

## Synonymy and nomenclatural history of the Common or Viviparous Lizard, by this time: *Zootoca vivipara* (Lichtenstein, 1823)

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**Abstract.** We carefully reread and translated the Latin account by J.F. von Jacquin (1787) on his description of a viviparous lizard (“*Lacerta vivipara*”) in the Austrian Alps near Vienna. It turned out that – in contrast to common usage – this account cannot be regarded as the original description and scientific denomination of the taxon *Zootoca* (formerly *Lacerta*) *vivipara*. It is apparent that v. Jacquin did not at all intend to describe a new species, but just wanted to point on his extraordinary observation that the lizard observed by him gave birth to young instead of laying eggs (Latin: *Lacerta vivipara* = viviparous lizard). For securing nomenclatural stability of this well-known and widely distributed species, we had to search for the next, subsequent author using v. Jacquin’s name in the sense of a taxonomic denomination. According to our extensive literature review, it was Lichtenstein (1823) who first used “*Lacerta vivipara*” as a species name (although he thought it to be a synonym of *Lacerta muralis*). In accordance with and to meet the standards of Article 11 of the International Code of Zoological Nomenclature (ICZN 1999), the common lizard has now to be named *Lacerta vivipara* Lichtenstein, 1823, or, according to current concepts, *Zootoca vivipara* (Lichtenstein, 1823).

Cocteau (1832) was the only earlier author who recognized that von Jacquin had no intention of describing a new species. He therefore named his lizard from Schneeberg / Austria “*Lacerta de Jacquin*” which has to be regarded as a replacement name (at least with respect to *Lacerta vivipara* Lichtenstein). Subsequently, Duméril & Bibron (1839) discussed the biological details of “*Lacerta vivipara*” given by Cocteau (1832), but omitted his nomenclatural findings completely, like all subsequent authors. Since then the common lizard was usually named “*Lacerta vivipara* de Jacquin, 1787”, whereupon some older names before Lichtenstein’s (1823) action were relegated into its synonymy.

The viviparous lizard was for a long time the hidden member of a voluminous collective species since early Linnean times (named *Lacerta agilis* by Linnaeus, 1758, or *Lacertus cinereus* by Lacepède, 1788 – and comprising at least additionally *Lacerta agilis* Linnaeus, 1768, *Lacerta viridis* Laurenti, 1768, and *Podarcis muralis* (Laurenti, 1768), in their current sense. On the other hand Wolf in Sturm (1805) and Mikan in Sturm (1805) had split the present-day *Zootoca vivipara* into three species later on. The discrepancy between several simultaneous lumping and splitting trends immensely complicated the development of nomenclature and systematics – not only in *Zootoca vivipara* (see Schmidtler, 2010) – up to the middle of the 19<sup>th</sup> century.

In this paper, we provide a detailed list of the names erected and described in connection with the common lizard and discuss and evaluate their nomenclatural availability. Some of the old nomina were rediscovered here and are rather curious examples from early post-Linnean times.

**Key words.** Squamata: Lacertidae: *Zootoca vivipara*; nomenclature, authorships, history of herpetology.

### INTRODUCTION

The Common or viviparous lizard (*Lacerta* – now *Zootoca vivipara* auct.) is the most widespread terrestrial reptile in the world ranging from the Cantabrian mountains and Ireland in the west through the entire Eurasian landmass to Sakhalin Id. (Russia) and Hokkaido Id. (Japan) in the east, and from the Po valley (Italy) and South Bulgaria in the south to the Barents Sea in the north. But despite this huge range, this species was for long believed to be monotypic (see e.g. Wermuth 1951, Mertens & Wermuth 1960). However, more recent studies revealed considerable differences in physiology, natural history, karyology, and – most important – molecular genetics which resulted in the description and/or recognition of several

subspecies, viz. *sachalinensis* Perelshin & Terentyev, 1963, *pannonica* Lac & Kluch, 1968, *carinolica* Mayer, Böhme, Tiedemann & Bischoff, 2000, and *louislantzi* Arribas, 2009 (see Dely & Böhme 1984, Kuprianova & Böhme 1997, Cabela et al. 2001, Mayer & Böhme 2000, Mayer et al. 2000, Odierna et al. 2000, 2004, Glandt 2001, Surget-Groba et al. 2001, Arribas 2009). Subsequently, it was even claimed that it would be possible (though still difficult) to define some of these taxa by external morphology (Clasen 2001, Guillaume et al., 2006, Arribas 2009).

