Quick Identification Guide: Air Potato, *Dioscorea bulbifera* [1]

Christopher Kerr[2] and Ryan Poffenberger[2]

INTRODUCTION:

The invasive air potato vine has become a major concern throughout Florida and neighboring states. Currently, the air potato leaf beetle, *Lilioceris cheni*, is being mass-reared and released across the region through collaborative efforts between the United States Department of Agriculture, Agricultural Research Service (USDA-ARS); the Florida Department of Agriculture and Consumer Services, Division of Plant Industry (FDACS-DPI); and the University of Florida (UF). A major component of this biological control program is the inclusion of releases on private lands which allows the identification of and release onto infestation sites which otherwise may not have been found or accessible. The air potato leaf beetle will only feed on air potato (Pemberton and Witkus 2015); shipping beetles to sites that do not contain the target plant will hinder the success of this biological control program. The following identification guide provides individuals the tools needed to verify that weedy vines are actually air potato. This helps to avoid disappointment from lack of results on the part of the requesting individual(s) and limits unnecessary costs to the program.

C. Kerr (FDACS DPI)

[1] Methods Contribution No. 1, Bureau of Methods Development and Biological Control
[2] Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL 32608

AIR POTATO VINE:

Growth Characteristics

Air potato is a perennial, inedible yam; while it will die back during the winter months, it will readily grow back each spring from its underground tuber. It is an herbaceous twining vine which climbs up other plants for support. Growth rates of 8 inches per day with the vine reaching 65 feet or more in total height (Langeland and Burks 1998). The vine forms vegetative propagules, known as bulbils or "air potatoes", during summer months and into the fall. Bulbils contribute substantially to the air potatoes persistence and aggressive rate of spread. Each vine is capable of producing over a hundred of these bulbils if its growth is unhindered. Bulbils that fall to the ground will generally sprout the following year and produce a new tuber along with additional bulbils.

Leaves

Leaves range in size and can become quite large. They are held on a long petiole with the major leaf veins radiating from the point of petiole attachment. Leaves are cordate (heart -shaped) and have a pointed apex. The air potato vine has the leaves alternately arranged on the stem.

Stems

Stems of the air potato vine are herbaceous; stems are smooth and rounded. The stems can become thickened and very robust but will not become woody. Stems will be found twining around nearby plants or other objects for support, wrapping from right to left. Dead stems often remain strongly affixed to nearby vegetation for a prolonged period and serve as an attachment for new growth the following season.

Bulbils

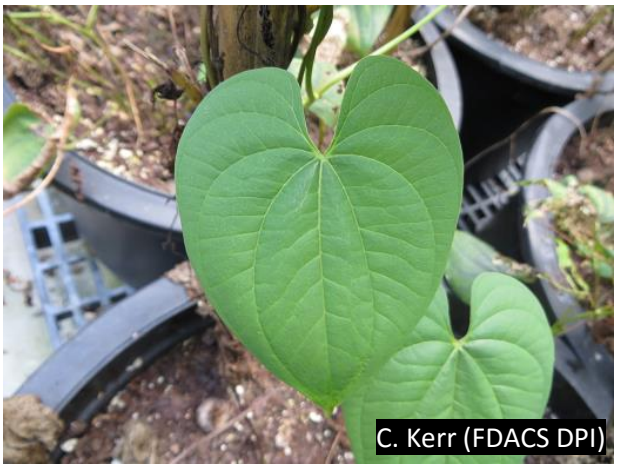
Bulbil is the term given to the aerial tubers or "air potatoes" produced, giving this species its common name, air potato vine. Bulbils are round to irregular and can vary in size from as small as a pea to larger than a grapefruit. Even the smallest bulbil is capable of sprouting. Bulbil formation can occur at each node of each petiole but generally is found to be every other node; this equates to the potential for one bulbil to be produced for every two leaves on a given vine (Rayamajhi et al. 2016). There are two types of bulbils that can be found in Florida, which represent separate genotypes of the air potato vine. They may be either light tan with a relatively smooth surface or dark brown with a rough surface. Germination appears to be temperature dependent and bulbils will readily germinate even in the absence of water.

Tubers

Tubers of the air potato vine appear very similar to the aerial bulbils. The major difference is that these tubers will be found underground and will have modestly robust roots, or remnants of the roots, covering their external surfaces. The air potato vine will deplete the reserves of the tuber during periods of bulbil production and produce a new tuber during the growing season.

DIFFERENTIATING FROM COMMONLY ENCOUNTERED RELATED SPECIES:

There are two native yams in Florida which are rarely encountered, namely wild yam, *D. villosa*, and Florida yam, *D. floridana*. In addition to air potato, there are three additional invasive yams found in Florida: Zanzibar yam, *D. sansibarensis*; Chinese yam, *D. polystachya*; and winged yam, *D. alata*. Of the aforementioned yam species found in Florida, only the non-native yams produce aerial bulbils. Air potato and winged yam are the two most commonly encountered and currently the most invasive of the four non-native yams in Florida. Below is a quick comparison chart to differentiate between these two species.

Air Potato	**Winged Yam**
Leaves Features of the leaves are rather variable and at times the two species can appear similar	
 Leaf apex often coming to an angular point; overall leaf appears broader compared to the winged yam; one leaf at each node.	 Leaf apex often with an elongated 'tail'; overall leaf appears narrower compared to the air potato; two leaves at each node.
Bulbils	
 Bulbils tan to dark-brown and round to irregularly-round	 Bulbils dark-brown and elongate to pear-shaped

Stems	
Stem twines from right to left	Stem twines from left to right
Stem is smooth and rounded	Stem is squared-off having distinct ridges or "wings" that are often purple in color.

OTHER VINES MISTAKEN FOR AIR POTATO:

There are quite a few other vines that are mistakenly identified as air potatoes. While this is not an exhaustive list of all vines found in Florida, these are the vines most commonly mistaken for air potato. Unlike the air potato vine, none of these vines will produce aerial bulbils. Additionally, many of these vines may bear fruits, thorns, or have tendrils attaching them to the supporting surface. If after reviewing these photos you are unsure if you have air potato vine or not, you can request identification assistance through your county extension office or email an up-close photo of the suspected vine to Christopher.Kerr@freshfromflorida.com for confirmation.

Green Briar, *Smilax* sp.

(Several species in Florida with variable characteristics-many with thorns; tendrils for attachment)

Kudzu, *Pueraria montana*

(three leaflets attached to the leaf stalk at each node)

Morning Glory, *Ipomoea* sp.

(Several species in Florida with variable characteristics- purple, blue or white trumpet shaped flowers)

Muscadine Grape, *Vitis rotundifolia*
(tendrils for attachment)

Virginia Creeper, *Parthenocissus quinquefolia*
(five leaflets attached to the leaf stalk at each node)

LITERATURE CITED

Langeland, K. A., and K. C. Burks. 1998. Identification and biology of non-native plants in Florida's natural areas. University of Florida, Gainesville, FL.

Rayamajhi, M. B., P. D. Pratt, P. W. Tipping, E. Lake, M. Smith, E. Rohrig, F. A. Dray, and T. D. Center. 2016. Seasonal growth, biomass allocation, and invasive attributes manifested by *Dioscorea bulbifera* L. (air-potato) plants generated from bulbils in Florida. Invasive Plant Science and Management 9(3): 195-204.

Pemberton, R. W. and G. L. Witkus. 2010. Laboratory host range testing of *Lilioceris* sp. near *impressa* (Coleoptera: Chrysomelidae) - a potential biological control agent of air potato, *Dioscorea bulbifera* (Dioscoreacea). Biocontrol Science and Technology 20(6): 567-587.