Sabatieria lawsi sp. nov.

(Figs 4–6)

MATERIAL STUDIED. Holotype: ♂1 BM(NH) 1982.6.38. Allotype: ♀1 BM(NH) 1982.6.44. Paratypes: five males BM(NH) 1982.6.39–43; five females BM(NH) 1982.6.44–48; nineteen juveniles BM(NH) 1982.6.49–68.

LOCALITY. See *S. kelletti.*

MEASUREMENTS (Tables 2 and 3)

Holotype ♂: $\dfrac{-\quad 233\quad \mathrm{M}\quad 2250}{16\quad 57\quad 71\quad 46}$ 2400 μm; a = 34; b = 10·3; c = 16·2; S = 73 μm

Allotype ♀: $\dfrac{-\quad 233\quad 1180\quad 2395}{15\quad 52\quad 83\quad 50}$ 2595 μm; a = 31; b = 11·1; c = 12·9; V = 45%

DESCRIPTION. The anterior region gradually narrows from the end of the oesophagus to the head: h.d. 26–35% of the posterior oesophagus c.d. The anterior end is typically bent dorsally in formalin-fixed specimens (Fig. 4c).. Cuticle punctated. Lateral differentiation of larger, more irregularly arranged dots begins immediately posterior to the amphids and is especially conspicuous in the oesophageal and caudal regions. In the middle region of the body the lateral dots are not so markedly larger than the medial ones but they are still more irregularly arranged (Fig. 6c). The decrease in the size of the lateral dots posterior to the oesophagus region occurs gradually. In the anterior oesophagus, the dots appear somewhat stellate when the microscope is focused at the surface (Fig. 6b). The dots are also conspicuously large ventrally in the oesophagus region (Fig. 4b, c). Short but stout somatic setae are located at the edges of the lateral field, relatively more numerous in the oesophagus and tail regions where there are also some subdorsal and subventral somatic setae: no regular repeated or distinctive patterns could be made out in the distribution of somatic sensilla. R1 sensilla papilliform but conspicuous. R2 sensilla very short but setiform, about 1·5 µm (Fig. 6a). R3 sensilla 32–44% h.d.: similar relative length in juveniles. Amphids in adults describe almost 3 turns (Fig. 6a); similar in size in both sexes, 48–66% c.d. Buccal cavity cup-shaped anteriorly, posterior part tubular and tri-radiate (Fig. 4i) but not expanded. Oesophagus widens posteriorly: marginal tubes at the ends of the radii can be seen in optical cross-section (Fig. 4j). Nerve ring at 50–54% of oesophagus length. Excretory pore at 53–66% of oesophagus length. Tail conico-cylindrical with the cylindrical part about 33% of the total which shows little variation (Fig. 5): 3·1–3·8 a.b.d. in males, 3·8–4·6 a.b.d. in females. There appear to be separate subterminal openings to the caudal glands at the tail tip (Fig. 6f, g).

Spicules equal, curved, relatively long and slender with a proximal median partition extending up to a third of the total spicule length (Fig. 4f): 1·6–1·7 a.b.d. (chord). Gubernaculum apophyses long, straight and dorso-caudally directed. Ventral view of cloacal opening shows it to be a double-bowed transverse slit (Fig. 4g). Ventral precloacal spine about 1·5 µm (Fig. 6h). 17 inconspicuous tubular precloacal supplements extending 355–385 µm from cloaca (β) or 15–17% of total body length. The posterior 4 or 5 supplements are situated closer together than the remainder. Two opposed testes; anterior to left, posterior to right of gut.

Ovaries opposed, outstretched. Vulva conspicuous; V = 45–49%. Eggs round. Receptaculum seminis of mature females contain large hollow sperm (Fig. 6d, e).

