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ON *LITHOBIUS SUBTILIS* LATZEL 1880, A LITTLE-KNOWN EUROPEAN SPECIES OF LITHOBIIDAE

(CHILOPODA : LITHOBIOMORPHA)

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ABSTRACT

Lithobius subtilis Latzel is recorded from a number of localities in the Netherlands and Switzerland and is fully described; *Lithobius silvaenigrae* Verhoeff, 1935, is proposed as a junior synonym.

INTRODUCTION

Since its original description by Latzel in 1880 *Lithobius subtilis* has received very little attention from European authors. Dalla Torre's (1888) inclusion of the species in his list of the centipedes of Tirol depends on Latzel's original record. Verhoeff (1925a: 637) and Attems (1949: 116) both recorded *L. subtilis* from further Alpine localities but neither of these records is accompanied by a redescription. Attems (1927) placed *subtilis* in the genus *Alokobius* without comment and, although it appears in

Verhoeff's (1936, 1937) keys to European species, these keys make use only of the characters given by Latzel. The only redescription of *L. subtilis* in the literature seems to be that of Mouralévitch (1929), based on two males and a female from the Caucasus. A more recent description of the species by Zaleskaya (1978) in her monograph of the Lithobiidae of the U.S.S.R. appears to be based on a combination of Latzel's and Mouralévitch's accounts.

A total of 42 specimens of *L. subtilis* from two localities in the Netherlands and four localities in Switzerland has recently been

examined and affords a good opportunity of giving a detailed redescription of this little-known but probably quite widespread European species.

Lithobius subtilis Latzel
(Figs. 1 to 6)

Lithobius subtilis Latzel, 1880: 91.
Alokobius subtilis: Attems, 1927: 245.
Lithobius subtilis: Mouralévitch, 1929: 48.
Lithobius silvaenigrae Verhoeff, 1935: 186, figs. 2 & 3. Syn. nov.
? *Lithobius vindelicus* Verhoeff, 1935: 188, fig. 10.
? *Lithobius lapidicola*: Jeekel, 1964: 135 (non Meinert, 1872).

Material examined.-

Twenty-eight specimens from the Netherlands collected by Dr. C.A.W. Jeekel: 7 ♂♂ (including a 3rd and a 4th post-larval stadium) and 2 ♀♀ from Aerdenhout, 19.XI.1946; 11 ♂♂ and 8 ♀♀ (including one 3rd and two 4th post-larval stadium) from Bloemendaal, 18.III.1956.

Fourteen specimens from Switzerland collected by Dr. Hans Jungen and his students in 1975: 1 ♂ and 3 ♀♀ from Besserstein, Villigen; 1 ♂ and 3 ♀♀ (one a 4th post-larval stadium) from Ramsflue, nr. Erlinsbach; 1 ♂ and 3 ♀♀ from Küttigen, nr. Aarau; 2 ♂♂ (one a 4th post-larval stadium) from Homberg, nr. Aarau.

Description of adults.-

Colour: pale brown.

Size: 7.5 to 11.5 mm long and 1.15 to 1.50 mm broad at T. 10.

Head: smooth; 1.0 to 1.3 mm broad, broader than long and usually broader than T. 3 but narrower than T. 5; projection of lateral marginal interruptions distinct; posterior border straight or very slightly emarginate.

Antennae: a third to two-fifths of body-length; of 32 to 44 (usually 36 to 40) articles, about as broad as long or slightly transverse, the last article only slightly longer than penultimate.

Ocelli: 9 to 16, frequently 1 + 4, 4, 3, 1; posterior ocellus larger than posterosuperior; main mass compact with superior row straight or slightly curved (Fig. 1).

Organ of Tömösváry: about the size of a small ocellus.

Prosternum: with 2 + 2 teeth, the line of their apices straight or very slightly recurved; porodont stouter than a seta at base but very slender for most of its length, arising from a large alveolus usually well-separated from the lateral tooth and often set on a prominent node; no shoulder lateral to porodont (Fig. 2).

