Description and chromosome number of a species of *Pseudonannolene* Silvestri (Arthropoda, Diplopoda, Pseudonannolenidae)

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ABSTRACT. *Pseudonannolene mesai* **sp.n.** from Biritiba Mirim, State of São Paulo, Brazil, is described and the chromosome number (2n=16) is reported. It was impossible to observe the chromosomal sex determination mechanism.
KEY WORDS. Diplopoda, *Pseudonannolene*, millipeds, cytogenetics

Diplopods constitute a group of arthropods of furtive habits which hide from light and live under rocks and tree trunks, some of them being commensals in ant and termite nests. They act on soil dynamics by providing greater aeration and enrichment of the organic matter present.

Despite the ecological importance of the group, few people study these animals. From a taxonomic viewpoint, Otto Schubart studied Brazilian species up to the mid-sixties in about 50 publications. More recently, other studies have been performed by the North American investigator Richard HOFFMAN (1980, 1981, 1982, 1985, 1988, 1990a,b,c, 1995). Thus, when specimens are analyzed, new species and doubtful genera are frequently found. This fact is particularly notable in *Pseudonannolene* Silvestri, 1895.

This genus, which occurs in the neotropical region, is the only one in the family Pseudonannolenidae that occurs in Brazil.

According to SCHUBART (1947), this family, together with Spirostreptidae, Leptodesmidae, Rhinocricidae and Strongylosomidae, is the richest in species and one of the most typical in Brazil. These are usually long and thin animals which are closely similar in their gonopods, a fact that impairs species identification. Approximately 40 species are known and the author recently described four new species occurring in Brazilian caves (FONTANETTI 1996a,b).

From a cytogenetics viewpoint, some works have been realized in Brazilian species by FONTANETTI (1990, 1991, 1996a,c,d, 1998).

The objective of the present report was to present a description and the chromosome number of a *Pseudonannolene* species collected in a reserve of the Atlantic Forest in the State of São Paulo.

MATERIAL AND METHODS

The specimens were collected by the author at the Biological Station of Boracéia, Municipality of Salesópolis, São Paulo, in April 1984, and by A. Mesa and J.A.F. Diniz in November 1990.

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Male specimens were used for cytogenetic analysis. The testicular vesicles were removed in physiological saline, placed in 0.45% hypotonic KCl solution and fixed with the following solutions: fixative I (1.5 ml glacial acetic acid + 1.5 ethanol + 2 ml distilled water); fixative II (2 ml glacial acetic acid + 2 ml ethanol), fixative III (Carnoy I), and fixative IV (glacial acetic acid). After fixing, the testicular vesicles were squashed on a slide, dried on a hot metal plate and stained with 1% orcein.

RESULTS AND DISCUSSION

Pseudonannolene mesai sp.n.

Figs 1-3

Holotype. Adult male (n. 41 in the collection) from Brazil, *São Paulo*: Biritiba Mirim (Biological Station of Boracéia), IV-1984, C.S. Fontanetti *leg.*. Paratypes: 1 young male from the same collection (n. 42); 1 male and 1 female from the same location, XI-1990, A. Mesa and J.A. Diniz-Filho *leg.* (n. 41b); material deposited in the collection of the Department of Biology, Biosciences Institute, Universidade Estadual Paulista (UNESP), Rio Claro Campus, São Paulo, Brazil.

Description. Medium, thin body with a more tapered anterior portion; dark prozones and metazones, the latter with a light margin; collum and first three segments lighter; antennae and legs of the same color as the collum.

Head with a sulcus on the vertex that does not exceed the frontal suture. Ocelli in a darker spot. Long antennae densely covered with fine setae.

Metazone of the same diameter as the prozone; segments moderately narrowed ventro-laterally. Neck strongly marked with 3 striae on the sides.

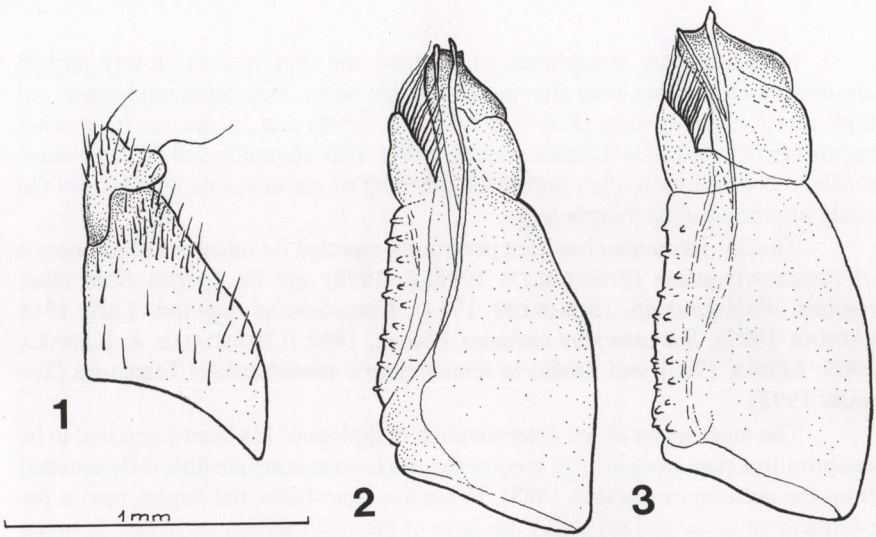
Epiproct projecting slightly over the anal valves; anal valves with setae (2+2).

