

Two new species of *Ceratophysella* (Collembola: Hypogastruridae) from Thailand

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Abstract. We describe in this paper two species of *Ceratophysella* from Northern Thailand: *C. mucronata* n. sp. and *C. morula* n. sp.. We proposed the use of two new chaetotaxic characters for *Poduromorpha* taxonomy.

Key words: *Collembola*, new species, Thailand, leg chaetotaxy.

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The genus *Ceratophysella* is recorded here for the first time in Thailand with two species (*Ceratophysella mucronata* and *C. morula*) new to science, collected during the expeditions of the "Association Pyrénéenne de Spéléologie" in 1980-81 and 1985. Other forms near *C. armata* and *C. denticulata* are also present in our material, but their taxonomic status cannot be established with certainty at the present time. All these *Ceratophysella* are restricted to medium to high altitude forests of northwestern Thailand, where they represent probably a palearctic element of oriental affinities.

The material is deposited in the collection of the Laboratoire d'Ecologie des Invertébrés Terrestres, Université P. SABATIER, Toulouse.

At the occasion of this descriptive work, we examined the subcoxal and trochanteral chaetotaxy of our species as well as several other *Poduromorpha*, which are discussed in the first part of the paper.

Some chaetotaxic characters of legs

Leg chaetotaxy has been rarely used as a source of taxonomic character in *Poduromorpha* except for tibiotarsus (YOSII, 1962). A simple analysis of setae number on any segment of leg shows however that it can provide excellent diagnostic characters at species or

generic levels. Chaetotaxy of subcoxae 1 and trochanter are briefly discussed here; more detailed study will be published later.

Subcoxae 1 chaetotaxy (Fig. 1 & 2). Three patterns were recognized from th.I to th.III:

- 1,2,2 in first instar of *H. boldorii* from Pyrenees, of *H. viatica* from Kerguelen and in adults of several *Friesea* sp. from France (*F. albida*, *F. mirabilis* and *F. truncata*);

- 1,2,3 in adults of *C. cf armata* from different populations of France, of *C. mucronata* n. sp. and of *H. viatica* from Kerguelen.

- 1,3,3 in adults of *C. bidentata* from Pyrenees, of *C. denticulata* from different populations of France, of *C. recta* from Pyrenees and of *C. morula* n. sp.; also in most *Neanurinae* species;

Variability was observed only in a population of *C. bengtsoni* from Isère (France), with both patterns 1,2,2 and 1,2,3.

Serial homologies with other segments are not evident; the symboles L1, L2 and L3 can be provisionally used for the subcoxa-1 setae in the sense of DEHARVENG, 1983. L1 (on all legs, often a macrocheta) and L2 (on legs II and III) are present in all instars; L3 is present on legs II and III in adults of many species.

Trochanter chaetotaxy (Fig. 3 & 4). We observed the following patterns from leg I to leg III in different *Hypogastruridae*, *Poduridae* and *Neanuridae*:

- 5,5,4 in first instar of *Xenylla* sp. from Toulouse (France);

- 5,5,5 in adults of *Paraxynella affiniformis* from Aude (France);

- 6,6,5 in adults of *Xenyllogastrura octocolata* from Pyrenees; in first instar of *Hypogastrura boldorii* from Pyrenees, and *H. viatica* from Kerguelen and from Toulouse;

- 6,6,6 in adults of *Anuridella germanica* from Canarias, of *Gomphiocephalus* sp. from Antarctica, of *Mesogastrura ojcoviensis* and of *Podura aquatica* from Pyrenees;

- 6,7,7 in adults of *Ceratophysella acuminata* from Pyrenees,

- 7,7,7 in adults of the following species: *Ceratophysella cf armata*, *C. denticulata*, *C. recta*, *Hypogastrura crassaegranulata*, *H. elevata*, *H. purpurescens*, *H. boldorii*, *Schaefferia subcaeca*, *S. maxima*, *Triacanthella perfecta* from Pyrenees; *H. viatica* from Kerguelen; *Typhlogastrura breuilii* from Spain; *C. morula* n. sp. and *C. mucronata* n. sp. from Thailand,

- 8,8,?8 in adults of *Triacanthella frigida*.

