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New records of the microcaddisfly *Stactobia moselyi* (Trichoptera: Hydroptilidae) from Western Switzerland

Nouvelles mentions de *Stactobia moselyi* (Trichoptera: Hydroptilidae) en Suisse occidentale

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Abstract

Hygropetric habitats, defined by a thin film of water flowing over rock surfaces, are among the least studied freshwater environments. They host a limited, but highly specialized assemblage of madicolous aquatic insects, including Trichoptera (caddisflies) of the genus *Stactobia* McLachlan, 1880. In Central Europe, species of *Stactobia* appear to be strictly associated with these habitats. Of the 164 known *Stactobia* species, three occur in Switzerland: *Stactobia eatoniella* McLachlan, 1880, *Stactobia furcata* Mosely, 1930, and *Stactobia moselyi* Kimmins, 1949, the latter currently listed as “endangered” in the 2012 Swiss Red List. As of June 2025, only three historical records of *S. moselyi* existed in Western Switzerland (defined here as the French-speaking region of the country), all dating from more than 80 years ago. In this context, we surveyed 14 hygropetric sites in Western Switzerland between April and July 2025. *Stactobia moselyi* larvae were found at three of them, one each in the Cantons of Valais, Vaud, and Fribourg. At the site in the Canton of Fribourg, *S. moselyi* was detected in sympatry with *S. eatoniella*. The two species can be distinguished in the field by larval case texture and coloration. Our results suggest that *S. moselyi* is more widespread in Switzerland than previously assumed, and that its Red List status may warrant re-evaluation in the ongoing revision. Its apparent rarity likely reflects historical under-sampling of hygropetric habitats and the challenge of detecting such a minute species. However, our experience shows that brief training is sufficient to effectively prepare collectors to detect the species in the field. Further surveys will help clarify the distribution, ecology, and conservation status of the three *Stactobia* species occurring in Switzerland.

Keywords: aquatic insect, biodiversity surveys, conservation status, hygropetric habitats, species distribution.

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Résumé

Les habitats hygropétriques (à faune madicole), caractérisés par un mince film d'eau ruisselant sur des surfaces rocheuses, figurent parmi les milieux d'eau douce les moins étudiés. Ils abritent une faune aquatique et semi-aquatique spécialisée, incluant notamment des Trichoptères du genre *Stactobia* McLachlan, 1880, strictement associé à ces habitats en Europe centrale. Sur les 164 espèces connues actuellement, trois sont présentes en Suisse: *Stactobia eatoniella* McLachlan, 1880, *Stactobia furcata* Mosely, 1930, et *Stactobia mosehyi* Kimmins, 1949. Cette dernière est classée «en danger» sur la Liste rouge suisse de 2012. En juin 2025, seules trois occurrences historiques de *S. mosehyi* étaient officiellement recensées en Suisse occidentale (définie ici comme la région francophone de Suisse), toutes datant de plus de 80 ans. Dans ce contexte, nous avons mené, entre avril et juillet 2025, une campagne ciblée sur 14 localités présentant des conditions hygropétriques a priori favorables en Suisse occidentale. Des larves de *S. mosehyi* ont été découvertes sur trois sites: en Valais, en aval de la cascade de la Pissevache (près de Vernayaz); dans le canton de Vaud, dans le secteur amont de la Mèbre (près de Cugy); et dans le canton de Fribourg, sur les rives de la Veveysse de Fégire (près de Châtel-St-Denis). Ce dernier site a également révélé la présence de *S. eatoniella*, en sympatrie avec *S. mosehyi*. Les deux espèces sont facilement distinguables sur le terrain, notamment par la texture et la couleur de leur fourreau larvaire. Nos résultats indiquent que *S. mosehyi* est plus largement répartie en Suisse qu'on ne le supposait, et que son statut sur la Liste rouge pourrait être réévalué dans le cadre de sa mise à jour en cours. Sa rareté apparente semble résulter principalement du faible intérêt porté historiquement aux habitats hygropétriques, ainsi que de la difficulté à détecter cette espèce de très petite taille. Toutefois, notre expérience montre qu'une brève initiation suffit à former efficacement les collecteurs à la repérer sur le terrain. De nouvelles prospections permettront de mieux cerner la répartition, l'écologie et le statut de conservation des trois espèces de *Stactobia* présentes en Suisse.

Mots-clés: insectes aquatiques, inventaire de la biodiversité, statut de conservation, habitats hygropétriques, répartition des espèces.