DIFFERENTIAL DIAGNOSIS. *Sabatieria lawsi* sp. nov. belongs to the *celtica*-group of species in terms of general body shape, cuticle punctation pattern, R3 sensilla length, amphid form and size, number of precloacal supplements and general tail shape. In several respects, the new species appears to be similar to *S. heterura* (Cobb, 1898), a species originally found in Australia and subsequently redescribed by Wieser (1954) on specimens from Chile. However, the species may be distinguished most easily by the detailed structure of the spicules and gubernaculum.

ETYMOLOGY. The species is named after Dr R. M. Laws, Director of the British Antarctic Survey.

REMARKS. *Sabatieria lawsi* would appear to be the more common of the sympatric *Sabatieria* species: they could be readily distinguished even in the juvenile stages by the markedly different shape of the oesophagus region.

The hollow sperm in the females were similar to those previously reported from *Sabatieria* by Riemann (1983).

Table 2 Measurements of adult *Sabatieria lawsi* (μm)

Character	Holotype	All males No.	Mean	Range	CV%	Allotype	All females No.	Mean	Range	CV%
Total body length	2400	6	2250	2060–2400	6	2595	6	2295	1940–2595	12
Demanian ratio a	34	6	34	32–35	4	31	6	31	26–34	8
Demanian ratio b	10·3	6	10·0	8·8–10·6	7	11·1	6	9·8	8·4–11·1	12
Demanian ratio c	16·2	6	14·5	12·0–16·2	11	12·9	6	12·3	11·7–13·3	6
R3 sensilla length	6	6	6	6–7	10	7	6	6	5–7	10
Head diameter	16	6	15	14–16	4	15	5	16	15–18	6
Amphid diameter	11	6	10	9–11	7	10	6	10	8–10	12
Amphid c.d.	16	6	18	16–19	5	19	6	17	16–19	6
Oesophagus length	233	6	225	201–235	6	233	6	236	226–243	3
Oesophagus c.d.	57	4	56	54–57	3	52	6	55	47–62	9
Maximum body diameter	71	6	67	61–74	7	83	6	76	57–95	17
Spicule length (chord)	73	6	73	70–75	—	—	—	—	—	—
a.b.d.	46	6	44	43–46	2	50	6	45	39–50	10
Vulva to anterior	—	—	—	—	—	1180	6	1065	950–1180	9
Cloaca to anaterior supplement (β)	355	4	363	340–385	5	—	—	—	—	—
Tail length	150	6	155	135–170	9	200	6	185	165–215	10

Table 3 Measurements of juvenile *Sabatieria lawsi* (μm)

Character	Fourth-stage juveniles No.	Mean	Range	CV%	Third-stage juveniles No.	Mean	Range	CV%	Second-stage juveniles No.	Mean	Range	CV%
Total body length	4	1705	1585–1860	7	6	1130	1025–1295	8	9	725	630–850	9
Demanian ratio a	4	31	29–35	8	6	29	26–32	10	9	27	24–30	7
Demanian ratio b	4	8·2	7·9–8·4	3	6	6·8	6·5–7·1	3	9	5·1	4·7–5·8	7
Demanian ratio c	4	11·2	10·5–12·7	9	6	9·7	8·3–10·7	12	9	8·5	7·8–9·3	6
R3 sensilla length	4	5·2	4·4–5·9	12	6	4·8	4·4–5·2	7	8	4·2	3·7–4·8	10
Head diameter	4	13	11–15	12	5	11	9–13	13	7	9	7–11	11
Amphid diameter	4	8	7–8	5	5	7	6–8	10	8	5	4–6	19
Amphid c.d.	4	14	13–16	10	5	13	11–14	11	8	11	9–13	11
Oesophagus length	4	208	192–225	7	6	166	144–187	9	9	142	124–182	12
Maximum body diameter	4	55	53–56	2	6	39	36–41	6	9	27	24–32	9
Tail length	4	155	130–170	11	6	115	100–130	9	9	85	75–105	12