Complete serial (i. e. with other leg segments) as well as inter-whorls homologies are uncertain. The setae designation proposed here is therefore provisional and recognize an arrangement in two rows, the proximal one (p) and the distal one (d) (Fig. 3 & 4). The posterior distal seta, which is usually thinner than others, may be homologous of the trochanteral organ setae *Entomobryoidea*. From our data, the pattern 6,6,6 is likely to be the most primitive one. Post-embryonic neochaetosis gives 7,7,7 and 8,8,8 patterns. Lower number of setae would be the result of paurochaetosis during evolution.

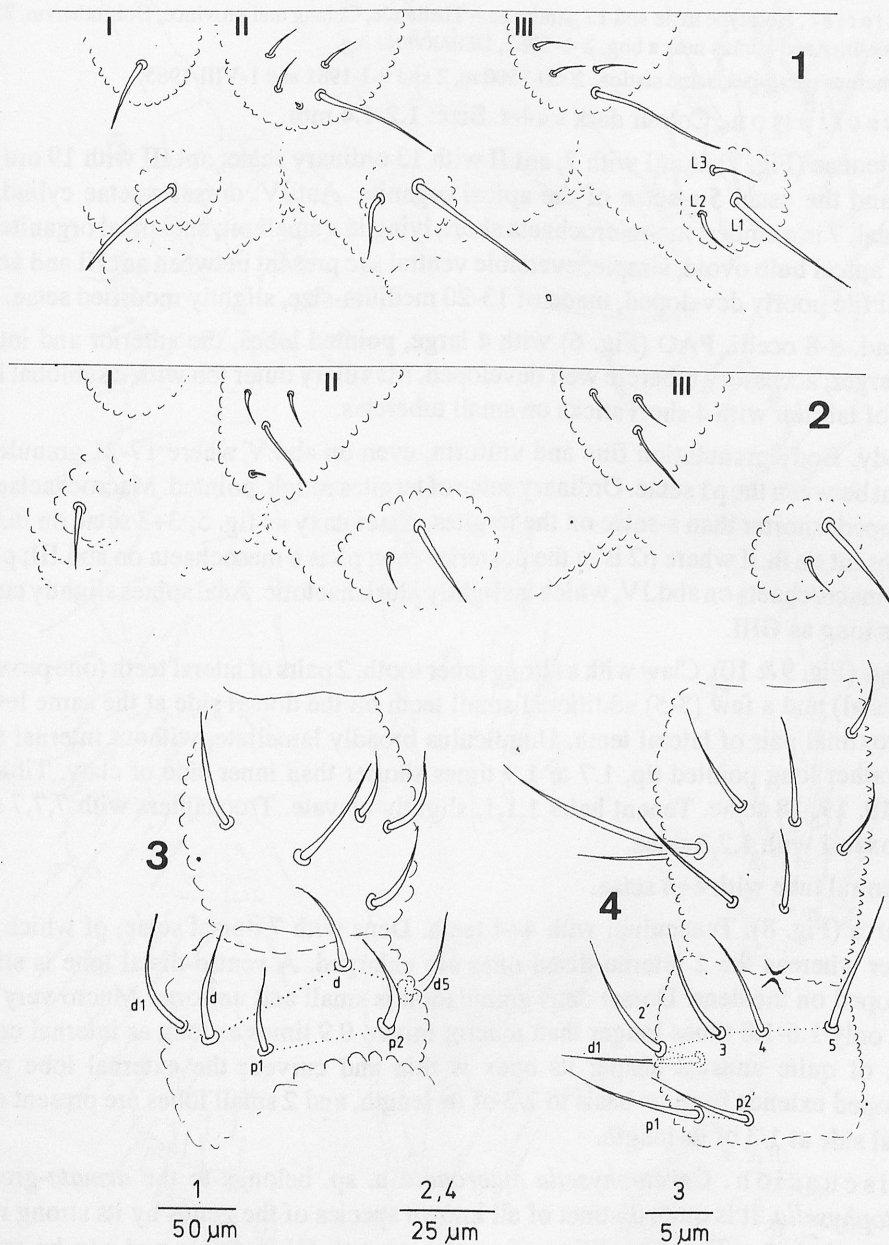


Fig. 1 - 4: 1 - subcoxae 1 in *Ceratophysella mucronata*; 2 - subcoxae 1 in *Friesea* sp. from Thailand; 3 - trochanter and femora in *Xenyllogastrura* cf. *octoculata*, ventral view, with tentative partial homology of setae with *C. mucronata*; 4 - trochanter and femora in *C. mucronata*, ventral view. d1 - "trochanteral organ", cf. text; d2' - seta is absent in first instar of *Hypogastrura viatica* on leg III; p2' - seta is absent in first instar of *H. viatica* on legs I, II and III.

