

Two New Species of the Genus *Filippinodillo* (Isopoda, Oniscidea, Armadillidae) from Philippines

Dae Soo Jeon and Do Heon Kwon*

(Department of Biology, Inje University, Kimhae 621-749, Korea)

ABSTRACT

Filippinodillo flavimaculis and *F. palawanensis* from Philippines, are described as new species. For the presence of a ledge on pereonal epimeron 1, *F. flavimaculis* resembles both of the previously known species, *F. maculatus* Schmalzfuss, 1987 and *F. kimberleyensis* Lewis, 1998, but differs from *F. maculatus* in the shape of frontal shield and from *F. kimberleyensis* in the shape of ventral surface of pereonal epimera 3-7 and pleonal epimeron 3. *F. palawanensis* is easily distinguished from all the others in the genus by the shape of the pereonal epimeron 1 not forming a ledge and with lateral margin grooved entirely.

Key words: Crustacea, Oniscidea, Armadillidae, *Filippinodillo*, new species, Philippines

INTRODUCTION

The genus *Filippinodillo* was instituted by Schmalzfuss (1987) to accommodate a new species, *F. maculatus* collected in the Philippines. Recently, Lewis (1998) described the second species of the genus, *F. kimberleyensis* from Australia.

Authors and Miss M. H. Kim collected diverse armadillids from five times of field trip to Philippines during the period from 1992 to 2000. This paper deals with two new species which belong to the genus *Filippinodillo* in our collection from Philippines. They are described with

* Corresponding author: Do Heon Kwon
E-mail: biodhkwo@ijn.inje.ac.kr, Tel: 055-320-3263

illustrations of diagnostic characters.

The specimens examined are deposited in the Museo Zoologico "La Specola" dell'Università, Firenze (MZUF) and the Department of Biology, Inje University, Kimhae (IJB).

SYSTEMATIC ACCOUNT

Genus *Filippinodillo* Schmalfuss, 1987

Filippinodillo Schmalfuss, 1987: 253.

Type species. *Filippinodillo maculatus* Schmalfuss, 1987 by original designation and monotypy.

Remarks. *Filippinodillo* is characterized as follows: Cephalon with frontal shield well developed, protruding above vertex. Pereonal epimeron 1 with lateral part strongly turned outwards, occasionally forming a ledge perpendicular to dorsal surface; lateral margin grooved and postero-lateral corner with a schisma. Pereonal epimeron 2 with an oblique tooth-like process on ventral surface. Pereon, pleon and telson with closed outline. Telson hour-glass shaped, with apex wider than central part. Maxillular exopod with 4+6 teeth; endopod with two short and stout penicils in the shape of a shaving-brush. Each pleopodal exopod with a polyspiracular covered lung. Minute uropodal exopod inserted on dorsal surface of protopod, beneath an oblique protuberance (modified from Schmalfuss, 1987).

The presence of the ledge on pereonal epimeron 1 was stated by Schmalfuss (1987) as a unique character of the genus *Filippinodillo* that had not been found in any other genera of the family Armadillidae. One of the two new species in this paper, *F. flavimaculis*, as well as both of the previously recorded species, *F. maculatus* and *F. kimberleyensis*, has it. The other new species, *F. palawanensis*, does not have the ledge in dorsal view, but the ventral surface of the pereonal epimeron 1 shows nearly right-angled cross sectional view.

The structure of pleopodal lung is considered to be one of important generic characters while this character was not mentioned by Lewis (1998) in the description for *F. kimberleyensis*. *F. maculatus* and following two new species have polyspiracular covered lungs on the pleopodal exopods as defined by Taiti, Paoli and Ferrara (1998) based on the species of *Troglodillo* Jackson, 1937 (Kwon and Taiti, 1993). Polyspiracular covered lung consists of a large perispiracular area in the form of polygonal protuberances with a very complex surface on dorsal side of pleopodal exopod on which several spiracles as narrow longitudinal cleft are present. Each spiracle is connected to a respiratory tree inside the pleopodal exopod.

Filippinodillo flavimaculis, n. sp. (Figs. 1-3)

Material examined. Holotype: ♂, dimension 16.9×8.0 mm, Mindanao, Misamis Oriental, Initao National Park, 19 Jan. 1996, leg. D.H. Kwon and D.S. Jeon (MZUF). Paratypes: 7 ♂♂, 13 ♀♀, same data as holotype (MZUF); 8 ♂♂, 13 ♀♀, same data (IJB).

