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A faunal survey of the Oedipodinae (Acrididae: Orthoptera) of the Menoua Division in Cameroon

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ABSTRACT

Menoua Division is geographically located between 5°- 5.5° latitude north and 9.4° to 10.25° longitude east on the map of the world in the West Region of Cameroon. This division is separated by a steep forested elevation into two main sectors, a lowland plain called Santchou at altitude 600m and a hilly, savannah-type Dschang with a peak of 2200m above sea level at Djuttitsa. The Menoua Division is one of the important bread baskets of Cameroon. Short-horn grasshopper species belonging to the subfamily Oedipodinae collected from six localities in the Menoua Division of Cameroon included: *Gastrimagus africanus* Saussure 1888, *Heteropternis thoracica* (Walker, 1870), *Morphacris fasciata* (Thunberg 1815) and *Trilophidia conturbata* (Walker 1870). The main objective of this study was to explore the grasshopper species belonging to the subfamily Oedipodinae (Family: Acrididae; Order: Orthoptera) from the Menoua Division in Cameroon along with data on habitat, altitudinal zonation, cytogenetics and description of the species.

Keywords: Oedipodinae, Habitat, Altitudinal Zonation, Cytogenetics, Description

1. Introduction

The Menoua Division in the West Region of Cameroon covers a surface area of 1380Km² and is composed of six sub-Divisions (Santchou, Dschang, Fongo-Tongo, Nkong-Ni, Penka Michel and Fokoue). The division spans from Santchou at an altitude of 600m through Dschang (1500m) and topping on the plateau of Djuttitsa at an altitude of 2200m. The Division experiences an annual average rainfall of 1717.7mm and temperatures range from 25.35°C to 13.66°C. Over 80% of the inhabitants are farmers and the most important agricultural and horticultural plants include Coffee, tea, plantains, Irish potato, tomato, maize, pear, mango, banana, tomato, cabbage, carrot, onion and beans. This Division is one of the important bread baskets of Cameroon. The use of fertilizers and pesticides in the Menoua Division is known to cause runoffs that pollute both air and water. This is bound to affect grasshopper species diversity in the division.

The most recent check list of short-horn grasshoppers belonging to the families Acrididae and Pyrgomorphidae found in Cameroon and the Central African Republic was published by Mestre and Chiffaud (2009). This list comprised some 210 Acrididae species among which were found some 25 species of the subfamily Oedipodinae. Some of these species that had also been collected in the West African Sub-region were described by Mestre and Chiffaud (2006).

There are no published records available in literature on the Oedipodinae of the Menoua division of Cameroon. A good deal of research work on Oedipodinae of Cameroon has been done by earlier workers (Dirsh, 1963; Johnston, 1968; Dirsh, 1975; Mestre and Chiffaud, 2009) but no faunal survey of the Oedipodinae of the Menoua Division was done. In order to bring forth the Oedipodinae diversity in this area an extensive survey was made to document members of this subfamily with a note on their habitat, altitudinal zonation, cytogenetics and description.

2. Materials and Methods

The survey was conducted in localities like Dschang (1200m), Fokoue (1200m), Fongo – Tongo (2000m), Nkong-Ni (2000m), Penka Michel (1500m) and Santchou (600m). Specimens were collected using insect nets and were properly spread and mounted in insect storage boxes, labelled with scientific names, place and date of collection and deposited in the insect

collection of the Department of Animal Biology, University of Dschang, for future reference. Chromosome smears were prepared from testes by the methods of Seino et al, (2012). From these, chromosome numbers and morphology were determined.

3. Results and Discussions

Twenty-five Oedipodinae species have been recorded in Literature for Cameroon (Dirsh, 1975; Mestre and Chiffaud, 2009). During the present study on the identification and distribution of Oedipodinae fauna of the Menoua Division in Cameroon, a total of 162 specimens were collected from six localities in the division. Identification of these specimens showed 4 different species in 4 genera that belong to the same subfamily, Oedipodinae and family Acrididae. These four Oedipodinae species were found in the Plains of Santchou in the Menoua Division at 600m to the altitude of 2200m on the plateau of Djuttisa in the Nkong-Ni subdivision. All four species were found on the species list for Cameroon (Mestre and Chiffaud, 2009).

