

# Chapter 5

## Type and voucher slides of taxa described by W. Foissner in the chapter “Taxonomy of soil ciliates (Ciliophora) from Australia and some other parts of the world”<sup>1</sup>

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In the present chapter, the type and voucher slides of the species and subspecies described in Chapter 4 (Foissner 2021) of the present book are depicted (Fig. 1a–e to Fig. 39a–f). Fortunately, Wilhelm Foissner has already prepared the relevant slides (holotypes, paratype slides, vouchers) for deposition in the museum. As is usual, the slides will be stored in the Upper Austrian Museum in Linz (LI); for details on this acknowledged depository, see Aesch (2008, 2013, 2018a, b).

For some species described by Foissner (2021), the type slides have been deposited already much earlier in Linz, for example, for *Protocyclidium namibiense* Foissner, 2021 because this species was established for the Namibian population of *Protocyclidium terricola* (Kahl, 1931) Foissner et al., 2002 as described by Foissner et al. (2002). The voucher slides of the Namibian population (accession numbers 84–86/2002; see Foissner et al. 2002, p. 42), deposited in Linz since 2002, are now the type slides of *Protocyclidium namibiense* and thus not shown in the present work.

Some slides contain the type specimens of two or more species. For example, in four slides from a sample from *Uluru* (English colonial name: Ayers Rock), four new species are contained, namely *Protocyclidium bimacronucleatum* Foissner, 2021 and its parasite *Microsporidium protocyclicola* Foissner, 2021, *Urosomoida uluruensis* Foissner, 2021, and *Hausmanniella uluruensis* (this species was not yet described by W. Foissner and thus this name is disclaimed for nomenclatural purposes, ICZN 1999, Article 8.3; Fig. 24a–h). The slide shown in Fig. 11a contains not only the holotype of *Bryophyllum australiense* (see Chapter 4, p. 125), but also the types of two so far undescribed species belonging to the genera *Arcuospinthidium* and *Protospinthidium*, respectively (Fig. 11b). The voucher slides of *Gonostomum affine* and *Monomicrocaryon opisthomuscorum*, mentioned by Foissner (2021), are not detectable at present.

<sup>1</sup> This chapter should be referenced as follows: Berger H. (2021): Type and voucher slides of taxa described by W. Foissner in the chapter “Taxonomy of soil ciliates (Ciliophora) from Australia and some other parts of the world”. – In: Foissner W. & Berger H. (Eds): Terrestrial ciliates (Protista, Ciliophora) from Australia and some other parts of the world. — Series Monographiae Ciliophorae, Number 5: 347–369.

**Table 1.** Species and subspecies described by W. Foissner in Chapter 4 of the present book and reference to figures showing slides and protocols in the present work arranged in alphabetical order. For type of slides (holotype, paratype, voucher), see figures and legends. AN, accession number of depository (Upper Austrian Museum in Linz; LI); HT, slide containing the holotype<sup>c</sup>; PT, slide containing paratypes; V, voucher slide.

Species or subspecies	Figures in present work	AN
<i>Afrogonostomum alveum</i> Foissner, 2021	Fig. 25a–f	HT 2020/141 PT 2020/141–143
<i>Apobryophyllum pinetum</i> Foissner, 2021	Fig. 10a–c	HT lacking PT 2020/68–70
<i>Apooxytricha bromelicola</i> Foissner, 2021	Fig. 35a–j	HT 2020/174 PT 2020/174–178
<i>Bophrya costata</i> Foissner, 2021	Fig. 13a–f	HT 2020/76 PT 2020/76–79
<i>Bothrix africana</i> Foissner, 2021	Fig. 31a–i	HT 2020/154 PT 2020/154–159
<i>Bryophyllum australiense</i> Foissner, 2021	Fig. 11a–e	HT 2020/71 PT 2020/72
<i>Bursaria africana</i> Foissner, 2021	Fig. 17a–m	HT 2020/91 PT 2020/92–102
<i>Bursaria americana</i> Foissner, 2021	Fig. 18a–i	HT 2020/103 PT 2020/104–109
<i>Bursaria fluviatilis</i> Foissner, 2021	Fig. 21a–g	HT 2020/128 PT 2020/129–133
<i>Bursaria salisburyensis</i> Foissner, 2021	Fig. 19a–h	HT 2020/110 PT 2020/111–116
<i>Bursaria truncatella</i> Müller, 1773	Fig. 16a–g	V 2020/201–207
<i>Bursaria uluruensis</i> Foissner, 2021	Fig. 20a–l	HT 2020/119 PT 2020/117, 118, 120–127
<i>Circinella filiformis australiensis</i> Foissner, 2021	Fig. 26a–f	HT 2020/192 PT 2020/192–194
<i>Conothrix australiensis</i> Foissner, 2021	Fig. 9a–g, 34a–f	HT 2020/64 PT 2020/64, 65, 67, 170–173
<i>Crassienchelys oriclavata</i> Foissner, 2021	Fig. 7a–m	HT 2020/53 PT 2020/53–59
<i>Enchelariophrya jamaicensis</i> Foissner, 2021	Fig. 1a–e	HT 2020/32 PT 2020/32–35
<i>Enchelys australiensis</i> Foissner, 2021	Fig. 4a–f	HT 2020/39 PT 2020/39–42
<i>Enchelys bivacuolata</i> Foissner, 2021	Fig. 5a–i	HT 2020/43 PT 2020/43–48
<i>Enchelys polynucleata hollandica</i> Foissner, 2021	Fig. 3a–d	HT 2020/36 PT 2020/36–38
<i>Enchelys polynucleata polynucleata</i> (Foissner, 1984) Foissner et al., 2002	Fig. 2a–f	PT 2020/195–197 V 2020/198–200
<i>Enchelys polyvacuolata</i> Foissner, 2021	Fig. 6a–f	HT 2020/49 PT 2020/49–52
<i>Exocolpoda augustini</i> (Foissner, 1987) Foissner et al., 2002	Fig. 22a–f	V 2020/208–213

**Table 1.** Continued

Species or subspecies	Figures in present work	AN
<i>Gastronauta insula</i> Foissner, 2021	Fig. 23a–e	HT 2020/134 PT 2020/134–136
<i>Gonostomum affine</i> (Stein, 1859) Sterki, 1878	See footnote a	
<i>Hemiurosoma similis</i> (Foissner, 1982) Foissner et al., 2002	Fig. 29a–d	V 2020/214–217
<i>Levispatha australiensis</i> Foissner, 2021	Fig. 8a–g	HT 2020/60 PT 2020/60–63
<i>Microsporidium protocyclidicola</i> Foissner, 2021	Fig. 24a, b	HT + PT 2020/137
<i>Mixophrya pantanalensis australiensis</i> Foissner, 2021	Fig. 33a–g	HT 2020/165 PT 2020/166–169
<i>Mixophrya pantanalensis pantanalensis</i> Foissner, 2021	Fig. 32a–f	HT 2020/161 PT 2020/160, 162–164
<i>Monomicrocaryon australiense</i> Foissner, 2021	Fig. 36a–i	HT 2020/181 PT 2020/179–185
<i>Monomicrocaryon opisthomuscorum</i> (Foissner et al., 1991) Foissner, 2016	See footnote a	
<i>Oxytricha africana australiensis</i> Foissner, 2021	Fig. 23a, c, d, 37a–c	HT 2020/186 PT 2020/136, 186, 187
<i>Oxytricha lithofera</i> Foissner, 2016	Fig. 38a, b	V 2020/218, 219
<i>Pattersoniella (Pattersoniella) vitiphila</i> Foissner, 1987	Fig. 26a, b	V 2020/192
<i>Protocyclidium bimacronucleatum</i> Foissner, 2021	Fig. 24a, b	HT + PT 2020/137
<i>Pseudofuscheria magna</i> Foissner, 2021	Fig. 9a–g	HT 2020/64 PT 2020/64–67
<i>Rimaleptus similis australiensis</i> Foissner, 2021	Fig. 12a–f	HT 2020/73 PT 2020/73–75
<i>Tachysoma setifera</i> Foissner, 2021	Fig. 39a–f	HT 2020/188 PT 2020/189–191
<i>Urosoma australiensis</i> Foissner, 2021	Fig. 27a–d	HT 2020/144 PT 2020/144–146
<i>Urosoma pelobia</i> Foissner, 2021	Fig. 28a–d	HT 2020/147 PT 2020/147–149
<i>Urosomoida bromelicola</i> Foissner, 2021	Fig. 30a–e	HT 2020/150 PT 2020/150–153
<i>Urosomoida uluruensis</i> Foissner, 2021	Fig. 24a–h	HT 2020/137 PT 2020/138–140
<i>Wolfkossia acuta</i> Foissner, 2021	Fig. 14a–h	HT 2020/80 <sup>b</sup> PT 2020/80–85 <sup>b</sup>
<i>Wolfkossia pantanalensis</i> Foissner, 2021	Fig. 15a–g	HT 2020/86 PT /2020/86–90

<sup>a</sup> Voucher slides not detectable at present (see text).<sup>b</sup> Figures 14a, d show the same slide (see legend for explanation). Thus, for *Wolfkossia acuta* only five type slides and not six have been deposited.<sup>c</sup> This slide usually also contains paratypes.

For photographing, the slides have been placed on a white sheet of paper with a 5 mm-grid of black dots. The photos have been taken with a smartphone (Samsung Galaxy S8+) under somewhat suboptimal conditions of illumination and thus they are not perfect. A photographic documentation of the deposited slides has the advantage that the position of tags (usually black ink circles on the

cover glass) are known even when the tags are lost, for example, due to the use of oil immersion or cleaning of slides. For a more simple and precise method of marking relevant specimens on a microscopic slide, see Chapter 1 (Berger 2021).

For some slides, a sheet of paper equally sized to the slide is available showing the positions of relevant specimens (e.g., holotype; Fig. 1b). This sheet of paper was termed “protocol” by Aescht (2008, p. 137, 138). In the figures of the present chapter, the protocol is, if available, always shown underneath the corresponding slide. In the print edition, the slides are shown in original size (76 × 26 mm). For explanation of labelling of slides, see Fig. 8 in Chapter 3 of present book.