Tergites: almost smooth; T. 1 narrower than T. 3, somewhat rectangular with posterior border straight; posterior borders of T. 3 and 5 straight or very slightly emarginate, those of T. 8 and 10 slightly emarginate, those of T. 12 and 14 moderately emarginate; posterior angles of T. 8 and 10 rounded or blunt, those of T. 12 and 14 rounded, blunt or slightly angulated; the posterior angles of T. 9, 11 and 13 show considerable variation; in some of the larger specimens the posterior projections on T. 9 are small but distinct and those on T. 11 and 13 are well-developed, but in most specimens the projections on T. 9 are feeble or absent, those on T. 11 small or feeble and only those on T. 13 distinct.

Intermediate tergite: posterior border moderately emarginate in females, strongly so in males, and frequently lobed at either angle in both sexes, without lateral concentrations of setae.

Coxal pores: in females 3, 3, 3, 3 to 3, 4, 4, 4, frequently 3, 4, 4, 3; in males 2, 3, 3, 2 to 3, 4, 4, 3, frequently 3, 3, 3, 3; small, circular, separated from one another by more than their own diameter.

Tarsal articulations of anterior legs: distinct.

13th leg: not swollen; in males the tibia usually has a feeble dorsal sulcus on its distal half.

14th leg: femur and tibia sometimes slightly swollen in both sexes; in males the tibia has a dorsal sulcus on its distal half to two-thirds (Fig. 3), sometimes very feeble amounting to little more than an area of flattening.

15th leg: about a third of body length; femur and tibia sometimes slightly swollen in both sexes; accessory apical claw well-developed; in males the tibia has a shallow, oblong, dorsal subdistal

pit whose long-axis extends along a seventh (in small specimens) to almost a third (in large specimens) of its length, the medial rim of the pit, which may be associated with a very feeble medial swelling, usually beset with a group of four to seven setae (Fig. 4); the pit is variable in shape, sometimes forming only a faint dimple, sometimes very narrow in the form of a short longitudinal sulcus, and sometimes double, one dimple lying immediately proximal to the other; but all adult males examined show some trace of this pit in one form or another.

Female gonopod: with two stout conical equal or subequal spurs and a claw with well-developed medial and lateral denticles (Fig. 5); four or five dorsolateral setae in a line on the second article, the proximal two or three short and slender, the distal two longer and relatively stout, rather stouter than the general setae; a group of four to six small dorsomedial setae on the first article immediately proximal to the insertions of the spurs (Fig. 6).

Male genitalia: first genital sternite with about 20 setae on either side; second genital sternite without setae; gonopod sometimes of two articles each with two setae but in most males which seem otherwise to be fully mature it is of a single article with two setae.

Spinulation: see Table I.

Description of juveniles.-

The following description is based on two males and three females corresponding to the fourth post-larval stadium of *Lithobius variegatus* Leach, 1814 (see Eason, 1964).

Size: 7.0 to 8.5 mm long and about 1.1 mm broad at T. 10. Head: 0.90 to 0.95 mm broad. Antennae: of 34 to 39 articles. Ocelli: 9 to 12; posterior ocellus little larger or sometimes smaller than posterosuperior. Coxal pores: 2, 3, 3, 3 or 2, 3, 3, 2. Male secondary sexual characters: either absent or a feeble dorsal sulcus on 14th tibia. Male genitalia: first genital sternite with about ten setae on either side; gonopod vestigial. Female gonopod: spurs slightly or markedly unequal; claw as in adult. Spinulation of last four pairs of legs: 15 DaC may be absent, otherwise as in adult.

The following description is based on a male and a female corresponding to the third post-larval stadium of *L. variegatus*.

