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Vindobonella leopoldina gen. n., sp. n. from Austria (Protura: Acerentomidae s. l.)

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Abstract. A new genus, *Vindobonella* gen. n. (Acerentomidae s. l.), and a new species, *Vindobonella leopoldina* sp. n., are described from Vienna. The new genus belongs to a group characterized by a reduced labial palp and a non-modified striate band on abdominal segment VIII.

INTRODUCTION

An investigation of the soil fauna of the city of Vienna revealed two new proturan species of the family Eosentomidae (Szeptycki & Christian, 2000). The new acerentomid species described in the present paper is placed in a new genus:

***Vindobonella* gen. n.**

Type species: *Vindobonella leopoldina* sp. n., by original designation.

Etymology: The genus name (female gender) is derived from Vindobona (lat.) = Vienna, the species name refers to the type locality Leopoldsberg.

Diagnosis (characters arranged according to their supposed systematic significance): A genus of the family Acerentomidae s.l. (= sensu Tuxen, 1964). Meso- and metanotum with 4 anterior setae. Seta *P3* on urotergites II-VI anterior to line *P2-P4*. Abdominal legs II and III with 2 setae. Striate band on abdominal segment VIII normal. Labial palp without tuft. Seta *P2a* on meso- and metanotum nearer to *P3* than to *P2*. Calyx of filamento di sostegno ovoid, smooth. Foretarsus with sensillum *b′*, sensillum *d* nearer to *c* than to *e*, *t1* claviform (cf. Rusek, 1974), *t2* spindle-like, *t3* cylindrical. Head with postpseudocular seta. Dorsal lobe of telson with a single pore. Urosternite VIII with four setae. Habitus similar to *Gracilentulus* species.

Description: Head without differentiated sensory setae. Postpseudocular seta present. Labial palp reduced, with three setae and a long, thick, more or less parallel-sided sensillum. Filamento di sostegno with smooth, ovate calyx and long, simple posterior filament. Pseudoculus round, with short lever.

Meso- and metanotum with two anterior setae (*A2* and *A4*), seta *P2a* nearer to *P3* than to *P2*. Setae *P1a* and *P2a* on meso- and metanotum as gemmate microchaetae, seta *P5* as a small pit; metanotal seta *P4a* as a thin, linear microchaeta (cf. Bernard, 1990). Pore *sl* present on meso- and metanotum, *al* on mesonotum only. Prosternum with seta *A2*.

Foretarsal sensillum *b′* present, *t1* claviform, *t2* thick and pointed (not filiform and thin as in most Acerentomidae), *t3* cylindrical. Sensillum *d* inserted proximad to level of insertion of *t2*, much nearer to *c* than to *e*.

Seta *P3* on abdominal terga II-VI anterior to line *P2-P4*. Seta *P2a* on urotergite I is a gemmate microchaeta, *A5* on urotergite I and all accessory setae on abdominal segments II-VII are thin, linear microchaetae. Abdominal legs with 4, 2, and 2 setae, respectively, subapical seta on legs II and III more than twice length of apical seta. Urosternite II with seta *P1a*. Pore *psm* present on the urotergites I-VIII, *psl* on VI and VII, *al* on II-VII. Sternal porotaxy of *Acerentulus* type: medial pore only on urosternite VII. Striate band on abdominal segment VIII well developed, normal. Hind margin of comb VIII straight. Urosternite VIII with 4 setae in one row, seta *1a* absent. Urotergite X with seta *1a* present, set of setae on urotergites IX and X identical. Urosternite XI with 4 setae. Hind margin of segments IX-XI and of the telson smooth. A single dorsal pore on the dorsal lobe of the telson. Female squama genitalis of *Acerentulus* type, acrostyli situated subapically.