In Table 1, Oedipodinae species found were sorted out for their altitudinal occurrence. Three of the species occurred in the whole altitudinal range of study. These species included *Gastrimargus africanus*, *Heteropternis thoracica*, and *Trilophidia conturbata*. One species, *M. fasciata* was exclusively found at altitudes above 1500m. Table 2 also revealed that the four species were found in forest, grassland, clearings, fields or farms or a combination of these. *G. africanus* was common to the forest, grasslands and farmlands. *H. thoracica* was found in clearings/fields, grassland and farms. *M. fasciata* was strictly grassland and farms while *T. conturbata* was found in forest, grasslands and farms. They were available all round the year during the period of study (2010 to 2012). *G. africanus*, *H. thoracica* and *T. conturbata* were recorded at both low and high altitudes; *M. fasciata* was recorded only at high altitudes ($\geq 1200\text{m}$). Though all four Oedipodinae species were found on farms, none has been linked to pest activity. Descriptions of these species are here included.

Table 1: Altitudinal distribution of Oedipodinae species in the Menoua Division of Cameroon.
Rec.: Number of records between 2010 and 2012.

Species	Re c.	Hundred meters elevation								
		6	8	10	12	14	16	18	20	22
<i>Gastrimargus africanus</i>	36	+	+	+	+	+	+	+	+	+
<i>Heteropternis thoracica</i>	45	+	+	+	+	+	+	+	+	+
<i>Morphacris fasciata</i>	28	-	-	-	-	+	+	+	+	+
<i>Trilophidia conturbata</i>	53	+	+	+	+	+	+	+	+	+
Total		-	-	-	-	-	-	-	-	-

Table 2: Habitat preferences of Oedipodinae species in the Menoua Division of Cameroon

Species	Forest	Clearings & fields	Grassland	Farms
<i>Gastrimargus africanus</i>	+	-	+	+
<i>Heteropternis thoracica</i>	-	+	+	+
<i>Morphacris fasciata</i>	-	-	+	+
<i>Trilophidia conturbata</i>	+	-	+	+

3.1 *Gastrimargus africanus* Saussure 1888

3.1.1 Materials examined

Dschang = 2♂, 7♀; Fokoue = 1♂, 2♀; Fongo – Tongo = 3♂, 4♀; Nkong-Ni = 3♂, 4♀; Penka Michel = 1♂, 4♀; Santchou = 2♂, 7♀.

3.1.2 Measurements

♂ body length: 36.58 – 38.05mm (average length= 22.32±0.43mm); ♀ body length: 51.86 – 54.22mm (average length= 53.04±1.67mm).

3.1.3 Description

(Fig.1: a, b and c). Head is rounded and bears filiform antennae. Pronotum is tectiform and has an angled rear edges (a). Prosternal tubercle is absent; and the mesosternal space is open (b). The anterior wings (elytra) and the posterior wings are well developed, exceeding clearly the abdominal extremity and the rear (posterior) knees. Posterior wings with yellowish base and a large dark brown fascie in the median part (c). A white cream spot that has a triangular shape is present in the basal part of elytra (c). The posterior or rear tibiae are red with a bright ring in the basal part (a). The external apical spines are absent on the rear tibiae. The general coloration is a variable brown mixed more or less with dark brown.