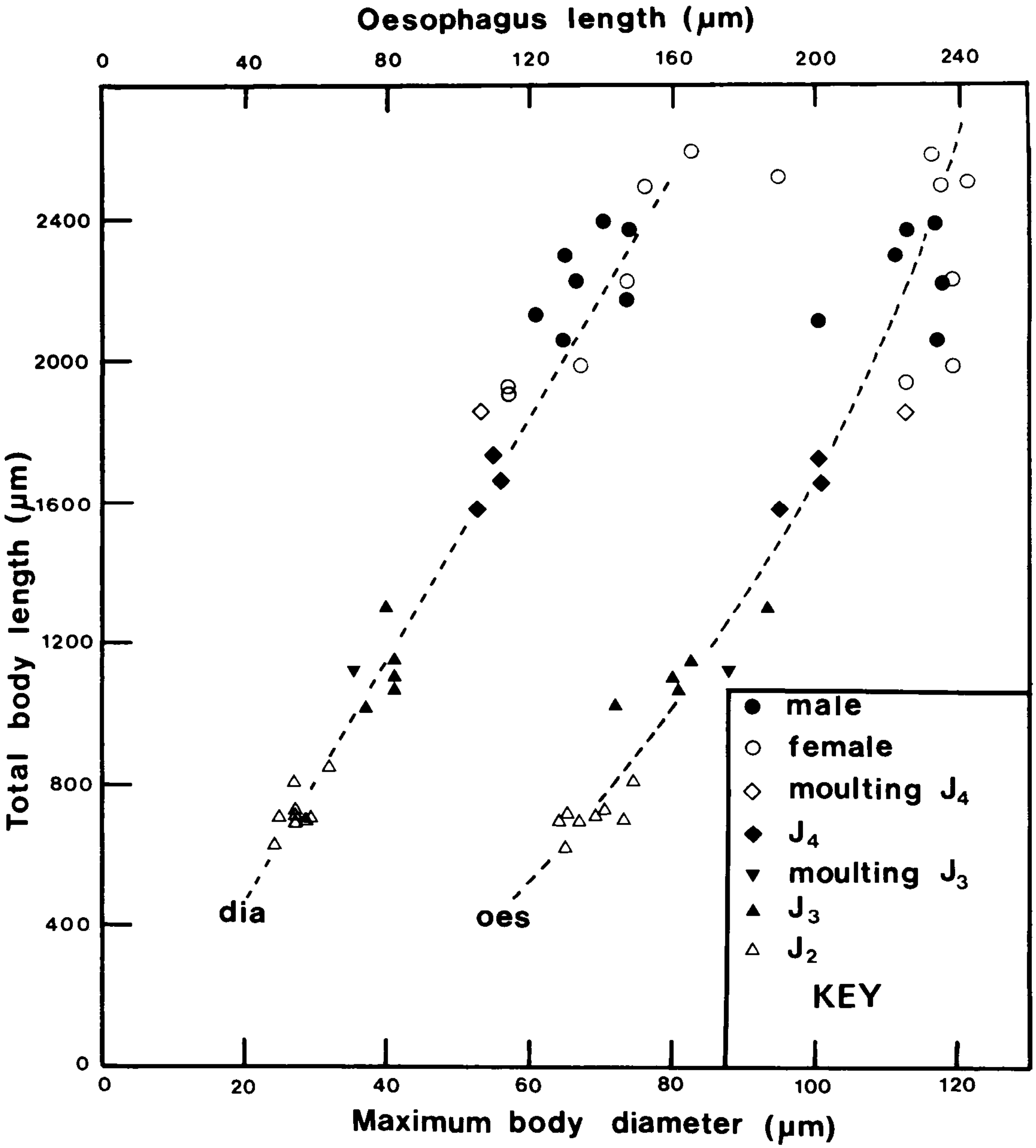

Fig. 7 Relationships between body length and oesophagus length, and body length and maximum body diameter for *S. lawsi*: curves fitted by eye.

