Buprestidae (Coleoptera: Buprestoidea)

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The results of Malaise and yellow pan trapping in the Namibian Brandberg for jewel beetles (Coleoptera: Buprestidae) are briefly discussed and tabulated. Thirteen morpho-species and 177 specimens were collected. A general discussion about the current state of knowledge about jewel beetles in southern Africa and Namibia is presented.

INTRODUCTION

The family Buprestidae, known as ‘jewel beetles’, is the eighth largest family in the largest order in the Animal Kingdom, the Coleoptera. Approximately 15,000 species of buprestids are known throughout the world and occur in every biogeographic region, from the subalpine zones of the northern continents to isolated Pacific islands. It has been estimated that at least 1000 species occur in southern Africa, but this number may represent half of the actual regional diversity of these beautiful beetles. A review of the ‘World catalogue’ (Bellamy in prep.), indicates that there are 144 buprestid genera found in the Afrotropical Region, with records of species in at least 36 genera in Namibia. There are five genera endemic to Namibia, or have only been recorded just over the eastern or southern borders. These are the monotypic Freya Théry (1943), Descarpentriesiota Cobos, 1978 (= Castalina Théry, 1949) [also Botswana], Namibogenius Bellamy (1996), Nathomorphoides Holm (1986a) and Lepidoelema Bellamy & Holm (1985) [also South Africa, Northern Cape] with two species.

Biologically, buprestids are obligate plant associates with larvae being wood-boring, leaf-mining or external root-feeders. Such catholic tastes for floral diversity indicates that Namibia, with its variety of habitats and flora, should harbour an equally large and diverse fauna of ‘jewel beetles’. Regional studies on African Buprestidae are not common in the literature (e.g. Descarpentries 1958, 1960; Quedenfeldt 1886; Théry 1946, 1947) there are catalogues (e.g. Ferreira 1963, 1965), or systematic revisions of particular genera or tribes, as summarised below. No particular studies concentrating on the Namibian buprestid fauna have been published, so the following comments should serve both to introduce the group, as well as to point out the breadth of the unrevised portions of the family awaiting study.

The higher classification of ‘jewel beetles’ is now better understood. A more expansive scheme was summarised by Bellamy (1985) and Holm & Bellamy (1985). Currently, a more conservative approach indicates a classification of four subfamilies, slightly expanded from the approach of Holyński (1993), all of which are known from Namibia.

The African Julodinae and Polycerinae are the most well-known as the following studies indicate. Holm (1979a) presented an overview of the Julodini and later revised the three smaller constituent genera Amblysterna Saunders, 1871, Julodella Semenov-Tian-Shankij, 1893, and Neojulodis Kerremans, 1902 (Holm 1979b). The African species of the genus Sternocera Eschscholtz, 1829, were revised by Holm & Gussmann (1992) and the southern African species...
of *Julodis* Eschscholtz, 1829, have been revised by Gussmann (1995, 1997, 2000). The afrotropical Polycestinae were clarified through the efforts of Cobos (1980, 1981) and Holm who revised the Acmaeoderini genera *Nothomorphus* Saunders, 1871 (Holm 1976), *Acmaeodera* Eschscholtz, 1829 (Holm 1978), Polycestini (Holm 1982) and *Sponsor* Gory & Lapeyre, 1839 (Holm & Wentzel 1991). New species, taxonomic notes and distribution information for Julodinae and Polycestinae were added by Holm (1979c, 1985, 1986b) and Holm & Schoeman (1999). The remaining elements of Polycestinae, the Mastogeniina and the Bulina, were discussed by Bellamy (1991a, 1995).

The remaining two subfamilies, Buprestinae and Agrilinae, are known only from more particular focused studies of tribes or genera. Several groups were summarised by Ferreira & da Veiga-Ferreira (1958a, 1958b). Such genera as *Sternspis* Dejean, 1833, *Lampepis* Dejean, 1883, *Chrysobothris* Eschscholtz, 1829, and the African *Actenodina* (Chrysobothrinae) are in need of revisionary studies. The very large buprestine genus *Sphenoptera* Dejean (*Anthaxini*, Sphenopterina) has remained unreviewed for nearly 100 years and is likely to contain numerous new African species and many synonyms are suspected from the uncoordinated descriptive efforts of the past authorities, namely: Kerremans, Obenberger and Théry. The African species of another large genus *Anthaxia* Eschscholtz, 1829 (Anthaxini, Anthaxina), also requires revision. The Agrilinae is comprised of several large tribes: Agrilini for Agrilina, Coraebina and Galbellina, Aphaniasticini for Aphaniasticina and Anthaxomorphina, the monotypic Cylindromorphini and Trachyini for the nominate subtribe. In Agrilina, afrotropical species of the enormous genus *Agrilus* Curtis, 1825, is being revised by Curletti (e.g. 1993, 1994a, 1994b, 1996a, 1996b). The afrotropical Coraebina was summarised by Bellamy (1991b) and the afrotropical Cylindromorphini by Bellamy (1992). The Galbellina was revised by Bellamy & Holm (1986) and the placement of this enigmatic group was discussed by Bellamy (2000). The last studies of afrotropical *Aphanisticus* Latreille, 1829, were published by Obenberger (1928, 1937a, 1937b) and Théry (1930a) and of *Anthaxamorphus* Deyrolle, 1864, by Théry (1930b) and Bellamy (1987). The last published revision of the large leaf-mining genera *Trachys* Fabricius, 1801 and *Habroloma* C. G. Thomson, 1864, was by Obenberger (1937c, 1938, 1939).

