



REQUEST FOR SPECIMENS OF THE “BLACK VELVET LEATHERLEAF SLUG”

The “**Black velvet leatherleaf slug**”, *Belocaulus angustipes* (Heynemann 1885), has now been reported from all five Gulf Coast states, and as of 2007 is confirmed for southeastern South Carolina. Specimens were found in an Oklahoma greenhouse in 2011. As the taxonomy of slugs in the family Veronicellidae is only now beginning to be understood, the identity of this invasive slug species now is confirmed, and its taxonomic history and distribution in the United States is being studied.

An unknown “velvety black veronicellid” slug was first collected in August, 1960, from a cemetery in Mobile, Alabama, and very shortly thereafter in New Orleans, Louisiana (Dundee *et al.* 1963). Nine years later, Dundee (1969) identified the species as *Vermicella* [sic] *ameghini* (Gambetta 1923), based on comparative material that had been collected in Rio Grande do Sul, Brazil. The species in the United States was re-identified as *Belocaulus angustipes* (Heynemann 1885) by Thomé (1989), who also reported the species from Honduras. Caballero *et al.* (1991) noted this invasive species in the highlands of Honduras, and described the Honduran population of *B. angustipes*, illustrating its reproductive anatomy. It was also reported as an important vector of the nematode parasite *Angiostrongylus costaricensis* that causes abdominal angiostrongyliasis in humans. Thanks to Dr. Suzete Gomes - the world’s foremost veronicellid expert - from São Paulo, Brazil, who was visiting the APHIS PPQ National Malacology Laboratory in Philadelphia PA, in April of 2009, the identity of this slug in the United States has been confirmed conclusively.

Family VERONICELLIDAE Gray 1840
Genus *BELOCAULUS* Hoffmann 1925



Dorsal and ventral views
[photos courtesy of Bill Frank in Duval County, Florida]

Belocaulus angustipes (Heynemann 1885)

Description: Up to 3½ inches in length, this slug is easy to recognize by its almost pure black notum (=dorsa; surface), flattened body, and velvet-like body texture. On the ventral surface, the foot (running the length of the body) is pale brown, with the hyponota (areas on either side of the foot on the ventral surface) pale-colored but darkening to black at the edges of the body. The two ocular tentacles on the head are prominent when the slug is active, and a smaller pair of sensory tentacles may be visible close to the mouth.

Known geographic distribution: native to southeastern Brazil, Paraguay, and northern Argentina. It is established in Honduras, and the southern and southeastern United States.

Biology: From the outset, Dundee *et al.* (1963) recognized the potential pest status of this slug, and attempted to document which plants species they could confirm were being consumed, including grasses and other low vegetation species. They indicated that the slug is quite polyphagous and will feed on any number of plant species, just as long as the conditions in which they grow are well-shaded and humid. Plant species listed were: St. Augustine grass, *Stenotaphrum secundatum* (Walt.), Oxalis or Small-flowered Crowfoot, *Oxalis europea*; buttonweed, *Diodea teres* Walt. and to a lesser degree, *D. virginiana* L.; Yerba-de-Tago, *Eclipta alba* (L.) Hassk.; *Chamaesyce hirta* (L.) Millsp.; *Cynodon dactylon* (L.) Pers. *Cyperus rotundatus* (L.), *Dichondra carolinensis* Michx.; *Eleusine indica* (L.) Gaertn.; *Syntherisma sanguinale* (L.) Dulac; and the tomato, *Lycopersicon esculentum* Mill.. Detritus and general garbage were also reported as food sources: Dog food, dog faeces, beef, bread, vegetable soup, paper, mushrooms, Japanese plums, candy and banana peels (*Musa* sp.).



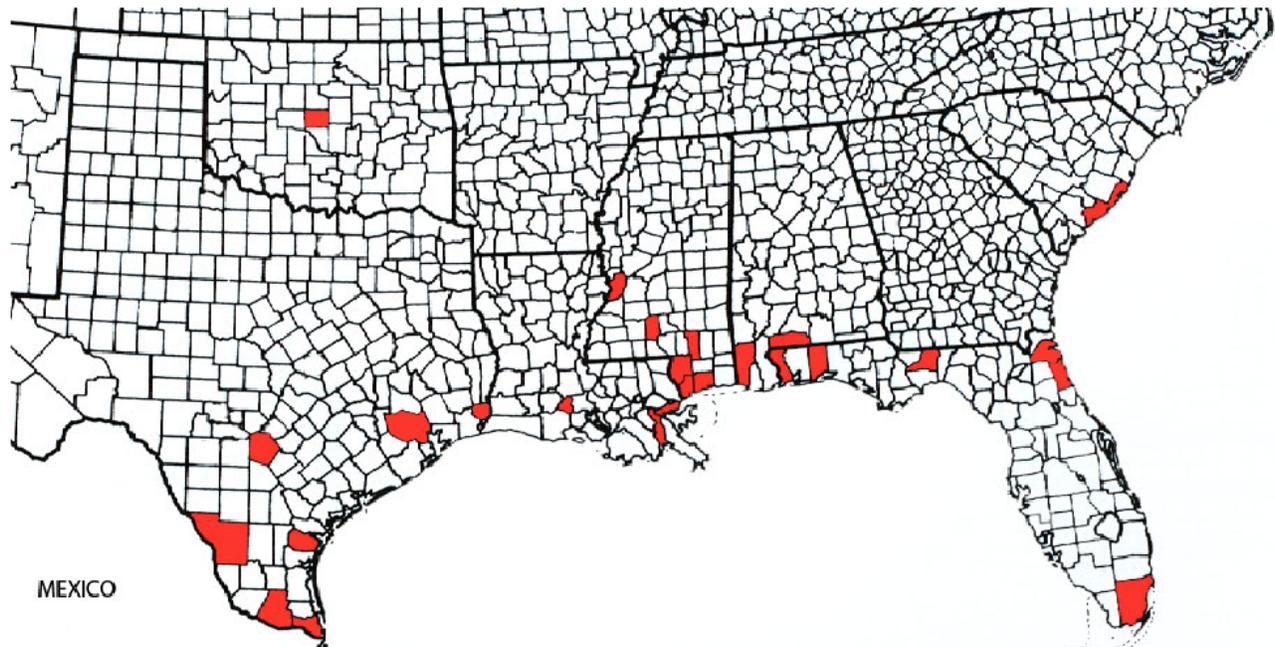
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During preliminary pest mollusk surveys in Mississippi and Alabama by APHIS PPQ in April 2000, numerous specimens of this species were collected in garden centers. Although most proprietors and staff at these commercial operations reported minor to moderate “slug damage” to numerous ornamental plant species, the fact that the species is principally nocturnal meant that actual feeding damage by this veronicellid species could not be confirmed. Egg-laying was observed at this time at most locations.