Discussion

Although several species of *Sabatieria* have previously been reported from Antarctic waters (as defined in Platt, 1979) only one can be considered valid: *Sabatieria mawsoni* Wieser, 1954 which was originally described from Commonwealth Bay, Adelie Land, as *Parasabatieria antarctica* by Cobb (1930). Cobb provided a small and rather inadequate figure but described it as having six supplements, which clearly separates it from the two species described here. *Sabatieria antarctica* Cobb, 1914, not *Parasabatieria antarctica,* was described from a juvenile and was considered doubtful by Wieser (1954). Allgen's (1929)

S. australis was also described from juveniles and is here considered dubious as are several other species either described, *S. curvispiculum, S. dorylaimopsis* and *S. heterospiculum*: all from South Georgia and unfortunately too poorly described ever to be recognised again with any degree of certainty, or reported from Antarctic waters by Allgen (1953, 1959).

Measurements of *S. lawsi* juveniles and adults suggest that during post-embryonic growth, or more strictly during post-juvenile-stage-4 growth, most of the anatomical features other than those of the reproductive system remain in similar proportion. There is some indication from the 'a' ratio that the worms become slightly thinner relatively (Tables 2 & 3) although a straight line can be fitted to the points of the relationship between body length and width (Fig. 7); that this line does not pass through the origin suggests a curved line might be more appropriate. Geraert (1978*a*, 1979*a*) also concluded that various freeliving soil forms became relatively thinner during post-embryological growth but became thicker again during maturation.

A less equivocal change can be seen in the relative length of the oesophagus, with the 'b' ratio increasing (i.e. the oesophagus becoming relatively shorter) with no overlap in the ranges for the various developmental stages, assuming these have been correctly identified (Tables 2 and 3). Geraert (1978*a*, 1978*b*, 1979*a*) found that for freeliving soil forms there were many different kinds of oesophageal growth patterns: the shape of the curve in Fig. 7 suggests that for *S. lawsi* the oesophagus continues to grow in all stages but progressively slows down, as Geraert found occurred in rhabditids.

In his study of relative tail length, Geraert (1979*b*) concluded that the 'c' ratio was of minor importance and that tail length varied independantly and was taxonomically unimportant. However, the relatively low CV for these measurements in marine nematodes together with low infraspecific variability in shape (Fig. 5) indicates that at least for these comesomatids, characters of the tail are of greater importance than in the soil forms studied by Geraert, possibly because in marine nematodes the tail plays a greater functional role than in soil forms.

A final point of interest to emerge from this study is the general range of infraspecific variation found in these organisms in view of what would appear to be very stable and cold environmental temperatures. The CV for most characters was under 10% (Tables 1–3), similar to but not any less than the range previously reported for *Sabatieria* species from warmer waters (Jensen & Gerlach, 1977; Jensen, 1979*a*, 1979*b*). The maximum body diameter CV can exceed 10%, especially in females (Table 2) but this, as pointed out by Jensen (1979*a*) is influenced by the state of gonad development.