First pair of male legs (Fig. 1). Thigh a little longer than wide, covered with setae, but more densely in the distal portion; thigh with a wide base that narrows gradually; base of the thigh twice as wide as the distal portion. All articles covered with setae. Prefemur more densely covered with setae in the median-internal region; long process parallel to its pair.

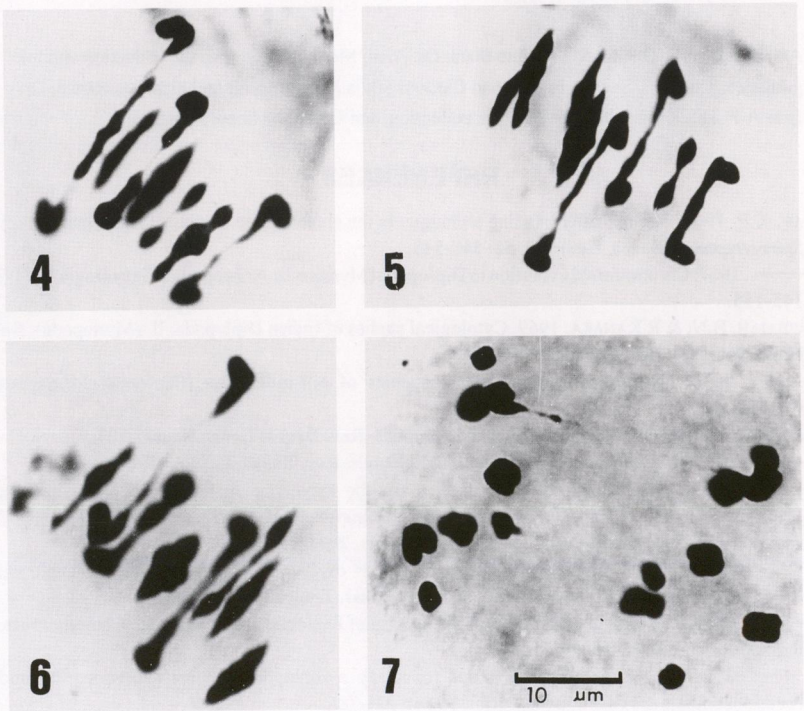
Gonopods (Figs 2 and 3). Large thigh, two times longer than the basal width, with the inner part covered with dentiform processes. Telopodite with a wide base that narrows gradually, with a strong, not very long setose surrounding the solenomerite; the length of the telopodite is about 3.5 times shorter than that of the thigh. The solenomerite is larger than the telopodite, directed upward and inward; the distal part is barely tapered in relation to the basal portion.

Discussion. This is a species closely similar to *P. callipyge* Brolemann, 1901 from Paraná. The two species basically differ in the configuration of the solenomerite; *P. mesai* **sp.n.** presents a marked curvature of the solenomerite towards the telopodite and a small narrowing in the basal portion compared to the thigh.

The species has 2n=16 chromosomes (Figs 4-7), and the sex pair could not be observed. No heteromorphism that might suggest the system of sex determination was noted in metaphases I (Figs 4-6) or anaphases I (Fig. 7).



Figs 1-3. *Pseudonannolene mesai* **sp.n.**. (1) Oral view of the male first pair of legs; (2) oral view of the gonopods; (3) caudal view of the gonopods.



Figs 4-7. Meiosis in *Pseudonannolene mesai* **sp.n.**. (4-6) Metaphases I; (7) anaphase I.

Normally, rare metaphases I are found and they present closely packed chromosomes, at times even clumped in a single block. This clumping is observed both in Brazilian species (FONTANETTI 1990, 1998) and in species from other regions (CHOWDAIAH & KANAKA 1969, 1974). This clumping and the high chromosome condensation often impair the counting of chromosome number and the study of chromosome morphology.

The 2n=16 number has been previously reported for other Brazilian species of *Pseudonannolene* (FONTANETTI 1996a,d, 1998) and for species from other regions: *Polyxenus* sp. (SOKOLOFF 1914), *Cingalobolus bugnioni* Carl, 1918 (ACHAR 1987), *Spirostreptus asthenes* Pocock, 1892 (CHOWDAIAH & KANAKA 1969; ACHAR 1983), and *Riukiaria semicircularis semicircularis* Takakuwa (TANABE 1992).

The mechanism of sex determination of diplopods has been suggested to be in a primitive state since in most species the sex chromosomes are little differentiated from the autosomes (ACHAR 1983). In species from India, the largest pair in the complement is recognized as XY because of the small difference in size between the chromosomes of this pair in some species (ACHAR 1987). In many milliped species investigated both from Brazil and from other regions, the sex pair cannot be distinguished from the autosomes, nor is it possible to suggest that the largest pair in the complement is the XY (FONTANETTI 1991, 1996a,d, 1998; TANABE 1992).

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