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EENY683

Habronattus Jumping Spiders *Habronattus* (Pickard-Cambridge, 1901) (Arachnida: Araneae: Salticidae)[1]

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Introduction

Habronattus is a large and diverse genus of New World jumping spiders in the family Salticidae (Griswold 1987, Maddison and Hedin 2003). These spiders are small (5–8 mm), primarily ground-dwelling, and can be found in a variety of habitats (Griswold 1987). As with most other jumping spiders, members of the genus *Habronattus* are voracious generalist predators that eat a variety of small insects and other arthropods, including many small agricultural pests (Taylor 2012). *Habronattus* males are known for their unique and elaborate color patterns, particularly on their faces and front legs, which they display to the comparatively drab females during courtship (Figure 1, Taylor et al. 2011, Elias et al. 2011). Although most spiders (including *Habronattus*) have venom that they use to subdue their prey (Foelix 2011), *Habronattus* jumping spiders are not aggressive or defensive and do not bite humans.

Distribution

The genus *Habronattus* is restricted to the New World, mainly in North and Central America. Their distribution extends as far north as the Yukon in Canada across to New Brunswick, south through the US and Central America including the Galapagos Islands, the Lesser Antilles and other Caribbean islands (Griswold 1987). These spiders can be found in a variety of habitats including mountaintops, deserts, and riparian areas (Griswold 1987). In parts of their range, they are common and abundant in backyards, gardens, and agricultural areas (Griswold 1987, L. Taylor, and J. Coco, unpublished data).

Figure 1. A male *Habronattus pyrrithrix* (right) courting a conspecific female (left). Male displays in this and other *Habronattus* species consist of movement, color, and substrate-borne vibrations. Credits: Lisa Taylor, UF/IFAS

There are eleven species of *Habronattus* known to inhabit Florida:

Habronattus alachua (Griswold, 1987)
Habronattus brunneus (Peckham & Peckham, 1901)
Habronattus calcaratus (Banks, 1904)
Habronattus carolinensis (Peckham & Peckham, 1901)
Habronattus coecatus (Hentz, 1846)
Habronattus decorus (Blackwall, 1846)
Habronattus georgiensis (Chamberlin & Ivie, 1944)
Habronattus notialis (Griswold, 1987)
Habronattus ocala (Griswold, 1987)
Habronattus trimaculatus (Bryant, 1945)

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Habronattus viridipes (Hentz, 1846)

Identification

The genus *Habronattus* is in the jumping spider family Salticidae, the largest family of spiders, with more than 5800 species (World Spider Catalog 2015). Jumping spiders can be distinguished from other spiders by their large, forward-facing anterior median eyes (Figure 2). Most jumping spiders do not build webs for prey capture (but see Jackson 1992 for an exception). Silk use in most jumping spiders is limited to construction of draglines, resting retreats, and egg sacs (Richman and Jackson 1992). Jumping spiders are active during the day across a variety of habitats (Richman and Jackson 1992).

The genus *Habronattus* contains roughly 100 species of relatively small jumping spiders and can be distinguished from other jumping spiders by the microscopic morphology of male pedipalps (small appendages near the face of the spider) and an elongated third pair of legs (Griswold 1987). However, the most striking features of *Habronattus* that can aid in identification are the elaborate color patterns of mature males that are used in their mating displays. Across the genus, colorful species-specific ornamentation appears on the face, pedipalps, first and third pairs of legs, and (less commonly) on the abdomen (Griswold 1987, Figures 2 and 3).

Figure 2. Mature males of several *Habronattus* species common in north central Florida: *Habronattus calcaratus calcaratus* (top left), *Habronattus brunneus* (top right), *Habronattus trimaculatus* (bottom left), and *Habronattus decorus* (bottom right). Note the large forward-facing eyes and the species-specific color patterns on the males' face and legs (and on the abdomen of *Habronattus decorus*), which are displayed to females during courtship.
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In contrast with the males, the females of most *Habronattus* species look similar to one another with only subtle differences in their drab gray and brown markings (Griswold 1987, Figure 4).