When first collected in Mount Pleasant, South Carolina in 2007, *Belocaulus angustipes* was reported as feeding on cucumber plants (E. Cutright, pers. comm.).

Current reported distribution in the United States:

Map of the southern and southeastern USA with county records of *Belocaulus angustipes* (Heynemann 1885) marked in red



Request for specimens: As the current distribution is somewhat sketchy, submission of additional samples of this black slug (especially from parts of the country where it has not yet been reported), are urgently needed so that we may better understand its current and potential distribution in the United States, as well as document its nuisance or pest status.

Belocaulus angustipes is generally nocturnal, avoiding sunlight and adverse conditions such as extreme heat and cold, and low humidity. It is most active at night, but may emerge on dark, cloudy days, and also after a heavy rainfall, to feed and/or search for mates. When light levels increase (such as in the early morning), or when conditions become increasingly dry, they will take refuge under an object where it is shaded and where there remains some humidity;

- under rocks and boulders that are lying on the ground surface, where there are spaces between the rock and the ground for humidity to collect and space enough for the mollusk to hide. If the boulder is partly buried, the slugs may be hidden around its edges,
- under boards and planks, garbage, as well as under fallen trees, logs and branches,
- under flower pots and planters, especially around the drainage holes,
- in damp leaf litter (not wet or soggy), where it is cooler and moist enough to attract slugs,
- in greenhouses, where optimum conditions for warm temperate and tropical plants are also ideal these slugs,
- in garden centers, where there is a concentration of many different food plants, (as well as the possibility of other introduced mollusks from other regions of the country),
- in fields and gardens where plants have been damaged by feeding slugs: look at the base of plants, under leaves, or in the “hearts” of compact plants, such as lettuce or cabbage.



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Follow slime trails: terrestrial mollusks leave behind them a characteristic glistening trail of mucus that can be used to track them down.

Keep in mind that urban and suburban backyards and gardens are more likely to be productive than unspoiled wilderness areas. A general rule of thumb, synanthropic species (those associated with human activity such as agriculture and human habitation) such as this slug, are more likely to be nuisance, or horticultural and agricultural pests.

Specimens of slugs should be preserved in the following manner: the slug has to be drowned in water before being preserved: the specimen first should be placed in a vial or specimen bottle of water that is then sealed as it is held under water to make sure that no air bubble remains inside. The container should be placed in a cool place for about 12 hours, by which time the mollusk will have died in a fully extended (relaxed) condition. The specimen then should be transferred to 75-80% ethanol (**not** denatured if available), and then submitted for identification. It is vital that specimens are preserved quickly after death, as once decomposition begins, DNA analysis will be impossible.

If not using a standard PPQ Form 391, please include the following data with any specimens:

- i) Associated plant (“host”), or conditions under which found (e.g. under wooden board, under cement block, *etc.*). Any feeding or breeding behavior, including egg-laying, should also be noted.
- ii) Locality (as exact as possible), including street address, county, and state.
- iii) Collector(s), affiliation, and date collected.
- iv) A phone number and/or e-mail address so that you may be notified of the identification.
- v) If possible, please take digital images of the snail or slug in its living situation.

Please pack carefully suspected *Belocaulus angustipes* and mail to:

Dr. David G. Robinson
USDA APHIS National Malacology Laboratory
Academy of Natural Sciences of Drexel University
1900 Benjamin Franklin Parkway
Philadelphia, PA 19103-1195

After handling live slugs, hands should be washed in hot soapy water, and rinsed in alcohol or a standard hand disinfectant. Although abdominal angiostrongyliasis is not yet reported in the region where the slug has been detected, it is recommended that latex gloves be worn, or at least samples handled using a plastic bag.



Crawling *Belocaulus angustipes*- about 2 inches in length
[photo courtesy of Bill Frank in Duval County, Florida]