The arrangement of the slides (Fig. 1a–e to Fig. 39a–f) in the present work follows the arrangement of the species and subspecies in Chapter 4 (Foissner 2021). For alphabetical order of species and subspecies, see Table 1.

### Acknowledgements

Many thanks to Erna Aescht (Upper Austrian Museum in Linz) for providing the accession numbers for the type slides.

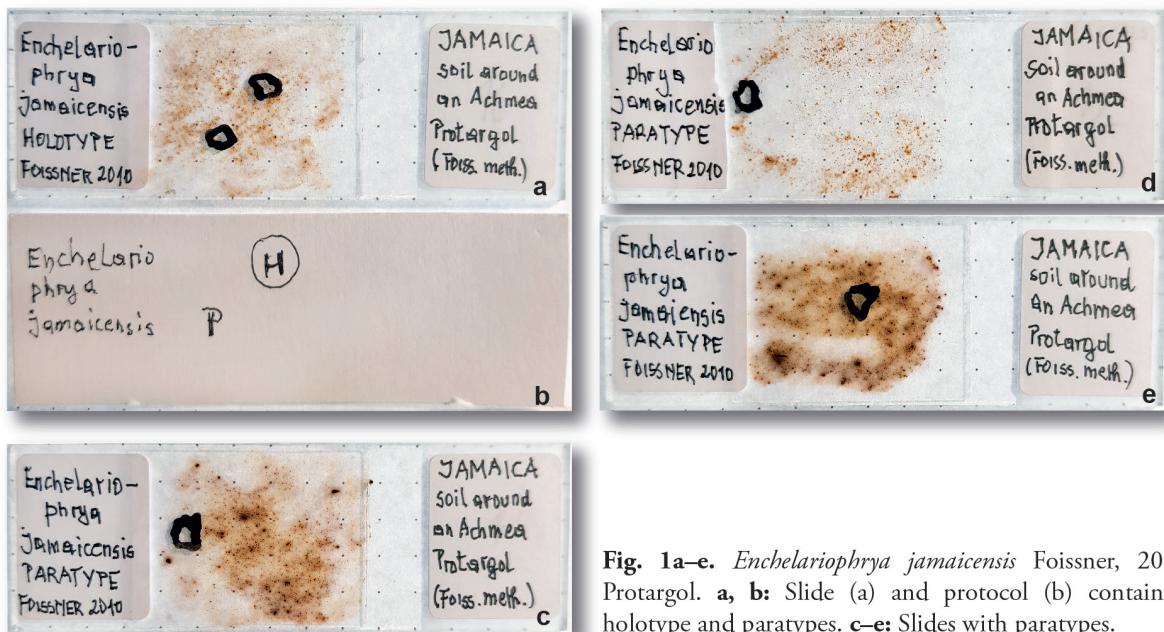
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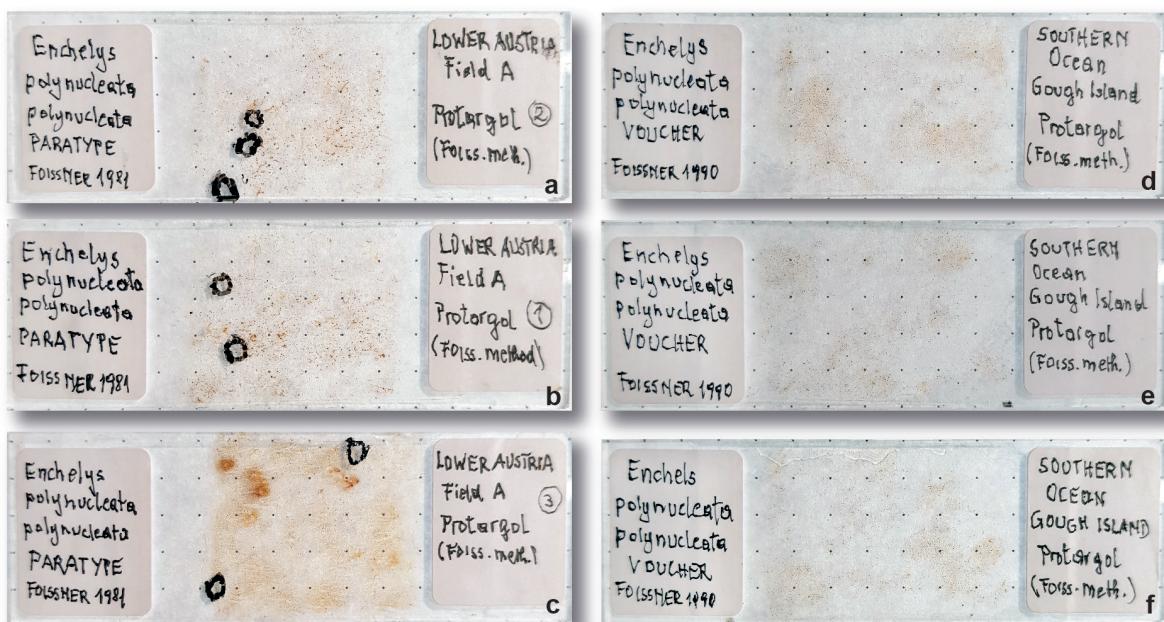
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**Fig. 1a-e.** *Enchelariophrya jamaicensis* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype and paratypes. **c-e:** Slides with paratypes.



**Fig. 2a-f.** *Enchelys polynucleata polynucleata* (Foissner, 1984) Foissner et al., 2002. Protargol. **a-c:** Paratype slides of Austrian type population of *E. polynucleata*. **d-f:** Voucher slides of population from Gough Island.



**Fig. 3a-d.** *Enchelys polynucleata hollandica* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype and paratypes. **c, d:** Paratype slides.



**Fig. 4a-f.** *Enchelys australiensis* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype and paratypes. **c-f:** Paratype slides (c, d, f) and protocol (e).



**Fig. 5a-i.** *Enchelys bivacuolata* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype and paratypes. **c-i:** Paratype slides (c, e, g-i) and protocols (d, f).

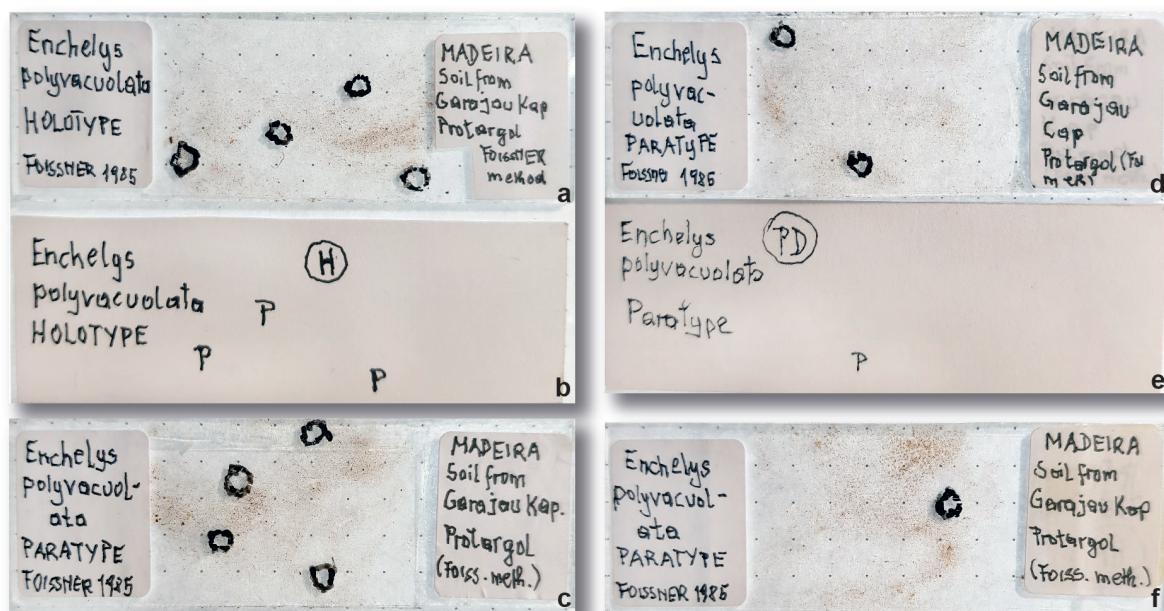


Fig. 6a-f. *Enchelys polyvacuolata* Foissner, 2021. Protargol. a, b: Slide (a) and protocol (b) containing holotype and paratypes. c-f: Paratype slides (c, d, f) and protocol (e).

