



Confirming safety: Ecological host-range and monitoring for spillover in weed biological control

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Physiological host-range: plant species on which adults will readily feed and immatures will complete their development



Ecological host-range: includes all the plants an agent will utilize when given the opportunity to use its full suite of host seeking and acceptance behaviors in an open field setting



Dioscorea bulbifera

- Climbing vine (20+ meters)
- Vigorous vegetative propagation
- Outcompetes native vegetation
- Challenging to control using conventional methods



Lilioceris cheni (Coleoptera: Chrysomelidae)



Pupa



Adult



~28 days



Larvae



Egg



L. cheni feeding damage



Lilioceris cheni quarantine results

- Did not complete development on any non-target species
- Oviposited on: *Dioscorea floridana*, *D. villosa*
- Test fed on: *D. floridana*, *D. villosa*, *D. alata*, *D. altissima*, *D. polystachya*, *D. rotundata*, *D. sansibarensis*, *Rajania cordata*

Testing the ecological host-range of *Lilioceris cheni*



Dioscorea alata^F

Dioscorea bulbifera^{F,O}

Dioscorea floridana^{F,O}

Dioscorea polystachya^F

Dioscorea sansibarensis^F

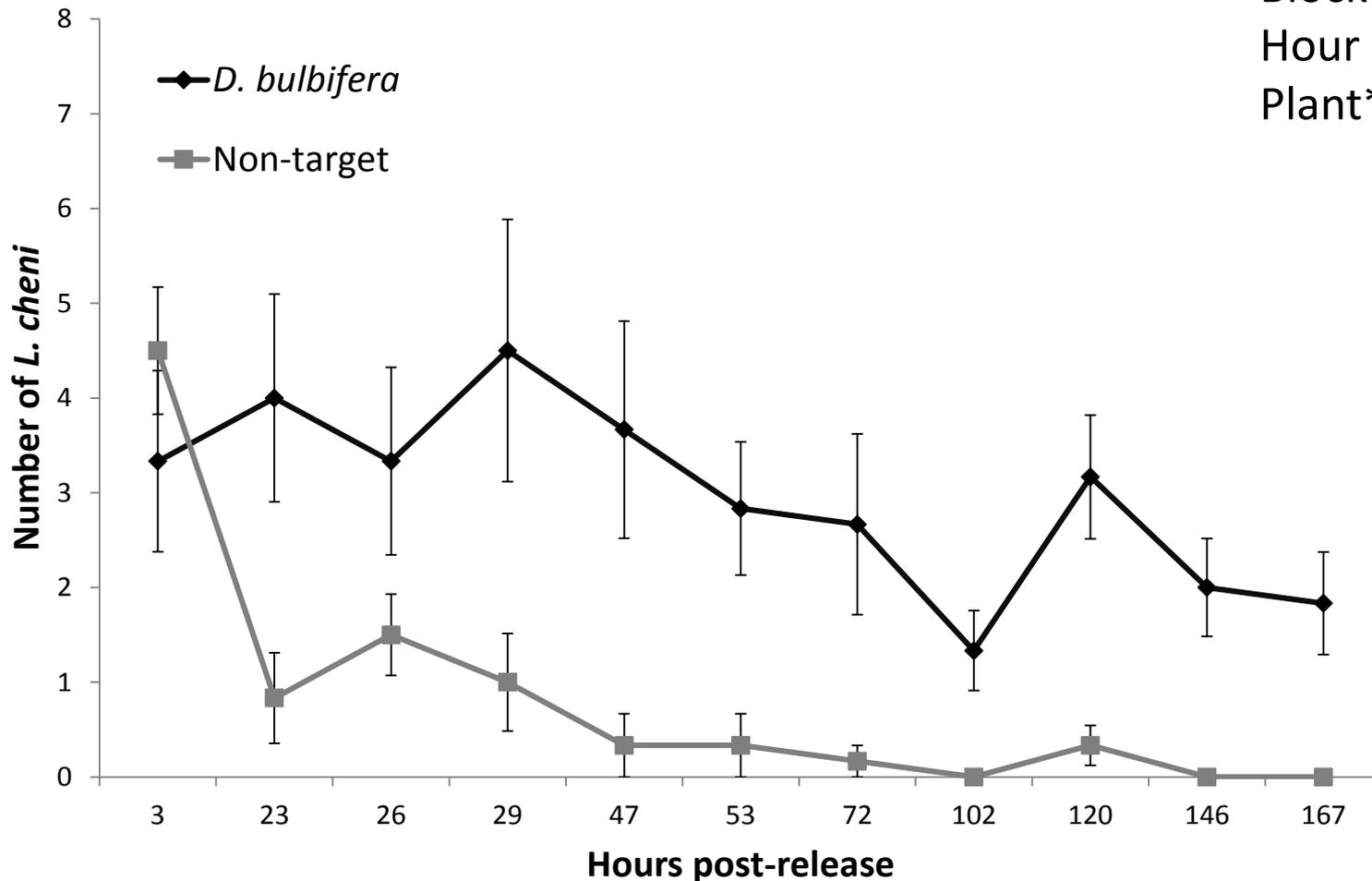
Dioscorea villosa^{F,O}

Tacca chantrieri

Plastic plant

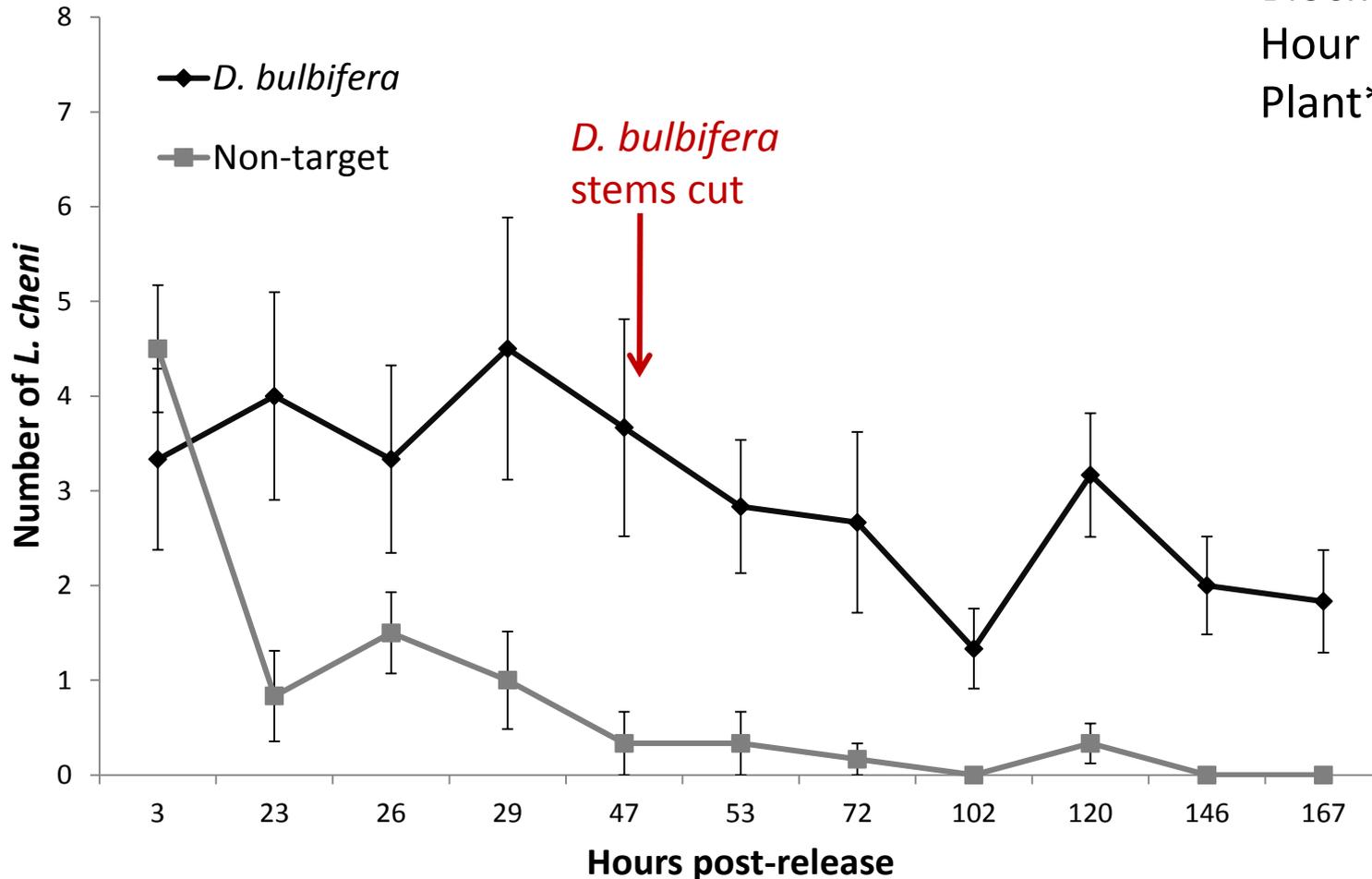
Number of naive *L. cheni* on *D. bulbifera* and non-target plants (mean \pm SE)

