

Scapteriscus didactylus (West Indian Mole Cricket or Changa)

Order: Orthoptera (Grasshoppers and Crickets)

Class: Insecta (Insects)

Phylum: Arthropoda (Arthropods)



Fig. 1. West Indian mole cricket, *Scapteriscus didactylus*.

[Photographed at the Zoology Museum, University of the West Indies St. Augustine campus, 9 March 2016]

TRAITS. Adults are brownish in colour with dark markings and are roughly 30mm long without their antennae or anal cerci (Fig. 1). According to Van Zwaluwenburg (1918) size varies between males and females, with lengths being 19-34mm and 24-36mm respectively. Their large head is protected posteriorly by a pronotal shield, and the clypeus (front shield) is leathery and covers their black mandibles (mouthparts), and they have prominent black compound eyes (Fig. 2). The filamentous antennae can have up to 87 segments when unbroken, which are attached at the lower margins of its eyes and are roughly one third of its body length. Changas are specially adapted to digging, and their muscular, heavily chitinized forelegs possess two pairs of fixed tibial dactyls

(Fig. 3). The femora of the hind legs are muscular and used for leaping while their spined tibiae assists in landing. Adults have two sets of wings; the upper pair (tegmina) is small, heavily veined and leathery in texture. The lower pairs are finely veined, soft and more ample (Fig. 1). When not in flight it folds the lower pair in plaits with the apical end (tip) rolled. This extends beyond their abdomen but usually does not reach the ends of their anal cerci (Van Zwaluwenburg, 1918).

DISTRIBUTION. The changa is prominent in Puerto Rico and has also been thriving in south-eastern United States since 1912 (Worsham and Reed, 1912). The changa is also extensively distributed and native to the West Indies and South America. It may be dispersed through flying and through ‘hitchhiking’ on imported cargo. It can be found as pests in countries such as Guadeloupe, Trinidad and Tobago, St. Vincent, Grenada, St. Lucia, Barbados, St. Kitts and St. Christopher-Nevis, Martinique, the US Virgin Islands, Dominica, St. John and St. Thomas, Haiti, the Dominican Republic, and Haiti (Fig. 4) (Frank and McCoy, 2014; Van Zwaluwenburg, 1918).

HABITAT AND ACTIVITY. Changas are tunnelling insects found in mainly subterranean habitats and all of their development takes place underground forming vast networks of burrows. As a result it is abundant in alluvial soils of coasts and inland river valleys. It is also found amongst light loamy, compressible soils such as pastures, golf courses, landscapes, and vegetable farms (Leppla et al., 2007). Since it is nocturnal most of their feeding is done at night and adults are frequently observed flying at this time seeking out mates or relocating to more favourable habitats (Van Zwaluwenburg, 1918). The nymphs (immature animals) moult several times before final moulting to become an adult (Fig. 5).

FOOD AND FEEDING. Changas are generally herbivores and particularly found feeding on young grasses which gives them their reputation of damaging golf courses. They usually feed on young tobacco, tomato, eggplants, potatoes, peppers, sugar cane, grama grass (*Paspalum sp.*), yerba dulce (*Elusine indica*), Bermuda grass (*Cynodon dactylon*), rice, cabbage, collard, rape, turnip, cantaloupe, sweet potatoes, and lettuce. These insects during the day mostly feed from their burrow attacking the crown of these plants (Frank and McCoy, 2014). At night they are seen more frequently feeding on the leaves of plants and they may even feed on the kernel of sprouting corn (Van Zwaluwenburg, 1918). The consumption of food generally occurs in proportions to their body size as growth occurs.

POPULATION ECOLOGY. Changas are not known for living in large collective groups with parents and young. However they do exist in large quantities once conditions are favourable. They are also seen existing in the same area as other species of mole crickets. A study of 0.4 hectare plots in bahiagrass pastures during September of 2000 in Florida showed 600 mole crickets and more being caught in the plots over a three month period. *Scapteriscus didactylus* along with its relative *Scapteriscus vicinus* were amongst the species found (Leppla et al., 2007). They are also not known to be territorial, however if provoked they do not hesitate to commit cannibalism (Walton, 1921).

REPRODUCTION. Females are prolific breeders laying up to approximately 110 eggs and eggs are deposited every month except for December in captivity (Fig. 6). They are attracted to males through calls produced in burrows underground. After mating the eggs are laid in an oval shaped chamber which is a pocket connected to an adjacent tunnel that is 7-8cm from the surface in the

wet season and 20cm in the dry season. They are dropped in clusters and the entrance to this pocket is covered with loose dirt protecting them. The eggs are originally grey in colour but eventually turns yellowish/white (Van Zwaluwenburg, 1918). These eggs hatch about 19 days after being laid, while in temperate countries they continue to hatch for 7-8 months. Egg development is heavily dependent on moisture as many changa eggs die in dry conditions (Walton, 1921).

BEHAVIOUR. Juvenile behaviour: changas do not require any care from their parents and are called nymphs soon after birth. They emerge from the soil and immediately start feeding on debris, plant roots and seeds of the soil's topmost layer. In lab studies, juveniles are also known to have fed on weaker nymphs after birth (Van Zwaluwenburg, 1918).

Antipredator behaviour: Distressed changas eject a foul liquid from its anal orifice as a drop or discharged a considerable distance behind them. The offensive fluid discharge is an effective defence mechanism as all instars secrete this fluid. This acts as a deterrent to predators by imitating a dead changa. Males protect themselves through the production of short, sharp, high-pitched chirps by rubbing the file like veins of one tegmen on the other. When above ground and attacked by predators they immediately dig a hole with its adaptive forelegs.

REFERENCES

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Fig. 2. Head view of changa specimen.

[Photographed at the Zoology Museum, University of the West Indies St. Augustine campus, 9 March 2016]



Fig. 3. Changa tibial dactyls, used for digging.

[<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1835&context=insectamundi>
downloaded 9 March 2016]



Fig. 4. Changa geographic distribution and possible path of dispersal.

[<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1835&context=insectamundi>
downloaded 9 March 2016]



Fig. 5. Changa's nest of eggs.

[http://entnemdept.ifas.ufl.edu/creatures/orn/turf/pest_mole_crickets.htmhttp://entnemdept.ifas.ufl.edu/creatures/orn/turf/pest_mole_crickets.htm, downloaded 9 March 2016]



Fig. 6. Moulting stages of changas.

[Photographed at the University of the West Indies St. Augustine campus, Zoology Museum, 9 March 2016]