

## The earthworm genus *Pleionogaster* (Clitellata: Megascolecidae) in southern Luzon, Philippines

Samuel W. James\*

Natural History Museum and Biodiversity Research Center, Dyche Hall, 1345 Jayhawk Drive, University of Kansas, Lawrence, KS 66045, USA

Received 2 December 2004; accepted 11 August 2005

### Abstract

An earthworm biodiversity survey of the Philippines has yielded 14 new species of the perichaetine megascolecid genus *Pleionogaster*, previously known from only a few species from scattered Philippine locations. Bicol, the southern peninsula of Luzon, has intact forests on several isolated volcanic peaks and other remote areas. Collections made in these forests yielded the following new species, here presented by type location: Mt. Malinao, *Pleionogaster albayensis*, *P. bicolensis*, *P. castilloi*, *P. malinaoensis*, *P. tiwiensis*; Mt. Isarog, *P. ffitzchae*, *P. isarogensis*; Mt. Bulusan, *P. bulusanensis*, *P. hongii*, *P. sorsogonensis*; Catanduanes Island, *P. nautsae*, *P. viracensis*; Caramoan Peninsula, *P. caramoanensis*, *P. nillosae*. Most of the species were found only in the neighborhood of the type locality, but *P. bicolensis* occurs in two locations in northern Bicol. Intraspecific variation in *P. castilloi* was observed between northern and southern flanks of Mt. Malinao. The importance of several previously overlooked *Pleionogaster* traits is demonstrated by their homogeneity within species reported here.

© 2006 Gesellschaft für Biologische Systematik. Published by Elsevier GmbH. All rights reserved.

**Keywords:** *Pleionogaster*; Megascolecidae; Clitellata; Philippines; Luzon; Bicol

**Full article** published online at <http://www.senckenberg.de/odes/06-08.htm>.

### Introduction

The full descriptions of the new species as well as illustrations, a discussion section, etc., are given in the accompanying Organisms Diversity and Evolution Electronic Supplement (<http://www.senckenberg.de/odes/06-08.htm>).

Holotypes of the new species are deposited in the National Museum of the Philippines Annelid Collection (NMA), P. Burgos St., Manila, Philippines. Additional

depositories: KUNHM – Kansas University Natural History Museum, Lawrence, Kansas USA; UPLBMNH – University of the Philippines Los Baños Museum of Natural History, College, Laguna, Philippines.

Collecting site data include the acronym PTAGS (Philippine Terrestrial Annelid and Gastropod Survey) followed by a location number that uniquely identifies a location in the survey. Latitude and longitude are given in degrees and decimal minutes. Elevations were read from a GPS unit (Magellan Map410) if sufficient satellites were detectable, or from an altimeter. The map datum used in the GPS readings was Luzon.

\*Tel.: +1 641 919 0275.

E-mail address: [sjames@ku.edu](mailto:sjames@ku.edu).

## Taxonomic section

### Genus *Pleionogaster* Michaelsen, 1892

See James (2004).

#### *Pleionogaster tiwiensis* n. sp.

Etymology. Named after Tiwi, the municipality closest to the type locality.

Type material. Holotype (NMA 004134): adult, PTAGS 055, Albay Province, near Tiwi, montane forest on north ridge of Mt. Malinao, 13°25.98'N, 123°37.63'E, 850 m asl, 10 May 2001, leg. S.W. James and A. Castillo. Paratypes (KUNHM 002175): four adults, collecting data as for holotype.

Diagnosis. Unpigmented *Pleionogaster* with both paired and midventral genital markings, four intestinal gizzards in xxvii–xxx, six to ten micronephridia per intestinal segment, closely spaced male and spermathecal pores, intestinal origin in xix, typhlosolar origin in xlvi, latero-parietal blood vessels paired xiv–xvii, holandric with annular testes sacs, spermathecal ducts not differentiated.

#### *P. albayensis* n. sp.

Etymology. Named after the province of Albay in which the species was found.

Type material. Holotype (NMA 004135): adult, PTAGS 055, Albay Province, near Tiwi, montane forest on north ridge of Mt. Malinao, 13°25.98'N, 123°37.63'E, 850 m asl, 10 May 2001, leg. S.W. James and A. Castillo.