Description. Maximum dimension of male 17.3×8.1 mm, of female 19.2×9.2 mm. Color in alcohol brown or dark brown mottled with irregular large yellow spots. Dorsum smooth and densely covered with minute scale-spines. One nodulus lateralis per side on each pereonite; noduli laterales on all pereonites more or less at same distance from lateral margin. Eye with 18-20 (rarely 17)

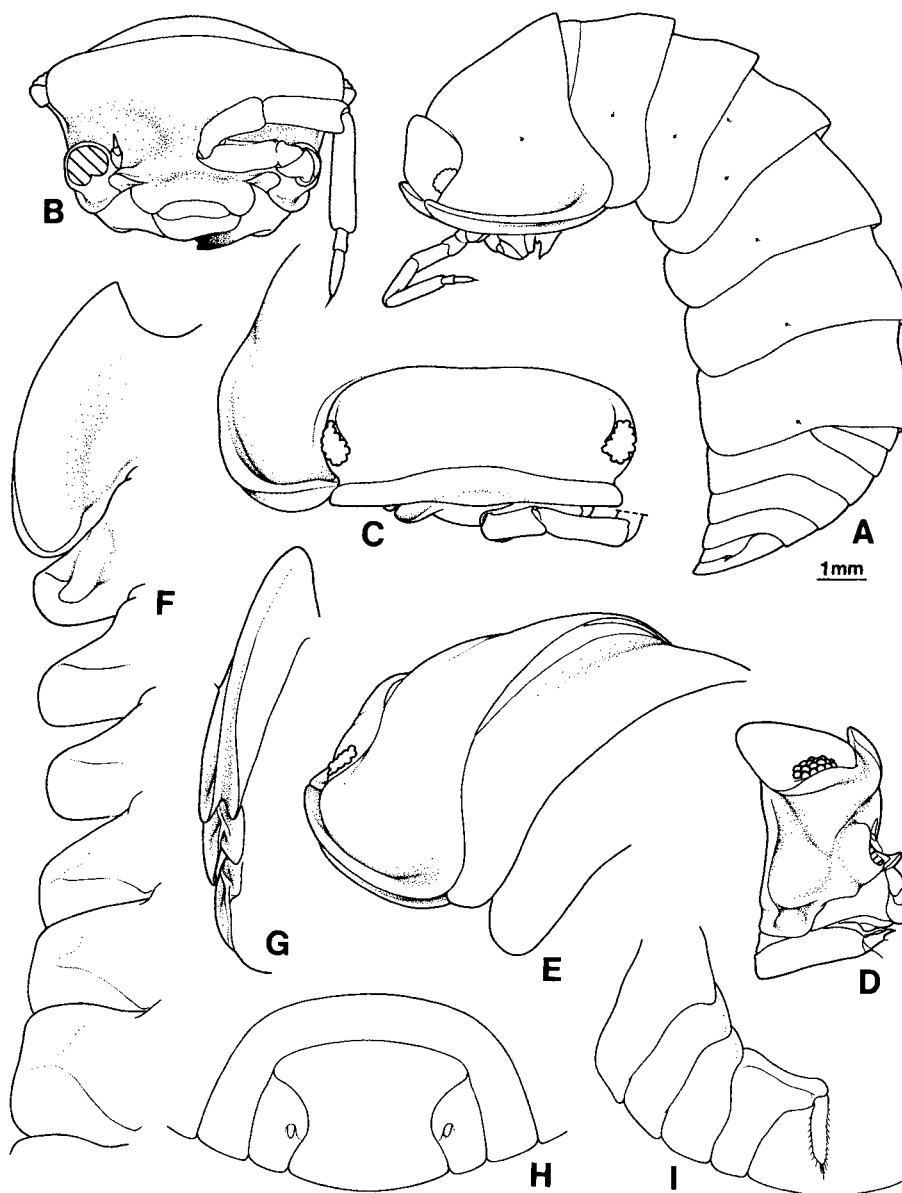


Fig. 1. *Filippinodillo flavimaculis*, n. sp., paratype male: A, habitus, lateral view; B, cephalon, frontal view; C, cephalon and pereonite 1, dorsal view; D, cephalon, lateral view; E, cephalon and pereonites 1-3, postero-lateral view; F, pereonial epimera 1-7, ventral view; G, pereonial epimera 1-3, view from bottom; H, pleonites 4-5, telson and uropods, dorsal view; I, pleonial epimera 3-5, telson and right uropod, ventral view.