Ceratophysella mucronata n. sp.

(Fig. 5 to 10)

Material. Holotype male and 12 paratypes – Thailande, Chiang mai province, Doi Inthanon, 2500 m a.s.l., wet litter and humus near a bog, 2-I-1981, DEHARVENG leg.

Numerous paratypes, same station, 2000-2500 m, 2 and 9-1-1981 and 1-VIII-1985.

Description. Colour dark violet. Size: 1.2-1.4 mm.

Antennae (Fig. 7). Ant.I with 7, ant.II with 13 ordinary setae; ant.III with 19 ordinary setae and the usual 5 s-setae of the apical organite. Ant.IV: dorsal s-setae cylindrical, subequal, 7 in number; ms-microchaeta short, lying in a small pit; subapical organite very small; apical bulb ovoid, simple; eversible ventral sac present between ant.III and ant.IV; ventral file poorly developed, made of 13-20 medium-size, slightly modified setae.

Head. 8-8 ocelli. PAO (Fig. 6) with 4 large, pointed lobes, the anterior and internal ones larger; accessory tubercle well developed. Maxillary outer lob with 2 sublobal hairs. Apex of labrum with 4 short sticks on small tubercles.

Body. Body granulation fine and uniform, even on abd.V where 17-21 granules are present between the p1 setae. Ordinary setae of tergites rough, pointed. Macrochaetae well developed, shorter than s-setae on the tergites. chaetotaxy as fig. 5; 3+3 setae on th.I; m2 seta absent on th.II where p2 is in the posterior row; p3 is a mesochaeta on abd.III; p1 and p3 are macrochaeta on abd.IV, which is slightly plurichaetotic. Anal spines slightly curved, half as long as GIII.

Legs (Fig. 9 & 10). Claw with a strong inner tooth, 2 pairs of lateral teeth (one proximal, one distal) and a few (3-5) additional small teeth on the dorsal side at the same level as the proximal pair of lateral teeth. Unguiculus broadly lamellate, without internal tooth, with rather long pointed tip, 1.7 to 1.9 times shorter than inner side of claw. Tibiotarsi with 19, 19, 18 setae. Tenent hairs 1,1,1, slightly clavate. Trochanters with 7,7,7 setae. Subcoxae 1 with 1,2,3 setae.

Ventral tube with 4+4 setae.

Furca (Fig. 8). Tenaculum with 4+4 teeth. Dens with 7 dorsal setae, of which 5 are slender whereas the 2 interno-distal ones are enlarged. A ventro-distal lobe is slightly developed on the dens. Dorsal dens granulation is small and uniform. Mucro very large (dens only 1.6-1.8 times longer than mucro; mucro 0.9 times as long as internal crest of GIII), of quite unusual shape: its apex is thin and curved; the external lobe poorly developed extends from its basis to 2/3 of its length, and 2 small lobes are present on the ventral side at 1/3 of its length.

Discussion. *Ceratophysella mucronata* n. sp. belongs to the *armata*-group of *Ceratophysella*. It is quite distinct of all known species of the genus by its strong mucro of unusual shape. The disposition of s-setae on ant. IV is stable and can be used as discriminant character.