Diagnosis. Lightly purple–brown pigmented *Pleionogaster* with both paired and midventral genital markings, about 150 setae in segment vii, four intestinal gizzards in xxvii–xxx, 12 micronephridia per intestinal segment, 0.2 body circumference spaced male and spermathecal pores, intestinal origin in xx, typhlosolar origin in xlvi, latero-parietal blood vessels paired xiv–xvii, holandric with annular testes sacs, spermathecal ducts not differentiated.

#### *P. bicolensis* n. sp.

Etymology. Named after the province of Bicol in southern Luzon, because the species was collected in several locations in this region.

Type material. Holotype (NMA 004136): adult, PTAGS 056, Albay Province, Barangay Jarod, upper montane forest on south ridge of Mt. Malinao, 13°23.96'N, 123°37.16'E, 1030 m asl, 11 May 2001, leg.

S.W. James and A. Castillo. Paratypes: one adult (KUNHM 002176), one adult (UPLBMHN Z-NS-0083); collecting data as for holotype.

Diagnosis. Deep brown pigmented *Pleionogaster* with only paired genital markings, about 130–220 setae in segment vii, four intestinal gizzards in xxvii–xxx, 12 micronephridia per intestinal segment, 0.17 body circumference spaced male and spermathecal pores, intestinal origin in xix or xx, typhlosole lacking, intestinal constriction lvii, latero-parietal blood vessels paired xiv–xv, holandric with testes sacs open ventrally, spermathecal ducts differentiated from ampulla.

#### *P. bulusanensis* n. sp.

Etymology. Named after the mountain on which the species was discovered.

Type material. Holotype (NMA 004137): preclitellate adult, PTAGS 051, Sorsogon Province, Bulusan National Park, dipterocarp forest at Bulusan Lake, 12°45.32'N, 124°05.34'E, 360 m asl, 3 May 2001, leg. S.W. James, A. Castillo, K. James and P. James. Paratype (KUNHM 002179): one juvenile; collecting data as for holotype.

Diagnosis. Unpigmented *Pleionogaster* with only paired genital markings, about 200 setae in segment vii, eight to ten setae between male pores, four intestinal gizzards in xxvii–xxx, 14 micronephridia per intestinal segment, 0.15–0.17 body circumference spaced male and spermathecal pores, intestinal origin in xx, typhlosole lacking, intestinal constriction lv, latero-parietal blood vessels paired xiv–xvi, holandric with annular testes sacs, arc-shaped seminal vesicles, spermathecal ducts not differentiated from ampulla.

#### *P. hongii* n. sp.

Etymology. Named after Dr. Hong Yong, a Korean earthworm specialist who is part of the PTAGS research team.

Type material. Holotype (NMA 004138): adult, PTAGS 051, Sorsogon Province, Bulusan National Park, dipterocarp forest at Bulusan Lake, 12°45.32'N, 124°05.34'E, 360 m asl, 3 May 2001, leg. S.W. James, A. Castillo, K. James and P. James. Paratype (KUNHM 002180): adult; collecting data as for holotype.

Diagnosis. Faint pink pigmented *Pleionogaster* with only paired genital markings, about 176 setae in segment vii, 20 setae between male pores, four intestinal gizzards in xxvii–xxx, 12 micronephridia per intestinal segment, 0.18–0.19 body circumference spaced male and spermathecal pores, intestinal origin in xx, typhlosolar origin xlvi, intestinal constriction xlv, latero-parietal

blood vessels paired xv–xvii, holandric with annular testes sacs, spermathecal ducts not differentiated from ampulla.

***P. ffitcheae* n. sp.**

**Etymology.** Named after Jana Ffitch, who as an undergraduate student participated in the fieldwork and initial cataloging of the 2001 expedition collections.

**Type material.** Holotype (NMA 004139): adult, PTAGS 060, Camarines Sur Province, montane forest on Mt. Isarog, 13°39.90'N, 123°21.89'E, 1100 m asl, 14 May 2001, leg. Y. Hong, M. Levi, J. Ffitch, P. Nillos and R. Abiada. Paratype (KUNHM 002181): adult; collecting data as for holotype.

**Diagnosis.** Medium brown pigmented *Pleionogaster* with only paired genital markings, about 220 setae in segment vii, eight setae between male pores, four intestinal gizzards in xxvii–xxx, 12 micronephridia per intestinal segment, 0.18–0.19 body circumference spaced male and spermathecal pores, intestinal origin in xix, typhlosolar origin 50/51–liv, intestinal constriction xlix, latero-parietal blood vessels paired xiv–xvi, holandric with annular testes sacs, spermathecal ducts not differentiated from ampulla, genital marking glands present.

