



SPHECIDAE (HYMENOPTERA: APOIDEA) OF RIO DE JANEIRO STATE (SOUTHEASTERN BRAZIL): INVENTORY OF SPECIES AND NOTES ON BIOLOGY AND DISTRIBUTION ¹

(With 1 figure)

SANDOR CHRISTIANO BUYS ²

ABSTRACT: An inventory of the Sphecidae (*sensu stricto*) of the Atlantic Forest in Rio de Janeiro State is presented, with remarks on distribution. The published observations on biology of Sphecidae made in Rio de Janeiro State are compiled and original biological notes are provided for *Ammophila gracilis*, *Sphex ingens*, *Sphex opacus*, *Penepodium luteipenne*, and *Sceliphron fistularium*. The study is based on the examination of the entomological collection of the Museu Nacional, Universidade Federal do Rio de Janeiro, and on biological observations carried out in several places of the Rio de Janeiro State.

Key words: Wasp. Biodiversity. Atlantic forest. Distribution. Biology. Behaviour.

RESUMO: Sphecidae (Hymenoptera: Apoidea) no Estado do Rio de Janeiro (Sudeste do Brasil): inventário de espécies e notas sobre biologia e distribuição.

Um inventário dos Sphecidae (*sensu stricto*) da Mata Atlântica no Estado do Rio de Janeiro é apresentado, com comentários sobre distribuição. As observações publicadas sobre biologia de Sphecidae feitas no Estado do Rio de Janeiro são compiladas e notas biológicas originais sobre *Ammophila gracilis*, *Sphex ingens*, *Sphex opacus*, *Penepodium luteipenne* e *Sceliphron fistularium* são fornecidas. O estudo é baseado no exame da coleção entomológica do Museu Nacional, Universidade Federal do Rio de Janeiro, e em observações biológicas feitas em várias localidades no Estado do Rio de Janeiro.

Palavras-chave: Vespa. Biodiversidade. Mata Atlântica. Distribuição. Biologia. Comportamento.

INTRODUCTION

Sphecidae (*sensu stricto*) is a world-wide distributed family of solitary wasps with 19 genera and approximately 730 species (PULAWSKI, 2008). The major reference on this family is the comprehensive book by BOHART & MENKE (1976), which must be updated with the on-line catalog by PULAWSKI (2008). Besides these, the synonymic catalog by AMARANTE (2002; 2005) is a basic reference on the classifications and distribution of Neotropical Sphecidae.

The Rio de Janeiro State (Southeastern Brazil) is entirely included in the mega-diverse Atlantic Forest biome and has a great physiognomic diversity provided by two mountain chains (Serra dos Órgãos and Serra do Mar), one of which reaches almost 3.000m in maximum altitude, and a large costal area with a peculiar savanna-like vegetation called "restinga". Aiming to contribute to the knowledge on the hymenopteran fauna from Brazilian Atlantic forest, an inventory of the species of Sphecidae found in Rio de Janeiro State is herein presented and their distribution is discussed. The published observations on biology of Sphecidae made in Rio

de Janeiro State are compiled and original biological notes are provided, emphasising habitat, soil used to nest, prey and parasitoids.

This paper is part of the project "Diversidade Biológica da Mata Atlântica do Estado do Rio de Janeiro – Rede de Insetos" supported by Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro – FAPERJ.

MATERIAL AND METHODS

The present study is based on the examination of the Hymenoptera collection of the Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ), and on biological observations carried out from 1995 to 2005 in the following places: Reserva Biológica de Poços das Antas (Silva Jardim); Restinga de Barra de Maricá (Maricá); Parque Estadual da Serra da Tiririca (Niterói); Cafubá (Niterói); Ilha Grande (Angra dos Reis); Parque Natural Municipal de Grumari (Rio de Janeiro); Parque Nacional da Tijuca (Rio de Janeiro). Voucher specimens for the present biological observations, including specimens of prey and parasitoids, have been deposited in the Hymenoptera collection of the MNRJ.

¹ Submitted on June 18, 2008. Accepted on September 1, 2009.

² Museu Nacional/UFRJ, Departamento de Entomologia, Quinta da Boa Vista, São Cristóvão, 20940-040, Rio de Janeiro, RJ, Brasil. E-mail: E-mail: sbuys@biologia.ufrj.br.