Plant	0.0111
Block	0.1862
Hour	0.0032
Plant*Hour	0.0034



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	Quarantine Test feeding	Field Test Feeding
<i>Dioscorea bulbifera</i>		
<i>Dioscorea alata</i>		
<i>Dioscorea floridana</i>		
<i>Dioscorea polystachya</i>		
<i>Dioscorea sansibarensis</i>		
<i>Dioscorea villosa</i>		
<i>Tacca chantrieri</i>		

	Quarantine Test feeding	Field Test Feeding		Quarantine Oviposition	Field Oviposition
<i>Dioscorea bulbifera</i>					
<i>Dioscorea alata</i>					
<i>Dioscorea floridana</i>					
<i>Dioscorea polystachya</i>					
<i>Dioscorea sansibarensis</i>					
<i>Dioscorea villosa</i>					
<i>Tacca chantrieri</i>					

Ecological host-range of *Melaleuca quinquenervia* agents



Ecological host-range of *Neomusotima conspurcatalis*, a biological control agent for Old World climbing fern



Spillover

- Non-target use: feeding or development on a species that is usually closely related to the target weed
- Spillover: can occur on related or non-related species when the biological control agent outbreaks and depletes the target weed; spillover events are uncommon and tend to be transient

Will *L. cheni* spillover onto *D. floridana* during population outbreaks?



Field sites with high beetle
populations in:
Gainesville
Fort Pierce
Fort Lauderdale





