

**Species of the genus *Isotoma* subgenus *Parisotoma*
BAGNALL, 1940 and *Sericeotoma* subgen. nov.
(*Collembola*, *Isotomidae*) of USSR fauna**

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POTAPOV M. B. (1991). Species of the genus *Isotoma* subgenus *Parisotoma* BAGNALL, 1940 and *Sericeotoma* subgen. nov. (*Collembola*, *Isotomidae*) of USSR fauna, Acta zool. cracov., 34(1): 267-301

Abstract. New species and subspecies of *Isotoma* (*Parisotoma*) (*I. appressopilosa*, *atroculata*, *iremeli*, *longa* spp. n., and *reducta amurica* ssp. n) are described from the USSR. Many new data about the distribution and morphology of known species are presented. New subgenus and species *Isotoma* (*Sericeotoma*) *knissi* subgen. et sp. n. is described from a cave (Bashkir ASSR). Old and new taxonomic characters are discussed.

Key words: *Collembola*, *Isotomidae*, taxonomy, Palaearctic.

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I. INTRODUCTION

The species of *Isotoma* (*Parisotoma*) have a very wide distribution in the Holarctic region; they often dominate among other species of *Collembola* and achieve a high density. 7 species of *Parisotoma*: *I. notabilis*, *setispinosa*, *vtorovi*, *trichaetosa*, *removeophthalma*, *reducta*, and *terricola* have been known so far from Soviet Union (KUTYREVA 1979; MARTYNOVA, BERMAN, CHELNOKOV 1977; RUSEK 1984; VTOROV, MARTYNOVA 1977).

The analysis of the material from different points of the USSR has yielded four new species, one new subspecies of known species and a new subgenus related to *Parisotoma* have been found. One species has been discovered for the first time for the USSR and many data about the distribution of known species have been found.

The author cordially thanks the following collembologists for the valuable materials: Drs A. B. BABENKO (Taimyr), N. M. BABUSHKIN (Chabarovsk region), D. I. BERMAN (Magadan region), V. I. BULAVINTZEV (north regions of the USSR), I. P. VTOROV (Altai), T. M. ZHELTIKOVA (Baikal), S. N. IORDANSKY (Sajan), O. G. KAPUSTJAN (Kamchatka), N. A. KUZNETZOVA (European part of the USSR), L. T. KUTYREVA (Primorski Territory), A. D. PETROVA-NIKITINA (Yamal, Magadan region), S. K. STEBAEVA (Chukotka, south

regions of Siberia), G. M. KHANISLAMOVA (South Ural). I express my deep gratitude to Dr A. FJELLBERG and Dr A. SZEPTYCKI for their advice in the process writing this work.

All type material of the new taxa is preserved in Moscow Lenin State Pedagogical Institute.

II. REMARKS TO SUBGENUS *PARISOTOMA*

A detailed diagnosis for the taxon was given by DEHARVENG (1981) and RUSEK (1984). Basing on a large material of this subgenus, I consider its most important characters as:

- 0 - 5 ommatidia on each half of head (figs 1-20), small size of body and white or grey spotty colour.
- Furca typical for *Isotoma*, no spineform chaetae on manubrium, mucro with 3 or (rarely) 4 teeth.
- No clavate tibiotarsal hairs.
- Decreased number of chaetae on appendages and other parts of body:
 - a. From 3+3 to 4+4 postlabial chaetae (excluding *I. iremeli*).
 - b. Total number of chaetae on ventral tube less than 20.
 - c. 2-4 (rarely 6) chaetae on tenaculum.
 - d. 7 chaetae on dorsal side of dens (excluding *I. ekmani* and *I. iremeli*).
 - e. 2+2 microchaetae above manubrial thickening (see for example figs 4 B, 5 L, 7 D by RUSEK 1984).
- Structure of maxilla: maxillary head always with enlarged lamella no. 1 (figs 39-56). Maxillary outer lobe with 3-furcated papilla and 4 sublobal hairs.
- Large, oval PAO.
- General scheme of distribution of body sensillae (see the description of sensorial chaetotaxy) (figs 22-29).
- 4 obvious, thick sensillae on Ant. IV, other sensillae feebly or strongly thickened but less than the first (see figs 6 B, 8 A, 10 A, 12 A, 13 A by RUSEK 1984).

The *Parisotoma* diagnosis makes it necessary to reconsider the independence of the subgenus *Pseudosorensia* IZARRA, 1972, as the majority of differences between them disappear (see DEHARVENG 1981).

I do not consider *I. jacutica* MARTYNOVA, 1980 (Jakutia) and *I. insularis* DEHARVENG, 1981 (Subantarctic, Kroze Isl.) as members of *Parisotoma*, because they have an increased number of chaetae on appendages. The first one also has other unusual characters (structure of PAO, very weak differentiation of sensillae, *accp*-sensillae on abdomen are in front of posterior row of chaetae). Though it has been described from the territory of the USSR, I do not consider it in my work.

Table I

Number of sensillae on the body in *Isotoma (Parisotoma)* spp.*

Species	Th. II			Th. III			Abd. I		Abd. II		Abd. III		Abd. IV		Abd. V	
	accp	al		accp	al		accp	al-ms	accp	al-ms	accp	accp ms	accp	as	accp	as
		s	ms		s	ms										
<i>ekmani</i>	4	2	+	4	1	-	3	+	3	-	4	+	5	1	5(4)	1
<i>trichatosa</i>	4	2	+	4	1	+	4	+	4	+	4	+	5	1	5	2
<i>appressopilosa</i>	5	2	+	5-6	1	+	5	+	5	+	5	+	5	1	5	2
<i>iremeli</i>	6(5)	2	+	6	1	+	6	-	6	-	6	+	5	1	5	2
<i>vtorovi</i>	6(5)	2	+	7	1	+	6	+	6	+	6	+	6	1	5	2
<i>reducta reducta</i>	6	2	+	6	1	+	6	+	6	+	6	+	6	1	5	2
<i>reducta amurica</i>	6	2	+	6	1	+	6	+	6	+	6	+	6	1	5	2
<i>longa</i>	6	2	+	7	1	+	6	+	6	+	6	+	6	1	5	2
<i>atroculata</i>	6	2	+	6	1	+	6	+	6	+	6	+	6	1	5	2
<i>removeophthalma</i>	6	2	+	6	1	+	6	+	6	+	6	+	6	1	5	2
<i>setispinosa</i>	6	2	+	6	1	+	6	+	6	+	6	+	6	1	5	2
<i>notabilis</i>	5-6	2	+	6	1	+	6	+	6	+	6	+	6	1	5	2
<i>notabilis</i> (Altai Mts)	6	2	+	6	1	+	6	+	6	+	6	+	6	1	5	2

*Tables I-IV are based on data taken from 10 specimens of each species

III. CHARACTERS OF SPECIES TAXONOMY

Characters of taxonomical importance:

- Structure of maxilla (FJELLBERG 1977) - the most distinct character.
- Chaetotaxy of labium and number of postlabial chaetae (figs 34-36) (DEHARVENG 1981).
- Presence of chaeta on 2-nd subcoxa of leg I (RUSEK 1984).
- Number of laterodistal chaetae on ventral tube.
- Degree of development of macrochaetae: their length and number of feathers on their surface (RUSEK 1984).
- Number and distribution of sensillae on all tergites of body (used for Abd. IV, V by DEHARVENG 1981).
- Number of mucronal teeth.

Chaetotaxy in

Species	No. of labial chaetae	No. of post- labial chaetae	No. of ventral sensillae on Ant. I	No. of ventral micro- chaetae on Ant. I	Chaeta on 2-nd subco- xa of Leg I	No. of axial chaetae on Th. II	No. of axial chaetae on Th. III
<i>ekmani</i>	4+4	(3+1)+ (3+1)	2	1	-	10-11	9-12
<i>trichaetosa</i>	5+5	4+4 (4+5)	2(3)	2	-	9-11	8-10
<i>vtorovi</i>	4+4 5+5	3+3	2	2	-	10-11	9-11
<i>iremeli</i>	4+4 4+5	6+6 (6+5)	2	2	+	11-13	11-13
<i>appressopilosa</i>	5+5	3+3 (4+4)	4-5	2	+	12-14	11-13
<i>reducta reducta</i>	5+5	3+3	2	2	+	9-12	9-12
<i>reducta amurica</i>	5+5	3+3	2	2	+	10-12	9-11
<i>longa</i>	5+5	3+3	2-3	2	+	10-12	9-11
<i>atroculata</i>	5+5	3+3	2-3	2	-	10-13	10-11
<i>removeophthalma</i>	5+5	3+3	2	2	-	10-11	9-11
<i>setispinosa</i>	5+5 (5+4)	3+3	2	2	-	10-12	9-11
<i>notabilis</i>	5+5	4+4	2	2	-	9-11	8-10
<i>notabilis</i> (Altai Mts)	5+5	4+4	2	2	-	10-11	8-10

The most important characters are framed

Table II

Isotoma (Parisotoma) spp.

No. of laterodistal chaetae on ventral tube	Ventral tube		No. of chaetae on tenaculum	No. of chaetae on furcal paratergite	Dorsal side of dens			No. of teeth on mucro
	No. of anterior chaetae	No. of posterior chaetae			No. of basal chaetae	No. of medial chaetae	No. of lateral chaetae	
4+4	3+3 (3+2)	3(4)	2(1)	21-26	2	3	3	3
3+3	3+3 (4+4)	3-5	2	26-31	2	2	3	4
2+2	3+3 (4+3)	3	2	22-26	2	2	3	4
3+3	4+4 (5+5)	5-6	2	38-48	3-4	3	4	3
2+2	3+3 (4+4)	3	2-5	25-31	2	2	3	3
3+3	3+3 (4+4)	4-5 (3)	2(3)	28-33	2	2	3	3
2+2	3+4 4+4	5-6	2	26-32	2	2	3	3
2+2	3+3 (4+3)	3 (4,5)	4 (3,5)	32-43	2	2	3	3
2+2	3+3 (4+4)	3 (4,5)	2 (3,4)	25-31	2	2	3	3
2+2	3+3	3	3	27-28	2	2	3	3
3+3	3+3 (2+3)	3	2(3)	24-32	2	2	3	3
3+3	3+3 (2+2)	3-5	2	25-36	2	2	3	3
3+3	3+3	4,5 (3)	2	25-34	2	2	3	3

Characters of lesser taxonomical value:

- Number of ommatidia - vary within one population, in *I. notabilis* - from 2+2 to 4+5 (RUSEK 1984) (I describe a new form with 1+1), also in *vtorovi*, *atroculata*, *reducta amurica* (see diagnosis). Only some species can be easily recognized by their eyes (e. g. *I. setispinosa*).

- Sensorial chaetotaxy of antennae- ant. I constant: all species have 2 slightly thickened ventral sensillae and 2 basal microchaetae (see figs 3 C, 10 D, 12 C by RUSEK 1984). Specimens with 3 ventral sensillae often appeared among normal ones within one population. Only *I. ekmani* and *appressopilosa* have unusual ant. I. AO of ant. III is characteristic only for *iremeli* and *terricola*.

- The length: width ratio of ant. IV (as used by RUSEK 1984) - according to mine data, this character varies in most of the species. I measured the ratio inside one population of *I. longa* sp. n. related with absolute length of ant. IV (the last reflects the length of the body and age stage (fig. 98)). The ratio was 3,4-4,1 in adult specimens. It is important to note that the ratio in other species gets to sliding curve of *longa* (fig. 99). Only adult specimens of the small species *I. ekmani* have a very low value of the ratio in comparison to adult ones of other species.

- Axial chaetom of body tergites, number of chaetae on furcal paratergite (characters of big taxonomical importance e. g. in *Tetracanthella*, *Anurophorus*) - the species not very differentiated (Table II). The character strongly varies within one population in specimens of similar size. Specimens with asymmetrical number of axial chaetae are frequent (the difference of 1-2 chaetae). Only *I. iremeli* and *longa* have a distinctly increased number of chaetae.

The majority of other traditional characters (claw, empodial appendage, chaetotaxy of furca and others) are useless because according to these characters, *Parisotoma* species are nearly the same.

Sensorial chaetotaxy.

Sensorial setae are abundant, as in the other members of the subfamily *Isotominae* (DEHARVENG 1977, 1979). *Accp*-sensillae of Th. II, III are in front of posterior row of common chaetae, those of Abd. I-V are in posterior row and alternate with common ones. I use the terminology proposed by SZEPTYCKI (1972): *accp* - "accessory p-row", *al* - "anterolateral" and *as* - "anterosubmedial" sensillae.

I. longa and *vtorovi* have the most complete sensorial variant (fig. 21). The sensorial chaetotaxy of these species is:

Th. II: 3 *al*-sensillae (including 1 microsensilla) and 6 *accp*-sensillae.

III: 2 *al*-sensillae (including 1 microsensilla) and 7 *accp*-sensillae.

Abd. I: 1 *al*-microsensilla and 6 *accp*-sensillae.

II: 1 *al*-microsensilla and 6 *accp*-sensillae

III: 7 *accp*-sensillae (including 1 microsensilla).

IV: 1 *as*-sensilla and 6 *accp*-sensillae.

V: 2 *as*-sensillae and 5 *accp*-sensillae.

Table III

Morphometrical ratios in *Isotoma* (*Parisotoma*) spp.

