

Species of Geotrupidae (Coleoptera: Scarabaeoidea) in Aquidauana, Mato Grosso do Sul, Brazil

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Abstract: Coleoptera of the family Geotrupidae play an important ecological role in the decomposition of animal and plant organic matter. In Brazil there is little information on the diversity and distribution of this group, thus, this work had a purpose to study Geotrupidae species, occurring in Aquidauana, MS. A survey for geotrupids was conducted in Aquidauana, Mato Grosso do Sul, Brazil. Beetles were captured using a light trap over a period of two years, from January 2006 to December 2007. A total of 907 specimens were collected and identified to eight species. From the subfamily Bolboceratinae, the species identified were *Bolbapium minutum* (Luederwaldt, 1929) and *Pereirabolbus castaneus* (Klug, 1845). In the subfamily Athyreinae the species identified were *Athyreus bilobus* Howden & Martínez, 1978, *Parathyreus* aff. *bahiae*, *Neoathyreus* aff. *julietae*, *N. sexdentatus* Laporte, 1840, *N. centromaculatus* (Felsche, 1909) and *N. goyasensis* (Boucomont, 1902). Four species (*A. bilobus*, *N. centromaculatus*, *N. goyasensis* and *P. castaneus*) are reported for the first time in Aquidauana, MS, Brazil. The most abundant species, representing 85.9% of the total capture, was *B. minutum*. The greatest numbers of specimens was caught from October to December of both years of the study.

Keywords: *athyreinae, bolboceratinae, insect ecology, insecta.*

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Resumo: Os coleópteros da família Geotrupidae desempenham importante função ecológica na decomposição de matéria orgânica de origem animal e vegetal. No Brasil, escassas são as informações sobre distribuição e diversidade desse grupo, assim o objetivo do presente trabalho foi relacionar as espécies de Geotrupidae ocorrentes em Aquidauana, MS. Os estudos com Geotrupidae foram conduzidos em Aquidauana, Mato Grosso do Sul, Brasil. Para realizar a coleta dos insetos foi utilizada uma armadilha de luz, instalada de janeiro de 2006 a dezembro de 2007. Foram coletados 907 espécimes de Geotrupidae sendo identificadas oito espécies. Na subfamília Bolboceratinae foram identificados *Bolbapium minutum* (Luederwaldt, 1929) e *Pereirabolbus castaneus* (Klug, 1845). Na subfamília Athyreinae foram identificados *Athyreus bilobus* Howden & Martínez, 1978, *Parathyreus* aff. *bahiae*, *Neoathyreus* aff. *julietae*, *N. sexdentatus* Laporte, 1840, *N. centromaculatus* (Felsche, 1909) e *N. goyasensis* (Boucomont, 1902). Quatro espécies (*A. bilobus*, *N. centromaculatus*, *N. goyasensis* e *P. castaneus*) são reportadas pela primeira vez em Aquidauana, MS, Brasil. *Bolbapium minutum* foi a espécie mais abundante, representando 85,9% do total de insetos coletados, e a maior quantidade amostrada concentra-se de outubro a dezembro.

Palavras-chave: *athyreinae, bolboceratinae, ecologia de insetos, insecta.*

Introduction

Geotrupid beetles (Coleoptera: Scarabaeoidea) are represented by 68 genera and about 620 species worldwide (Scholtz & Brownw, 1996) and many can be found in Brazil. Howden (1985a), when reviewing *Neoathyreus* Howden & Martínez, 1963, listed 44 species in South America, where 23 of these occur in Brazil. In this genus, Howden (2006) described five more new species including *Neoathyreus moraguesi* Howden occurring in Brazil. *Neoathyreus braziliensis* Howden, 1985 was registered in the northern region of the state of Paraná by Ronqui & Lopes (2006).

Howden & Martínez (1978) conducted a review of the genus *Athyreus* Macleay and reported 31 species, of which 19 occur in Brazil. Additionally, Howden (1999, 2002) described more two species, *A. nebulosus* and *A. mouraensis*, both collected in the state of Amazonas, Brazil.

In *Parathyreus* Howden & Martínez, 1963, Howden (1985b) revised the genus including in it more two new species, *P. lobatus* and *P. rectus*. He also redescribed *P. trituberculatus* Howden & Martínez, 1963, *P. fissicollis* Howden & Martínez, 1978 and *P. bahiae* Howden & Martínez, 1978, and also reported the many locality records of these species in Brazil.

According to Martínez (1976), 12 species of *Bolbapium* Boucomont, 1910, can be found in South America and of these, the following species occur in Brazil: *B. bigibbosum* (Luederwaldt, 1929), *B. borgmeieri* Martínez, 1976, *B. lucidulum* (Klug, 1845), *B. minutum* (Luederwaldt, 1929), *B. parcepunctatum* (Arrow, 1913), *B. quadrispinosum* (Luederwaldt, 1929), *B. sculpturatum* (Mannerheim, 1829) and *B. striatopunctatum* (Laporte, 1840). Ide & Martínez (1993), described two more species with *B. paralucidulum* registered to Brazil, Argentina and Uruguay, and *B. sulcifrons* from Brazil.