Size: 6 mm long and 0.85 mm broad at T. 10. Head: 0.75 mm broad. Antennae: of 29 to 33 articles. Ocelli: 8. Coxal pores: 2, 2, 2, 2. Male secondary sexual characters: absent. Male genitalia: first genital sternite with three setae on either side; gonopod undeveloped. Female gonopod: with a well-developed lateral spur, a minute medial spur and a small tridentate

Table I

	Ventral					Dorsal				
	C	t	P	F	T	C	t	P	F	T
1	-	-	(p)	(am)	m	-	-	p	a	a
2	-	-	(p)	(am)	(a)m	-	-	(m)p	ap	a
3	-	-	(mp)	(a)m	(a)m	-	-	(m)p	ap	a(p)
4-5	-	-	(mp)	am	(a)m	-	-	(m)p	ap	a(p)
6	-	-	m(p)	am	am	-	-	(am)p	ap	ap
7-9	-	-	m(p)	am	am	-	-	(a)mp	ap	ap
10-11	-	-	(a)m(p)	am(p)	am	-	-	(a)mp	ap	ap
12	-	(m)	(a)m(p)	amp	am	(a)	-	amp	(a)p	ap
13	-	m	amp	amp	am	(a)	-	amp	p	p
14	-	m	amp	amp	(a)m	(a)	-	(a)mp	p	p
15	-	m	amp	(a)m	-	a	-	mp	(p)	-

Letters in brackets indicate the usual variable spines. In addition to these variations 15 VpF, 15 VmT, 15 DaP, 1 DpF and 13 DaT may occasionally be present; and 13 Vmt, 6 and 7 VaT, 13 VaT, 1 VmT, 1 DpP, 1 DaF, 14 DpF, 12 DaT and 14 DpT may occasionally be absent.

claw. Spinulation of last four pairs of legs: 15 DaC absent in female, otherwise as in adult.

Remarks.-

Latzel's original description of *Lithobius subtilis* was based on three males and a female from Tirol, all only 8 mm long without posterior projections on T. 9 and with the projections on T. 11 and 13 small enough for him to place the species in the species-group *Archilithobius* Stuxberg. Although Stuxberg's (1875) system has long been out of use, this original classification has led to the assumption that *L. subtilis* is always without marked posterior projections on any of the tergites. Those examples with conspicuous projections on T. 9 do not, therefore, run to *L. subtilis* in either of Verhoeff's (1936, 1937) keys and the females, and also the males if the rather obscure secondary sexual characters are overlooked, are likely to be mistaken for *Lithobius melanops* Newport, 1845. On the other hand examples without projections on T. 9 are likely to be determined either as *Lithobius lapidicola* Meinert, 1872, whose identity has until recently been uncertain (Eason, 1974), or as *Lithobius lusitanus valesiacus* Verhoeff, 1935, which is sometimes difficult to separate from *L. lapidicola*. The former seems to be so in the case if the two females described by Jeekel (1964) from north-west Germany: although Jeekel named these two specimens "*L. lapidicola*" he remarked on the uncertainty of this determination owing to the absence of males. The two females from Munich which are among the specimens in the Koch Collection in the British Museum (Natural History) which were labelled "*Lithobius mutabilis*" by L. Koch and identified as "*L. lapidicola* Meinert (*sensu* Jeekel 1964, *non* Latzel 1880)" by the author (Eason, 1972: 134) certainly belong to *L. subtilis*: they may be distinguished from *L. lapidicola* and *L. lusitanus valesiacus* by the presence of the spine VaT on most of the legs and the relatively stout and well-differentiated dorsolateral setae confined to the second article of the gonopod, which contrast with the total absence of VaT and the slender dorsolateral setae found on the second and third articles of the gonopods of both *L. lapidicola* (see Eason, 1980) and *L. lusitanus valesiacus* (Eason & Schatzmann, unpublished).

