



Air Potato Biological Control Extension Needs Assessment

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A new initiative is helping connect land managers struggling with invasive air potato (*Dioscorea bulbifera*) with a new weapon in our arsenal: the air potato leaf beetle (*Lilioceris cheni*). Host specificity testing conducted by scientists at the U.S. Department of Agriculture, Agricultural Research Service (USDA–ARS) Invasive Plant Research Laboratory in Fort Lauderdale demonstrated that the beetle would only feed on the intended target plant. Larvae and adults feed predominantly on air potato leaves and occasionally on bulbils and do considerable damage to the plant. Program partners include University of Florida Institute of Food and Agricultural Science, USDA–ARS, and the Florida Department of Agriculture and Consumer Services, Division of Plant Industry. The Air Potato Biological Control Extension Needs Assessment was conducted to help better target outreach efforts for this initiative. This Extension Needs Assessment 1) analyzed end users' perceived knowledge of air potato and the role of IPM and biological control in the plant's management; 2) analyzed end users' preferred methods of obtaining information on air potato IPM strategies; 3) determined the characteristics, needs and priorities of the target audience; and 4) determined types and numbers of educational resources currently being used by end users to manage air potato.

Air potato (*Dioscorea bulbifera*) is a nonnative vining plant found throughout Florida. It is generally considered to be an invasive plant that is difficult to manage and is listed as a noxious weed by the Florida Department of Agriculture and Consumer Services (USDANRCS 2015). While this vine is native to tropical Asia, sub-Saharan Africa and northern Australia, genetic studies strongly suggest that the air potato in Florida originated from Asia (Croxtton et al., 2011). Its vines grow over and cover mature trees in a variety of habitats including pine flatwoods and hardwood hammocks (Overholt et al, 2008). This vine can be identified in part by its "potato-like" aerial tubers called bulbils (Fig. 1).

There is a new weapon for combatting air potato: the air potato leaf beetle (*Lilioceris cheni*) (Fig. 2). The beetle was discovered in Nepal and China by scientists at the U.S. Department of Agriculture, Agricultural Research Service (USDA–ARS) Invasive Plant Research Laboratory in Fort Lauderdale. The same labora-

tory also conducted host specificity testing which concluded that the insect was a specialist on air potato and would not complete development on any other plant found in Florida. Adult and larvae of this insect defoliate air potato, damage the growing tips of the vines and occasionally feed on bulbils. Program partners in the Air Potato Biological Control Working Group include University of Florida, Institute of Food and Agricultural Science (UF/IFAS) USDA–ARS, and the Florida Department of Agriculture and Consumer Services, Division of Plant Industry.

Given the statewide nature of the air potato problem in Florida, there is a tremendous demand for information about these biological control agents from both public and private property managers. The Air Potato Biological Control Working Group conducted the Air Potato Biological Control Extension Needs Assessment in 2014 to: 1) analyze end users' perceived knowledge of air potato and the role of integrated pest management (IPM) and biological control in the plant's management; 2) analyze end users' preferred methods of obtaining information on air potato IPM strategies; 3) determine the characteristics, needs and priorities of the target audience; and 4) determine types and

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Fig 1. Bulbil of the air potato (*Dioscorea bulbifera*) (Photo Credit: W. Overholt).

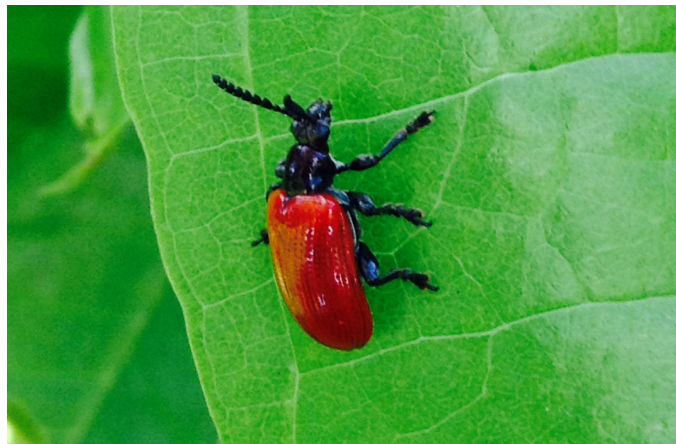


Fig 2. Air potato leaf beetle (*Lilioceris cheni*) (Photo Credit: K. Gioeli).

numbers of educational resources currently being used by end users to manage air potato.

