

## The millipede *Poratia insularis* (Kraus, 1960) new to the fauna of Brazil (Diplopoda: Polydesmida: Pyrgodesmidae)

### Диплопода *Poratia insularis* (Kraus, 1960), новая для фауны Бразилии (Diplopoda: Polydesmida: Pyrgodesmidae)

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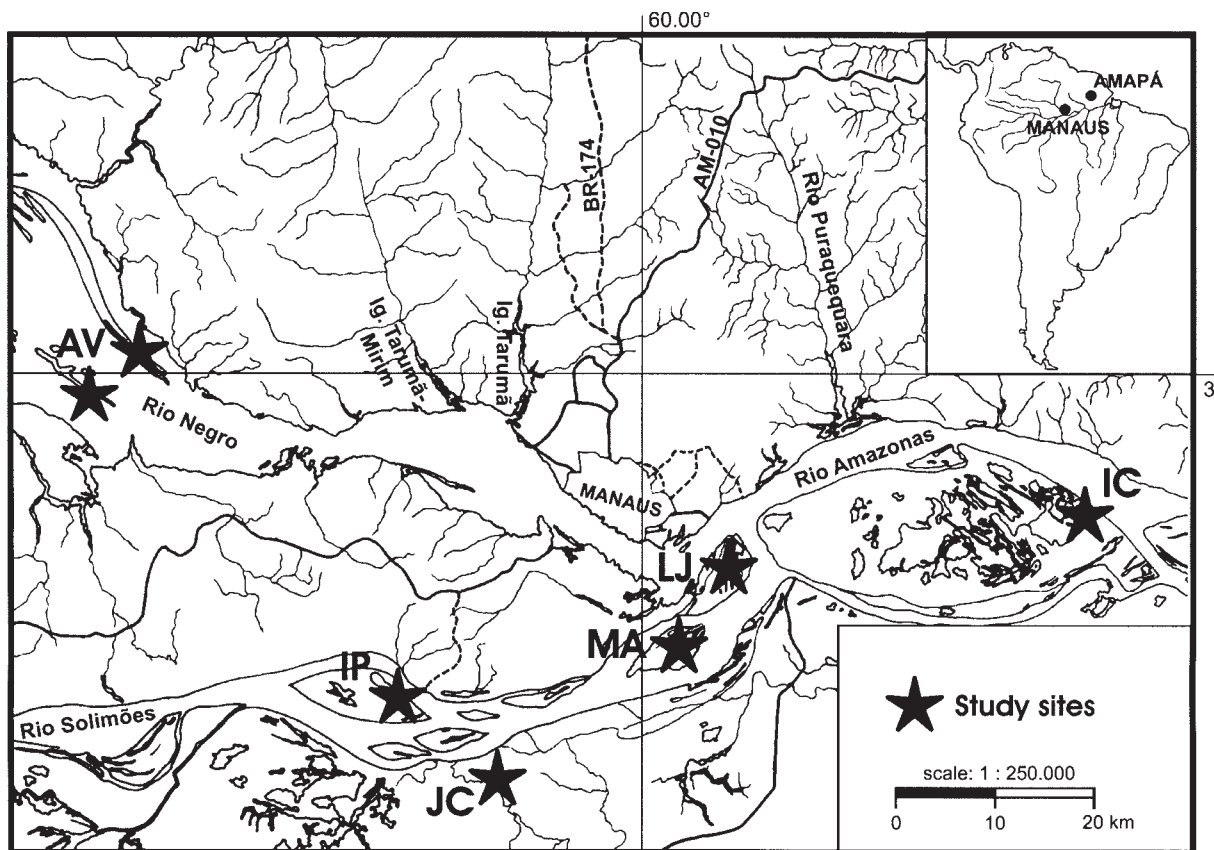
KEY WORDS: Diplopoda, *Poratia insularis*, new records, Brazil.

КЛЮЧЕВЫЕ СЛОВА: Diplopoda, *Poratia insularis*, новые находки, Бразилия.