INTRODUCTION

Hygropetric habitats, characterized by a thin layer of water flowing over rock surfaces, are among the most poorly surveyed freshwater environments (MILLER & PERKINS 2012). They are inhabited by a rich, largely endemic community of aquatic and semi-aquatic insects, including many specialized species of Diptera, Coleoptera, and Trichoptera (MERRITT & WALLACE 2009, GRAF 2014, SHIMABUKURO & TRIVINHO-STRIXINO 2018).

The Trichoptera genus *Stactobia* McLachlan, 1880, which in Central Europe is strictly associated with hygropetric habitats (GRAF *et al.* 2004), currently comprises 164 described species worldwide. The highest species diversity is found in the Oriental biogeographic region (102 species), while 44 species occur in the West Palearctic (MORSE 2025). In Switzerland, three *Stactobia* species are reported: *Stactobia eatoniella* McLachlan, 1880, *Stactobia furcata* Mosely, 1930, and *Stactobia mosehyi* Kimmins, 1949 (INFO FAUNA 2025a). In the most recent Red List of Ephemeroptera, Plecoptera, and Trichoptera in Switzerland (LUBINI *et al.* 2012), *S. eatoniella* was listed as “regionally extinct”, *S. furcata* as “data deficient”, and *S. mosehyi* as “endangered”. However, recently published observations (VUATAZ *et al.* 2021, FÄSSLER & BIRNSTIEL 2023) and targeted field surveys, primarily in central, eastern, and southern Switzerland (INFO FAUNA 2025a), suggest that these concerning statuses may result from under-sampling of hygropetric habitats rather than true rarity.

As of 10 June 2025, *S. mosehyi* had been officially recorded at 37 localities in Switzerland (INFO FAUNA 2025b). Only three sites are located in Western Switzerland (defined here as the

French-speaking region of the country), all of which are historical records: Vaud, La Mèbre, sources, 28.VI.1943, leg. J. Aubert; Vaud, Talent, Montheron, 24.VI.1944, leg. J. Aubert; Valais, Crans, 20.VII.1944, leg. F. Schmid. SCHMID (1959) also reported having observed numerous specimens of *S. mosehyi* from the Swiss Plateau and southern slopes of the Alps, as well as *S. eatoniella* from the Central Alps and the Jura Mountains, but the whereabouts of his collection remain unknown.

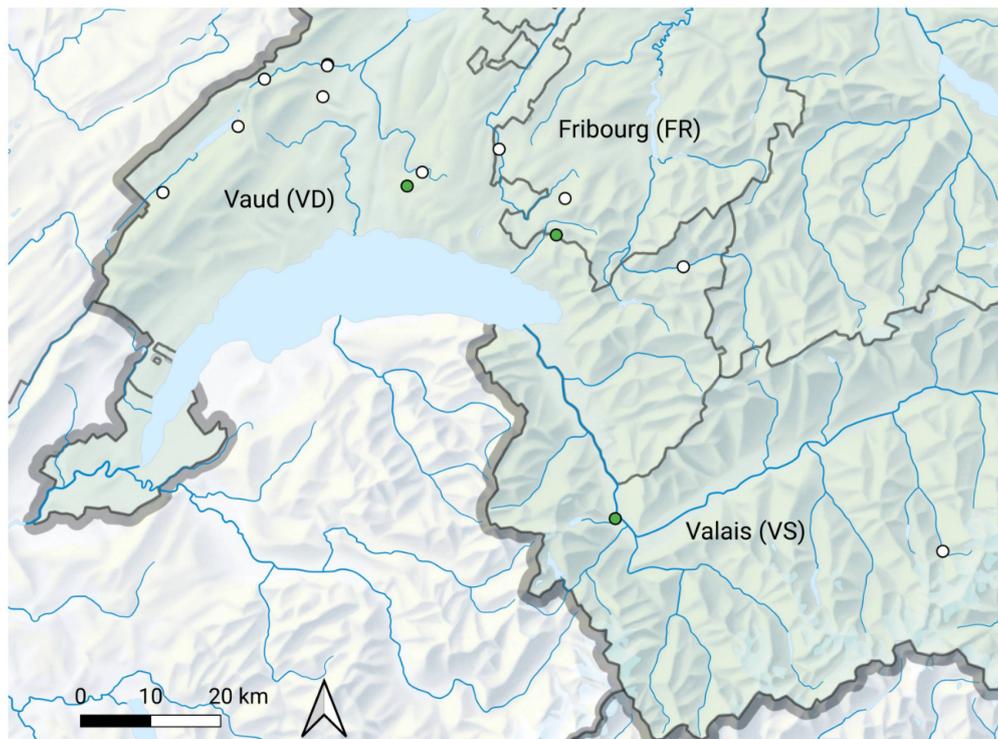


Figure 1. Sampling map of *Stactobia mosehyi* from Western Switzerland. Green circles indicate sites where *Stactobia mosehyi* larvae were found, while empty circles indicate sites where sampling was unsuccessful. The map was created in QGIS 3.42 (QGIS Development Team, 2025. Geographic Information System. QGIS Association, www.qgis.org) using land cover data from the Federal Office of Topography (swisstopo).