Materials and Methods

The Air Potato Extension Needs Assessment was conducted utilizing the Qualtrics survey instrument (Gioeli et al., 2014). Qualtrics enabled piping of questions based on prior responses which helped target questions specific to the responder. A focus group of twenty seven Florida Master Naturalists completed the assessment one week before statewide distribution. This focus group enabled the designers to determine if survey flow and response collection was satisfactory prior to statewide distribution.

The final version of the instrument was distributed through networks within UF/IFAS Extension (including Master Gardeners and Master Naturalists), press releases, Cooperative Invasive Species Management Areas, Florida Exotic Pest Plant Council and others. The Needs Assessment was open for responses statewide from 22 Sept. 2014 to 23 Jan. 2015. Six hundred and thirty-six recipients agreed to the informed consent to participate in the survey while seven did not.

Results and Discussion

Demographics Attributes of the Needs Assessment recipients were collected including race, gender, age, spatial distribution in Florida. Recipients also self-assessed their level of knowledge about air potato. Authors of the Needs Assessment defined knowledge in the following way:

Expert—highest level of knowledge; someone who is sought out to extend their expertise to others through teaching, extension or research.

Experienced—someone who has experience implementing an effective air potato management strategy based on the location, situation and problems that might arise.

Intermediate—someone beyond being a beginner and can implement an effective air potato management strategy but has limited experience.

Advanced Beginner—someone beyond being a novice, but is still learning how to prioritize air potato management strategies based on likelihood of success.

Table 1. Self-assessed levels of knowledge expressed by 436 respondents who participated in a Needs Assessment conducted between 22 Sept. 2014 and 23 Jan. 2015 on knowledge level of air potato (*Dioscorea bulbifera*) management.

Knowledge level	Number of responses	Percent response
Expert	24	4%
Experienced	97	16%
Advanced beginner	123	20%
Novice	121	28%
No knowledge	71	12%

Table 2. Management preferences expressed by 590 respondents who participated in a Needs Assessment conducted between 22 Sept. 2014 and 23 Jan. 2015 on air potato (*Dioscorea bulbifera*) management.

Preferred management method	Number of responses	Percent response
No preference	60	10%
Herbicides	23	13%
Harvesting	75	13%
IPM	210	36%
Beneficial insects	222	38%

Novice—someone who is just beginning to learn the basics of air potato management.

In total, 602 people responded to this question.

Air Potato Extension Needs Assessment respondents identified themselves as mostly novices or advanced beginners indicating a rather low level of knowledge about air potato management (Table 1).

Needs Assessment recipients were also asked about their preferences for air potato management techniques such as herbicide, mechanical, biological control.

When managing air potato, they prefer to use biological control over herbicides and harvesting bulbils. Most people were comfortable using biological control agents such as the air potato leaf beetle and would be even more likely to use them if information



Fig 3. Air Potato Biological Control website.



Fig 4. QR Code for Air Potato Biological Control website <<http://bcrc1.ifas.ufl.edu/airpotatobiologicalcontrol.shtml>>.

was made available showing that there was documented safety on biological control showing it is an environmentally friendly strategy to manage air potato (Table 2).

When accessing information about air potato management, the University of Florida, IFAS Extension is the primary place respondents would most likely seek air potato management information, followed by the Florida Department of Agriculture and Consumer Services and internet/social media. When search engines are used, recipients preferred Google, Yahoo and Facebook.

The Air Potato Biological Control Working Group created a website with extensive information on the topic to serve as a portal for information (Gioeli et al 2014) (Fig. 3). Links to this site were co-seeded on collaborator's websites. A bitly-shortened website URL for use on Twitter and a common QR (quick response) code was made available and placed on the website for easy access (Fig. 4).

The HTML source code metatag "air potato biological control" was used which helped make this site visible to search engines such as Google and Yahoo. These efforts resulted in this website being the number one ranked site when users search for "air potato biological control." The website was visited 24,000 times in 2014.

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