New Biological Control Agent for Air Potato

Mass Rearing Protocol of *Lilioceris egena*

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Background – Air Potato Vine

- Scientific name: *Dioscorea bulbilfera*
- Why it is a problem: an herbaceous, perennial, twining vine capable of displacing native vegetation and disrupting ecological functions
- Mechanical Removal: time consuming and limited to areas of easy access[1]
- Chemical Removal: costly and ineffective[1]

Air potato infestation in Florida

Leaf-Feeding Beetle

- *Lilioceris cheni* approved for release in 2011
- FDACS-DPI began release program in 2012
- Approximately one million beetles released in Florida over the past 10 years
- Beetles determined to be established in 2021[2]
- FDACS-DPI *L. cheni* release program ended in 2022

Lilioceris cheni Damage

Hole punch-like damage caused by adult feeding

Larvae feed gregariously, skeletonizing leaves

Bulbil-Feeding Beetle

- *Lilioceris egena* is specialized to feed on air potato[3]
- Approval for release granted in 2021 and a mass-rearing program initiated in 2022
- Damage caused by larval feeding inhibits future growth
- Expected to work synergistically with *L. cheni* to further reduce air potato dominance

Lilioceris egena Damage

Adults primarily feed on bulbils instead of leaves

Larvae liquify bulbils from the inside-out

Life Cycle of *Lilioceris egena*

- Females lay eggs on the surface of and within bulbils
- Eggs are laid individually or in clusters of 2-15
- Eggs take an average of 5 days to hatch

- Larvae grow through four instars
- Development takes place inside the bulbils
- Larval stage lasts approximately 16 days

- Larvae exit bulbils and pupate in the soil
- Puparium is a white foam-like cocoon
- Pupal stage lasts approximately 12 days

- Females can lay more than 600 eggs in their lifetime
- Adults live over six months in laboratory settings
- Development from egg to adult takes ~35 days

Mass Rearing Protocol of *Lilioceris egena*

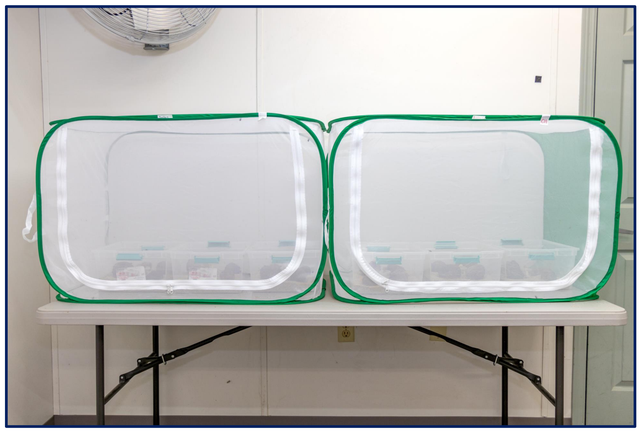

Fig 1. Rearing cages, each with 25 mating pairs

Fig 2. Beetles are allowed to oviposit freely over 12 mid-size bulbils for 10 days

Fig 3. After 10 days, bulbils are transferred to new containers for larval growth and development

Fig 4. Bulbils are inspected weekly. New bulbils are provided as needed and emerging adults are removed and recorded

Fig 5. Approximately 7,000 adults are produced per month and maintained in colonies of 200 individuals

Fig 6. Beetles are released at sites with high vine/bulbil density

Acknowledgements

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References

[1]Wheeler, G. S., et al. 2007. A biological control feasibility study of the invasive weed – air potato, *Dioscorea bulbifera* L. (Dioscoraceae): an effort to increase biological control transparency and safety. Nat. Area J. 27: 269–279

[2]Rayamajhi, M., et al. 2021. Phenological synchrony between a weed (*Dioscorea bulbifera*) and a biocontrol agent (*Lilioceris cheni*) in the introduced range, Florida: implications for biological control. Biocontrol Sci. Techn. 31: 797-816

[3]Dray Jr, F. A., et al. 2023. *Lilioceris egena* (Weise)(Coleoptera: Chrysomelidae: Criocerinae) - Biological Control Agent of Air Potato Vine. EDIS. IN1406/EENY-804

More information: