

# Scorpiones: Buthidae

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The scorpion family Buthidae is represented in the Caribbean by at least four independent radiations including two endemic genera (*Alayotityus* Armas, 1973; *Centruroides* Marx, 1890; *Microtityus* Kjellesvig-Waering, 1966; *Rhopalurus* Thorell, 1896; *Tityus* C.L. Koch, 1896; *Tityopsis* Armas, 1974). All of the genera present in the Caribbean are endemic to the New World and form a monophyletic clade sister to all other buthid scorpions. These scorpions are morphologically and ecologically diverse and can be found in every habitat type on every island in the Caribbean region. Considerable effort has been made in describing the Caribbean fauna, and there are upwards of 100 described species endemic to the Caribbean. However, the systematics of the group is in disarray; none of the genera have been comprehensively revised or analyzed using modern phylogenetic methods. The highest priority for this family are the genera *Centruroides*, *Rhopalurus*, and the two endemic genera, *Alayotityus* and *Tityopsis*.

*Centruroides* is comprised of 71 extant species and 5 subspecies and is distributed from the southwestern United States to northern South America and the Galápagos. There are also amber fossils attributable to species groups within the genus known from the Dominican and Chiapas deposits. Several species of the genus endemic to Mexico are capable of lethal envenomation. There is currently a taxonomic revision underway which should be submitted for publication in 2011, the preliminary findings of which suggest a 'reverse colonization' event that led to a massive diversification in the North American deserts.

The *Rhopalurus* group (*Rhopalurus*, *Physoctonus* Mello-Leitao, 1934; *Troglorhopalurus*, Lourenço *et al.*) is the putative sister group to *Centruroides* and is comprised of 3 genera and 20 species. The group is of particular interest biogeographically because it has a disjunct distribution in open grassland habitats in eastern Brazil, northern South America and the Greater Antilles. A taxonomic revision is currently underway, with an anticipated publication date in 2011.

The 'microtityoids' (*Microtityus*, *Alayotityus*, *Tityopsis*) are distributed in northeastern South America, the Lesser Antilles and the Greater Antilles. Two of the genera (3 spp.) are endemic to Cuba (*Alayotityus* and *Tityopsis*). There are fossils of *Microtityus* known from Dominican amber. The taxonomy of this group may need to be revised before it is useful for biogeographical studies. None the less, the Caribbean endemics make this group particularly intriguing.

The largest New World buthid genus, *Tityus*, currently contains over 205 extant species and several Dominican amber fossils are known from the genus. It is distributed throughout South America, the windward islands of the Lesser Antilles and the Greater

Antilles. Some effort has been made to revise the group and there are several proposed subgenera, however, taxonomic work must be done on the group.



Fig 1. Distribution of *Centruroides* Marx, 1890 from L.A. Esposito & L. Prendini, in prep. Cosmopolitan species are associated with shipping routes.

**Monophyly.** The 8 genera in the New World buthid subfamily are likely monophyletic. Furthermore, most of the genera are undoubtedly monophyletic. However, there are no published phylogenies sampling the entire group, nor are there any comprehensive phylogenies of any of the genera.

**Amber species.** There is one (?) Dominican amber species from *Centruroides* (assignable to an extant Caribbean species group), *Microtityus*, and *Tityus*. (I have high-resolution images of specimens from a private amber collection provided by Dave Grimaldi.)

**Dispersal.** These scorpions range from apparent good dispersers to highly endemic poor dispersers. Many *Centruroides* species in the Caribbean are errant (wandering) and reside in temporary burrows under tree bark or dry vegetation. These animals can only disperse via rafting or vicariance.

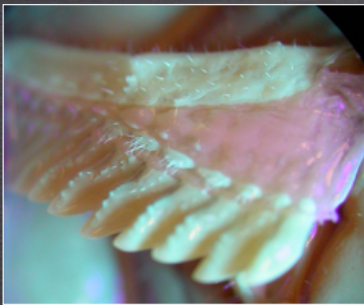
**Search Strategy.** They are most active during the middle two weeks of the lunar cycle (half-moon to no moon to half-moon). **IDEALLY, THEY SHOULD BE LOCATED AT NIGHT USING UV LIGHTS.** They will generally be sitting on vegetation or rock faces.

During the day they can be found by **PEELING BARK** and **ROCK-ROLLING**. The 'microtityoids' are often best found with **LEAF LITTER SIFTING**.

**Similar genera.** All New World buthid scorpions are of interest for the project.

**Needed Collecting.** Cuba, Jamaica, Haiti, Lesser Antilles, Caymans

- *Rhopalurus* Thorell, 1896
  - *Physoctonus* Mello-Leitao, 1934
  - *Troglohopalurus* Lourenço et al, 2004
  - 20 spp.
  - disjunct distribution
  - stridulatory mechanism



- *Centuroides* Marx, 1890
  - 71 spp.
  - highly venomous
  - morphologically diverse





- *Tityus* C.L. Koch, 1836
  - *Mesotityus* Gonzales-Sponga, 1981
  - 205 spp.
  - considerable diversity
  - highly venomous



- **Microtityoids**
  - *Microtityus* Kjellesvig-Waering, 1966
  - *Alayotityus* Armas, 1973
  - *Tityopsis* Armas, 1974