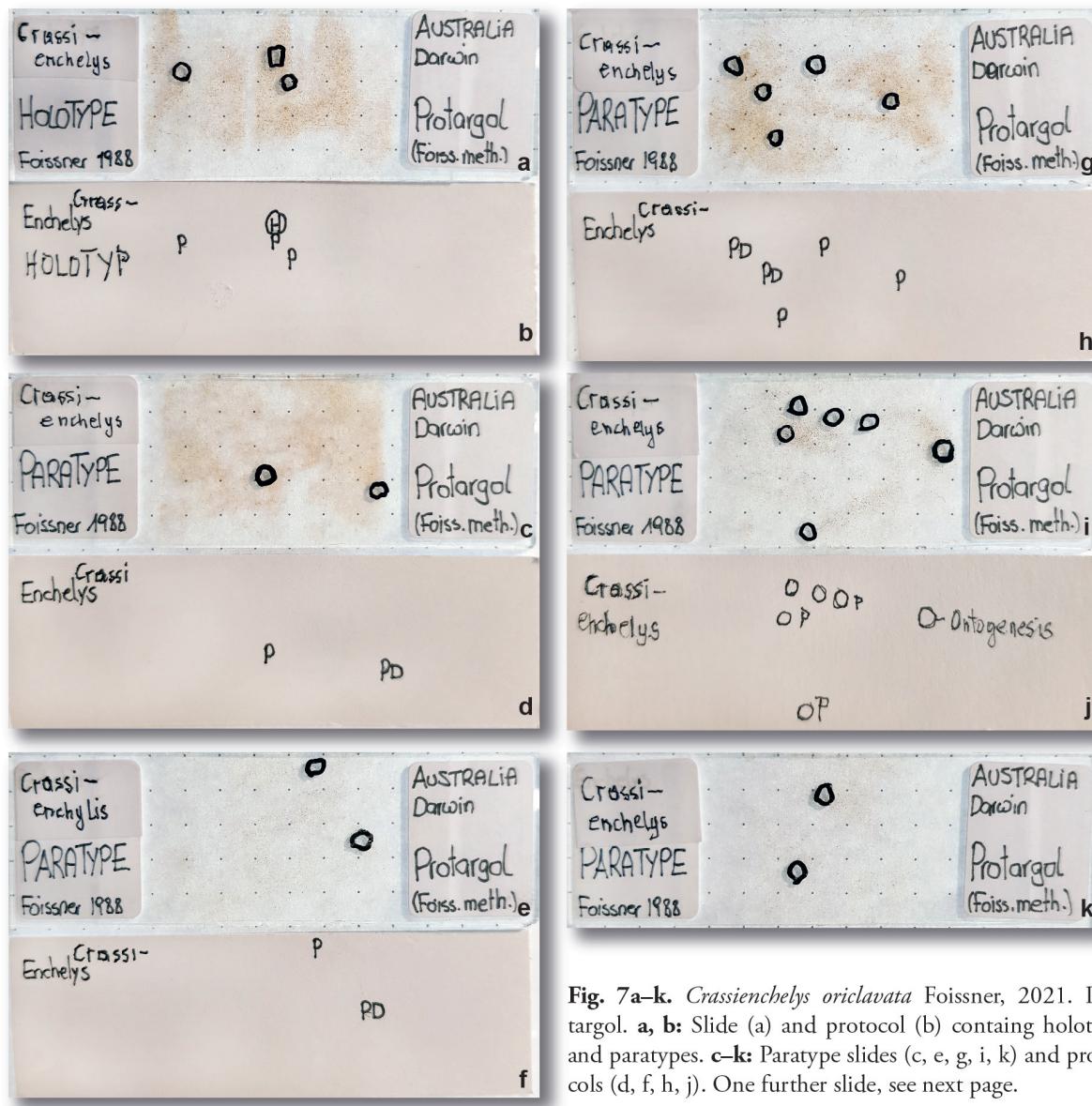
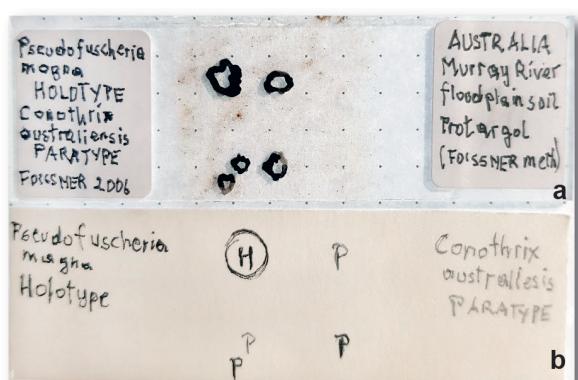
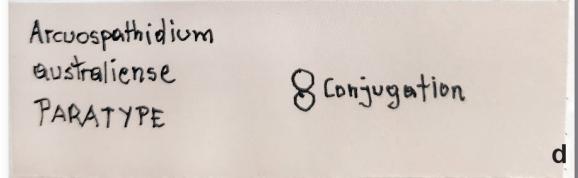
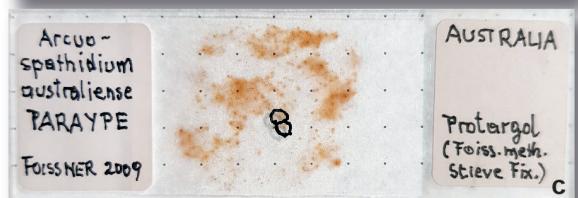
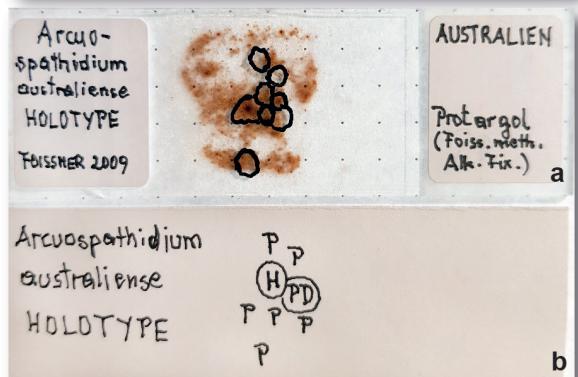
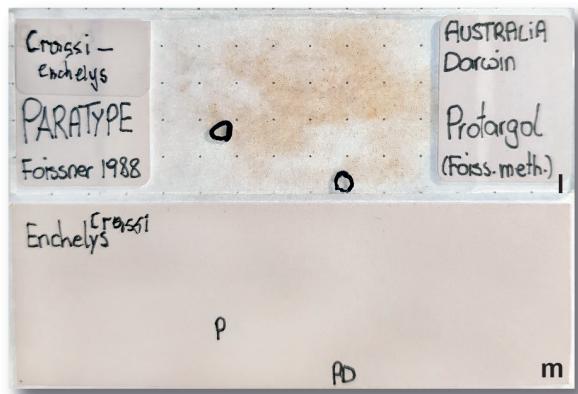
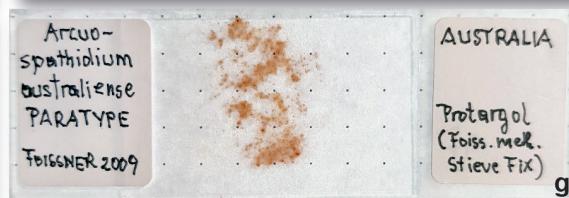
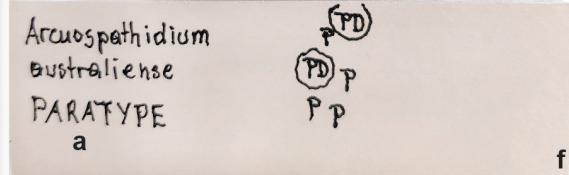
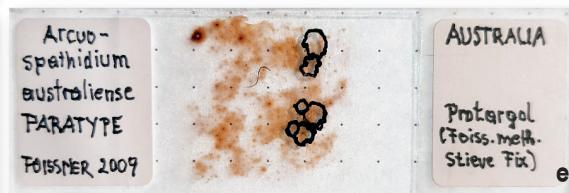


Fig. 7a-k. *Crassienchelys oriclavata* Foissner, 2021. Protargol. a, b: Slide (a) and protocol (b) containing holotype and paratypes. c-k: Paratype slides (c, e, g, i, k) and protocols (d, f, h, j). One further slide, see next page.



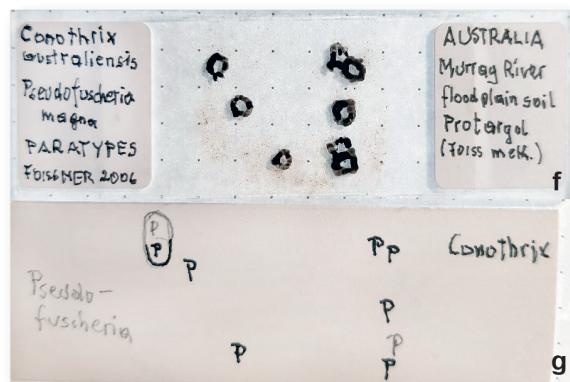
**Fig. 7l, m.** *Crassienchelys oriclavata* Foissner, 2021. Protargol. **l, m:** Slide (l) and protocol (m) containing paratypes. Further slides, see previous page.



**Fig. 8a-g.** *Levispatha australiensis* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype and paratypes. **c-g:** Paratype slides (c, e, g) and protocols (d, f). The name *Arcuospavidium australiense* is disclaimed for nomenclatural purposes (ICZN 1999, Article 8.3).



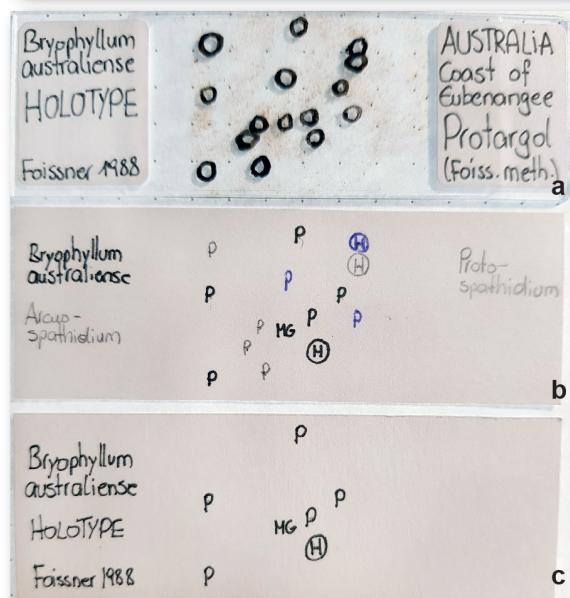
**Fig. 9a-e.** *Pseudofuscheria magna* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype and paratypes. **c-e:** Paratype slides (c, d) and protocol (e). For further slide, see next page. The slides also contain paratypes of *Conothrix australiensis* Foissner, 2021.



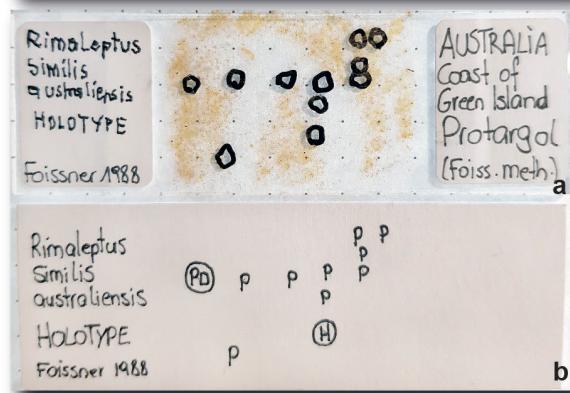
**Fig. 9f, g.** *Pseudofuscheria magna* Foissner, 2021. Protargol. **f, g:** Slide (f) and protocol (g) containing paratypes. For further slides, see previous page. The slide also contains paratypes of *Conothrix australiensis* Foissner, 2021.