RESULTS

Tribe Ammophilini
Genus *Ammophila* Kirby, 1798

Ammophila gracilis Lepeletier de Saint-Fergeau, 1845
BRAZIL, RIO DE JANEIRO, Angra dos Reis, 1 ♀, H.S.Lopes, 01/IV/1972; (Ilha Grande), 1 ♀, S.Buys, 16/V/2002; Duque de Caxias (Imbariê), 1 ♀, F.M.Oliveira, V/1955; (São Bento), 2 ♀, P.A.Teles, VIII/1953; 1 ♂, A.Teles, XII/1954; Maricá (Restinga de Barra de Maricá), 1 ♀, S.Buys and C.Andrade, 12/XI/2000; 1 ♀, S.Buys, 15/VI/2000; 1 ♀, S.Buys, 30/IX/2000; Niterói (Cafubá), 2 ♀ 2 ♂, S.Buys, I/2005; (Colubandê), 2 ♀ 3 ♂, R.Arlé, XI/1955; (Imbuí), 1 ♂, R.Arlé, 03/X/1934; (Jurujuba), 3 ♀; Nova Friburgo, 1 ♂, S.Lopes, 26/IV/1937; Petrópolis, 1 ♀, D'Albuquerque, II-III/1958; Rio de Janeiro, 1 ♂; 2 ♀ 3 ♂, R.Arlé (Floresta da Tijuca, Sumaré), 2 ♀, VIII/1935; 1 ♀, R.Arlé; (Grumari), 1 ♀, S.Buys, XI/2002; (Guaratiba), 2 ♂, J.H.Guimarães, XII/1955; 2 ♀, J.H.Guimarães, 01/I/1956; (Jacarepaguá, Represa de Camorim), 1 ♂, 19/VI/1954; (Jardim Botânico), 1 ♀, H.S.Lopes, I/1934; 1 ♂, H.S.Lopes, VII/1936; (Serra de Realengo), 1 ♀, R.Arlé, 07/X/1934; (Tijuca), 1 ♀, Moure and Seabra, II/1955; Seropédica (BR 465, Km 47), 1 ♀, D.Mendes, 20/V/1944; 1 ♀, D.Mendes, 12/III/1949; 1 ♀, J.Miranda, 25/VI/1946; 2 ♀ 8 ♂, W.Zikán, 06/X/1947; 1 ♀, W.Zikán, 13/V/1951; Silva Jardim (Reserva Biológica de Poço das Antas), 1 ♀, S.Buys, 24/X/2002.

Previous literature records in Rio de Janeiro State – AMARANTE (2002): Rio de Janeiro State.

Remarks – Species commonly found in Rio de Janeiro State and widespread in Serra dos Órgãos, Serra do Mar, and coastal plains. In the MNRJ collection there is a pinned female collected by P.A. Telles in the city of Duque de Caxias with unidentified specimens of Stylopidae (Strepsitera) as parasitoid in the gaster; and another female collected by D. Mendes in city of Seropédica labelled with the information that it was observed carrying a larval Geometridae (Lepidoptera). Stylopids have been rarely recorded as parasitoid of Neotropical sphecids, but this is possibly due to the lack of biological studies. Stylopisation was recorded in other *Ammophila* species by DE BEAUMONT (1955). GAIMARI & MARTINS (1996) presented observations on the biology of this species in Minas Gerais State. New observations are provided as follows: (1) Restinga de Barra de Maricá – This area was visited every month from January 2001 to March 2002 and nesting activity was observed in all seasons of the year, but it seemed greater in the summer. Females dug their nests in

soil composed of clay and sand, and commonly visited flowers of *Borreria* sp. (Rubiaceae). (2) Reserva Biológica de Poço das Antas – Females nested in compacted clay soil of unpaved roads crossing forested areas. (3) Ilha Grande – One female was observed nesting in the sandy soil of the upper portion of a beach adjacent to a forested area. (4) Cafubá – Several females were found nesting in soil composed of clay and sand and visiting flowers of *Indigofera hirsuta* Linnaeus (Fabaceae) and two unidentified Asteraceae.

Genus *Eremnophila* Menke, 1964

Eremnophila binodis (Fabricius, 1798)
BRAZIL, RIO DE JANEIRO, Duque de Caxias (São Bento), 1 ♂, P.A.Teles, XI/1963; Nova Friburgo, 1 ♀ 2 ♂, Mello Leitão, II/1932; 2 ♂, 1933; Petrópolis (Taquara), 1 ♀, H.S.Lopes, 11/VI/1972; São Francisco de Itabapoana (Barra de Itabapoana), 1 ♂, M.Rosa, X-XI/1935; Silva Jardim (Reserva Biológica de Poço das Antas), 1 ♀, S.Buys, 29/XI/2001.

Previous literature records in Rio de Janeiro State – BUYS (1999): Silva Jardim (Reserva Biológica de Poço das Antas); AMARANTE (2002): Rio de Janeiro State.

Remarks – BUYS (1999) published the only note on the biology of *E. binodis*, based on a female that was nesting in the compacted clay soil of an unpaved road crossing a forested area in the Reserva Biológica de Poço das Antas. A notodontid caterpillar (Lepidoptera) was found as prey; females were commonly observed visiting flowers of *Borreria* sp. (Rubiaceae).

Eremnophila eximia (Lepeletier, 1845)
BRAZIL, RIO DE JANEIRO, Duque de Caxias (São Bento), 1 ♀, P.A.Teles, I/1954; Itatiaia (Montserrat surroundings), 1 ♀, Bruno Lobo, 2/III/1921; Seropédica (BR 465, Km 47), 1 ♀ 1 ♂, B.Ramos, 28/II/1945; 1 ♂; W.Zikán; 1 ♀, XII/1953; W.Zikán, XII/1954.

Eremnophila melanaria (Dahlbom, 1843)
BRAZIL, RIO DE JANEIRO, Cachoeiras de Macacu (Boca do Mato), 1 ♀ 1 ♂, M.Rosa; Nova Friburgo, 1 ♀ 1 ♂, C.F.Mello Leitão, II/1952; Itatiaia, 1 ♀ 1 ♂, W.Zikán, 16/V/1950; (Montserrat), 1 ♂, Bruno Lobo, 2/III/1921; Petrópolis, 1 ♀, I/1935; 1 ♀, D'Albuquerque, II-III/1958; (Alto Mosela, Le Vallon), 2 ♂, Dalcy, III/1957; 1 ♂, D'Albuquerque, 24/I-23/II/1956; (Represa de Caxambu), 1 ♀, R.Arlé, IV/1935; Rio de Janeiro (Floresta da Tijuca), 1 ♂, C.A.Campos Seabra, III/1951; 1 ♀, C.A.Campos Seabra, 2/II/1952; 1 ♀, C.A.Campos Seabra, 31/I/1953; (Tijuca), 1 ♂, A.M.Ribeiro and C.Moreira; (Jacarepaguá), 1 ♂, Newton Santos, 02/III/1953; Teresópolis, 1 ♀, J.Jurberg and P.Melo, II/1972.