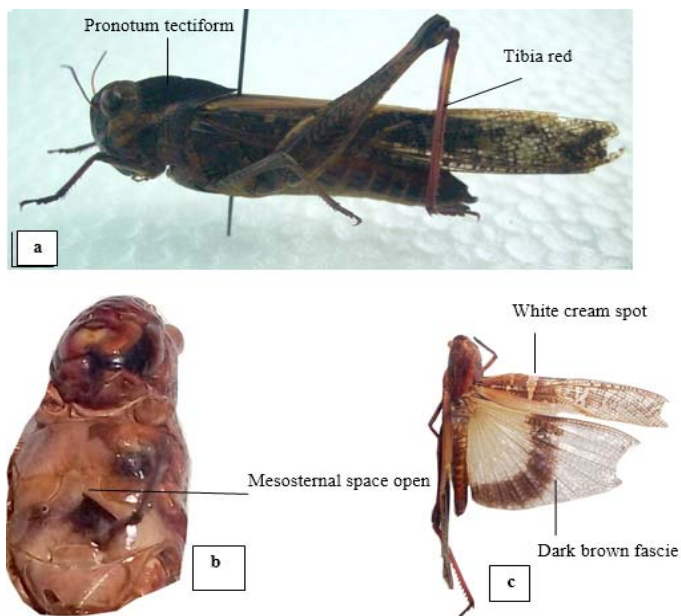


Fig 1: *G. africanus*. a = female, left profile; b = female, head and thorax, ventral view; c = female, dorsal view.

3.1.4 Cytogenetics

Chromosome number obtained was $2n=23$ and all chromosomes were acrocentric in morphology.

3.1.5 Remarks

This is a first record of *G. africanus* in the Menoua Division of Cameroon. According to Mestre and Chiffaud (2009), this species is found in neighbouring southern Nigeria and Gabon. The species had been previously described by Dirsh (1975) and Mestre and Chiffaud (2009). Our description matches these previous descriptions. Similar karyotype has been reported for this species (Channaveerappa and Ranganath, 1997).

3.2 Heteropternis thoracica (Walker 1870)

3.2.1 Material examined

Dschang = 5♂, 6♀; Fokoue = 3♂, 2♀; Fongo – Tongo = 6♂, 4♀; Nkong-Ni = 3♂, 4♀; Penka Michel = 1♂, 4♀; Santchou = 2♂, 5♀.

3.2.2 Measurements

♂body length: 18.96 – 20.03mm (average length= 19.35±0.43mm);
♀body length: 23.98 – 25.57mm (average length= 25.17±0.50mm)

3.2.3 Description

(Fig. 2: a, b, c, d and e). Head is rounded and antennae are filiform. Pronotum has a slightly high lateral carina which is angled towards the rear edge (a). Dorsal surface (disc) of pronotum patterned or without a pattern (d). Prosternal tubercle absent; and open mesosternal space. The ventral surface of thorax is white cream with large black areas; the palps (mouth) are white cream (b). The anterior wings (elytra) and the posterior wings are well developed, exceeding clearly the abdominal extremity and the rear knees. Median areas of elytra densely covered by thick small nerves, oblique and parallel (c). Hyalin posterior wing (d). Internal surface of the rear femurs are orange-red (e). Rear tibiae are red or orange-red with a small black ring in the basal part. The external apical spines are absent on the rear tibiae. General coloration is a variable brown-grey.

3.2.4 Cytogenetics

Chromosome number obtained was $2n=23$ and all chromosomes were acrocentric in morphology.

3.2.5 Remark

This is a first record of *H. thoracica* in the Menoua Division of Cameroon. It has been recorded in neighbouring southern Nigeria, Central Africa and Gabon. Our description of the species is similar to previous descriptions by Dirsh (1965) and Mestre and Chiffaud

(2006). Information on karyotype of *H. thoracica* was not found in available literature.