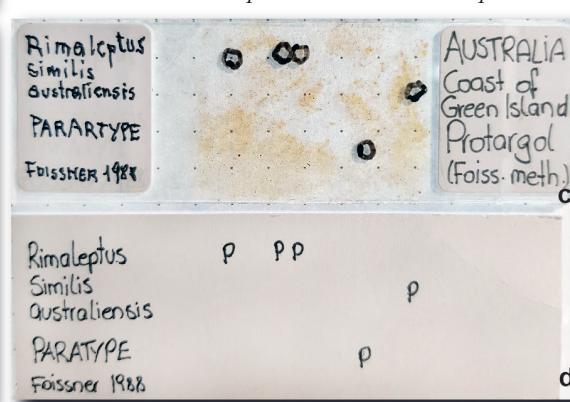
**Fig. 10a-c.** *Apobryophyllum pinetum* Foissner, 2021. Protargol. **a-c:** Paratype slides. The slide containing the holotype is not traceable at present; for details, see Foissner (2021). The name on the slide (*Bryophyllum pinetum*) is disclaimed for nomenclatural purpose (ICZN 1999, Article 8.3).

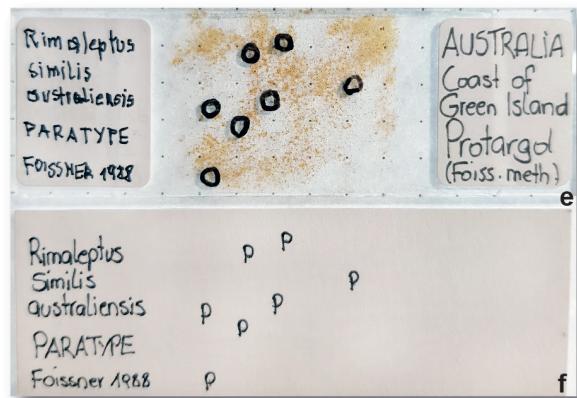


**Fig. 11a-c.** *Bryophyllum australiense* Foissner, 2021. Protargol. **a-c:** Slide (a) and protocols (b, c) containing holotype and paratypes. **d, e:** Paratype slide (d) and protocol (e). See text for note on "Arcuospathidium" and "Protospathidium".

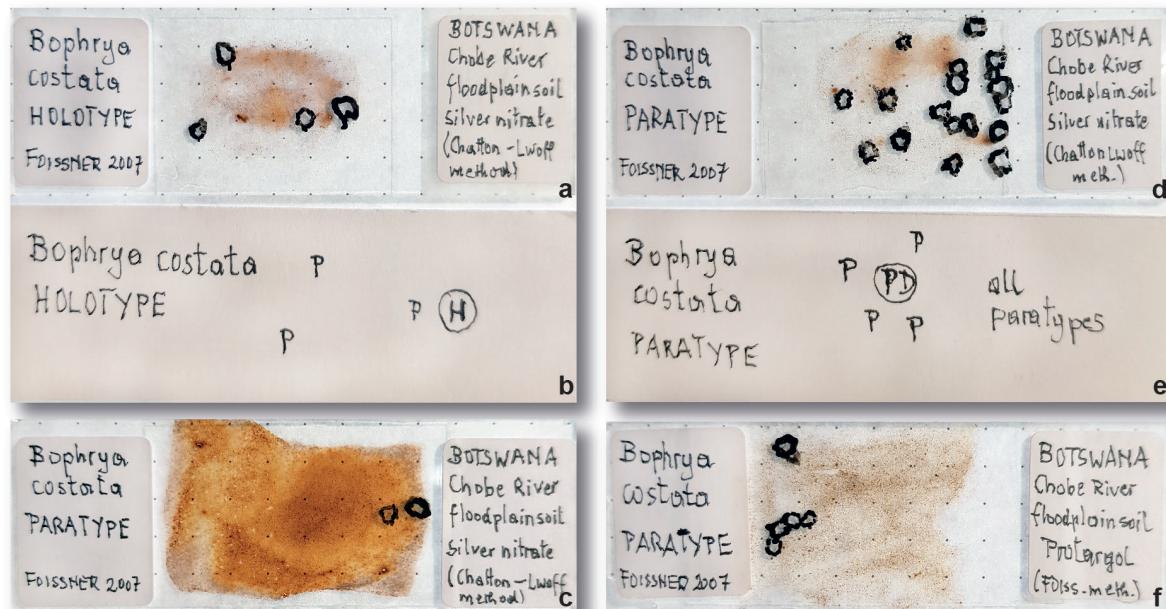


**Fig. 12a-d.** *Rimaleptus similis australiensis* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype and paratypes. **c, d:** Paratype slide (c) and protocol (d). Further slide, see next page.

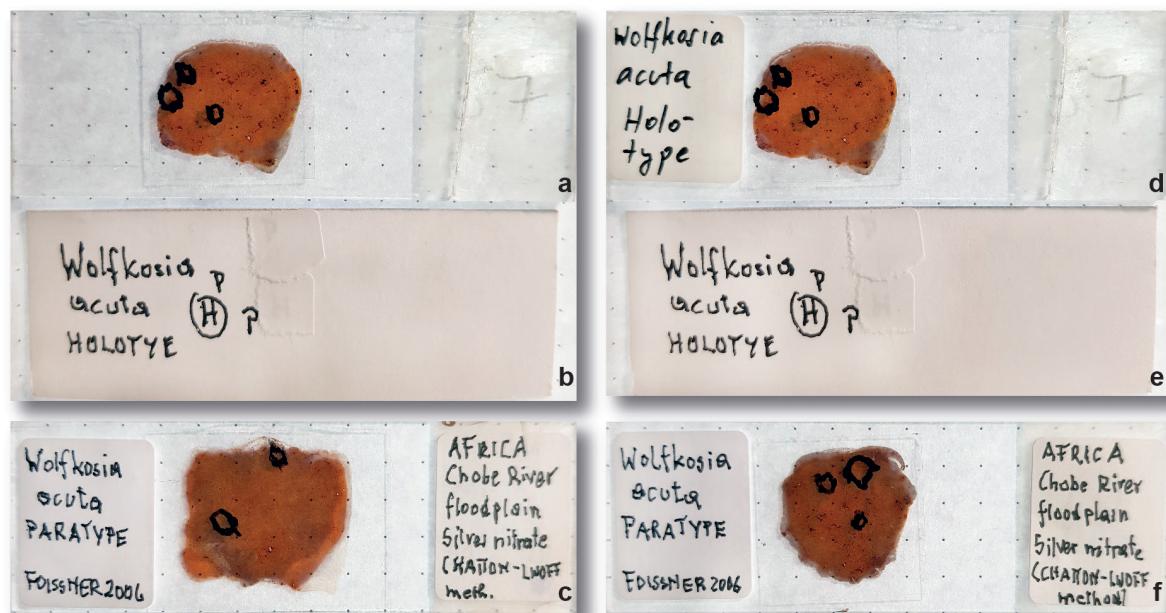




**Fig. 12e, f.** *Rimaleptus similis australiensis* Foissner, 2021. Protargol. **e, f:** Paratype slide (e) and protocol (f). Further slides, see previous page.



**Fig. 13a-f.** *Bophrya costata* Foissner, 2021. Chatton-Lwoff (a, c, d), protargol (f). **a, b:** Slide (a) and protocol (b) containing the holotype and paratypes. **c-f:** Paratype slides (c, d, f) and protocol (e).



**Fig. 14a-f.** *Wolfkasia acuta* Foissner, 2021. Chatton-Lwoff. **a, b, d, e:** Slide (a, d) and protocol (b, e) containing the holotype and paratypes. In (d) I added a label with the name of the species and the designation "Holotype". **c, f:** Paratype slides. Further slides, see next page. In total, five type slides have been deposited.

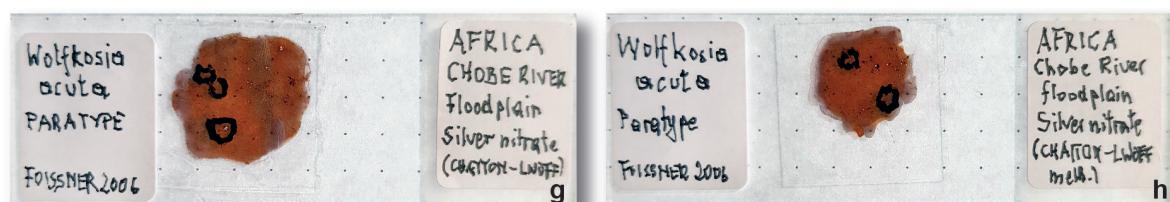


Fig. 14g, h. *Wolfkobia acuta* Foissner, 2021. Chatton-Lwoff. g, h: Paratype slides. Further slides, see previous page.

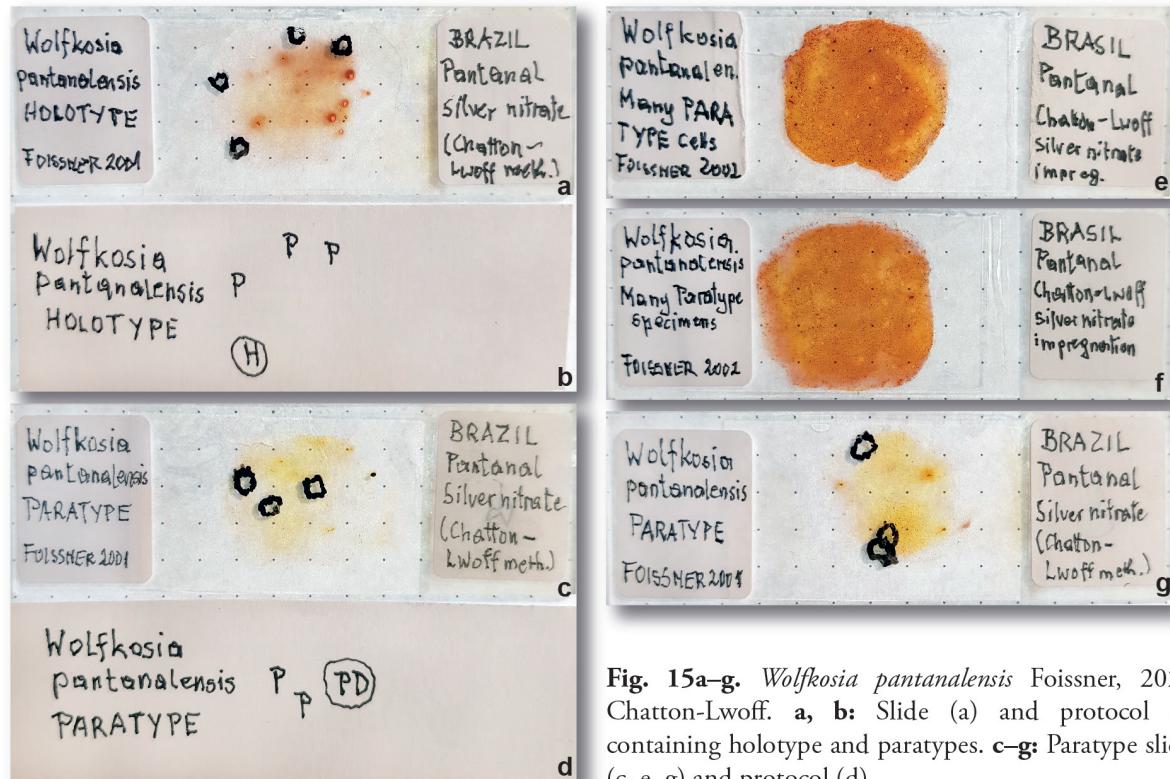


Fig. 15a–g. *Wolfkobia pantanalensis* Foissner, 2021. Chatton-Lwoff. a, b: Slide (a) and protocol (b) containing holotype and paratypes. c–g: Paratype slides (c, e–g) and protocol (d).