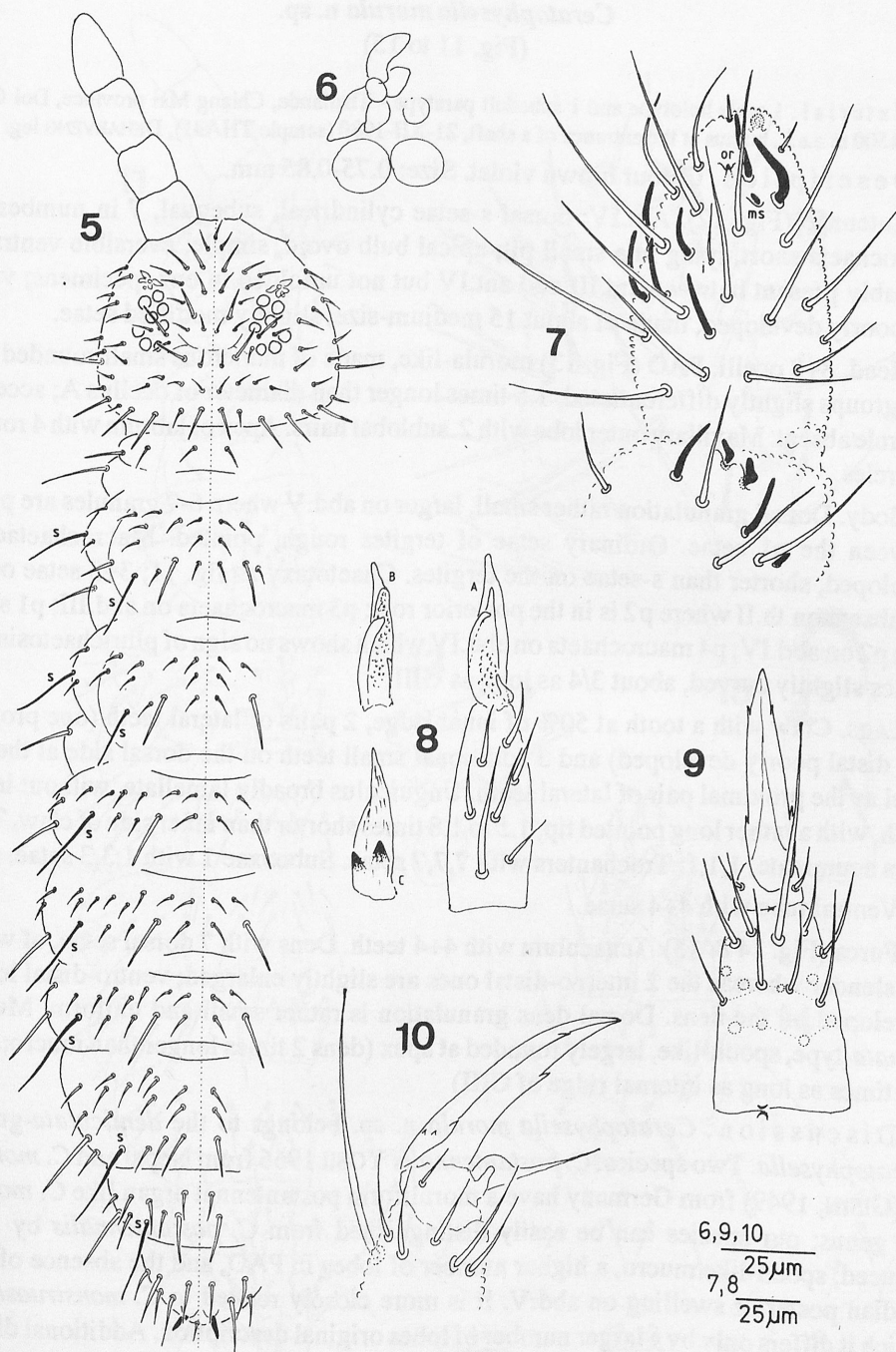


Fig. 5-10: *Ceratophysella mucronata*. 5 – dorsal chaetotaxy; 6 – postantennal organ with 2 anterior eyes; 7 – distal part of ant. III and ant. IV, dorsal view (right antenna); 8 – left mucrodens, dorsal view (A), other mucro in dorsal (B) and ventral (C) view; 9 – tibiotarsus and praetarsus of leg I, dorsal view; 10 – praetarsus and distal part of tibiotarsus of leg I, lateral view.

Ceratophysella morula n. sp.

(Fig. 11 to 15)

Material. 1 male holotype and 1 subadult paratype - Thaïlande, Chiang Mai province, Doi Chiang Dao, 1500 m a.s.l., humus at the entrance of a shaft, 21-XII-1980 (sample THA31), DEHARVENG leg.

Description. Colour brown violet. Size: 0.75-0.85 mm.