Verhoeff, in a series of papers, described and redescribed a number of closely related forms which are difficult to separate from *L. subtilis*. In his account of the species of the "*borealis-acuminatus* group" (Verhoeff, 1925b), all of which are without projections on T. 9, he described a new species, *Lithobius salicis* from northern Italy, with a dorsal subdistal pit on the male 15th tibia: although he made no mention of any sulci on the 13th or 14th tibiae of the males of *L. salicis* these features may be inconspicuous or even absent in *L. subtilis* and the only characters separating *salicis* as originally described from some of the present specimens of *subtilis* are the smaller number of antennal articles (26 to 31) and the absence of the spine 15 DaC: the former just overlaps the range given for the number of these articles in *subtilis* by Mouralévitch (31 to 33), and specimens without 15 DaC would be included in Latzel's original description of the species. In the same paper Verhoeff (1925b) described another form, under *Lithobius acuminatus* Brölemann, also from northern Italy and even closer to *L. subtilis*, with a shallow dorsal sulcus on the male 15th tibia, 37 to 44 antennal articles and both 14 and 15 DaC present. However, in a lateral paper (Verhoeff, 1935) he mentioned that the "*acuminatus* forms" from south of the Alps (among which he presumably included *L. salicis*) are without the marked emargination of the posterior border of the male intermediate tergite, and without the stout dorsolateral setae on the female gonopod, both of which are found in *L. subtilis*. And in his 1937 key Verhoeff mentioned another feature of *L. salicis* not found in the present specimens of *subtilis*, namely the absence of the spine VmP from the first eight pairs of legs. There is considerable doubt, therefore, as to whether *L. salicis* Verhoeff and *L. acuminatus* (*sensu* Verhoeff) are conspecific with *L. subtilis*. *L. acuminatus* (*sensu* Verhoeff) cannot, incidentally, be the same as *Lithobius acuminatus* Brölemann, 1892, which has coxolateral spines (VaC) on the 15th legs (Brölemann, 1892).

In the second paper quoted above (Verhoeff, 1935), which is an account of the centipedes of the Black Forest and Swiss Jura, Verhoeff described a single male 11.5 mm long with small posterior projections on T. 9 (Verhoeff, 1935:

fig. 2) and a weak dorsal sulcus on the 14th as well as a more distinct sulcus on the 15th tibia which he placed in a new species, *Lithobius silvaenigrae*. This specimen is almost certainly a large male of *L. subtilis* in which the pit on the 15th tibia is relatively extensive, appearing as a longitudinal sulcus. Although Verhoeff (1935), in his original description of *L. silvaenigrae*, gave the species a simple apical claw on the 15th leg, he placed it among those species with a 15th accessory apical claw in his 1937 key and it is reasonable to assume that he intended the key to correct an earlier mistake.

In his 1935 paper Verhoeff described another new species, *Lithobius vindelicus*, based on a number of specimens from 9 to 11 mm long with a fine dorsal sulcus on the male 15th tibia and resembling in other respects those present specimens of *L. subtilis* in which the projections on T. 9 and the dorsal sulci on the male 13th and 14th tibiae are absent or so weak as to be overlooked. Although he made no special mention of the 15th accessory apical claw in his original description of *L. vindelicus*, in stressing its similarity to the species of the "*acuminatus* group" and to another form, *Lithobius pelidnus alemannicus* Verhoeff, 1935, in all of which this claw is present, Verhoeff (1935) implied that the claw is also present in *vindelicus*. In his 1937 key Verhoeff placed *L. vindelicus* among those species with a 15th accessory apical claw and, making no mention of a sulcus or pit, described a dorsal subdistal group of setae on the male 15th tibia such as is frequently found in *L. subtilis*. But in a subsequent paper (Verhoeff, 1939) he denied the presence of this group of setae in *L. vindelicus* and questioned its identity, suggesting that it might be a race of *Lithobius nigrifrons* Latzel & Haase, 1880, differing from the typical form of this species in being without posterior projections on T. 9 and 11. *L. nigrifrons* (= *tenebrosus* Meinert, 1872) is without the 15th accessory apical claw so that this final suggestion of Verhoeff's is puzzling.

In order to understand Verhoeff's descriptions of *L. silvaenigrae* and *L. vindelicus* it is necessary to assemble together several fragmentary accounts, some of them contradictory. However, the former is regarded here as a synonym of *L. subtilis* whereas the identity of

the latter, owing to Verhoeff's associating it with *L. nigrifrons*, is regarded as uncertain.

With Verhoeff's record of *L. silvaenigrae* from Switzerland together with the Swiss and Dutch localities attaching to the present specimens, and the specimens of "*L. lapidicola*" from Munich in addition to the established Alpine records, *L. subtilis* seems to be a wide-spread European species which has been overlooked. Its occurrence as far east as the Caucasus is not surprising because a fair proportion of Western European species of Lithobiidae has been recorded from this region (Zalesskaya, 1978).