ABSTRACT. The millipede *Poratia insularis* (Kraus, 1960), previously known from near Iquitos, Peru only, has been found in the environs of Manaus and in Amapá state, Brazil. Apparently being terricolous and restricted to various types of inundation forest in Central Amazonia, and to a palm plantation in eastern Amazonia, this small species appears to be far less

common than the sympatric, often syntopic and similarly trans-Amazonian congener *P. obliterata* (Kraus, 1960). Some illustrations are provided to facilitate the recognition of both these species.

РЕЗЮМЕ. Диплопода *Poratia insularis* (Kraus, 1960), прежде известная только близ Икитоса (Перу),



Map. The Manaus region showing the localities whence *Poratia insularis* material was taken.

Карта. Район Манауса с указанием локалитетов, где был собран материал *Poratia insularis*.

найдена в окрестностях Манауса и в штате Амапа (Бразилия). Очевидно, будучи мелким наземным видом, приуроченным к разным типам затопляемых лесов в Центральной Амазонии и к пальмовой плантации в Восточной Амазонии, он оказался там намного более редким, чем симпатрический, часто синтопический и схожим образом трансамазонский вид *P. obliterated* (Kraus, 1960). Представлены иллюстрации для того, чтобы облегчить различение обоих этих видов.

Although the millipede fauna of Amazonia has recently been reviewed, with special reference to that of the environs of Manaus [Hoffman et al., 2002], the list has since increased with the discovery of *Myrmecodesmus hastatus* (Schubart, 1945) [Bergholz et al., 2004].

Table 1. *Poratia insularis* monitored.\*  
Таблица 1. Наблюдения за *Poratia insularis*.

	Abbr.	Adults (♂♂/♀♀)	Immatures	Sum (%)
<b>Whitewater [AM]</b>				
Ilha do Careiro	IC	19 (8/11)	1	20 (19.2)
Ilha de Marchantaria	MA	16 (9/7)	38	54 (51.9)
Ilha Paciência	IP	0	15	15 (14.4)
Lago Janauacá	JC	9 (2/7)	6	15 (14.4)
Subtotal		<b>44 (19/25)</b>	<b>60</b>	<b>104 (100.0)</b>
<b>Mixedwater [AM]</b>				
Lago Janauari	LJ	55 (33/22)	41	96
<b>Blackwater [AM]</b>				
Anavilhanas	AV	6 (3/3)	0	6
<b>Upland [AP]</b>				
Amapá	AA	2 (1/1)	2	4
<b>Total</b>		<b>107 (56/51)</b>	<b>103</b>	<b>210</b>

\*(1) monitored from April–October 2002 (fortnightly) and March–September 2003 (monthly) on tree trunks in inundation forests at Ilha de Marchantaria (whitewater) and Lago Janauari (mixedwater) in the vicinity of Manaus, Amazonas [AM]/Brazil (leg. N.G.R. Bergholz), (2) collected in June 2002 and July–September 2003 on tree trunks in inundation forests at Ilha do Careiro, Ilha Paciência, Lago Janauacá (whitewater) and Anavilhanas (blackwater), near Manaus, Amazonas [AM]/Brazil (leg. N.G.R. Bergholz), and (3) collected in June 2002 from decaying seeds in an African oil palm plantation (*Elaeis guineensis* Jacq.; Arecaceae) on uplands north of Macará, Amapá [AP]/Brazil (leg. E.L. Oliveira).

1) в апреле–октябре 2002 г. (каждые две недели) и в марте–сентябре 2003 г. (ежемесячно) на стволах деревьев в затопляемых лесах на острове Маршантария (белая вода) и у озера Жанауари (смешанная вода) в окрестностях Манауса (штат Амазонас, Бразилия) (leg. N.G.R. Bergholz), 2) по сборам в июне 2002 г. и июле–сентябре 2003 г. на стволах деревьев в затопляемых лесах на острове Карейру, острове Пасиенсия, у озера Жанауака (белая вода) и у Анавильянас (черная вода) в окрестностях Манауса (штат Амазонас, Бразилия) (leg. N.G.R. Bergholz) и 3) по сборам в июне 2002 г. из гниющих семян на плантации африканской масличной пальмы *Elaeis guineensis* Jacq.; Arecaceae) на незатопляемом участке к северу от Макапа (штат Амапа, Бразилия) (leg. E.L. Oliveira).