Species	PAO: Claw III (inner margin)	Macrochaetae of Abd. V		Length of the chaetae P ₁ :P ₂ on Abd. IV
		Claw III inner margin)	dorsomedial length of Abd. V	
<i>ekmani</i>	1.5-1.9	2.0-3.1	0.7-1.0	0.9-1.3
<i>trichaetosa</i>	1.0-1.4	2.6-3.5	1.0-1.1	1.2-1.5
<i>vtorovi</i>	1.6-2.0	3.6-4.6	1.0-1.4	1.2-1.8
<i>iremeli</i>	1.3-1.4	3.4-4.2	1.2-1.5	1.6-1.8
<i>appressopilosa</i>	1.5-1.8	1.8-2.4	0.7-0.9	1.0-1.2
<i>reducta reducta</i>	1.2-1.5	3.2-4.5	1.3-1.8	1.3-2.0
<i>reducta amurica</i>	1.4-1.7	3.6-5.1	1.5-1.8	1.6-2.1
<i>longa</i>	1.2-1.6	3.2-4.0	1.3-1.6	1.4-1.7
<i>atroculata</i>	1.5-1.6	3.6-4.7	1.5-2.5	1.7-2.2
<i>removeophthalma</i>	1.8	2.9-3.5	—	1.5-1.6
<i>setispinosa</i>	1.3-1.9	2.7-4.1	1.1-1.4	1.4-1.8
<i>notabilis</i>	1.5-1.8	2.8-3.8	1.0-1.3	1.2-1.5
<i>notabilis</i> (Altai Mts)	1.7-2.3	3.1-4.5	1.1-1.4	1.3-1.7

Sensillae of abdomen are separated by common chaetae, the number of the latter is relatively constant within one species. The author proposes to mark the *accp*-sensorial chaetom as follows: (e. g. of Abd. I, IV in *I. longa*): $2_s1_s1_s1_s1$, $1_s1_s1_s1(s)1_s$. S - sensilla, cipher - number of p-row chaetae between adjacent sensillae (s) (s in parenthesis) - sensilla removed from p-row.

Most of the species have an almost complete set of sensillae, differing from the most complete one by 1-2 sensillae (figs 22-26). An analysis of the variability within subgenus was given by POTAPOV (1988). Some species have a decreased number of sensillae. These species have a less constant number of common chaetae between sensillae than species with an undecreased sensorial set.

Structure of maxillary head.

It is relatively stable inside the subgenus (figs 39-56). *I. ekmani* and *iremeli* (figs 39-42) are the exceptions. Differences among other species are small but distinct. The most useful here are lamellae no. 1 and 6, because they are visible and usually carry distinct rows of cilia, the number of which is stable within one species.

Table IV

Morphological characters in closely related species of *Isotoma* (*Parisotoma*).

Species	No. of ommatidia	Division of eye spot	No. of cilia on		No. of postlab. chaetae	Chaeta on 2-nd subcoxa I	No. of chaetae on tenaculum	No. of laterodistal chaetae on vent. tube	No. of accp-s on Th. III	No. of common chaetae between		
			lam. no. 1	lam. no. 6						accp1 on Abd. IV	on Abd. V	accp1 accp2 accp3
<i>reducta reducta</i>	1	-	2	3	3+3	+	2(3,4)	3+3	6	1(2)	0	1(2)
<i>reducta amurica</i>	1(0)	-	2	3	3+3	+	2	2+2	6	2	0	2(1)
<i>longa</i>	1(0)	-	2	5-6	3+3	+	4-5	2+2	7	2	1	2
<i>atroculata</i>	1(2,3)	-	2-4	5	3+3	-	2(3)	2+2	6	2(1)	0	2(1)
<i>removeophthalma</i>	2	+	3-5	?	3+3	-	3	2+2	6	2	1	2
<i>setispinosa</i>	2	+	3	3(4)	3+3	-	2	3+3	6	2	1	2
<i>notabilis</i>	2-5	-	4-5	5-6	4+4	-	2	3+3	6	2	0	1
<i>notabilis</i> (Altai Mts)	1	-	3-5	5-6	4+4	-	2	3+3	6	2	0	1

IV. KEY TO THE PALEARCTIC SPECIES OF *ISOTOMA* (*PARISOTOMA*)

1. 2+2 laterodistal chaetae on ventral tube 2
- 3+3 laterodistal chaetae on ventral tube 8
- 4+4 laterodistal chaetae on ventral tube *ekmani* FJELLBERG, 1977
2. 4+4 ommatidia in black elongated eye spot *dichaeta* YOSII, 1969
- From 0+0 to 3+3 ommatidia, in case of 3+3 ones, eye spot is round 3
3. Mucro with 4 teeth. *Accp5* sensilla on Abd. IV is disposed side by side to *accp6* in posterior row of chaetae (fig. 60) *vtorovi* MARTYNOVA, 1977
- Mucro with 3 teeth. *Accp5* sensilla on Abd. IV is in front of common posterior row of chaetae and is separated from *accp6* by chaeta (fig. 85) 4
4. 2+2 ommatidia, posterior one is at a big distance from anterior one (fig. 15) *removeophthalma* MARTYNOVA, 1977
- From 1+1 to 3+3 ommatidia in a single eye spot or eyes absent 5
5. Macrochaetae of Abd. V shorter than dorsomedial length of tergite. 5+5 *accp*-sensillae on Abd. I-IV (excluding microsensillae) (fig. 68) *appressopilosa* sp. n.
- Macrochaetae of Abd. V longer than dorsomedial length of tergite. 6+6 *accp*-sensillae on Abd. I-IV (excluding microsensillae) (fig. 88) 6
6. Chaeta on 2-nd subcoxa of leg I absent *atroculata* sp. n.
- Chaeta on 2-nd subcoxa of leg I present 7
7. 7+7 *accp* and 2 *al*-sensillae on Th. III (fig. 21). Lamella no. 6 of maxilla with 5-6 rows of cilia (figs 47-49). Common chaeta of p-row between *accp1* and *accp2* sensilla on Abd. V present (fig. 21) *longa* sp. n.
- 6+6 *accp* and 2 *al*-sensillae on Th. III. Lamella no. 6 of maxilla with 3 rows of cilia (figs 43, 44). Common chaeta of p-row between *accp1* and *accp2* sensilla on Abd. V absent (see fig. 88) *reducta amurica* ssp. n.
8. 4+4 sensillae on Abd. I-III (excluding microsensillae). Mucro with 4 teeth *trichaetosa* MARTYNOVA, 1977
- 4+4 sensillae on Abd. I-III (excluding microsensillae). Mucro with 3 or 4 teeth 9
9. Mucro with 4 teeth. Without pigment sp. non det.
- Mucro with 3 teeth. Pigment present or absent 10
10. Chaeta on 2-nd subcoxa of leg I present 11
- Chaeta on 2-nd subcoxa of leg I absent 14
11. Eyes absent. Sensory rods of AO of ant. III increased *terricola* RUSEK, 1984
- Eyes present. Sensory rods of AO of ant. III increased or normal 12
12. 4+4 ommatidia in elongated eye spot (fig. 8). *Accp6* sensilla on Abd. IV and *al*-microsensillae on Ab. I and II absent. Sensory rods of AO of ant. III increased *iremeli* sp. n.
- 1+1 ommatidia (figs 5-7). *Accp6* sensilla on Abd. IV (fig. 88) and *al*-microsensillae on Abd. I and II present. Sensory rods of AO of ant. III normal 13
13. 4-5 rows of cilia on lamella no. 6 of maxilla. Macrochaetae on Abd. V with 3-4 feathers *agrelli* DELAMARE, 1950
- 3 rows of cilia on lamella no. 6 of maxilla (figs 43, 44). Macrochaetae on Abd. V with 7-23 feathers (fig. 88) *reducta reducta* RUSEK, 1984
14. From 1+1 to 4+5 ommatidia in a single eye spot (figs 1-4). 4+4 postlabial chaetae *notabilis* SCHAFER, 1896
- 2+2 ommatidia, posterior one is at a distance from anterior (figs 11, 12). 3+3 postlabial chaetae (fig. 36) *setispinosa* LEE, 1977

Some Holarctic species were described unsufficiently: *I. tariva* WRAY, 1953, *I. sphagneticola* LINNANIEMI, 1912, *I. hyonosenensis* YOSII, 1939, *I. notabilis f. coeca* YOSII, 1966. They are not included into the key but discussed in the diagnoses of some species.

V. DESCRIPTIONS AND REDESCRIPTIONS OF SPECIES

Isotoma ekmani FJELLBERG, 1977

(Figs 16, 29, 34, 41, 42, 31)

Isotoma ekmani: FJELLBERG 1977

Notes to description. Sensorial chaetotaxy (fig. 29) with the least number of sensillae on the body compared with other species in Holarctic. Some medial *accp*-sensillae of Th. II - Abd. III, microsensillae of Th. III and Abd. II, *as*-sensilla of Abd. V are absent. Number of common p-row chaetae between sensillae on abdomen is unstable. Formula of *accp*-sensillae on abdomen:

Abd. I: $3_s 2_s 2-3_s$

II: $4_s 2-3_s 2_s$

III: $4_s 2_s 1-2_s 2_{ms} 0-1_s$

IV: $1/2-1, 1/2_s 1_s 1-2_s 1-2_s 1_s$

V: $1_{ss} 1_{ss} 1_s$

Material studied: Murmansk reg., near Kirovsk (coniferous woods, mountain tundra); Murmansk reg., near Skalny (tundra); Arkhangelsk reg., Velsk distr. (birch wood); Komi ASSR, near Sivomaskinsky (tundra); Byelorussian SSR, Vitebsk distr. (sphagnous pine wood); Khakass A. Reg., Tashtyp distr. (mountain tundra); Chukotka, Beringovsky distr. (tundra); Magadan reg., near Magadan (larch wood); Kamchatka, Kronotsky nature reserve (coniferous woods).

Distribution (fig. 100, 1) and ecology. Holarctic species, widely distributed in Norway, Alaska and Arctic Canada (FJELLBERG 1977, 1986). Reported also from mountains in more southern areas: the Alps (CHRISTIAN 1987), Colorado Front Range (USA) (FJELLBERG 1984). Probably present in mountains of Japan and Nepal (according to some data of YOSII 1966). Till now not recorded from USSR. Very characteristic for northern areas (but not observed in the northernmost Arctic, e. g. not found in the Arctic coast of Taimyr and Arctic islands - personal communication of Dr A. BABENKO). In southern areas it appears only in the mountains and sphagnous bogs.

Discussion. RUSEK (1984) gave a very detailed redescription of this species. It has many unique details:

- Maxillary head structure: lamellae no. 1, 2, 4, 6 similar with each other, mushroom-shaped with a row of cilia on their borders (figs 41, 42).
- Macro- and common chaetae on body short (similar with *I. appressopilosa*).
- Unique sensorial chaetotaxy of body.

- Sensorial chaetotaxy of Ant. I: one ventral sensilla thickened, 1 basis microchaeta present (other species with thin sensillae and 2 microchaetae) (see fig. 5 I by RUSEK 1984).
- Subapical sensory peg globular and large (other species with small one).
- 3 medial chaetae on dorsal side of dens (fig. 31). Almost all other species with 2.
- Basis of labium always with 4+4 chaetae (other species with 5+5 or variable number).
- 4+4 postlabial chaetae, one lesser than other 3, removed to more lateral position (all postlabial chaetae are equal in other species).
- 4+4 laterodistal chaetae on ventral tube.
- Very short Ant. IV.

I. ekmani can be compared only with *I. notabilis f. coeca* (from Nepal) (YOSII 1966). This form (morphologically far from *I. notabilis*) is similar to *ekmani* in 4+4 laterodistal chaetae on ventral tube, 3 dorsomedial chaetae on dens, short macrochaetae, short Ant. IV and small body-size. It differs from *ekmani* by the absence of eyes. It can be an independent species, or - taking into account the weak development of eye pigment in *ekmani* - only a form of the considered species.

Isotoma trichaetosa MARTYNOVA, 1977

(figs 17, 18, 28, 50, 51, 57-59)

Isotoma trichaetosa: MARTYNOVA, BERMAN, CHELNOKOV 1977

Notes to description. Sensorial chaetotaxy (fig. 28) with number of sensillae on body strongly decreased. Sensillae *accp4* and *accp5* on Abd. II-III and *accp4* on Abd. IV disappear. Formula of *accp*-sensillae on abdomen:

Abd. I: $2_s 1_s 1_s 2-4_s$

II: $2_s 1_s 1_s 3-5_s$

III: $2_s 1_s 1_s 2_{ms} 1_s$

IV: $1_s 1_s 1_s 2-3_{(s)} 1_s$

V: $1_{ss} 1-2_{ss} 1_s$

Maxillary head typical for subgenus (fig. 50, 51).

Material studied: 2 paratypes (Magadan reg., near Magadan, "Sneschnaja dolina"); Novosibirsk reg., near Chingis (pine wood); Novosibirsk reg., Kochenevsky distr. (deciduous wood); Tomsk reg., near Tomsk (pine wood); Krasnoyarsk Territory, near Nazarovo (decaying plant mass); Magadan reg., near Magadan (birch wood); Chukotka, near Shachtersky (tundra); Kamchatka, Kronotsky nature reserve (coniferous woods).

