

Spiders from the Island of Fernando de Noronha, Brazil. Part III: Gnaphosidae (Araneae: Arachnida)

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ABSTRACT. The female of *Zimiromus hortenciae* Buckup & Brescovit, 1993 is described for the first time and *Trachyzelotes kulczynskii* (Böseberg, 1902), a species introduced from Europe, is recorded for the first time on the island of Fernando de Noronha, state of Pernambuco. The latter, along with *T. lyonneti* (Audouin, 1826) recorded from the state of Rio Grande do Sul, is the second species of this genus to be reported from Brazil. The spiders were collected with pitfall traps in five points of the island. Ecological data showed that Gnaphosidae was the fifth best sampled spider family, with 179 specimens, belonging to two species, *T. kulczynskii* and *Z. hortenciae*. *Trachyzelotes kulczynskii* was the most abundant with 118 adults while *Z. hortenciae* was represented by only 21 adults. Both species were collected during the dry and wet seasons but *T. kulczynskii* was more abundant during the wet season while *Z. hortenciae* was more abundant during the dry season. The male:female ratio for the dry season was similar for both species but in the wet season it was three times higher for *T. kulczynskii*.

KEY WORDS. Neotropical region; taxonomy; *Trachyzelotes*; *Zimiromus*.

RESUMO. Aranhas da Ilha de Fernando de Noronha, Brasil. Parte III: Gnaphosidae (Araneae: Arachnida).

A fêmea de *Zimiromus hortenciae* Buckup & Brescovit, 1993 é descrita pela primeira vez. *Trachyzelotes kulczynskii* (Böseberg, 1902), uma espécie de origem européia, é registrada pela primeira vez na Ilha de Fernando de Noronha, no estado de Pernambuco. Junto com *T. lyonneti* (Audouin, 1826), já registrado para o estado do Rio Grande do Sul, Brasil, é a segunda espécie do gênero introduzida no Brasil. As aranhas foram coletadas com armadilhas de solo em cinco pontos da ilha e os dados ecológicos detectados para Gnaphosidae foram de que esta foi a quinta família melhor amostrada dentre Araneae, com 179 espécimes de duas espécies, *T. kulczynskii* e *Z. hortenciae*. *Trachyzelotes kulczynskii* foi mais abundante com 118 adultos enquanto *Z. hortenciae* teve 21 adultos coletados. Ambas foram coletadas nas estações seca e chuvosa, sendo que *T. kulczynskii* foi mais abundante na estação chuvosa enquanto *Z. hortenciae* o foi na estação seca. A proporção de machos e fêmeas foi similar na estação seca, mas na estação chuvosa a proporção de *T. kulczynskii* foi três vezes maior.

PALAVRAS-CHAVE. Região Neotropical; taxonomia; *Trachyzelotes*; *Zimiromus*.

Gnaphosidae includes nearly 2000 species worldwide, distributed in over 100 genera, making it the 7th largest spider family (PLATNICK 2008). Forty species of *Zimiromus* Banks, 1914 have so far been described from the Neotropical region (PLATNICK 2008). Of these, 14 species were recorded from Brazil (BUCKUP & BRESCOVIT 1993, BRESCOVIT & BUCKUP 1998). For many of these species, descriptions of one of the sexes are lacking. For example, *Z. hortenciae* Buckup & Brescovit, 1993 was described based only on male specimens, collected in the state of Sergipe, Northeastern Brazil (BUCKUP & BRESCOVIT 1993).

Trachyzelotes Lohmander, 1944 was partially revised by PLATNICK & MURPHY (1984) mainly focusing on the Old World

species. This is a large genus from the Holarctic region and comprises at least three species, introduced into several countries of the American continent such as Peru, Brazil, Colombia, Mexico, and the United States (PLATNICK & MURPHY 1984, MÜLLER 1994). In Brazil, only one species, *Trachyzelotes lyonneti* (Audouin, 1826) has been recorded, in the state of Rio Grande do Sul, southern region of the country.

A recent inventory of spider species in the Island of Fernando de Noronha, Brazil has contributed towards expanding the knowledge on the diversity and the geographical distribution of members of Gnaphosidae. In this paper, the third concerning the spiders of Fernando de Noronha Archipelago (RUÍZ

et al. 2007, RODRIGUES et al. 2008), the female of *Zimriomus hortenciae* is described for the first time and *Trachyzelotes kulczynskii* (Bösenberg, 1902), a species probably native to the Balkan region (PLATNICK & MURPHY 1984), is recorded from the island, representing the first record of this species from Brazil. Brief data on the natural history of these two species is presented.