METHODS AND RESULTS

In the context of renewed interest in hygropetric habitat surveys in Switzerland, we conducted a targeted field campaign in Western Switzerland from April to July 2025. We surveyed 14 localities (figure 1) with hygropetric habitats potentially suitable for *Stactobia* species across the Cantons of Vaud (VD), Valais (VS), and Fribourg (FR), including the two historical sites of J. Aubert mentioned above. Potentially suitable habitats were carefully examined with the naked eye, and specimens were collected directly using soft entomological forceps and preserved in 100% ethanol. Specimens were subsequently identified in the laboratory under a stereomicroscope using the key of WARINGER & GRAF (2011). Larvae of *S. mosehyi* were found at three of these sites: VS, Salanfe downstream Pissevache waterfall near Vernayaz, 452 m, 11.IV.2025, 46.14428, 7.02941, leg. L. Vuataz (new site); Mèbre, Budron near Cugy, 706 m, 20.V.2025, 46.57222, 6.63858, leg. L. Vuataz, P. Andelbeek, J.-L. Gattolliat & J.-P. G. Reding (historical site); FR, Veveyse de Fégire near Châtel-St-Denis, Es Lances, 786 m, 31.V.2025, 46.51050, 6.91696, leg. L. Vuataz (new site). No adults were found at these sites. Two of these sites, along with images of larvae and adults, are shown in figure 2.

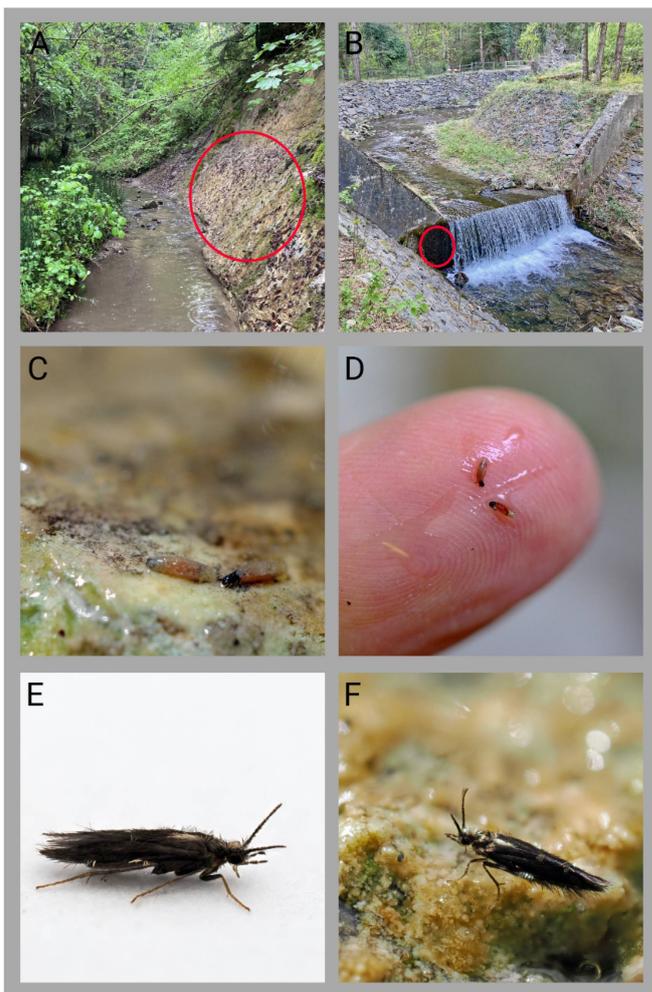


Figure 2. Photographs of *Stactobia moselyi* specimens and their habitats in Western Switzerland. **A.** La Mèbre, a historical site where the species was rediscovered. **B.** La Salanfe, downstream of the Pissevache waterfall. Red ellipses indicate the precise hygropetric microhabitats where larvae were observed: on a natural cliff along the left bank of La Mèbre (A) and on the side of an artificial weir on the right bank of La Salanfe (B).