After 8 days in the field

D. bulbifera

- 83% of plants had eggs and/or larvae present



D. floridana

- No plants with eggs or larvae





Bill Overholt

Bikasha collaris flea beetle on Chinese tallow

Adult Feeding

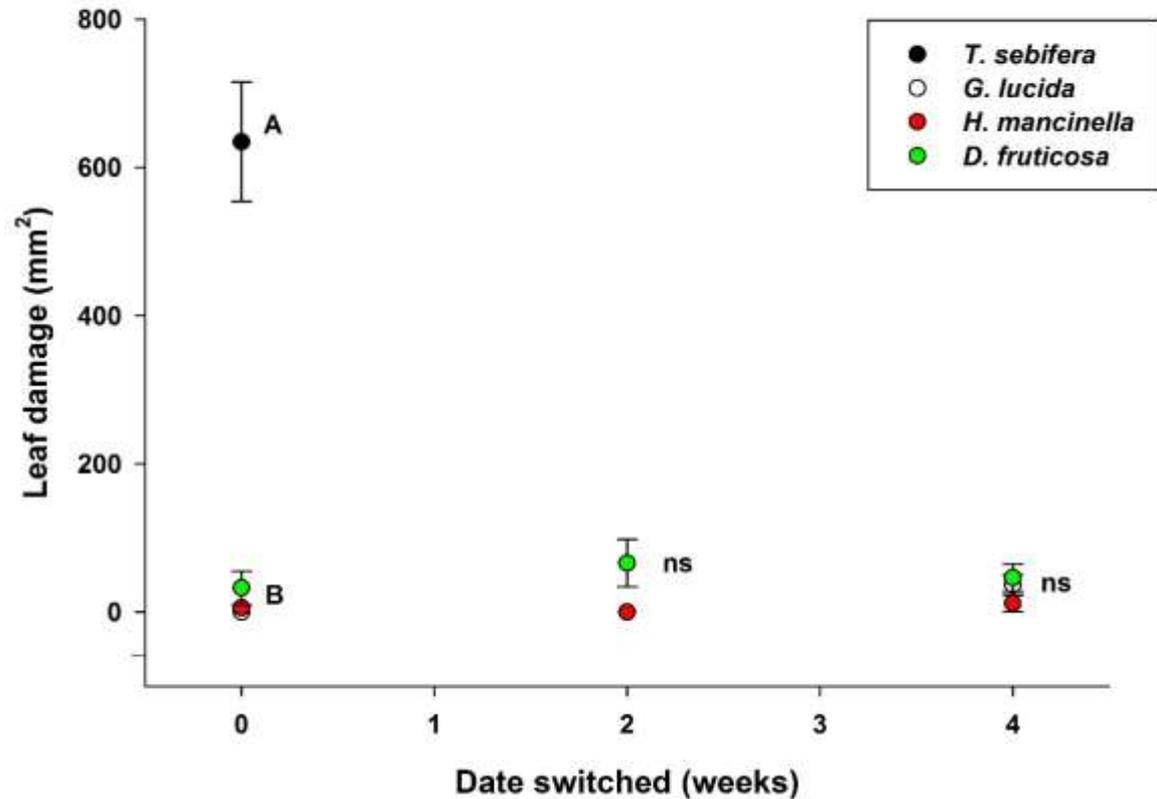


Larval Feeding



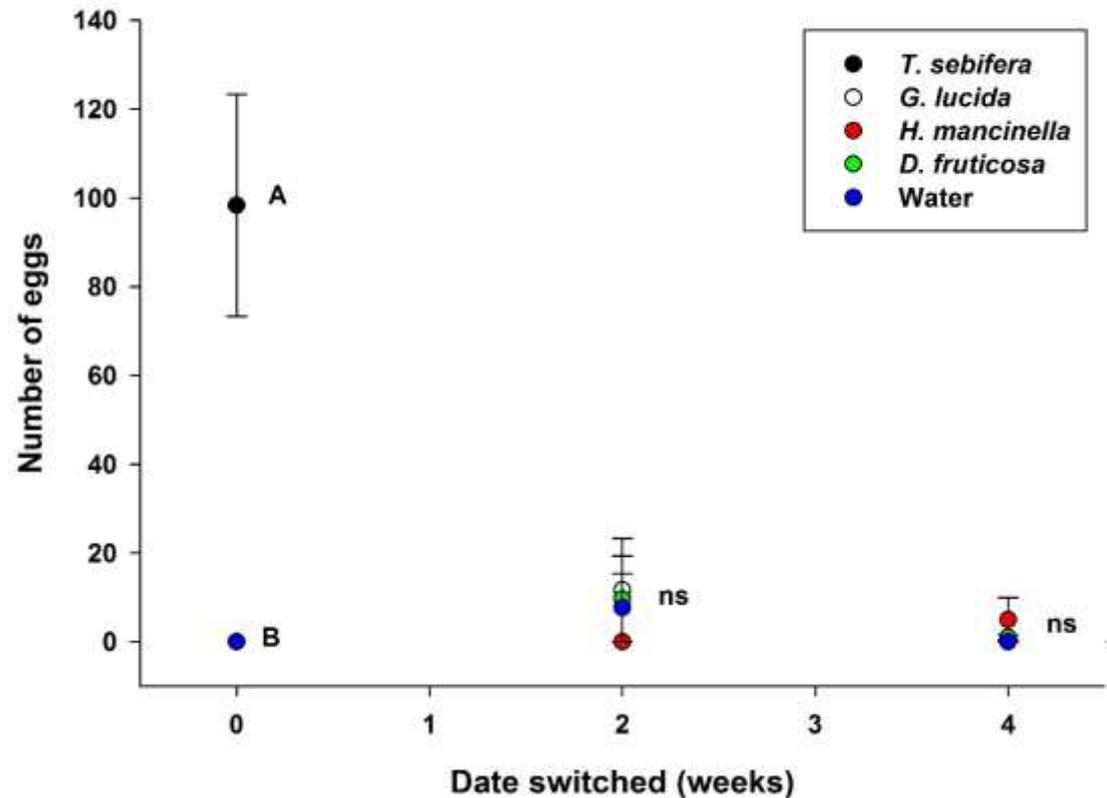
Danger of spillover

- Post-release, what will the happen to these non-targets?
- Ate $> 600 \text{ mm}^2$ tallow
- Ate very little non-targets
- Will eat very little non-target leaves

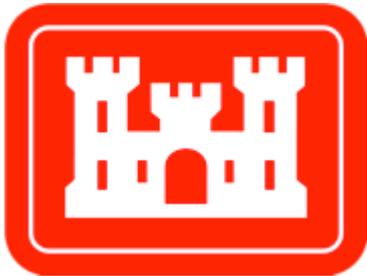


Danger of spillover

- Post-release, what will happen these non-targets?
- 100 eggs when fed tallow
- No eggs when fed non-targets or only water
- Need tallow for egg production



Acknowledgments



Questions?