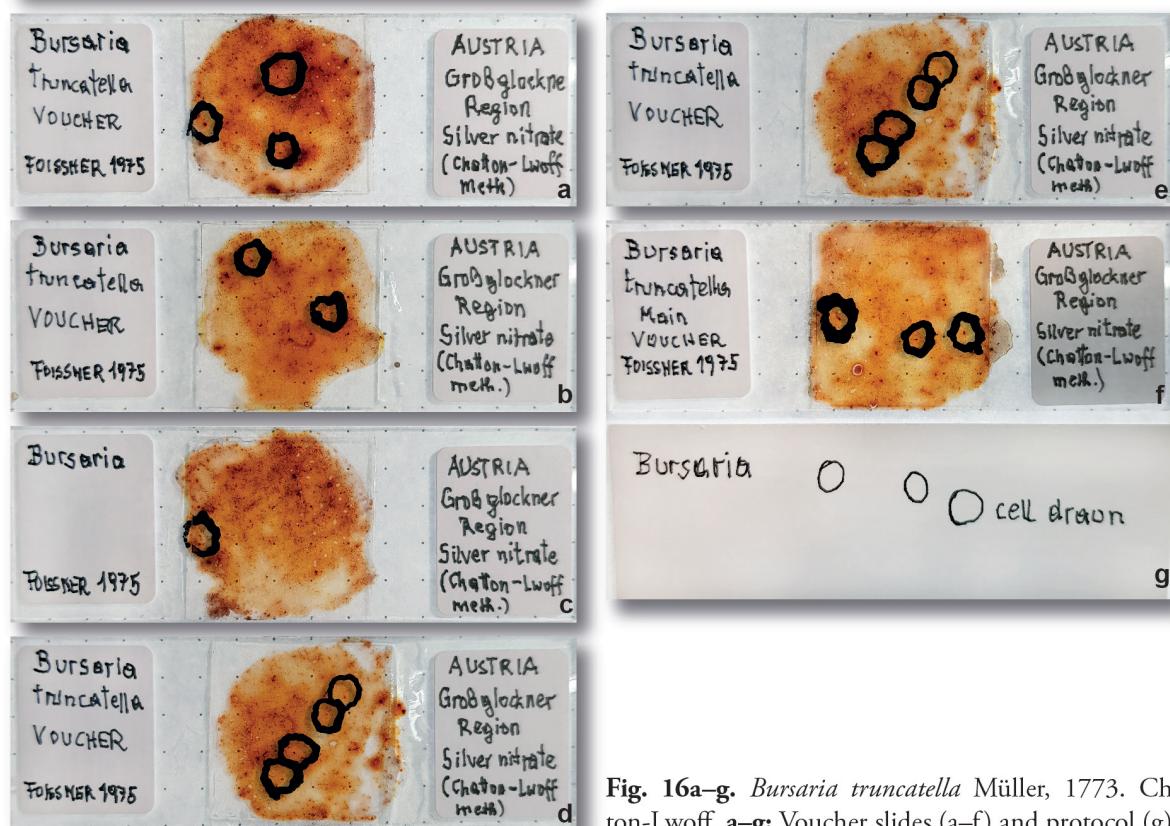
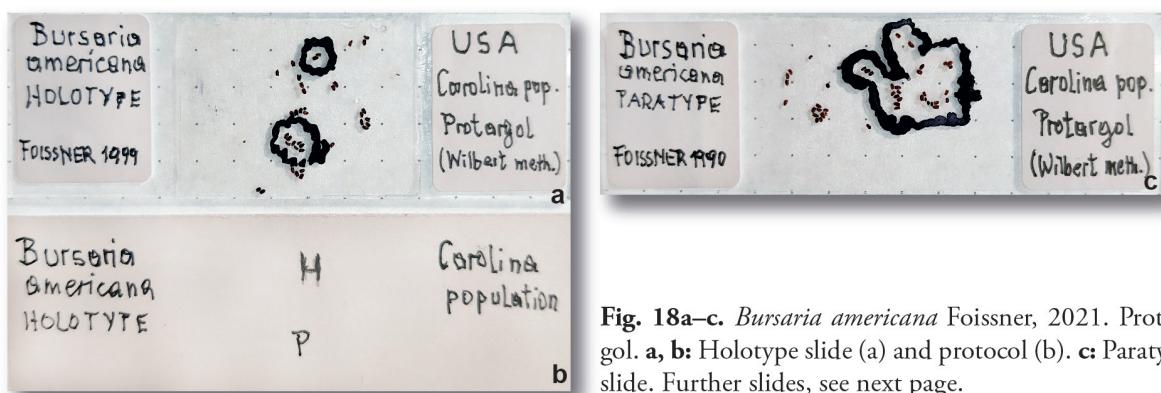


Fig. 16a–g. *Bursaria truncatella* Müller, 1773. Chatton-Lwoff. a–g: Voucher slides (a–f) and protocol (g).



**Fig. 17a–m.** *Bursaria africana* Foissner, 2021. Chatton-Lwoff (a, k–m), silver carbonate (c–e), protargol (f–j). a–g: Holotype slide (a) and protocol (b). c–m: Paratype slides.



**Fig. 18a–c.** *Bursaria americana* Foissner, 2021. Protargol. a, b: Holotype slide (a) and protocol (b). c: Paratype slide. Further slides, see next page.



Fig. 18d–i. *Bursaria americana* Foissner, 2021. Protargol (d, e), Chatton-Lwoff (f–i). d–i: Paratype slides. Further slides, see previous page.



Fig. 19a–h. *Bursaria salisburgensis* Foissner, 2021. Protargol. a, b: Holotype slide (a) and protocol (b). c–h: Paratype slides.

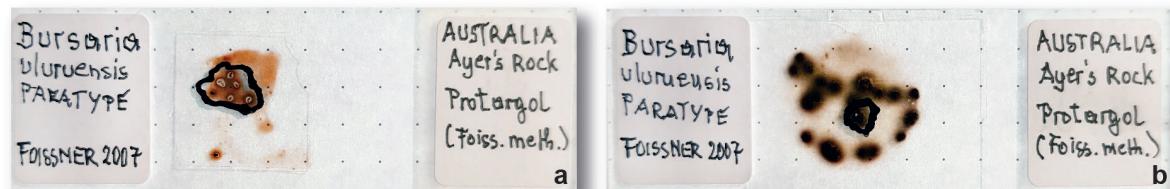


Fig. 20a, b. *Bursaria uluruensis* Foissner, 2021. Protargol. a, b: Paratype slides. Further slides, see next page.

