

Two new *Eosentomon* species from Austria (Insecta: Protura: Eosentomidae)

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Abstract

Two new species of Protura (Eosentomidae) from forests within the municipal area of Vienna, Austria, are described: *Eosentomon vindobonense* sp.n. and *Eosentomon cetium* sp.n.

Key words: Protura, *Eosentomon*, new species, Vienna, Austria.

Zusammenfassung

Zwei neue Proturen-Arten (Eosentomidae) aus Wäldern des Wiener Stadtgebietes werden beschrieben: *Eosentomon vindobonense* sp.n. und *Eosentomon cetium* sp.n.

Introduction

About 40 species of Protura have been recorded from Austria, most of them identified by the late Dr. Josef Nosek, Bratislava. Nevertheless, our knowledge on the proturan fauna of this country is still fragmentary, as revealed by the frequency of new records and the discovery of undescribed species. Particular attention is therefore paid to Protura in a current investigation of the soil fauna of Vienna. As a first result, we present the descriptions of two new species of the genus *Eosentomon* BERLESE, 1908.

Eosentomon vindobonense sp.n.

Holotype: ♀ (coll. nr 3503). 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, 11 05 1987.

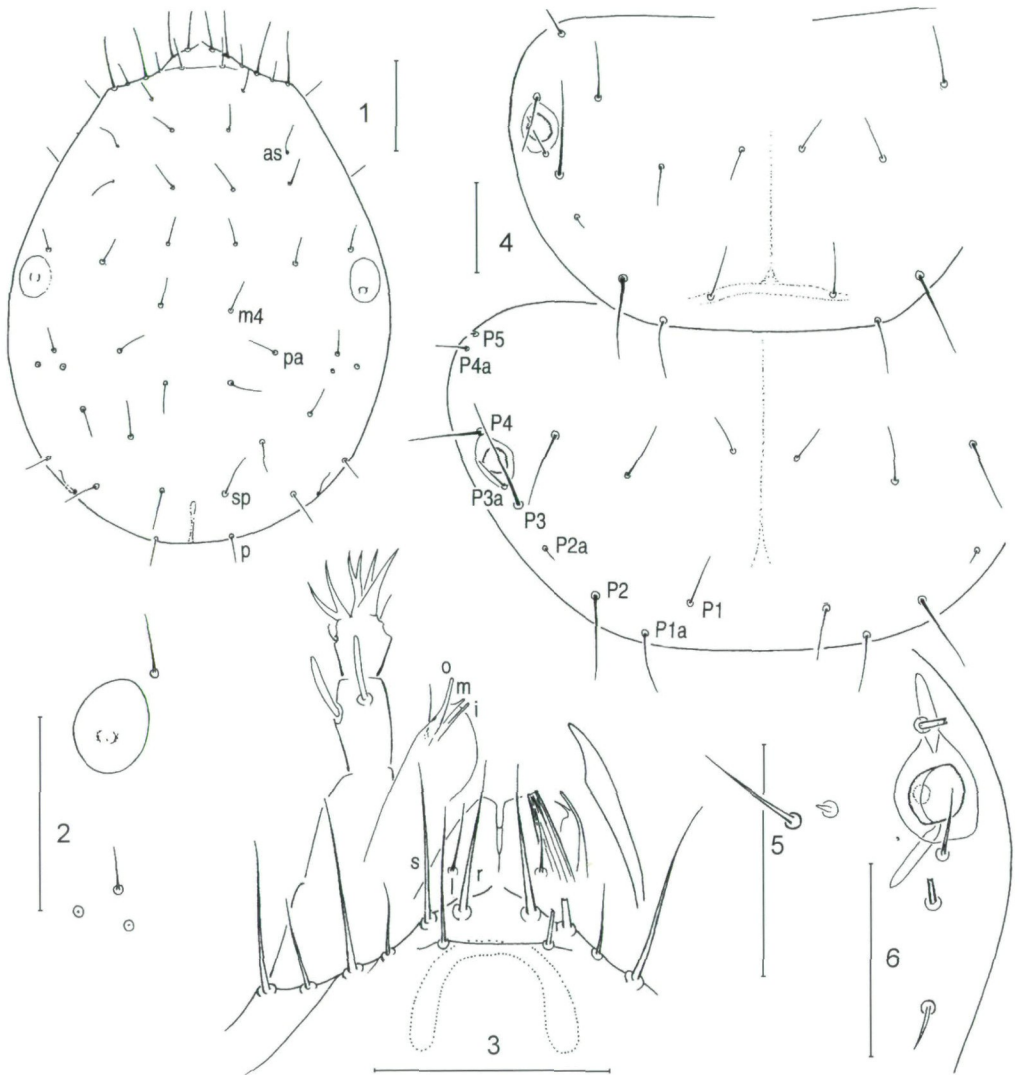
Paratypes: collected together with holotype: 2 ♀♀, 5 ♂♂ (nrs 3504-3508, 3510, 3615); same locality, leg. E. Christian, 26 11 1986: 1 ♂ (nr 3514). All specimens mounted in Marc André II medium.