Affinities: *Vindobonella* gen. n. belongs to a group of acerentomid genera with a well developed (normal) striate band on abdominal segment VIII and a reduced labial palp without terminal tuft. In the structure of the foretarsus (the shape of sensillum *b*, the position of sensilla, the relatively long empodial appendage), in the presence of four setae on urosternite XI and in the short female squama genitalis the new genus is most similar to *Tuxenidia* Nosek & Cvijović, 1969 and *Podolinella* Szeptycki, 1995 (Nosek & Cvijović, 1969; Szeptycki, 1995). *Vindobonella* differs from both these genera in the peculiar, thick and pointed sensillum *t2* ("spindle-like", cf. Tuxen, 1964). From *Podolinella* it differs in the presence

TABLE 1. Body measurements (µm) of *Vindobonella leopoldina* gen. n., sp. n.

	imago	preimago	mat. jun.	larva II
head	98–112	93	85–92	94
pseudoculus	5–7	5	5	5
filamento di sostegno	18–22	19	17–19	14
P1 on mesonotum	14–15	14	11–13	11
P2 on mesonotum	19–22	18	15–18	14
foretarsus	68–71	61	53–58	48
claw	19–29	16	14–17	15
empodial appendage	6–7	5	5–6	4
max body length	960	?	780	?
nr of specimens	5	1	3	1

of a postpseudocular seta on the head, the uniformly shaped head setae, the cylindrical sensillum *t3* (in *Podolinella* it is "leaf-like"), and in the structure of the reduced labial palp (with a long apical seta - probably a rudiment of the terminal tuft - in *Vindobonella*, versus a small conical structure in *Podolinella*). It differs from *Tuxenidia* in the structure of the striate band (normal in *Vindobonella*, highly modified in *Tuxenidia*), the number of setae on urosternite VIII (4 versus 6), and the number of setae on abdominal legs II and III (2 versus 1).

The thick, spindle-like sensillum *t2* was only previously recorded in the genus *Delamarentulus* Tuxen, 1963 (Tuxen, 1964, 1979). Since this genus differs from *Vindobonella* in many important characters (e.g., shape of filamento di sostegno, position of phanerae on the foretarsus, position of *P3* on abdominal terga), they are not likely to be closely related. *Vindobonella* shares the differentiation of accessory setae (gemmate microchaetae on nota and on urotergite I, linear microchaetae on abdominal segments II-VII) with some other genera. Data on this feature are scarce, but a very similar differentiation has been observed in *Acerentulus* Berlese, 1908 (Szeptycki, 1991), *Podolinella* (of Szeptycki, 1995), *Najtentulus* Szeptycki & Weiner, 1997, and (at least in some species of) *Kenyentulus* Tuxen, 1981 (Nakamura, 1997), *Australentulus* Tuxen, 1967 (Imadaté, 1989), and Far Eastern species of *Gracilentulus* Tuxen, 1963 (Nakamura, 1995b). On the other hand, in some species of *Baculentulus* Tuxen, 1977 (Nakamura, 1995a) and in European species of *Gracilentulus* (of Szeptycki, 1993) the accessory setae on the nota and on the abdominal segments are of equal shape.

***Vindobonella leopoldina* sp. nov.**

Holotype: female (coll. nr 6177). Austria, Vienna, Leopoldsberg, steep southwest slope (16°21.09´E/ 48°16.58´N, 390 m a.s.l.), xerothermic *Quercus pubescens* stand, pararendzina over platy marl, leg. E. Christian, 21 08 1999.

Paratypes: 2 females (6183, 6186) and 2 males (6187, 6188), collected with holotype.

Not included in the type material: 1 preimago and 3 maturi juniores (collected with holotype), and 1 larva II (same locality, leg. E. Christian, 11 05 1987).

Location of type material: In the collection of the Institute of Systematics and Evolution of Animals of the Polish Academy of Sciences, Kraków, except paratypes 6183 and 6187 and 2 maturi juniores at the Naturhistorisches Museum Wien. All specimens are mounted in Marc André II medium.

Description (Figs 1–26): Body measurements are given in Table 1. Head setae short, slightly diversified in length but not in shape. Additional and postpseudocular setae present. Rostrum short. Pseudoculus round, with short lever, PR 14–20. Filamento di sostegno short, with smooth, ovate calyx, long posterior filament and bilobate posterior dilation, CF 4.9–6.1. Maxillary palps short, thick; sensilla equal, short, thin and pointed. Labial palps without terminal tuft, with three setae and one long, thick, more or less parallel-sided sensillum.