The present paper puts on record still one more diplopod new not only to the Manaus region but to Brazil as a whole. This is *Poratia insularis* (Kraus, 1960), a small (5–6 mm long) species previously known only from its original description from Muyuy Island near Iquitos, Peru. Kraus [1960] made it the type species of *Muyudesmus* Kraus, 1960, but currently this genus is considered as a junior subjective synonym of *Poratia* Cook & Cook, 1894 [Golovatch & Sierwald, 2001].

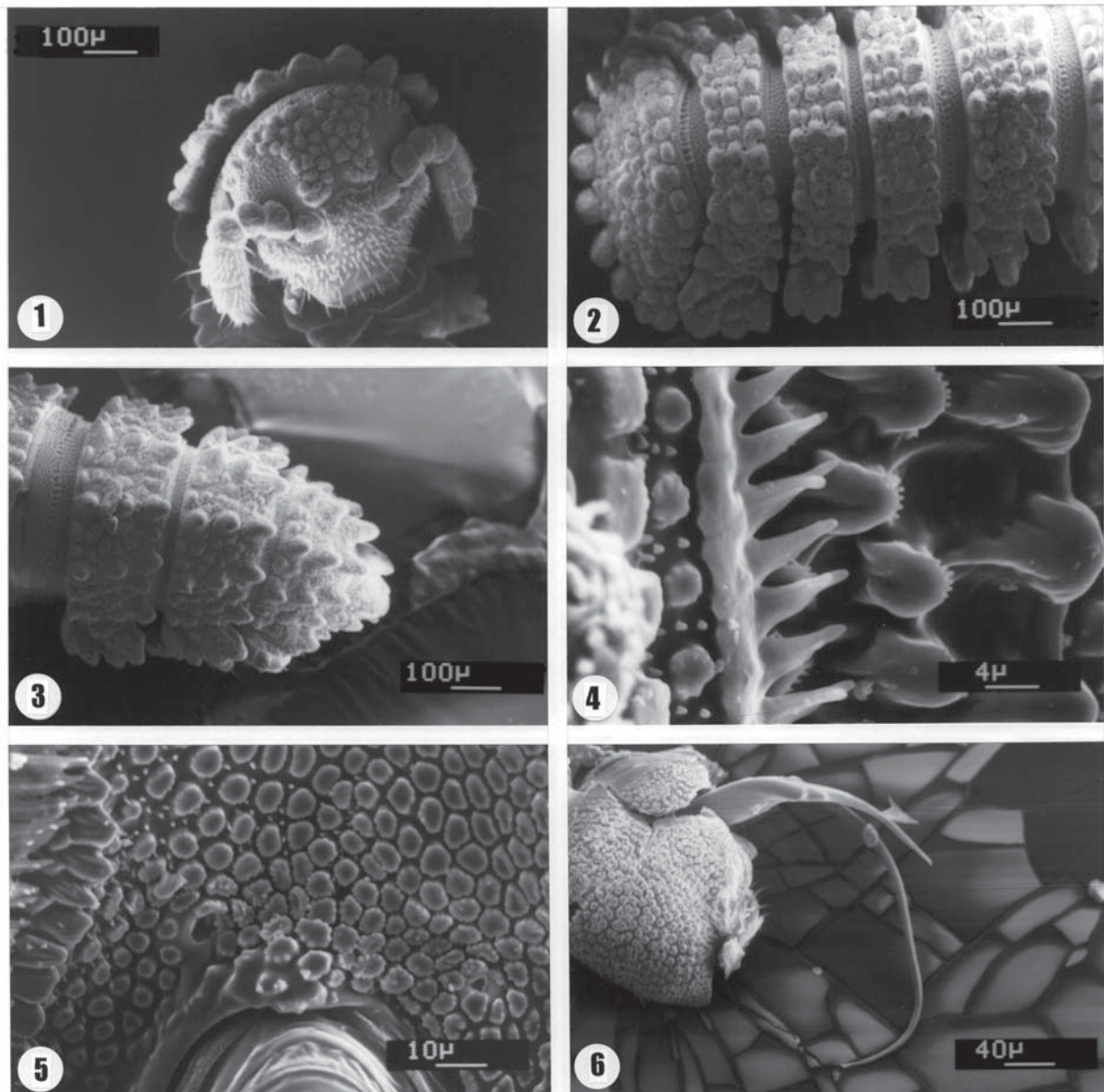
Interestingly, Muyuy Island supported not only *P. insularis* but still another congener, *P. obliterated* (Kraus, 1960). Both these species were taken syntopically on forest floor on that periodically inundated island, with material of *P. obliterated* considerably more abundant than that of *P. insularis* [Kraus, 1960]. Virtually the same has been observed on Ilha de Marchantaria, the