Antennae (Fig. 12). Ant.IV: dorsal s-setae cylindrical, subequal, 7 in number; ms-microchaeta short, lying in a small pit; apical bulb ovoid, simple; eversible ventral sac probably present between ant.III and ant.IV but not unfolded in our specimens; ventral file poorly developed, made of about 15 medium-size, slightly modified setae.

Head. 8+8 ocelli. PAO (Fig. 13) morula-like, made of numerous small rounded lobes in 4 groups slightly differentiated, 1.5 times longer than diameter of ocellus A; accessory tubercle absent. Maxillary outer lobe with 2 sublobal hairs. Apex of labrum with 4 rounded tubercles.

Body. Dorsal granulation rather small, larger on abd.V where 6-7 granules are present between the p1 setae. Ordinary setae of tergites rough, pointed. Macrochaetae well developed, shorter than s-setae on the tergites. Chaetotaxy as fig. 11; 3+3 setae on th.I; m2 absent on th.II where p2 is in the posterior row; p3 macrochaeta on abd.III; p1 shorter than p2 on abd.IV; p4 macrochaeta on abd.IV which shows no sign of plurichaetosis. Anal spines slightly curved, about 3/4 as long as GIII.

Legs. Claw with a tooth at 50% of inner ridge, 2 pairs of lateral teeth (one proximal, one distal poorly developed) and 3 additional small teeth on the dorsal side at the same level as the proximal pair of lateral teeth. Unguiculus broadly lamellate, without internal tooth, with a rather long pointed tip, 1.5 to 1.8 times shorter than inner side of claw. Tenent hairs acuminate, 1,1,1. Trochanters with 7,7,7 setae. Subcoxae 1 with 1,3,3 setae.

Ventral tube with 4+4 setae.

Furca (Fig. 14 & 15). Tenaculum with 4+4 teeth. Dens with 7 dorsal setae, of which 5 are slender whereas the 2 interno-distal ones are slightly enlarged; ventro-distal lobe not developed on the dens. Dorsal dens granulation is rather small and uniform. Mucro of *armata*-type, spoon-like, largely rounded at apex (dens 2 times longer than mucro; mucro 0.7 times as long as internal ridge of GIII)

Discussion. *Ceratophysella morula* n. sp. belongs to the *denticulata*-group of *Ceratophysella*. Two species: *C. postantennalis* YOSII 1966 from Nepal and *C. monstrosa* (GISIN, 1949) from Germany have a moruliform postantennal organ like *C. morula* in the genus; our species can be easily distinguished from *C. postantennalis* by its non reduced, spoon-like mucro, a higher number of lobes in PAO, and the absence of a light median posterior swelling on abd.V. It is more closely related to *C. monstrosa*, from which it differs only by a larger number of lobes original description. Additional differences were found with a material of *C. monstrosa* collected by Wanda WEINER: a shorter mucro (ratio dens: mucro=2-2,2 in *C. morula*, 2,6 in *C. monstrosa*) and several minor chaetotaxic differences, particularly the presence of a2 on abd.V in *C. morula*. The disposition of s-setae on ant.IV is stable in our 2 specimens and could provide discriminant character in the group, as noted for *C. mucronata*.