Main setae on nota long, slightly differentiated, setae *M* and *A2* short, thin, hair-like. Setae *P1a* and *P2a* are gemmate microchaetae; *P5* a small sensillum. *P4a* on metanotum a thin, linear microchaeta. Length ratio of *P1* : *P2* on mesonotum 1 : 1.3–1.5. Seta *A2* on thoracic sterna and *M2* on prosternum of same shape as *P4a* on metanotum, but shorter. Thoracal sterna without pores.

Foretarsal sensillum *b′* present; *t1* claviform; *t2* long and thick, pointed (spindle-like); *t3* short, cylindrical, apically rounded; *d* proximal to level of insertion of *t2*, much nearer to *c* than to *e*. External sensillum *a* of medium length, reaching base of *γ3*; *b* extremely long, reaching base of claw; *c* subequal to *a*; *d* shorter than *c*, reaching base of *f*. Internal sensillum *a′* situated on level of *t1*, long and thin, parallel-sided, reaching base of *b′*; *b′* and *c′* equal, long and thin, nearly seta-like. All exterior and interior sensilla, with exception of *b*, thin, parallel-sided. Proximal pore proximal to level of insertion of sensillum *c*. Setae *β1* and *δ4* short, equal; the latter situated proximal to base of *c′*. Relative length of foretarsal sensilla: $t1 < t3 < g < a' = b' = c' < t2 = d = f < a = c = e << b$.

Claw without inner tooth; empodial appendage relatively long. BS about 0.5, TR 2.3–3.8; EU 0.3–0.4.