Deposition: In the collection of ISEZ PAN Cracow, except paratypes 3504-3506 and 3508 at NHM Vienna.

Diagnosis: *Eosentomon vindobonense* sp.n. belongs to the "transitorium" group sensu SZEPTYCKI (1986). Within the group, it shares the position of *PIa* on urotergite VII (on level of the base of *P2*) and the spine-like seta *D2* on leg III with *E. enigmaticum* SZEPTYCKI, 1986, *E. gramineum* SZEPTYCKI, 1986, and *E. bryophilum* SZEPTYCKI, 1986.

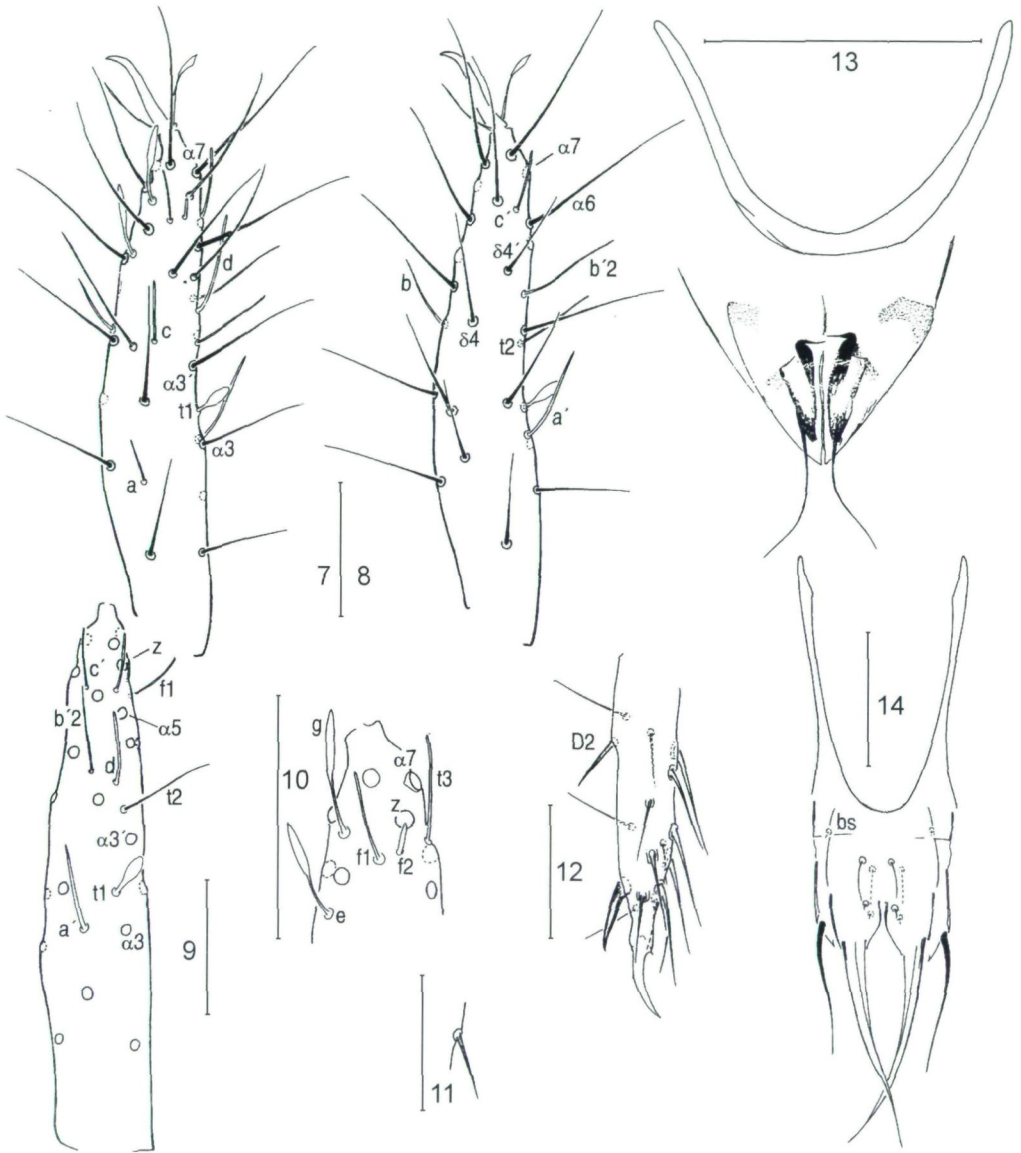
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Figs. 1 - 6: *Eosentomon vindobonense* sp.n.: (1) head, paratype nr 3510: as = anterior sensillum, pa = posterior additional seta, sp = subposterior seta, p = posterior seta, (2) pseudoculus, nr 3510, (3) anterior part of the head, dorsal view, nr 3510: o, m, i = outer, median and inner digit of galea, r = rostral seta, s = subrostral seta, l = labral seta, (4) meso- and metanotum, nr 3510, (5) setae P4a and P5 on metanotum, holotype, (6) tracheal camerae, nr 3510. Scale bars: 20 μ m.