ommatidia. Cephalon with frontal shield markedly protruding above vertex, bent backwards and broadly rounded at sides. Pereonial epimeron 1 thickened with upturned lateral part forming a ledge perpendicular to dorsal surface, bounded mesially by deep furrow parallel to lateral margin; lateral margin grooved on posterior half; postero-lateral corner with two lobes separated by a deep

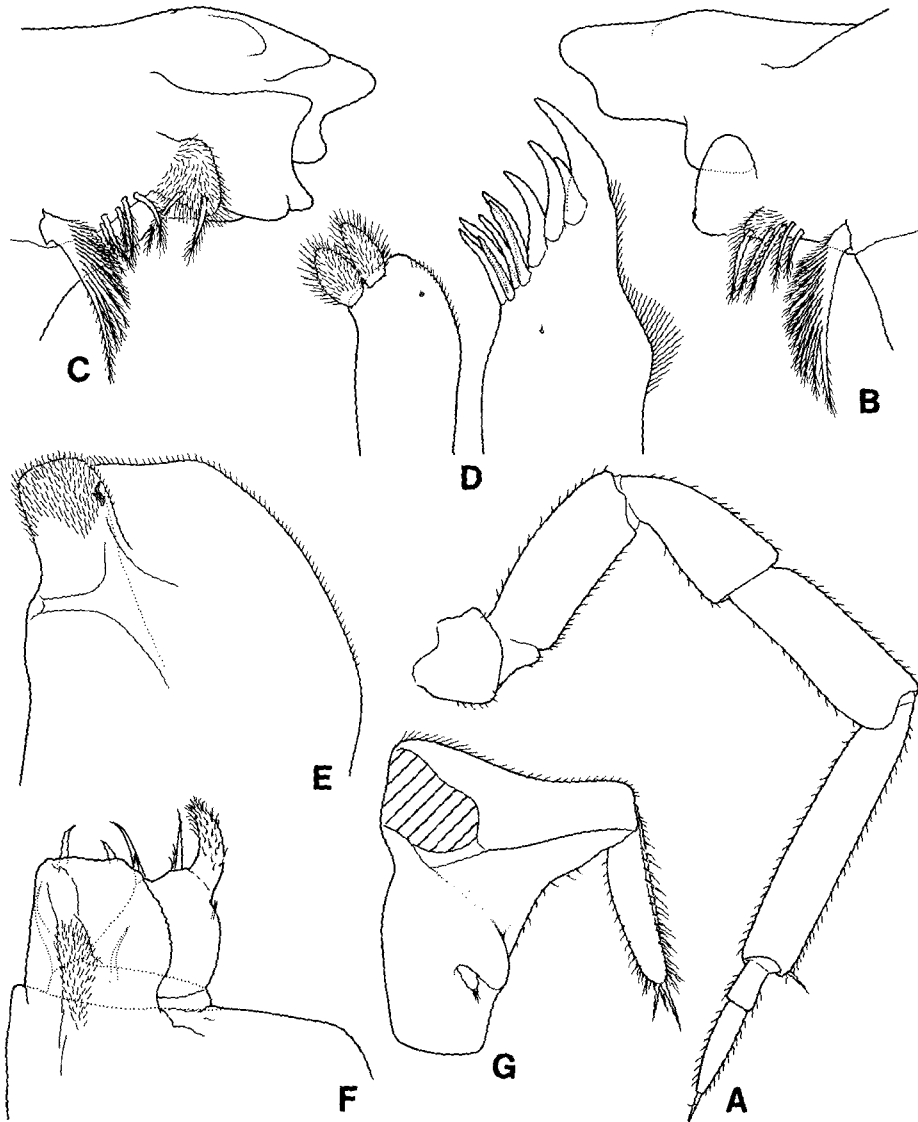


Fig. 2. *Filippinodillo flavimaculis*, n. sp., paratype female: A, antenna; B, right mandible; C, left mandible; D, maxillule, caudal view; E, maxilla, rostral view; F, maxilliped, rostral view; G, left uropod, dorsal view.

schisma, with ventral lobe shorter than dorsal one; schisma connected to groove on lateral margin. Pereonal epimeron 2 with an oblique tooth-like process on ventral surface. Each of pereonal epimera 3-7 with a thickening on anterior part of ventral surface, ones on posterior pereonites progressively lower and larger. Telson hour-glass shaped, with basal part wider than distal one, distal margin broadly rounded. Antenna with fifth article of peduncle about twice as long as flagellum; distal article of flagellum about twice as long as proximal one. Mandible with molar penicil consisting of numerous plumose setae of increasing length, arising from a common stem;

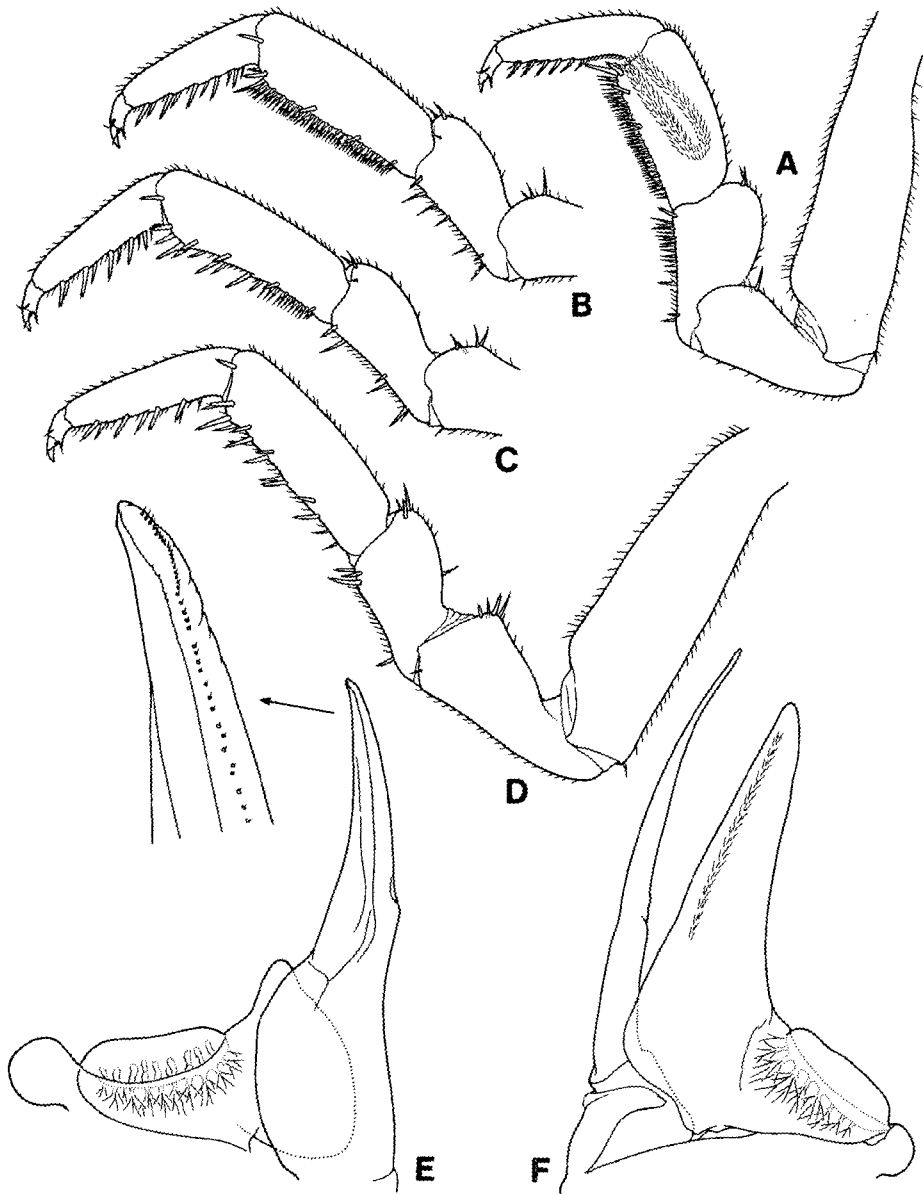


Fig. 3. *Filippinodillo flavimaculis*, n. sp., paratype male: A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 7; E, pleopod 1; F, pleopod 2.

right mandible with 5 (rarely 7) and left one with 8 penicils between molar penicil and lacinia mobilis. Maxillular exopod with 4 stout outer teeth and 6 slender inner ones; endopod with two short unequal stout penicils. Maxilla two-lobed, with setose inner lobe slightly longer than outer one, bearing 3 curved setae stronger than the other ones, near outer margin of rostral surface; outer lobe much larger than inner one, bearing setose caudal surface (not seen in Fig. 2E) and

truncate distal margin. Maxillipedal endite with 3 stout setae on distal margin; palp reduced, two-segmented with distal segment bearing slender distal part divided from proximal one by indistinct suture line and bearing two long, stout setae on inner margin of proximal part. Pereopod 1 shortest of all; carpus shortest and widest than any carpi of other pereopods, with a setose groove on rostral surface. Pereopods 2-7 similar in length and shape except for shape of ischia with distal corners of tergal margins rounded on pereopods 2-4 and nearly right-angled on 5-7. Each pleopodal exopod with a polyspiracular covered lung (Taiti, Paoli and Ferrara, 1998). Uropodal protopod trapezoidal, fitting in gap between pleonal epimeron 5 and telson tightly, with mesial margin concave; minute exopod inserted on dorsal surface of protopod, beneath an oblique protuberance; endopod about 0.6 times as long as protopod, with grooved outer margin and three stout apical setae.

Female. Pleopod 1 exopod reduced, oval; endopod absent. Pleopod 2 exopod about twice as wide as long, with outer-distal margin concave and apex rounded; endopod vestigial, horn-shaped. Pleopod 3 exopod largest of all, much wider than long, with outer-distal margin concave. Pleopodal exopods 4 and 5 with outer-distal margin nearly straight.

Male. Pereopod 1 carpus, distal part of pereopod 1 merus, pereopod 2 carpus and proximal part of pereopod 3 carpus with a brush of setae on sternal margin (distal part of pereopod 2 merus with a brush in a few specimens). Pleopod 1 exopod not reduced, much wider than long; endopod with apex slightly bent outwards. Pleopod 2 exopod about 1.5 times as long as wide; endopod longer than exopod. Pleopod 3 exopod longer than wide, with distal part narrow. Pleopodal exopods 4 and 5 as in female.

Etymology. Latin, flavus = yellow + macula = spot.

Remarks. For the presence of a ledge on pereonal epimeron 1, *F. flavimaculis* resembles both of the previously known species, *F. maculatus* Schmalzfuss, 1987 from Cebu, Philippines and *F. kimberleyensis* Lewis, 1998 from Walcott Inlet, Australia. This new species resembles *F. maculatus* in the groove on posterior half of lateral margin of pereonal epimeron 1. In *F. kimberleyensis*, posterior 1/3 of lateral margin of pereonal epimeron 1 grooved. This new species differs from *F. maculatus* in the shape of frontal shield which is bent backwards at the upper part and broadly rounded at the sides. Unlike *F. kimberleyensis*, it does not have ventral thickening on pleonal epimeron 3 and transverse ridge posteriorly on each pereonal tergite. Differences between *F. flavimaculis* and *F. kimberleyensis* are also found in ventral thickenings on pereonal epimera 3-7. While the ventral thickenings are present on the pereonal epimera 3-7 of the former, they are weaker than those of the latter and not bounded posteriorly by sharp groove.

***Filippinodillo palawanensis*, n. sp. (Figs. 4-5)**

Material examined. Holotype: ♂, dimension 11.9 × 5.4 mm, Palawan, Puerto Princesa, Iwahig, Balsahan, 20 Apr. 1997, leg. D.H. Kwon and D.S. Jeon (MZUF). Paratypes: 23 ♂♂, 37 ♀♀, same data as holotype (MZUF); 24 ♂♂, 37 ♀♀, same data (IJB).

Description. Maximum dimension of male 12.3 × 5.6 mm, of female 15.6 × 7.4 mm. Color in alcohol dark brown mottled with irregular yellow spots (sometimes lacking). Dorsum smooth and densely covered with minute scale-spines. One nodulus lateralis per side on each pereonite; noduli laterales on all pereonites more or less at same distance from lateral margin. Eye with 20-21

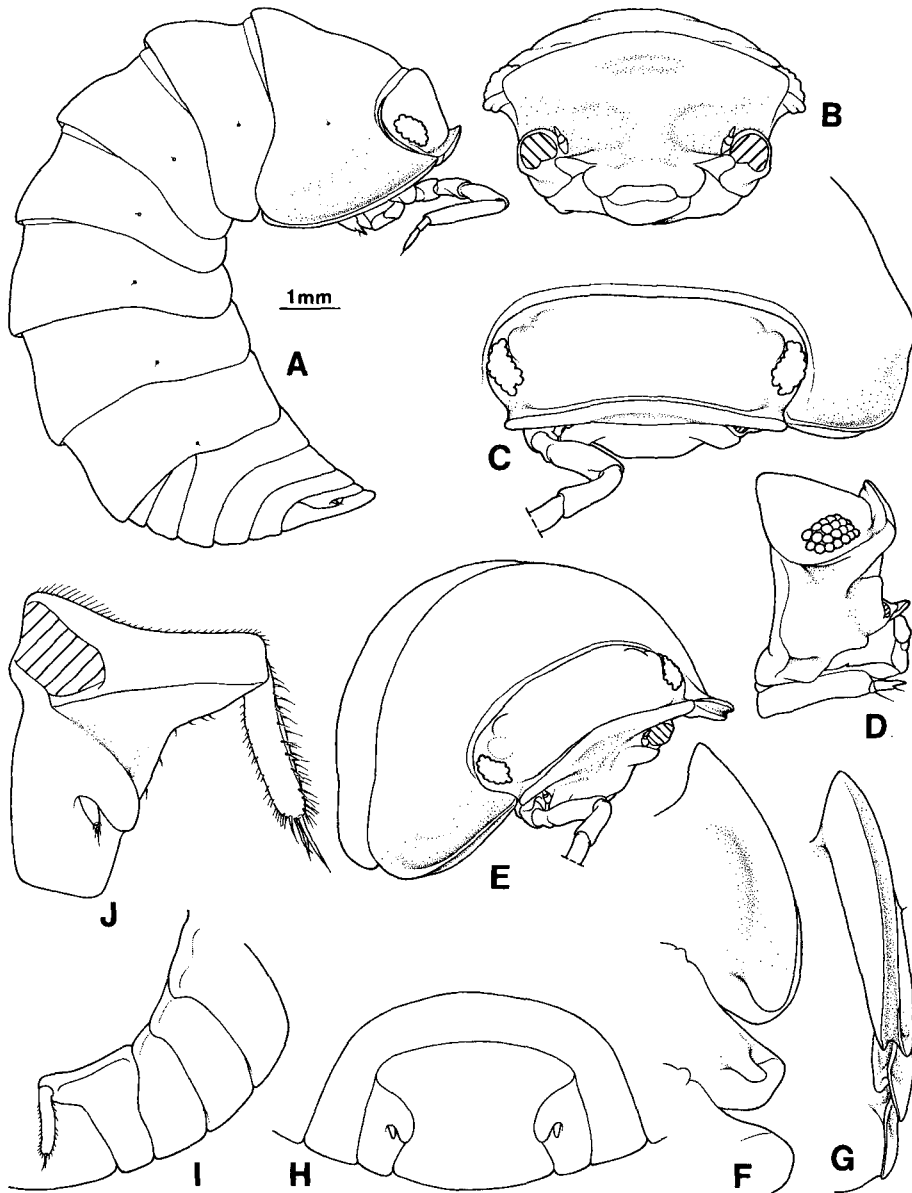


Fig. 4. *Filippinodillo palawanensis*, n. sp., paratype female: A, habitus, lateral view; B, cephalon, frontal view; C, cephalon and pereonite 1, dorsal view; D, cephalon, lateral view; E, cephalon and pereonites 1-2, antero-lateral view; F, pereonite epimera 1-3, ventral view; G, pereonite epimera 1-3, view from bottom; H, pleonites 4-5, telson and uropods, dorsal view; I, pleonite epimera 3-5, telson and left uropod, ventral view; J, left uropod, dorsal view.

ommatidia. Cephalon with frontal shield markedly protruding above vertex and slightly protruding laterally at corners; middle of profrons with a shallow transverse depression. Pereonite epimera 1

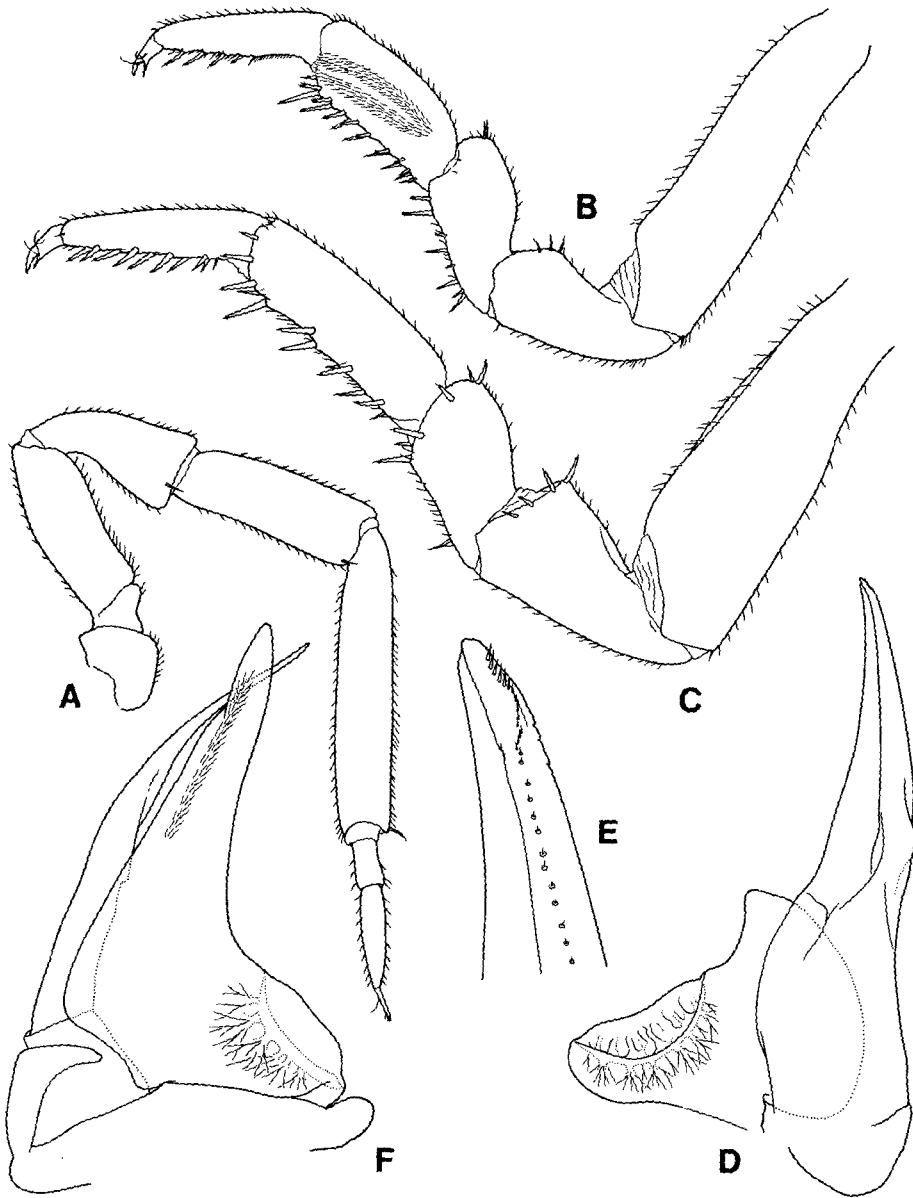


Fig. 5. *Filippinodillo palawanensis*, n. sp., paratype male: A, antenna; B, pereopod 1; C, pereopod 7; D, pleopod 1; E, distal part of pleopod 1 endopod; F, pleopod 2.

thickened with lateral part strongly turned outwards, showing cross sectional view broadly concave and nearly right-angled on dorsal and ventral surface, respectively; lateral margin grooved entirely; postero-lateral corner with two lobes separated by a deep schisma, with ventral lobe shorter than dorsal one; schisma connected to groove on lateral margin. Pereonal epimeron 2 with an oblique tooth-like process on ventral surface. Pereonal epimeron 3 with a distinct, even if low, thickening

on anterior part of ventral surface. Telson hour-glass shaped, with basal part wider than distal one, distal margin broadly rounded. Antenna with fifth article of peduncle about twice as long as flagellum; distal article of flagellum about twice as long as proximal one. Right mandible with 5 and left one with 8-10 penicils between molar penicil and lacinia mobilis. The other mouth parts as in *F. flavimaculis*, n. sp. Pereopod 1 shortest of all; carpus shortest and widest than any carpi of other pereopods, with a setose groove on rostral surface. Pereopods 2-7 similar in length and shape except for shape of ischia with distal corners of tergal margins obtuse on pereopods 2-4 and nearly right-angled on 5-7. Each pleopodal exopod with a polyspiracular covered lung. Uropodal protopod trapezoidal, fitting in gap between pleonal epimeron 5 and telson tightly, with mesial margin concave; minute exopod inserted on dorsal surface of protopod, beneath an oblique protuberance; endopod over half the length of protopod, with grooved outer margin and three stout apical setae.

Female. Pleopod 1 exopod reduced, oval; endopod absent. Pleopod 2 exopod about twice as wide as long, with outer-distal margin concave and apex rounded; endopod vestigial, horn-shaped. Pleopod 3 exopod largest of all, much wider than long, with outer-distal margin concave. Pleopod 4 exopod with outer-distal margin concave and mesial margin straight. Pleopod 5 exopod with outer-distal margin straight.

Male. Pereopods without particular modifications. Pleopod 1 exopod not reduced, wider than long, with triangular distal part bent outwards; endopod with apex slightly bent outwards. Pleopod 2 exopod more than 1.5 times as long as wide; endopod abruptly bent outwards, longer than exopod. Pleopod 3 exopod longer than wide, with distal part narrow. Pleopod 4 exopod with outer-distal margin concave and mesial margin slightly convex. Pleopod 5 exopod as in female.

Etymology. The specific name derives from Palawan Island where the specimens were collected.

Remarks. This new species is easily distinguished from all the other members of the genus by the shape of the pereonal epimeron 1 which does not form a ledge and with lateral margin grooved entirely. It also differs from *F. kimberleyensis* in the presence of distinct ventral thickening only on pereonal epimeron 3. Its ventral thickenings are indistinct on pereonal epimera 4-7 and absent on pleonal epimeron 3.

ACKNOWLEDGMENTS

The authors wish to acknowledge the financial support of the Korean Research Foundation made in the program year of 1996.

REFERENCES

- Kwon, D.H. and S. Taiti., 1993. Terrestrial Isopoda (Crustacea) from southern China, Macao and Hong Kong. *Stuttgarter Beitr. Naturk. (Ser. A)*, **490**: 1-83.
- Lewis, F., 1998. New genera and species of terrestrial isopods (Crustacea: Oniscidea) from Australia. *J. Nat. Hist.*, **32**: 701-732.

- Schmalfuss, H., 1987. *Filippinodillo maculatus* nov. gen., nov. spec. (Isopoda, Armadillidae). *Crustaceana*, **53**: 253-258.
- Taiti, S., P. Paoli and F. Ferrara., 1998. Morphology, biogeography, and ecology of the family Armadillidae (Crustacea, Oniscidea). *Israel J. Zool.*, **44**: 291-301.

RECEIVED: 31 March 2001

ACCEPTED: 13 April 2001

필리핀産 *Filippinodillo*屬 陸棲 等脚類
(Isopoda, Oniscidea, Armadillidae) 2新種

전 대 수 · 권 도 현
(인제대학교 생물학과)

요 약

필리핀産 陸棲 等脚類 2新種을 *Filippinodillo flavimaculis*와 *F. palawanensis*로命名하고記載하였다. *F. flavimaculis*는 제1가슴마디에 ledge가 있다는 점에서 기존의 두種 (*F. maculatus* Schmalfuss, 1987와 *F. kimberleyensis* Lewis, 1998)과類似하나 *F. maculatus*와는 frontal shield의形態가 다르고 *F. kimberleyensis*와는 제3-7가슴마디와 제3배마디의 배쪽 面의形態가 다르다. *F. palawanensis*는 제1가슴마디에 ledge가 없고 가장자리 전체에 흠이 파여 있다는 점에서 다른種들과 쉽게區別된다.