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On the identity of the various taxa that have been assigned to *Otostigmus* (O.) *politus* Karsch, 1881 and forms related thereto (Chilopoda: Scolopendromorpha)

Об идентичности всевозможных таксонов и форм, относящихся или близких к *Otostigmus* (O.) *politus* Karsch, 1881 (Chilopoda: Scolopendromorpha)

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КЛЮЧЕВЫЕ СЛОВА: Chilopoda, Scolopendromorpha, таксономия, *Otostigmus politus.*

ABSTRACT: Examination of type material has been carried out to resolve the confusion over the identity of various populations assigned to *Otostigmus politus* Karsch, 1881. *Otostigmus frigidus frigidus* Verhoeff, 1942 and *O. f. takakuwai* Verhoeff, 1942 are confirmed as junior synonyms of *O. politus*. *Otostigmus politus* occurs in China, Korea and Vietnam, and *O. p. yunnanensis* subsp.n. in southeastern China. *Otostigmus angusticeps* Pocock, 1898 is known from the Solomon Islands, New Guinea and Indonesia and *O. angusticeps schindleri* Würmli, 1972, comb.n. ex *O. politus*, from Indonesia. *Otostigmus australianus* Attems, 1930, stat.n., is recorded from Queensland, Australia. The status of the closely related and sympatric *Otostigmus ateles* Chamberlin,1920 remains problematical.

РЕЗЮМЕ: Проведено переизучение типового материала для устранения путаницы в идентичности различных популяций, относимых к виду *Otostigmus politus* Karsch, 1881. Подтверждено, что *Otostigmus frigidus frigidus* Verhoeff, 1942 и *O. f. takakuwai* Verhoeff, 1942 — младшие синонимы *O. politus*. *Otostigmus politus* отмечен в Китае, Корее и Вьетнаме, а *O. p. yunnanensis* subsp.n. в ЮВ Китае. *Otostigmus angusticeps* Pocock, 1898 известен с Соломоновых островов, Новой Гвинеи и из Индонезии, а *O. angusticeps schindleri* Würmli, 1972, comb.n. ex *O. politus*, из Индонезии. *Otostigmus australianus* Attems, 1930, stat.n., отмечен из Квинсленда (Австралия). Статус близкого к нему и симпатричного вида *Otostigmus ateles* Chamberlin,1920 остается проблематичным.

Introduction

There has been considerable confusion about the centipedes that have been referred to *Otostigmus politus* Karsch 1881. The type material was collected in China by O. von Möllendorf, the German consul in Peking (Beijing). It was redescribed by Haase [1887] and, with additional material, by Kraepelin [1903] who gave the distribution as China (Tientsin, Tsingtau, Peking, now Tianjin, Quingdao and Beijing), Burma (now Myanmar), Sumatra, New Guinea, and Australia (?). He suggested that there were several forms of the species differentiated thus:

1. Coxopleuron elongated, with dorsal spine. Margination from tergite 9. Head and tergite yellow green, the rest dark green. Sumatra.

He suggested *O. angusticeps* Pocock, 1898 from New Britain belonged here.

2. Coxopleuron without dorsal spine

a) Coxopleuron short, 3-spined, marginate from tergite 11. China.

b) Coxopleuron long, 2-spined, marginate from tergite 9. Body with 4 indistinct green longitudinal streaks. New Guinea.

Kraepelin [1916] described a further form from northern Queensland (*Otostigmus* cfr. *politus*) distinguished from *O. politus* s.str. by the absence of lateral coxopleural spines, tergite 21 quadratic and margination commencing only on 17 or 19 (in one case on 14). Another species that he regarded as new to science but did not name as the two specimens lacked end legs, he recorded as *Otostigmus* sp. n. It was subsequently named *Otostigmus ateles* by Chamberlin [1920] but without further comment.

Attems [1930] recognised three subspecies namely, *O. p. politus* from China and *O. politus pigmentatus* Attems, 1930 and *O. p. australianus* Attems, 1930 (for Kraepelin's *O.* cfr. *politus*) from Australia. He suggested that Kraepelin's form from Sumatra might belong to *O. p. australianus.* He made no reference to the form

Table 1. The status of the various taxa that have been assigned to *Otostigmus politus* and the forms related thereto.
Таблица 1. Статус различных таксонов и форм, относимых или близких к *Otostigmus politus*.

Nominal species	Locality	Status
O. politus Karsch, 1881	China	valid
O. angusticeps Pocock, 1898	New Britain	valid
O. cf. *politus*, Kraepelin, 1916	Australia	*O. australianus* Attems, 1930
O. p. pigmentatus Attems, 1930	New Guinea	*O. a. angusticeps*
O. p. mandschurius Verhoeff, 1942	China	*O. p. politus*
O. frigidus Verhoeff, 1942	China	*O. p. politus*, syn.n.
O. f. takakuwai Verhoeff, 1942	China	*O. p. politus*, syn.n.
O. politus schindleri Wurmli, 1972	Indonesia	*O. angusticeps schindleri* comb.n.
O. politus Lewis, 2001 (in part)	China	*O. politus yunnanensis* subsp.n.

from New Guinea. *Otostigmus angusticeps,* he regarded as a junior synonym of *O. politus*.

Verhoeff [1942] described *Otostigmus politus mandschurius* and the closely related *Otostigmus frigidus frigidus* Verhoeff, 1942 and *O. f. takakuwai* Verhoeff, 1942, each from single specimens from Manchuria. Würmli [1972] described *O. politus schindleri* from East Sumba, Indonesia.

Lewis [2001] gave details of two further Chinese specimens of *O. politus* and suggested that *O. angusticeps* was a good species. He also suggested that *O. frigidus* and *O. frigidus takakuwai* were junior synonyms of *O. politus* although he had not seen the type material.

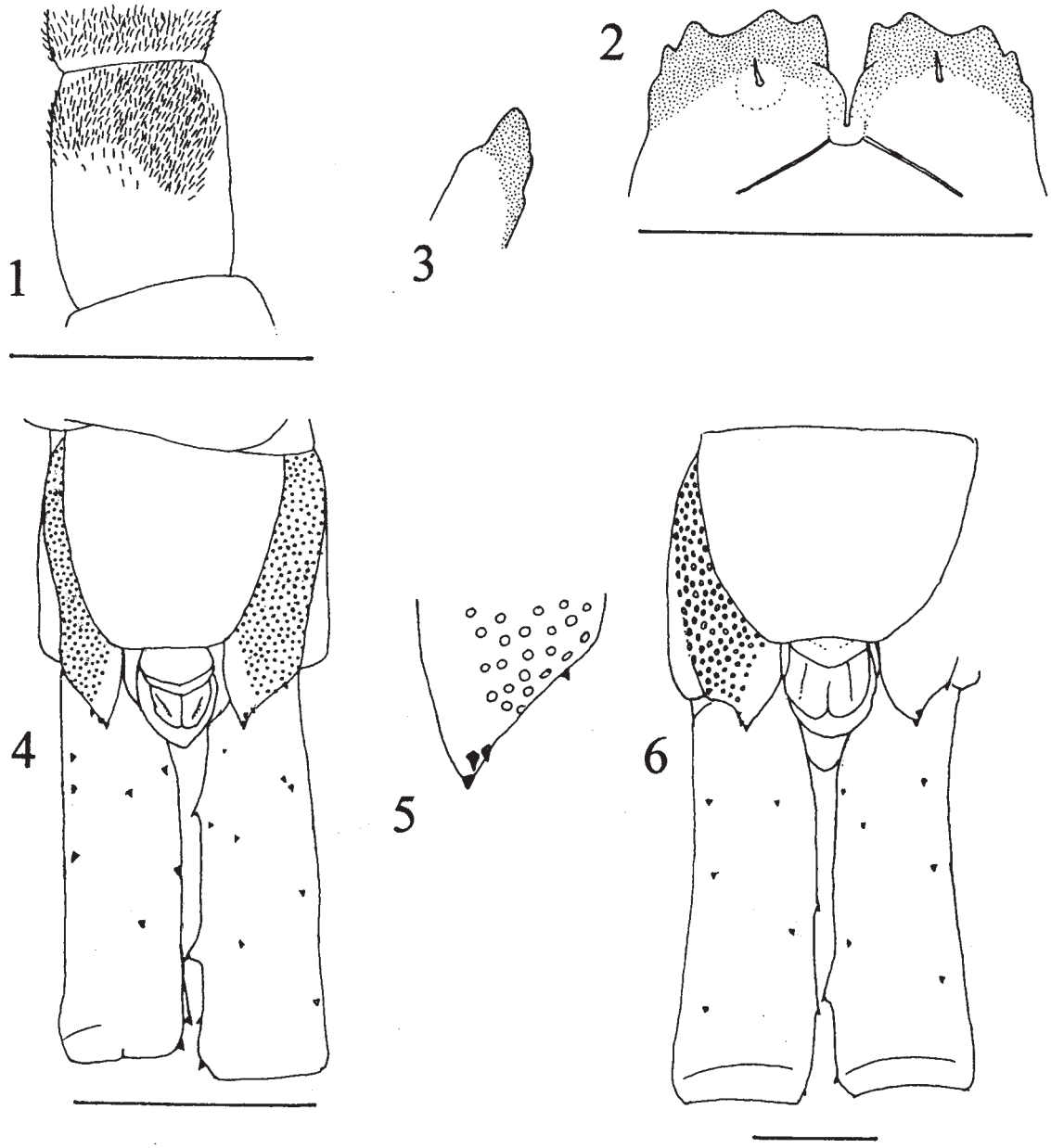
The available type material is here redescribed and treated in chronological order, each under the original specific name. Data from additional material are included. The conclusions are shown in Table 1.

The species treated all have antennae with 17 to 20 antennomeres, the basal two or three glabrous dorsally, tergites without sharp keels or spines, sternites without tubercles. End leg prefemur with only one row of ventrolateral spines and at least legs 1–18 with tarsal spurs. The characters separating the species are shown in Table 2.

Table 2. The principal characters differentiating *Otostigmus p. politus*, *O. a angusticeps* and *O. australianus*.
Таблица 2. Главные признаки, отличающие *Otostigmus p. politus*, *O. a. angusticeps* и *O. australianus*.

	O. p. politus[1]	*O. a angusticeps*[2]	*O. australianus*
Maximum length (mm)	66	55	35
Subcuticular pigment	none	in some	none
Antennomere number	17	(17)18, 19	17
glabrous dorsally	3	3	2 to 3
Principal forcipular teeth	4+4	3+3	3+3
Sternite paramedian sutures	complete	complete	incomplete or absent
Tergites marginate from	9 to 15	5 to 10	17
Coxopleural process	short	long	short
end spines	(2)3(4)	2(3)	2(3)
lateral spines	(0)1	(1)2	0
dorsal spines	0	1	0
pore-free median strip	absent	present	present
End leg prefemoral spines			
ventrolateral	3(4)	3–4	3(4)
ventromedial	2(3)	2(3)	(0)1(2)
medial	2–3(4)	2–3	2
dorsomedial	(1)2	(1)2	(0)1
corner spine	1	1	1

[1] In *O. politus yunnanensis*: end leg prefemoral spines 5, 4 or 5, 4, 2 and a corner spine.
[2] In *O. angusticeps schindleri*: 20 antennomeres, basal 2 2/3 glabrous, coxopleural process very long.



Figs 1–6. *Otostigmus politus* Karsch, 1881, syntypes, specimen 1 (1–5) & specimen 5 (6): 1 — left antennomere 3, ventral; 2 — forcipular coxosternal toothplates; 3 — process of right forcipular trochanteroprefemur; 4 — terminal segments and prefemora of end legs, ventral; 5 — detail of left coxopleural process; 6 — terminal segments and prefemora of end legs, ventral. — Scale lines = 1 mm.

Рис. 1–6. *Otostigmus politus* Karsch, 1881, синтипы, экземпляр 1 (1–5) и экземпляр 5 (6): 1 — членик 3 левой антенны, вентрально; 2 — зубные пластинки коксостернума ногочелюстей; 3 — отросток правого трохантеропрефемура ногочелюстей; 4 — последний сегмент тела и префемуры последних ног, снизу; 5 — детали строения левого коксоплеврального выроста; 6 — последний сегмент тела и префемуры последних ног, снизу. — Масштаб 1 мм.

Acronyms used: NHML — The Natural History Museum, London, UK; NMB — Naturhistorisches Museum, Basel, Switzerland; NMNHS — National Museum of Natural History, Sofia, Bulgaria; NMW — Naturhistorisches Museum, Vienna, Austria; NRS — Naturhistoriska Riksmuseet, Stockholm, Sweden; ZMHB — Zoologisches Museum, Humboldt University, Berlin, Germany; ZMUH — Zoologisches Institut und Zoologisches Museum, Hamburg, Germany; ZSM — Zoologische Staatssammlung, Munich, Germany

Taxonomic part

Otostigmus politus politus Karsch, 1881
Figs 1–6.

Otostigmus politus Karsch, 1881: 62.
Otostigma politum, Haase, 1887: 75.
O. politus, Kraepelin, 1903: 109 (in part).
O. (O.) politus politus, Attems, 1930: 149.

non *O. (O.) politus pigmentatus* Attems, 1930: 150.
nec *O. (O.) politus australianus* Attems, 1930: 151.
O. politus mandschurius Verhoeff, 1942: 186.
O. frigidus Verhoeff, 1942: 186.
O. frigidus takakuwai Verhoeff, 1942: 188.
nec *Otostigmus politus schindleri* Würmli, 1972: 97.
nec *O. (O.) politus*, Lewis, 1991: 342.
O. (O.) politus, Zalesskaja & Schileyko, 1992: 22.
O. (O.) politus (s. str.), Schileyko, 1995: 80 (in part).
nec *O. (O.) politus,* Lewis, 2000a: 436.
O. (O.) politus, Lewis, 2001: 31 (in part — specimen 1, figs 59, 60, 62–66).

TYPE MATERIAL. Five syntypes. ZMHB. Three spms (1-3), 64, 62, and 66 mm, ZMB 947. Original label faded. NB: Haase [1887] gives the locality of 947 as Tientsin. One spm (4), ZMB 949. Peking. Syntype leg. Möllendorf. det. Karsch.

One spm (5), 52 mm, ZMB 948. Peking. O. Möllendorf.

ADDITIONAL MATERIAL. ZMUH. Two spms 57 and 46 mm (6 & 7). Mus. Bremen, c.vi.08. Tientsin, China. Two spms 57 and 42 mm (8 & 9). Graeser l. 23.2.1882. J .G. Fischer d. 26.2.1883. Tientsin, China. Seven spms 27 to 32 mm (1−7). Dr R. Mull. Schiffsartz (ship's doctor) D.S. Suevia. leg.4.1900, ded 31.7.1900. Tsingtau, China.

DESCRIPTION OF SYNTYPES. Antennomeres: seventeen in spms 2 and 5, damaged or regenerated in spms 1, 3 and 4. Basal three antennomeres glabrous dorsally, 2.5 ventrally (Fig. 1). Forcipular coxosternal teeth 4 on each side, the outer two somewhat separated from inner two (Fig. 2). Trochanteroprefemoral process with slight indication of one or two low median teeth (Fig. 3).

Tergites from 4(5) to 20 with complete paramedian sutures, margination from tergites 11–13, without lateral keels, corrugations or spines. Tergite 21 with trace of posterior median depression. Sternitesfrom 5 or 6 with paramedian sutures complete. Sternite 21 with sides converging posteriorly and hind border straight (Fig. 4) or very slightly concave (Fig. 6).

Coxopleural process (Figs 4–6) very short with three or four end spines, one of which is subterminal in some specimens. One lateral (basal) spine, no dorsal spine. No pore-free median longitudinal strip in pore field as seen in other *Otostigmus* species. Pores behind articular condyle about nine on right, seven on left in spm 1, about four or five in spm 5. See remarks for explanation.

End leg prefemora with three or four ventrolateral, two or three ventromedial, two or three medial and none or one dorsomedial spines and a corner spine in specimen 1 (Fig. 4). Specimen 2 with only two ventrolateral, and one ventromedial spine, these very small, the leg probably regenerated. Specimens 3 and 4 lack end legs. Specimen 5 (Fig. 6) with three ventrolateral, two ventromedial, two medial, two or one dorsomedial spines and a corner spine.

First, first two, three or four pairs of legs with a tibial spur, 1 to 4, 6, 7 or 8 with two tarsal spurs, 5, 6, 7, 8 or 9 to 19 with one tarsal, left leg 19 in specimen 5 without tarsal spur. Legs 20 and 21 without tarsal spurs. Abnormalities: right leg 10 with two tarsal spurs in spm 1, left leg 14 with 2 in spm 3, right leg 9 without tarsal spur in spm 5.

VARIATION. Maximum length 66 mm. Undamaged antennae with 17 antennomeres, except Tientsin spm 6 (left 17, right 16). The antenna with 16 antennomeres shows no indication of regeneration or repair and it may be a developmental abnormality. NB: Lewis [2000b] stated that the lowest number of antennomeres in Scolopendromorpha was 17. Tergites with paramedian sutures complete from 4, 5 or 6, marginate from between 9 and 15. Sternites with paramedian sutures complete from (4) 5 or 6 with or without weak median longitudinal and posterior depressions. Coxopleuron with three or four end spines (or two or three end spines and a subterminal spine) and one lateral (basal spine), very rarely without one unilaterally. No dorsal spine. End leg prefemur with 3(4) ventrolateral, 2(3) ventromedial, 2/3 (4) medial and (0,1) 2 dorsomedial and a corner spine. Two tarsal spurs on first four to eight pairs of legs (in one specimen from Tientsin to 11 and 12). One tarsal spur on subsequent to 19, in one case 18, in one 20, 20 and 21 without tarsal spur.

REMARKS. Gravely [1910] listed *O. politus* (identified by Kraepelin) from the East and West Himalayas, and subsequently Jangi & Dass [1984], Khanna [1994, 1997], Khanna & Kumar [1984] and Khanna & Tripathi [1986] gave further records for India. As these records may have referred to *O. politus, O. angusticeps,* or some other species, they need to be reassessed. Specimens from Rennell Island [Lewis, 2000a] and Krakatau [Lewis, 1991] identified as *O. politus* are *O. angusticeps* (see below). Schileyko [1995] recorded the species from China, Korea and Vietnam but as he used the wider interpretation of the species as given by Attems [1930] it is not possible to be certain of their identity. The localities, however, strongly suggest *O. politus* s.str. Zalesskaya & Schileyko's [1991] figures of a specimen from Korea are clearly of *O. politus.* Lewis's [2001] specimen from Yunnan Province (China) is here regarded as a separate subspecies, *O. politus yunnanensis* (see below).

Verhoeff [1942] proposed a new character, namely the number of pores on the coxopleuron distal to a line drawn transversely from the ventral articulation of the end leg prefemur, 'Gelenkknoten-Ebene' at the end of the costa coxalis, in order to differentiate *O. frigidus* with five or six pores from *O. politus* with 16 to 20. It is here termed the plane of the articular condyle. This character is very variable and depends on the length of the coxopleural process. In one syntype from Beijing there are six but in the Beijing specimen described by Lewis [2001] there are 14 to 16.

The currently known distribution of *Otostigmus politus* is China, Korea and Vietnam.

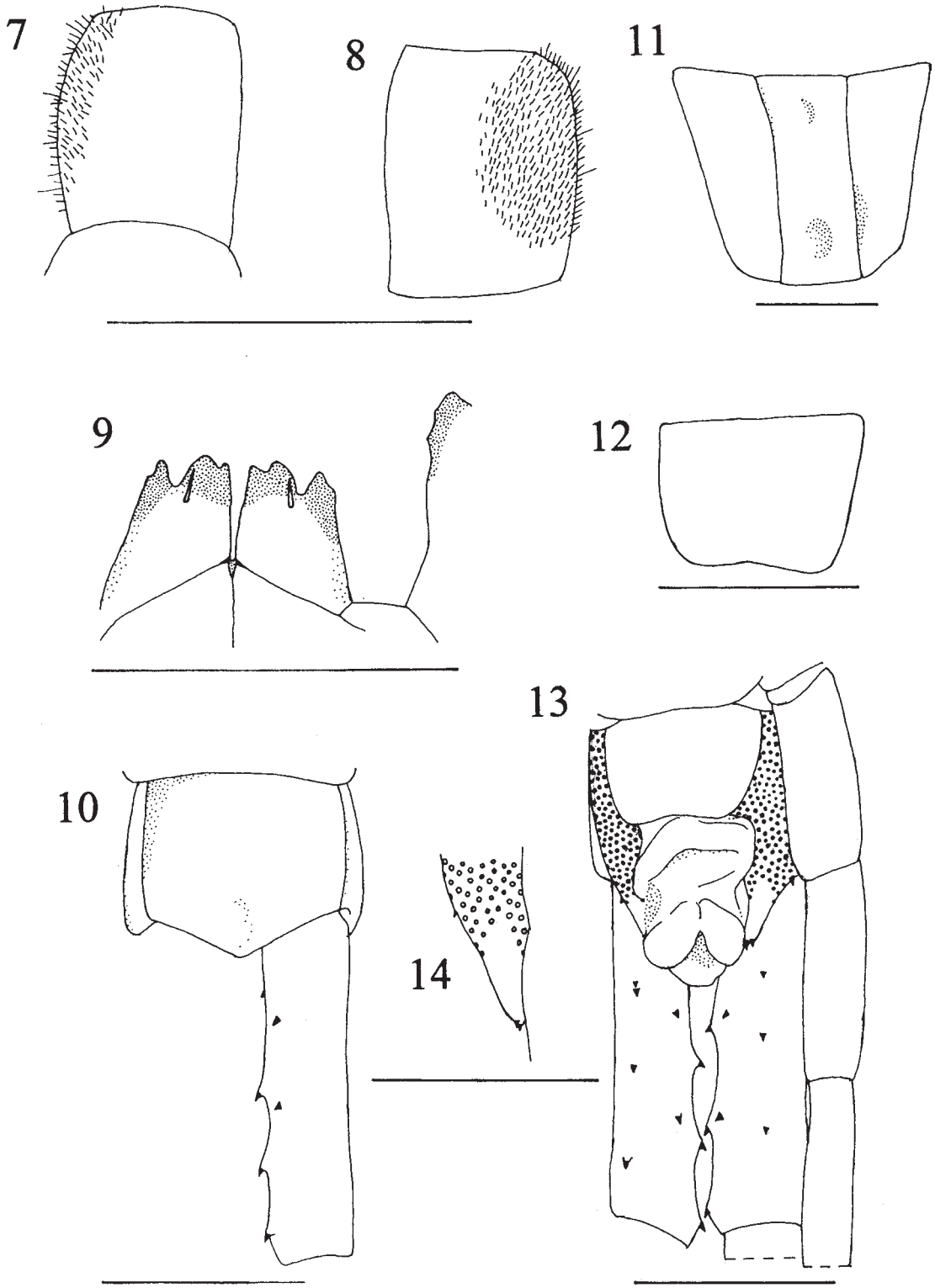
Otostigmus angusticeps Pocock, 1898
Figs 7–14.

Otostigmus angusticeps Pocock, 1898: 62.
O. politus, Kraepelin, 1903: 109 (in part).
O. completus Chamberlin, 1920: 15.
O. politus (O.) pigmentatus Attems, 1930: 150.
O. p. pigmentatus, Verhoeff, 1942: 183 (in key).
(?) *O. politus pigmentatus*, Wang, 1951: 53.
(?) *O. politus dentatus* Wang, 1951: 53.
O. politus, Lewis, 1991: 342.
O. (O.) politus, Lewis, 2000a: 436.
O. (O.) angusticeps, Lewis, 2001: 34.
O. (O.) politus, Lewis, 2002: 1702.

TYPE MATERIAL. Holotype. NHML. *O. angusticeps* New Britain. Pocock type. Coast of Blanches. Dr Palebrun. 1898.12.6.5. A recent label gives *Otostigmus (Otostigmus) politus* Karsch. The tube contains 8 eggs.

ADDITIONAL MATERIAL. ZMUH. One spm 30 mm. Labelled *Otostigmus politus* Karsch. 1 expl juv. Neue Guinea. Dr Smend leg. Ded 11.10.1907. One spm 42 mm. Labelled *Otostigmus* cfr. *politus* Karsch. Hamburg Südsee-Expedition. 395. An Bord des "Reiho" Dr G Duncker leg. X.1908-iii.1909.

DESCRIPTION OF HOLOTYPE. Colour olive brown, without dark subcuticular pigment granules. Length 40 mm. Antennomeres 19+19, the right regenerated. The basal two antennomeres glabrous, the third glabrous dorsally except for median edge (Fig. 7), setae continue ventrally to occupy a rounded area ventromedially (Fig. 8) (Pocock stated basal 2 or 3 are naked). Head capsule and tergite 1 finely and densely punctate.



Figs 7–14. *Otostigmus angusticeps* Pocock, 1898, holotype: 7 & 8 — right antennomere 3, ventral and dorsal, respectively; 9 — forcipular coxosternal toothplates and process of left forcipular trochanteroprefemur; 10 — tergite 21 and prefemur of end leg; 11 — sternite 17; 12 — sternite 21; 13 — terminal segments and prefemora of end legs, ventral; 14 — detail of right coxopleural process. — Scale lines = 1 mm.

Рис. 7–14. *Otostigmus angusticeps* Pocock, 1898, голотип: 7 и 8 — членик 3 правого усика, соответственно снизу и сверху; 9 — зубные пластинки коксостернума ногочелюстей и отросток левого трохантеропрефемура ногочелюстей; 10 — тергит 21 and префему последней ноги; 11 — стернит 17; 12 — стернит 21; 13 — концевые членики и префемуры последних ног, снизу; 14 — детали строения правого коксоплеврального отростка. — Масштаб 1 мм.

Forcipular coxosternal tooth plates each with three principal teeth, the inner two partially fused, the outer with a small lateral subsidiary tooth (Fig. 9). The process of the forcipular trochanteroprefemur with two very low teeth.

Tergites very finely and densely punctate, with complete paramedian sutures from 5 to 20, marginate from 9 but anterior 25% of tergite 8 marginate, without spines or keels. Posterior tergites slightly wrinkled laterally. Tergite 21 with very weak posterior median depression (Fig. 10).

Sternites with complete paramedian sutures from 4 to 19, with weak anterior median depression on 7 to 18, more elongated on anterior sternites and posterior median depression on 4 to 19 (Fig. 11). Sternite 21 with sides converging only slightly posteriorly and hind border slightly concave (Fig. 12).

Coxopleural process (Figs 13, 14) long, with two end spines, one lateral and one dorsal spine. With a pore-free ventral median strip. End leg prefemur with three or four ventrolateral spines, two ventromedials, two or three medials, two dorsomedials and a corner spine (Fig. 10 & 13).

Legs 1 and 2 with a tibial spur, 1 to 3 with two tarsal spurs (legs 4 to 6 missing), 7 to 20 with one, leg 21 without.

VARIATION. Maximum length 48 mm. Often with dark subcuticular pigment. Antennomeres (17), 18 or 19. Tergites with paramedian sutures complete from 5 (7), marginate from between (6) 7, 8, (9,10). Sternites with paramedian sutures complete or almost so on most segments, with median longitudinal and posterior depressions. Coxopleuron with two end spines and two lateral (or two end spines, a subterminal spine and one lateral spine) and a dorsal spine. NB: The holotype has two end spines and only one lateral spine and a dorsal spine. End leg prefemur with (3)4 ventrolateral, 2(3) ventromedial, 2 or 3 medial, (1)2 dorsomedial and a corner spine. Tibial spurs on leg 1(2) or none. Two tarsal spurs on first, first two or first three pairs of legs. One tarsal spur on subsequent legs to 18 or 19(20), (19)20 and or 21 without. The specimen of *O. angusticeps* from Kalimantan [Lewis, 2001] is the only one so far recorded with sternite 21 diverging posteriorly as seen in some *O. astenus* (Kohlrausch, 1881).

REMARKS. Lewis [2001] stated that a re-examination of the type of *Otostigmus angusticeps* (Lewis, unpublished data) showed that it is quite distinct from *O. politus* and closely resembles *O. astenus.* However, it runs down to *O. politus* in both Kraepelin's [1903] and Attems' [1930] keys. This, and the fact that *O. p. pigmentatus* Attems figured by Attems [1930] is a junior synonym of *O. angusticeps* have confused the issue.

Wang's [1951] *O. p. pigmentatus* from the Philippines may be an *O. angusticeps,* as well may his *O. p. dentatus,* also from the Philippines, but confirmation is required.

Since Lewis [1991] had described an *O. politus* from Krakatau as having two or three dorsal spines, Lewis [2000a] suggested it be re-examined. The original statement would, however, appear to be a typographical error as his [1991] figure 17 shows only a single dorsal spine. It is clearly an *O. angusticeps.* Likewise, *O. completus* Chamberlin 1920, from the Solomon Islands, redescribed by Lewis [2002] and considered to be a junior synonym of *O. politus* is, in fact, *O. angusticeps.*

The currently known distribution of *O. angusticeps* is the Solomon Islands, Kalimantan, Papua New Guinea, Krakatau (Indonesia) and possibly the Philippines. *O. a. schindleri* Würmli, 1972 is known from Sumba, Indonesia (see below).

Otostigmus (O.) australianus Attems, 1930, **stat.n.** Figs 15–22.

Otostigmus cfr. *politus* Kraepelin, 1916: 5.

Otostigmus (O.) politus australianus Attems, 1930: 150.

Otostigmus politus australianus, Verhoeff, 1942: 183 (key only).

TYPE MATERIAL. Lectotype. NRS. Spm 1, 31 mm. Queensland, Herberton (Mjöberg). The lectotype is here designated to facilitate subsequent work on this somewhat problematical (sub)species. Paralectotypes, Spms 2−6, 32, 18, 18,14 and 14 mm, respectively. Queensland, Beleden Ker (Mjöberg). ZMUH. Spm 7, 35 mm, Malanda, N. Queensland. Mjöberg, c.vii.14.

DESCRIPTION OF SPECIMEN 1. (Kraepelin's [1916] data in parentheses where relevant). Length 31 mm (25 mm). Antennomeres 17, the basal two glabrous dorsally and ventrally (3).

Each coxosternal toothplate with three principal teeth, the two inner partially fused, the outer with a small subsidiary lateral tooth (Fig. 15). Process of forcipular trochanteroprefemur with one median tooth.

Tergites with paramedian sutures complete from 5, without keels or spines, 17–21 marginate, weak on 17–20. (Differs from *O. politus* in that the margination begins far back and is difficult to determine. The margination begins on segment 17 or even 19, however grooves can be detected from segment 14). Tergite 21 with weak posterior median depression.

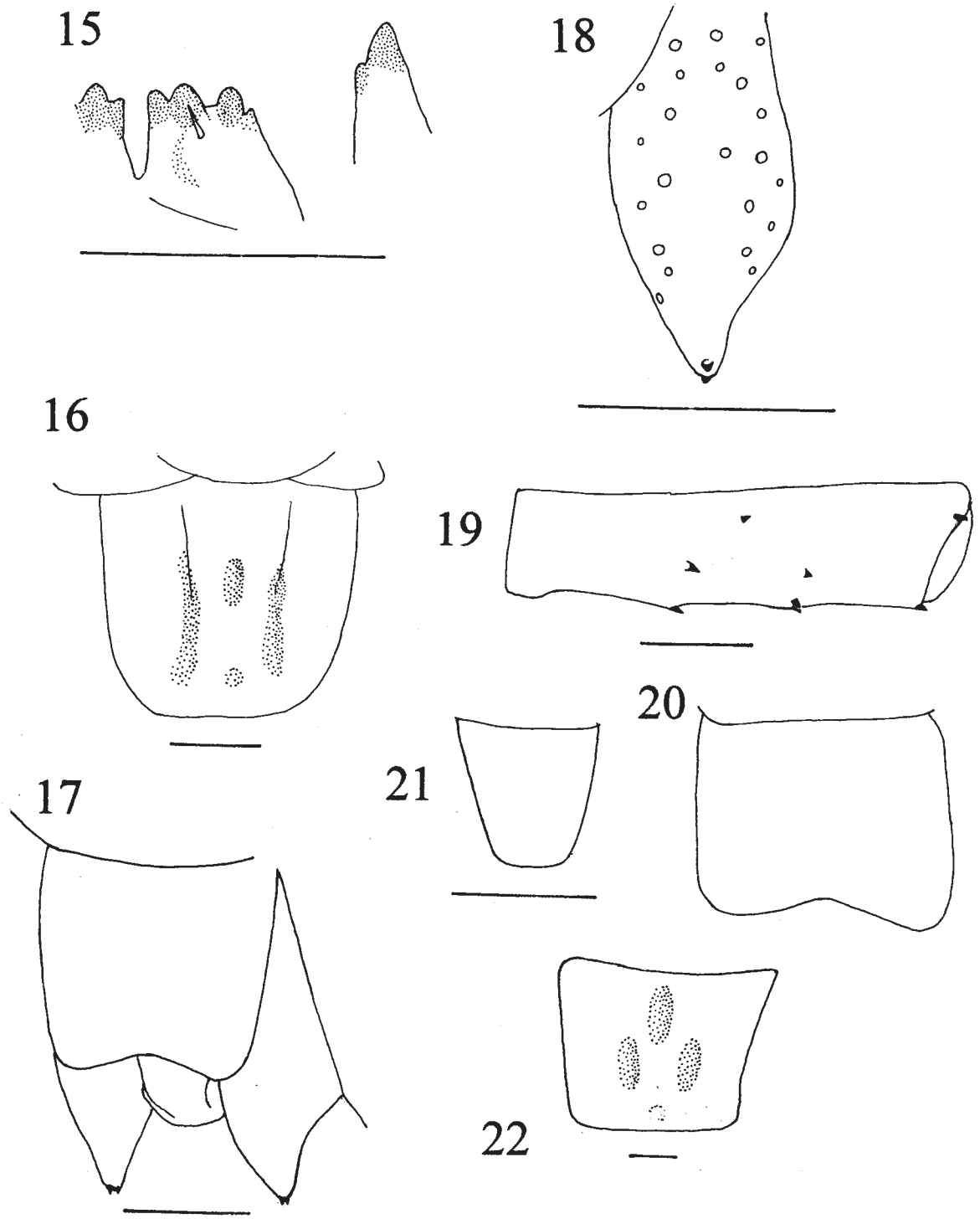
Sternites of mid-trunk with very fine incomplete paramedian sutures situated in well-marked sulci. With anterior median longitudinal depression and posterior median round depression (Fig. 16). (Sternites 3–19 with two almost complete paramedian sulci ('medialen Furchen'), a median sulcus in anterior half. Segments of posterior half of trunk also with short posterior median depression). Sternite 21 with sides parallel, posterior corners rounded and posterior border concave (Fig. 17).

Coxopleuron with short conical process and two end spines, no lateral or dorsal spines (Fig. 18). With median posterior pore-free strip. End legs are detached. Each prefemur with three ventrolateral spines, one ventromedial, two medial, one dorsomedial and one corner spine (Fig. 19).

No observations could be made on femoral or tibial spurs because the specimen is curved ventrally. Two tarsal spurs on legs 1–4, one from 5–20 on right, 5–21 on left.

VARIATION. Basal 2 to 2½ antennomeres glabrous (3 in specimen 7). Tergites marginate from 17 in specimens 1, 2 and 7, from 15 in specimen 3 and from nine in specimen 4 (both 18 mm) suggesting that a large number of marginate tergites is a juvenile character! Sternites with very fine, incomplete paramedian sutures in deep sulci and with anterior and posterior median depressions. Specimen 7 (from Malanda), lacks paramedian sutures but has two paramedian and two median depressions (Fig. 22), their appearance varying with the angle of illumination. Sternite 21 quadratic in specimens 1, 2 and 7 (Fig. 20), with sides converging and hind border straight in specimens 3 and 4 (Fig. 21). Coxopleuron with two end spines, except specimen 2 which has in addition a very small subapical spine. End leg prefemora: specimen 3 with three or four ventrolateral, one ventromedial, two medial and one dorsomedial spine. Specimen 5 with three ventrolaterals, none or one ventromedials, two medials and one dorsomedial spine. Specimen 7 with two or three ventrolaterals, one ventromedial, two medials, one or none dorsomedials and a corner spine. Two tarsal spurs on first two, three, four or five pairs of legs. Leg 20 with or without, 21 without tarsal spur.

REMARKS. Kraepelin [1916] considered that these young specimens, maximum size 25 mm (in fact the largest is 35 mm), were close to the *politus* species group but differences were insufficient for it to be given a separate name. He stated that the basal three antennomeres were glabrous but this is only the case in the specimen from Malanda, otherwise only 2–2½ are.



Figs 15–22. *Otostigmus australianus* Attems, 1930, lectotype (15–19), specimen 2 (20), specimen 3 (21) & specimen 7 (22): 15 — left forcipular coxosternal toothplate and process of forcipular trochanteroprefemur; 16 & 22 — sternite 12; 17 — sternite 21 and coxopleura, pores not shown; 18 — detail of left coxopleuron; 19 — end leg prefemur, medial view; 20 & 21 — sternite 21; 22 — sternite 12. — Scale lines = 0.5 mm.

Рис. 15–22. *Otostigmus australianus* Attems, 1930, лектотип (15–19), экземпляр 2 (20), экземпляр 3 (21) и экземпляр 7 (22): 15 — левая зубная пластинка коксостернума и отросток трохантеропрефемура ногочелюстей; 16 и 22 — стернит 12; 17 — стернит 21 и коксоплевры, поры не показаны; 18 — детали строения левого коксоплеврита; 19 — префемур последней ноги, вид изнутри; 20 и 21 — стернит 21; 22 — стернит 12. — Масштаб 0,5 мм.

On the basis of Kraepelin's incomplete description and his statement that the basal three antennomeres were glabrous, Attems [1930] proposed a new subspecies, *O. politus australianus* Attems, 1930, for *O*. cf. *politus* in the sense of Kraepelin. The re-examination of the type material detailed here shows that the form is distinct. It is not recognisable as any hitherto described species of *Otostigmus* and is therefore raised to full specific status as *Otostigmus australianus* Attems, 1930. More material is required in order to clarify the relationship of this species to *O. ateles* which is also from Queensland.

The current known distribution is Queensland, Australia.

Otostigmus (O.) politus pigmentatus Attems, 1930

O. (O.) politus pigmentatus Attems, 1930: 150.
O. (O.) politus pigmentatus, Verhoeff, 1942: 183.
(?) *O. politus pigmentatus*, Wang, 1951: 53.
(?) *O. politus dentatus*, Wang, 1951: 53.
O. (O.) angusticeps, Lewis, 2001: 35.

REMARKS. Wang [1951] recorded *O. p. pigmentatus* from Mindanao, Philippines, and *O. p. dentatus* var. nov., characterised by the lack of black-green pigment and the presence of two elevations on the process of the forcipular trochanteroprefemur, also from the Philippine Islands. I have not seen these specimens: they may or may not be *O. angusticeps*. Lewis [2001] noted that *O. p. pigmentatus* was quite clearly an *O. angusticeps*. Attems [1930] gave its distribution as Australia: Kaiserin Augusta Fluss, Merauke but, as Lewis [2001] pointed out, neither of these localities is in Australia. There is an Empress Augusta Bay in Bougaiville (Papua, New Guinea) and a Marauke river in Irian Jaya. I have been unable to determine the location of the type specimens of this subspecies. Dr Verena Stagl has confirmed that they are not in the collection of the Naturhistorisches Museum, Vienna.

Otostigmus politus mandschurius Verhoeff, 1942
Figs 23–28.

Otostigmus politus mandschurius Verhoeff, 1942: 181.
O. (O.) politus, Lewis, 2001: 31.

TYPE MATERIAL. Holotype. ZSM. Two slides, the first labelled "*Otostigmus politus mandschurius* Verh. Mandschurei" with head, forcipules and segments 1 and 2, maxillae and mandibles, segments 18−21 and one end leg. The second slide labelled "*Otostigmus politus mandschurius* Verh. Stigmen 3, 5, 8, 10".

DESCRIPTION. (Verhoeff's data in parentheses where appropriate). (Female almost laying ripe eggs, 58 mm. Colour greenish black with metallic glaze, legs yellow-brown).

Antennomeres 17, the basal three glabrous dorsally, an irregular oval area occupying the distal 70% ventrally (Fig. 23).

Claw of telopodite of second maxilla with single accessory spine and telomere 2 with spine (Fig. 24). Forcipular coxosternal tooth plate with 4+4 teeth (Fig. 25), the inner two on each side somewhat separated from the outer two (tooth plates separated by acute angle). Process of forcipular trochanteroprefemur with low inner tooth.

(Tergite 1 with broad triangular pit in middle, with two clear paramedian sutures from 6, marginate from 12. Tergite 21 without median suture, weakly impressed only posteriorly). The pit ('breiter dreieckiger Grube') on tergite 1 is not visible on the preparation of this specimen and may have been an artifact.

(Sternites with two deep sutures from 2). Sternite 21 with sides converging posteriorly and hind border slightly concave (Fig. 26).

Coxopleural process with three end spines (Fig. 27), one lateral and no dorsal spines. Pore field oval without median posterior pore-free strip (Fig. 26). About 16 pores behind plane of articular condyle (16–20).

End leg prefemur with four ventrolateral, three ventromedial, three medial, two dorsomedial spines and a corner spine (Fig. 28).

REMARKS. Verhoeff [1942] separated *O. politus (genuinus*) from *O. politus mandschurius* by its pale olive brown colour, prefemur of end legs with two inner rows of two to five spines (in toto) and forcipular tooth plate transversely truncated in the former as opposed to greenish black with a metallic sheen, prefemur with two inner rows of six spines and tooth plate not truncated. Colour is variable and changes on preservation and the difference in spinulation is insignificant. The other differences are trivial. *Otostigmus (O.) p. mandschurius* is here confirmed as a junior synonym of *O. (O.) p. politus*.

Otostigmus frigidus Verhoeff, 1942
Figs 29–36.

O. frigidus Verhoeff, 1942: 186.
? *O. (O.) politus,* Lewis, 2001: 31.

TYPE MATERIAL. Holotype. ZSM. Two slides each labelled *Otostigmus frigidus* Verh. Mandschurei b. The first slide with head, maxillae and mandibles, forcipules and tergite 1, four segments, four and three half-segments (divided longitudinally). The second slide with segments 18 to 21 and detached end legs.

DESCRIPTION. (Verhoeff's data in parentheses where appropriate).

(Length 53 mm). Antennomeres 17, the basal three glabrous dorsally except for densely setose anterolateral edge. Ventrally with rounded area in anterolateral half.

Claw of left telopodite of second maxilla with one accessory spine, that on the right with two (Fig. 30). No spine visible on telomere 2 on either side.

Coxosternal toothplate with 4+4 teeth, the outer and inner two somewhat separated (Fig. 29). Process of forcipular trochanteroprefemur as in Fig. 29.

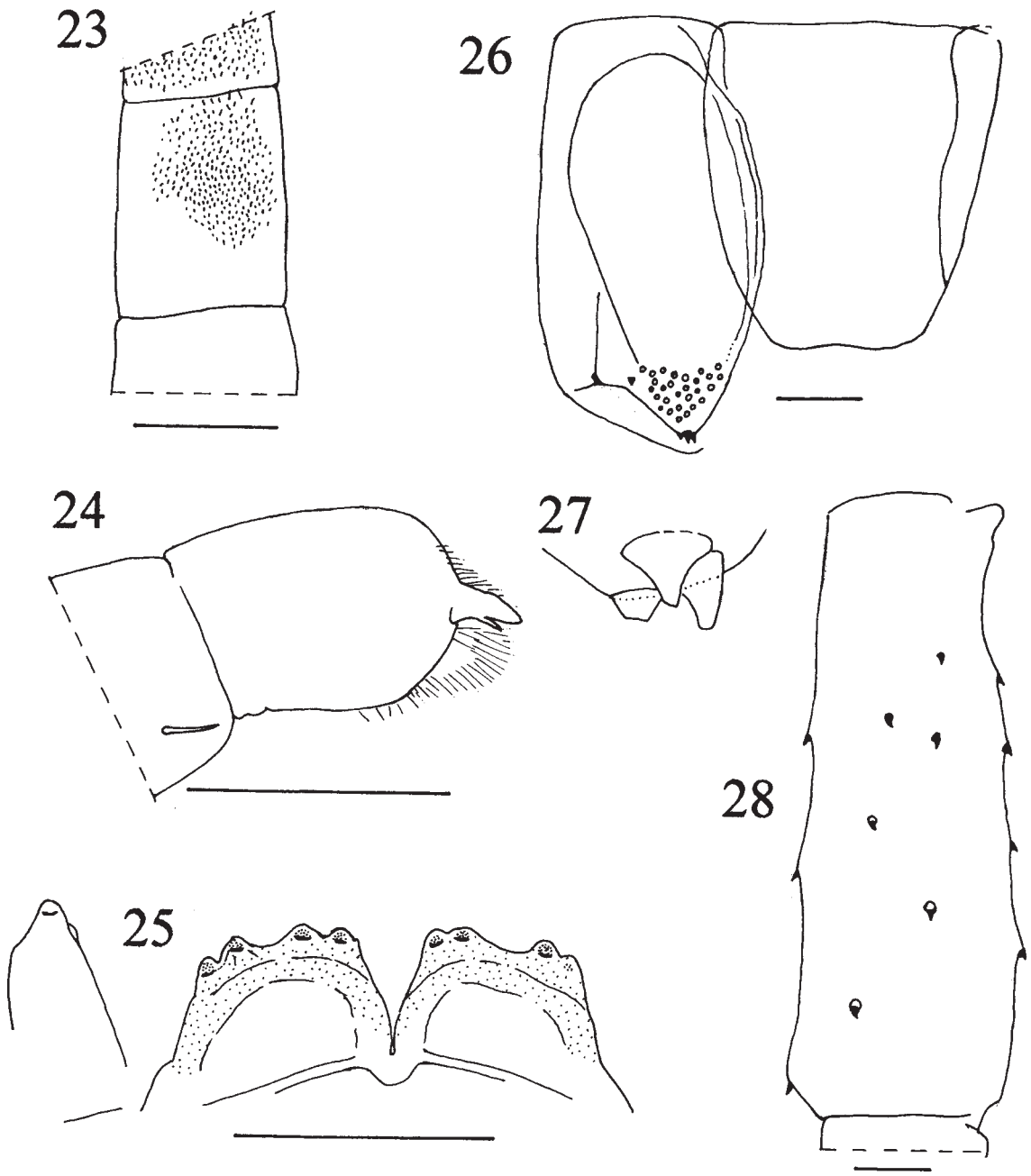
(Tergite paramedian sutures complete from 4, anterior only on 3, marginate from 13 (12). Sternite paramedian sutures from 2). Sternite 21 with sides converging posteriorly and posterior border concave (Fig. 31) (with posterior depression).

Coxopleural process very short with three end spines on right, two end spines, one subapical (Fig. 32) and one lateral on the left (Fig. 33). No median posterior pore-free strip. Three pores behind the plane of articular condyle (only 5–6 pores).

End leg with four ventrolateral, two ventromedial, three medial, two dorsomedial and a corner spine on the right prefemur (Figs 34, 35), 3,2,3,2 and a corner spine on the left (Fig. 36) (in all 8–10 spines). Verhoeff's fig. 1 shows the right prefemur with eight spines. There are in fact 11, of which five are represented by faint scars. Verhoeff overlooked three of these. (First pair of legs with one tibial and two tarsal spines, leg 12 with one tarsal, leg 20 without).

REMARKS. Lewis [2001] noted that *O. f. frigidus* fell within his diagnosis of *O. politus*, including it as ?*O. frigidus* in his synonymy of *O. politus*. As noted above, the number of pores behind the plane of the articular condyle is variable and not adequate to differentiate the species.

Otostigmus (O.) frigidus frigidus is here regarded as a junior synonym of *Otostigmus (O). politus politus*, syn.n.



Figs 23–28. *Otostigmus politus mandschurius* Verhoeff, 1942, holotype: 23 — antennomere 3, ventral; 24 — telomere 3 and part of telomere 2 of left second maxillary telopodite; 25 — coxosternal toothplates and process of right forcipular trochanteroprefemur; 26 — sternite 21 and right coxopleuron, only distal pores are shown; 27 — detail of coxopleural end spines; 28 — prefemur of end leg, medial view. — Scale lines = 0.5 mm.

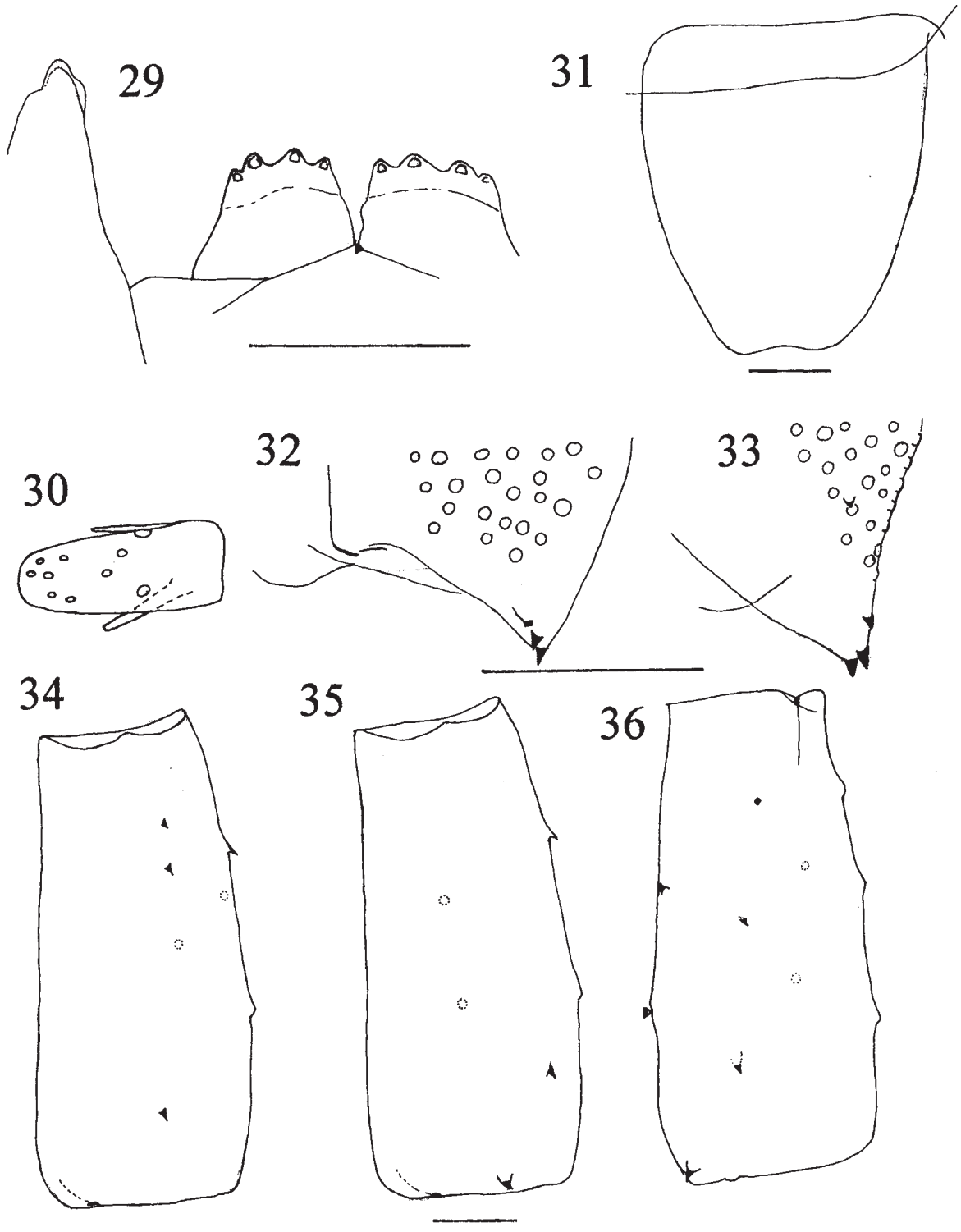
Рис. 23–28. *Otostigmus politus mandschurius* Verhoeff, 1942, голотип: 23 — членик 3 усиков, снизу; 24 — теломер 3 и часть теломера 2 левого телоподита вторых максилл; 25 — зубные пластинки коксостернума и отросток правого трохантерофемура ногочелюстей; 26 — стернит 21 и правая коксоплевра, показаны только дистальные поры; 27 — детали строения конечных шипов коксоплевр; 28 — преыемур последней нрги, вид изнутри. — Масштаб 0,5 мм.

Otostigmus frigidus takakuwai Verhoeff, 1942
Figs 37–43.

O. frigidus takakuwai Verhoeff, 1942:188.
? *O. (O.) politus*, Lewis, 2001:31.

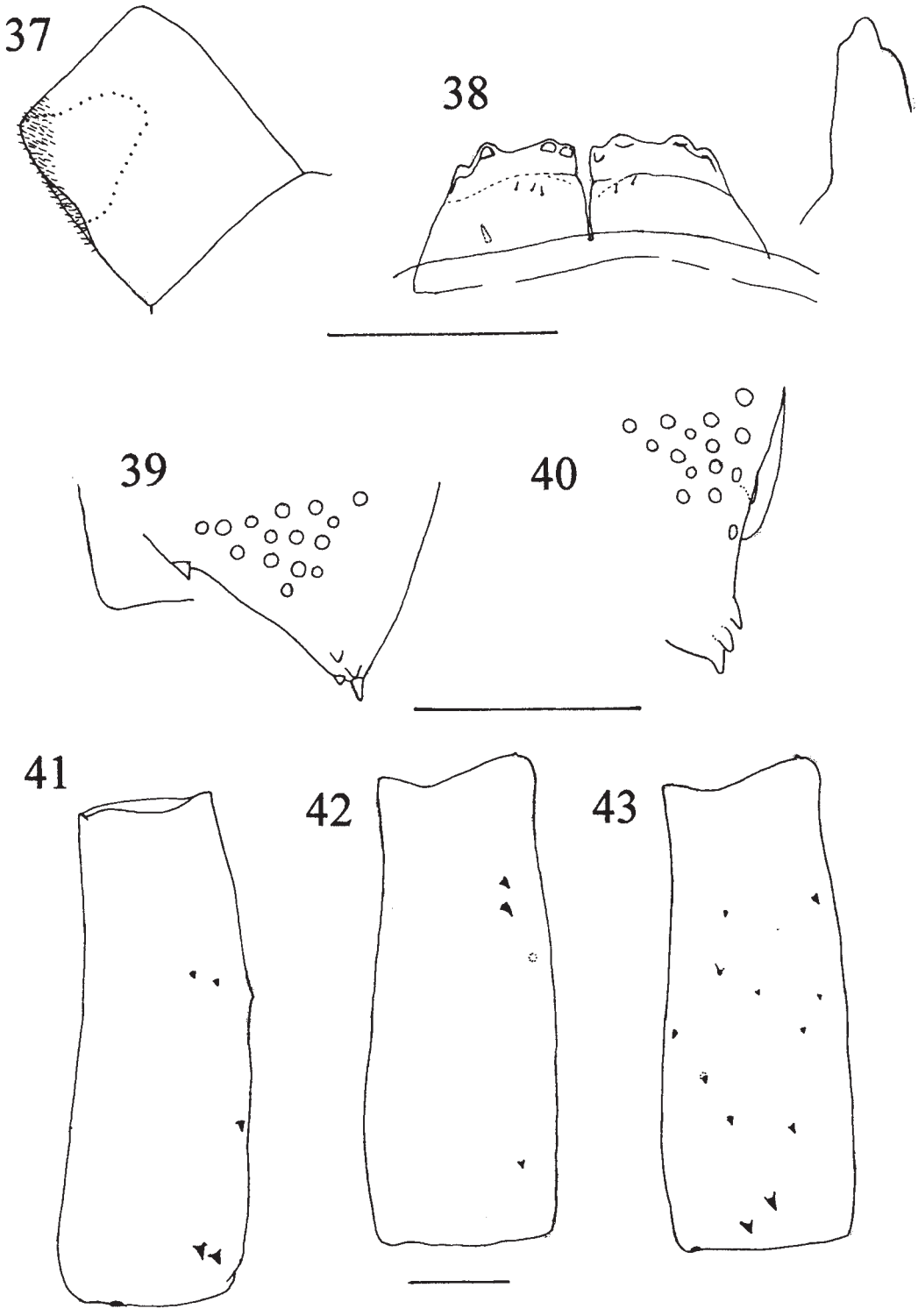
TYPE MATERIAL. Holotype. ZSM. A single slide labelled "*Otostigmus frigidus takakuwai* Verh. Mandschurei".

DESCRIPTION. (Verhoeff's data in parentheses where appropriate). (Length 48 mm). Antennae damaged, with 13+10 antennomeres, the basal three glabrous dorsally except for



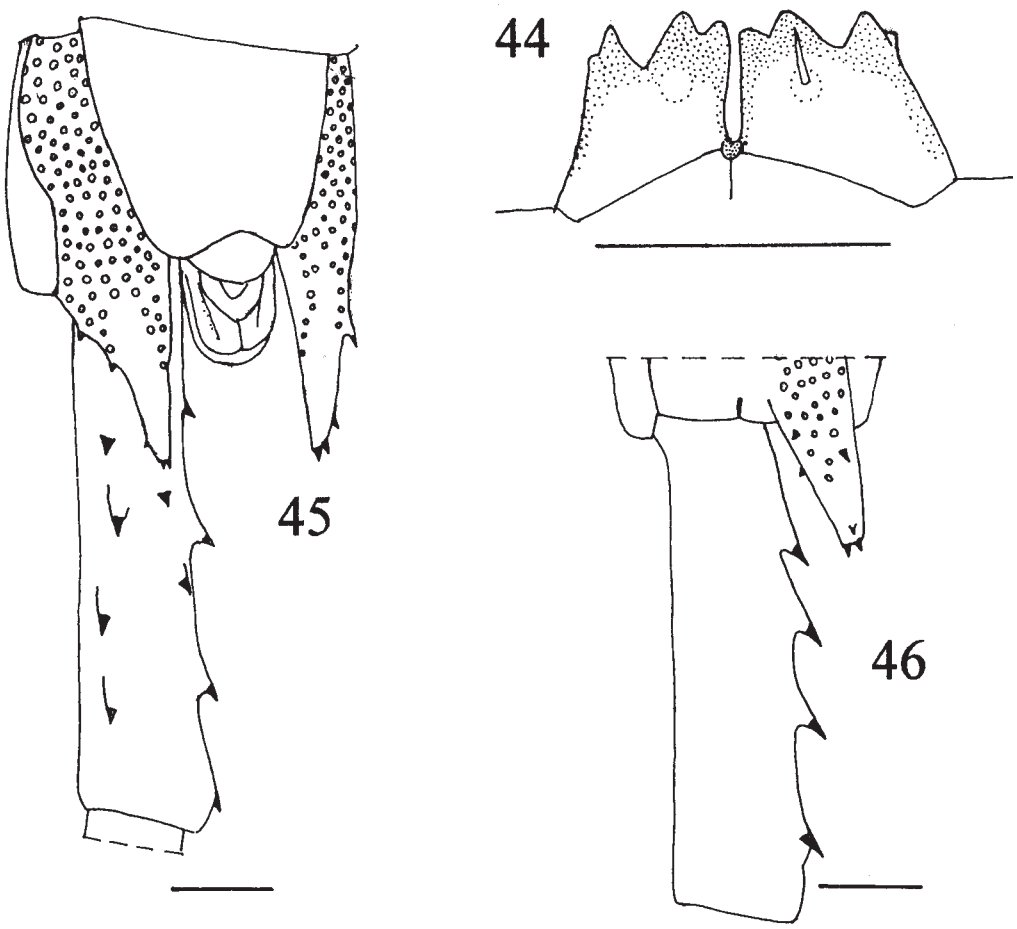
Figs 29–36. *Otostigmus frigidus frigidus* Verhoeff, 1942, holotype: 29 — coxosternal toothplates and process of right forcipular trochanteroprefemur; 30 — claw of left telopodite of second maxillae; 31 — sternite 21; 32 — right coxopleural process; 33 — left coxopleural process; 34 — ventral spines of prefemur of right end leg; 35 — dorsal spines of prefemur of right end leg; 36 — left prefemur of end leg, medial view. — Scale lines = 0.5 mm.

