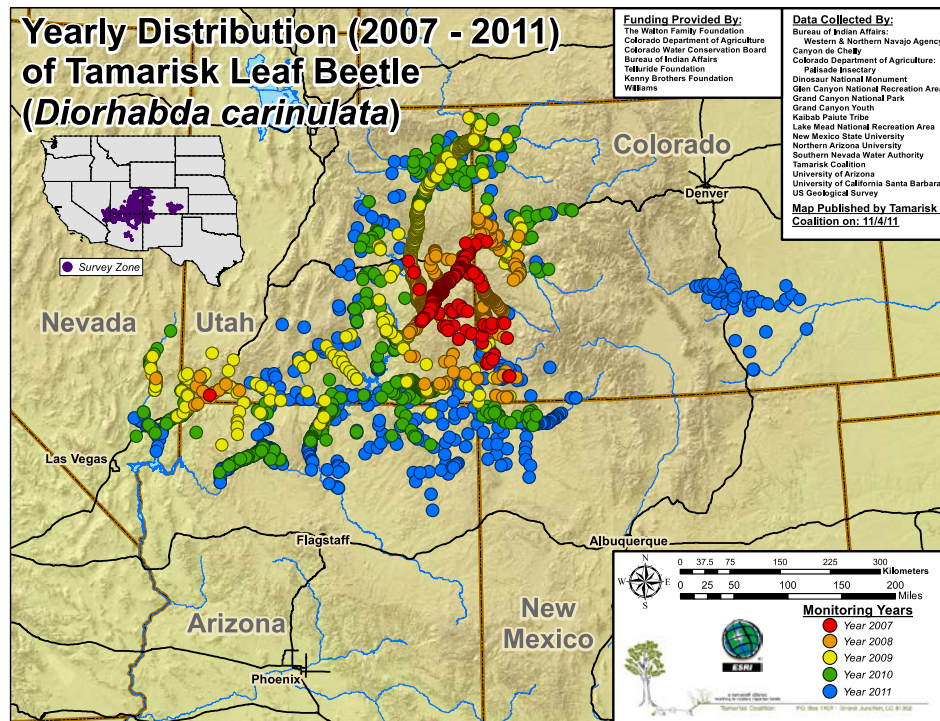


Photo by Jim Rorabaugh

Takeaways

Ecosystem versus species based management:

Different goals can lead to different metrics of success

Biocontrol can be a risky endeavor:

Often going to be unintended, unaccounted for impacts



Questions?



Aspects of successful biocontrol

- Environmental matching
- Pre-release testing for specificity
- Characteristics of agents
- Multiple lines of attack-
“integrative pest management”



(Kimberling 2004, Cock et al. 2016, USDA APHIS Biological Control Program)

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