Because of this new and earlier unexpected diversity in the above-mentioned parameters of this species it became

important to define what *Zootoca* (or *Lacerta* respectively) *vivipara* actually is. To this end, a re-analysis of J.F. v. Jacquin's (1787) first description and a short biographical search about himself seemed useful as a first step. This first description of a viviparous lizard is a short account of one and a half pages published in Latin language in the "Annales Helveticæ". It deals with an observation the author made when he was an eleven years old boy, accompanying his father, the famous botanist Nikolaus Josef von Jacquin, on a botanical excursion to the Schneeberg near Vienna in 1778. During this walk, Josef Franz happened to catch a female lizard, put it into a small box, looked after it again two days later and found six juveniles but no eggshells wherefore he drew the correct conclusion that these juveniles should have come to light directly from their mother's body. A first important point in respect to this article (written down nine years later, i.e. 1787) is that the term "Lacerta vivipara" (i.e. a viviparous lizard) is used only once, viz. in the title. The next mentioning of the animal, the first in the text, reads "Lacerta praegnans" (i.e. a pregnant lizard). But the statement given by the author at the end of his article, that he would never dare to state which species his lizard might belong to, makes definitely clear that "Lacerta vivipara" was not intended as a new scientific taxon name but only as a Latin term for the observed phenomenon of viviparity. If he would have written his account in German or any other language, the name *Lacerta vivipara* would never have been created at that time and would never have been ascribed to J.F. von Jacquin (see Cocteau 1835, Böhme & Rödder 2006, Schmidtler & Böhme 2006). This means, that *Lacerta vivipara* Jacquin, 1787 does not at all meet the criteria of Art. 11.5 of the International Code of Zoological Nomenclature (ICZN 1999) which states: "To be available, a name must be used as valid for a taxon when proposed".

We were aware that this discovery is suited to endanger the stability of the name *Zootoca vivipara* because the synonymy list is long and dates back to the early 19<sup>th</sup> century. Changing the name of this famous reptile would be catastrophic, not so much for herpeto-taxonomists (who are accustomed to such changes) but mainly for taxonomy-users such as physiologists, ecologists, conservationists etc., and the Code clearly states already in its preamble that stability and universality of scientific names is its uppermost objective, and the priority rule for example has to serve stability and not vice versa (ICZN 1999). It was therefore our first ambitious goal to solve the nomenclatural problems arising from the insight that Jacquin (1787) is not the author of this taxon. Hence we provide here a commented list of all synonyms or other names connected with *Zootoca vivipara*. Such a list is certainly of interest because it might well be possible that further refinement of the infraspecific structure of *Z. vivipara* and consequently further taxonomic splitting can happen. This

should be facilitated when a sound nomenclatural basis is available. With this paper, we want to contribute to the creation of this basis by evaluating the complicated nomenclatural history of *Zootoca vivipara* which is more than 200 years old.

## RESULTS

### I. Synonymy list of *Zootoca vivipara*

In the following we give an as complete as possible commented list of names applied to *Z. vivipara* since von Jacquin's (1787) account. The year of description is followed by the name in its original spelling and by the type locality – if stated – likewise in the original spelling. Our comments are referred to numbered notes in the second paragraph of this chapter.