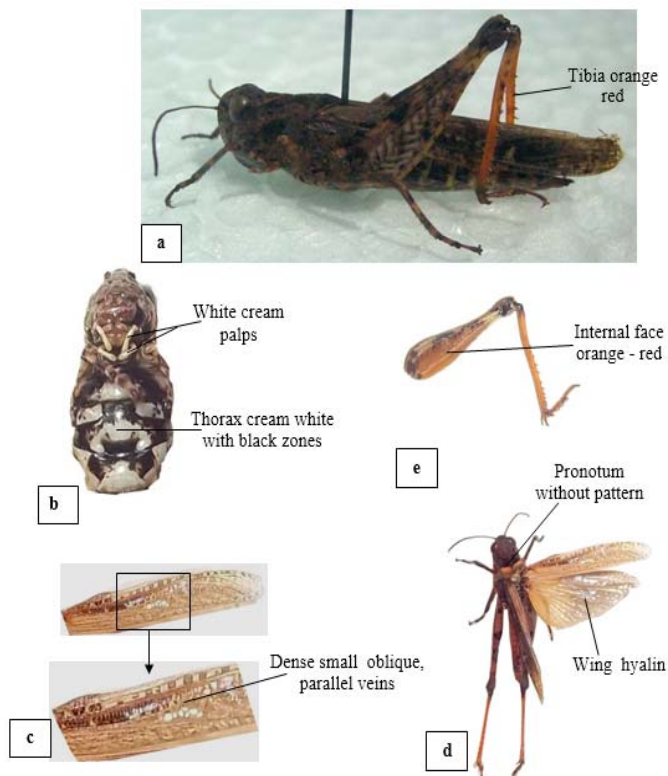


Fig 2: *H. thoracica*. a = female, left profile; b = female, head and thorax, ventral view; c = right posterior leg, anterior view; d = elytra; e: female, dorsal view.

3.3 Morphacris fasciata (Thunberg, 1815)

3.3.1 Materials examined

Dschang = 5♂, 1♀; Fokoue = 2♂, 1♀; Fongo – Tongo = 3♂, 2♀; Nkong-Ni = 3♂, 5♀; Penka Michel = 3♂, 3♀; Santchou = 0♂, 0♀.

3.3.2 Measurements

♂body length: 26.81– 28.07mm (average length= 27.34±0.64mm)
♀body length: 31.98– 34.08mm (average length= 32.94±0.75mm)

3.3.3 Description

(Fig. 3: a, b and c). Head is slightly rounded and bears filiform antennae. Pronotum is slightly tectiform with angled rear edge; lateral carina absent (a). Presence of longitudinal carinules on the pronotum disc. Prosternal tubercle is absent, open mesosternal space is present. Lateral surfaces of the pronotum have a dark brown oblique fascie which continue and reaches the cheeks. The anterior wings (elytra) and the posterior wings are well developed, exceeding clearly the abdominal extremity and the rear knees. Posterior wings have a yellowish base and a large dark-brown fascie in the median part and a slightly smoke coloration at the apex (c). Rear tibiae are grey-beige without external apical spines. General coloration is a variable brown or grey (a and b).

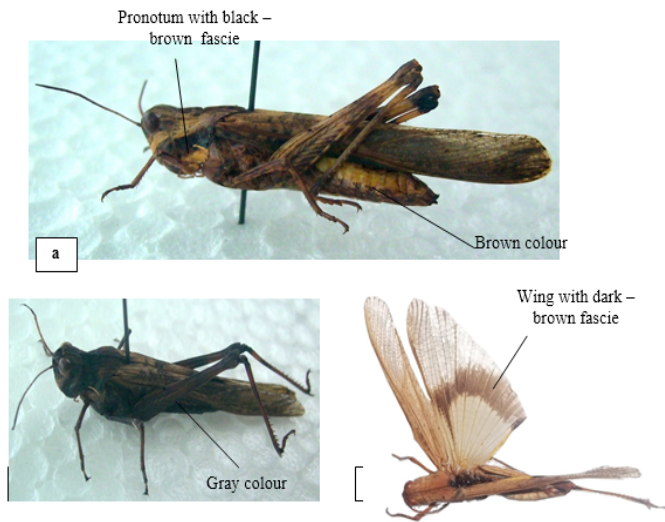


Fig 3: *M. fasciata*. and b : female, left profile ; c : female, dorsal view.