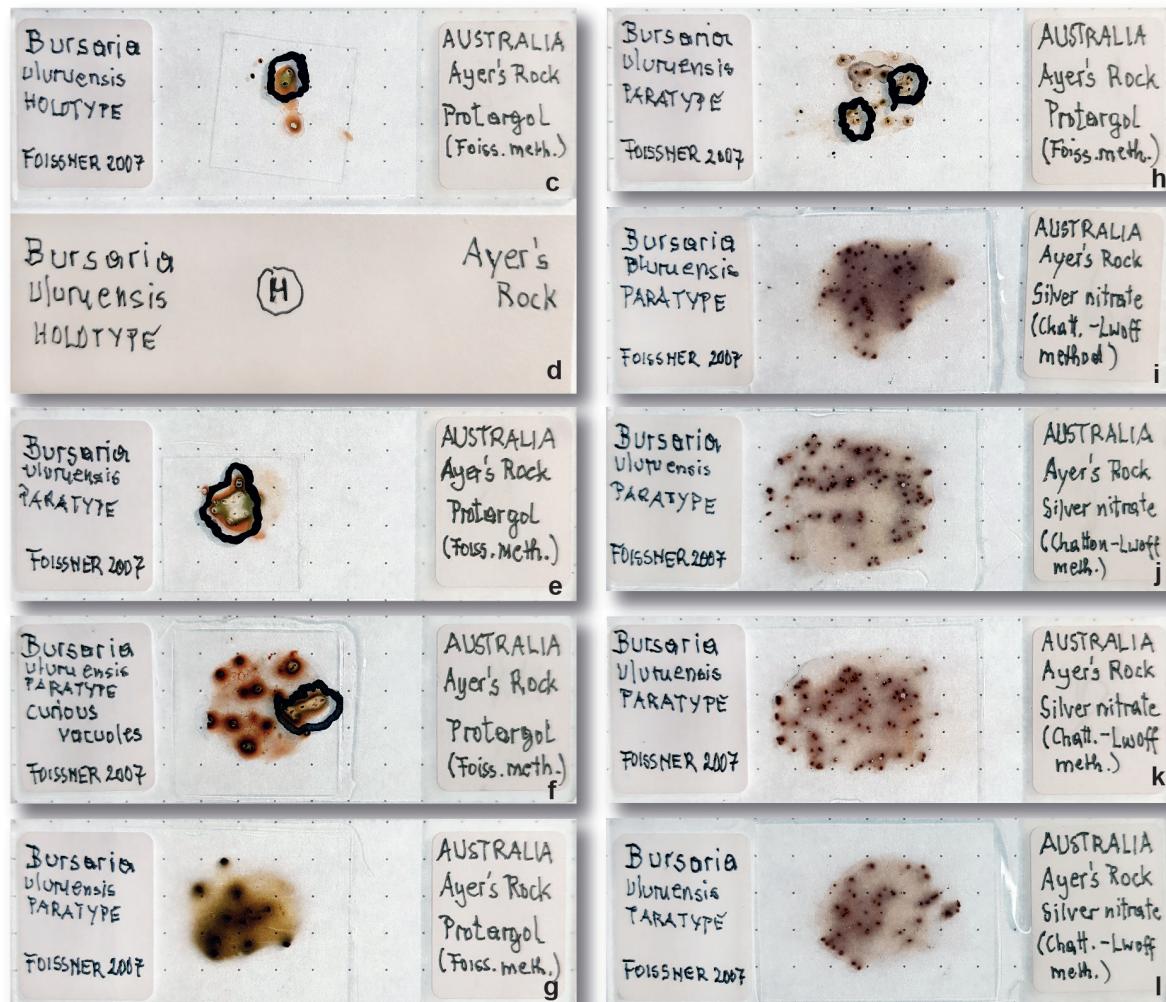


Fig. 20c–l. *Bursaria uluruensis* Foissner, 2021. Protargol (c–h), Chatton-Lwoff (i–l). c, d: Slide (c) and protocol (d) containing holotype and paratypes. e–l: Paratype slides. Further slides, see previous page.



Fig. 21a–g. *Bursaria fluviatilis* Foissner, 2021. Protargol. a, b: Slide (a) and protocol (b) containing holotype (and likely paratypes). c–g: Paratype slides.

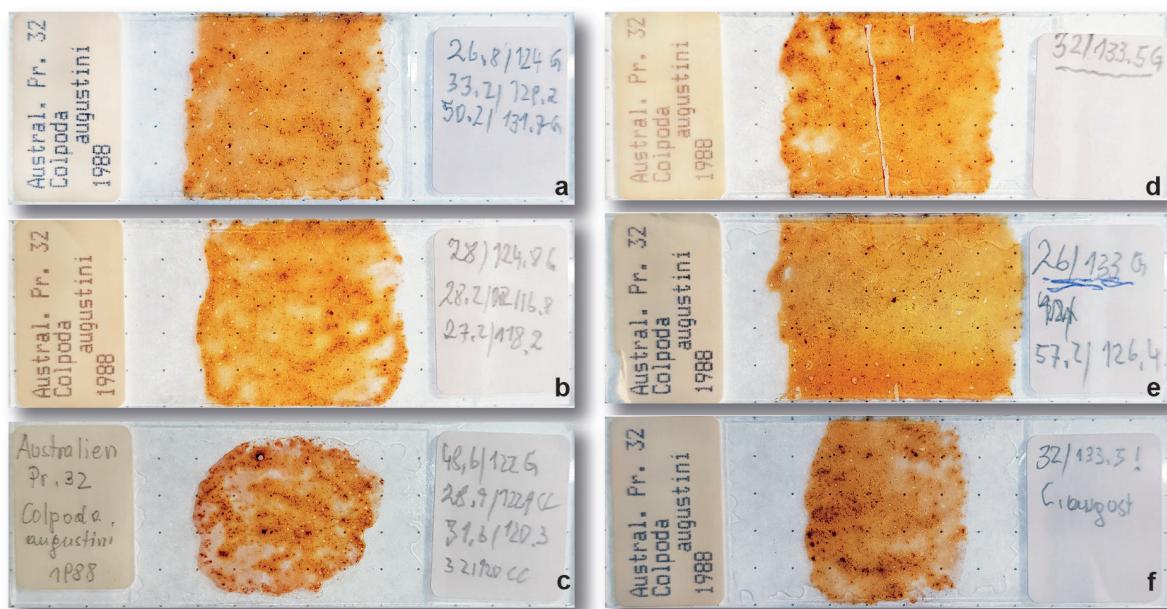


Fig. 22a-f. *Exocolpoda augustini* (Foissner, 1987) Foissner et al., 2002. Chatton-Lwoff. a-f: Voucher slides.

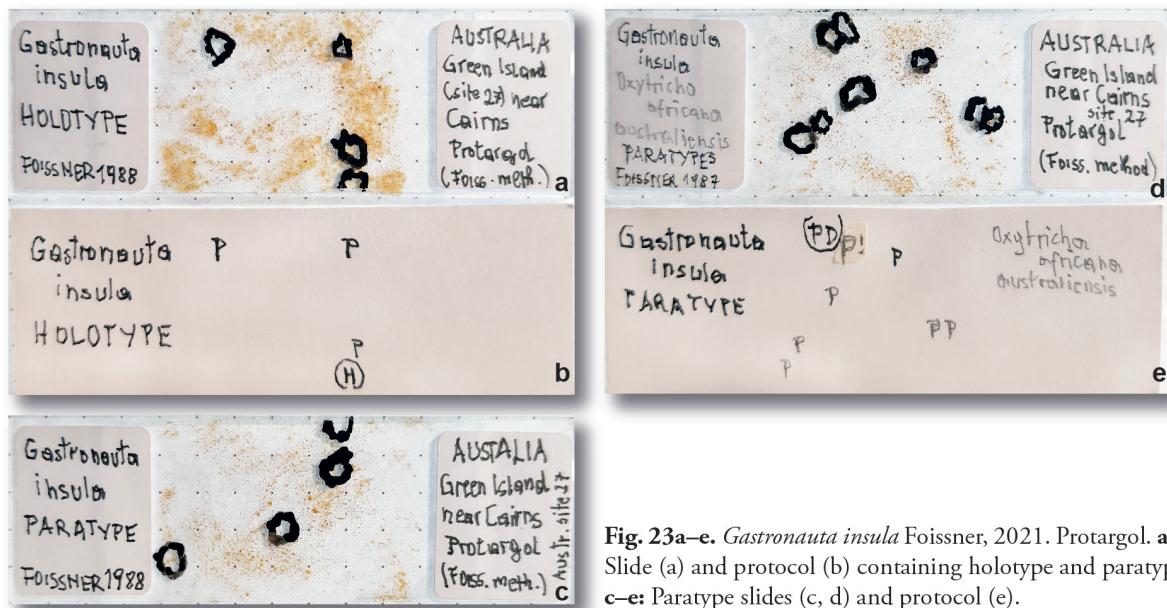


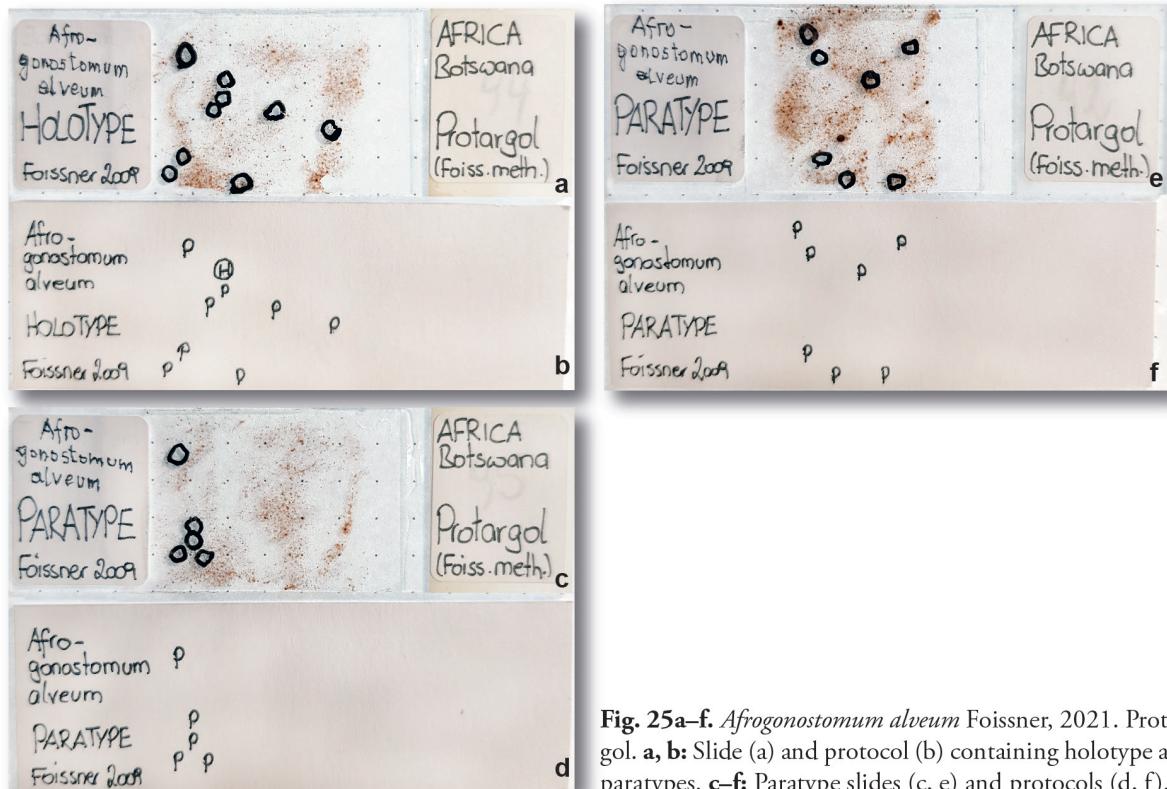
Fig. 23a-e. *Gastronauta insula* Foissner, 2021. Protargol. a, b: Slide (a) and protocol (b) containing holotype and paratypes. c-e: Paratype slides (c, d) and protocol (e).



Fig. 24a-d. *Protocyclidium bimacronucleatum* Foissner, 2021, *Microsporidium protocyclidicola* Foissner, 2021, and *Urosomoida uluruensis* Foissner, 2021. Protargol. a, b: Slide (a) and protocol (b) containing holotypes and paratypes. c, d: Paratype slides. Further slides, see next page. *Hausmanniella uluruensis* is not yet described, thus this name (c, d) is disclaimed for nomenclatural purposes (ICZN 1999, Article 8.3).