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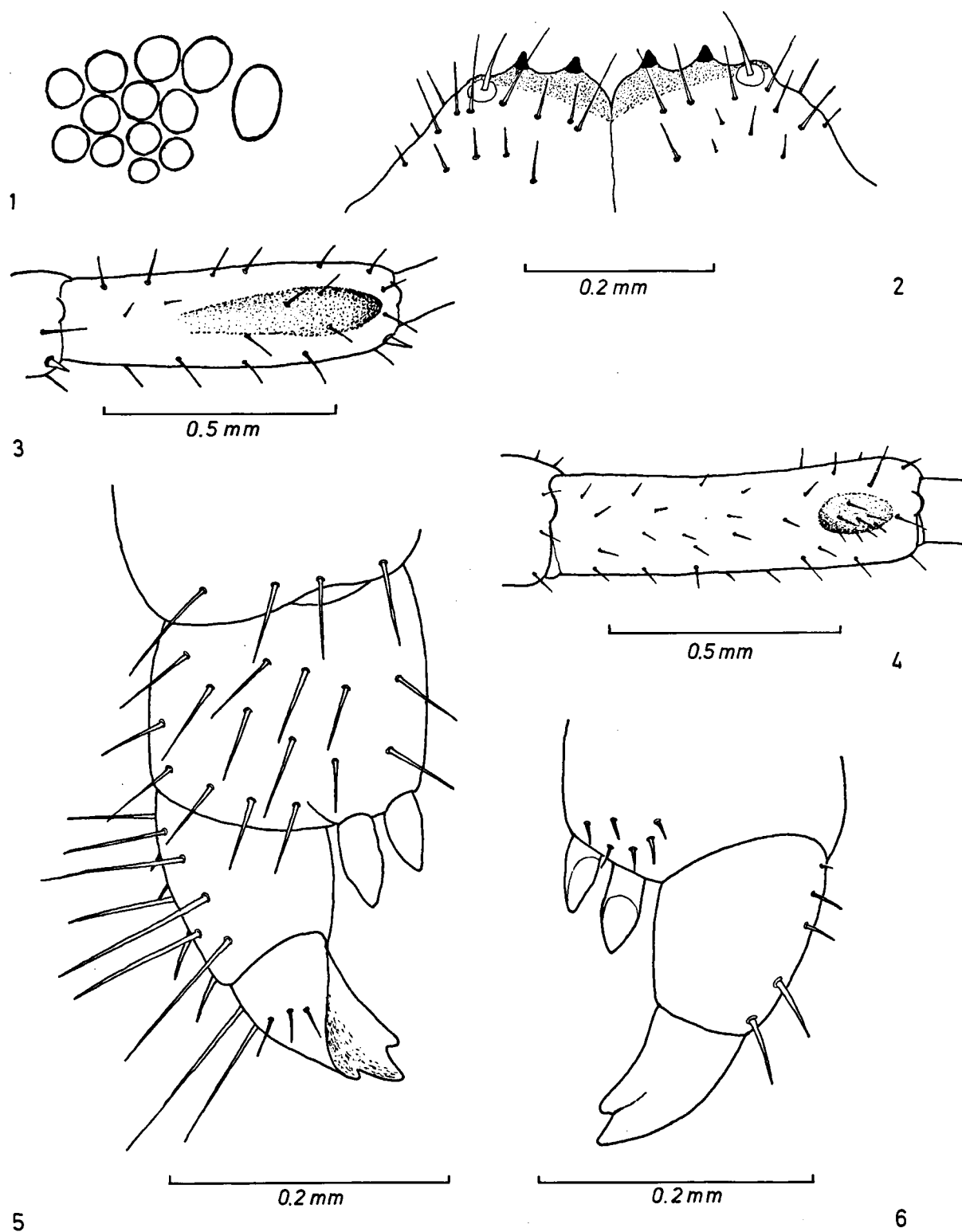
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Figs. 1-6. *Lithobius subtilis* Latzel, 1880.- 1: ocelli; 2: dental margin of prosternum, ventral; 3: right 14th tibia of ♂, dorsal; 4: right 15th tibia of ♂, dorsal; 5: right gonopod of ♀, ventral; 6: right gonopod of ♀, dorsal.