Table 2. *Poratia insularis* monitored.\*\*  
Таблица 2. Наблюдения за *Poratia insularis*.

	Adults (♂♂/♀♀)	Subadults (♂♂/♀♀)	Juveniles, 6th stage (♂♂/♀♀)	Sum (%)
<b>Ilha de Marchantaria</b>				
June 2002	1 (1/0)	0	0	1 (1.8)
July 2002	11 (5/6)	15 (9/6)	10 (4/6)	36 (66.7)
August 2002	2 (1/1)	11 (7/4)	1 (0/1)	14 (25.9)
March 2003	2 (2/0)	1 (1/0)	0	3 (5.6)
Subtotal	<b>16 (9/7)</b>	<b>27 (17/10)</b>	<b>11 (4/7)</b>	<b>54 (100.0)</b>
<b>Lago Janauari</b>				
May 2002	1 (0/1)	0	0	1 (1.0)
July 2002	24 (14/10)	13 (7/6)	3 (0/3)	40 (41.7)
August 2002	8 (7/1)	16 (4/12)	0	24 (25.0)
September 2002	6 (2/4)	1 (1/0)	0	7 (7.3)
March 2003	1 (1/0)	0	0	1 (1.0)
April 2003	1 (0/1)	0	0	1 (1.0)
May 2003	0	1 (1/0)	0	1 (1.0)
June 2003	1 (1/0)	1 (0/1)	0	2 (2.1)
July 2003	2 (2/0)	1 (0/1)	2 (1/1)	5 (5.2)
August 2003	5 (3/2)	1 (1/0)	0	6 (6.3)
September 2003	6 (3/3)	2 (2/0)	0	8 (8.3)
Subtotal	<b>55 (33/22)</b>	<b>36 (16/20)</b>	<b>5 (1/4)</b>	<b>96 (100.0)</b>
<b>Total</b>	<b>71 (42/29)</b>	<b>63 (33/30)</b>	<b>16 (5/11)</b>	<b>150</b>

\*\*monitored during the aquatic phase in April–October 2002 (fortnightly) and March–September 2003 (monthly) on tree trunks in inundation forests at Ilha de Marchantaria (whitewater) and Lago Janauari (mixedwater) in the vicinity of Manaus, Amazonas/Brazil (leg. N.G.R. Bergholz).

наблюдения во время фазы затопления в апреле–октябре 2002 г. (каждые две недели) и в марте–сентябре 2003 г. (ежемесячно) на стволах деревьев в затопляемых лесах на острове Маршантария (белая вода) и у озера Жанауари (смешанная вода) в окрестностях Манауса (штат Амазонас, Бразилия) (leg. N.G.R. Bergholz).