The new species differs from all of them in the filiform (not spatulate) foretarsal sensillum *fl*, in the shape of the squama genitalis ♀ (the "head" of the squama is flattened in *vindobonense*, not distinctly rounded), and in the shape of the styli (more or less triangular in *vindobonense*, not distinctly elongated). In the filiform sensillum *fl* the new species is similar to the other species of the "transitorium" group, *E. funkei* RUSEK, 1988 and *E. solarzi* SZEPTYCKI, 1993 (RUSEK 1988, SZEPTYCKI 1993). In *E. funkei* seta D2 on



Figs. 7 - 14: *Eosentomon vindobonense* sp.n.: (7) foretarsus, exterior view, holotype, (8) foretarsus, interior view, holotype, (9) foretarsus, dorsal view, nr 3504, (10) distal part of foretarsus, exterior view, holotype, (11) seta $D 2$ of leg III, holotype, (12) leg III, nr 3505, (13) squama genitalis ♀, nr 3505, (14) penis, nr 3504: bs = basiperiphallar seta. Scale bars: 20 μ m.

leg III is setiform (not spine-like), urosternites IX and X bear 6 setae (versus 4 in *vindobonense*) and the squama genitalis ♀ is similar to that in *E. gramineum*. The new species differs from *E. solarzi* in the length of seta $P 2a$ on the nota (relatively long in *solarzi*, very short in *vindobonense*), the position of $P 1a$ on urotergite VII (situated posteriorly

to the level of *P2* in *solarzi*), the shape of seta *D2* on leg III (setiform in *solarzi*) and in the shape of the squama genitalis ♀ (in *solarzi* the "head" is very small). The general pattern of foretarsus, the abdominal chaetotaxy and the shape of the squama genitalis ♀ of the new species seem to be similar to the insufficiently described *E. gisini* NOSEK, 1969. In *E. gisini* the foretarsal sensillum *d* is very short (long in *vindobonense*), seta *D2* on III leg is setiform (NOSEK 1973, fig. 37G), and seta *P1a* on urotergite VII is situated posteriorly to level of *P2* (ibid., fig. 37H).

Description (Figs. 1 - 22): Head setae short, slightly diversified, subposterior seta 1.1-1.5 times longer than posterior. Posterior additional seta, seta *m4*, and sensillum *as* present, anterior additional seta absent. Pseudoculus ovoid, with distinct inner structure, PR 9-14. Clypeal apodeme distinct. Rostral seta simple, subequal to subrostral. Labrum with long, narrow notch, labral seta present. Mandibles with two indistinct teeth. Digits of galea well-developed, blunt, median and inner of equal length, thinner and shorter than outer one. Sensilla of maxillary palp subequal.

Setae on nota slightly diversified. *P1a* situated posteriorly to the line *P1-P2*. *P2* 1.4-1.6 times longer than *P1*. Length ratio of *P1* : *P1a* : *P2* on mesonotum is 0.9-1.0 : 1 : 1.4-1.6. *P2a* shorter than *P3a*. *P3a* of normal shape. Base of *P4a* remote from *P5*. Tracheal camerae short, more or less parallel-sided.

Foretarsal sensillum *a* longer than half of *c*; *c* short, not reaching base of $\gamma\beta$; *b* shorter than *a*'; *d* long, passing base of $\alpha\delta$; *e* and *g* equal, with spatulate dilation about half sensillum length; *f1* filiform, about 2/3 the length of sensillum *e*; *t1* situated nearer to $\alpha\beta$ than to $\alpha\beta'$; *a'* situated nearly on level of $\alpha\beta$, slightly shorter than *t2*; *t2* and *b'2* subequal (sometimes *t2* shorter), filiform; *b'1* absent; *c'* distally to level of $\alpha\delta$; seta $\delta\delta'$ distally to level of $\delta\delta$. BS 0.8-0.9, TR 5.2-6.3, EU 0.8-0.9.

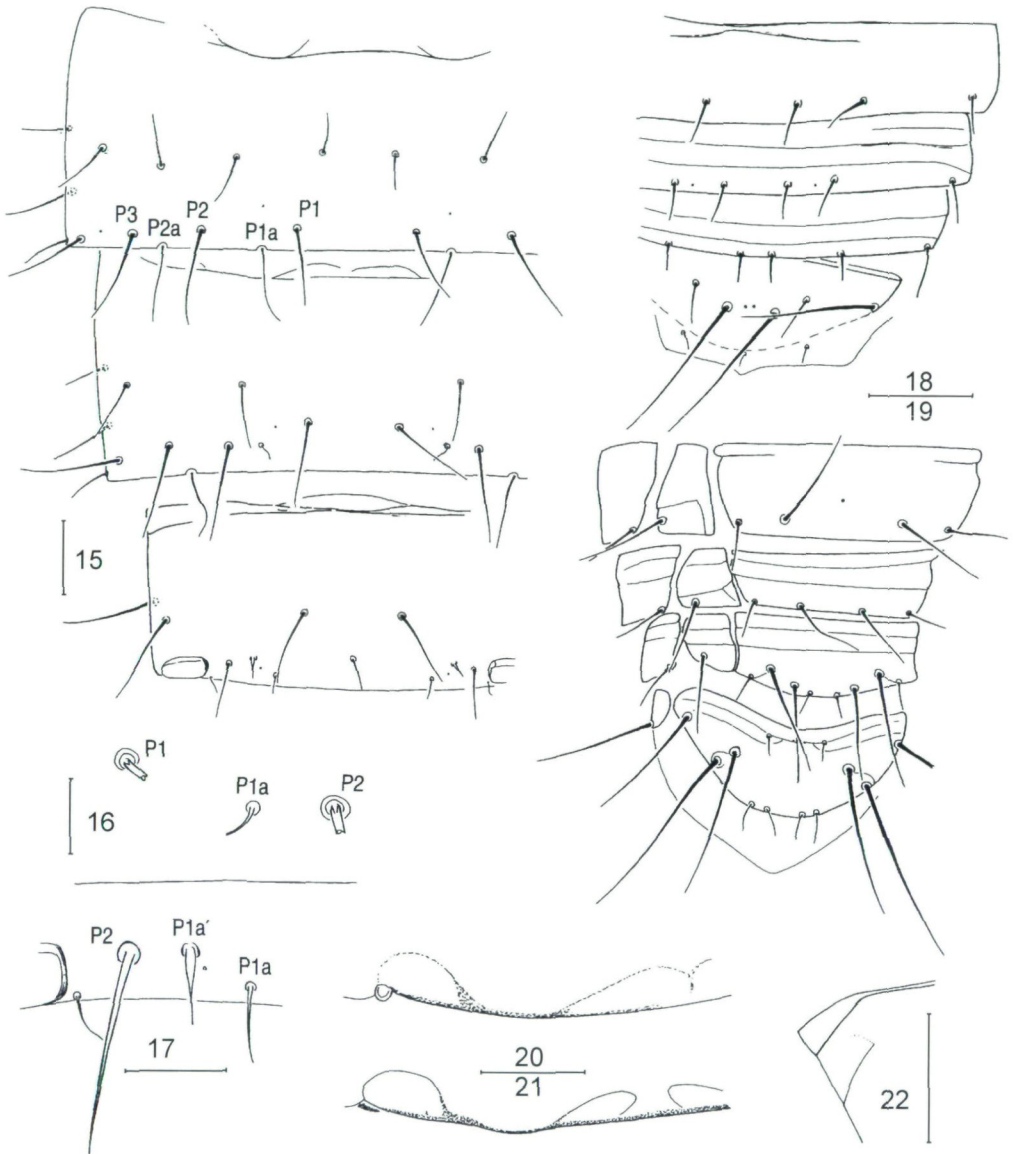
Empodial appendage of leg II and III short, basal seta of leg III (seta *D2*) spine-like.

Chaetotaxy formula of abdomen:

I	II-III	IV-VI	VII	VIII	IX-X	XI	XII
4	10	10	6	6			
---	---	---	---	---	8	8	9
12	14	16	16	9			
4	6	6	6	0			
---	---	---	---	---	4	8	12
4	4	10	10	7			

Chaetotaxy formula of urotergite I: 3, 1, 2. Seta *P4a* on urotergites II and III, and *A1* and *A4* on urotergite VII absent. Seta *P1a* on urotergites I-VI subequal to *P1*; on urotergite VII situated on level with *P2*, not reaching hind margin of tergite. *P2a* on urotergites II-VI looking like *P1a*, situated at half of the distance *P2-P3*; on urotergite VII as on preceding tergites. *P4a* on urotergites IV-VII setiform. *P1a'* on urotergite VIII long, with distinct basal dilation, situated on level with *P2*. Dorsal setae on urotergite XI longer than half length of setae on urotergite X, stout. Seta *1* on urosternite X about two times longer than seta 2. Antecostae with indistinct central lobe. Laterostigma II-IV large, with no internal structure. Lateral sclerotisation of urosternite VIII distinct, with hind margin not connected with antecosta. Dorsal lobe of telson with two central pores.

Squama genitalis ♀ short, with flat "head" of medium size and "beak" perpendicular to median line. Penis with very short basiperiphallar setae.