**RESULTS**

The specimens examined for this review were sampled by use of Malaise and yellow pan traps. The specimens were sorted, preserved, and transported in 70% ethyl alcohol. Upon receipt, the specimens were dried and mounted for sorting, counting and identification.

There were 177 specimens of 13 species sampled in this survey. Considering the dates of the survey periods were spring and autumn, further species diversity is expected to occur in the Brandberg habitats through the entire season, including summer and with the use of additional active collecting techniques (e.g. netting, beating, sweeping). Many species of the genera *Acmaeodera* and *Anthaxia* visit yellow flowers, mostly of annual and perennial Asteraceae and their attraction to yellow traps is expected. Those species collected in Malaise traps are surely fewer than what exist on the Brandberg, but as buprestids are all plant associates, passive collecting techniques are not the most reliable methods to survey buprestid diversity.

The 'jewel beetles' captured by trapping methods in the Brandberg are tabulated in Tables 1 and 2. The species captured by the two trapping methods are summarised in Table 3 and the contrast of species trapped in three altitudinal strata are listed in Table 4.
Table 1. Number of Buprestidae species collected in yellow pan traps during the Brandberg survey.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Armaeodera decemguttata</td>
<td>700 m</td>
<td>700 m</td>
<td>700 m</td>
<td>1200 m</td>
<td>1180 m</td>
<td>1180 m</td>
<td>1950 m</td>
<td>1960 m</td>
<td>6</td>
</tr>
<tr>
<td>Armaeodera hessi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Anthaxia (Cratoemerus) imperatrix</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
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<tr>
<td>Anthaxia (Cratoemerus) sp. 2</td>
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<td></td>
<td></td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Anthaxia (Haplanthaxia) sp. 1</td>
<td>12</td>
<td>1</td>
<td></td>
<td>51</td>
<td>40</td>
<td>13</td>
<td></td>
<td>117</td>
<td></td>
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<tr>
<td>Anthaxia (Haplanthaxia) sp. 2</td>
<td>1</td>
<td></td>
<td></td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthaxia (Haplanthaxia) sp. 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Anthaxia (Haplanthaxia) sp. 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Argrilus (Diplolophotus) sp. 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Totals</td>
<td>1</td>
<td>15</td>
<td>7</td>
<td>2</td>
<td>61</td>
<td>44</td>
<td>13</td>
<td>15</td>
<td>158</td>
</tr>
</tbody>
</table>

Table 2. Number of Buprestidae species collected in Malaise traps during the Brandberg survey.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sphenoptera (Hoplistura) sp. 1</td>
<td>700 m</td>
<td>1180 m</td>
<td>1980 m</td>
<td>1960 m</td>
</tr>
<tr>
<td>Sphenoptera (Troopepelis) sp. 1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthaxia (Cratoemerus) sp. 2</td>
<td></td>
<td></td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Anthaxia (Haplanthaxia) sp. 1</td>
<td>2</td>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Anthaxia (Haplanthaxia) sp. 2</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Anthaxia (Haplanthaxia) sp. 4</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Anthaxia (Haplanthaxia) sp. 5</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Kamosia tenebricosa</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 3. Number of species and individuals of Buprestidae from two trapping methods in the Brandberg survey.

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Malaise</th>
<th>Yellow pan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armaeodera</td>
<td>2</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Sphenoptera (Hoplistura)</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sphenoptera (Troopepelis)</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Anthaxia (Cratoemerus)</td>
<td>2</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Anthaxia (Haplanthaxia)</td>
<td>5</td>
<td>6</td>
<td>136</td>
</tr>
<tr>
<td>Kamosia</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Argrilus (Diplolophotus)</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 4. Altitudinal range of Buprestidae from Brandberg survey.