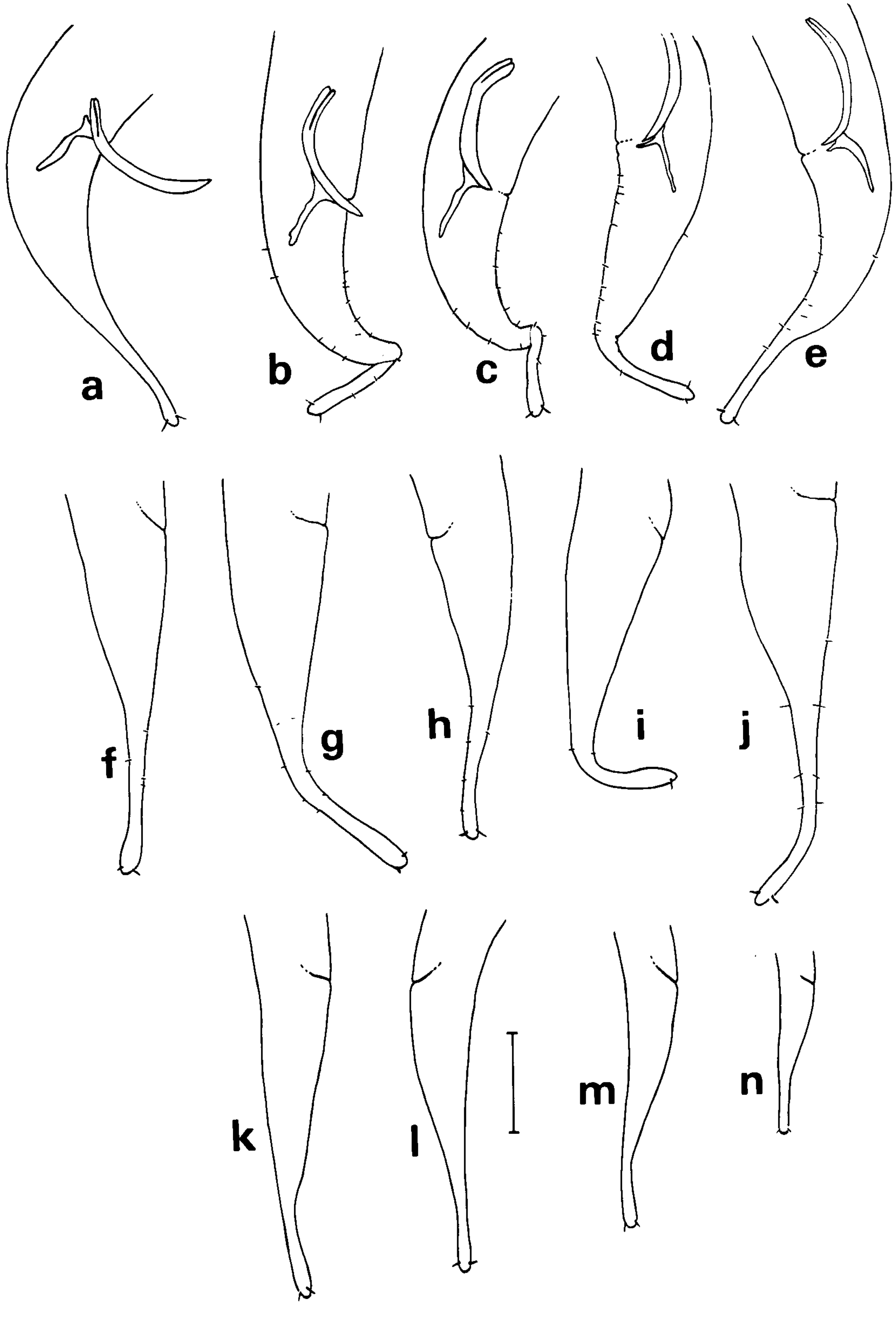

Fig. 5 *Sabatieria lawsi:* (a–e) tails of ♂5, ♂6, ♂4, ♂2 and ♂3, respectively; (f–j) tails of ♀5, ♀1, ♀4, ♀3 and ♀2 respectively; (k–l) tails of fourth-stage J1 and J4; (m) tail of third-stage J7; (n) tail of second-stage J15. Bar scale = 50 μm for all figures.