Рис. 29–36. *Otostigmus frigidus frigidus* Verhoeff, 1942, голотип: 29 — зубные пластинки коксостернума и отросток правого трохантерофемура ногочелюстей; 30 — коготь левого телоподита вторых максилл; 31 — стернит 21; 32 — правый отросток коксоплевр; 33 — левый отросток коксоплевр; 34 — вентральные шипы на правом префемуре последней ноги; 35 — дорсальные шипы на правом префемуре последней ноги; 36 — левый префемур последей ноги, вид изнутри. — Масштаб 0,5 мм.



Figs 37–43. *Otostigmus frigidus takakuwai* Verhoeff, 1942, holotype: 37 — left antennomere 3, dorsal (dotted line shows extent of setae ventrally); 38 — coxosternal toothplates and process of right forcipular trochanteroprefemur, dorsal; 39 — right coxopleural process; 40 — left coxopleural process; 41 — end leg 1 prefemur, dorsal; 42 — end leg 2 prefemur, dorsal; 43 — end leg 2 prefemur, ventral. — Scale lines = 0.5 mm.

Рис. 37–43. *Otostigmus frigidus takakuwai* Verhoeff, 1942, голотип: 37 — членик 3 левого усика, сверху (пунктирная линия показывает протяженность опушения снизу); 38 — зубные пластинки коксостернума и отросток правого трохантерофемура ногочелюстей, сверху; 39 — правый отросток коксоплевр; 40 — левый отросток коксоплевр; 41 — префемур конечный ноги 1, сверху; 42 — префемур конечный ноги 2, сверху; 43 — префемур конечный ноги 2, снизу. — Масштаб 0,5 мм.



Figs 44–46. *Otostigmus angusticeps schindleri* Würmli, 1972, holotype: 44 — coxosternal toothplates; 45 — terminal segments and right end leg prefemur, ventral; 46 — coxopleural process and right end leg prefemur, lateral view. — Scale lines = 0.5 mm.

Рис. 44–46. *Otostigmus angusticeps schindleri* Würmli, 1972, голотип: 44 — зубные пластинки коксостернума; 45 — конечные членики и правый префемур последней ноги, снизу; 46 — отросток коксоплевр и правый префемур последней ноги, сбоку. — Масштаб 0,5 мм.

anterolateral edge. Ventrally with rounded area in anterior lateral half (Fig. 37).

Claw of right telopodite of second maxilla with an accessory spine, claw obscured on left. With spine visible on left telomere 2, not on right.

Coxosternal tooth plate with 4+4 teeth (teeth very obtuse), the outer and inner two somewhat separated (Fig. 38). Process of forcipular trochanteroprefemur as in Fig. 38.

(Tergite 1 with central pit, paramedian sutures begin on 6, marginate from14 (13)). (Sternite paramedian sutures on 3).

Coxopleural processes very short with four end spines on the right (Fig. 39), three on the left (Fig. 40) and a lateral spine on each side (a spine under the 'Gelenkknoten'). No ventral median pore-free strip. Very few pores behind plane of articular condyle (5–6).

End leg prefemora, one with only six spines (Fig. 41), the other with 15 arranged irregularly (Fig. 42, 43). (Femur of end leg with two corner spines).

(Legs 1 and 2 with two tarsal and one tibial spur). Leg 19 with one tarsal, 20 without.

REMARKS. The characters that Verhoeff [1942] used to separate the subspecies of *O. frigidus* were given partly in a key on pp. 182–184 and a brief description on p. 188.

O. f. frigidus has end leg prefemur with one corner spine, coxopleuron without a spine under the 'Gelenkknoten', coxosternal teeth strong and tergite 1 without a median depression.

O. f. takakuwai has end leg prefemur with two corner spines, coxopleuron with a spine under the 'Gelenkknoten', forcipular coxosternal teeth obtuse and tergite 1 with a median depression.

The differences between the forcipular coxosternal teeth are trivial. Verhoeff's spine behind the 'Gelenkknoten' is a lateral spine, present on one side in *O. f. frigidus*, bilaterally in *O. f. takakuwai* and, as the end legs of *O. f. takakuwai* are regenerated, spinulation cannot be used as a differentiating character. The only remaining difference between the two subspecies is the pit on tergite 1; this cannot be seen in the cleared specimen and may well have been an artifact. There seems little justification for maintaining this subspecies. *Otostigmus frigidus takakuwai* is here confirmed as a junior synonym of *O. (O.) politus politus*, syn.n.

Otostigmus (O.) angusticeps schindleri Würmli, 1972, **comb.n.**

Figs 44–46.

O. (O.) politus schindleri Würmli, 1972: 96.

O. (O.) angusticeps, Lewis, 2001: 34.

TYPE MATERIAL. Holotype. NMB. 599a Ost-Sumba, Langgai, aus Bodenlaub in Urwald Mbana, 14.7.1949. Sumba-Expedition. A. Bühler + E. Sutter 1949.

DESCRIPTION. (Würmli's data in parentheses where appropriate). (Length about 4 cm. Colour dark olive with black-green pigment as in *pigmentatus*. Antennae yellow). Antennomeres 20+8, the latter damaged, basal 2 2/3 glabrous. Each forcipular coxosternal toothplate with three main teeth (Fig. 44).

Tergites with very fine paramedian sutures from 5(4), marginate from 11, without keels or spines. Sternites with paramedian sutures complete or almost so with two weak median depressions. Sternite 21 narrowed posteriorly with posterior margin concave (Fig. 45). Coxopleural process long with two end spines and one subapical spine, two laterals and one dorsal spine (Fig. 46). End leg prefemora with four ventrolateral spines, two ventromedials, three medials (2–3), two dorsomedials and a corner spine.

(Legs 1 to 6 with two tarsal spines, 7 to 20 with one)

REMARKS. Würmli's [1972] subspecies differs from Attems' *O. politus pigmentatus* in having 20 rather than (17)18 or 19 antennomeres, in having 2 2/3 rather than three antennomeres glabrous dorsally and in the longer coxopleural process. In the number of glabrous antennomeres, Würmli's subspecies shows convergence with *O. astenus* (Kohlrausch, 1881); however, Würmli [1972] also recorded *O. glaber* Chamberlin 1920 (= *O. astenus*) from Sumba while Lewis [2000] recorded both species from Rennell Island.

Lewis [2001] stated that *O. p. schindleri* was clearly *O. angusticeps* and whether or not it merited subspecific status was debatable. It is here retained as *Otostigmus angusticeps schindleri* Würmli, 1972, **comb.n.**

Otostigmus (O.) politus yunnanensis **subsp.n.**

O. (O.) politus, Lewis, 2001: 31 (in part), figs 63, 67, 68.

TYPE MATERIAL. Holotype. NMNHS. *Otostigmus politus* Karsch. 36 mm. China, Yunnan, Jinshui County near Yan Dong (cave), under stones, 18.1.1989. P. Beron leg.

DERIVATIO NOMINIS. From the Chinese province of Yunnan.

DIAGNOSIS. As *O. politus politus* but with end leg prefemur with five ventrolateral, four or five ventromedial, four medial, two dorsomedial and a corner spine, i.e. 15 or 16 spines rather than a total of 9 to 12 (typically 11) in the ten specimens from NE China for which data are available.

REMARKS. Lewis [2001] pointed out that his specimens of *O. politus,* one each from Beijing and Yunnan, differed in the spinulation of the end leg, the coxopleuron and in shape of sternite 21; he commented that 'with the present state of our knowledge it is probably best to regard them as different populations of a single species'. The additional information on the specimens of *O. politus* from NE China recorded above suggests that there is a clear difference in end leg spinulation between them and the Yunnan specimen, although perhaps not in the case of the coxopleuron and shape of sternite 21. Nevertheless, the difference is considered sufficient to distinguish the Yunnan specimen as a new subspecies.

Discussion and conclusion

The confusion over the identity of the various taxa that have been assigned to *O. politus* is here largely resolved. There are three species: *O. politus* with two subspecies, *O. angusticeps* with two subspecies and *O. australianus*. They are compared in Table 2. I have neither been able to locate Kraepelin's [1903] material from Sumatra nor his specimen from New Guinea. The specimen from Sumatra was very probably an *O. angusticeps* but the identity of the sample from New Guinea is uncertain. The form from China is *O. politus politus*.

Kraepelin's [1916] *Otostigmus* sp. nov. (= *O. ateles* Chamberlin, 1920) is closely related to *O. australianus* and both were recorded from Malanda, Queensland, but a decision as to its status is delayed pending the accumulation of additional data.

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