Figs. 15 - 22: *Eosentomon vindobonense* sp.n.: (15) urotergites VI-VIII, nr 3510, (16) seta *P1a* on urotergite VII, nr 3510, (17) seta *P1a'* on urotergite VIII, nr 3510, (18) urotergites IX-XII, nr 3505, (19) urosternites IX-XII, nr 3505, (20) antecosta of urotergite II, holotype, (21) antecosta of urotergite VI, holotype, (22) anterolateral part of urosternite VIII, nr 3505. Scale bars: 20 μ m.

Dimensions of the imago in μ m: Head 113-133, pseudoculus 10-15, subposterior head seta 10-12, posterior head seta 8-9, mesonotal seta *P1* 13-15, *P1a* 14-16, *P2* 20-23, foretarsus 84-92, claw 15-17, empodial appendage 11-15, maximum body length of expanded specimen about 1100.

Chaetal variability (9 imagines): in single specimens asymmetrical lack of *A3* on urotergite IV, and asymmetrical lack of *A1* on urosternite IV.

Derivatio nominis: Vindobona (lat.): Vienna.

Eosentomon cetium sp.n.

Holotype: ♀ (coll. nr 3555). 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, 11 05 1987.

Paratypes: collected together with holotype: 4 ♀♀, 4 ♂♂, 4 mj (nrs 3543-3553, 3556); Vienna, Neuwaldegg, north foot of Heuberg (16°15.66'E / 48°14.29'N, 300 m a.s.l.), *Fagus sylvatica* forest, braunerde over flysch sandstone: 3 ♀♀, 3 ♂♂, 1 mj (nrs 3559, 3562, 3570, 3571, 3574, 3583, 3592), leg. E. Christian, 11 05 1987. All specimens mounted in Marc André II medium.

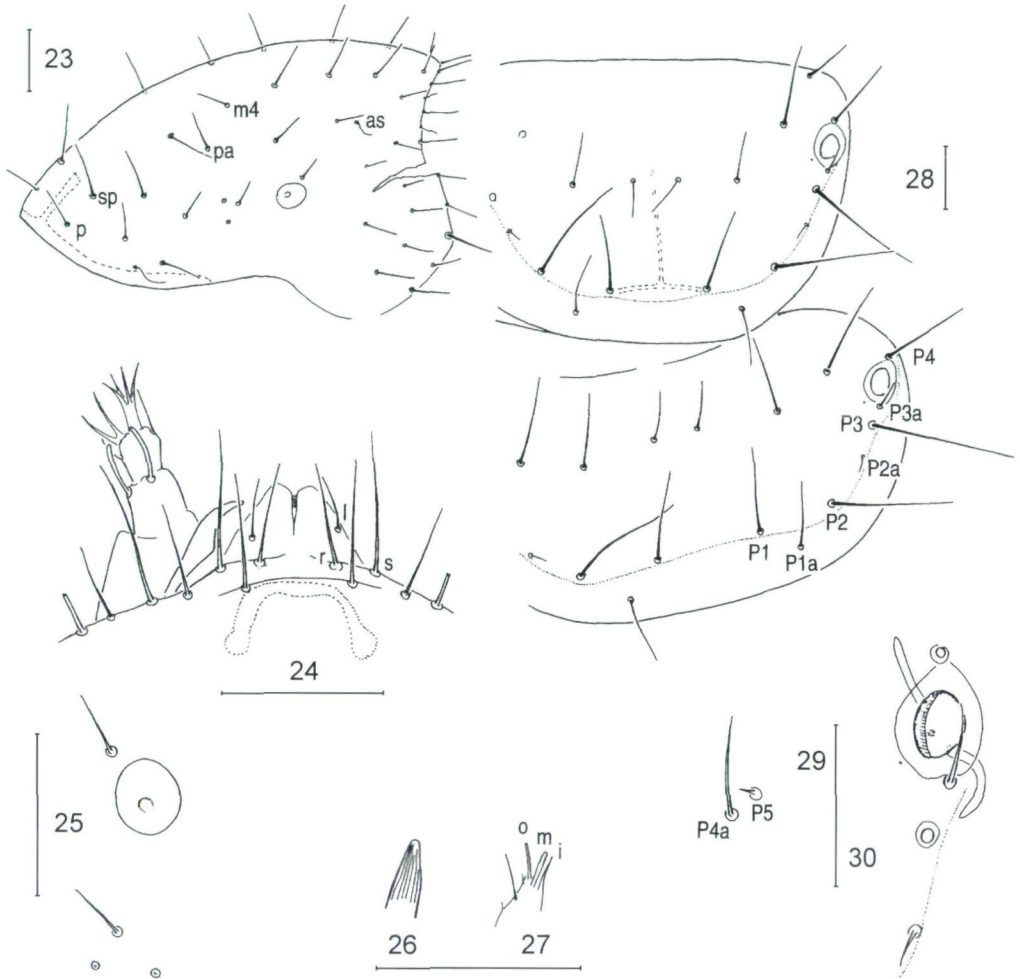
Deposition: In the collection of ISEZ PAN Cracow, except paratypes 3543, 3544, 3547, 3548, 3551, 3570 and 3571 at NHM Vienna.