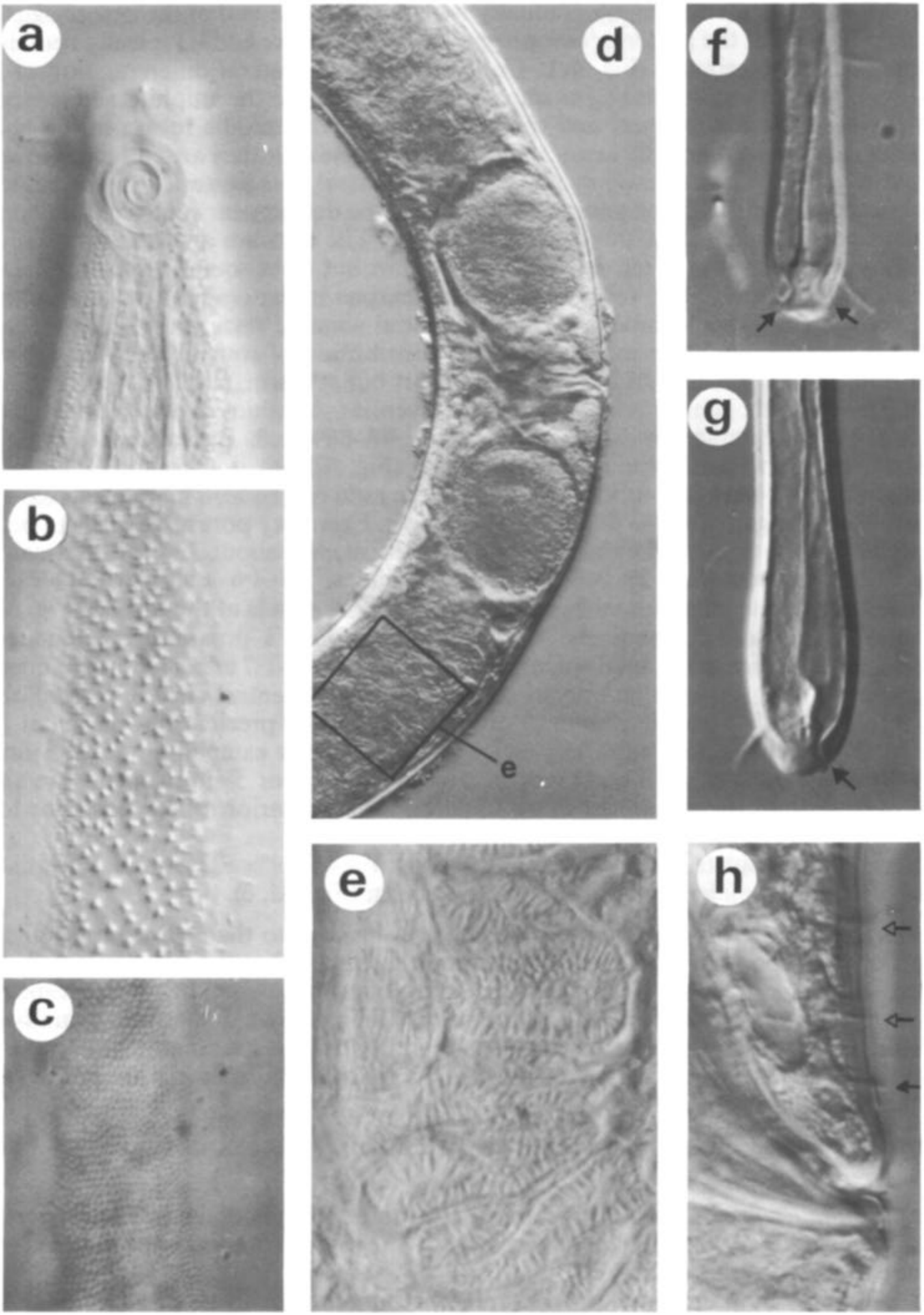

Fig. 6 *Sabatieria lawsi:* (a) anterior region showing amphid, R3 sensilla and lateral R2 sensilla; (b) lateral cuticle punctations in post-amphid region; (c) lateral cuticle pattern mid-body; (d) mid-body region of ♀ showing vulva and two eggs, box labelled e shows position of following figure; (e) large hollow sperm in receptaculum seminis, see Fig. 6d; (f–g) tail tips showing exit pores of caudal glands, arrowed; (h) precloacal region showing spine (solid arrow) and first two supplements (hollow arrows).