Previous literature records in Rio de Janeiro State – AMARANTE (2002): Rio de Janeiro State.

Eremnophila opulenta (Guérin-Méneville, 1838)

BRAZIL, RIO DE JANEIRO, Niterói (Morro do Cavalão), 1♂, R.Arlé; Rio de Janeiro (Corcovado), 1♀, Alvarenga and Seabra, XI/1958.

Tribe Sphecini

Genus *Prionyx* Linden, 1827

Prionyx bifoveolatus (Taschenberg, 1869)

BRAZIL, RIO DE JANEIRO, Nova Friburgo (Sítio Bonfim), 1♀, Wygodzisky, 08/XI/1948; Petrópolis, 1♀ 1♂, R.Arlé; 1♀, R.Arlé, 1975; 1♂, D'Albuquerque, II-III/1958; (Alto da Mosela, 1200m), 1♂, Newton Santos, 21/III/1953; Teresópolis, 1♂, R.P.Mello and J.Jurberg, II/1972.

Previous literature records in Rio de Janeiro State – TASCHENBERG (1869): Nova Friburgo (type-locality).

Prionyx fervens (Linnaeus, 1758)

BRAZIL, RIO DE JANEIRO, Macaé (Parque Nacional da Restinga de Jurubatiba), 1♀, S.Buys, 10/IX/2002; Rio de Janeiro, 1♂; (Guaratiba), 1♀, J.H.Guimarães, XII/1955; (Canal das Tachas), 1♀, N.Santos, 22/VII/1961; (Pedra de Itaúna), 1♀, L.Otero, II/1981; (Jacarepaguá), 2♀, Newton Santos, 04/V/1940; 1♀, Newton Santos, 21/III/1953.

Previous literature records in Rio de Janeiro State – AMARANTE (2002): Rio de Janeiro State; BUYS (2006a): Macaé (Parque Nacional da Restinga de Jurubatiba). Remarks – WILLINK (1951) summarized short biological notes on this species and EVANS (1958) published more detailed observations made in Central America. BUYS (2006a) observed a female in the surroundings of the Parque Nacional da Restinga de Jurubatiba (Macaé) nesting in soil composed by sand, clay, and sea shell fragments, near a beach in an area covered with restinga vegetation. *Schistocerca cancellata* (Serville, 1838) (Orthoptera: Acrididae) was recorded as prey.

Prionyx thomae (Fabricius, 1775)

BRAZIL, RIO DE JANEIRO, Duque de Caxias (São Bento), 1♂, A.Teles, 20/VI/1954; 1♀, A.Teles, 30/V/1954; Macaé (Parque Nacional da Restinga de Jurubatiba), 1♀, S.Buys, 12/V/2002; Maricá (Restinga de Barra de Maricá), 1♀, S.Buys, 25/V/2000; 1♀, S.Buys, 14/X/2001; Itatiaia (Fazenda Penedo, 1000m), 1♀, Araújo, 27/X/1942; Rio de Janeiro, 1♂, R.Arlé; (Floresta da Tijuca, Sumaré), 1♂, C.A.C.Seabra, IV/1954; 1♀, R.Arlé, 25/VIII/1933; (Grumari), 1♀, S.Buys, XI/2002; (Ilha do Governador), 1♂, R.Arlé; (Jacarepaguá, Itapeba), 1♀, 1937; (Marechal Deodoro), 1♀, W.Zikán, 13/II/1936;

Seropédica (BR 465, Km 47), 1♀, W.Zikán, 24/V/1948; Silva Jardim (Reserva Biológica de Poço das Antas), 1♀ 1♂, S.Buys, 22/VIII/2002; 1♀, S.Buys, 26/III/2003; 1♀, S.Buys, VI/2003.

Previous literature records in Rio de Janeiro State – AMARANTE (2002): Rio de Janeiro State.

Genus *Isodontia* Patton, 1880

Isodontia costipennis (Spinola, 1851)

BRAZIL, RIO DE JANEIRO, Itatiaia (700m), 1♀, W.Zikán, 05/1951.

Isodontia cyanipennis (Fabricius, 1793)

Previous literature records in Rio de Janeiro State – WILLINK [1951, as *I. nigrocoerulea* Taschenberg (1869)]: Itatiaia; AMARANTE (2002): Rio de Janeiro State.

Genus *Sphex* Linnaeus, 1758

Sphex brasiliensis de Saussure, 1867

Previous literature records in Rio de Janeiro State – DE SAUSSURE (1867): Rio de Janeiro (type-locality); AMARANTE (2002): Rio de Janeiro State.

Sphex caliginosus Erichson, 1849

BRAZIL, RIO DE JANEIRO, Itatiaia (700m), 1♂, W.Zikán, V/1951; Niterói (Morro do Cavalão), 1♂, R.Arlé, V/1933; Rio Bonito (Embaú), 1♀, L.Otero, I/1982; Rio de Janeiro (Floresta da Tijuca), 1♂, C.A.C.Seabra, III/1954; (Jacarepaguá), 1♀, Newton Santos, IV/1940; (Marechal Deodoro), 1♂, W.Zikán, 20/V/1936.

Previous literature records in Rio de Janeiro State – WILLINK (1951): Rio de Janeiro State; AMARANTE (2002). Remarks – A pinned female in the MNRJ collection from the city of Rio Bonito (Embaú) collected by L. Otero has a label saying that it had hunted four specimens of Tettigoniidae (Orthoptera).