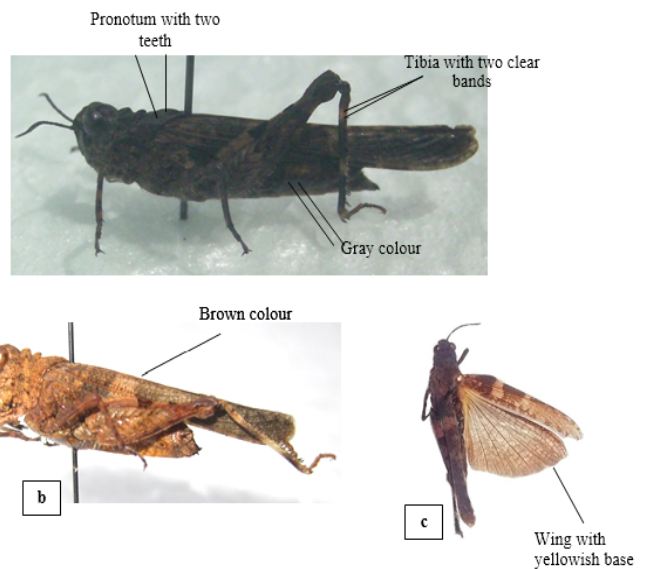


Fig 4: *T. conturbata*. a & b = female, left profile; c = female, dorsal view.

3.3.4 Cytogenetics

The species revealed a karyotype of $2n=23$ and all the chromosomes were acrocentric in morphology.

3.3.5 Remarks

This is a first record of *M. fasciata* in the Menoua Division of Cameroon. According to Mestre and Chiffaud (2006) the species is common to north Cameroon, neighbouring Southern and Northern Nigeria, Southern Chad, Northern Central African Republic and Gabon. Our description of this species is similar to previous descriptions by Dirsh (1963) and Johnston (1968). Karyotype reported in this paper is in agreement with Seino et al (2010).

3.4 *Trilophidia conturbata* (Walker 1870)

3.4.1 Materials examined

Dschang = 8♂, 3♀; Fokoue = 3♂, 4♀; Fongo – Tongo = 3♂, 6♀; Nkong-Ni = 2♂, 2♀; Penka Michel = 7♂, 4♀; Santchou = 8♂, 3♀

3.4.2 Measurement

♂body length: 18.96– 21.05mm (average length= 20.17±1.10mm)
 ♀body length: 21.97– 23.07mm (average length= 22.50±0.31mm)

3.4.3 Description

(Fig. 4: a, b and c). Head is rounded and bears filiform antennae. Pronotum has angled rear edges. Dorsal surface of pronotum has median carina forming two “teeth” in the prozone (a). Prosternal tubercle is absent; and mesosternal space is open. The anterior wings (elytra) and the posterior wings are well developed, exceeding clearly the abdominal extremity and the rear knees. Posterior wings have yellowish bases and slightly smoke coloration at the apex (c). Rear femurs flattened, short and large but does not exceed the abdominal extremity in females. Internal surface of rear femurs have a large black patch with a white cream ring at the apical part. Rear tibiae are black with two white cream rings. The external apical spines are absent on the rear tibiae. General coloration is a variable brown or grey mixed more or less with white cream (a and b).

3.4.4 Remarks

This species was recorded in the Menoua Division of Cameroon for the first time. According to Mestre and Chiffaud (2006), this species is common to Southern Cameroon, neighbouring Southern Nigeria, and Gabon. Our description of this species is similar to previous descriptions by Forsyth (1966) and Uvarov (1966). Information on karyotype of *T. conturbata* was not found in available literature.

4. Conclusion

This study took place during a period of two years (2010 and 2012) and resulted in an inventory of four Oedipodinae grasshopper species in the Menoua Division of Cameroon. These species included *Gastrimargus africanus*, *Heteropternis thoracica*, *Morphacris fasciata* and *Trilophidia conturbata*. Though these species had been previously listed for Cameroon, this was their first record in the Menoua Division in the West region of Cameroon. *G. africanus*, *H. thoracica*, and *T. conturbata* were found throughout the altitudinal range (600m – 2200m) of the study area while *M. fasciata* was limited to altitudes higher than 1000m. Even though all four species were collected in farms, none was associated with pest activity.

5. Acknowledgements

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