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The first North American records of the synanthropic spider *Cithaeron praedonius* O. P.-Cambridge (Araneae: Gnaphosoidea: Cithaeronidae), with notes on its biology

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The first North American records of the synanthropic spider *Cithaeron praedonius* O. P.-Cambridge (Araneae: Gnaphosoidea: Cithaeronidae), with notes on its biology

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Abstract. *Cithaeron praedonius* O. P.-Cambridge 1872 (Araneae: Gnaphosoidea: Cithaeronidae) is an Old World species with a distribution from The Gambia, western Africa, and Greece to Malaysia and Australia. In the New World, it was recently found in Brazil, and is now reported for the first time in North America, in the United States. Multiple individuals of both sexes and various life stages, including multiple eggsacs, have been found in a home in Port Richey, Pasco County, Florida. An adult female was found on the outside wall of the house feeding on another spider, suggesting that *C. praedonius* are no longer contained as a spot introduction in this one house. Observations in captivity indicate that this species may prefer feeding on other spiders. The eggsac and molting nest are described for the first time, and the first records on fecundity are reported.

Introduction

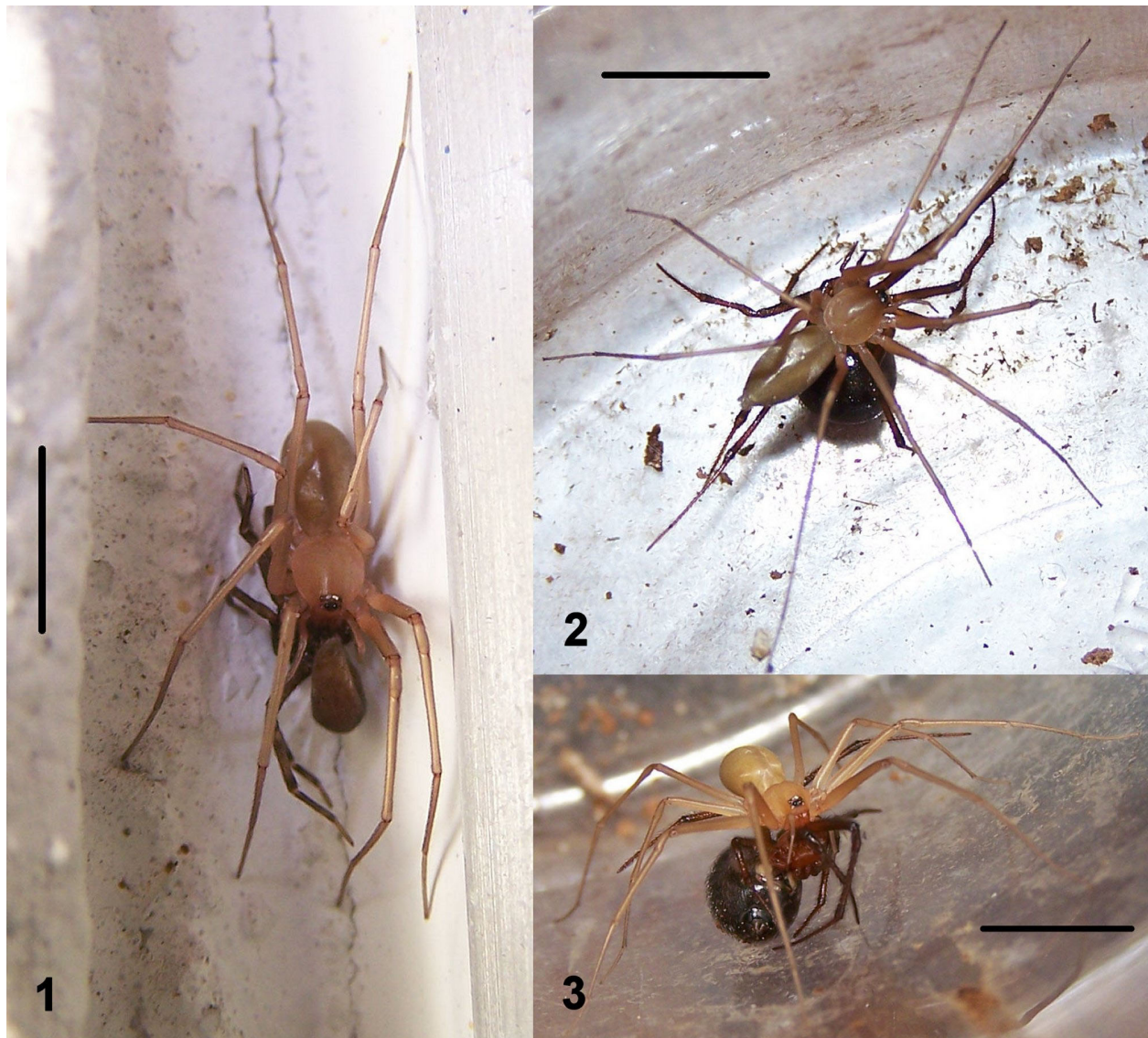
Cithaeron praedonius O. P.-Cambridge 1872 (Araneae: Gnaphosoidea: Cithaeronidae) belongs to a small family consisting of six described species in two genera (Platnick 1990, 1991). It was described from Lebanon, but occurs in the Old World in northern Africa as far west as Libya, and has been reported in several Middle Eastern countries, as well as Greece, Turkmenistan, India, Malaysia, and Singapore (Platnick 1991; Platnick and Gajbe 1994). It was subsequently documented from the Northern Territory of Australia (Platnick 2002), probably an introduction as this is a different ecozone than its main distribution. Penney (2009) recently reported it as a synanthrope in The Gambia, western Africa. In the New World, the only previous records were from an urban area in the State of Piauí, Brazil (Carvalho et al. 2007). With this report, the first for the family Cithaeronidae from North America, it is now known from every continent except Antarctica.