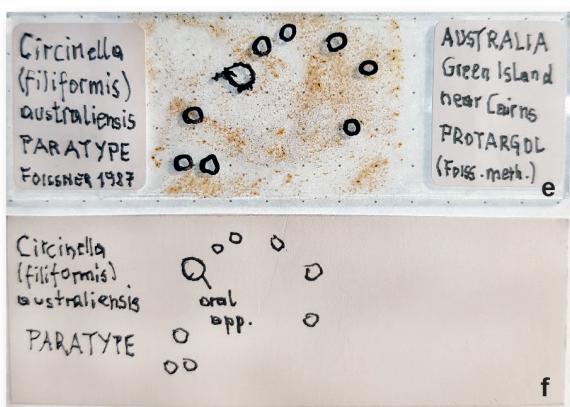
**Fig. 24e-h.** *Urosomoida uluruensis* Foissner, 2021. Protargol. **e-h:** Paratype slides (e, g) and protocols (f, h). Further slides, see previous page. *Hausmanniella uluruensis* is not yet described, thus this name (c, d) is disclaimed for nomenclatural purposes (ICZN 1999, Article 8.3).



**Fig. 25a-f.** *Afrogonostomum alveum* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype and paratypes. **c-f:** Paratype slides (c, e) and protocols (d, f).



**Fig. 26a-d.** *Circinella filiformis australiensis* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype. Note: This slide also contains voucher specimens of *Pattersoniella* (*Pattersoniellides*) *vitiphila* Foissner, 1987. The incorrect name *Pattersoniella* (*Pattersoniellides*) *vitiphila* is disclaimed for nomenclatural purposes (ICZN 1999, Article 8.3). **c, d:** Paratype slide (c) and protocol (d). Further slide, see next page.



**Fig. 26e, f.** *Circinella filiformis australiensis* Foissner, 2021. Protargol. **e, f:** Paratype slide (e) and protocol (f). Further slides, see previous page.



**Fig. 27a–d.** *Urosoma australiensis* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype. **c, d:** Paratype slide (c) and protocol (d).



**Fig. 28a–d.** *Urosoma pelobia* Foissner, 2021. Protargol. **a, b:** Slide (a) and protocol (b) containing holotype and paratypes. **c, d:** Paratype slides.



**Fig. 29a–d.** *Hemiuerosoma similis* (Foissner, 1982) Foissner et al., 2002. Protargol. **a–d:** Voucher slides.



Fig. 30a–e. *Urosomoida bromelicola* Foissner, 2021. Protargol. a, b: Slide (a) and protocol (b) containing holotype. c–e: Paratype slides.

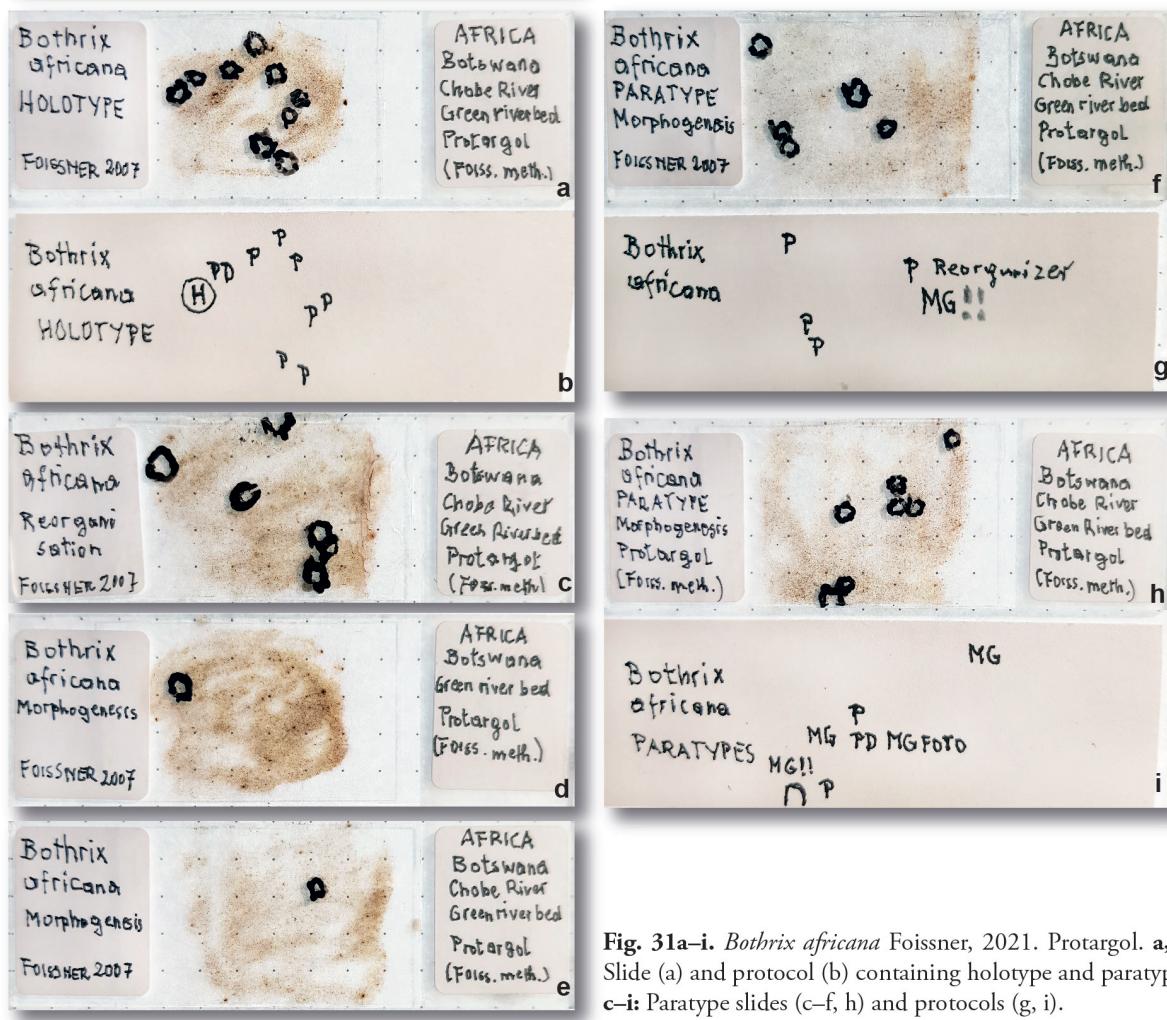


Fig. 31a–i. *Bothrix africana* Foissner, 2021. Protargol. a, b: Slide (a) and protocol (b) containing holotype and paratypes. c–i: Paratype slides (c–f, h) and protocols (g, i).

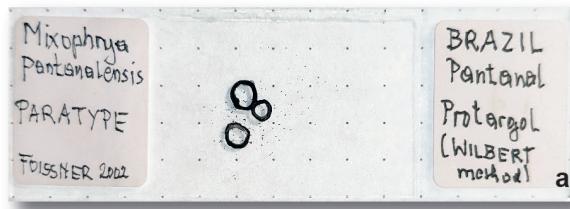


Fig. 32a. *Mixophrya pantanalensis pantanalensis* Foissner, 2021. Protargol. a: Paratype slide. Further slides, see next page.

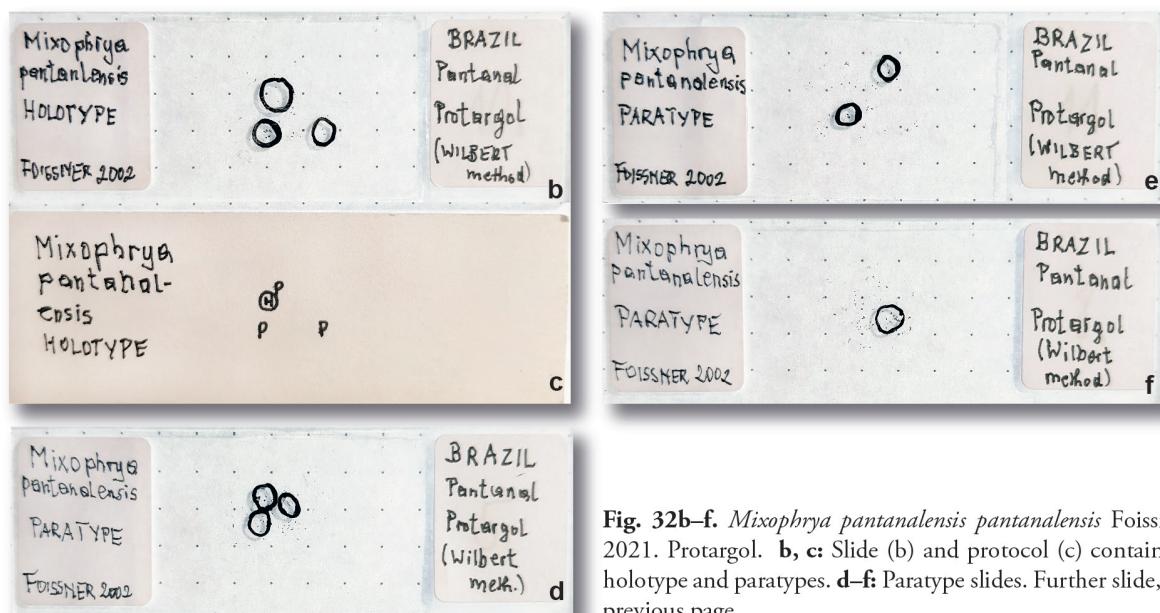


Fig. 32b-f. *Mixophrya pantanalensis pantanalensis* Foissner, 2021. Protargol. **b, c:** Slide (b) and protocol (c) containing holotype and paratypes. **d-f:** Paratype slides. Further slide, see previous page.



Fig. 33a-g. *Mixophrya pantanalensis australiensis* Foissner, 2021. Protargol. **a:** Slide containing holotype and paratypes. **b-g:** Paratype slides (b, d, e, g) and protocols (c, f).