MATERIAL AND METHODS

The Fernando de Noronha Archipelago (3°50'S, 32°15'W) is situated at 345 km northeast of the nearest Brazilian mainland. With a total area of 18.4 km², the Island of Fernando de Noronha itself comprises most of the Archipelago (16.9 km²). The archipelago is considered a World Natural Heritage site by the United Nations Educational, Scientific and Cultural Organization (UNESCO) but has been strongly modified by human activities, especially due to intense tourism activities. Spiders were collected using 500 ml pitfall traps (n = 52 in the dry and n = 138 in the rainy season) with plastic lids, scattered throughout the island in ten sampling areas under different degrees of human impact (e.g., urban area, national park area, access controlled beaches). Total sampling time was 30 days, 15 days during the dry season (October 2005, driest month) and 15 during the wet season (April 2006, wettest month). Due to sampling restrictions (including access to certain areas) in the dry season, the collection effort was greater during the rainy season. A short description of the sampling sites where gnaphosids were registered is given below:

Protected Area: is located within the National Park of Fernando de Noronha, with access strictly controlled by the Brazilian Institute for Environment and Natural Renewable Resources (Ibama). The vegetation presents a secondary stage of succession and low diversity with a predominance of *Ipomoea nil* (Linnaeus) Roth, *I. hederifolia* Linnaeus (Convolvulaceae) and *Cissus verticillata* (Linnaeus) Nicholson & Jarvis (Vitaceae), all creeping plants popularly known as "jitiranas". The physiognomy varies greatly between the wet and the dry seasons, reflecting the characteristics of a seasonal deciduous forest.

Urban Area: this area is situated in the administrative center of the island and is surrounded by residences, lodgings, and abandoned constructions. Garbage accumulates in this area and domestic animals are relatively common.

Baía do Sancho: this bay is situated in an area of difficult access; it has low vegetation diversity, with predominance of few native Cactaceae species.

Praia da Atalaia: open to restricted visitation, this beach very often receives wreckage and trash thrown in the ocean. The traps were placed in a shrub area.

Mangue do Sueste: a unique mangrove among the Southern Atlantic islands, vegetation in this area consists basically of *Laguncularia racemosa* (Linnaeus) (Combretaceae). The access is only allowed to researchers, but islanders invade the area and threaten the ecosystem by using the area for garbage disposal.

Biological material was preserved in 70% alcohol. The material examined was deposited in the arachnological collection of the Instituto Butantan, São Paulo (IBSP, curator: A.D. Brescovit). Description follows BUCKUP & BRESCOVIT (1993). The female epigynum was dissected and submerged in clove oil to study the internal structures. Abbreviations: AME, anterior median eyes; ALE, anterior lateral eyes; PME, posterior median eyes; PLE, posterior lateral eyes. All measurements are in millimeters.

RESULTS

Zimriomus hortenciae Buckup & Brescovit, 1993

Figs 1-2

Zimriomus hortenciae Buckup & Brescovit, 1993: 185, figs 13-14 (Holotype male, Campus of the Universidade Federal de Sergipe, São Cristóvão, Sergipe, Brazil, 20.V.1978, H.M.P. Araújo leg., deposited in MCN 21034, examined); Platnick, 2008.

Diagnosis. The female of *Zimriomus hortenciae* is easily distinguished from females of other species by the smooth, short, triangular scape, truncated at its tip.

Description. Male: Described by BUCKUP & BRESCOVIT (1993). Female (IBSP 68643): Carapace, legs, pedipalps, endites, labium, sternum and spinnerets pale orange. Median eyes black and the others opalescent. Abdomen gray with anterior border and ventral face grayish. Total length 4.00. Carapace 1.70 long, 1.20 wide. Eye diameters and interdistances: AME 0.12, ALE 0.14, PME 0.16, PLE 0.12; AME-AME 0.08, AME-ALE 0.02, PME-PME 0.08, PME-PLE 0.06, ALE-PLE 0.04. Abdomen without dorsal scutum. Leg measurements: I – femur 1.30/patella 0.70/tibia 1.00/metatarsus 0.90/tarsus 0.70/total 4.60, II – 1.20/0.60/0.90/0.90/0.70/4.30, III – 1.10/0.50/1.20/0.70/0.50/4.00, IV – 1.50/0.60/1.70/1.30/0.70/5.80. Leg spination: tibia I v0-2-0, II v0-1r-1p, III v0-1p-2; metatarsus III p0-1p-2, r0-1p-2; IV p1-1p-2, r0-1p-2. Epigynum with ample atrium (Fig. 1). Internally with oval spermathecae, long and coiled copulatory ducts and short fertilization ducts (Fig. 2).