Diagnosis: *Eosentomon cetium* sp.n. belongs to the species of the "transitorium" group with four setae on the urosternites IX and X, with a spine-like basal seta on leg III, and with seta *P1a* on urotergite VII in posterior position. It shares these characters with *E. longisquamum* SZEPTYCKI, 1986, *parvum* SZEPTYCKI, 1986, *semiarmatum* DENIS, 1927 and *sylvaticum* SZEPTYCKI, 1986 (SZEPTYCKI 1986). Among them, the new species is most similar to *E. longisquamum*. It differs from the latter in larger body dimensions and much longer setae (foretarsus length in *longisquamum* <91 µm, in *cetium* >103 µm; length of mesonotal setae *P1*, *P1a* and *P2* in *longisquamum* <15, 15 and 23 µm, in *cetium* >26, 20 and 38 µm) and in the shape of squama genitalis ♀. In *longisquamum* the "head" of squama is not as elongated as in *cetium* and the "beak" is always distinct (mostly invisible in *E.cetium*).

Description (Figs. 23-44): Head setae of medium length, slightly differentiated, subposterior seta 1.4-2.1 times longer than posterior. Posterior additional seta, seta *m4*, and sensillum *as* present, anterior additional seta absent. Pseudoculus small, with distinct "circle" inside. PR 12-14 (in maturi juniores 14-16). Clypeal apodeme strong, rostral seta simple, subequal to subrostral. Labrum with deep, narrow notch. Labral seta present. Mandibles with rounded tip (teeth invisible). Digits of galea well-developed, median much thicker than inner one, median and inner digits shorter than outer one. Sensilla of maxillary palp equal, slender.

Setae on nota strongly diversified, *P1a* situated posteriorly to the line *P1-P2*. *P2* 1.3-1.6 times longer than *P1*. Length ratio of *P1* : *P1a* : *P2* on mesonotum is 1.2-1.5 : 1 : 1.7-2.0. *P2a* shorter than *P3a*. *P3a* of normal shape. Base of *P4a* remote from *P5*. Tracheal camerae long, slender, parallel-sided.

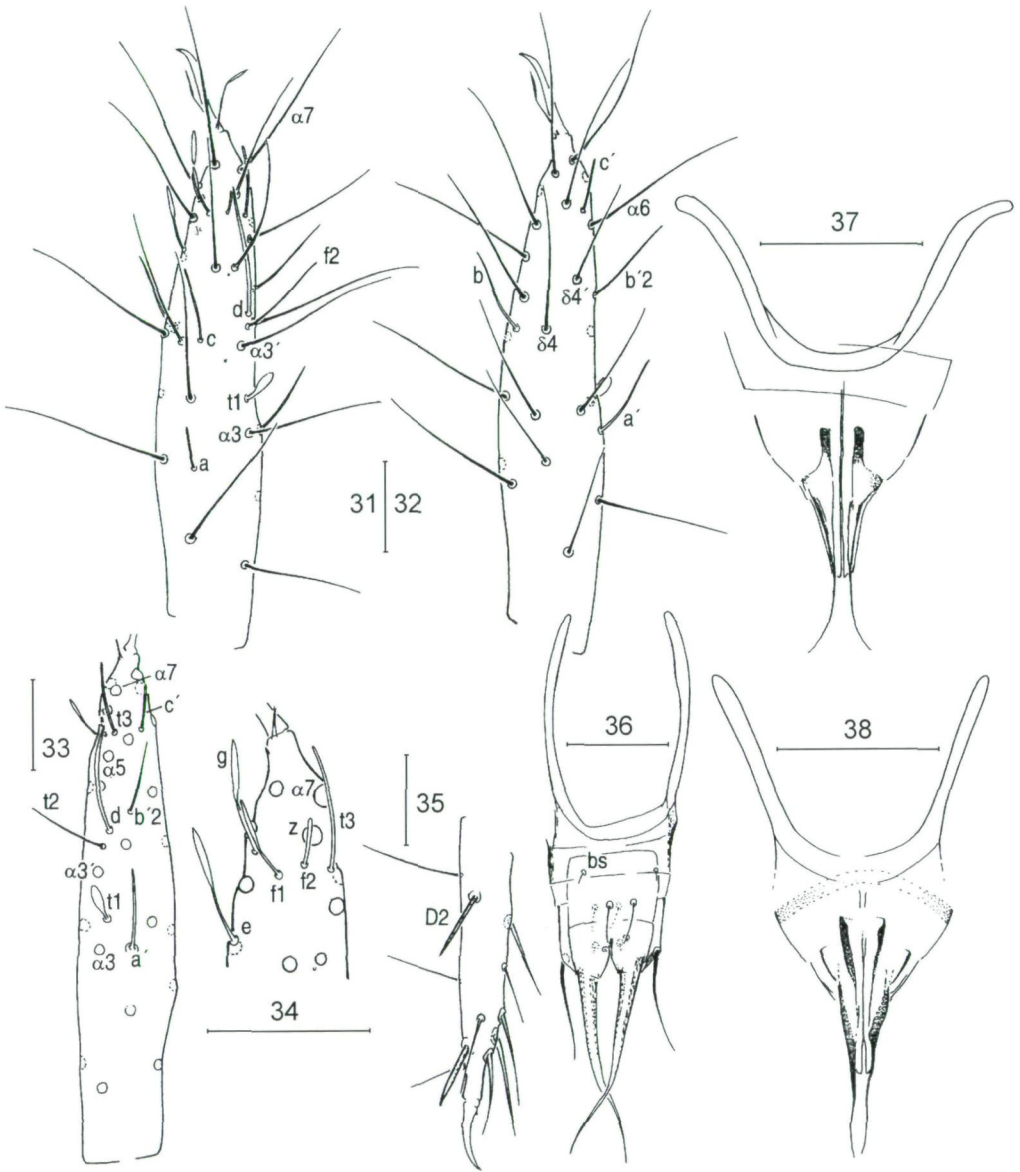
Foretarsal sensillum *a* about half the length of *c*; *c* long, reaching base of β ; *b* subequal to *a*; *d* very long, passing base of *z*; *e* and *g* equal, with spatulate dilation shorter than half the sensillum length; *f1* spatulate, long, about 3/4 the length of sensillum *e*; *t1* situated closer to α 3 than to α 3'; *t3* long, distinctly passing base of α 7; *a'* of medium length, reaching base of α 3', subequal to *t2*, situated nearly on level of α 3; *t2* and *b*'2 subequal, filiform; *b*'1 absent; *c'* distally to level of α 6, thin and short, about 2/3 the length of *t3*. Seta δ '4 distally to level of δ 4. BS 0.8-1.0, TR 5.5-6.0 (in maturi juniores 6.1-6.3), EU 0.7-0.8. Empodial appendage of leg II and III short, basal seta of leg III spine-like.