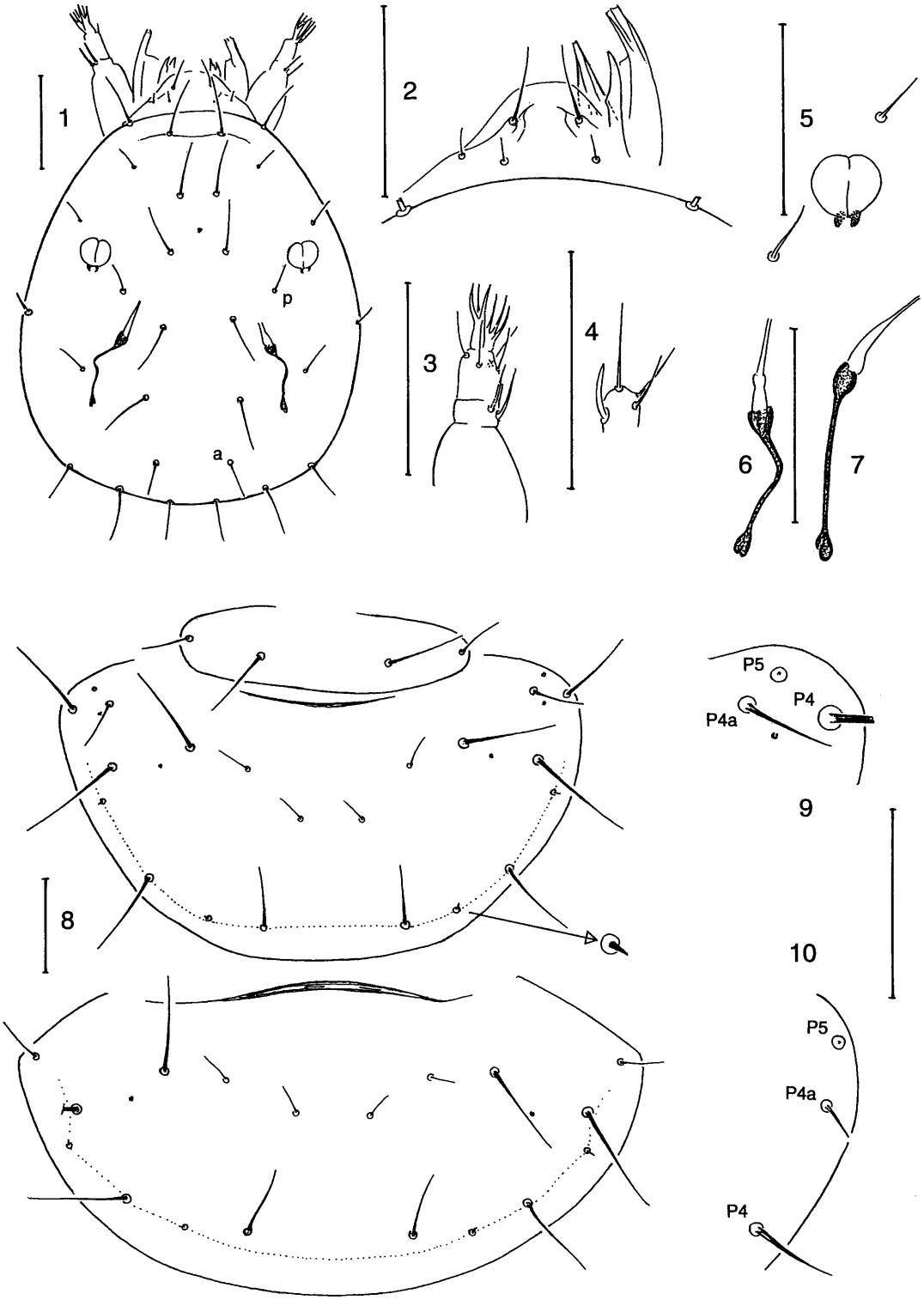
Trunk chaetotaxy as in Table 2. Urotergite I without *P1a*; *P2a* of same shape as *P1a* on nota; *A5* as a short and thin linear microchaeta. Urotergites II-VI without setae *P1a* and *P3a*; accessory setae are short and thin linear microchaetae. Urotergite VII with 3+3 anterior setae (*A2*, *A4*, *A5*); seta *P1a* absent, *P2a* and *P3a* present. Accessory setae as on preceding tergites. Seta *P4a* like other accessory setae, situated on the membrane between dorsal part of tergite and laterotergite. Pore *psm* on urotergites I-VIII, *psl* on VI and VII, *al* on II-VII: dorsal to *A5* on uroterites II-VI, ventral to *A5* on VII. Second anterior lines on urotergite VII visible only on the lateral part of the tergite.

Abdominal legs with 4, 2, and 2 setae, respectively; apical seta on legs II and III less than half the length of subapical seta. Accessory setae on urosternites I-VII of the same shape as on tergites, but shorter. Urosternite VII without seta *Pc*. Connecting line on urosternites IV-VI absent. Urosternites I-IV without pores; V with a single, asymmetrically situated pore; VI with 1+1 pores, VII with a single pore, situated medially near the hind margin of the tergite.