On 6 Feb 2011, JTS, a member of an online community of invertebrate enthusiasts on the website Arachnoboards (www.arachnoboards.com), requested the assistance of GBE to identify some spiders he had collected in his home. JTS had posted pictures of one of these spiders on Arachnoboards, and there were numerous posts guessing at its identity. One post, from a member located in Italy known online as Tarantula_Hawk, suggested that it might be *C. praedonius*. Subsequently, JTS was able to send multiple specimens of *C. praedonius* to GBE, who confirmed the identification.

Materials

On 9 March 2011, GBE visited the home of JTS, and in a 3-hour period, the two collectors obtained six specimens and two eggsacs. The records of these and other specimens are listed below. Some specimens, as indicated, are deposited in the American Museum of Natural History (AMNH), New York. All others are deposited in the Florida State Collection of Arthropods (FSCA), Gainesville, Florida.

Collection records (all USA: FLORIDA: Pasco County, Port Richey) in chronological order:



Figures 1-3. *Cithaeron praedonius*. 1) Adult female on outside wall with prey (unknown spider). 2-3) Adult female in shallow deli cup with prey, an adult female *Nesticodes rufipes*. 2) Dorsal view. 3) Anterolateral view. Scale line = 5 mm for all figures.

17-24 August 2010: 3 females, numerous small immatures, JTS, in Florida room (essentially an enclosed large patio on the back of the house).

10 January 2011: 1 female, JTS, in Florida room; made eggsac in captivity, 15 spiderlings hatched [female voucher and spiderlings (preserved in 100% ethanol) sent to American Museum of Natural History (AMNH), New York, for DNA research].

