

FIELD OBSERVATIONS OF *TROPIDACRIS COLLARIS* (ORTHOPTERA: ROMALEIDAE)

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Tropidacris is a neotropical genus of three known species that include the largest grasshoppers in the world (Carbonell 1986). Two species, *T. collaris* and *T. cristata*, have very broad ranges that include most of South America north of the southern cone. The former is the species found on Margarita Island, while the range of the latter includes Trinidad and Tobago. The two are readily distinguished by the following adult characters (Carbonell 1984, 1986): a) antennae entirely yellow in *T. collaris*, basal two segments brown to black in *T. cristata*, b) dorsal crest of pronotum continuing onto posterior-most lobe (metazona) in *T. cristata* but not *T. collaris*, c) hindwings mainly orange to red in *T. cristata*, green to blue in *T. collaris*. We will disregard here the third, smaller species, *T. decampsi*, known from a single locality in Colombia.

Hoppers (larvae) of *Tropidacris* show contrasting, evidently warning colouration, while adults at rest are very well camouflaged against vegetation. The forewings bear a strong resemblance to leaves, while the hindwings present striking flash colouration, especially in *T. cristata* (Rowell 1983; pers. obs.).

Adult *Tropidacris* are spectacular insects and are not rare throughout most of the genus's range. *T. collaris* is often encountered along much of the Caribbean coast and the llanos region of Venezuela (F. Cerdá, pers. comm.). Nonetheless, they are not often encountered in large numbers. In Trinidad I have never seen two adult *T. cristata* in one day and possibly not two in the same calendar month. Rowell's (1983) brief account of *T. cristata* summarized the biological information on record for the genus, ending with the remark that "Nothing very much is known of any of them." Carbonell (1986) supplied some further details, noting that in both species the hoppers are gregarious, generations are not discrete, and all stages feed on a variety of plants. He also noted that *T. collaris* shows a very broad habitat range from humid forest to drier, more open formations, while *T. cristata* is largely absent from open, dry formations.

It is this sparseness of biological information that justifies the present brief observations. All are from an area of cactus scrub outside the village of La Vecindad on the island of Margarita, Venezuela, on 19 August 1997. This was toward the end of a dry season that lasts the greater part of the year on Margarita. Observations were concentrated in a shallow, dry gulch about 150 m long, lined with grasses, sedges, and many herbaceous broadleaf plants but few trees.

My attention was drawn to *T. collaris* when I happened to see two adults in quick succession. I began a deliberate search and collected all adults that I could find.

The only hoppers that I encountered were a single, dense

aggregation close to the ground on a small shrub close alongside the gulch. I netted a sample of these, which disturbance caused the remaining individuals to scatter. Some time later I returned to that spot and found the aggregation re-formed in a similar situation less than a meter from where I had first found it. Although I did not attempt to quantify adult density in any part of the gulch, they appeared to be most concentrated within a very few meters of the aggregation of hoppers.

I tasted one hopper and found it to be very bitter, approximately like an adult monarch butterfly (*Danaus plexippus*). This distastefulness is consistent with the orange-and-black body colouration.

Casual observations elsewhere around La Vecindad confirmed that the adult grasshoppers were abundant over a large area. The local people with whom I spoke seemed unsurprised by this and told me that it is a seasonal phenomenon, although they were vague about the particular season of appearance of adults or whether they are abundant every year. They told me that *T. collaris* is locally known as *langosta* or *ñangaragato*.

The adults that I collected amounted to four females and 22 males with mean hind-femur lengths of 38.8 mm (range 36.5 - 42.0 mm) and 33.3 mm (range 29.0 - 37.5 mm), respectively. Measurement was of alcohol-preserved specimens with an ordinary ruler to the nearest half millimeter.

Dissection of the females showed that the two largest had well-developed ovaries with apparently mature ova. The next largest had slightly developed ovaries, while the smallest showed no ovarian development.

The sample of hoppers comprised 19 females and 10 males, with hind-femur lengths shown in Fig. 1. Sex is readily determined by ventral examination of the abdominal terminalia. Measurement was with an eyepiece micrometer to the nearest 0.16 mm; choice of the left or right leg was according to convenience.

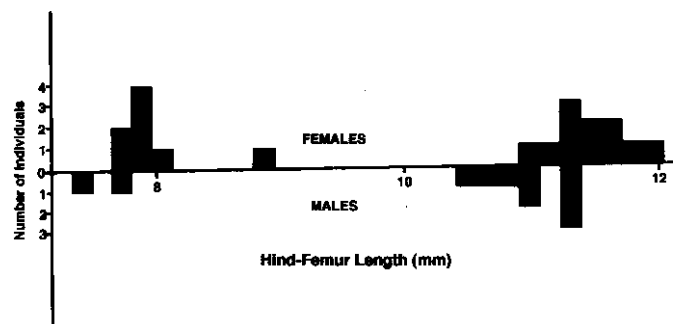


Figure 1: Frequency distribution of hind-femur length in 19 female and 10 male hoppers of *Tropidacris collaris* from an aggregation.

The size-frequency distribution of hoppers indicates that these represent two instars, with males on average slightly smaller than same-instar females. This conclusion is corroborated by consistent within-sex differences in the form of the abdominal terminalia between the two size-groups.

The basis of the strongly skewed sex-ratio in the sample of hoppers is not readily apparent. Given the small data-set, I do not discount the possibility that it is due to sampling bias.

Taken by themselves, the observations of adults are consistent with the hypothesis of a highly seasonal life cycle, with males developing somewhat faster than females and a concentration of breeding around the start of the rainy season. The presence of hoppers during the same time suggests that *T. collaris* breeds at two distinct seasons on Margarita.

I regret that I was unable to extend these few opportunistic observations and hope that they may stimulate someone else to undertake a more thorough study.

Thanks to C.S. Carbonell, F. Cerdá and H.F. Rowell for critical comment on these observations.

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NATURE NOTES

Observations Relating to Populations of the Giant Grasshopper *Tropidacris cristata* in Trinidad, West Indies.

Tropidacris cristata and the very similar *T. collaris* (Orthoptera: Romaleidae) are believed to be the largest grasshoppers in the world (Carbonell 1986). Of the two, only *T. cristata* is found in Trinidad. Earlier, I reported (Starr 1998) finding *T. collaris* in large numbers on Margarita Island, Venezuela in August 1997. In contrast, until the observations reported here I had never encountered *T. cristata* in any abundance in Trinidad. Although it is not a rare insect, I had never seen two individuals in one day and possibly not two in the same week, this despite a decade's residence in the area of the Northern Range.

The Botany Group of the Field Naturalists' Club toured the Irois Forest near the south-western corner of Trinidad on 20 October 2001. In the course of a two-hour walk, I noticed at least 20 of the grasshoppers, and others in the group also remarked on their abundance. According to our guide, local forester Wilbur Isaac, they are seasonally abundant in the area, and he believed that this was a regular occurrence about that time of year. The individuals that I noted were all mature females and males.

These observations are consistent with the working hypothesis that *T. cristata* has a regular seasonal breeding cycle in southern Trinidad, with very little or no breeding in northern Trinidad in most years. If this is the case, then the occasional individuals found in the north result from centripetal movement out of the breeding areas and are a genetic dead-end. The scarcity of individuals in the north may in itself account for the apparent absence of a breeding population, even if climatic and food conditions are suitable in some years.

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