

Anadenobolus monilicornis (Yellow-banded Millipede)

Order: Spirobolida (Round-backed Millipedes)

Class: Diplopoda (Millipedes)

Phylum: Arthropoda (Arthropods)



Fig. 1. Yellow-banded millipede, *Anadenobolus monilicornis*.

[<https://www.flickr.com/photos/94337523@N06/16142050071/#>, downloaded 10 March 2016]

TRAITS. The yellow-banded millipede, often called the bumblebee millipede, is bilaterally symmetrical, with a segmented body. The head is rounded, followed by an elongated cylindrical trunk (thorax and abdomen) composed of segments or rings. The first segment (collum) is wide and lacks legs. Each thoracic segment has a single pair of legs, whereas each abdominal segment has two pairs of segmented legs (diplopodous).. The most posterior unit of the body (telson) bears the anal opening and lacks legs. On each abdominal segment, there are two pairs of spiracles; which allow air to be delivered to the trachea (Hickman et al., 2003). In males, the gonopores lie directly at the base of the legs. Colour black with variable yellowish to lime-green bands, red legs and antennae (Fig.1), length approximately 45mm, with a maximum width of approximately 4.2 mm (Shelly, 2014). The cuticular exoskeleton is hard, containing protein, lipid, and chitin, as well as calcium carbonate, and is secreted by the underlying epidermis. The exoskeleton sheds at intervals (known as ecdysis).

DISTRIBUTION. *Anadenobolus monilicornis* is native to the Greater Antilles (excepting Cuba), the Lesser Antilles, Trinidad and Tobago, Venezuela, Guyana, Suriname and Brazil (Fig. 2), but introduced/invasive in Florida (Shelly, 2014).

HABITAT AND ACTIVITY. *Anadenobolus monilicornis* is a terrestrial arthropod that typically inhabits decomposing plant litter, dead wood, or soil. It feeds primarily on decaying plant material, as well as higher-quality foods, such as fallen fruits, seeds, mushrooms, faeces and dead invertebrates, feeding opportunistically on whichever is most available at the soil surface. Opportunistic feeding does not preclude food preferences. Higher quality food increases the developmental rate, growth and reproduction, so choice of habitat is not solely influenced by the quantity of food resources. In tropical and subtropical regions, *Anadenobolus monilicornis* are most abundant in moist deciduous forests. The presence of *Anadenobolus monilicornis* has also been reported in a variety of unusual habitats, such as under bricks and debris, under potted plants, and in light fixtures (Shelly, 2014). Millipedes may show diurnal, crepuscular, and nocturnal activity (Tuf, 2006).

FOOD AND FEEDING. *Anadenobolus monilicornis* are generalist and opportunistic detritivores, which feed on a variety of decaying plant material colonized by microbial decomposers (bacteria and fungi). A single pair of antennae, the mandibles and the gnathochilarium constitutes the head of *Anadenobolus monilicornis*. The mandibles are enlarged and specialized for chewing. The millipede walks on the soil surface, occasionally climbing on dead wood (Fig. 3), and burrowing through the soil and leaf litter, rummaging for food. They are involved in ecosystem nutrient cycling and consume approximately 5-10% of annual leaf litter production, and up to 25% when other invertebrates such as earthworms are scarce (Contreras and Cafaro, 2013).

REPRODUCTION. Very little information has been published about reproduction in this particular species. The male *Anadenobolus monilicornis* possesses a pair of modified legs (gonopods); during copulation, the male utilizes the gonopods to transfer sperm directly into the female. The gonopods are located on the seventh body segment (Shelly, 2014). Mating is conducted face to face and the pair often remains coupled for a lengthy period of time. The female lays her eggs in a nest and guards them carefully (Hickman et al., 2003). Number of eggs is variable. The young will ingest faecal pellets from the adults, which provides them with the bacteria contained therein.

BEHAVIOUR. Juvenile behaviour: Juveniles only bear one pair of legs per segment, as well as lack colour within the first few months of development (up to 6 months) (Fig. 4) (Hickman et al., 2003), after which their colour develops. Each shed (ecdysis) leads to the development of more segments and legs. Juveniles are very difficult to distinguish from adults, when they have attained their colour (Fig. 5).

Anti-predator behaviour: *Anadenobolus monilicornis* is slow moving, thus requiring defense mechanisms against predators. Its primary defense mechanism involves curling into a tight coil (Fig. 6), enabling protection of its legs and more vulnerable dorsal region (Day, 2015). Additionally, coiling making it increasing difficult for predators to swallow the millipede. The yellow-banded millipede can secrete toxins that often repulse its predators.

APPLIED ECOLOGY. *Anadenobolus monilicornis* are kept and bred in captivity, sold and utilized as pets. *Anadenobolus monilicornis* infestations occur in Florida, where the millipedes are present in large numbers (Shelly, 2014). They enter buildings and houses, but die quickly due to the dry conditions (lack of humidity) (Gabel et al., 2003).

REFERENCES

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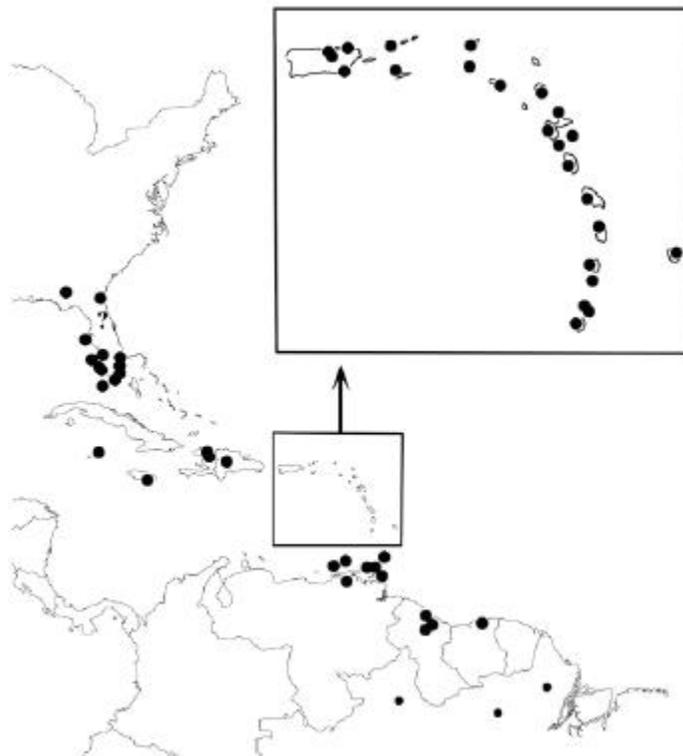


Fig. 2. Yellow-banded millipede geographic distribution.

[<http://digitalcommons.unl.edu/insectamundi/881>, downloaded 10 March 2016]



Fig. 3. Yellow-banded millipede climbing.

[<https://suzandtell.wordpress.com/2015/05/27/creepy-crawlies-millipedes/>, downloaded 10 March 2016]



Fig. 4. Juvenile yellow-banded millipede.

[<http://arachnoboards.com/threads/bumblebee-or-florida-scarlet.175135/>, downloaded 10 March 2016]



Fig. 5. One year old juvenile yellow-banded millipede.

[<http://arachnoboards.com/threads/bumblebee-or-florida-scarlet.175135/>, downloaded 10 March 2016]



Fig. 6. Yellow-banded millipede defensive behaviour.

[<https://www.flickr.com/photos/94337523@N06/16143971455/in/photostream/>, downloaded 10 March 2016]