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Plesioclytus morrisi Wappes and Skelley, 2015
and *Plesioclytus relictus* Giesbert, 1993
(Coleoptera: Cerambycidae)

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Notes on the natural history of *Plesioclytus morrisi* Wappes and Skelley, 2015 and *Plesioclytus relictus* Giesbert, 1993 (Coleoptera: Cerambycidae)

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Abstract. The host plant and life history observations of *Plesioclytus morrisi* Wappes and Skelley and *Plesioclytus relictus* Giesbert (Coleoptera: Cerambycidae: Plesioclytini) are described for the first time. The host for both species is shown to be *Polygonum polygamum* Vent. (Polygonaceae). Observations also indicate that plants chosen for oviposition occur in open sand areas of scrub habitat.

Key words. Plesioclytini, Georgia, Florida, life history, larval host, root-feeding.

Introduction

The genus *Plesioclytus* was proposed by Giesbert (1993) for an uncommon species of cerambycid found in relict sand dunes at the southern terminus of the Lake Wales Ridge in south-central Florida. Wappes and Skelley (2015) added a second species from riverine dunes in central Georgia and erected the tribe Plesioclytini for the genus. Specimens of *Plesioclytus relictus* Giesbert have been collected on flowers and in flight (Giesbert 1993). Specimens of *Plesioclytus morrisi* Wappes and Skelley have been found sitting on stems or flowers of low growing plants, typically *Licania michauxii* Prance (Chrysobalanaceae) and *Chrysoma pauciflosculosa* Michx. (Asteraceae), usually as single plants and not in clusters (Wappes and Skelley 2015).

Polygonum L. (Polygonaceae) is a nearly cosmopolitan plant genus of approximately 65 species, with 11 of the species occurring in the southeastern United States traditionally treated as a separate genus, *Polygonella* Michx. (Schuster et al. 2011). Five of the 11 species were checked for *Plesioclytus*, with only *Polygonum polygamum* Vent. found to be used as a host. The host plant and life history of both species was previously unknown.

Materials and Methods

Photographs of the habitat and plants were taken with an iPhone 6S Plus. Photographs of specimens were taken with a Canon EOS Rebel T4i with a 100mm macro lens. Images were compiled into plates using GIMP 2 software (version 2.10.12). Records of *P. polygamum* were compiled by searching the Southeast Regional Network of Expertise and Collections (SERNEC Data Portal 2019). Distribution maps were created with ArcGIS Pro 2.4.1. *Polygonum polygamum* were surveyed by removing sand around the roots and checking for ejected frass. Plants appearing to contain larvae or pupae were removed from the soil, trimmed several inches above the root, and then placed together in gallon bags indoors. When condensation formed inside the bag it was opened for several hours to reduce humidity and to avoid fungal growth. As specimens emerged they were frozen, pinned, and labeled. Reared specimens are deposited in the following collections:

ABSC Archbold Biological Station Collection, Lake Placid, Florida, USA

ACMT American Coleoptera Museum (James E. Wappes), San Antonio, Texas, USA

FSCA Florida State Collection of Arthropods, Gainesville, Florida, USA

GSPC Gareth S. Powell Collection, Nephi, Utah, USA

JRSC Jeffrey R. Slotten Collection, Gainesville, Florida, USA
KESC Kyle E. Schnepf Collection, Gainesville, Florida, USA
PERC Purdue Entomological Research Collection, West Lafayette, Indiana, USA
RFMC Roy F. Morris Collection, Lakeland, Florida, USA
RMBC R. Michael Brattain Collection, Lafayette, Indiana, USA