- 1830 *Zootoca* Wagler – Type species: "*Lacerta vivipara* Jacqu.". (Note 1)
- 1785 *Seps? atra* Schrank in Schrank & Moll – Berg Schwarzort bei Berchtesgaden. (Note 2)
- 1787 "*Lacerta vivipara*" Jacquin – "In monte Schneeberg". (Note 3)
- 1788 *Lacertus cinereus* Lacépède – (Note 4)
- 1804 *Lacerta oedura* Sheppard – "At different times found in vast abundance". (Note 5)
- 1805 *Lacerta montana* Mikan in Sturm – "Riesengebirg". (Note 6)
- 1805 *Lacerta nigra* Wolf in Sturm – "Wenger-Alpe, Canton Bern". (Note 7)
- 1805 *Lacerta crocea* Wolf in Sturm – "Hiesige Gegend". (Note 8)
- 1808 *Lacerta fragilis* Palmstruch & Swartz (Note 9)
- 1820 *Lac. unicolor* Kuhl – "Vaterland?" (Note 10)
- 1820 *Lac. ptychodes* Kuhl – "Vaterland?". (Note 11)
- 1820 *Lacerta ptychodes* Merrem – "Habitat...". (Note 11)
- 1820 *Lacerta pyrrhogaster* Merrem – "Deutschland". (Note 12)
- 1823 "*Lac. vivipara* Jaquin" (sic!), Lichtenstein. (Note 3)
- 1829 *Lacerta schreibersiana* Milne Edwards – "Envoyés de Vienne". (Note 13)
- 1832 *Lacerta Schreibersiana* var. a. *fusca* Gachet (p. 238) – "Environs de Bordeaux" (Note 13a)
- 1832 *Lacerta Schreibersiana* var. b. *lutea* Gachet (p. 239) – "Environs de Bordeaux (dans une prairie humide)" (Note 13a)
- 1832 *Lacerta chrysogastra* Andrzejowski – "In vallibus circa Cremeneum". (Note 14)
- 1835 *Lacerta de jacquin* Cocteau – "(nova acta Helvetica 1787, page 33 Icon tab. 1)" (Note 15)
- 1835 *Lacerta guérin* Cocteau – "La Forêt d'Eu". (Note 16)

- 1837 *Zootoca montana* Tschudi – “Wahrscheinlich das seltenste schweizerische Reptil... Gebirgsbewohnerin“. (Note 17)
- 1837 *Zootoca alpina* Tschudi – “Schweiz“. (Note 18)
- 1840 “*Lacerta isidori Geoffr.*“ (sic!), Schinz (Note 19)
- 1872 *Lacerta vivipara* var. *pallida* Fatio “Cà et là dans nos Alpes et dans le Jura“. (Note 20)
- 1897 *Lacerta vivipara* var. *carniolica* Werner – Krain (Schneeberg). (Note 21)
- 1898 *Lacerta (Zootoca) vivipara* var. *melanogastra* Pražák – “Leitomyschl, Carlsbad“, Böhmen (Note 22)
- 1902 *Lacerta vivipara* var. *barabensis* Kashchenko – “Barab“, near Tomsk (Note 23)
- 1923 *Lacerta vivipara* var. *gedulyi* Fejerváryi – “Felső-Babad, commune Ocsa, départment Pest“ (Note 24)
- 1963 *Lacerta vivipara sachalinensis* Pereljeshin & Terentjev – Type locality not given, but by implication Sakhalin Island. (Note 25)
- 1968 *Lacerta vivipara pannonica* Lác & Kluch – “Botány, Kapushanský Wald“ (Note 26)
- 2000 *Zootoca vivipara carniolica* Mayer, Böhme, Tiedemann & Bischoff – “Slovenia: Mt. Sneznik: 8 km SE Masun village, 1250 m a.s.l.“. (Note 21)
- 2009 *Zootoca vivipara louislantzi* Arribas – “Pla de Beret (Vall d’Arán, Lleida). Spain“ (Note 27)

## II. Notes

### 1. *Zootoca* Wagler, 1830

*Lacerta vivipara* is the type species of *Zootoca* Wagler, 1830 (see Stejneger 1907: 251); the later determination of *Zootoca crocea* by Fitzinger (1843: 20) is irrelevant, since the type determination had been carried out by Wagler (1830: 155) himself (by monotypy; Article 68.3 of the Code). Wagler listed indeed *Lacerta crocea* beside other nomina, but they have been added in brackets just behind *Lacerta vivipara*. According to Wagler’s handling, these nomina are deemed synonyms. *Zootoca* was re-elevated to full generic rank by Mayer & Bischoff (1996).