C. Two larvae in situ. **D.** Two larvae on a fingertip for scale. **E.** Adult photographed in the laboratory. **F.** In situ adult from a locality outside the study area. (Photographs A–D: L. Vuataz; E–F: P. Anelbeek).

DISCUSSION

Our findings indicate that while *S. moselyi* is likely not abundant (see e.g. GATTOLLIAT *et al.* 2018), it is probably not as rare in Switzerland as the current lack of data suggests. Consequently, its conservation status might be revised in the upcoming Red List update, which is currently in preparation. Two main factors may explain the scarcity of records for this species. First, hygropetric habitats have historically received little attention from hydrobiologists and naturalists, though this is beginning to change, particularly with the ongoing update of the Swiss Red List. Second, *Stactobia* species are minute and difficult to detect (LODOVICI & VALLE 2013). Adults of *Stactobia* are rarely captured in light traps (MALICKY 2014) or Malaise traps and are therefore more efficiently collected at the larval stage. In our field experience, however, locating larvae is nearly impossible without guidance from an experienced collector. Nonetheless, after a brief training period, even novice collectors rapidly learn to recognize the minute larval cases and can subsequently identify new sites independently.

Interestingly, *S. moselyi* and *S. eatoniella* were found co-occurring at the Veveysse de Fégire site, occupying the exact same rock surface, indicating at least partial ecological overlap. The two species are readily distinguishable in the field, even to the naked eye. *Stactobia moselyi* constructs yellowish to brownish, semi-transparent cases composed of silk, covered with only a very thin layer of mineral particles, through which the larva is visible (figure 3).

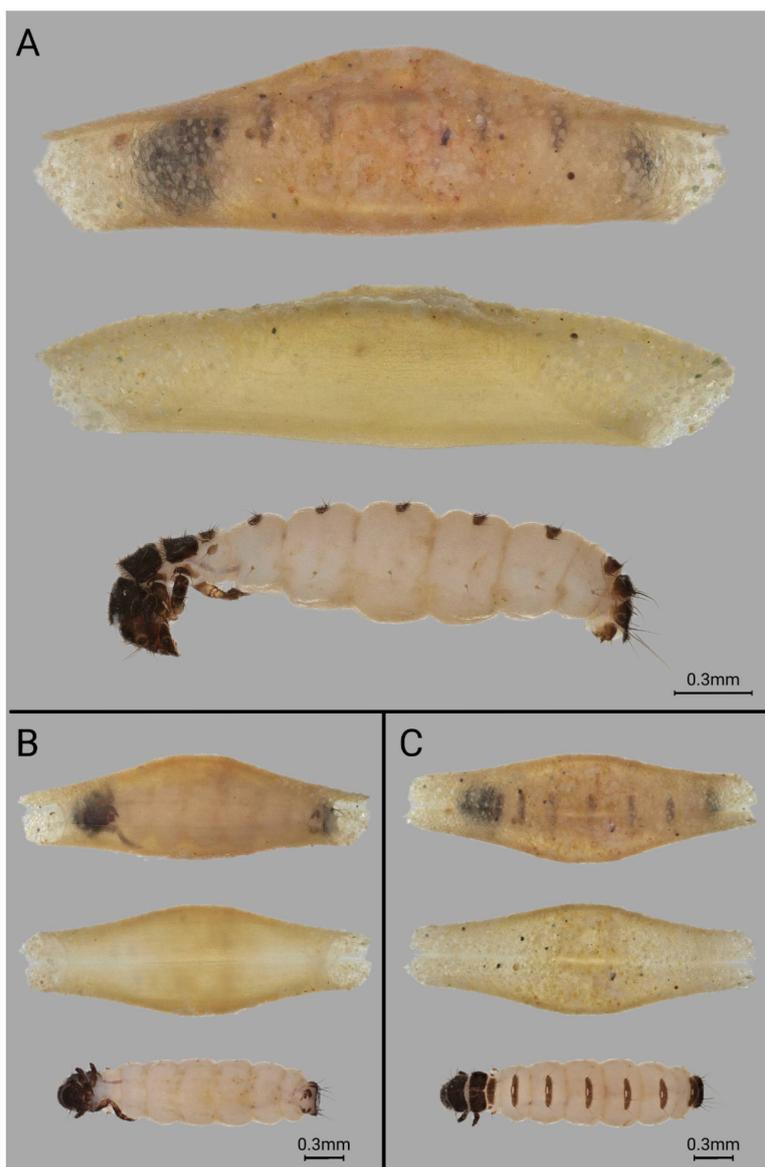


Figure 3. Photographs of a *Stactobia moseleyi* larva from La Mèbre in lateral (A), ventral (B) and dorsal (C) views. Each panel shows (from top to bottom): the larva within its case, the case alone, and the larva alone. For the lateral view (A), the case is shown from opposite sides, both with and without the larva. Images were edited using Photoshop CS5 (Adobe Inc., USA) and Inkscape 1.4.2 (Inkscape Project, 2025; <https://inkscape.org>), from original photographs taken with a Keyence Digital Microscope (Keyence Corp., Japan) using built-in stacking of 20 images. (Photographs: L. Vuataz).