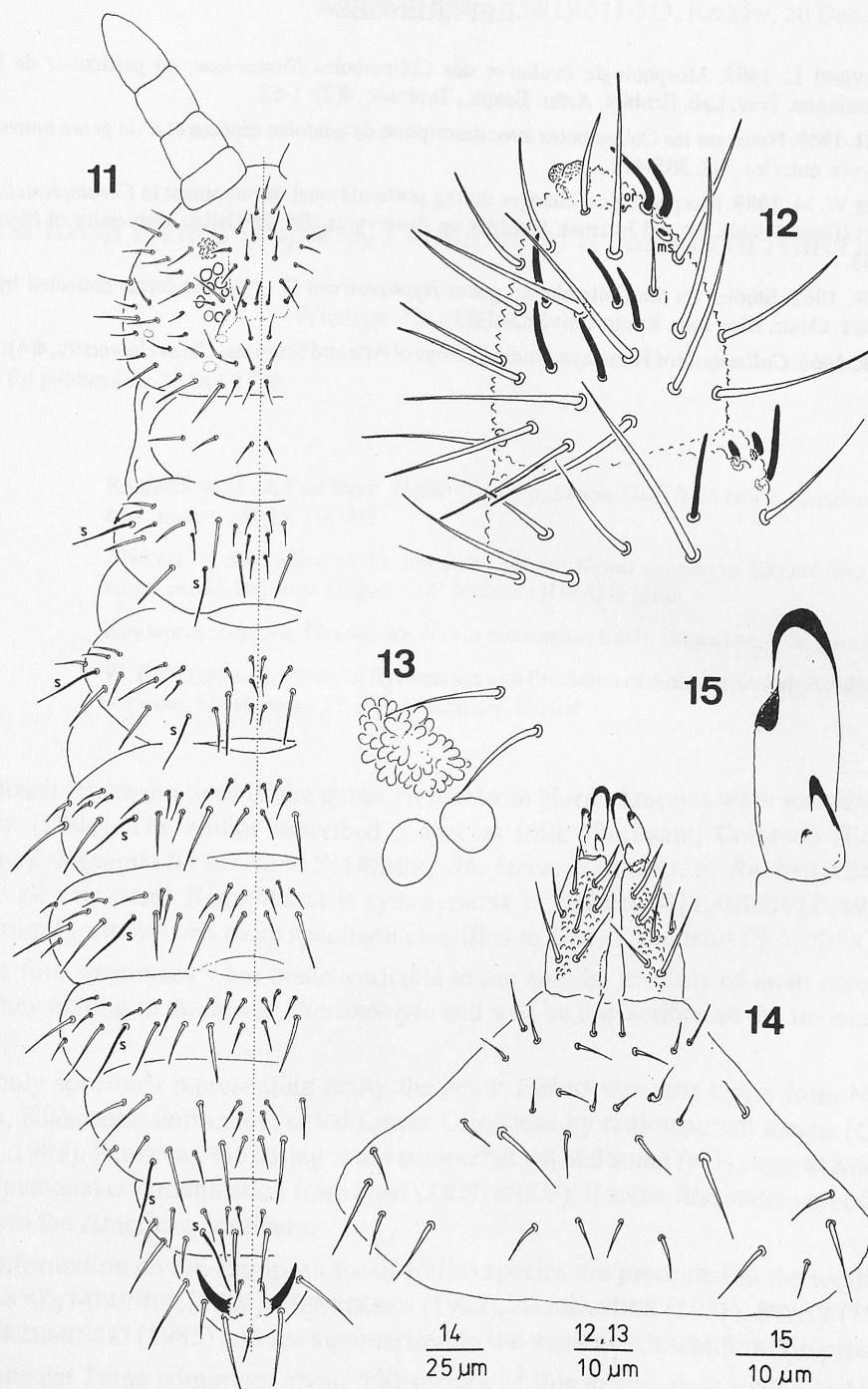


Fig. 11 - 15: *Ceratophysella morula*. 11 - dorsal chaetotaxy; 12 - distal part of ant.III and ant.IV, dorsal view (right antenna); 13 - postantennal organ with 2 anterior eyes; 14 - furca, dorsal view; 15 - left mucro, dorsal view.

REFERENCES

- DEHARVENG L. 1983. Morphologie évolutive des Collemboles *Neanurinae*, en particulier de la lignée neanurienne. Trav. Lab. Ecobiol. Arthr. Edaph., Toulouse, 4(2): 1-63.
- GISIN H. 1949. Notes sur les Collemboles avec description de quatorze espèces et d'un genre nouveau. Mitt. schweiz. ent. Ges., 22: 385-410.
- WEINER W. M. 1989. Morphological changes during postembrional development in *Ceratophysella armata* (sic!) (GISIN, 1949). In: 3rd Internat. Seminar on Apterygota. Ed. R. Dallai. University of Siena, Siena, 47-53.
- YOSII R. 1962. Studies on the Collembolan genus *Hypogastrura* II - Nearctic forms collected by Prof. F. BONET. Contr. Biol. Lab. Kyoto Univ., 13: 1-25.
- YOSII R. 1966. *Collembola* of Himalaya. Journ. College of Arts and Sciences, Chiba University, 4(4): 461-531.