Figs. 23 - 30: *Eosentomon cetium* sp.n.: (23) head, nr 3553: as = anterior sensillum, pa = posterior additional seta, sp = subposterior seta, p = posterior seta, (24) anterior part of the head, dorsal view, holotype: r = rostral seta, s = subrostral seta, l = labral seta, (25) pseudoculus, nr 3553, (26) mandible, holotype, (27) galea, nr 3551: o, m, i = outer, median and inner digit, (28) meso- and metanotum, holotype, (29) seta *P4a* and *P5* on metanotum, nr 3556, (30) tracheal camerae II, holotype. Scale bars: 20 μ m.

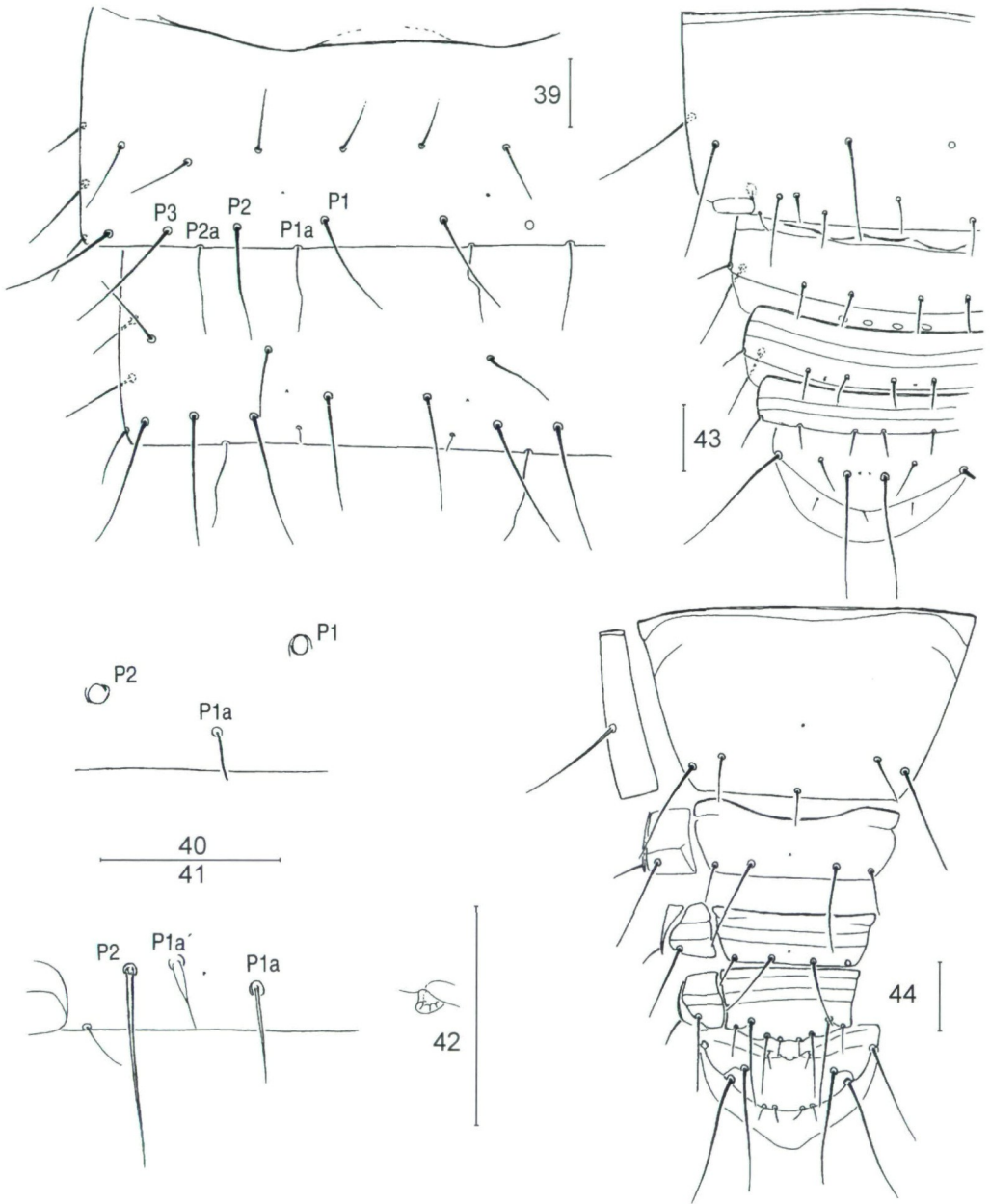
Chaetotaxy formula of abdomen:

I	II-III	IV-VI	VII	VIII	IX-X	XI	XII
4	10	10	6	6			
---	---	---	---	---	8	8	9
12	14	16	16	9			
4	6	6	6	0			
---	---	---	---	---	4	8	12
4	4	10	10	7			



Figs. 31 - 38: *Eosentomon cetium* sp.n.: (31) foretarsus, exterior view, nr 3553, (32) foretarsus, interior view, nr 3553, (33) foretarsus, dorsal view, holotype, (34) distal part of foretarsus, exterior view, nr 3553, (35) leg III, holotype, (36) penis, nr 3556: bs = basiperiphallar seta, (37) squama genitalis ♀, holotype, (38) squama genitalis ♀, nr 3570. Scale bars: 20 µm.

Chaetotaxy formula of urotergite I: 3, 1, 2. Seta *P4a* on urotergites II and III, and *A1* and *A4* on VII absent. Seta *P1a* on urotergites I-VI shorter than seta *P2*, on urotergite VII short, situated posteriorly to level of *P2*, extending slightly beyond hind margin of tergite. Seta *P2a* on urotergites II-VI shorter than *P2*, situated in half of distance *P2-P4*, on



Figs. 39 - 44: *Eosentomon cetium* sp.n.: (39) urotergites VI and VII, holotype, (40) seta *P1a* on urotergite VII, holotype, (41) seta *P1a'* on urotergite VIII, holotype, (42) laterostigma IV, holotype, (43) urotergites VIII-XII, holotype, (44) urosternites VIII-XII, holotype. Scale bars: 20 μ m.

urotergite VII as on preceding tergites. Seta *P4a* on urotergites IV-VII setiform. Seta *P1a'* on urotergite VIII with distinct basal dilation, situated on level with *P2*. Dorsal setae on urotergite XI longer than $2/3$ the length of setae on urotergite X, thick. Seta *I* on uro-

sternite X about two times longer than seta 2. Antecostae thin, with indistinct central lobe. Laterostigma II-IV small, with distinct inner structure. Lateral sclerotisation of urosternite VIII distinct, with hind margin not connected with antecosta. Dorsal lobe of telson with two central pores.

Squama genitalis ♀ long, with strongly elongated head and very thin, mostly invisible beak. Penis with very short basiperiphallar setae.

Dimensions of the imago in µm (in brackets: maturi juniores): Head 126-152 (117-135), pseudoculus 10-12 (8-9), subposterior head seta 22-25 (16-21), posterior head seta 12-16 (11-13), mesonotal seta *P1* 26-33 (19-23), *P1a* 20-25 (15-19), *P2* 38-45 (30-32), foretarsus 103-116 (95-102), claw about 19 (15-16), empodial appendage 15-16 (11-12), maximum body length of expanded specimen about 1400 (1100).

Chaetal variability: Asymmetrical lack of seta *P1* on urotergite IV (1 of 15 imagines). Asymmetrical lack of seta *A3* on urotergite II (1 of 5 maturi juniores).

Derivatio nominis: "Mons cetius" was the Roman name of the hilly woodland on the northeast spur of the Alps, today known as "Wienerwald" (Vienna Woods).

Acknowledgements

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