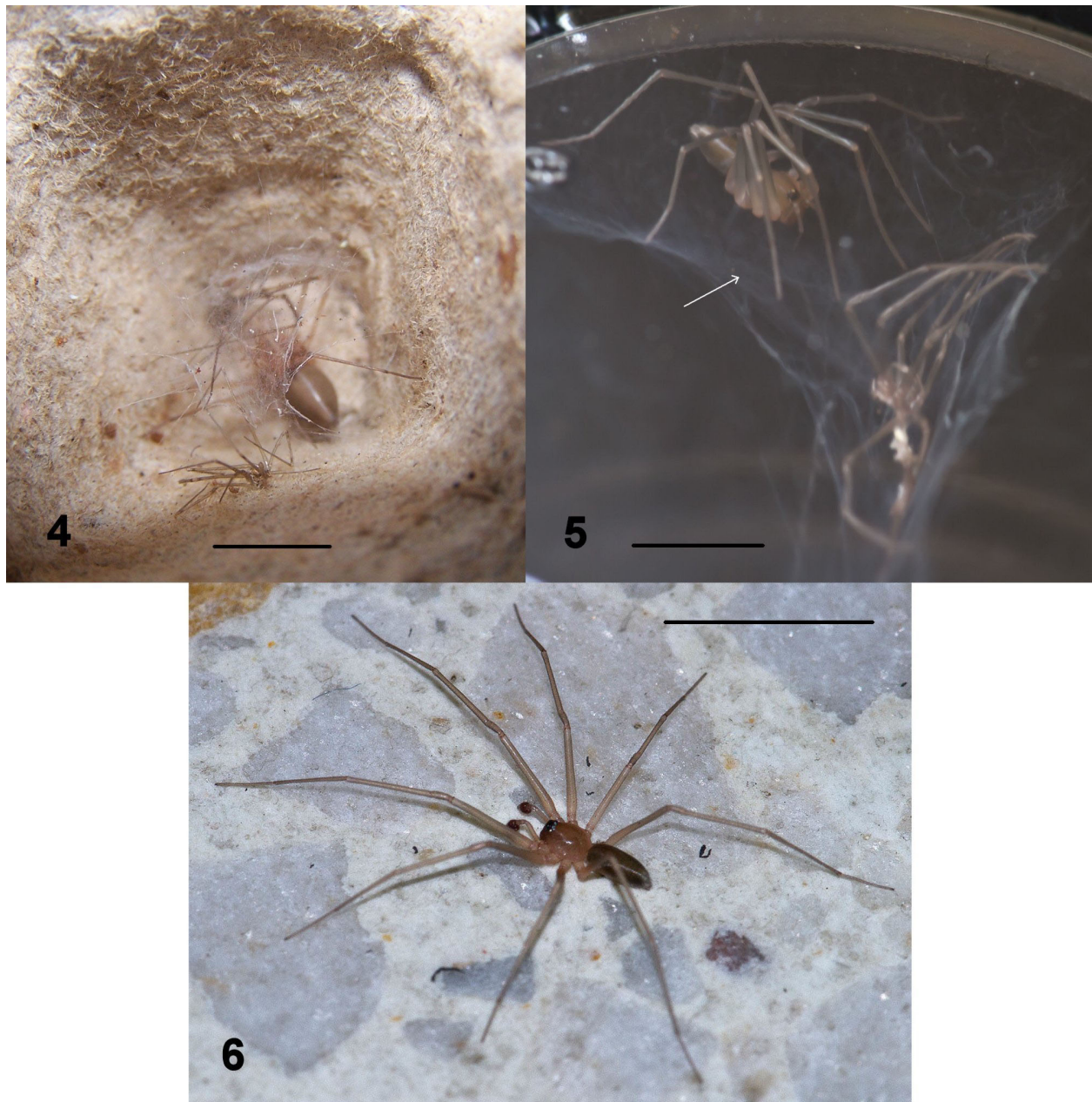
5 February 2011: 1 female, JTS, on outside wall near back door, feeding on small lycosid (?); made eggsac in captivity, 17 eggs.

10 February 2011: 1 male, JTS, in living room.

9 March 2011: 1 male in garage, 3 females, 2 juveniles, 2 eggsacs (others seen) in Florida room, GBE and JTS. The eggsacs contained 32 and 28 eggs, respectively. One of the females made the smallest eggsac (see below) in captivity, which contained 14 eggs [7 in each of two offset rosette layers (6 eggs in a hexagonal pattern around one central egg)].

31 March 2011: 1 male, JTS, in Florida room.

11 April 2011: 1 female, JTS, in Florida room.



Figures 4-6. *Cithaeron praedonius*. **4)** Adult female in nest in egg carton cavity, seen from underside, molt remnants discarded outside nest. Scale line = 5 mm. **5)** Penultimate female post molt in deli cup, showing shape of molting nest when cavity not available, and discarded molt below silken sheet (arrow). **6)** Adult male on floor.