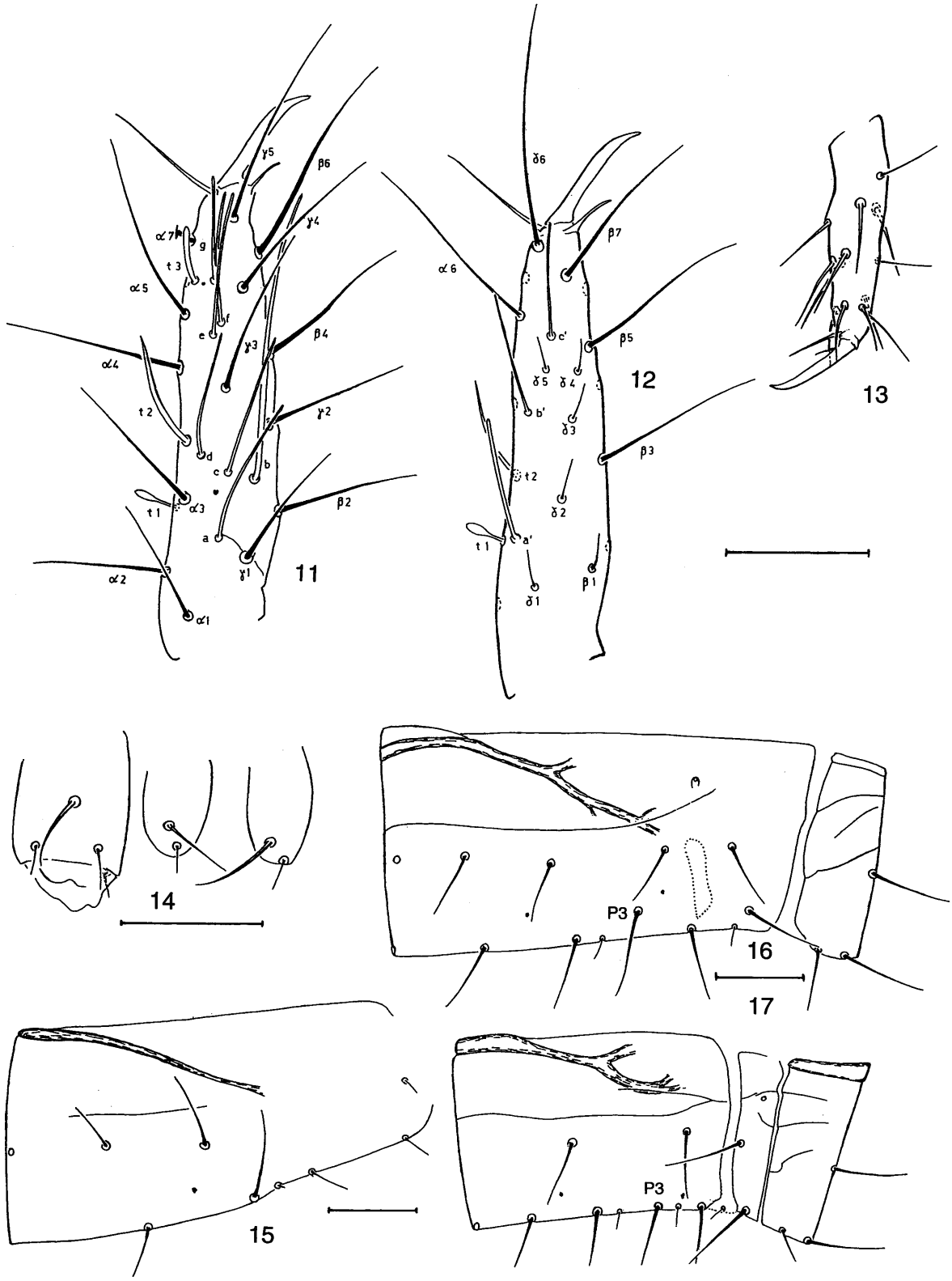
Striate band on abdominal segment VIII well developed, normal. Urotergite VIII with a more or less

TABLE 2. Chaetotaxy of *Vindobonella leopoldina* gen. n., sp. n. – Prelarval, primary and secondary setae in bold; tertiary setae in normal print; complementary setae in italics.
Footnotes: [1] sternal chaetotaxy of larva II not studied; [2] Mc in maturus junior; [3] no setae in maturus junior; [4] 8 setae in larva II (larval seta present).