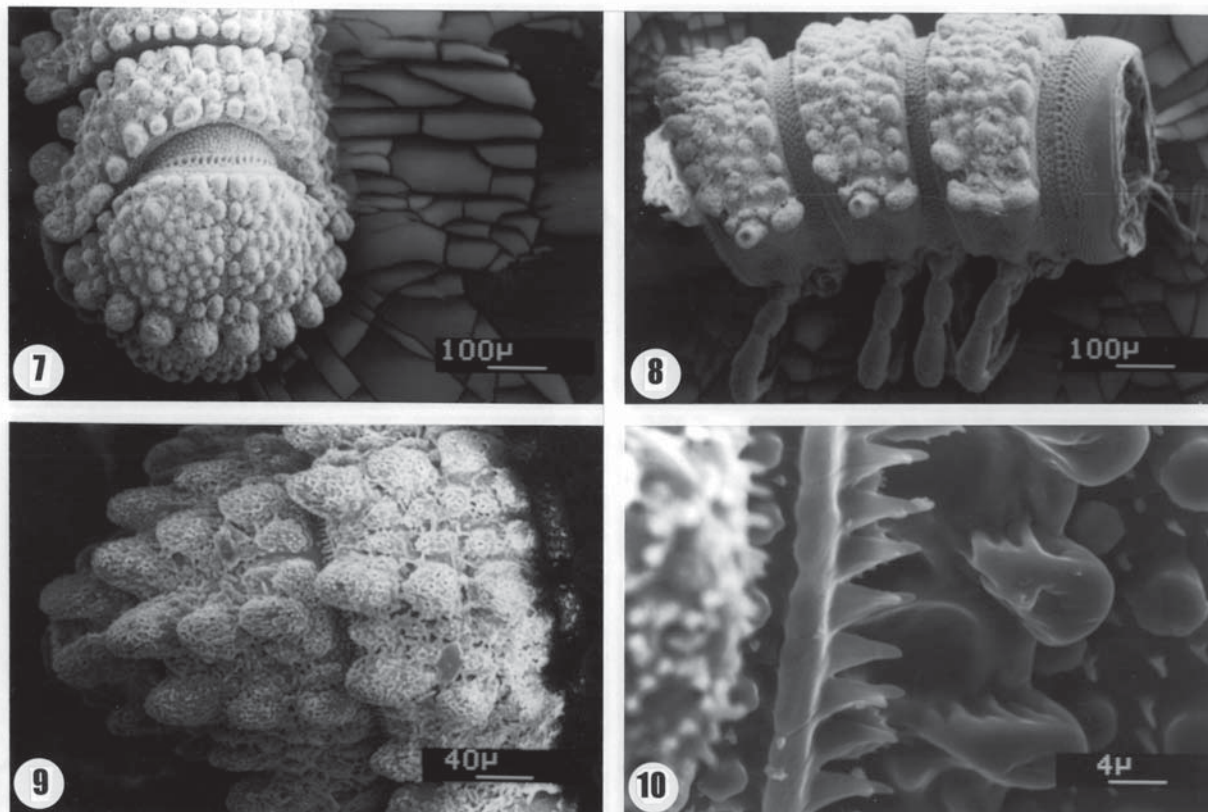


Figs 1–6. Some morphological details of *Poratia insularis* (Kraus, 1960), ♀ (1) and ♂ (2–6): 1 — head and anterior margin of collum, ventral view; 2 — anterior body portion, dorsal view; 3 — caudal body portion, dorsal view; 4 — limbus of a midbody segment; 5 — spiracle region of a midbody segment (a cerotegument missing), lateral view; 6 — right gonopod, lateral view.