Sphex dorsalis Lepelletier, 1845

BRAZIL, RIO DE JANEIRO, Duque de Caxias (São Bento), 1♀, P.A.Teles, I/1954; 1♀, P.A.Teles, II/1954; 1♀, P.A.Teles, 16/V/1954; Niterói (Cafubá), 1♀, S.Buys, II/2001; (Itaipú), 3♂, J.C.M.Carvalho, 30/X/1960; (Jurujuba), 1♂; Nova Iguaçu (Sarapuí), 2♀; Maricá (Restinga de Barra de Maricá), 1♀, S.Buys, 13/II/2001; Petrópolis (Bairro Pedro do Rio), 2♀, C.A.C.Seabra, III/1954; Rio de Janeiro, 4♀ 1♂, R.Arlé; 1♂, V.D'Anniballe, 23/II/1936; (Bonsucesso), 1♀; (Floresta da Tijuca), 1♀, C.A.C.Seabra, III/1954; (Guaratiba), 2♀ 1♂, J.Guimarães, XII/1955; 1♂, J.Guimarães, I/1956; (Inhaúma), 1♀, Newton Santos, V/1967; Seropédica (Km 47, BR 465), 1♀, IV/1943; 1♀, I.G.Nunes, 1960.

Previous literature records in Rio de Janeiro State – TASCHENBERG (1869, as *S. micans* Taschenberg, 1869): Rio de Janeiro; BUYS (2008): Restinga de Barra de Maricá (Maricá).

Remarks – GENISE (1980) published behavioural notes on *S. dorsalis* based on two females from Argentina. BUYS (2008) added new biological aspects for this species, based on specimens observed in Restinga de Barra de Maricá. This paper emphasizes a female defensive vigilant behaviour of the nests. Herein the following observations are provided: (1) Restinga de Barra de Maricá – Solitary nesting females were observed in open sites digging in clay soil. Nesting was observed only in the summer, although this place has been visited every month from January 2001 to March 2002. Remarkably, nesting activity of the congeneric *S. opacus* was observed in the same place only in the coldest month of the year. (2) Cafubá – Several females were gregariously nesting during the summer in the soil composed of clay and sand, an unidentified tettigoniid (Orthoptera) was observed as prey. (3) Parque Estadual da Serra da Tiririca – One female was digging a burrow in the hard compact clay soil of a trail, in a forested area at a place exposed to the sun.

Sphex ichneumoneus (Linnaeus, 1758)

BRAZIL, RIO DE JANEIRO, Itatiaia (700m), 1♂, J.F.Zikán, 06/VI/1947; 1♀ 2♂, W.Zikán, V/1951; Mangaratiba (Ilha de Itacuruçá, Águas Lindas), Heber, 23/XII/1961; Rio de Janeiro, 1♀ 1♂, R.Arlé; (Corcovado, Paineiras), 1♀, XI/1933; (Marechal Deodoro), 1♀, W.Zikán, 22/II/1937.

Previous literature records in Rio de Janeiro State – TEMPLETON [1841, as *Sphex aurocapilus* Templeton, 1841 (type locality)]: Rio de Janeiro; (VON HEYDEN, 1867, as *S. aurocapilus*): Rio de Janeiro State; AMARANTE (2002): Rio de Janeiro State.

Remarks – Several observations on the biology of *S. ichneumoneus* from North America were published, but almost nothing from specimens of the Neotropical Region. TEMPLETON (1841) and VON HEYDEN (1867) reported *S. ichneumoneus* (as *S. aurocapilus*) parasitized by *Paraxenos westwoodi* (Templeton, 1841) (Strepsiptera: Stylopidae) in Rio de Janeiro State. In the MNRJ collection there is a pinned female, collected by Heber in the city of Mangaratiba, with an unidentified immature Tettigoniidae (Orthoptera) and labelled that it had hunted that katydid and had introduced it into the burrow.

Sphex ingens Smith, 1856

BRAZIL, RIO DE JANEIRO, Angra dos Reis (Ilha Grande), 1♀, T.Branquinho, VIII/2002; (Japuiba), 2♂, Mario Ventel, I/1936; (Japuiba, Travessa Oiticica),

1♂, I/1935; Nova Iguaçu (Tinguá), 3♂, Bráulio, II/1947; 1♀ 1♂, Dalcy; Itaipuaçu, 1♀, XI/1961; Rio de Janeiro (Barra da Tijuca, restinga), 1♀, H.Schubart, 2/XI/1964; Silva Jardim (Reserva Biológica de Poço das Antas), 1♀, S.Buys, II/1995.

Previous literature records in Rio de Janeiro State – AMARANTE (2002): Rio de Janeiro State.

Remarks – Nothing was previously published on the biology of this species. The following observations are presented: (1) Reserva Biológica de Poço das Antas – A nesting colony was found in a same site of an unpaved road in three consecutive summers. This site was exposed to the sun, without litter or low vegetation. In order to dig the nest, the females crust the soil with the mandibles and throw the earth backwards beneath the body with the forelegs, similarly to other species of *Sphex* (see BOHART & MENKE, 1976; GENISE, 1980). When a female crusts the soil, she emits a buzzing sound audible as far as 3m from the wasp. The perpendicular central burrow of one observed nest was 2cm in diameter. Copulating wasps were often seen on the ground near the nests. Apparently the males of *S. ingens* remain near to active nests to guarantee the copulation. Similar behaviour was observed in males of a few other species of the genus, as *S. cognatus* Smith, 1856 (RIBI & RIBI, 1979), *S. tepanecus* Saussure, 1867 (GILLASPY, 1962), and *S. latreillei* (Lepelletier, 1831) (CHIAPPA, 1996). The females preyed on Tettigoniidae (Orthoptera). (2) Parque Nacional da Tijuca – a colony of nesting females was found in a shadow place in the hard floor of an abandoned human habitation. Interestingly, the habit of nesting in the floor of houses was previously reported at least in four species of *Sphex* (GENISE, 1980), but apparently has not been observed in related genera of Sphecidae. (3) Ilha Grande – a nesting colony was observed in compacted soil composed of clay and sand, near a beach.