Distribution (fig. 101, 3) and ecology. The species has been known so far only from type locality. It is probably a Siberian - Far - Eastern species, rare in northern areas.

Discussion. The species has the following unique details:

- Sensorial chaetotaxy of body.
- 4 mucronal teeth.

It can be compared with *I. vtorovi* and *I. sp. non det.* (see key) because of the similar structure of mucro.

Isotoma vtorovi MARTYNOVA, 1977
(figs 9, 10, 26, 33, 54, 55, 60-62)

Isotoma vtorovi: VTOROV, MARTYNOVA 1977

Notes to description. Sensorial chaetotaxy of the most complete variant (fig. 26): Th. III with 7+7 *accp*-sensillae (that is known only for *I. longa*). *Accp5*-sensilla not removed from the posterior row of chaetae and included in these row side by side with *accp6*. Other species have *accp5*-sensilla removed. In our material from the Tien Shan Mts the population of *vtorovi* consists of specimens with 2+2 and 1+1 ommatidia (figs 9, 10). I consider this fact an intrapopulation variability, because according to other morphological details these specimens are identical.

Maxillary head typical for subgenus (figs 54, 55).

Material studied: 2 paratypes (Tajik SSR, Babatag Range); Tajik SSR, Gissar Range, near Dyushambe (platan wood); Kirghiz SSR, Tien Shan Mts, Ala-Archa canyon (spruce wood).

Distribution (fig. 101, 2) and **ecology**. The species was reported from some mountain areas of Gissar and Tien Shan Mts (VTOROV, MARTYNOVA 1977). This form is characteristic for these areas, often abundant.

Discussion. The species has the following unique details:

- Sensorial chaetotaxy of body: position of *accp5*-sensilla on Abd. IV and 1 medial common chaetae between *accp1* on Abd. IV (almost all other species have 2).
- 4 mucronal teeth.

Isotoma iremeli sp. nov.
(figs 8, 25, 39, 40, 63-65, 69-73)

Description. Length about 1.1 mm. Dark grey. Chaetae on body relatively large and thickened. Macrochaetae Abd. V: dorsomedial length Abd. V = 1.2-1.5, macrochaetae Abd. V: Claw III = 3.4-4.2. Macrochaetae with many feathers (those on Abd. V with more than 30). Sensory setae abundant (fig. 25), but *accp6*-sensilla on Abd. IV, *al*-microsensillae on Abd. I, II absent. Microsensilla on Abd. III removed forward (fig. 70). Tendency to increase number of common chaetae between sensillae in posterior rows is observed. Formula of *accp*-sensillae on abdomen:

- Abd. I: $2s_1s_1s_1s_1s_1s$
 II: $3s_1s_1s_1s_1s_1s$
 III: $3s_1s_1s_1s_1(ms)s_1s$
 IV: $1s_1s_1s_1-2s_1-2(s)$
 V: $1s_1-2s_1ss_1s$

Ventral side of Ant. I with 2 microchaetae and 2 thin sensillae. Sensory rods of Ant. III unusually large (similar to *terricola*: see fig. 10b by RUSEK 1984). Ant. IV with 4 obviously thick sensillae and some thin and feebly thickened ones. 4 ommatidia in dark eye spot on each half on head, posterior ommatidia in some distance away from anterior ones, therefore eye spot is elongated (figs 8, 71). PAO 1.3-1.4 times longer than inner margin of claw III. Basis of labium with 4+4 - 4+5 chaetae, 6+6 (5+6) postlabial chaetae along ventral line. Maxilla is shown on figs 39, 40. Lamella no. 2 flameform, not dilated to apex, lamella no. 6 relatively small with smooth apex, lamella no. 3 relatively large. 2-nd subcoxa of leg I with chaeta. Claw without inner tooth, normal. 11-13 axilal chaetae on Th. II and III. Ventral tube with 3+3 laterodistal chaetae, 4+4 - 5+5 on anterior and 5-6 on posterior face. Tenaculum with 2 chaetae, furcal paratergite with 38-48 chaetae. Manubrium on ventral side with many chaetae, including 2+2 ones above manubrial thickening. Dens on dorsal side with 3-4 basal, 3 medial and 4 lateral chaetae. Mucro with 3 teeth.

Derivatio nominis: "*iremeli*" - species inhabits the Iremel hill.

Material: Holotype - Bashkir ASSR, South Ural Mts, near summit of Iremel hill, mountain tundra, 09 IV 86, leg. G. CHANISLAMOVA; 10 paratypes in the same locality.

Distribution and ecology. The species is known only from the type locality.

Discussion. The species has the following unique and rare details:

- Maxillary head structure.
- Sensorial chaetotaxy of body.
- 6+6 (5+6) postlabial chaetae (other species with no more than 4+4).
- Increased number of chaetae on dorsal side of dens.
- Very large sensory rods in AO of Ant. III.
- The maximum development of pigment on body.

This species is included to the subgenus *Parisotoma* basing on the reduced number of ommatidia. But it is similar to a members of the subgenus *Desoria* NICOLET, 1841 (many chaetae on appendages, maxillary structure) e. g. to *I. tenuicornis* AXELSON, 1903, which has 6+6 ommatidia, long thickly feathered macrochaetae and 3 mucronal teeth. The new species is distinguished from it by the normal shape of mucro (*tenuicornis* has a very long mucro with small basal tooth) and the number of ommatidia.

The shape of *I. iremeli* eye spot is similar to that in *dichatea* YOSII, 1969 (Japan) and *travei* DEHARVENG, 1981 (Subantarctic, Kroze Isl.). Differs from both mentioned above by several significant characters (e. g. by 3+3 laterodistal chaetae on the ventral tube).

***Isotoma appressopilosa* sp. nov.**

(figs 27, 37, 38, 66-68, 89)

Description. Length about 0.8-0.9 mm. White without trace of pigment. Chaetae on body relatively short. Macrochaetae also short: those on Abd. V shorter than tergite (0.7-0.9 its dorsomedial length), macrochaetae Abd. V: Claw III = 1.8-2.4, with 3-4

feathers on anterior side. Number of sensillae on tergites decreased (fig. 27). Some lateral *accp*-sensillae might disappear. Number of common chaetae in posterior rows between sensillae obviously increased. Formula of *accp*-sensillae on abdomen:

Abd. I: $2_s 1_s 1_s 2_s 2_s$

II: $3_s 1_s 1-2_s 2-3_s 1-2_s$

III: $3_s 1-2_s 1-2_s 2_s 1_{ms} 1_s$

IV: $1-1, 1/2_s 1_s 2_s 1_s 1-2(s)$

V: $1_s 1_s 2_{ss} 1_s$

Ventral side of Ant. I with 2 microchaetae and 4-5 sensillae. Sensory rods of Ant. III normal. Ant. IV with 4 obviously thick sensillae and some thin and feebly thickened ones. One vague, small and unpigmented ommatidium on each half of head, not found in some specimens. PAO 1.5-1.8 times longer than inner margin of claw III. Labial base with 5+5 chaetae, 3+3 (rarely 4+4) postlabial chaetae along ventral line. Maxilla is similar to that of *I. longa* (lamella no. 1 with 2 rows of cilia, no. 6 with 4-5 ones). 2-nd subcoxa of leg I with chaeta. Claw without inner tooth. 12-14 axial chaetae on Th. II, 11-13 ones on Th. III. Ventral tube with 2+2 laterodistal chaetae, 3+3 (4+4) on anterior and 3 ones on posterior face. Tenaculum with 2-5 chaetae. Furcal paratergite with 25-31 chaetae. Manubrium on ventral side with many chaetae including 2+2 ones above manubrial thickening. Dens normal, on dorsal side with 2 basal, 2 medial and 3 lateral chaetae. Mucro with 3 teeth.

Derivatio nominis: "*appressopilosa*" - with short and pressed chaetae.

Material: Holotype - Buryat ASSR, Barguzinsky distr., near Maksimicha, decaying algae on shore of lake Baikal, 27 VIII 86, leg. T. ZHELTKOVA. + paratypes - in the same locality.

Distribution and ecology. The species is only known from the type locality.

Discussion. The species has the following unique and rare details:

- Sensorial chaetotaxy of body.
- Increased number of ventral sensillae on Ant. I.
- Tendency to plurichaetose: 2 (non 1) common chaetae often placed between sensillae on abdomen, m_0 -chaeta often present on Abd. V (other species without it).
- Small macrochaetae with only 3-4 feathers on their surface.

The last two details are probably connected with the specific mode of life in wet habitat.

Some details (2+2 laterodistal chaetae on ventral tube, presence of chaeta on 2-nd subcoxa, small unpigmented ommatidia, presence of common chaetae between *accp1* and *accp2*- sensilla on Abd. V) unit *I. appressopilosa* and *longa*, but the latter has none of the unique details mentioned above.

Isotoma terricola RUSEK, 1984

Isotoma terricola: RUSEK 1984

The species is known only from the type locality (Irkutsk reg., near Listvjanka). It has not been found in mine material.

Discussion. The most important characters of this species:

- Very large sensory rods in AO of Ant.III.
- Absence of eyes.
- 1 medial chaeta between *accp*-sensillae on Abd. IV (according to fig. 9 C by RUSEK 1984 similar to *I. reducta reducta*).

The species should be compared with the type material of other blind species: *I. sphagneticola* LINNANIEMI, 1912 (Finland) and *tariva* WRAY, 1953 (USA) described incompletely, but probably belonging to subgenus *Parisotoma*.

Isotoma sp. indet.

White species without eyes. Mucro with 4 teeth. Number and arrangement of sensillae of the body similar to that of *I. notabilis*. The species is not described by the reason of shortage of material.

Material studied: Bashkir ASSR, Baltachevsky distr. (wood, 2 specimens).

Isotoma reducta reducta RUSEK, 1984 (figs 5-7, 24, 35, 43, 44)

Isotoma reducta: RUSEK 1984

Notes to description. Sensorial chaetotaxy is shown on fig. 24. Number of sensillae on body almost complete: 6+6 *accp*-sensillae on Th. III. Formula of *accp*-sensilla on abdomen

Abd. I: $2_s 1_s 1_s 1_s 1_s 1_s$

II: $2_s 1_s 1_s 1_s 1_s 1_s$

III: $2_s 1_s 1_s 1_s 1_{ms} 1_s$

IV: $1/2_s 1_s 1_s 1_s 1(s) 1_s$

V: $1_{ss} 1_{ss} 1_s$

Maxillary head is shown on figs 43, 44. Lamella no. 1 with 2 rows of cilia, lamella no. 6 with 3 ones.

Material studied: Vagach Isl. - near Novaya Zemlya (tundra); South Yamal Peninsula (tundra); Krasnoyarsk territory, Putorana Plateau, near Ayan river (larch wood); Taimyr Peninsula, arctic sea-coast near Dikson (tundra); Krasnoyarsk territory, Yenisei river, near Mirnoe (coniferous woods); Bashkir ASSR, S. Ural Mts, near summit of Karabash hill and Arvyakryaz hill (mountain tundra and forest-tundra); Buryat ASSR, Barguzinsky distr., near Maksimiha (coniferous woods); Lake Baikal, Ol'hon Isl. (coniferous wood); North Yakut ASSR, D. Laptev sea-coast (tundra); Magadan region, near Magadan (coniferous woods); Chukotka, near Volchiha river (tundra); Kamchatka, Kronotsky nature reserve (coniferous woods); Khabarovsk Territory, Lower Amur river (flood woods); Primorski Territory, near Ussuriysk (glade).

Distribution (fig. 101, 1) and **ecology**. Till now recorded from Irkutsk region (RUSEK 1984) and Taimyr (ANAN'EVA and all. 1987), also found in Alaskan tundra (personal communication of Dr A. FJELLBERG). Probably absent in Northern Europe and Spitsbergen (faunistic lists of FJELLBERG, own large material from Kolsky Peninsula and north Komi ASSR), in Franz Josef Land Isls and Severnaya Zemlya Isls (personal communication of Dr A. BABENKO), in Tien Shan Mts (faunistic lists of MARTYNOVA), Altai and West Sayan Mts (own large material). Probably a Siberian- Far-East species, typical for forests and tundra of this area. In South Ural Mts it was found only on summits of hills.

Discussion. The species is the most closely related to *I. agrelli*. Two differentiating characters given in the key (maxillary lamella no. 6 and macrochaetae) are constant and distinct. Other characters proposed by RUSEK (1984) are difficult to use (Ant. IV, ratio ommatidia: PAO, number of chaetae on tenaculum). According to RUSEK, ratio length: width Ant. IV is 1 : 4.4 in *agrelli* and 1 : 3.9 in *reducta*. According to mine material, intrapopulation variability in the last species is greater (fig. 99). Ratio ommatidia: PAO is 1 : 4.1 in *agrelli* and 1 : 3.8 in *reducta*. This character is difficult to use because of the small differences between the species and the unclear limit between the cornea of ommatidia and cuticle. According to RUSEK *agrelli* has 3-6 chaetae on tenaculum, *reducta* has 2. In mine material the specimens with 3 chaetae are often observed in the population of the latter species, but they clearly constitute the lesser part of the population.

I. reducta is distinguished from the other species of the territory of the USSR by a combination of characters (table IV). The most important ones are: 3+3 laterodistal chaetae on the ventral tube and presence of the chaeta on 2-nd subcoxa of leg I.