In addition, Wagler (1830) provided also the basis for the modern generic and specific systematic concept and the current nomenclature of European lizards, next to *Z. vivipara* also for e.g. *Lacerta agilis* and *Podarcis muralis*, although his generic concept was widely accepted much later, since the early 1990s (see Schmidtler 2010: fig. 1).

### 2. *Seps? atra* Schrank in Schrank & Moll, 1785 (Fig. 1)

Even if seen on the background of former contemporary practices, the original description appears highly strange. It corresponds only to a sight record of several seconds

(see text in fig. 1) on occasion of Schrank’s excursion to Mount Schwarzort near Berchtesgaden (then a clerical principality immediate to the so called Old German Empire; now situated in southeastern Bavaria). The identification as a viviparous lizard is nonetheless obvious: Schrank was a good adept of the local herpetofauna which he registered in the same work in his “20. Brief über Berchtesgaden“ (1785b). The simultaneous and progressive use of Laurenti’s (1768) new generic and specific names for the species observed by Schrank himself in this territory demonstrates well that he was able to differentiate between lizards and salamanders: *Proteus tritonius* (the larvae of the Alpine newt, now *Ichthyosaura alpestris*; see Schmidtler 2007), *Salamandra atra*, *Salamandra maculosa*, *Seps viridis* (here probably the male of the sand lizard, *Lacerta agilis*) beside “*Seps? atra*“). A certain uncertainty concerning the genus is mirrored by the question mark behind Laurenti’s new generic name *Seps* for lizards. In the case at hand the evidence of quickness, colouration, the long tail and the slender body are surely crucial. There may be added the ecological description of the Schwarzort mountain in the preceding “19. Brief“ (Schrank 1785a) which is pointing to a typical alpine montane forest. According to our present knowledge this altitudinal belt in the Northern Calcareous Alps is characteristically inhabited by *Zootoca vivipara*. In the subsequent literature this taxon is apparently alluded only once, by Jäckel (1871: 85), who correctly related it to the melanistic *Lacerta nigra* Wolf (see below note 7).

*Seps atra* (grammatically and according to Art. 34.3 ICZN nomenclaturally correct, would be: “*Seps ater*“; *Seps* has, contrary to *Zootoca*, a male gender; cf. Laurenti, final sentence of the “Errata“: „*Si Sepem inveneris in genere feminino lege masculinum*“) is therefore the oldest available synonym in the genus *Zootoca*. It is however a “nomen oblitum“ (compared with *vivipara*; see below note 3), but being available as a taxon of the species

53. Schwarze Eidechse? (*Seps? atra*.)  
 Ich habe dieses Thier nicht hinlänglich gesehen; vielleicht war es ein schwarzer Molch; aber es war doch schnell, und der Schwanz schien mir viel dünner und länger als bey den Molchen, und der Körper schlanker.  
 Ich habe es in dem Walde unterm Schwarzorte auf einem faulen Baumstocke gesehen, allein als ich es greifen wollte, war es weg, und nicht mehr zu finden.

Fig. 1. Text of the original description of *Seps atra* Schrank, 1785. For translation see Note 2.

group, if the taxonomical distinctness of this Berchtesgaden taxon should emerge. (Art. 29 ICZN).

The translation of Schrank's figure legend (Fig. 1) is: "53. Black lizard? (*Seps? atra.*) I did not see this lizard sufficiently; perhaps it was a black newt; but it was nonetheless quick, and the tail seemed to me much thinner and longer than in newts, and the body slimmer. I have seen it in the forest below of (Mt.) Schwarzort on a rotten tree trunk, however; when I wanted to catch it, it disappeared, and was not to be traced again."