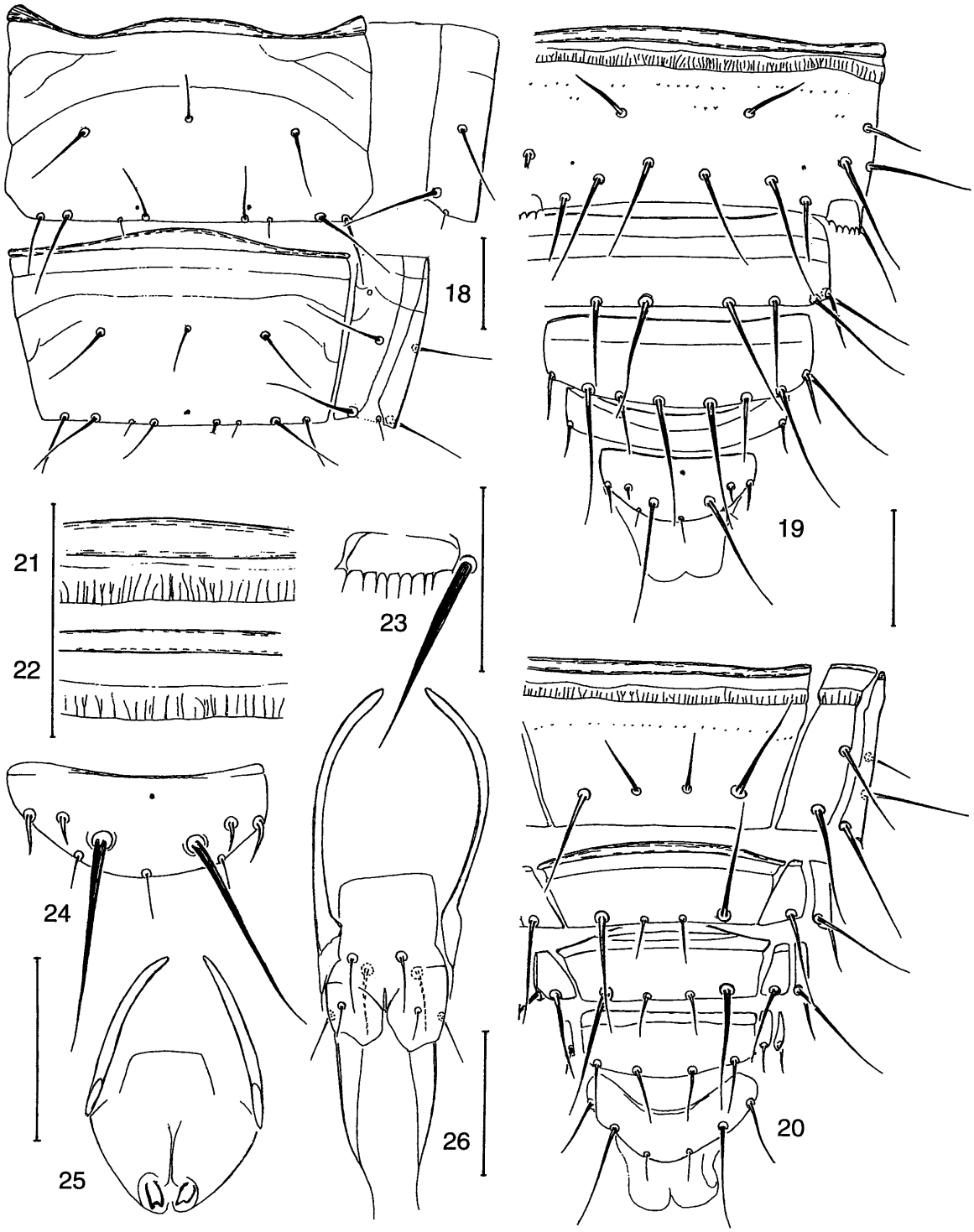
	dorsal		ventral	
	chaetotaxy	formula	chaetotaxy	formula
Th. I[1]	**1**, **2**	4	A1, 2, M1, 2 P1, 2, 3	4+4 --- 6
Th. II	**A2**, **4**, **M** --- **P1**, **1a**, **2**, 2a, **3**, **4**, **4a**, **5**	6 --- 16	**Ac**, **2**, **3**, **M** --- **P2**, 3	5+2 --- 4
Th. III	**A2**, **4**, **M** --- **P1**, **1a**, **2**, 2a, **3**, **4**, **4a**, **5**	6 --- 16	**Ac**, **2**, **3**, 4, **M** --- **P2**, 3	7+2 --- 4
Abd. I	A1, 2, 5 --- **P1**, **2**, **2a**, **3**, **4**	6 --- 10	**Ac**, **2** --- **P1**, *1a*	3 --- 4
Abd. II-III	A1, 2, 5 --- **P1**, **2**, **2a**, **3**, **4**, **4a**, **5**	6 --- 14	**Ac**, 2 --- **Pc**, 1a, **2**	3 --- 5
Abd. IV-V	A1, 2, 5 --- **P1**, **2**, **2a**, **3**, **4**, **4a**, **5**	6 --- 14	**Ac**, 2 --- **P1**, 1a, **2**, **3**	3 --- 8
Abd. VI	A1, 2, *4*, 5 --- **P1**, **2**, **2a**, **3**, **4**, **4a**, **5**	8 --- 14	**Ac**, 2 --- **P1**, 1a, **2**, **3**	3 --- 8
Abd. VII	A2, 4, 5 --- **P1**, **2**, **2a**, **3**, 3a, **4**, **4a**, **5**	6 --- 16	**Ac**, 2 --- **P1**, 1a, **2**, **3**	3 --- 8
Abd. VIII	A2, **4**, 5 --- M1[2], **P1**, **1a**, **2**, **2a**, **3**, **3a**, **5**	6 --- 16	**1**, **2**	4
Abd. IX	**1**, 1a, **2**, 2a, **3**, **4**	12	**1**, **2**	4
Abd. X	1, *1a*, 2, *2a*, 3, 4	12	1, 2	4
Abd. XI	3, 4	4		4[3]
Abd. XII		9		6[4]