Isotoma reducta amurica ssp. n.

Description. Length about 0.8 mm. White with rare pigment granules. Chaetae of body slightly thickened. Macrochaetae Abd. V: dorsomedial length Abd. V = 1.5 - 1.8, macrochaetae Abd. V: Claw III = 3.6 - 5.1. Macrochaetae with many feathers (they on Abd. V with 10-16 ones). Sensorial chaetotaxy similar to that shown in fig. 23. Formula of *accp*-chaetae on abdomen:

Abd. I: $2_s 1_s 1_s 1_s 1_s$

II: $2_s 1_s 1_s 1_s 1_s$

III: $2_s 1_s 1_s 1_s 1_{ms} 1_s$

IV: $1_s 1_s 1_s 1_s 1_{(s)} 1_s$

V: $1_{ss} 2_{ss} 1_s$

Abd. IV and V are similar to those of *I. atrocylata* (figs 86-88). Ventral side of Ant. I with microchaetae and 2 thin sensillae. Sensory rods of Ant. II normal. Ant. IV with 4 obviously thick sensillae and some thin and feebly thickened ones. 1+1 ommatidia in dark eye spot similar to that in light specimens of *reducta reducta*. Some specimens with a very weak development of eye pigment and hardly visible ommatidia. PAO 1.4-1.7 times longer than the inner margin of claw III. Basis of labium with 5+5 chaetae, 3+3 postlabial chaetae

along ventral line. Maxilla similar to that of *reducta reducta* (fig. 43, 44). 2-nd subcoxa of leg I with chaeta. Claw without inner tooth. 10-12 on Th. II and 9-11 axial chaetae on Th. III. Ventral tube with 2+2 (!) laterodistal chaetae, 3+3 - 4+4 on anterior and 5-6 ones on posterior face. Tenaculum with 2 chaetae. Furcal paratergite with 26-32 chaetae, furca similar to that of ssp. *reducta*.

Derivatio nominis: "*amurica*" - subspecies inhabits the regions near Amur river.

Material: Holotype - Chabarovsk territory, near Chabarovsk, litter of larch wood, leg. N. BABUSHKIN; 10 paratypes in the same locality.

Other material studied: Chabarovsk territory, Lower Amur river (flood woods); Primorsk territory, near Nahodka (decaying plant mass).

Distribution and ecology. The subspecies is distributed in the southern territories of the Soviet Far East, in some localities together with *reducta reducta*, the latter being rare in that region.

Discussion. Specimens described above correspond to *I. reducta* to some important characters as structure of maxilla, macrochaetae, presence of chaeta on 2-nd subcoxa of leg I and sensorial chaetotaxy. Ssp. *amurica* is distinguished from ssp. *reducta* only by 2+2 laterodistal chaetae on ventral tube. The difference is strong; this could be a new species. As I did not find any other differences between them I prefer to distinguish only subspecies nova and give a relatively detailed description. The majority of specimens of ssp. *amurica* have 2 common chaetae between *accp1*-sensillae on Abd. IV, while ssp. *reducta* has 1 chaeta in all material. Because of 2+2 laterodistal chaeta on ventral tube and the presence of chaeta on 2-nd subcoxa of leg I, *I. reducta amurica* is closely related to *I. longa*. Differences between them are the following:

- 6+6 *accp*-sensillae on Th. III (7+7 ones in *longa*).
- Maxillary lamella no. 6 with 3 rows of cilia (5-6 ones in *longa*).
- Common chaeta between *accp1* and *accp2*-sensilla on Abd. V absent (present in *longa*).
- Lesser number of chaetae on tenaculum and furcal paratergite (Table II).

I. longa usually has an unpigmented eye, while that in *reducta amurica* is usually black. Differences between these and other species are given in table IV.

***Isotoma longa* sp. nov.**
(figs 13, 14, 21, 22, 47-49, 74, 75)

Description. Length about 1.0-1.1 mm. White, sometimes with rare pigment granules. Chaetae of the body relatively large and slightly thickened. Macrochaetae Abd. V: dorsomedial length Abd. V = 1.3-1.6, macrochaetae Abd. V: inner margin of claw III = 3.2-4.0. Macrochaetae with many feathers (those on Abd. V with more than 10). Sensorial chaetotaxy the most complete (figs 21, 22). Formula of *accp*-sensillae on abdomen:

- Abd. I: $2s1s1s1s1s$
 II: $2s1s1s1s1s$
 III: $2s1s1s1s1ms1s$
 IV: $1s1s1s1s1(s)1s$
 V: $1s1s2ss1s$

Ventral side of Ant. I with 2 microchaetae and 2 (rarely 3) thin sensillae, sensory rods of Ant. III normal. Ant. with 4 obviously thick sensillae and some thin and feebly thickened ones. 1+1 very small, hardly visible and unpigmented ommatidia. Sometimes weak pigment present. In one population (Mirnoe), specimens with distinct pigment and large ommatidia were found (see discussion). PAO 1.2-1.6 times longer than inner margin of claw III. Basis of labium with 5+5 chaetae, 3+3 postlabial chaetae along ventral line. Maxilla is shown on figs 47-49. Lamella no. 1 with 2 rows, lamella no. 6 with 5-6 rows of cilia. 2-nd subcoxa of leg I with chaeta. Claw without inner tooth. 10-12 axial chaetae on Th. II and 9-11 ones on Th. III. Ventral tube with 2+2 laterodistal chaetae, 3+3 (4+3) on anterior and 3 (rarely 4 or 5) on posterior side. Tenaculum with 3-5 chaetae, furcal paratergites with 32-43 chaetae. Manubrium on ventral side with many chaetae including 2+2 above manubrial thickening. Dens on dorsal side with 2 basal, 2 medial and 3 lateral chaetae, 3 teeth on mucro.

Derivatio nominis: "*longa*" - with long appendages.

Material: Holotype - South Yamal Peninsula, near Schuch'e, moss, decaying organic matter and excrements, 29 IX 1983, leg. T. ANDREEVA; 10 paratypes in the same locality.

Other material studied: Taimyr Peninsula, Arctic sea-coast near Dikson (decaying plant mass on river bank); Krasnoyarsk Territory, Yenisei river, near Mirnoe (coniferous woods); Krasnoyarsk Territory, near Novokuzneck, Baydaevka (decaying plant mass); Tuva ASSR, near Tere-Hol (poplar wood); Komandorsk Isls: Bering Isl (excrements); Chukotka (tundra).

Distribution (fig. 100,2) and *ecology*. Probably a Siberian-Far-Eastern species, often present in decaying organic mass.

Discussion. The new species is distinguished from the other ones from the territory of the USSR by a combination of characters (table 4). It is closely related to *I. reducta reducta* (by the presence of chaetae on 2-nd subcoxa of leg I), *reducta amurica* and *atroculata* (by 2+2 laterodistal chaetae on ventral tube). The most important characters of *I. longa* are:

- 7+7 *accp*-sensillae on Th. III.
- Presence of common chaeta between *accp1* and *accp2*-sensilla on Abd. V.
- Increased number of chaetae on tenaculum.

In the population of *I. longa* from Mirnoe, specimens with black pigment granules on the body and distinctly pigmented small ommatidia (fig. 14) and even large similar to *I. reducta* (fig. 7) are observed as frequently as the normal white specimens with weakly pigmented eyes (fig. 13). The presence of intermediately pigmented forms identical in other morphological details indicates for an intrapopulation variability.

Isotoma atrocitata sp. nov.

(figs 19, 20, 45, 46, 86-88)

Description. Length about 1 mm, white with large granules of black pigment. Chaetae of body large and slightly thickened. Macrochaetae Abd. V: dorsomedial length Abd. V = 1.5-2.5, macrochaetae Abd. V: Claw III = 3.6-4.7. Macrochaetae with many feathers (those on Abd. V with more than 15). Sensorial chaetotaxy is similar to that of *I. notabilis*. Formula of *accp*-sensillae on abdomen:

Abd. I: $2s_1s_1s_1s_1s_1s$ II: $2s_1s_1s_1s_1s_1s$ III: $2s_1s_1s_1s_1ms_1s_1s$ IV: $1s_1s_1s_1s_1(s)_1s$

Ventral side of Ant. I with 2 microchaetae and 2-3 thin sensillae. Sensory rods of Ant. III normal. Ant. IV obviously thick 4 sensillae and some thin and feebly thickened ones. Eye spot large and black with at least 1 ommatidia on each half of head, often 1-2 additional side by side with it. PAO 1.5-1.6 times longer than inner margin of claw III. Basis of labium with 5+5 chaetae, 3+3 postlabial chaetae along ventral line. Maxilla is shown on figs. 45, 46. Lamella no. 1 with 2-3 rows of cilia. 2-nd subcoxa of leg I without chaeta. Claw without inner tooth, normal. 10-13 axial chaetae on Th. II and 10-11 ones on Th. III. Ventral tube with 2+2 laterodistal chaetae, 3+3 (4+4) on anterior and 3 (rarely 4 or 5) on posterior side. Tenaculum with 2 (rarely 3 or 4) chaetae, furcal paratergite with 25-31 chaetae. Manubrium on ventral side with many chaetae, including 2+2 above manubrial thickening. Dens on dorsal side with 2 basal, 3 medial and 3 lateral chaetae. Mucro with 3 teeth.

Derivatio nominis: "*atrocitata*" - with black eyes.

Material: Holotype - Khakass A. Reg., Tashtyp distr., West Sayan Mts, near Bolshoi On, Siberian pine wood, VIII 1989, leg. S. IORDANSKY; 10 paratypes in the same locality.

Other material studied: Khakass A. Reg., Tashtyp distr. (different kinds of coniferous woods); Tuva ASSR, near Kara-hol (larch wood).

Distribution and ecology. According to mine material, the species is common in the zone of coniferous woods of West Sayan Mts.

Discussion. The new species is the most closely related to *I. reducta amurica* and distinguished from it by a greater number of cilia on maxillary lamella no. 6 and absence of chaeta on 2-nd subcoxa of leg I. The new species is similar to *I. removeophthalma*; 2+2 laterodistal chaetae on ventral tube and no chaeta on 2-nd subcoxa of leg I. It differs from it by the arrangement of ommatidia (figs 15, 19, 20) and number of feathers on macrochaetae. Differences from other species are given in table IV.

Isotoma removeophthalma MARTYNOVA, 1977

(figs 15, 83-85)

Isotoma removeophthalma: MARTYNOVA, BERMAN, CHELNOKOV 1977

Notes to description. Sensorial chaetotaxy normal, similar to that of *I. notabilis*. Formula of *accp*-sensillae:

Abd. I: $2s1s1s1s1s$

II: $2s1s1s1s1s$

III: $2s1s1s1ms1s$

IV: $1s1s1s1(s)1s$

Maxillary head typical for subgenus. Lamella no. 1 with 3 rows of cilia, lamella no. 6 with about 5 rows (detailed structure not studied).

Material studied: 2 paratypes (Magadan reg., near Magadan, "Sneschnaja dolina").

Distribution and ecology. Known only from type locality.

Discussion. The species is similar to *I. atrocitata* and *setispinosa* by the lack of chaeta on 2-nd subcoxa of leg I and 3+3 postlabial chaetae. Differences between them are given in discussion to the previous species. *I. removeophthalma* is distinguished from *setispinosa* by a similar arrangement of ommatidia and 2+2 laterodistal chaetae on ventral tube (3+3 ones in *setispinosa*). Their species independence requires further studies.

Isotoma setispinosa LEE, 1977

(figs 11, 12, 76, 77)

Isotoma setispinosa: LEE 1977

Notes to description. Sensorial chaetotaxy normal, similar to that of *I. notabilis*. Formula of *accp*-sensillae on abdomen:

Abd. I: $2s1s1s1s1s$

II: $2s1s1s1s1s$

III: $2s1s1s1ms1s$

IV: $1s1s1s1(s)1s$

V: $1s1s1ss1s$

Maxillary head is shown on fig. 56. Lamella no. 1 with 3 rows of cilia, lamella no. 6 with 3 (rarely 4) ones.

Material studied: Primorski Territory, Ussuriyski nature reserve (deciduous woods).

Distribution and ecology. The species was described from Korea and reported by KUTYREVA (1979) from the USSR. It is probably distributed only in the southern part of Primorski Territory.

Discussion. Differences from *I. removeophthalma* were given in discussion to previous species. *I. hyonosenensis* with 2+2 ommatidia is probably closely related with the group *setispinosa* - *removeophthalma*, but has 4-5 (according to YOSII 1939) chaetae on tenaculum. Their relationship requires a further study of the type material.

Isotoma notabilis SCHAFFER, 1896
(figs 1-3, 23, 30, 32, 35, 52, 53)

Isotoma notabilis: RUSEK 1984

Notes to description. Sensorial chaetotaxy is almost complete (fig. 23).
Formula of *accp*-sensillae on abdomen:

- Abd. I: $2s_1s_1s_1s_1s_1s$
 II: $2s_1s_1s_1s_1s_1s$
 III: $2s_1s_1s_1s_1ms_1s_1s$
 IV: $1s_1s_1s_1s_1(s)_1s_1s$
 V: $1ss_1ss_1s_1s$

Maxillary head is shown on fig. 52-53.

Material studied: Many localities all over the territory of the USSR.