***P. viracensis* n. sp.**

**Etymology.** Named after Virac, the capitol city of Catanduanes Province and the large town nearest to the type locality.

**Type material.** Holotype (NMA 004140): adult, PTAGS 068, Catanduanes Province, low-elevation forest near Barangay Summit, Buradan, 13°43.60'N, 124°17.14'E, 210 m asl, 21 May 2001, leg. S.W. James, P. James, J. James, K. James, J. Ffitch and A. Castillo. Paratype (KUNHM 002183): adult; collecting data as for holotype.

**Diagnosis.** Medium brown pigmented *Pleionogaster* with midventral and paired genital markings, about 200 setae in segment vii, 10 setae between male pores, four intestinal gizzards in xxvii–xxx, ten micronephridia per intestinal segment, male and spermathecal pores, respectively, spaced 0.17, 0.13 of body circumference, collecting data as for holotype, intestinal origin in xix, typhlosolar origin lii, intestinal constriction lii, latero-parietal blood vessels paired xiv, xv, holandric with annular testes sacs, spermathecal ducts differentiated from ampulla.

***P. isarogensis* n. sp.**

**Etymology.** Named for Mt. Isarog, on which the species was found over a wide elevational range.

**Type material.** Holotype (NMA 004141): adult, PTAGS 065, Camarines Sur Province, upper montane forest soils on Mt. Isarog, 13°39.75'N, 123°21.98'E, 1500 m asl, 16 May 2001, leg. S.W. James, Y. Hong, M. Levi, J. Ffitch, P. Nillos, R. Abiada and R. Lazaro. Paratypes: three adults (KUNHM 002184), four adults (UPLBMNH Z-NS-0088); collecting data as for holotype.

**Diagnosis.** Unpigmented *Pleionogaster* with only mid-ventral genital markings, about 180 setae in segment vii, four to eight setae between male pores, four intestinal gizzards in xxvii–xxx, six micronephridia per intestinal segment, male and spermathecal pores respectively spaced 0.11, 0.10 of body circumference, intestinal origin in xx, typhlosolar origin xlii, intestinal constriction xli, latero-parietal blood vessels paired xv, holandric with annular testes sacs in x, open dorsally in xi, spermathecal ducts differentiated from ampulla.

***P. malinaoensis* n. sp.**

**Etymology.** Named after the mountain on which the material was collected.

**Type material.** Holotype (NMA 004142): adult, PTAGS 055, Albay Province, near Tiwi, montane forest on north ridge of Mt. Malinao, 13°25.98'N, 123°37.63'E, 850 m asl, 10 May 2001, leg. S.W. James and A. Castillo. Paratype (KUNHM 002189): adult; collecting data as for holotype.

**Diagnosis.** Unpigmented *Pleionogaster* with post-clitellar paired and midventral genital markings, about 160 setae in segment vii, two to four setae between male pores, five intestinal gizzards in xxv–xxix, 10–12 micronephridia per intestinal segment, 0.10 body circumference spaced male and spermathecal pores, intestinal origin in xx, typhlosolar origin xlv, intestinal constriction xlv, latero-parietal blood vessels paired xiv–xvii, holandric with annular testes sacs, spermathecal ducts differentiated from ampulla.

***P. castilloi* n. sp.**

**Etymology.** Named after Augusto Castillo, one of the PTAGS logistics coordinators, who discovered unknown reserves of strength climbing the crater wall of Mt. Malinao.

**Type material.** Holotype (NMA 004143): adult, PTAGS 055, Albay Province, near Tiwi, montane forest on north ridge of Mt. Malinao, 13°25.98'N, 123°37.63'E, 850 m asl, 10 May 2001, leg. S.W. James and A. Castillo. Paratype (KUNHM 002191): adult; collecting data as for holotype.

Diagnosis. Unpigmented *Pleionogaster* with only midventral post-clitellar genital markings, about 160 setae in segment vii, six to eight setae between male pores, five to seven intestinal gizzards in xxv, xxvi–xxix, xxx, xxxi, six micronephridia per intestinal segment, 0.17 body circumference spaced male and spermathecal pores, intestinal origin in xx, typhlosolar origin xlvii, intestinal constriction xlv, latero-parietal blood vessels paired xiv–xvii, holandric with annular testes sacs, spermathecal ducts differentiated from ampulla.