Sphex latro Erichson, 1849

BRAZIL, RIO DE JANEIRO, Rio de Janeiro (Floresta da Tijuca), 1♀, C.A.C.Seabra, I/1954; idem, 1♀, C.A.C.Seabra, II/1954.

Sphex melanopus Dahlbom, 1843

BRAZIL, RIO DE JANEIRO, Duque de Caxias (São Bento), 1♀, P.A.Teles, I/1954; 1♂, P.A.Teles, XII/1954; Niterói (Morro do Cavalão), 1♀, 16/III/1947; Rio de Janeiro, 1♀ 3♂, R.Arlé; (Floresta da Tijuca), 1♀, C.A.C.Seabra, II/1950; Seropédica (BR 465, Km 47), 1♀, D.Mendes, 03/XII/1942; 1♂, Neto, 13/III/1944; 1♂, P.Wygodzinsky, 18/I/1943; 1♂, W.Zikán, 15/VII/1949; 1♀, W.Zikán, 08/III/1954.

Previous literature records in Rio de Janeiro State – AMARANTE (2002): Rio de Janeiro State.

Sphex nitidiventris Spinola, 1851

BRAZIL, RIO DE JANEIRO, Rio de Janeiro (Jacarepaguá, Represa dos Ciganos), 1♀, I/1968.

Sphex opacus Dahlbom, 1845

BRAZIL, RIO DE JANEIRO, Araruama, 1♀, H.Schubart, 03/II/1961; Duque de Caxias, 1♂, A.Teles, I/1954; Maricá (Restinga de Barra de Maricá), 1♀, S.Buys, 15/VI/2000; Seropédica (BR 465, Km 47), 1♀ 1♂, Zikán, 03/VII/1947; Rio de Janeiro (Guaratiba), 1♀, J.H.Guimarães, XII/1955; (Sumaré), 1♀, R.Arlé, 13/VI/1933; Silva Jardim (Reserva Biológica de Poço das Antas), 1♀, S.Buys, 25/IX/2001.

Previous literature records in Rio de Janeiro State – BUYS (2005): Maricá (Restinga de Barra de Maricá). Remarks – BUYS (2005) published on the nesting biology of this species based on females found in Restinga de Barra de Maricá (Maricá). The females nested in soil composed of clay and sand, hunted on Tettigoniidae (Orthoptera), and visited flowers of *Borreria* sp. (Rubiaceae). Herein another observation is provided: Restinga de Barra de Maricá – one nest containing two larvae of a non-identified species of *Ormia* (Diptera: Tachinidae) was found. Because species of *Ormia* are known as parasitoids of orthopteroid insects (Enio Nuñez, pers. comm.), the wasp probably hunted preys already parasitized. See also remarks under *S. dorsalis*.

Sphex servillei Lepeletier, 1843

BRAZIL, RIO DE JANEIRO, Nova Friburgo, 1♀, S.Lopes, 27/IV/1937; Rio de Janeiro (Floresta da Tijuca), 1♀, C.A.C.Seabra, I/1964.

Tribe Sceliphriini

Subtribe Podiina

Genus *Dynatus* Lepeletier, 1845*Dynatus nigripes spinolae* (Lepeletier, 1845)

BRAZIL, RIO DE JANEIRO, Rio de Janeiro (Gávea), 1♂, E.May, I/1925.

Previous literature records in Rio de Janeiro State – DE SAUSSURE (1867): Rio de Janeiro State; BOHART & MENKE (1976:94): Rio de Janeiro State; AMARANTE (2002): Rio de Janeiro State.

Genus *Penepodium* Menke, 1976*Penepodium fumipenne* (Taschenberg, 1869)

Previous literature records in Rio de Janeiro State – AMARANTE (2002): Rio de Janeiro State.

Penepodium latro (Kohl, 1902)

Previous literature records in Rio de Janeiro State – BUYS (2006b): Angra dos Reis (Ilha Grande, Vila do Abraão).

Remarks – BUYS (2006b) published on the biology of this species based on a nesting female collected in a forested area in Angra dos Reis (Ilha Grande, Vila do Abraão) next to the beach. An adult *Poeciloderrhis* sp. (Blattodea: Blaberidae) was found as prey.

Penepodium luteipenne (Fabricius, 1804)

BRAZIL, RIO DE JANEIRO, Niterói (Parque Estadual da Serra da Tiririca), 1♀, S.Buys; Petrópolis, 1♀, Borgmeier, III/1929; Silva Jardim (Reserva Biológica de Poço das Antas) S.Buys, 2♀, I/1996. Previous literature records in Rio de Janeiro State – TASCHEBERG (1869): Nova Friburgo; WILLIAMS (1928): Niterói; BUYS (2001; 2009): Silva Jardim (Reserva Biológica de Poço das Antas).

