ÖGH Herpetozoa
Austrian Herpetological Society

Herpetozoa 39: 17–21 (2026)
DOI 10.3897/herpetozoa.39.e178255

The identity of *Proteus tritonius* Laurenti, 1768: comments on a really doubtful case of literary interpretation

Günter Gollmann[1], Birgit Gollmann[2]

1 *Department of Evolutionary Biology, University of Vienna, Djerassiplatz 1, 1030 Wien, Austria*
2 *Department of Functional and Evolutionary Ecology, University of Vienna, Djerassiplatz 1, 1030 Wien, Austria*

https://zoobank.org/3E50C4FF-C0A3-4DA9-AE44-F5215F46D006

Corresponding author: Günter Gollmann (guenter.gollmann@univie.ac.at)

Academic editor: Peter Mikulíček ♦ **Received** 16 November 2025 ♦ **Accepted** 3 February 2026 ♦ **Published** 13 February 2026

Abstract

Proteus tritonius Laurenti, 1768 has long been regarded as the larva of *Triton alpestris* Laurenti, 1768. It is the type species of *Ichthyosaura* Sonnini & Latreille, 1801, the oldest available generic name for the Alpine newt, *Triton* being preoccupied by a senior homonym. Mutz and Böhme (2025) declared *Proteus tritonius* a nomen dubium, based on new interpretation of Laurenti's text, and moved it to the synonymy of *Salamandra salamandra* (Linnaeus, 1758) by a neotype designation. We challenge the validity of this neotype designation, because Mutz and Böhme (2025) ignored evidence contradicting their argumentation, and the morphology of the neotype does not conform with the description of *P. tritonius*.

Key Words

Ichthyosaura, *Mesotriton*, nomenclature, priority, stability, synonymy

Introduction

Proteus tritonius, a gill-bearing aquatic caudate, was described by Laurenti (1768) from a lake on Ötscher mountain in Lower Austria. It was "soon recognized as the larva … of Laurenti's own *Triton alpestris*" (Stejneger 1936). Not all later authors, however, agreed with this assessment; Sonnini and Latreille (1801) coined the name *Ichthyosaura* based on Laurenti's *Proteus tritonius* (The publication year was claimed to be 1802 by Mutz and Böhme (2025), but Frétey (2025) provided evidence for 1801 as the correct date). When the former genus *Triturus* was split into four genera, for good taxonomic reasons, *Ichthyosaura* was the oldest available genus name for the Alpine newt (*Triton* being preoccupied by a senior homonym), and after a few years of debate, was widely accepted (see Schmidtler 2004, 2009; Dubois and Raffaëlli 2009).

Recently, Mutz and Böhme (2025) have opened this debate again. They put forward new arguments against the identity of *P. tritonius* with *T. alpestris* (we will consistently use Laurenti's original name here, for brevity and neutrality in the debate on the valid genus name). They then try "to finally eliminate all the doubts" by designating a neotype of *Proteus tritonius*. Our aim here is to examine their "Arguments against" and to assess the validity of their neotype designation, not to review the full debate in detail.

Copyright *Günter Gollmann & Birgit Gollmann*. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

PENSOFT

Arguments against identifying *Proteus tritonius* as larva of the Alpine newt

Climate change

Mutz and Böhme (2025) correctly point out that ecological conditions in Laurenti's lifetime may have been different from the present. Otherwise, their speculations seem to be of little relevance. Weather data have been recorded in Austria since 1767, summary presentations of climatic development are openly available from GeoSphere Austria (e.g. https://klimaportal.geosphere.at/informationsportal-klimawandel/neoklim_lufttemperatur.html). Judging from these data, it appears highly improbable that more thermophilic urodeles may have been able to exist in places that are currently too cold for them around 1760, as discussed by Mutz and Böhme (2025), particularly in a water body described as "frigidissimus" (very cold) (Laurenti 1768).

The type locality

The small lake northeast of the summit of mount Ötscher has been identified as Laurenti's "lacus, qui est in alpe Etscher" because it is the only lake on the whole mountain range that is visible on maps or aerial photographs (H. Grillitsch, pers. comm.; Dubois and Raffaëlli 2009; Gollmann and Gollmann 2010). Mutz and Böhme (2025) develop several arguments to question this location as the type locality. All these arguments, however, are derived from free interpretations of certain words or sections in Laurenti (1768), with little ambition to adduce evidence for their verification.