### 3. "Lacerta vivipara" Jaquin, 1787 and *Lacerta vivipara* Lichtenstein, 1823. (Fig. 2)

#### 3.1. Only a "viviparous lizard" but not an original description.

As mentioned already in the introduction, J.F. de Jacquin (1787) entitled a short note as follows: „Lacerta vivipara, observatio Jos. Francisci de Jacquin“. After having described the context of his discovery and the morphology of a female with its hatchlings born shortly after the capture, he stated that he would not dare to decide to which species this specimen could be assigned, He even consulted Linné's work in vain, who did also not seem to him to know much in terms of many other species of "our Austria". Thus the aforementioned caption should certainly not denote a new species but rather was intended as the scientific communication of a sensational biological anomaly, namely a "viviparous lizard" (Latin: "*Lacerta vivipara*") within the class of the "oviparous quadrupeds" - the present-day amphibians and reptiles (see Böhme & Rödder 2006; Schmidler & Böhme 2006). Cocteau (1835; see note 14) was the first to spot these facts, but they were forgotten shortly after publication of his work. "*Lacerta vivipara* Jacquin, 1787" had therefore not become an available name (Art. 11.5 ICZN).

#### 3.2. The search for the correct species name.

According to the principle of priority (Art. 23.3.5 ICZN), the name *vivipara* would generally have to be replaced by the next-oldest available synonym (see listing in chapter I). However, the principle of priority is not a value in its own, but it is a means to serve stability and universality of nomenclature (Preamble and Art. 23.2 ICZN). Therefore, names of long acceptance should not be invalidated but preserved if this can anyhow be achieved. This is particularly true for the name of such a famous and widespread species as in this case!

As far as noticeable for us, the name *Lacerta vivipara* was first used as a "real" species name – and also by referring to Jacquin – in Lichtenstein's (1823) catalogue (see

fig. 3), which contains also many new species descriptions. From that time onwards (especially since Duméril & Bibron, 1839) this name became more and more in general use. The peculiarity here is that in this "Verzeichniss" by Lichtenstein 1823 the history of discovery and the description of "*Lac. vivipara*. Jaquin" (sic!) are treated in detail, but that this taxon was "only" ranked as a synonym under "14. *Lacerta muralis* Merr." (text under fig. 3). But, by virtue of the Articles 11.5, 11.6, 50.7 ICZN this fact is sufficient to make the name *Lacerta vivipara* from its type locality "Mons Schneeberg" (= Mt. Schneeberg, west of Vienna) available.

The older synonyms (between 1788 and 1820: *atra*, *oedura*, *nigra*, *crocea*, *montana* etc., see the synonymy list above) must not be considered as threatening the citation of *vivipara* by Lichtenstein (1823): None of them was used as a valid name after 1899 (Art. 23.9.1.1 ICZN), and it is no question here that *Lacerta vivipara* was validly used in at least 25 publications by at least 10 authors in the last 50 years (Art. 23.9.1.2 ICZN).

#### 3.3 The correct authorship of *Lacerta vivipara*

"H. Lichtenstein" is headed on the title page of the "Verzeichniss" (1823), but this fact does not exclude a possible coauthorship of other persons for parts of the publication (Art. 50.1 ICZN). So, among others, Tschudi (1837: 29) had nominated "Schulze" (sic!) without any substantiation as a coauthor of the mentioned citation. This was apparently based on Lichtenstein's own statement on his introductory page IX: „Damit ich mir nicht allein anzumaßen scheine, was Verdienstliches an dieser kleinen Arbeit sein mag, so darf ich nicht unerwähnt lassen, dass zwei meiner werthen Gehülphen, Herr Doctor Rödig, (jetzt Professor in Münster) und Herr Stud. Med. Ferd. Schultze von Halle an dem Verzeichniß der Amphibien und Fische einen wesentlichen Antheil haben. Namentlich sind die eingestreuten Bemerkungen über die variablen Eidechsen Arten und die Fassung der mehrsten Diagnosen in den letzten 4 Bogen ganz des letztern Werk, und von demselben während meiner Abwesenheit von hier, zum Druck befördert“ which reads in our translation: „In order not to ascribe everything to myself what could be meritorious in this small work, I may not leave it unmentioned that two of my estimated helpers, Dr. Rödig (now professor at Münster) and Mr. Stud. Med. Ferd(inand) Schultze of Halle have considerably participated in the list ("Verzeichniss") of amphibians and fishes. Particularly the dispersed comments on the variable lizard species and the version of most of the diagnoses in the last 4 sheets are completely the latter's work, and were also sent by him to the printer during my absence.“