Figs 1 – 10: *Vindobonella leopoldina* gen. n., sp. n. 1 – head, dorsal view (holotype) (a - additional seta, p - postpseudocular seta); 2 – anterior part of the head, dorsal view (holotype); 3 – maxillary palp (holotype); 4 – labial palp (paratype nr 6183); 5 – pseudoculus (holotype); 6 – filamento di sostegno, dorsal view (holotype); 7 – filamento di sostegno, lateral view (6183); 8 – pro-, meso- and metanotum (holotype); 9 – anterolateral part of mesonotum (6183); 10 – anterolateral part of metanotum (6183). Scale bars = 20 μm.



Figs 11 – 17: *Vindobonella leopoldina* gen. n., sp. n. 11 – foretarsus, exterior view (holotype); 12 – foretarsus, interior view (holotype); 13 – leg III (holotype); 14 – abdominal legs I - III (6186); 15 – urotergite I (6183); 16 – urotergite VI (6183); 17 – urotergite VII (6183). Scale bars = 20 μm.



Figs 18 – 26: *Vindobonella leopoldina* gen. n., sp. n. 18 – urosternite VI and VII (holotype); 19 – urotergite VIII - XII (holotype); 20 – urosternite VIII - XII (holotype); 21 – striate band (medial part) of urotergite VIII (holotype); 22 – striate band (medial part) of urosternite VIII (holotype); 23 – comb VIII (6183); 24 – dorsal lobe of telson (holotype); 25 – female squama genitalis (holotype); 26 – penis (6187). Scale bars = 20 µm.

regular row of small granules, and some granules forming the traces of a second row; urosternite with a single row of small granules. Comb VIII with straight hind margin, composed of 8–11 (mostly 9–10) slender teeth. Pore *psm* without surrounding teeth. Urosternite VIII with 4 setae, seta *1a* absent.

Seta *1a* on urotergites IX and X shorter than seta *1*. Urotergite XI with 2+2 setae, seta *1* absent. Setae on hind margin of dorsal lobe of telson short, equal. Dorsal pore single. Urosternite XI with 2+2 setae, external subequal to internal ones.

Female squama genitalis short, with short subapical bidentate acrostyli. Penis with 4+4 setae.

Maturus junior without seta *P1a* on urosternite I and without setae on urosternite XI. Larva II with a larval seta on the ventral lobe of the telson. Larva I and prelarva unknown.

Chaetal variability: Asymmetrical lack of *M2* on prosternum in one of five adults.

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