

# New Candidate for Biological Control of Brazilian Peppertree?

by Lindsey R. Christ<sup>1</sup>, James P. Cuda<sup>2</sup>, William A. Overholt<sup>3</sup>, and Marcelo D. Vitorino<sup>4</sup>

Several exotic plants introduced into Florida are wreaking havoc on native plant and animal communities. One such plant is the perennial, woody Brazilian peppertree, *Schinus terebinthifolius*. Dr. James Cuda, Associate Professor in the Department of Entomology and Nematology and Lindsey Christ (Fig. 1), an entomology graduate student in the School of Natural Resources and the Environment, believe insects are the key to controlling this invasive plant. Native to Brazil, Argentina, and Paraguay and related to poison ivy and poison oak, Brazilian peppertree is one of the worst offenders. This woody shrub out-competes native species because of its fast growth, prolific seed production, vigorous resprouting, and tolerance to various growing conditions including salt, moisture, and shade. Also called Florida Holly or Christmasberry, Brazilian peppertree was planted as an ornamental because of its attractive green leaves and red fruits that ripen in December. It became naturalized in Florida during the 1950s, and began invading disturbed sites, natural communities, and environmentally sensitive areas such as the Everglades



Fig. 1 [above]: University of Florida graduate student Lindsey Christ examining plants at the LAMPE, Santa Catarina, Brazil, for the presence of psyllid pit galls.



Fig. 2 [right]: Pit galls of the psyllid *Calophya terebinthifolii* on Brazilian peppertree leaflets in the field.

National Park. It wasn't until 1990 that the plant was banned for commercial sale in Florida.

Now that Brazilian peppertree is firmly established in Florida plant communities, measures have been taken to try and control the plant and keep it from spreading. It is currently controlled by herbicides, mechanical, and physical methods. A more sustainable approach for managing exotic invasive plants is integrating conventional control measures with classical biological control. Biological control is the use of living organisms to control another living organism, usually arthropod pests and weeds. Highly specific biological control organisms are found in the native range of a pest organism. In the case

of Brazilian peppertree, previous studies identified a psyllid, *Calophya terebinthifolii* (Hemiptera: Psyllidae), attacking Brazilian peppertree in Brazil. These psyllids are very small insects (< 2 cm in length) that feed on plant phloem with their sucking mouthparts; the nymphs produce pit galls on the leaflets as they develop (Fig. 2). Psyllids can be effective biological control agents because they are known for being very damaging to plants and tend to be highly host specific, e.g., the melaleuca psyllid. The combination of the feeding damage by the adults



Fig 3: Map showing locations in Santa Catarina, Brazil, where research and field collections of the psyllid *Calophya terebinthifolii* were conducted during the 2009 Summer C Semester.

and gall formation by the nymphs makes *C. terebinthifolii* a good candidate for biological control of Brazilian peppertree.

With assistance from a Florida Exotic Pest Plant Council research grant, Lindsey spent the summer in Brazil studying the psyllid to learn more about its life cycle and how it could best be used in the overall management strategy for Brazilian peppertree. Collaborating with Dr. Marcelo Vitorino, an Entomologist from Fundação Universidade Regional de Blumenau, Lindsey conducted her research at the Laboratory of Monitoring and Forest Protection (LAMPF) in Gaspar, Santa Catarina, Brazil (Fig. 3) from May-August 2009. Using psyllids collected from field sites near the Atlantic coastal region near Santa Catarina, her studies focused on establishing a laboratory colony, and investigating pit gall orientation, female fecundity, adult longevity, sex ratios, and development of the nymphal stage. With very little research conducted on this particular psyllid species, Lindsey discovered adult mating and juvenile behaviors not previously published. Studying the psyllid's life cycle parameters in Brazil rather than under quarantine conditions in Florida proved to be easier because of unlimited access to the insects and without the restrictions required in quarantine. With base-line data collected on the basic biology of the insect, Lindsey expects to establish a colony in quarantine at the Florida Biological Control Laboratory in Gainesville in order to identify which of the two Florida Brazilian peppertree genotypes the psyllid prefers. Hopefully, Lindsey's research on the psyllid *C. terebinthifolii* will pave the way for risk assessment studies required for candidate biological control agents of Brazilian peppertree.

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