This highly precious and mannered information does not represent in itself a proof that F. Schultze really authored

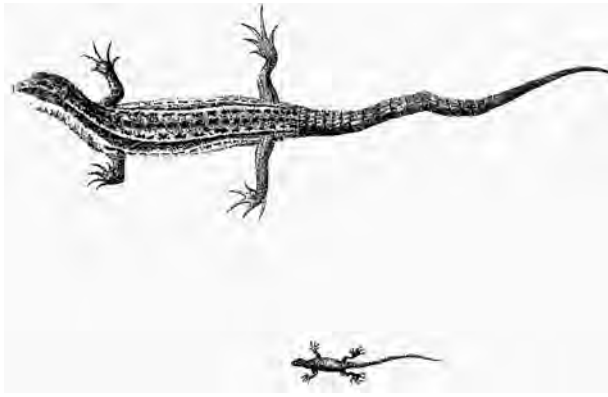


Fig. 2. “*Lacerta vivipara*” from de Jacquin (1787); adult female with its newborn offspring, from Schneeberg, west of Vienna. – Note 3.

#### 4. *Lacertus cinereus* Lacépède, 1788 (Figs 4, 5).

4.1. *A confusing collective species and an unavailable binomen.*

This binominal taxon is mentioned by Lacépède (1788) only in his „Synopsis methodica quadrupedum oviparum“ being adherent to his herpetological encyclopedia (“*L. cinereus*” under the caption “*Lacertus*”). Apart from that, Lacépède was always speaking of the “Lézard gris” (= Grey lizard; cf. also “*Lacertus cinereus*” and “Graue Eidechse” in Bechstein 1800: 537). However, *Lacertus cinereus* does not anymore figure in any contest with other available taxa, since Lacépède’s new taxa in this first and not constantly binominal volume of his encyclopedia were declared as not available („Lacépède, B.G.É. de la V. 1788. *Histoire Naturelle de Quadrupèdes Ovipares*, and all subsequent editions of this work ruled to be not avail-