The subfamilies of Geotrupidae occurring in Brazil (Athyreinae and Bolboceratinae) are known to feed primarily on underground fungi, as well as plant leaves that are carried into underground tunnels (Howden 1955, Howden et al. 2007). In Brazil, the diversity and population dynamics of these beetles is still poorly known, and therefore this study was developed to better understand the family Geotrupidae in Aquidauana, Mato Grosso do Sul, Brazil.

Materials and Methods

The study was conducted at the Universidade Estadual de Mato Grosso do Sul (UEMS) in Aquidauana, MS, Brazil. The experimental area of the UEMS on the farm where the experiment was conducted, has about 10 hectares, and has cultivated the grass *Brachiaria decumbens* Stapf cv. Basilisk (Poaceae). Behind this area

there is a sector of agriculture where it is cultivated with cereals and legumes. Surrounding the experimental area at a distance of about 1 km, the native vegetation is savannah. All the studied materials were captured with one light trap operating every day from January 2006 to December 2007. The trap utilized an attractive 20-watt fluorescent lamp and was one meter above the ground. The trap remained on from 6:00 PM until 6:00 AM the next day, at which time the insects were collected.

Geotrupidae specimens were deposited in the insect collection at the Universidade Estadual de Mato Grosso do Sul in Aquidauana, MS, Brazil and in the entomological collection of the Universidade Federal do Mato Grosso, in Cuiabá, Mato Grosso.

Results and Discussion

A total of 907 specimens of Geotrupidae were captured in the two years of sampling. In 2006 a total of 408 specimens were collected, in which the greatest abundance of beetles was registered from September to December. In October 255 specimens were captured (62.5%), which is the largest amount during the year (Figure 1). A total of 499 specimens were captured in 2007, where the greatest quantities were obtained from October to December, being November the month in which the greatest number was captured, 167 specimens (33.5%) (Figure 1).

From the specimens captured, representatives of Athyreinae and Bolboceratinae were identified, belonging to five genera and eight species (Table 1). From Athyreinae those identified were *Athyreus bilobus* Howden & Martínez, 1978, *Neoathyreus* aff. *julietae*, *Neoathyreus sexdentatus* (Laporte, 1840), *N. centromaculatus* (Felsche, 1909), *N. goyasensis* (Boucomont, 1902) and *Parathyreus* aff. *bahiae*, while from Bolboceratinae were *Bolbapium minutum* (Luederwaldt, 1929) and *Pereirabolbus castaneus* (Klug, 1843) (Table 1).

From *Athyreus* a single specimen of *A. bilobus* was collected in February of 2007. Distribution of this species is reported to Paraguay and Brazil (states of Goiás, Minas Gerais, Paraná, Rio de Janeiro and São Paulo) (Howden 1978), thus being reported for the first time in the state of Mato Grosso do Sul.

A specimen of *Neoathyreus centromaculatus* was captured in May 2007. Its occurrence has been reported in Bolivia, Paraguay and Brazil in the states of Goiás and Pará (Howden 1985a), therefore this is first record for the state of Mato Grosso do Sul. In 2006, 41 specimens of *N. goyasensis* were captured. A total of 28 specimens were collected in 2007. From this study, knowledge on the distribution of this species is amplified since it has been reported only for the state of Goiás (Brazil) (Howden 1985a).

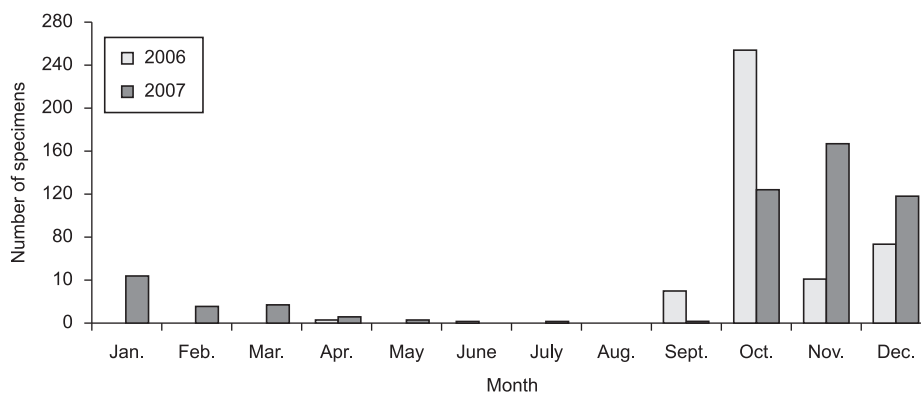
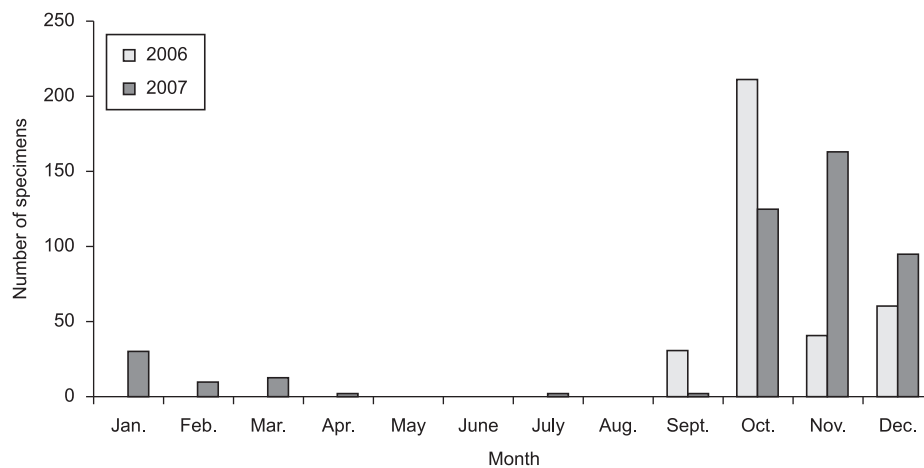