Distribution and ecology. A cosmopolitan species, widely distributed over the whole of territory of the USSR, but the most common in forest zones (less frequently reported from the tundra and the steppe). The species reaching the Arctic sea-coast of Taimyr (personal communication of Dr A. BABENKO) and North Chukotka (MACLEAN, BEHAN, FJELLBERG, 1978). It is absent in the material from the desert zone of Central Kizil-Kum (personal communication of Dr I. VTOROV).

Discussion. Modern taxonomical remarks were given by FJELLBERG (1977), DEHARVENG (1981) and RUSEK (1984). The most important details distinguishing *I. notabilis* from other species are:

- 4+4 postlabial chaetae
- Many rows of cilia on maxillary lamellae no. 1 and 6
- 2-5 ommatidia on each half of body and usually grey body colour.

From the materials from West Altai Mts and Tuva ASSR I discovered specimens, corresponding to *I. notabilis* by all important morphological details (postlabial chaetom, maxilla, macrochaetae among them), but having 1+1 ommatidia and white body colour (fig.4). This form (a separate species ?) prefers a greater altitude than the main but is usually found among the latter one.

VI. *SERICEOTOMA* SUBGEN. NOV.

Possesses the characters of *Isotoma* sensu lato. Eyes absent. PAO wide elliptic. Head of maxilla normal, similar to that of the species of *Parisotoma* - subgenus. No clavate tibiotarsal chaetae. Manubrium without spineform chaetae, dens crenulated, narrowed, mucro with 3 teeth. Furca achieve ventral tube. Common chaetae on body, obviously thickened. Sensorial chaetom includes common sensillae, microsensillae and superthin additional sensillae (figs 90-94). Number of common chaetae decreased: from 0+0 to 2+2 on tergite. Abd. II-V with very many (several dozens) additional sensillae.

Type species: *Isotoma (Sericeotoma) knissi* sp. n.

Discussion. The new subgenus is distinguished from other *Isotomidae* by the presence of additional superthin sensillae. The representatives of some genera (*Pachyotoma*, *Isotomurus*) have an increased number of common sensillae but all sensillae have an approximately identical length and width. The form of the additional sensillae of *I. knissi* is similar to the common ones but the former are 3-4 times thinner and shorter than the latter and hardly visible in light microscope. They are very abundant in some tergites (more than 100 on Abd. IV), disposed more or less asymmetrically on body. It is interesting to mention that they are also present on Abd. VI, while common sensillae are always absent there.

The following types of sensillae on the tergites of *Isotomidae* might be distinguished (botriotrichia are not considered):

1) Common sensillae. Disposed on Th. II - Abd. V. Have a characteristic form with blunt apex. Their number and distribution in different species and genera were studied by DEHARVENG (1977, 1979). They can be very slightly differentiated and hardly distinguished from the common chaetae (e. g. *al*-sensillae of some *Isotoma* with short chaetae). All sensillae or some of them in some species, e. g. *Isotoma* (*Folsomotoma*) ssp. can be elongated or shortened. Sometimes all the sensillae (or part of them) are enlarged and become of "typical" form (e. g. *Folsomia sensibilis* Kseneman).

2) Additional sensillae. These are thinner and shorter than the common ones, and cover diffusely the whole tergite (while the common sensillae are disposed mainly in its posterior parts).

3) Microsensillae. Have a characteristic form (figs 21, 94), usually shorter but thicker than the common ones; their apex is more pointed; 1+1 inlateral part of Th. II - Abd. III (the most complete variant). Some of them can disappear in some genera and species.

I consider the appearance of many additional sensillae in *Sericeotoma* as a necessity of increasing the sensibility in a situation where the number of common sensillae is strongly reduced. This could be explained by the troglophilous mode of life. Some other morphological details are probably also troglomorphic (claw, empodial appendage, sensillae of Ant. I).

Sericeotoma are the most closely related with the subgenus *Parisotoma*. Apart from the differences mentioned above, it is necessary to note the strong reduction of number of common sensillae unknown in *Parisotoma* species.

Isotoma (*Sericeotoma*) *knissi* sp. nov.
(figs 78-82, 90-97)

Description. Length about 0,8 mm. White without trace of pigment. Chaetae on body relatively short and thickened. Macrochaetae also short: those on Abd. V: dorsomedial length Abd. V = 0,9, macrochaetae Abd. V: claw III = 3.2-3.9, with 3-5 feathers on posterior side. Number of common sensillae on body strongly reduced. Many additional sensillae on abdomen. Sensorial chaetotaxy in this species:

Th. II: 1 lateral *accp*-sensilla (not discovered in some specimens), 1 *al*-microsensilla, common *al*-sensillae absent (only one specimen found with 1 *al*-sensilla side by side with *al*-microsensilla on one half of tergite).

Th. III: 1 lateral *accp*-sensilla, 1 *al*-sensilla.

Abd. I: 1 *accp*-sensilla, additional sensillae absent.

Abd. II: 1 *accp*-sensilla, about 10 additional sensillae.

Abd. III: 1 *accp*-sensilla, 1 *accp* microsensilla, about 30 additional sensillae.

Abd. IV: 1 *accp*-sensilla, about 60 additional sensillae.

Abd. V: 2 *accp*-sensillae (one in more lateral position weakly differentiated, possibly a common chaeta), about 40 additional sensillae.

Abd. VI: 4 additional sensillae (excluding 1 medial one) on anterior margin of tergite.

Ventral side of Ant. I with 2 microchaetae and 2 large thickened sensillae, and 3-4 sensorial elements difficult to identify because of their small size and weak the refractivity of the animal. Sensory rods of Ant. III normal. Ant. IV similar to that of *Parisotoma* with some thickened and thin sensillae. Eye absent. PAO - large oval, about 2,5 times longer than inner margin of claw III. Basis of labium with 4+4 chaetae, 3+3 postlabial chaetae along ventral line. Maxillary head similar to that of *Parisotoma* species with increased lamella no. 1 and without hypertrophied cilia on lamellae (its detailed structure not studied). Maxillary outer lobe with 4 hairs and 3-furcated papilla. Claw without inner tooth, relatively small in comparison with empodial appendage. 8-9 and 7-8 axial chaetae on Th. II and III respectively. Ventral tube with 2+2 laterodistal, 3+3 anterior and 3 posterior chaetae. Tenaculum with 2 chaetae. Furcal paratergite with about 20 chaetae. Manubrium on ventral side with about 32 chaetae including 2+2 above manubrial thickening. Dens similar to that of *Parisotoma*, crenulated, slender, with a relatively small number of chaetae on ventral side. Dens on dorsal side with 2 basal, 2 lateral and 2 medial chaetae. Mucro with 3 teeth. Abd. V and VI fused, but tranverse zone without chaetae present.

Derivatio nominis: species dedicated to V. KNISS, to whom I owe the material described here.

Material: Holotype - Bashkir ASSR, Burzyan distr., near nature reserve "Shulgan-Tash" (Bashkirsky resrves), cave Yakshingulovskaya-1, 23 VII 1979, leg. V. KNISS, 4 paratypes in the same locality.

Discussion. Most of the distinguishing characters have already been mentioned in the discussion to the diagnosis of the subgenus *Sericeotoma*. It is necessary to mention the other unique details:

- Large size of microsensillae (present only on Th. II and Abd. III): nearly equal to common sensillae and distinguished from the latter only by their form.

- Presence of strongly thickened sensillae on Ant. I.

Description was made on the basis of nonadult specimens. Proportion of the body, manubrial chaetotaxy and axial chaetom of thorax permit to suppose that the specimens are subadult. In any case our principal character, i. e. sensorial chaetom is fairly independent on the age stage and distinctly distinguished the new species.

Of the eye-less specimens it is necessary to mention *I. tariva* and *I. sphagneticola*. The description of the former is not sufficient, but some remarks, e. g. the sensillae on Ant. I not thickened (CHRISTIANSEN et BELLINGER 1980) make it possible to consider them as a different species. Future investigation should compare the specimens of *I. knissi* with the type material of *I. sphagneticola*.

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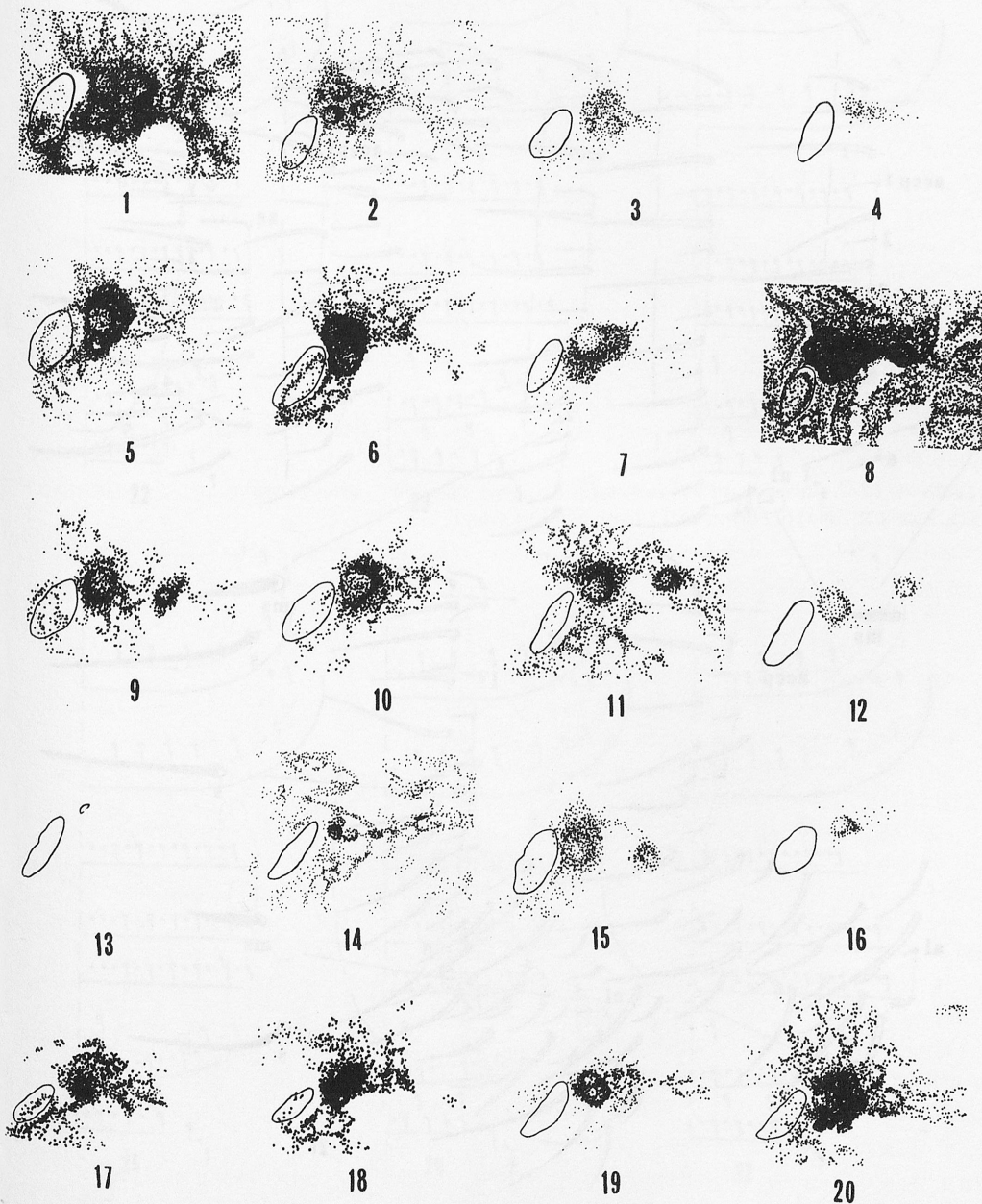


Fig. 1-20. Distribution of eye pigment. 1-3 - *I. notabilis* (main form); 4 - *I. notabilis* (Altai Mts); 5-7 - *I. reducta*; 8 - *I. iremeli*; 9, 10 - *I. vtorovi*; 11, 12 - *I. setispinosa*; 13, 14 - *I. longa* (13 - Yamal, 14 - Mirnoe); 15 - *I. removeophthalma* (paratype); 16 - *I. ekmani*; 17, 18 - *I. trichaetosa*; 19, 20 - *I. atroculata*