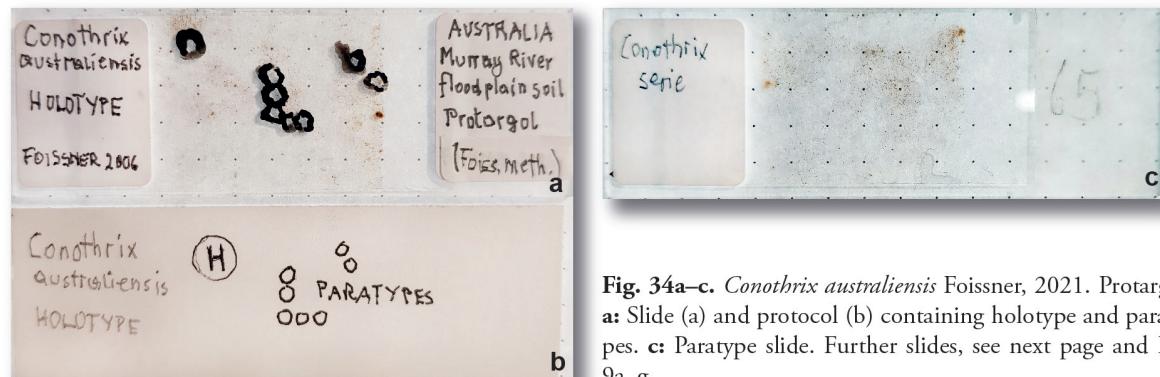


Fig. 34a-c. *Conothrix australiensis* Foissner, 2021. Protargol. **a:** Slide (a) and protocol (b) containing holotype and paratypes. **c:** Paratype slide. Further slides, see next page and Fig. 9a-g.



Fig. 34d-f. *Conothrix australiensis* Foissner, 2021. Protargol. d-f: Paratype slides (d, f) and protocol (e). Further slides, see previous page and Fig. 9a-g.



Fig. 35d-j. *Apoxytricha bromelicola* Foissner, 2021. Protargol. a, b: Slide (a) and protocol (b) containing holotype and paratypes. c-j: Paratype slides (c, e, g, i) and protocols (d, f, h, j).

Fig. 36a, b. *Monomicrocaryon australiense* Foissner, 2021. Protargol. a, b: Paratype slides. Further slides, see next page.

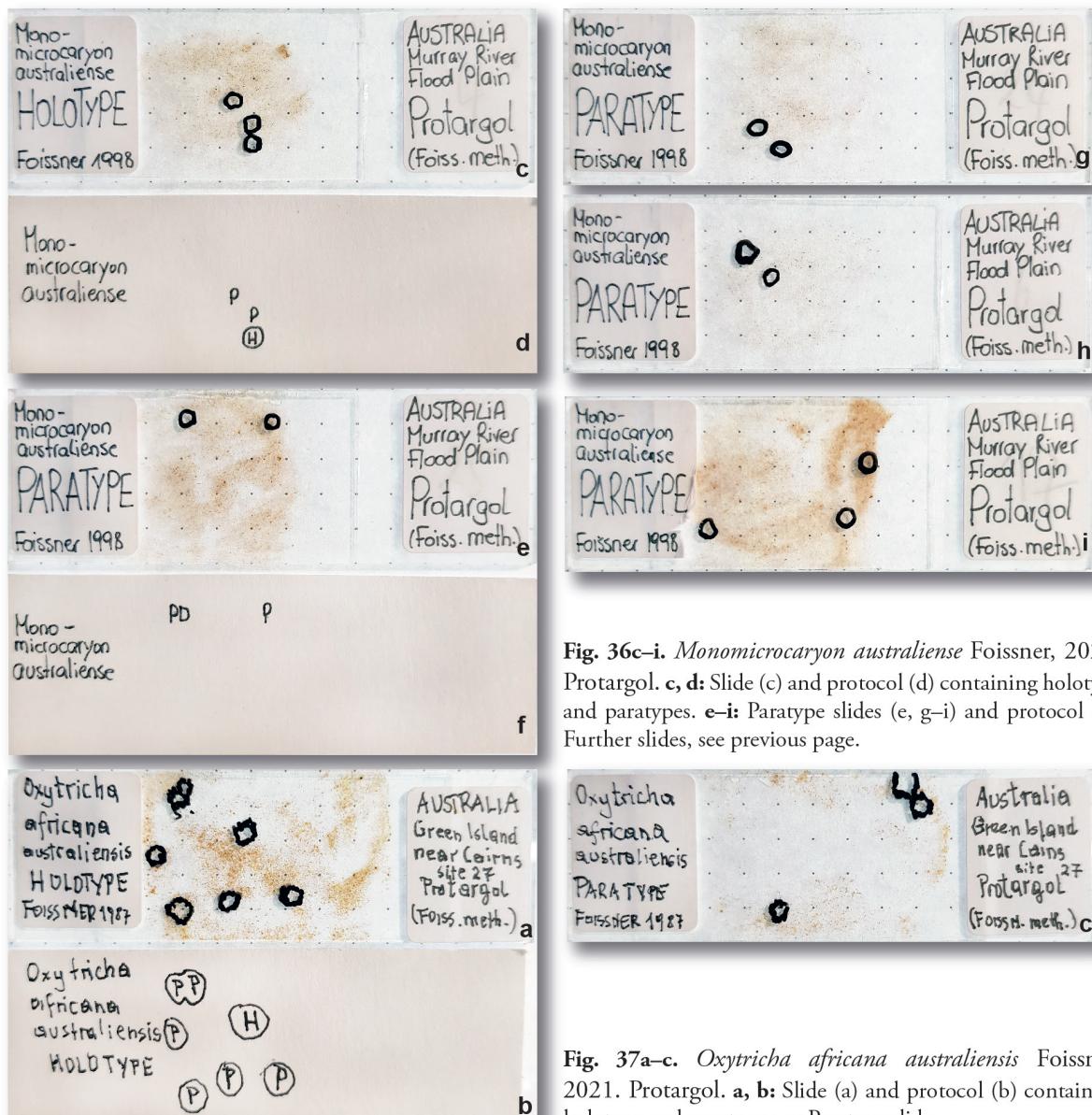


Fig. 36c-i. *Monomicrocaryon australiense* Foissner, 2021. Protargol. c, d: Slide (c) and protocol (d) containing holotype and paratypes. e-i: Paratype slides (e, g-i) and protocol (f). Further slides, see previous page.



Fig. 37a-c. *Oxytricha africana australiensis* Foissner, 2021. Protargol. a, b: Slide (a) and protocol (b) containing holotype and paratypes. c: Paratype slide.

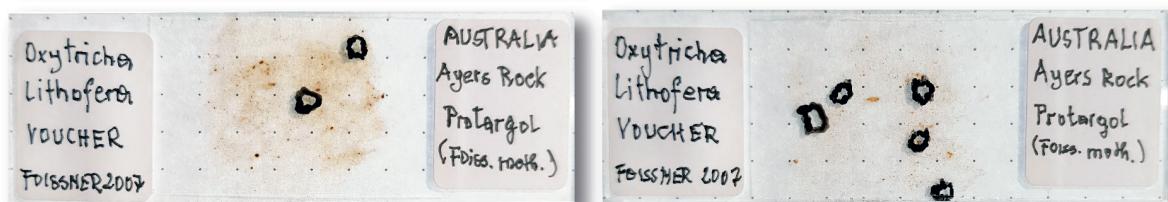


Fig. 38a, b. *Oxytricha lithofera* Foissner, 2016. Protargol. a, b: Voucher slides.

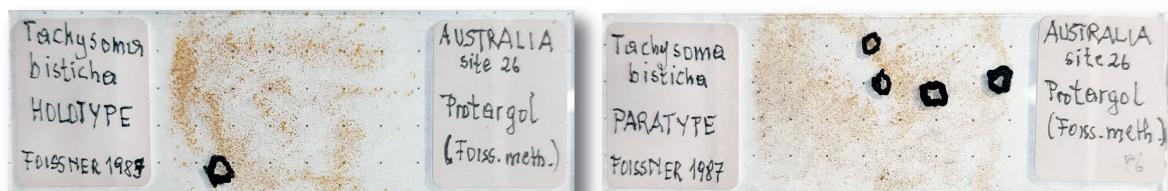
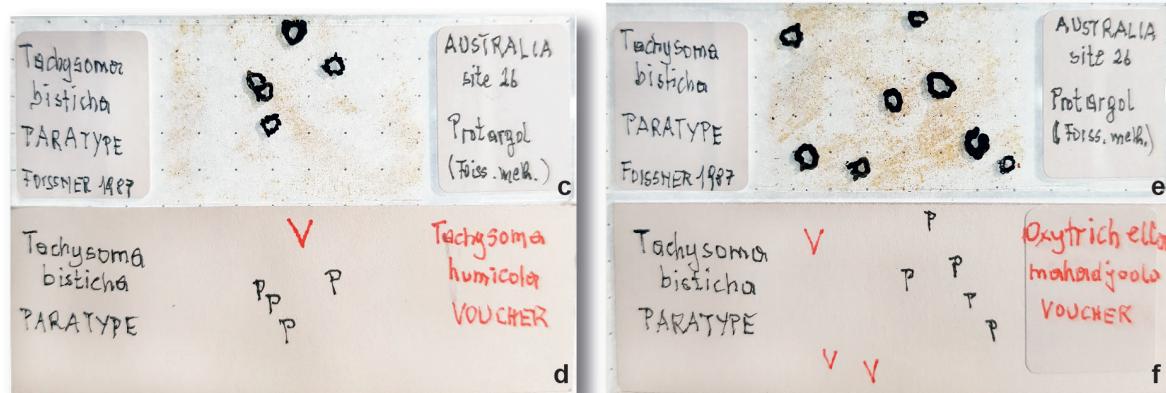


Fig. 39a, b. *Tachysoma setifera* Foissner, 2021. Protargol. a: Slide containing the holotype. b: Paratype slide. The name *Tachysoma bisticha* on the slides was a working title for *Tachysoma setifera*. *Tachysoma bisticha* is disclaimed for nomenclatural purposes (ICZN 1999, Article 8.3). Further slides, see next page.



**Fig. 39c–f.** *Tachysoma setifera* Foissner, 2021. Protargol. **c–f:** Paratype slides (c, e) and protocols (d, f). The name *Tachysoma bisticha* on the slides was a working title for *Tachysoma setifera*. *Tachysoma bisticha* is disclaimed for nomenclatural purposes (ICZN 1999, Article 8.3). Further slides, see previous page.