Mutz and Böhme (2025) note that Laurenti (1768) referred to "Etschero monte" as habitat of *Triton alpestris*, while using "alpe Etscher" when dealing with *Proteus tritonius* and *Salamandra atra*. From the sequence "Habitat in alpe Etscher Austriacae & Loibel inter Carinthiam & Carnioliam", referring to *S. atra*, they conclude "*... here two mountain sites, Mt. Ötscher in Austria and the Loibl Pass between Carinthia and Krain (today Slovenia) are both referred to "in alpe". Therefore, the latter formulation should not be translated with "on Mt. Ötscher" but with "in the Ötscher mountain range", or the Ötscher Alps ...*". We cannot follow the logic of this argument, as "alpe" here seems to refer only to "Etscher" and not to "Loibel", and the latter is no mountain range. Nevertheless, it may be worth considering the possibility that "alpe Etscher" might denote the entire Ötscher region. Careful reading of Laurenti (1768), however, suggests that he intended a different distinction.

In German, the word Alpe, often with soft ending as Alb or Alm, has always been used for mountain pastures (Drosdowski 1989). In his treatment of *P. tritonius*, Laurenti (1768) referred to cattle, and humans, drinking from the water full of these small animals throughout the summer, an observation communicated by alpine herdsmen ("*Pastorum alpestrium: boves in Etscher, per totum aestatem, subinde etiam pastores eam aquam, his animaculis refertissimam, bibunt*"). In his time, such pastures were more widespread than they are now. Starting in the 19th century, more remote places were abandoned and reforestation was initiated; these developments accelerated since the 1960s (Eibl and Kremer 2009). Hence, "in Etschero monte" may refer to the whole mountain, from the top to the foot, whereas Laurenti (1768) used "alpe Etscher" for the region of alpine pastures on the Ötscher. This distinction would agree with the distributions of both species, *T. alpestris* extending to lower altitudes than *S. atra* (Cabela et al. 2001). This restricted meaning is strongly supported by Laurenti's description of the habitat of *S. atra*: "In alpe Etscher, ubi nunquam visa *Salamandra maculosa*" ("In alpe Etscher, where the fire salamander was never seen").

Mutz and Böhme (2025) continue "*Also the "ecological data" provided by Laurenti (1768, p. 141) on the habitat of his* Proteus tritonius *such as "Asylum in glutine fundi paludum" (= Retreat in the mud on the ground of a swamp) point more to a vegetated water body in lower altitude than to the mountain pond on the north-eastern flank of Mt. Ötscher at 1320 m a.s.l. as described by Gollmann and Gollmann (2010), more so as their photograph suggests relatively clear water with comparatively little submersed vegetation*." In our photograph (Suppl. material 1) a layer of fine, probably organic sediment, covering most of the stony ground of the lake is clearly visible. With even a slight rise of the water table, the lake would extend into the grassy vegetation on its margins. Of course, we do not know the state of the lake in Laurenti's time; probably it was larger and deeper than now, and trampling by cattle may have created a swampy littoral zone.

Next, they cite our short report as evidence for a visit even in our days being "quite arduous" (Mutz and Böhme 2025). This statement needs some qualification. We had approached the lake from the north, on a marked hiking trail leading to "Rauer Kamm", a rocky ridge extending from the summit eastwards, and then descended over a scree slope, largely overgrown with grassy vegetation, towards the lake. We mentioned this fact for two reasons, to explain the angle from which the site photograph was taken (Suppl. material 1), and to put in a short warning against taking this route ("eine Routenwahl, von deren Nachahmung wir ausdrücklich abraten wollen", Gollmann and Gollmann 2010). The lake can be more comfortably reached by trails from the south; we took one of those on our way back.

Mutz and Böhme (2025) add "How much more difficult must that have been in Laurenti's time, …". This assertion is totally amiss. In a 19th century tourist guide one can read "*In einer Höhe von 4500′ wird mit der Krummholzregion zugleich sein großartiges Felsengerippe, der „rauhe Kamm" sichtbar, welches großentheils von fetten Weideplätzen unterbrochen, sich über den Gipfel hinzieht* ..." ("At an altitude of 4500′ together with the krummholz

region its magnificent rock skeleton, the "rauhe Kamm" becomes visible, which to a large extent interrupted by rich pastures, extends over the peak …". Becker 1859, p. 3; altitude is given in Wiener Fuß and corresponds to ca. 1420 m). Judging from topography and current vegetation, the neighbourhood of the lake may have been the richest of these pastures (Fig. 1, Suppl. material 1). Far from being the inaccessible place Mutz and Böhme (2025) want us to believe, it certainly was connected to other sites by a network of well-trodden paths, and probably inhabited during the herding season.