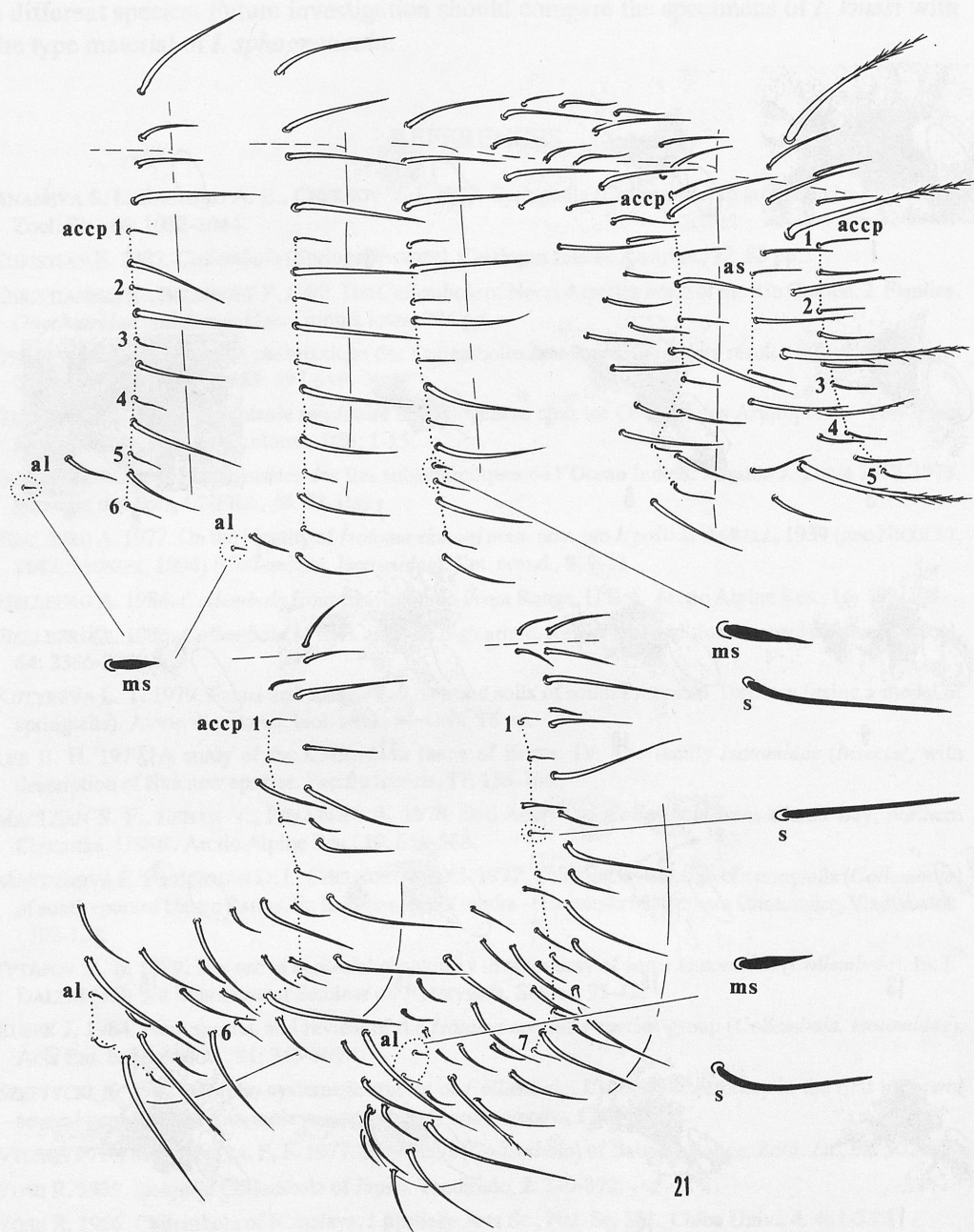


Fig. 21. Sensorial chaetotaxy of *I. longa* (accp - accp-sensilla, al - al-sensilla, ms - microsensilla, s - common sensilla)

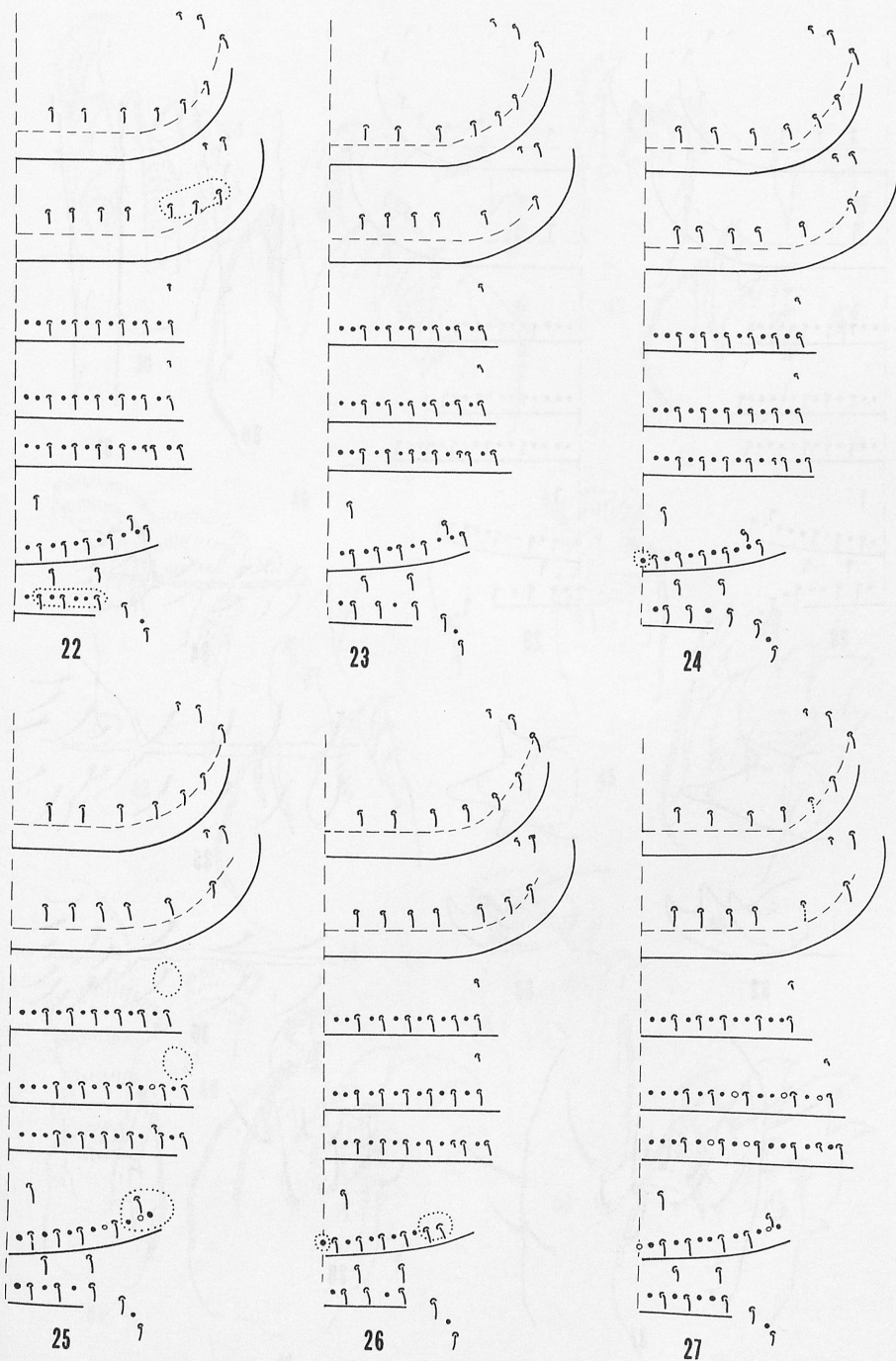


Fig. 22-27. Sensorial chaetotaxy. 22 - *I. longa*; 23 - *I. notabilis*; 24 - *I. reducta*; 25 - *I. iremeli*; 26 - *I. vtorovi*; 27 - *I. appressolosa* (the most important parts are encircled)

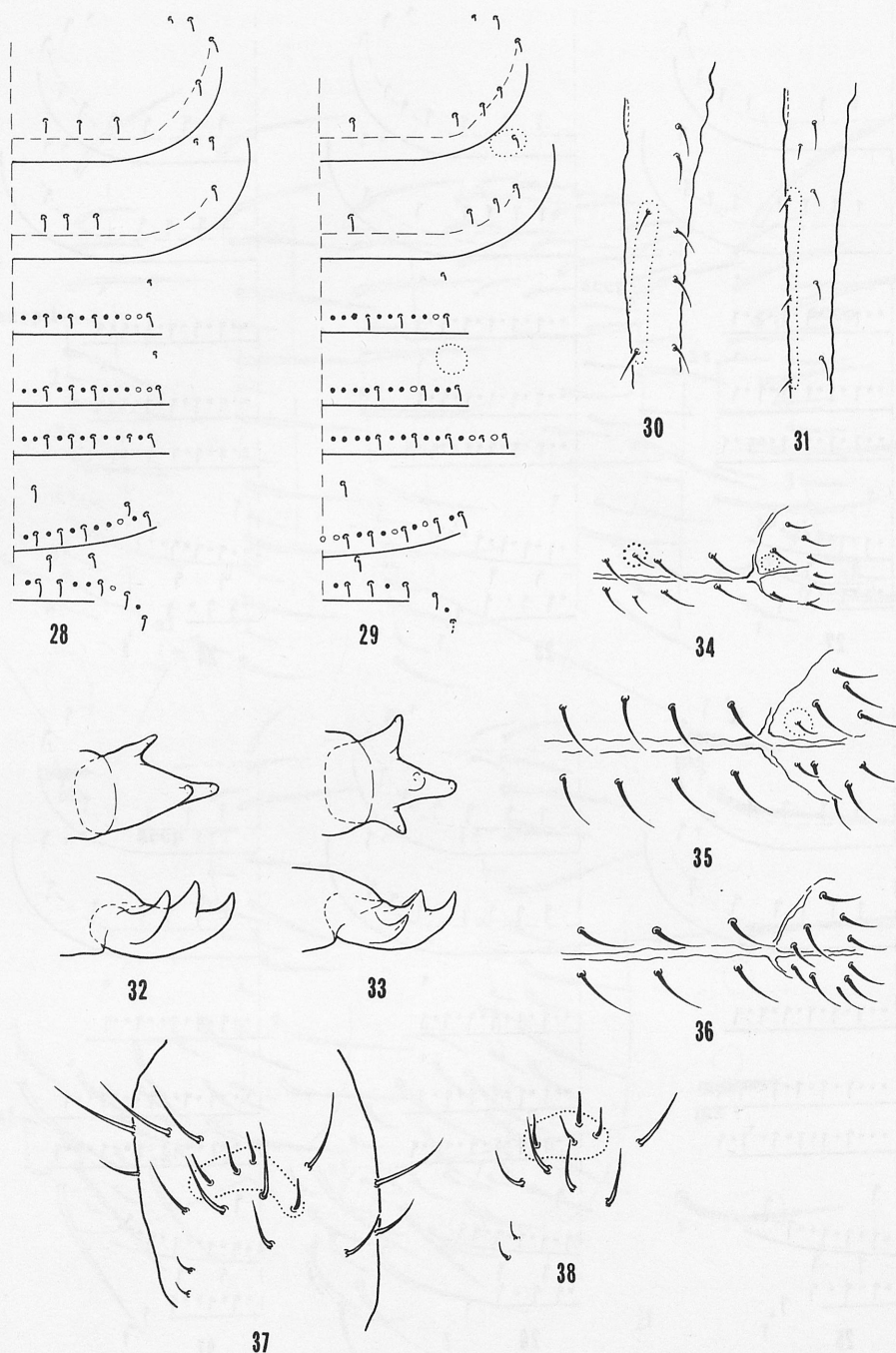


Fig. 28-38. 28, 29 - Sensorial chaetotaxy of *I. trichaetosa* (28) and *I. ekmani* (29); 31 - dorsal side of dens in *I. ekmani*; 30 - ditto in *I. notabilis* (dorsomedial chaetae encircled); 33 - mucro of *I. vtorovi*; 32 - ditto of *I. notabilis*; 34 - medioventral chaetotaxy of the head in *I. ekmani*; 35 - ditto in *I. notabilis*; 36 - ditto in *I. reducta*; 37 - ventral side of Ant. I in *I. appressopilosa*; 38 - ditto (other specimen) (sensillae encircled)