Figure 1. Abundance of Geotrupidae (Coleoptera: Scarabaeoidea) captured from January 2006 to December 2007.

Table 1. Total and relative abundance of species of Geotrupidae (Coleoptera: Scarabaeoidea) captured from January 2006 to December 2007.

Subfamily/Species	2006	2007	Total	Relative abundance (%)
Athyreinae				
<i>Athyreus bilobus</i> Howden & Martínez, 1978*	-	1	1	0.11
<i>Parathyreus</i> aff. <i>Bahiae</i>	2	13	15	1.65
<i>Neoathyreus</i> aff. <i>julietae</i>	14	11	25	2.76
<i>Neoathyreus sexdentatus</i> (Laporte, 1840)	8	6	14	1.54
<i>Neoathyreus centromaculatus</i> (Felsche, 1909)*	-	1	1	0.11
<i>Neoathyreus goyasensis</i> (Boucomont, 1902)*	41	28	69	7.61
Bolboceratinae				
<i>Bolbapium minutum</i> (Luederwaldt, 1929)	343	436	779	85.89
<i>Pereirabolbus castaneus</i> (Klug, 1843)*	-	3	3	0.33
Total	408	499	907	100

*Reported for the first time in the state of Mato Grosso do Sul.

**Figure 2.** Abundance of *Bolbapium minutum* (Luederwaldt, 1929) captured from January 2006 to December 2007.

Fourteen specimens of *Neoathyreus* aff. *julietae* were captured in 2006. In 2007, 11 specimens were collected. *Neoathyreus julietae* Howden, 2006 is also distributed in Bolivia and Peru (Howden 2006). A total of 14 specimens of *N. sexdentatus* were captured during the two years of study. According to Howden (1985a), this species has previously been encountered in Argentina, Paraguay and Brazil (states of Espírito Santo, Mato Grosso, Mato Grosso do Sul, Pará and Rondônia). Two specimens of *Parathyreus* aff. *bahiae* were collected in 2006. In 2007 this number increased to 13. In Brazil, *P. bahiae* (Arrow, 1913) occurs in Bahia, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Rio de Janeiro and São Paulo, as well as in Paraguay (Howden 1985b).

Despite presenting only two species of Bolboceratinae (*Bolbapium minutum* and *Pereirabolbus castaneus*), the highest percentage of sampled specimens belong to this subfamily. In 2006, 408 specimens were captured, 343 (84.1%) represented by *B. minutum* and of the 499 specimens captured in 2007, 436 (87.4%) were also of this species. Therefore, the population dynamics of Geotrupidae sampled in Aquidauana, is principally influenced by the dynamics of *B. minutum*, given that 85.9% of the specimens are of this species.

Considering the two years of sampling, *B. minutum* was registered from January to April, in July and from September to December (Figure 2). This species was originally described as *Bolboceras minutum* by Luederwaldt (1929), from specimens collected in the state of Mato Grosso (Brazil). Very little information is available on the distribution of representatives of *Bolbapium*, but the presence of *B. sculpuratum*

(Mannerheim, 1829) is reported in the Brazilian state of Paraná, where it was also captured using a light trap (Ronqui & Lopes 2006).

Three specimens of *P. castaneus* were sampled in this study, two in November and one in December of 2007. The occurrence of this species was limited to the hot and humid period (Spring) in Aquidauana. This species was originally described as *Bolboceras castaneum* by Klug (1843) from Brazilian specimens. The present study is the first record of its occurrence in Mato Grosso do Sul.

In conclusion, this study reported eight species of the family Geotrupidae living in pastures or area around, in Aquidauana, MS. Four species were recorded for the first time in the state of Mato Grosso do Sul, adding to the knowledge of the geographic distribution of this group.

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