<table>
<thead>
<tr>
<th>Area</th>
<th>Altitude (metres)</th>
<th>Species Total</th>
<th>Shared species Area 1 and 2</th>
<th>Shared species Area 2 and 3</th>
<th>Shared species Area 1 and 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>650-700</td>
<td>6</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1180-1200</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1950-2000</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

A brief discussion of the 13 morphospecies in Tables 1 and 2 is presented below.

POLYCESTINAE: ACMAEODERINI

*Acmaeodera decemguttata* (Thunberg, 1787)

Six specimens of this species were sampled in yellow pan traps at Wasserfallfläche, 07-10.iv.1999.

*Acmaeodera hessei* Holm, 1978

Five specimens of this species were sampled in yellow pan traps, all at the foot of the massif (Table 1).

BUPRESTINAE: SPHENOPTERINI

The large Old World genus *Sphenoptera* Eschscholtz, 1829, contains more than 1100 species throughout Africa, Asia and the Palaearctic Region. The species are presently contained in about 10 subgenera, but the systematics are in a poor state, with many multiply described species awaiting comprehensive revisionary work and synonymy studies.

*Sphenoptera* (*Hoplisturis*) sp. 1

One specimen of this species was collected from a Malaise trap at Messum Valley, 02-05 April 1999. Members of this subgenus are wood-boring in the larval stage and utilise a variety of woody perennial shrubs and trees as hosts.

ANTHAXIINI

Another large genus, *Anthaxia*, is also nearly cosmopolitan, occurring throughout all biogeographic regions except Australasia. The larvae of *Anthaxia* are wood-boring in woody perennial shrubs and trees. The afrotropical fauna is in dire need of revisionary study. Most species can only be identified by one or two specialists.

*Anthaxia* (*Cratomerus*) *imperatrix* Obenberger, 1928

Four species of this large, attractive and sexually dichromatic species, which are known to visit flowers, were sampled in yellow pan traps at Messum Valley, 05-17.iv.1999.

*Anthaxia* (*Cratomerus*) sp. 2

Sixteen specimens of a second species of the *A.* (*Cratomerus*) group were sampled during the survey. The species is dark-coloured, not sexually dichromatic and is possibly the elevational replacement of *A.* (*C.*) *imperatrix*, having been collected in greater numbers from both yellow pan and Malaise traps at Hungorob, 02-05.iv. 1999 and Wasserfallfläche, 07-10.iv.1999.
**Anthaxia (Haplanthaxia)** sp. 1

This elongate, bright coppery coloured species was the most commonly sampled buprestid from this survey. It was sampled in yellow pan traps at all surveyed elevations (Table 1).

**Anthaxia (Haplanthaxia)** sp. 2

Seventeen specimens of a larger, dark, more cuneiform species, bearing a superficial resemblance to *A. (Cratomerus)* sp. 2 were sampled in both Malaise and yellow pan traps at all sampled elevations (Tables 1 and 2).

**Anthaxia (Haplanthaxia)** sp. 3

A single specimen of a medium-sized, dark-coloured species was taken in a yellow pan trap at Hungorob Valley, 02-05.iv.1999.

**Anthaxia (Haplanthaxia)** sp. 4

A single specimen of a small, dark-coloured species was sampled in a Malaise trap at high elevation at Wasserfallfläch, 07-10.iv.1999.

**Anthaxia (Haplanthaxia)** sp. 5

A single specimen of a medium-sized, dark-coloured species was sampled in a Malaise trap at Wasserfallfläch, 10-12.xi.1998 and two additional specimens were sampled at Hungorob River, 03-13.xi.1998 in yellow pan traps.

**AGRILINAE: CORAEBINI**

The writer has studied the afrotropical genera of this most diverse tribe. Some of the larger genera, such as *Kamosia* Kerremans, are in need of thorough revision.

**Kamosia tenebricosa** Péringuey, 1908

One example of this widespread southern African species was sampled in a Malaise trap at Hungorob Valley, 05-16.iv.1999. This species is a known associate of *Combretum molle* R. Br. Ex G. Don (Combretaceae) in northern South Africa, but may utilise other related plants as its larval hosts.

**AGRILINI**

**Agrilus (Diplolophotus)** sp. 1

Species of this subgenus of the enormous, cosmopolitan genus *Agrilus* Curtis (*ca. 4000* spp.) are wood-boring in the larval stage, utilising various dead trees and shrubs, often *Acacia* L. spp. (Fabaceae) as hosts. One specimen of this species was collected in a yellow pan trap at Hungorob Valley, 02-05.iv.1999.

**REFERENCES**


Manuscript received May 2000, accepted August 2000.