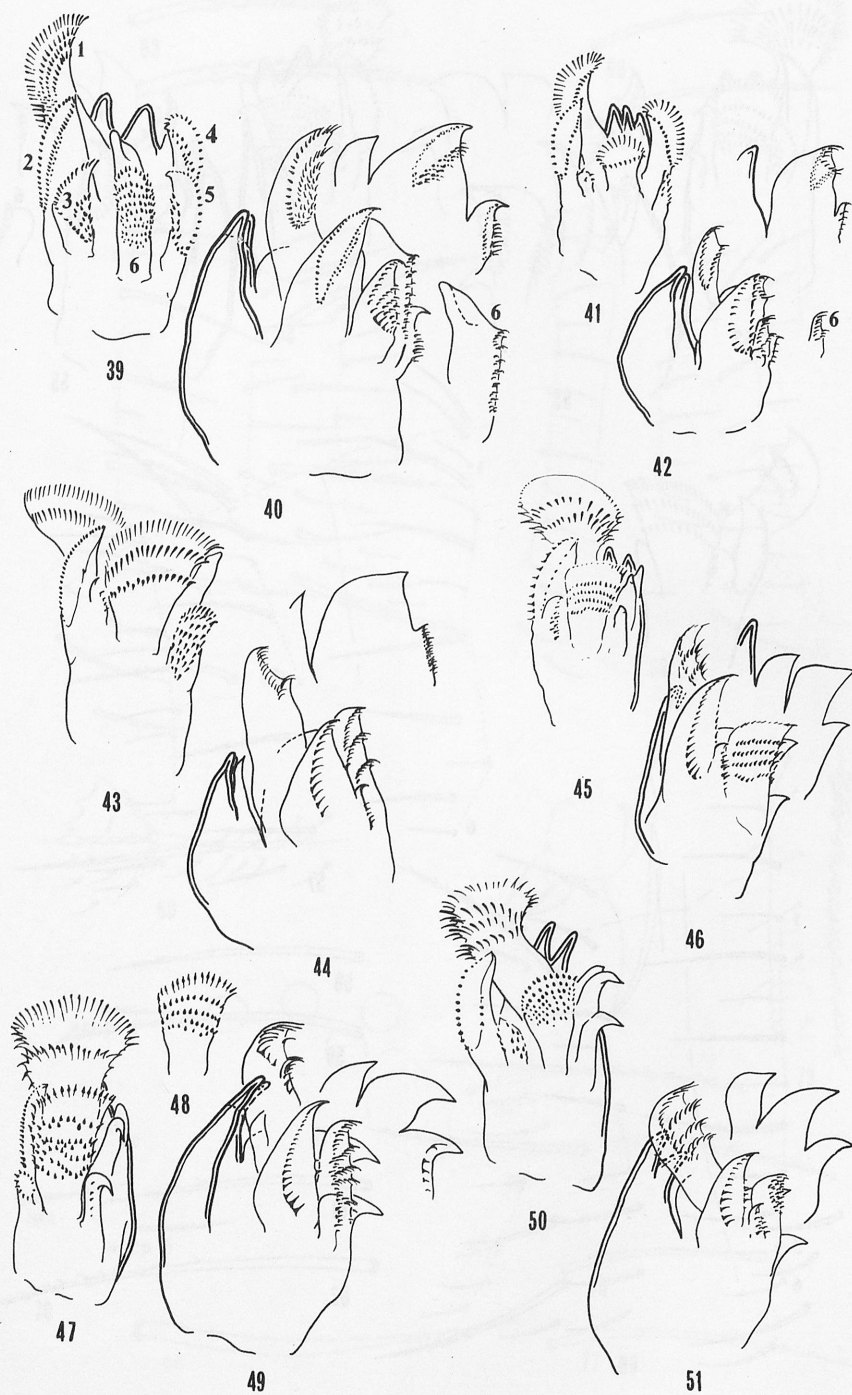


Fig. 39-51. Maxillary head 39, 40 - *I. iremeli*; 41, 42 - *I. ekmani*; 43, 44 - *I. reducta*; 45, 46 - *I. atrocitata*; 47-49 - *I. longa* (48 - lamella no. 6 of other specimen); 50, 51 - *I. trichaetosa*.

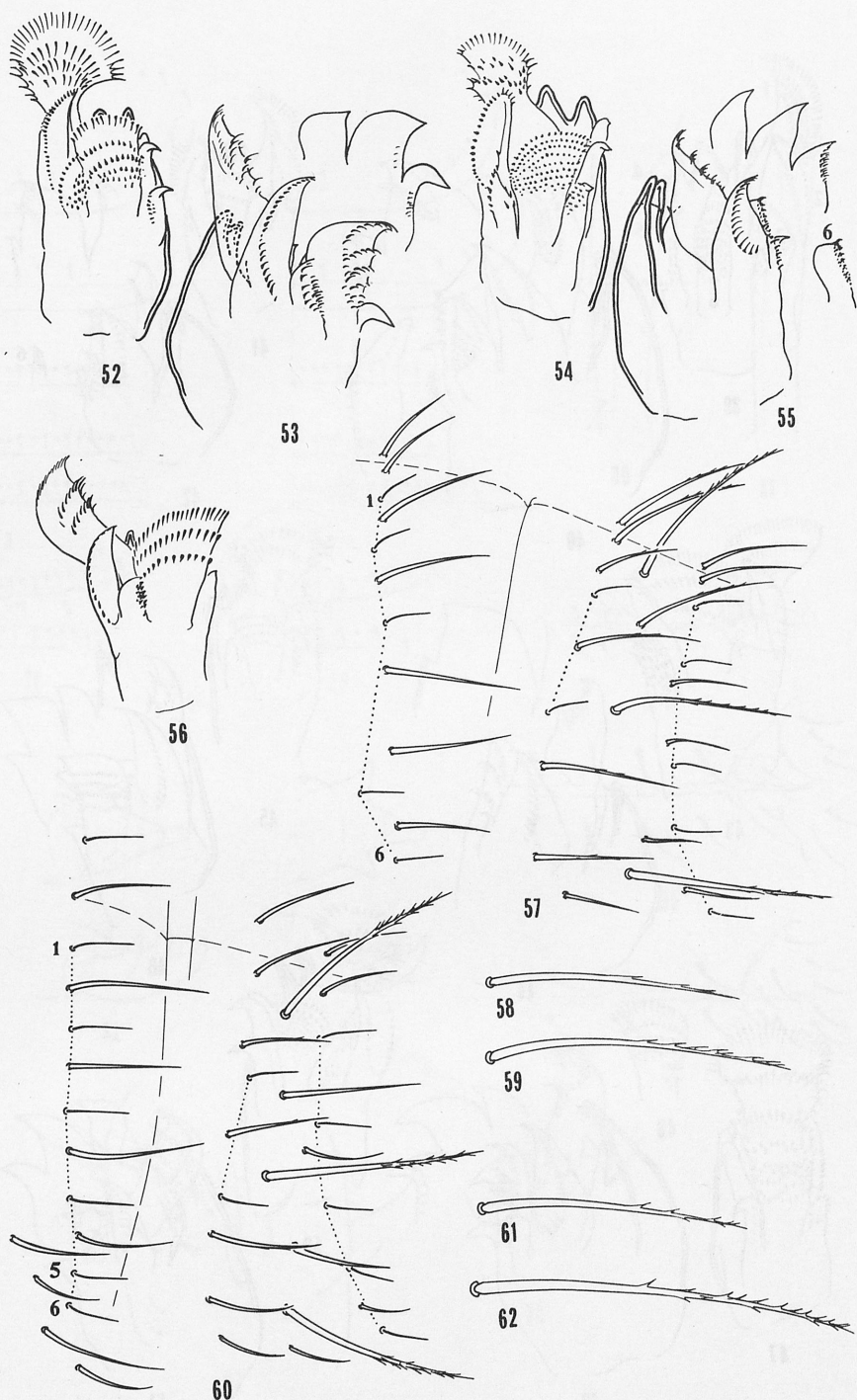


Fig. 52-62. 52-56 - maxillary head 52, 53 - *I. notabilis*; 54, 55 - *I. vtorovi*; 56 - *I. setispinosa*; 57 - Abd. IV (p-row) and Abd. V of *I. trichaetosa*; 58, 59 - macrochaeta (58 - on Abd. IV, 59 - on Abd. V); 60 - Abd. IV (p-row) and Abd. V of *I. vtorovi*; 61, 62 - macrochaeta (61 - on Abd. IV, 62 - on Abd. V) of *I. vtorovi*

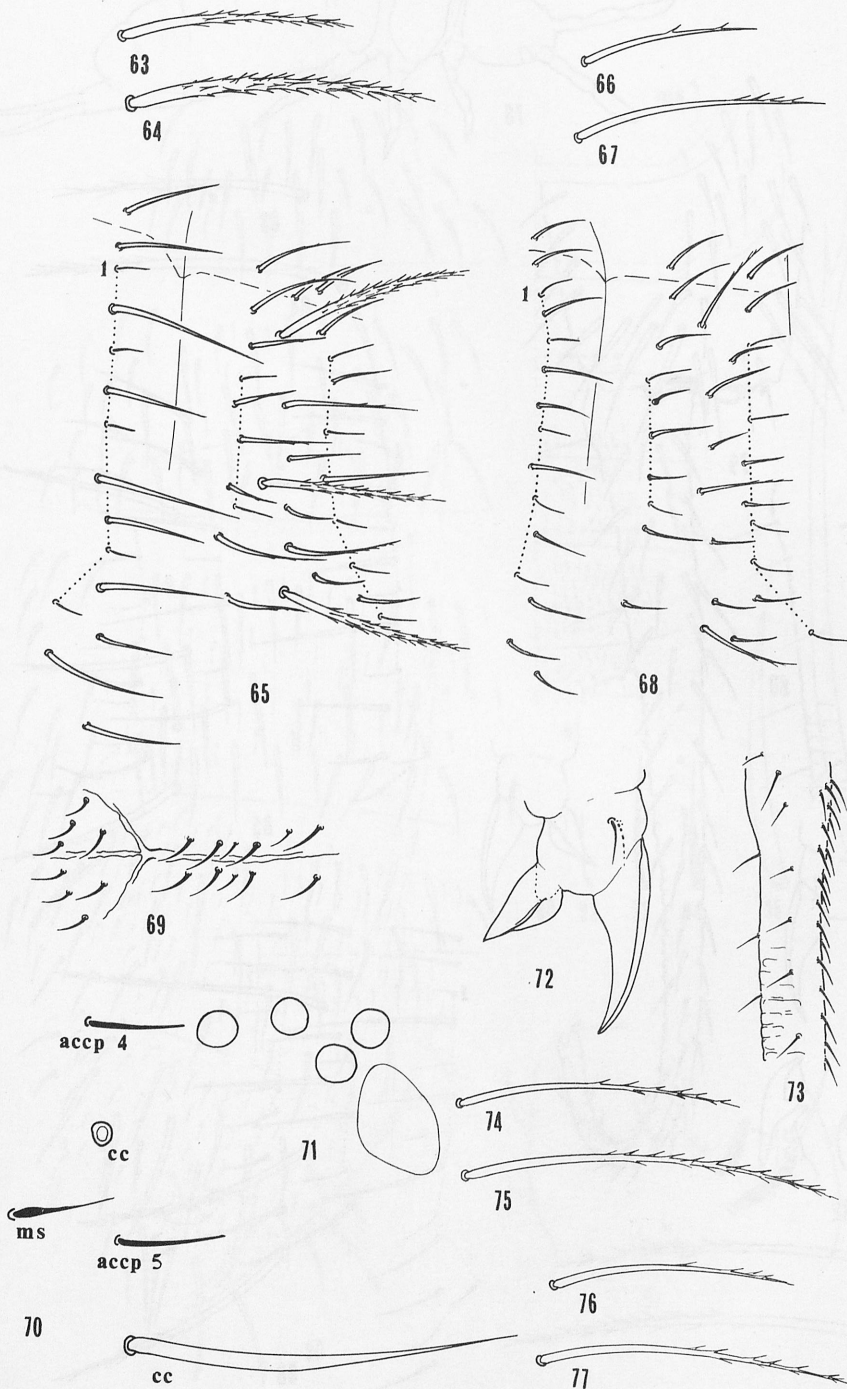


Fig. 63-77. 63, 64 - macrochaeta (63 - on Abd. IV, 64 - on Abd. V) of *I. iremeli*; 65 - Abd. IV (p-row) and Abd. V of *I. iremeli*; 66-67 - macrochaeta (66 - on Abd. IV, 67 - on Abd. V) of *I. appressopilosa*; 68 - Abd. IV (p-row) and Abd. V of *I. appressopilosa*; 69-73 - *I. iremeli*; 69 - medioventral chaetotaxy of the head; 70 - lateral sensillae on Abd. III (accp-sensilla, ms-microsensilla, cc-common chaeta); 71 - PAO and ommatidia; 72 - apical part of Leg III; 73 - dorsal side of dens; 74, 75 - macrochaeta (74 - on Abd. IV, 75 - on Abd. V) of *I. longa*; 76, 77 - macrochaeta (76 - on Abd. IV, 77 - on Abd. V) of *I. setispinosa*