Remarks – WILLIAMS (1928) studied the biology of this species and found nesting females in shaded trail in a forested area in the city of Niterói (RJ) (as *P. dubium* Taschenberg, 1869). BUYS (2009) observed females in the Biological Reserve of Poço das Antas (Silva Jardim) digging unicellular nests in the hardly compacted clay soil of unpaved roads that cross forested areas and reported *Poeciloderrhis basistriga* (Walker, 1868) and *Poeciloderrhis catharina* (Shelford, 1910) (Blattodea: Blaberidae) as prey. The following observations are herein added: Parque Estadual da Serra da Tiririca – Several nesting females were observed in hardly compacted clay soil. Two nests were examined: one nest 4.5cm deep contained an adult of *P. basistriga* and a similar nest contained two adults of *P. catharina*.

Penepodium spretum (Kohl, 1902)

Previous literature records in Rio de Janeiro State – AMARANTE (2002): Rio de Janeiro State.

Penepodium taschenbergi (Kohl, 1902)

Previous literature records in Rio de Janeiro State – KOHL (1902): Nova Friburgo (type locality); AMARANTE (2002): Rio de Janeiro State.

Genus *Podium* Fabricius, 1904*Podium sexdentatum* Taschenberg, 1869

Previous literature records in Rio de Janeiro State. TASCHEBERG (1869): Nova Friburgo (type locality); AMARANTE (2002): Rio de Janeiro State.

Genus *Trigonopsis* Perty, 1833*Trigonopsis rufiventris* (Fabricius, 1804)

BRAZIL, RIO DE JANEIRO, Rio de Janeiro, 1♀; R.Arlé; (Floresta da Tijuca), 3♀, R.Arlé, VI/1933. Previous literature records in Rio de Janeiro State – ARLÉ (1933): city of Rio de Janeiro (Floresta da Tijuca); VARDY (1978): Niterói; AMARANTE (2002): Rio de Janeiro State.

Remarks – This species is widely distributed in South America, but it is rarely observed in the Rio de Janeiro State. ARLÉ (1933) published observations on specimens from the Parque Nacional da Floresta da Tijuca (city of Rio de Janeiro) in a forested area.

Subtribe Sceliphrina
Genus *Sceliphron* Klug, 1801

Sceliphron asiaticum (Linnaeus, 1758)

BRAZIL, RIO DE JANEIRO, Iguaba Grande, 1♀, E.Oliveira, XI/2006; Itatiaia (1.400m), 2♀, W.Zikán, 02/I/1954; Niterói, 1♀, R.Arlé, IX/1935; Rio de Janeiro (Copacabana), 1♂; (Manguinhos), 1♀ 1♂ (pinned together and labelled that they were in copulation), 08/XII/1935; (Quinta da Boa Vista), 1♀ 1♂; Seropédica (BR 465, Km 47), 1♀, P.Wygodzinsky, 03/I/1944; 1♀ 1♂ (pinned together), D.Mendes, 07/XII/1944; 1♀, Miranda, 22/I/1946; 1♀ 1♂ (pinned together), D.Mendes; 2♀ 1♂, D.Mendes, I/1942; 1♂, P.Wygodzinsky, 25/II/1944; 1♀, Wygodzinsky, 20/I/1943; 1♀ 1♂, 27/IX/1944; 1♀, P.Wygodzinsky, 15/I/1943.

Previous literature records in Rio de Janeiro State – AMARANTE (2002): Rio de Janeiro State.

Sceliphron fistularium (Dahlbom, 1843)

BRAZIL, RIO DE JANEIRO, Iguaba Grande, 2♂, E.Oliveira, XI/2004; 1♀, E.Oliveira, XI/2006; Itatiaia, 1♀ 2♂, W.Zikán, 16/VIII/1935; 1♀, Wygodzinsky, III/1942; Niterói (Morro do Cavalão), 1♀, V/1933; Rio de Janeiro, 2♀ 2♂, Teixeira, 03/II/1940; 1♂, Teixeira, 07/XI/1940; 1♀ 1♂, R.Arlé; 2♀ 1♂, D.Mendes; 1♂, C.Lacerda, X/1924; 1♀ 3♂, C.Moreira, XII/1927; (Corcovado), 1♂, Alvarenga and Seabra, XI/1958; (Floresta da Tijuca), 1♀, C.A.Campos Seabra, III/1949; (Jacarepaguá), 1♀, N.Santos, 04/V/1940; 1♀, D.Mendes, III/1953; (Marechal Deodoro), 2♀ 1♂, Zikán, 16/VIII/1935; 2♀ 1♂, W.Zikán, 16/VIII/1935; (Represa dos Ciganos), 1♀, R.Arlé, 17/I/1948; Seropédica (BR 465, Km 47), 1♀, D.Mendes, III/1942; 3♀ 2♂, D.Mendes, I/1956; 1♀, D.Mendes, IX/1956; 1♂, C.A.Zikán, 24/IX/1954; 1♀, Wygodzinsky, IV/1943; Teresópolis, 1♀, C.Moreira.

Previous literature records in Rio de Janeiro State – VAN DER VECHT & VAN BREUGEL (1968): city of Rio de Janeiro (Corcovado); AMARANTE (2002): Rio de Janeiro State.