Laurenti's own discussion

Laurenti (1768) discussed the possibility that *P. tritonius* might be the larva of *T. alpestris*, and denied it. Mutz and Böhme (2025) use this denial as main argument for regarding *P. tritonius* as a nomen dubium. They include the complete pertinent text, but ignore Laurenti's caveats and do not discuss his argumentation. They fail to see that all objections raised by Laurenti (1768) are arguments against these animals being larvae at all. He believed these animals belong to a distinct species, perennibranchiate like the olm, and therefore placed them in the same genus, *Proteus*. The choice of the species epithet *tritonius* indicates that he perceived their similarity to the newts.

In the first part of the book, the synopsis of Classis Reptilium, he wrote "Paradoxum, ut hic sit gyrinus tritonis alpestris" ("Paradox, if it were the larva of *Triton alpestris*"). He raised the possibility of *P. tritonius* being the larva of the Alpine newt, while expressing strong scepticism. In the second part, on the natural history of the Austrian species, he presented his arguments against this possibility, and concluded "Si quis melioribus argumentis contrarium ostenderit, acquiesco" ("If anyone counters with better arguments, I agree"). His denial clearly was tentative, not definite.

Today, we can easily resolve Laurenti's paradox: Overwintering of *T. alpestris* larvae has been commonly observed (Thiesmeier and Schulte 2010; Denoël 2017), explaining their occurrence in the lake in autumn, and all year round. Laurenti (1768) regarded the presence of both functional gills and lungs at the same time as unusual for larvae; he used this combination of traits to characterize the genus *Proteus*. We now know that it occurs regularly in the development of many amphibian species. Laurenti's opinion can be fairly paraphrased, we suggest, like this: If these animals were larvae after all, contrary to my judgement, they certainly belong to *Triton alpestris*. As he found no other species worth of consideration in this context, his discussion provides strong support for the synonymy of *P. tritonius* with *T. alpestris*, not against it.

Neotype designation

Believing to have created sufficient doubts on the identification of *P. tritonius* as *T. alpestris*, Mutz and Böhme (2025) designate a larva of *Salamandra salamandra* collected in a creek near Nesselberg in the Ötscher region as neotype of *Proteus tritonius.* We challenge the neotype designation of specimen ZFMK 104202 for two reasons – wrong location, wrong species – nicely summarized in Laurenti's "In alpe Etscher, ubi nunquam visa *Salamandra maculosa*" cited above.

The type locality of *Proteus tritonius* is not "in alpe Etscher", as wrongly stated several times by Mutz and Böhme (2025), but "in lacu, qui est in alpe Etscher" (Laurenti 1768; Dubois and Raffaëlli 2009; Gollmann and

Figure 1. Orthophotograph of the lake (L), situated at ca. 1315 m altitude on mount Ötscher, and its vicinity. Scale bar: 100 m (Source: basemap.at).

Gollmann 2010; Frost 2026). Mutz and Böhme (2025) fail to present any sound argument against accepting the lake northeast of the summit of mount Ötscher as this location. In contrast, a "vegetated water body in lower altitude", as they imagine, would not fit Laurenti's report of pastoralists drinking water from the lake throughout summer. This observation clearly points to an alpine pasture at high altitude as position of the type locality. At lower altitude, people would have visited springs or streams to fetch water; in contrast, in the higher parts of this karst mountain range, surface water is rare. In choosing a creek as new type locality, Mutz and Böhme (2025) demonstrate remarkable inconsistency of argumentation; the objections they try to bring forth against the lake surely disqualify the creek.