Results and Discussion

Plesioclytus morrisoni. Initial observations of *P. morrisoni* were made in June 2018 in Emanuel County, Georgia. While searching for adults of this species in open sandy areas, as indicated by Morris in Wappes and Skelley (2015), individual plants in open sand were noticed (Fig. 9). Realizing this plant was in the right spot but not one of the species mentioned in Wappes and Skelley (2015), they were investigated to see whether larval workings could be detected. The first plant removed had thin stems, likely too small to support larvae the size late instar *Plesioclytus* individuals might be. The root, however, was larger and appeared to have damage. As more plants were checked, some with “sawdust” were found and some had round emergence holes. A few roots with “sawdust” were broken open and larvae appearing to be a cerambycid were found inside. The roots of some plants that did not have or had not had larvae in them were thin, about the size of the basal stem, indicating the larvae cause the root to swell and grow larger than it normally would. Approximately 15 plants with swollen roots and ejected frass were collected from this site and placed in a collecting net for transport and then left at room temperature and humidity for approximately three weeks. After this period the stems were cut off and the roots were placed in a gallon bag. Most roots contained a single larva, but at least two contained two larvae each. In July 2018, approximately five weeks after being collected, the first adult specimen of *P. morrisoni* emerged, followed by 11 additional specimens the following three weeks. Wappes and Skelley (2015) indicate peak adult activity occurs in May and June; it is possible the cooler indoor temperatures delayed development slightly. Subsequent trips in September 2018 and April 2019 to a similar site in Tattnall County, Georgia, (Fig. 2) resulted in the discovery of more plants with the same larval damage. The plant was later determined to be *Polygonum polygamum*. Two additional species, *Polygonum fimbriatum* Elliott and *Polygonum pinicola* T.M. Schust. and Reveal, in similar sandy situations were also surveyed but no larvae or damage was found.

Plesioclytus relictus. With the host of *P. morrisoni* not yet known but thought to be a species of *Polygonum*, a trip to Archbold Biological Station in Highlands County, Florida, in September 2018 allowed for investigation into the host of *P. relictus*. While looking in open patches and trail sides for *Polygonum*, *P. polygamum* was found to be conspicuous and flowering (Fig. 11). Soil adjacent to and below plants of *P. polygamum* was removed to inspect the root (Fig. 7), exposing similar “sawdust” and damage seen in plants from Georgia with *P. morrisoni* present. After some time finding and inspecting plants, a pattern of which ones had larval workings and which ones didn’t began to emerge. Plants with the very base of the stem exposed to sandy soil, not dark soil or leaf litter, almost always had larvae or damage. Plants that were not in open sand never had damage or larvae. Some plants in areas of thick leaf litter, but with at least some sand exposed where the stem met the ground, also almost always contained larvae (Fig. 10). Many *Polygonum dentoceras* T.M. Schust. and Reveal and *Polygonum nesomii* T.M. Schust. and Reveal found in open, exposed sand in similar habitats were investigated but no damage or “sawdust” was found. Multiple *P. pinicola* in open sand were checked, and only one was found to have an individual cerambycid larva. Although left in the root, this larva desiccated and died before pupation; it is possible this was a specimen of *P. relictus*.

The first batch of roots collected at Archbold in September and October 2018 were processed in the same manner as plants from Georgia but did not produce adults. Frass or “sawdust” was kicked out for approximately one week before stopping. After six months the roots were cut into and investigated with no adults or larvae found. Additional trips to Archbold in April, May, and June 2019 allowed for the niche hypothesis to be tested and more habitats to be surveyed (Fig. 6). Roots of ~100 plants with active damage were again treated in the same manner as those from Georgia in hopes of rearing adults. Roots taken on April 21 and May 12 contained larvae which persisted but did not pupate at the same time as

those left in the field and collected on June 8. Approximately half the roots taken on June 8 contained larvae, the other half held pupae or teneral adults (Fig. 4). It is thought that lower indoor temperatures delayed development slightly, up to 2–3 weeks. A single adult male was also collected June 8 resting on a short plant in the vicinity of *P. polygamum*. In the original description, Giesbert (1993) had adults collected in April and July.

Although adult beetles are rarely collected, virtually every plant checked in open sand had at least one larva. In less than two hours in an area of approximately 0.25 acres (1000 square meters), 40 plants containing over 50 larvae were taken. While many smaller plants and roots contained a single larva, it was not uncommon to find two to three larvae in one root, with the most larvae found in a single root being four. Roots with larvae were quite fragile, frequently breaking even when sand around the plant was dug carefully by hand. A small shovel was helpful in exposing roots, reducing the number broken. Although most commonly found in the root, larvae are not confined to feeding in roots. There were several instances in which stems of a plant were covered by sand and were swollen and had ejected frass (Fig. 12). Beetles infest the same plants year after year, as old damage was present in almost all plant specimens (Fig. 5).

From June 8 through August 19, 2019, 76 adults emerged from roots taken in April, May, and June. These consisted of 37 males (Fig. 1) and 39 females (Fig. 3). Six specimens of a braconid wasp belonging to the genus *Bracon* Fabricius also emerged from the root samples in June 2019, indicating possible parasitism.