9 June 2011: 1 male, 2 subadult females, JTS, in Florida Room.

18 June 2011: 1 male, JTS, in kitchen.

20 June 2011: 1 male, 1 gravid female, 1 penultimate male, 2 subadult females, JTS, in Florida room [pair of adults sent to the AMNH as further vouchers].

Discussion

The source of this introduction is unknown. One possible source was the boxes of live crickets that JTS purchased to feed his tarantulas. The owner of the establishment in Florida that sold the crickets stated to GBE that he raised his own crickets and did not import stock from elsewhere due to diseases now



Figure 7. Adult male *Cithaeron praedonius* in nest in living room, recently molted, molt discarded outside nest. Note *C. praedonius* eggsac on wall at lower right. Also in background is another spider in a web, probably a *Physocyclus globosus*.

affecting the pet trade feeder cricket industry. Another possible source is the purchase by JTS of tarantulas at local “Repticon” events, a pet trade exposition, in the Tampa area. Potentially, tarantula specimens were imported and then sold at these events. If so, then it is possible that a gravid female or an eggsac of *C. praedonius* was on or in the shipping container.

At the house in Port Richey, females (Fig. 1-5) were most often found in cardboard egg cartons of the type used to create substrate in cricket colonies. A nest consisted of silk lining an “egg” cavity in the cardboard and a thin sheet of silk covering the open side of the cavity (not a dense opaque white sac as is often seen in members of the *Dionycha*). The spider could be easily seen inside the nest (Fig. 4). As the egg cartons were typically turned over to observe the spiders in nests (which would put the sheet uppermost), it seems that the typical position is for the spider to be standing on the sheet with the cavity above. The molt is ejected below the sheet (as can be seen in Fig. 4, 5, and 7). A molting nest made in a small deli cup by a captive subadult female shows a similar shaped, free-standing structure (creating its own ‘cavity’) attached top and bottom as a funnel-like outer silken frame with a sheet near the bottom of the cone-shaped, wider, upper part of the funnel. The spider is seen standing above the sheet (Fig. 5), supporting the previous observations. On the whole, the impression was as much like a small sheet web as a nest, although there is no evidence that the spider uses the silk to capture or impede prey. Juveniles preparing to molt were found in nests similar to those containing recently molted adult females. Repeated observations seem to indicate that individuals only make nests in which to molt, and otherwise are free-living. Most individual males (Fig. 6-8) and juveniles were captured under or behind objects, often on walls or egg cartons. The male in the living room was found in a nest (where it had recently molted) in the crease

between the wall and ceiling (Fig. 7). The male in the garage was found on the wall next to the main garage door; there was sufficient space between the wall and door where the spider could have easily exited to the outside. One female was captured on an outside wall of the house near dusk feeding on what is possibly a small lycosid spider (prey specimen not kept) (Fig. 1). The population of *C. praedonius* at this point clearly is not restricted to the inside of this one house, and may be spreading in the neighborhood.

Other spiders, common in the room where most of the *C. praedonius* were found, were the amphinetid *Metaltella simoni* (Keyserling), the pholcid *Physocyclus globosus* (Taczanowski), and the theridiid *Nesticodes rufipes* (Lucas). An adult male corinnid, *Trachelas volutus* Gertsch, was also found in the same room. Another common synanthropic theridiid, *Latrodectus geometricus* C. L. Koch, was found in the garage and on the outside of the house; *P. globosus* was also found in the garage, and most likely the other two synanthropic species were there as well. A female *C. praedonius* in captivity killed and ate a *N. rufipes* female that exceeded its own body mass (Fig. 2, 3). All of the specimens captured 9 March readily caught and ate *L. geometricus* spiderlings.