Variation. Ten males: total length 3.70-4.10; carapace 1.40-1.70; femur I 1.20-1.50. Eight females: total length 4.00-4.50; carapace 1.60-2.00; femur I 1.20-1.50.

Additional material examined. BRAZIL, Pernambuco: Fernando de Noronha Archipelago, Island of Fernando de Noronha, 9 males and 9 females, X.2005-IV/2006, G. Freitas (IBSP 68639-68644); (Mangue do Sueste), 1 male (IBSP 68645).

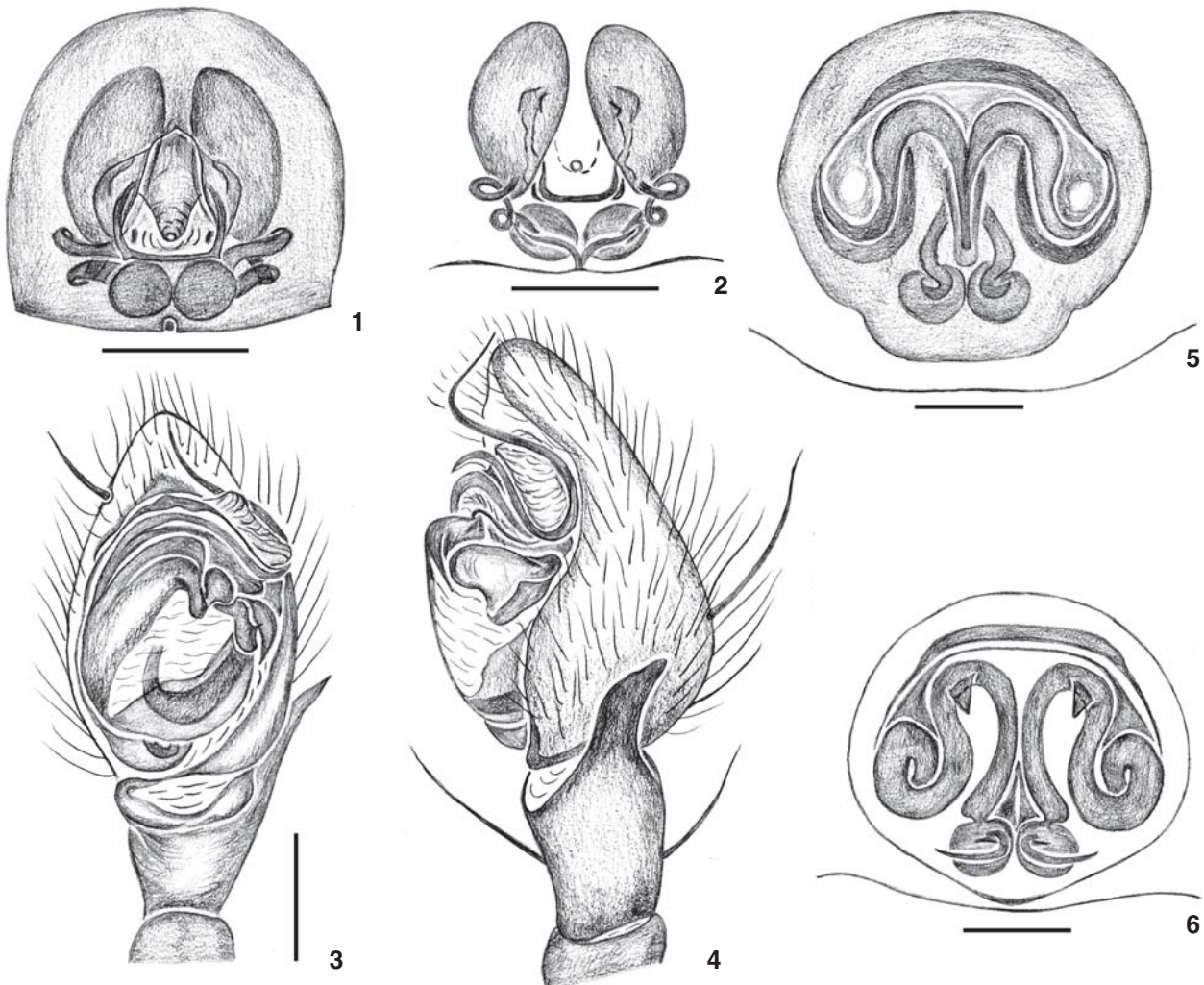
Distribution. Brazil, states of Sergipe and Pernambuco (Fernando de Noronha Archipelago).

Trachyzelotes kulczynskii (Bösenberg, 1902)

Figs 3-6

Prosthesima kulczynskii Bösenberg, 1902: 313, plate 29, figs 463A-B (Holotype female from Pfromheim, Baden-Württemberg, West Germany, destroyed during World War II).