Figure 3. Mature males of several *Habronattus* species common in the southwestern US: *Habronattus pyrrithrix* (top left), *Habronattus clypeatus* (top middle), *Habronattus hirsutus* (top right), *Habronattus hallani* (bottom left), *Habronattus icenoglei* (bottom right).
Credits: Lisa Taylor, UF/IFAS

Figure 4. Mature females of several species of *Habronattus* common in the southwestern US: *Habronattus pyrrithrix* (top left), *Habronattus clypeatus* (top right), *Habronattus hirsutus* (bottom left), *Habronattus hallani* (bottom right). In contrast to the conspicuous colors of males of the same species (see Figure 3), females are typically drab and cryptically colored and are typically larger than males.
Credits: Lisa Taylor, UF/IFAS

In the field, both males and females can often be seen jumping along the ground, across leaf litter, or through vegetation. Their small size can make them difficult to spot (Figure 5). The drab gray and brown dorsal coloration of females allows them to blend in with their environment (Figure 6), while males often have dorsal color patterns that make them more conspicuous (Figure 7). Males spend more time moving through their environment compared with females, making them easier to find (Taylor 2012).

A species-level key to males of the genus *Habronattus* can be found in Griswold (1987). Additional images useful for species-level identification can be found in Maddison (1995).

Figure 5. Sub-adult male *Habronattus pyrrithrix* (almost full adult size).
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Figure 6. Adult female *Habronattus pyrrithrix* illustrating the cryptic dorsal color pattern which is characteristic of many other *Habronattus* females and allows them to blend in with their environment.
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Figure 7. Adult male *Habronattus pyrrithrix* illustrating a characteristic conspicuous dorsal pattern which is similar in appearance to the males of many other *Habronattus* species.
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Vision

While there is evidence that many jumping spiders can see and discriminate a range of colors across both the UV and human visual spectrum (Nakamura and Yamashita 2000, Lim and Li 2006), members of the genus *Habronattus* use a unique color vision system that differs from other groups and provides an enhanced ability to discriminate colors (Zurek et al. 2015). Specifically, *Habronattus* has a red filter pigment in their retina, which gives them a broad color discrimination ability ranging from UV to red (Zurek et al. 2015).Recently, it has been shown that *Habronattus* use the color red as the basis for choosing both prey (Taylor et al. 2014, Taylor et al. 2016) and mates (Taylor and McGraw 2013).

Courtship

Habronattus spp. are perhaps best-known for the complex and multimodal courtship behavior of males, which incorporates movement, bright colors, and substrate-borne vibrations into a choreographed species-specific display (Elias et al. 2011, Figure 2). As males approach females, they move their adorned appendages and display their (often colorful) faces in the direction of females. Females are typically larger than males (Griswold 1987), can be highly cannibalistic (Taylor 2012, Figure 8), and choose mates on the basis of various aspects of a male's display, including color (Taylor and McGraw 2013) and vibrations (Elias et al. 2005). Sexual selection behavior may be the driving force behind the rapid diversification of this genus (Masta and Maddison 2002).


Figure 8. Adult female *Habronattus pyrrithrix* found cannibalizing an adult male in the field.
Credits: Lisa Taylor, UF/IFAS

Prey and Predators

Jumping spiders get their name because of the way they hunt—by stalking and jumping onto their prey (Jackson and Pollard 1996, Richman and Jackson 1992). They are so efficient at this method of prey capture that they are often compared to cats and have even been nicknamed "fly tigers" (Harland et al. 2012). Their prey capture technique relies

on their acute vision, which enables them to tackle and take down prey much larger than themselves (Forster 1977, Jackson and Pollard 1996, Figure 9).

Figure 9. Juvenile *Habronattus hallani* just before attacking a fly much larger than itself. The spider tackled the fly but was unsuccessful in capturing it.
Credits: Lisa Taylor, UF/IFAS

Habronattus jumping spiders, in particular, are opportunistic and voracious generalist predators. They can be extremely abundant in certain habitats and eat mostly small insects and other arthropods, including many pest species (Taylor 2012, Figure 10). As such, they have the potential to be important players in both natural and agricultural food webs but their role in these systems has not been well studied (see Young and Edwards 1990).

Figure 10. Female *Habronattus pyrrithrix* jumping spider feeding on a fly.
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Habronattus jumping spiders also have predators of their own. While there has been little work on the natural predators of *Habronattus*, there are records of individuals being eaten by larger conspecifics (members of the same species) as well as larger species of spiders (Taylor 2012, Figure 11). The black and yellow mud dauber wasp (*Sceliphron caementarium*) also takes large numbers of *Habronattus* in some locations (L. Taylor, unpublished data, Figure 12).

Figure 11. A philodromid spider, *Tibellus* sp., eating a male *Habronattus pyrrithrix*.
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Figure 12. Nest of a black and yellow mud dauber wasp (*Sceliphron caementarium*) that is full of *Habronattus hirsutus* jumping spiders. Female mud daubers capture and paralyze spiders, which they bring back to their nests to provision their offspring.
Credits: Lisa Taylor, UF/IFAS

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