Interestingly, earlier caught (before 9 March) adult females of *C. praedonius* kept alive by JTS refused small crickets and dermestid beetle larvae as prey in captivity, although one juvenile caught 9 March apparently ate a small cricket. While not conclusive, and certainly many spiders consider other spiders “always on the menu” (Helsdingen 2011), the evidence available suggests that *C. praedonius* might prefer other spiders as prey. Given the populations of the web-building spiders present, if *C. praedonius* does in fact prefer eating other spiders, it would seem to have an excellent prey source at this location. Of the other spiders present that were seen or captured, a *L. geometricus* was taken with three eggsacs, a *N. rufipes* was captured with an eggsac, a *P. globosus* was seen with an eggsac, and both female *M. simoni* taken made eggsacs in captivity. Spiderlings and older individuals of multiple synanthropic species would be an abundant prey resource for a spider that specialized on eating other spiders.

Eggsacs of these other synanthropic spider species are retained in the web where they are protected and/or tended by the mother, however eggsacs (Fig. 8) of the cursorial *C. praedonius* are not made in a nest nor are they protected by the mother. They are deposited in the environs and the mother leaves. In captivity, the mother would remain near an eggsac that was laid, but this might be an artifact of being caged. Eggsacs found in the house never had a female associated with them (see Fig. 7).

In appearance, *C. praedonius* eggsacs are white lenticular with a noticeable medial bulge, and tend to blend into the substrate. The base is a thicker pad of white silk about 4 mm in diameter on which the eggs are laid surrounded by a ring of fine silk about 2 mm in diameter which presumably helps anchor the central part. This section strongly adheres to the substrate and is very thin, the combination of which prevents it from being peeled from the substrate without destroying it. The covering is thin papery, almost cellophane-like, although not obviously translucent as in some related spiders. It is white and appears slightly tinted medially, due to the yellow eggs, and thin enough that some color from the substrate is visible through it in the peripheral part, which has a camouflaging effect. The central bulging section over the eggs is slightly oblong to circular, although the dimensions may depend on whether the substrate surface is flat or curved. Five eggsacs had the following dimensions: 10x10, 10x9, 10x8, 10x7, and 8x6 mm. Silk over the central area was extended outward to form a flat border surrounding the central raised area, 2-4 mm in diameter, which adhered it to the substrate. Probably due to the papery



Figure 8. Eggsac of *Cithaeron praedonius* on egg carton. Scale line = 5 mm.

nature of the outer cover, with care it could be separated from the substrate and the lower part of the eggsac without significant damage and preserved. This also allowed access to eggs or spiderlings within the eggsac.

Cithaeronid biology is poorly known. They are noted for being extremely fast and difficult to catch (A. Russell-Smith, in Platnick 1991). They tend to live in dry habitats but in relatively damp microhabitats (see species accounts in Platnick 1991). Penney (2009) reported this species as being active at night in buildings. The above accounts of molting nest appearance, eggsac structure, and fecundity are the first reported for the family. We also can vouch that a *C. praedonius* individual has the capability of incredible speed; while it will walk very deliberately, in short bursts when startled it seems to teleport from one location to a nearby location several cm away. However, if found in a nest, it is relatively easy to catch by covering the nest with a vial and prodding it out.

The speed alone of *C. praedonius* would seem to give it a significant advantage over other spiders, especially those which are more dependent on using silk-based prey catching techniques. The structure of its web-like nest and apparent motile ability on silk seems to indicate that it would easily be able to traverse the webs of other spiders to attack the owners of those webs. Perhaps the pseudo-segmented tarsi are a factor in this ability. The nest webbing they create is reminiscent of that made by the web-invasive salticid *Portia fimbriata* (Doleschall) (Jackson and Blest 1982), another spider that will eat insects, but preferentially takes other spiders as prey.

The possibility that *C. praedonius* has web-invasive behaviors similar to *P. fimbriata* should be explored. Some gnaphosids have been reported as predators of other spiders, even having specialized hunting techniques for them (e.g., Bristowe 1958; Jarman and Jackson 1986). Cithaeronids are gnaphosoid spiders, and perhaps this small family has taken a propensity to feed on other spiders to a more advanced level. If this is true, the availability of large numbers of other types of synanthropic spiders as prey may have contributed to reports of *C. praedonius*, a member of an otherwise small and poorly known family, as another synanthrope.

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