There is wide consensus that the figure presented by Laurenti (1768) does not allow unequivocal assignment of this larva to a certain species. Mutz and Böhme (2025) concede that the anterior onset of the dorsal fin argues for a newt larva, either *Lissotriton vulgaris* (Linnaeus, 1758) or *T. alpestris*. We are puzzled by their statement "The relatively long forelegs point additionally to an Alpine Crested Newt (*Triturus carnifex*) larva", because the forelegs have the same proportions as in a topotypic *T. alpestris* larva (Fig. 2) and the fingers are very short. A rounded tail, regarded by Mutz and Böhme (2025) as fitting a *S. salamandra* larva better, can occur in *T. alpestris* as well (e.g. Thiesmeier 2019, p. 26). *Salamandra atra* is live-bearing and does not have aquatic larvae. In view of the frequent occurrence of animals with mutilated tails mentioned by Laurenti (1768, p. 141) the illustration may actually be a fairly accurate depiction of an Alpine newt larva with a tail fin in a late stage of regeneration (Fig. 2).

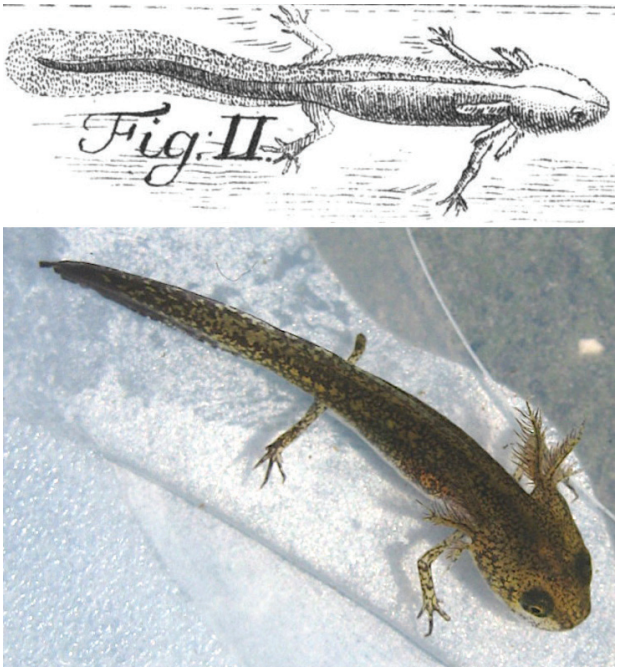

Figure 2. Above: figure of *Proteus tritonius* on Tab. II in Laurenti (1768); below: photograph of an Alpine newt larva from the lake on mount Ötscher (source: Gollmann and Gollmann 2010).

Laurenti (1768) also provided a verbal description of *P. tritonius*, which helps to clarify its identity, as noted by Schmidtler (2009) and Dubois and Raffaëlli (2009). The description of the dorsal fin beginning at the nape ("Dorsum medium membrana lata natatoria percurrit, quæ a nucha, tenui incepta principio, oritur, …") definitely rules out *S. salamandra*, leaving *T. alpestris* and *L. vulgaris* from the species known to occur in this region. The type locality, and Laurenti's own discussion, clearly point to *T. alpestris.*

Mutz and Böhme (2025), however, completely disregard this description. Their neotype designation thus fails to fulfil the qualifying conditions laid out in article 75.3 of the Code, in particular "75.3.5. evidence that the neotype is consistent with what is known of the former name-bearing type from the original description …" (Anonymous 1999). The neotype is not consistent with the original description.

Conclusions

All available evidence supports the identity of *Proteus tritonius* as larva of *T. alpestris.* Mutz and Böhme (2025) apparently did not even try to visit the lake, nor do they propose any alternative suggestion for the location of Laurenti's "lacus, qui est in alpe Etscher". Their purpose seems only to make *Ichthyosaura* unavailable as generic name for the Alpine newt by moving *Proteus tritonius* to the synonymy of another genus. The argumentation is severely flawed, ignoring passages in Laurenti (1768) that contradict their conclusions.

Recently, Böhme et al. (2025) published a plea for nomenclatural stability, which we fully endorse (see Gollmann 1996). The first example discussed there is "*Mesotriton* vs. *Ichthyosaura*". *Ichthyosaura* has been widely accepted for the last 15 years, after a few years of mixed use of *Triturus*, *Mesotriton* and *Ichthyosaura* for the Alpine newt. The conclusions of Mutz and Böhme (2025) are unfortunately not based on "A careful check of Laurenti's (1768) original text" (Böhme et al. 2025), but erroneous as demonstrated above. An application to the Commission to set aside the neotype according to article 75.6 of the Code (Anonymous 1999) is in preparation.

Acknowledgements

We thank Andrea Kourgli and Alain Dubois for hints to literature, and Pim Arntzen and two anonymous reviewers for comments that helped to improve our presentation. Open access funding provided by University of Vienna.