***P. nillosae* n. sp.**

Etymology. Named after Portia Nillos, one of the PTAGS logistics coordinators.

Type material. Holotype (NMA 004144): preclitellate adult, PTAGS 122, Camarines Norte Province, Caramoan Peninsula, low-elevation forest on karst, 13°45.29'N, 123°53.81'E, 346 m asl, 22 May 2001, leg. Y. Hong, M. Levi and P. Nillos. Paratype (KUNHM 002193): juvenile; collecting data as for holotype.

Diagnosis. Unpigmented *Pleionogaster* with only paired post-clitellar genital markings, about 314 setae in segment vii, zero setae between male pores, six intestinal gizzards in xxiv–xxix, eight to ten micronephridia per intestinal segment, 0.2 body circumference spaced male and spermathecal pores, intestinal origin in xx, typhlosolar lacking, intestinal constriction i–iv, latero-parietal blood vessels not seen, holandric with annular testes sacs, spermathecal ducts differentiated from ampulla; genital marking glands may be present.

***P. caramoanensis* n. sp.**

Etymology. Named for the Caramoan Peninsula on the eastern side of Bicol.

Type material. Holotype (NMA 004145): adult, PTAGS 123, Camarines Norte Province, Caramoan Peninsula, low-elevation forest on karst, 13°41.77'N, 123°54.02'E, 350 m asl, 23 May 2001, leg. Y. Hong, M. Levi and P. Nillos. Paratype (KUNHM 002194): adult; collecting data as for holotype.

Diagnosis. Unpigmented *Pleionogaster* with only paired post-clitellar genital markings, 170–250 setae in segment vii, six setae between male pores, three intestinal gizzards in xxvi–xxvii or xxvii–xxix, four to six micronephridia per intestinal segment, 0.14 body circumference spaced male and spermathecal pores, intestinal origin in xix, typhlosolar origin xxxix, intestinal constriction xxxix, latero-parietal blood vessels xvi, xvii, holandric with annular testes sacs, spermathecal ducts differentiated from ampulla.

***P. sorsogonensis* n. sp.**

Etymology. Named after the province that includes the type locality.

Type material. Holotype (NMA 004146): adult, PTAGS 051, Sorsogon Province, Bulusan National Park, dipterocarp forest at Bulusan Lake, 12°45.32'N, 124°05.34'E, 360 m asl, 3 May 2001, leg. S.W. James, A. Castillo, K. James and P. James.

Diagnosis. Unpigmented *Pleionogaster* with midventral pre- and post-clitellar, and paired post-clitellar genital markings, 120 setae in segment vii, two setae between male pores, five intestinal gizzards in xxv–xxix, four micronephridia per intestinal segment, male and spermathecal pores, respectively, spaced 0.15, 0.11 of body circumference, intestinal origin in xix, typhlosolar origin xl, intestinal constriction 38/39, latero-parietal blood vessels not seen, holandric with annular or possibly ventrally interrupted testes sacs, spermathecal ducts not differentiated from ampulla.

***P. nautsae* n. sp.**

Etymology. Named after Phyllis Nauts of Connecticut, USA, as a gift from her husband.

Type material. Holotype (NMA 004147): adult, PTAGS 071, Catanduanes Province, lower riparian forest near Barangay San Miguel, Pangabinan, LMK039, 13°54.5'N, 124°11.0'E, 212 m asl, 23 May 2001, leg. S.W. James, J. Fitch and A. Castillo. Paratypes (KUNHM 002196): two adults; collecting data as for holotype.

Diagnosis. Unpigmented *Pleionogaster* with midventral pre- and post-clitellar genital markings, 170–264 setae in segment vii, zero to seven setae between male pores, six intestinal gizzards in xxiv–xxix, eight micronephridia per intestinal segment, 0.13 body circumference spaced male and spermathecal pores, intestinal origin in xx or xxi, typhlosolar origin liii, intestinal constriction li, latero-parietal blood vessels xv, holandric with annular testes sacs, spermathecal ducts not differentiated from ampulla.

## Reference

- James, S.W., 2004. New species of *Amyntas*, *Pheretima* and *Pleionogaster* (Clitellata: Megascolecidae) of the Mt. Kitanglad Range, Bukidnon, Mindanao Island, Philippines. *Raffles Bull. Zool.* 52, 289–313.