Remarks – There are several papers on the biology of this species (e.g. BODKIN, 1918; FREEMAN, 1982; CAMILO, 2002), which is frequently found in forested areas, restingas, and urban environments. Females commonly construct their mud nests attached to walls or windows of human habitations. Herein some

biological notes are presented, as follows: (1) Reserva Biológica de Poço da Antas – One mud nest was found attached to a small herbaceous plant, bearing two specimens of *Macrosiagon* sp. (Coleoptera: Ripiphoridae) as parasitoids. (2) Ilha Grande – The following species of Araneidae spiders were found as prey: *Metepeira* sp., *Alpaida* sp., *Araneus workmani* (Keyserling, 1884), *Araneus vincibilis* (Keyserling, 1893). Moreover, *Amobia floridensis* (Townsend) (Diptera: Sarcophagidae) and *Anthrax oedipus oedipus* Fabricius (Diptera: Bombyliidae) were found as parasitoids.

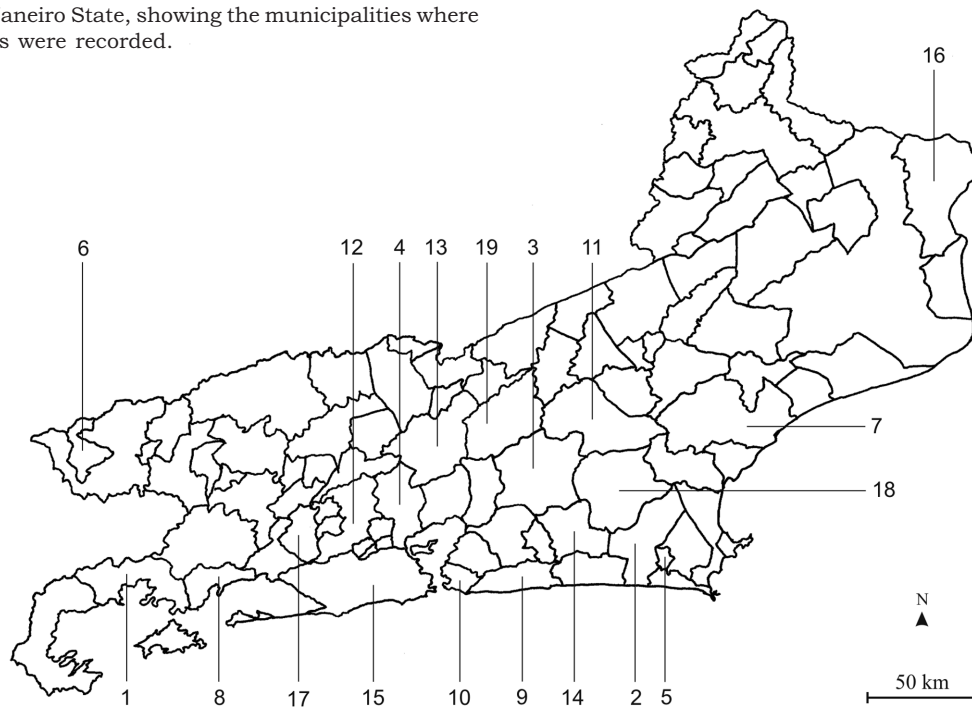
ACKNOWLEDGEMENT

I thank Cinara Andrade for always assisting in the field works; Renner Baptista for identifying the spiders; Sônia Lopes and Edivar Oliveira for identifying the cockroaches; Carlos Lamas for identifying the Bombyliidae; Cátia Mello-Patiu for identifying the Sarcophagidae; Enio Nuñez for identifying the Tachinidae. I specially thank Márcia Couri for assisting during the development of this project. The manuscript benefited from the useful comment of two anonymous referees. This paper is a partial result of the project Biological Diversity of the Atlantic Forest of the Rio de Janeiro State, which was sponsored by the Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ) (project number E-26/171-281/2006).

REFERENCES

- AMARANTE, S.T.P., 2002. A synonymic catalog of the neotropical Crabronidae and Sphecidae (Hymenoptera: Apoidea). **Arquivos de Zoologia**, **37**(1):1-139.
- AMARANTE, S.T.P., 2005. Addendum and corrections to a synonymic catalog of Neotropical Crabronidae and Sphecidae. **Papéis Avulsos de Zoologia**, **45**(1):1-18.
- ARLÉ, R., 1933. Sobre a nidificação, a biologia e os parasitos de *Sceliphron (Trigonopsis) abdominalis* Perty. **Anais de Academia Brasileira de Ciências**, **5**:205-212.
- BODKIN, G.E., 1918. Notes on some British Guiana Hymenoptera (exclusive of the Formicidae). **The Transaction of the Entomological Society of London**, **1917**:297-321, pls.21-23.
- BOHART, R.M. & MENKE, A.S., 1976. **Sphecidae wasps of the world: a generic revision**. Berkeley: University of California Press. 695p.
- BUYS, S.C., 1999. Notes on the nesting behavior of *Eremnophila binodis* (Guérin) (Hymenoptera, Sphecidae). **Entomological News**, **110**(3):184-186.
- BUYS, S.C., 2001. Last instar larva of *Penepodium dubium* (Hymenoptera: Sphecidae). **Revista de Biologia Tropical**, **49**(1):329-332.

Fig. 1- Rio de Janeiro State, showing the municipalities where sphecid wasps were recorded.



- | | | |
|------------------------|-------------------|---------------------------------|
| 1. Angra dos Reis | 8. Mangaratiba | 15. Rio de Janeiro |
| 2. Araruama | 9. Maricá | 16. São Francisco de Itabapoana |
| 3. Cachoeira de Macacu | 10. Niterói | 17. Seropédica |
| 4. Duque de Caxias | 11. Nova Friburgo | 18. Silva Jardim |
| 5. Iguaba Grande | 12. Nova Iguaçu | 19. Teresópolis |
| 6. Itatiaia | 13. Petrópolis | |
| 7. Macaé | 14. Rio Bonito | |

BUYS, S.C., 2005. Nesting behaviour and larval biology of *Sphex opacus* Dahlbom (Hymenoptera, Sphecidae) from Brazil. **Revista Brasileira de Zoologia**, **22**(3):709-711.