Additional records. Since the original description, specimens of *P. relictus* have been collected in Collier and Polk counties, Florida (Fig. 13). Specimens from Collier County indicate this species is not restricted to the Lake Wales Ridge and are more dependent on a suitable microhabitat than on geologic age of the sand. Two Collier County specimens were collected in flight in July and September in open sand where Florida rosemary, *Ceratiola ericoides* Michx. (Ericaceae), is abundant (Fig. 8). A third specimen emerged in October 2018 from a swelling taken the previous month on *Polygonum polygamum brachystachyum* (Meisn.) T.M. Schust. and Reveal, occasionally treated as a full species by some authors. In addition, damage in roots of *P. polygamum* from Bay County, Florida found in June 2019 was consistent with old larval workings of *Plesioclytus*. An area of exposed, open sand containing *P. polygamum*, the presumed required niche, was not found. One root was located with fresh damage and frass, but no larvae or adults were found. Additional collecting efforts near this locality and others containing the host plant are encouraged in order to find if new species are present or if there are large distributional gaps, as populations of *P. polygamum* occur as far west as Texas and as far north as Virginia (Fig. 14)

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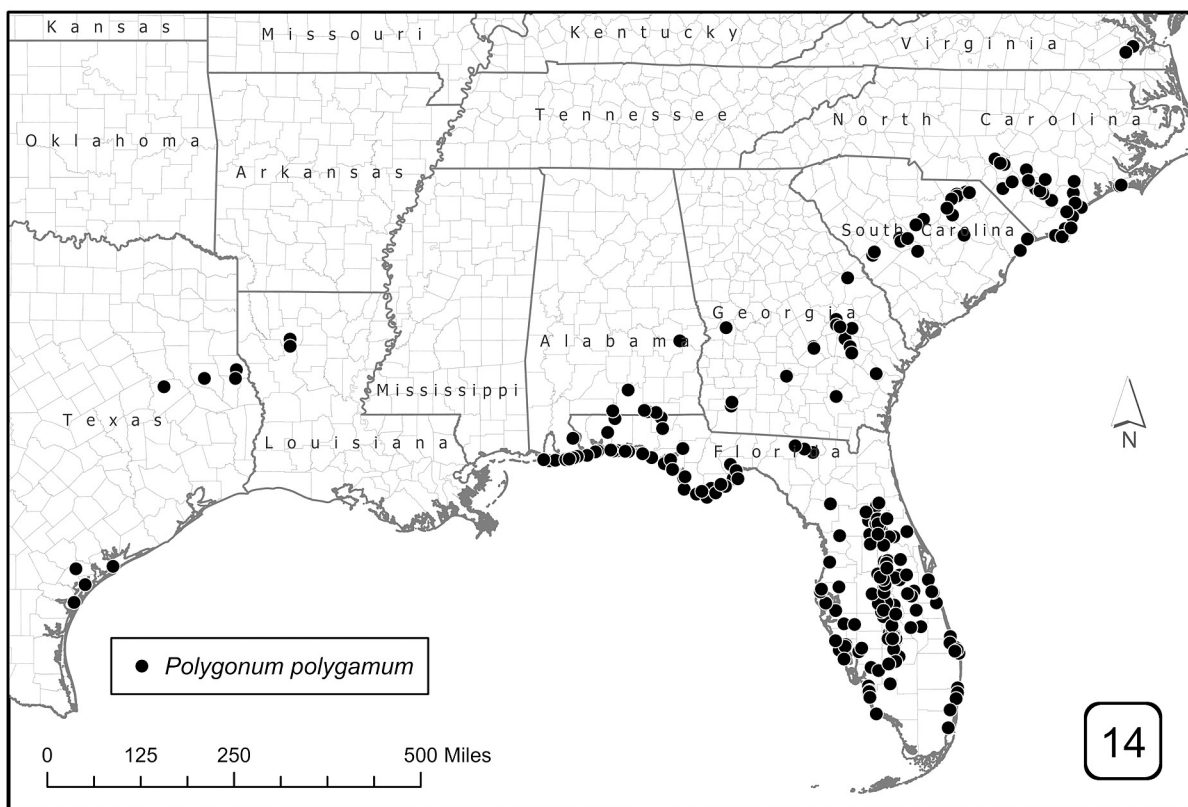
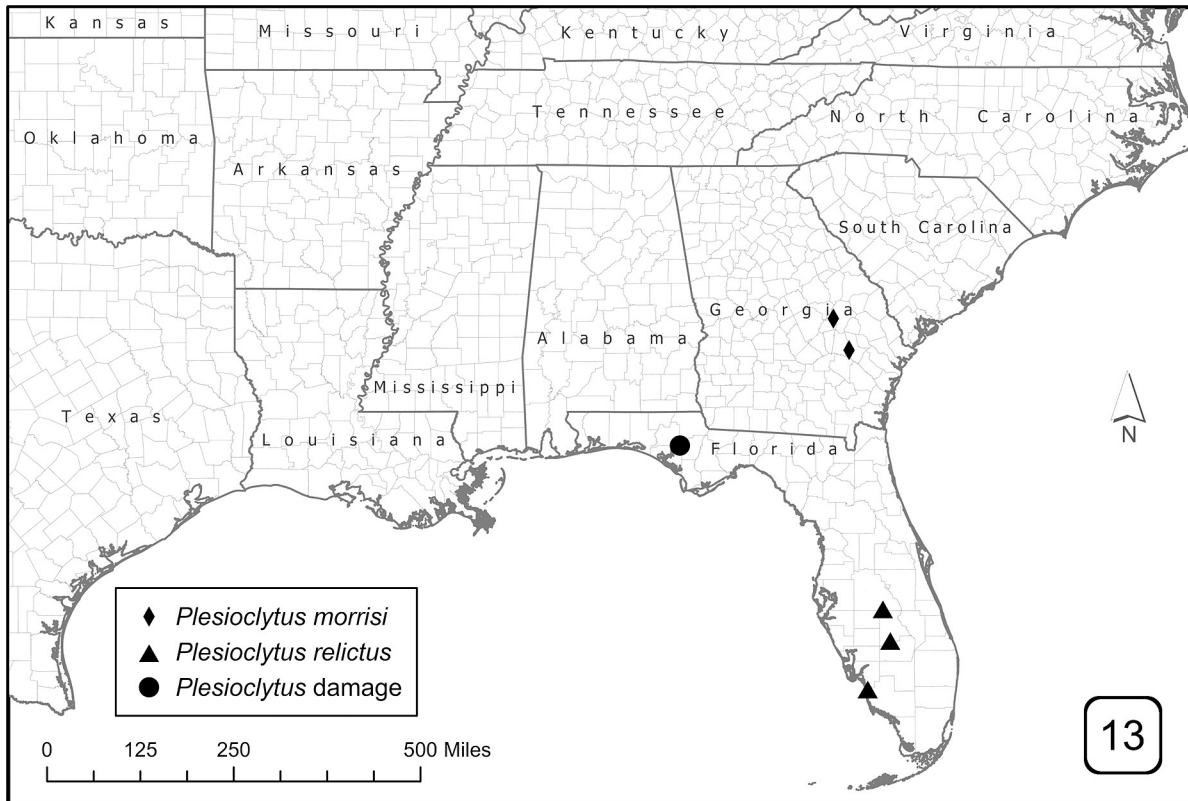
Figures 1–4. Adult, pupa, and habitat of *Plesioclytus*. **1)** Adult male of *P. relictus*. **2)** Habitat of *P. polygamum* and *P. morrisoni* in Tattnall County, Georgia. **3)** Adult female of *P. relictus*. **4)** Partially dissected root of *P. polygamum* exposing pupa and adult of *P. relictus*.



Figures 5–8. Root damage and habitat of *Plesioclytus*. **5)** Damage to roots of *P. polygamum* by *P. relictus*. **6)** Habitat of *P. polygamum* and *P. relictus* in Highlands County, Florida. **7)** Active damage by *P. relictus* in root of *P. polygamum*. **8)** Habitat of *P. polygamum* and *P. relictus* in Collier County, Florida.



Figures 9–12. Root damage and habitat of *Plesioclytus*. **9)** Specimen of *P. polygamum* with larvae of *P. relictus* in open sand in Emanuel County, Georgia. **10)** Active damage by *P. relictus* in root of *P. polygamum*. **11)** Blooming specimen of *P. polygamum* in open sand with larvae of *P. relictus*. **12)** Active damage in stem of *P. polygamum* containing *P. relictus* covered by sand.



Figures 13–14. Distribution of *Plesioclytus* and *Polygonum*. 13) Distribution records of *Plesioclytus*. 14) Distribution records of *Polygonum polygamum*.