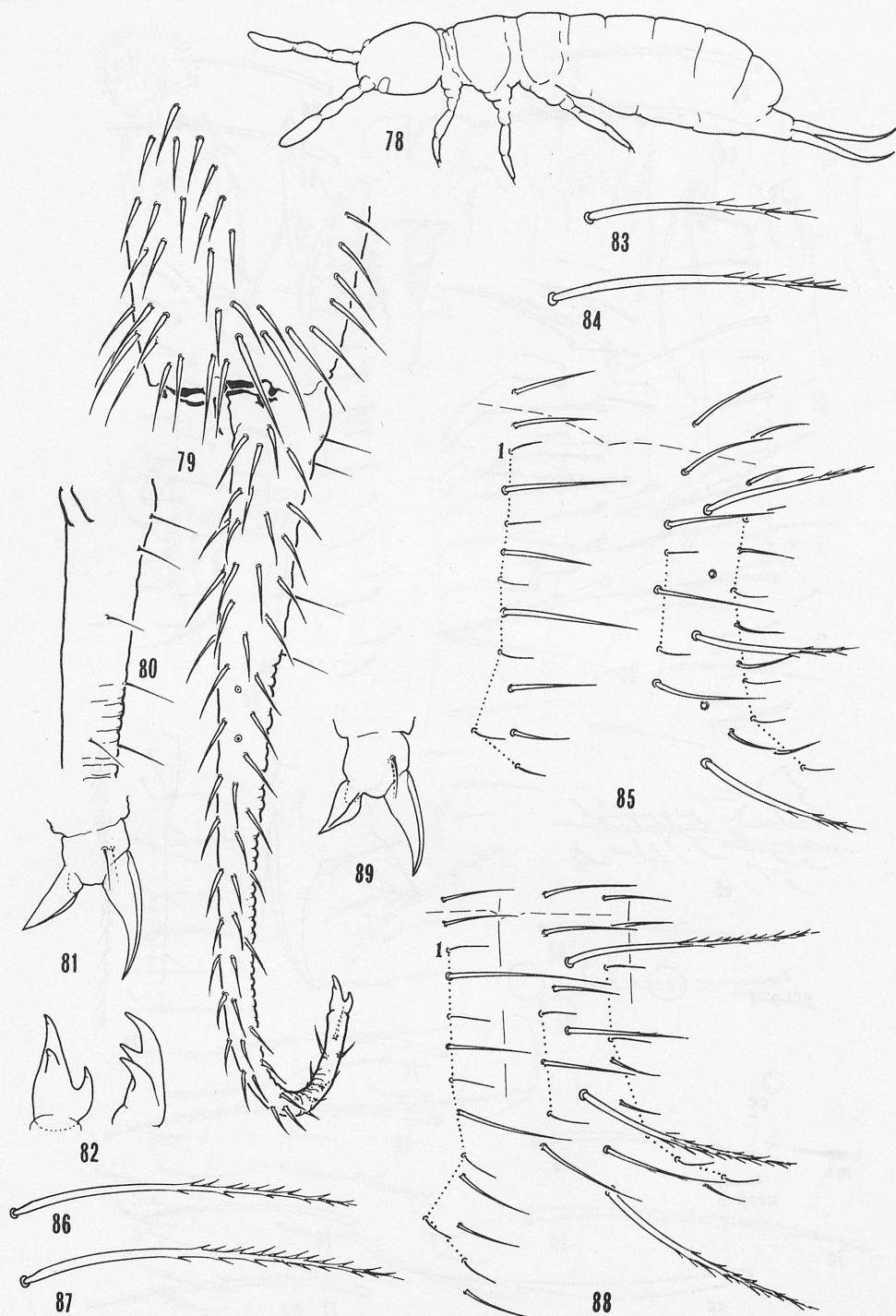


Fig. 78-89. 78-82 - *I. (Sericeotoma) knissi*. 78 - habitus; 79 - ventral side of furca; 80 - dorsal side of dens; 81 - apical part of Leg III; 82 - mucro; 83, 84 - macrochaeta (83 - on Abd. IV, 84 - on Abd. V) of *I. removeophthalma*; 85 - Abd. IV (p-row) and Abd. V of *I. removeophthalma*; 86, 87 - macrochaeta (86 - on Abd. IV, 87 - on Abd. V) of *I. atrocitata*; 88 - Abd. IV (p-row) and Abd. V of *I. atrocitata*; 89 - apical part of Leg III in *I. appressopilosa*

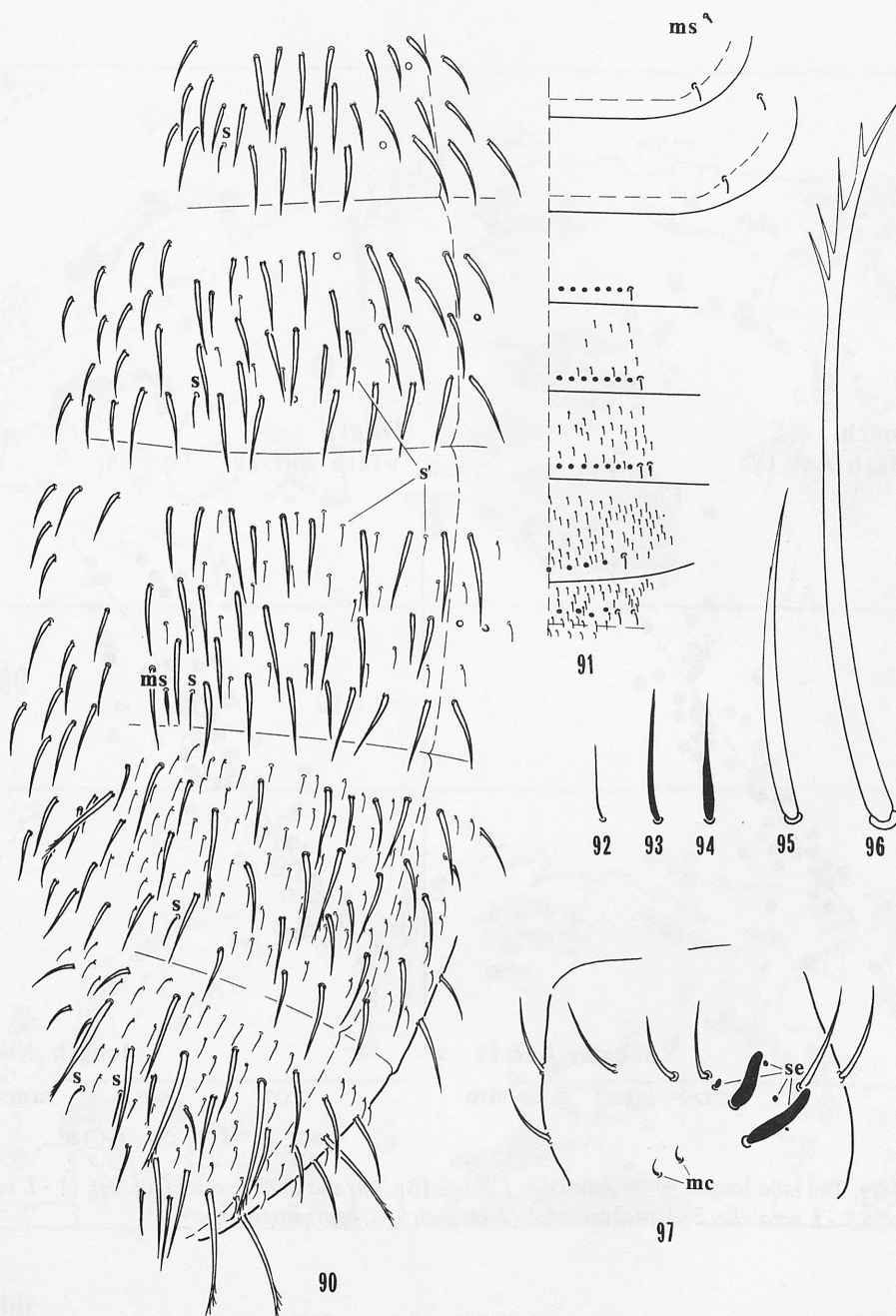


Fig. 90-97. *I. (Sericeotoma) knissi*. 90 - dorsal chaetotaxy of abdomen; 91 - Sensorial chaetotaxy (*s* - common sensilla, *s'* - additional sensilla, *ms* - microsensilla); 92 - additional sensilla; 93 - common sensilla; 94 - microsensilla; 95 - common chaeta; 96 - macrochaeta of Abd. V; 97 - ventral side of Ant. I (*mc* - microchaeta, *se* - sensorial elements)

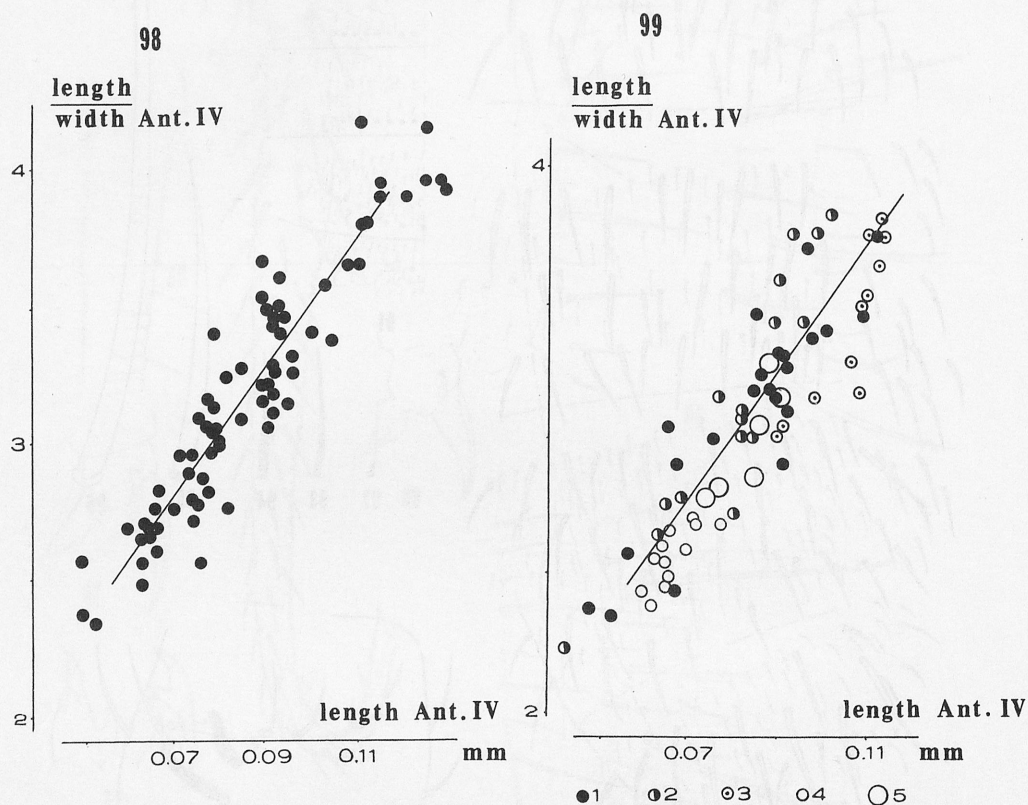
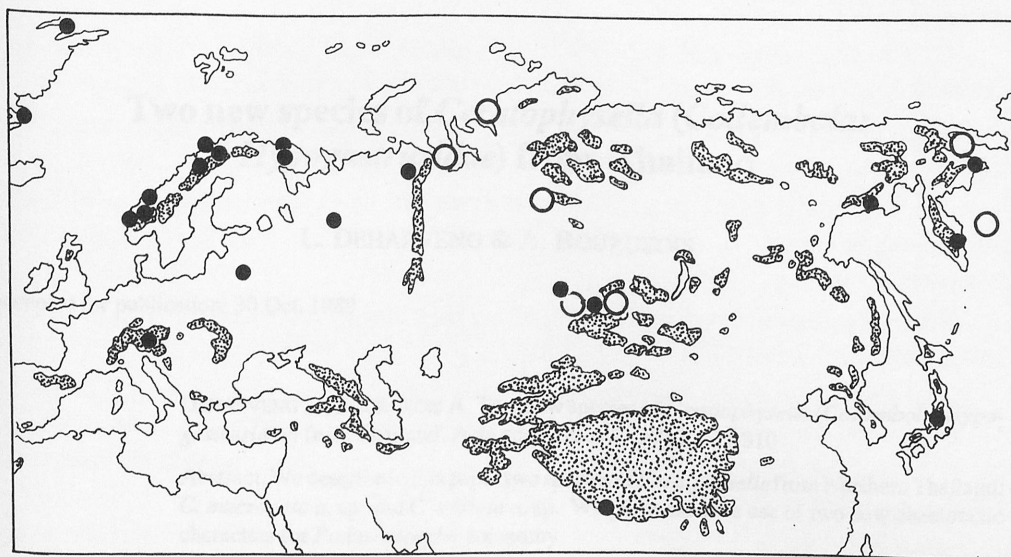
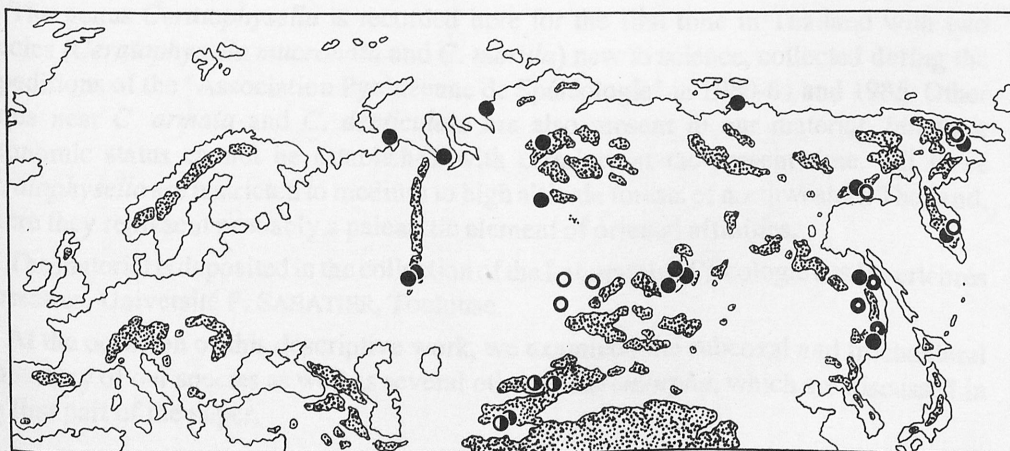


Fig. 98-99. The ratio length: width Ant. IV in *I. longa* (fig. 98) and other species (fig. 99). (1 - *I. reducta reducta*, 2 - *I. notabilis*, 3 - *I. trichaeosa*, 4 - *I. ekmani*, 5 - *I. appressopilosa*)



100

● 1 ○ 2



101

● 1 ○ 2 ◐ 3 ● 4

Fig. 100. Geographical distribution of *I. ekmani* (1) and *I. longa* (2)

Fig. 101. Geographical distribution of *I. reducta reducta* (1), *I. vorovi* (2), *I. trichaetosa* (3) and *I. reducta amurica* (4)