Рис. 1–6. Некоторые детали морфологии *Poratia insularis* (Краус, 1960), ♀ (1) и ♂ (2–6): 1 — голова и передний край коллума, вид снизу; 2 — передняя часть тела, вид сверху; 3 — задняя часть тела, вид сверху; 4 — лимбус среднетеловишного сегмента; 5 — район дыхалец среднетеловишного сегмента (церотегумент отсутствует), вид сбоку; 6 — правый гонопод, вид сбоку.

first island in the Amazon River upstream Manaus (Map). Both species appear to coexist there, both were collected on tree trunks above the water-level during inundation but *P. obliterata* dominated (altogether 1.456 specimens collected from all 16 trunks inspected, representing 4 hardwood species, in 2002 and 2003), whereas *P. insularis* only co-occurred on a single tree trunk (*Vitex cymosa* Bertero ex Spreng., Verbenaceae, 54 individuals). Similarly, at Lago Janauari, a mixedwater environment, all 17 trees examined, representing 4 hard-

wood species, supported *P. obliterata* (421 individuals taken in 2002 and 2003), but only 12 of these (representing *Cassia leiandra* Benth., Fabaceae; *Eschweilera ovalifolia* [DC.] Nied., Lecythidaceae; *Macrolobium acaciifolium* [Benth.] Benth., Fabaceae) harboured *P. insularis* as well (a total of 96 specimens). At the other localities, material of *P. insularis* was too scarce to be meaningfully analyzed. Specimens were collected on *Mabea nitida* Spruce ex Benth., Euphorbiaceae; *Macrolobium acaciifolium* and *Nectandra amazonum* Nees,



Figs 7–10. Some morphological details of *Poratia obliterated* (Kraus, 1960), ♂: 7 — anterior body portion, dorsal view; 8 — several midbody segments, lateral view; 9 — caudal body end, dorsal view; 10 — limb of a midbody segment.

Рис. 7–10. Некоторые детали морфологии *Poratia obliterated* (Краус, 1960), ♂: 7 — передняя часть тела, вид сверху; 8 — несколько среднетеловишних сегментов, вид сбоку; 9 — задняя часть тела, вид сверху; 10 — лимбус среднетеловишнего сегмента.

Lauraceae at Ilha do Careiro, on *Mabea nitida* and *Cassia leiandra* at Lago Janauacá and on *Mabea nitida* at Anavilhanas.

*P. insularis* seems thus to be far less common than the sympatric and often syntopic *P. obliterated* known to support bisexual populations all along the Amazon but only parthenogenetic ones in several European hothouses [Adis et al., 2001]. Based on our observations, *P. insularis* is definitely a bisexual species.

The material of *P. insularis* from Brazil is presented below in a tabular form (Tables 1, 2). Most of the samples derived from whitewater (Várzea) habitats, with only a few taken in blackwater (Igapó), mixedwater (Várzea & Igapó) or palm plantation environments. In Central Amazonian inundation forests, this basically terricolous species escapes on tree trunks in response to flooding to pass the aquatic phase in aggregations close to the water line as adults (30/50 % population at MA/LJ, respectively), subadults (50/38 %) or juvenile stage 6 (20/5 %). Apparently no reproduction takes place during inundation periods, as no offspring were found on tree trunks. There the life history seems to be univoltine. In this respect the bionomics of *P. insularis* and *P. obliterated*, like the choice of tree species to escape on as well as the survival strategies, seem very similar if not the same.

We clearly face here another example of trans-Amazonian distribution, with the Amazon serving as a pathway for repeated downstream migrations [Golovatch et al., 1998]. However, the lack of a cerotegument in the spiracle region (Fig. 5) like the one present in *Myrmecodesmus adisi* [Adis & Messner, 1997] prevents survival under water. As *Poratia obliterated* and most other diplopods, *P. insularis* represents the terricolous guild with temporary vertical migrations to trunk and/or canopy as a response and survival strategy to flooding in inundation forests of Amazonia [Adis, 1997].

SEM micrographs of both the species involved (Figs 1–10) are provided to facilitate recognition, *P. insularis* being 19-segmented (versus 20 in *P. obliterated*), with better developed and more strongly differentiated tergal tuberculation, and a long flagelliform solenomere. Further distinctions can be found in Kraus [1960], Adis et al. [2001] and Golovatch & Sierwald [2001].

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