References

Anonymous (1999) International Code of Zoological Nomenclature. International Trust for Zoological Nomenclature, London, xxix + 306 pp.

Becker MA [Ed.] (1859) Der Ötscher und sein Gebiet. Leopold Grund, Wien, x + 524 pp.

Böhme W, Denzer W, Wüster W (2025) Noli tangere nomina probata! Taxonomists must prioritise stability and protection of well-established scientific names in herpetology. Salamandra 61: 395–406.

Cabela A, Grillitsch H, Tiedemann F (2001) Atlas zur Verbreitung und Ökologie der Amphibien und Reptilien in Österreich. Umweltbundesamt, Wien, 880 pp.

Denoël M (2017) On the identification of paedomorphic and overwintering larval newts based on cloacal shape: review and guidelines. Current Zoology 63: 165–173. https://doi.org/10.1093/cz/zow054

Drosdowski G [Ed.] (1989) Duden Etymologie. Herkunftswörterbuch der deutschen Sprache. 2nd Ed., Dudenverlag, Mannheim, 844 pp.

Dubois A, Raffaëlli J (2009) A new ergotaxonomy of the family Salamandridae Goldfuss, 1820 (Amphibia, Urodela). Alytes 26: 1–85.

Eibl J, Kremer D (2009) Almwirtschaft im Alpenraum. Glossar Deutsch, Französisch, Italienisch. Institut für Translationswissenschaft der Universität Innsbruck, 138 pp.

Frétey T (2025) Publication date of the first edition of Sonnini & Latreille's "Histoire naturelle des Reptiles". Bionomina 41: 53–59. https://doi.org/10.11646/bionomina.41.1.4

Frost DR (2026) Amphibian Species of the World: an online reference. Version 6.2, American Museum of Natural History, New York. https://amphibiansoftheworld.amnh.org/index.php [accessed on 18 January 2026]

Gollmann G (1996) Species concepts: a contrast of viewpoints. Amphibia–Reptilia 17: 295–301. https://doi.org/10.1163/156853896X00018

Gollmann G, Gollmann B (2010) In alpe Etscher: auf der Jagd nach *Ichthyosaura*. Zeitschrift für Feldherpetologie 17: 237–239.

Laurenti JN (1768) Specimen medicum, exhibens synopsin reptilium emendatam cum experimentis circa venena at antidota reptilium Austriacorum. Trattner, Wien, 214 pp. [5 pl.] https://doi.org/10.5962/bhl.title.5108

Mutz T, Böhme W (2025) *Ichthyosaura* as a generic nomen for the Alpine newt (Caudata: Salamandridae): a doubtful case of literarian archeology. Salamandra 61: 41–52.

Schmidtler JF (2004) Der Teichmolch (*Triturus vulgaris* (L.)), ein Musterbeispiel für systematische Verwechslungen und eine Flut von Namen in der frühen Erforschungsgeschichte. Sekretär 4/2: 10–28.

Schmidtler JF (2009) *Ichthyosaura*, der neue Gattungsname für den Bergmolch – ein Lehrbeispiel in Sachen Nomenklatur. Zeitschrift für Feldherpetologie 16: 245–250.

Sonnini CS, Latreille PA (1801) Histoire naturelle des Reptiles. Tome 4, Seconde partie. Detreville, Paris, iii+410 pp. [14 pl.]

Stejneger L (1936) Types of the amphibian and reptilian genera proposed by Laurenti in 1768. Copeia 1936 (3): 133–141. https://doi.org/10.2307/1435820

Thiesmeier B (2019) Fotoatlas der Amphibienlarven Deutschlands, Österreichs und der Schweiz. Laurenti-Verlag, Bielefeld, 160 pp.

Thiesmeier B, Schulte U (2010) Der Bergmolch: im Flachland wie im Hochgebirge zu Hause. Laurenti-Verlag, Bielefeld, 160 pp.

Supplementary material 1

Documentary photographs published in Gollmann and Gollmann (2010)

Authors: Günter Gollmann, Birgit Gollmann

Data type: pdf

Explanation note: A) Lake on mount Ötscher, viewed from Rauer Kamm; B) adults of *Ichthyosaura alpestris* and larvae of *Bufo bufo* in the lake (1 August 2009).

Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0/). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.

Link: https://doi.org/10.3897/herpetozoa.39.e178255.suppl1