BUYS, S.C., 2006a. Nesting behaviour and larval biology of *Prionyx fervens* (Linnaeus) (Hymenoptera: Sphecidae) from Brazil. **Revista Brasileira de Zoologia**, **23**(2):311-313.

BUYS, S.C., 2006b. Observations on the biology and description of the last instar larva of *Penepodium latro* (Kohl, 1902) (Hymenoptera, Sphecidae). **Arquivos do Museu Nacional**, **64**(2):121-124.

BUYS, S.C., 2008. Notes on the nesting behaviour of *Sphex dorsalis* Lepeletier (Hymenoptera: Sphecidae). **Entomologist's Monthly Magazine**, **144**:147-149.

BUYS S.C., 2009. Larval behaviour and development of *Penepodium luteipenne* (Fabricius, 1804). **Mitteilungen des Internationalen Entomologischen Vereins**, **34**(1/2):33-40.

CAMILO, E., 2002. The natural history of the mud-dauber wasp *Sceliphron fistularium* (Hymenoptera: Sphecidae) in southeastern Brazil. **Revista de Biologia Tropical**, **50**:127-134.

CHIAPPA, E., 1996. Comportamento reprodutivo e machos de *Sphex latreillei* Lepeletier (Hymenoptera: Sphecidae).

Revista Chilena de Entomologia, **23**:19-27.

DE BEAUMONT, J., 1955. La stylopisation chez les Sphecidae. **Revue Suisse de Zoologie**, **62** (supplément):51-72.

DE SAUSSURE, H., 1867. **Reise der Österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. von Wüllerstoeuf-Urbair. Zoologischer Theil. Zweiter Band. Hymenoptera. Familien der Vespiden, Sphegiden, Pompiliden, Crabroniden und Heterogynen.** Wien: K-K Hof- und Staatsdruckerei 138p+pls.1-4.

EVANS, H.E., 1958. Studies on the nesting behavior of digger wasps of the tribe Sphecini. Part I: genus *Priononyx* Dahlbom. **Annals of the Entomological Society of America**, **51**:177-186.

FREEMAN, B.E., 1982. The comparative distribution and population dynamics in Trinidad of *Sceliphron fistularium* (Dahlbom) and *S. asiaticum* (L.) (Hymenoptera: Sphecidae). **Biological Journal of the Linnean Society**, **17**:343-360.

GAIMARI, S.D. & MARTINS, R.P., 1996. Nesting behavior and nest distribution of *Ammophila gracilis* Lepeletier (Hymenoptera: Sphecidae) in Brazil. **Journal of Hymenoptera Research**, **5**:240-248.

- GENISE, J.F., 1980, Comportamiento de nidificación de *Sphex argentinus* Tasch. y *Sphex dorsalis* Lep. (Hymenoptera, Sphecidae). Revisión de esta actividad en el género. **Revista de la Sociedad de Entomología de Argentina**, **39**:251-262.
- GILLASPY, J.E., 1962. Nesting behavior of *Sphex tepanecus* Saussure (Hymenoptera: Sphecidae). **Bulletin of the Brooklyn Entomological Society**, **57**:15-17.
- KOHL, F.F., 1902. Hymenopterengruppe der Sphecinen. II. Monographie der neotropischen Gattung *Podium* Fabr. **Abhandlungen der k.k.Zoologisch-Botanischen Gesellschaft in Wien**, **1**:1-101, pls.1-8.
- PULAWSKI, W.J., 2008. **Catalog of Sphecidae sensu lato**. Available at: <http://www.calacademy.org/research/entomology/Entomology_Resources/Hymenoptera/sphecidae/Genera_and_species_PDF/introduction.htm>. Accessed on 5 May 2008.
- RIBI, W.A. & RIBI, L., 1979. Natural history of the Australian digger wasp *Sphex cognatus* Smith (Hymenoptera: Sphecidae). **Journal of Natural History**, **13**:693-701.
- TASCHENBERG, E.L., 1869. Die Sphegidae des zoologischen Museums der Universität in Halle. **Zeitschrift für die Gesamten Naturwissenschaften**, **34**:407-435.
- TEMPLETON, R., 1841. Description of a new strepsipterous insect. **The Transaction of Entomological Society of London**, **3**:51-56, pl.4.
- VAN DER VECHT, J. & VAN BREUGEL, F.M.A., 1968. Revision of the nominate genus *Sceliphron* Latreille (Hymenoptera: Sphecidae). **Tijdschrift voor Entomologie**, **111**:185-255.
- VARDY, C.R., 1978., A revision of the Neotropical wasp genus *Trigonopsis* Perty (Hymenoptera: Sphecidae). **Bulletin of the British Museum of Natural History (Entomology)**, **37**:117-152.
- VON HEYDEN, L., 1867. Exotische *Xenos*-Arten. **Berliner Entomologischen Zeitschrift**, **11**:398.
- WILLIAMS, F.X., 1928. Studies in tropical wasps - their host and associates. **Bulletin of the Experimental Station of the Hawaiian Sugar Planter's Association (Entomological Series)**, **19**:1-179.
- WILLINK, A., 1951. Las especies argentinas y chilenas de "Chlorionini" (Hym., Sphecidae). **Acta Zoologica Lilloana**, **11**:52-225.