In contrast, *S. eatoniella* produces whitish, opaque cases by attaching a thicker layer of fine, possibly calcareous, sediments to its silken case. Notably, *S. moseleyi* also co-occurs with *S. furcata*, in the Canton of Ticino (INFO FAUNA 2025a, E. BIRNSTIEL pers. comm.). In this context, distinguishing the larvae in the field is more challenging, as both species construct similar cases. However, the larvae of all three species can be reliably identified under a stereomicroscope based on the shape and arrangement of abdominal tergal sclerites (WARINGER & GRAF 2011).

We are confident that, in the coming years, the distribution and ecology of *S. moseleyi*, and of *Stactobia* species more generally, will become better understood in Switzerland. Such advances will support more accurate assessments and inform more appropriate conservation statuses and management measures.

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Table 1. List of sampling sites. For each site, the table lists the collection date, canton (VD: Vaud; FR: Fribourg; VS: Valais), locality, altitude or altitude range, geographic coordinates or coordinate ranges (WGS 84, latitude/longitude), hygropetric habitat type, and collectors (LV: L. Vuataz; PA: P. Anedelbeek; JLG: J.-L. Gattolliat; JPR: J.-P. G. Reding; PS: P. Stucki). Sites where *Stactobia moseyi* larvae were detected are highlighted in bold; sites without records are shown in regular font.

<i>Date</i>	<i>Canton</i>	<i>Locality</i>	<i>Altitude</i>	<i>GPS coordinates</i>	<i>Habitat</i>	<i>Collector</i>
11.IV.2025	VS	Vernayaz, Pissevache, La Salanfe (new site)	452 m	46.14428, 7.02941	artificial weir margin	LV
15.IV.2025	FR	Semsaies, Cascade du Dâ, Le Dâ	972 m	46.55784, 6.93275	waterfall spray zone	LV
22.IV.2025	VD	Château-d'Oex, Cascade du Ramaclé, Ruisseau de la Rosette	915 m	46.47016, 7.15353	waterfall spray zone, seepage rock faces	LV
2.V.2025	VD	Les Clées, Crêt Blanc	564 m – 552 m	46.72850, 6.48785 – 46.72608, 6.47878 (along trail)	seepage rock faces	LV, PA, JLG, PS
2.V.2025	VD	Croy, Cascade du Dard, Le Nozon	584 m	46.68658, 6.47972	waterfall spray zone, seepage rock faces	LV, PA, JLG, PS
2.V.2025	VD	Lausanne, Montheron, Le Talent	723 m – 732 m	46.59031, 6.66645 – 46.59072, 6.66944 (upstream)	natural streambank seepage cliffs	LV, PA, JLG, PS
15.V.2025	FR	Rue, Chutes de Chavanettes, La Broye	559 m	46.62100, 6.80931	waterfall spray zone, seepage rock faces	LV
17.V.2025	VD	Le Chenit, Côte de la Bursine, Le Biblanc	1106 m	46.55979, 6.18406	seepage rock faces	LV
17.V.2025	VD	L'Abbaye, Source de la Lionne	1131 m	46.64671, 6.32225	seepage rock faces, artificial weir margin	LV
17.V.2025	VD	Vallorbe, L'Orbe	747 m	46.70843, 6.37029	artificial weir margin	LV
20.V.2025	VD	Cugy, Bois des Fougères, La Mèbre (historical site)	706 m	46.57222, 6.63858	natural streambank seepage cliffs	LV, PA, JLG, JPR
24.V.2025	VD	Brettonnières, Gorges de l'Orbe, L'Orbe	521 m – 528 m	46.72670, 6.48721 – 46.72566, 6.48073 (upstream)	natural streambank seepage cliffs	LV
31.V.2025	FR	Châtel-St-Denis, Es Lances, La Veveyse de Fégire (new site)	786 m	46.51050, 6.91696	natural streambank seepage cliffs	LV
9.VII.2025	VS	Anniviers, Zinal, Le Vichiesso	1913 m	46.10259, 7.63426	seepage rock faces	LV