Zelotes kulczynskii: Reimoser, 1919: 168.



Figures 1-6. (1-2) *Zimiromus hortenciae*, female: (1) epigynum, ventral view; (2) vulva, dorsal view; (3-6) *Trachyzelotes kulczynskii*: (3) male, left palp, retrolateral view; (4) male, ventral view; (5) female, epigynum, ventral view; (6) vulva, dorsal view. Scale lines: 0.5 mm.

Zelotes samoensis Berland, 1934: 325, figs 7-8 (Holotype female from Samoa, deposited in The Natural History Museum, London, not examined); Platnick & Murphy, 1984; Platnick, 2008.

Trachyzelotes kulczynskii; Platnick & Murphy, 1984: 13, figs 23-26; Müller, 1994: 143; Kamura, 1997: 79, figs 5-8; Platnick, 2008.

Diagnosis. *Trachyzelotes kulczynskii* could be confused only with *T. lyonneti* (Audouin 1826), the other species of this genus in Brazil (see PLATNICK & MURPHY 1984: figs 7-10), but differs from the latter by the smooth terminal apophysis in the male palp (Figs 3 and 4), short anterior epigynal border, and more elongated copulatory ducts (Figs 5 and 6).

Description. Male and female described by PLATNICK & MURPHY (1984: 13).

Variation. Ten males: total length 4.00-4.70; carapace 1.60-1.90; femora I 1.10-1.50. Eight females: total length 4.00-4.50; carapace 1.60-2.00; femora I 1.20-1.50.

Additional material examined. BRAZIL, *Pernambuco*: Island of Fernando de Noronha, 83 males and 29 females, X.2005-IV/2006, G. Freitas (IBSP 68610-68638; 69940-69976).

Distribution. Balkan area, Japan (KAMURA 1997), United States, Caribbean and Samoa (PLATNICK & MURPHY 1984), Colombia (MÜLLER 1994), and now recorded from northeastern Brazil (state of Pernambuco).

Natural history

Of a total of 3099 spiders collected in the inventory (adults and juveniles), 179 specimens (40 juveniles and 139 adults) belonged to Gnaphosidae, one of the top five families

in terms of abundance in the island. All identified adults belonged to two species: *Zimiromus hortenciae* (11 males and 10 females) and *Trachyzelotes kulczynskii* (85 males and 33 females).

The species were collected in both seasons and the abundance was higher during the wet season for *T. kulczynskii* and the dry season for *Z. hortenciae*. Possible explanations for these differences are peculiarities of the reproductive cycle, since *Z. hortenciae* specimens mate during the dry season (TRETZEL 1954, CHATZAKI *et al.* 1998), or by the presence of one year-long adult period for *T. kulczynskii*, as proposed by TOFT (1976). It is possible that the natural process of species turnover on the island has contributed to the local extinction or at least strong population depletion of *Z. hortenciae* in the habitats. However, these differences in terms of abundance can be a direct effect of sampling effort, which was higher during the rainy season. Proportionally, the numbers of *T. kulczynskii* over *Z. hortenciae* were similar in the driest month (18:19 = 0.95:1), but in the wet season individuals of *T. kulczynskii* were far more abundant in samples than *Z. hortenciae* (100:2 = 50:1).

The male:female ratio for the dry season was similar for both *T. kulczynskii* (1.25:1) and *Z. hortenciae* (1.1:1). However, in the wet season the proportion of *T. kulczynskii* males increased considerably, with a sex ratio 3:1, probably due to the fact that the juveniles might reach adulthood in the wet season (KUNTNER & BAXTER 1997, JIMÉNEZ-VALVERDE & LOBO 2006) and actively search for mates (DRANEY & CROSSLEY 1999, BUDDLE & DRANEY 2004). This result seems to be in accordance with TRETZEL (1954), who suggested that the maximum number of males could indicate the reproductive period.

An interesting variation in the distribution patterns of both gnaphosids could be noticed. *Zimiromus hortenciae* occurred only in preserved or protected areas and in the Mangue do Sueste, in both dry and rainy seasons. In contrast, *T. kulczynskii* was present in four areas but almost exclusively in the urban area during the dry and rainy seasons, with only one individual (out of 118) collected in the preserved area during the rainy season. No specimens of *T. kulczynskii* were found in the mangrove area.

While the origin of *T. kulczynskii* is controversial (BRAUN 1982, PLATNICK & MURPHY 1984), its distribution pattern and presence on the island of Fernando de Noronha appears to have a strong relationship to maritime transportation, following the main navigation routes and port zones.

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