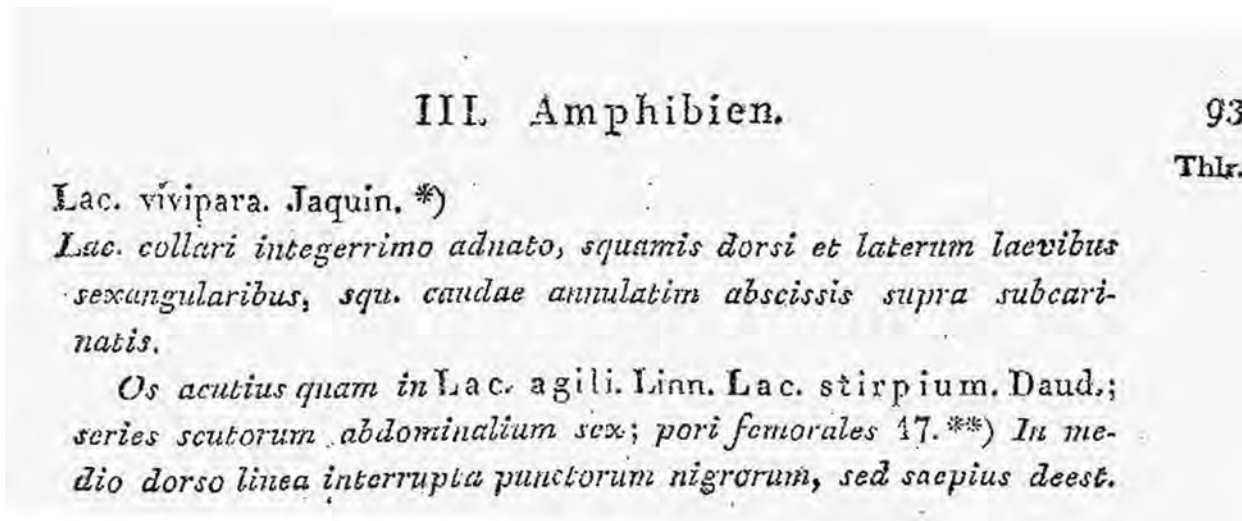


Fig. 3. Excerpt from the description of *Lacerta vivipara* in Lichtenstein (1823) as a synonym under “14. Merr. *L. muralis*. p. 67” (preceding page 92). Below page number 93 see the price column with the abbreviation “Thlr” (=Thaler), at that time the Prussian currency. The publication of Lichtenstein (1823) belongs to an unusual and rare literary genre in which sales catalogue and zoological science are combined (see Junk, 1926–1936: 192, 198). Numerous animal species are described here under specification of the selling price per specimen. The explanations of the reptiles are at great length (see also Schmidtler 2004). – Note 3.

the citations on *Lacerta muralis* or *Lacerta vivipara*, respectively. Even the instance that F.S. Leuckart (see Leuckart 1841: 14, footnote 64) had discussed with F. Schultze on the viviparity of the viviparous lizard (“*L. crocea*”), cannot be used as an argument. Therefore, Lichtenstein, author of the “Verzeichniss (1823)”, should be regarded also as the author of the taxonomic parts that deal with lacertids (Art. 50.1 ICZN).

**We conclude that the correct scientific denomination of the viviparous lizard is now *Zootoca vivipara* (Lichtenstein, 1823).**

able for nomenclatural purposes, and no name to acquire the status of availability by reason of having been published in any edition. Op. 2104“; see ICZN 1987, 2005).

4.2. *Nonetheless: A key taxon important for the understanding of the history of systematics.*

The story of *Lacertus cinereus* seems well appropriate to understand the hopeless confusion which arose at the end of the 18<sup>th</sup> century in the systematics of lizards (and not

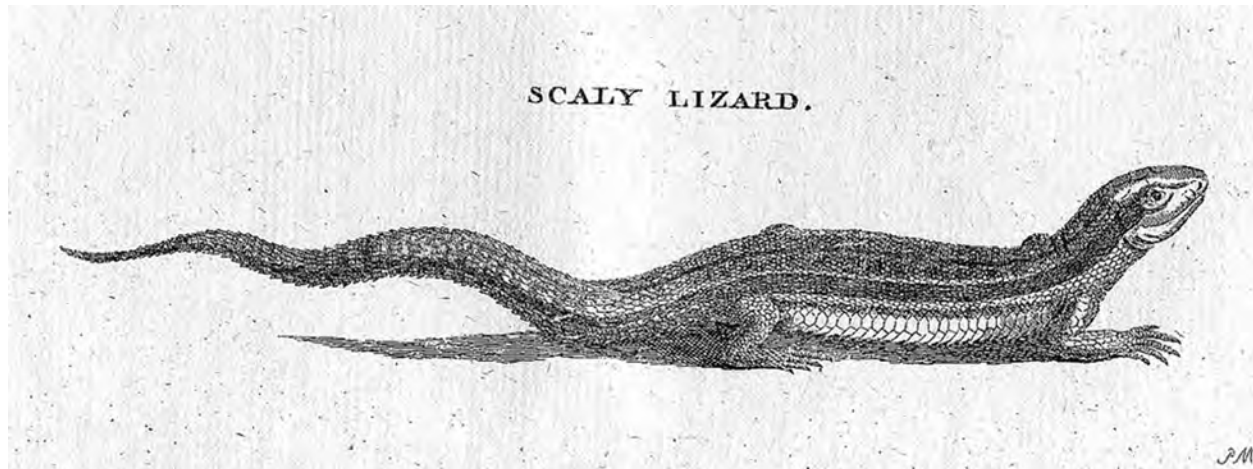


Fig. 4. The “Scaly lizard” from Pennant (1776) is a British *Zootoca vivipara* female. – Note 4.

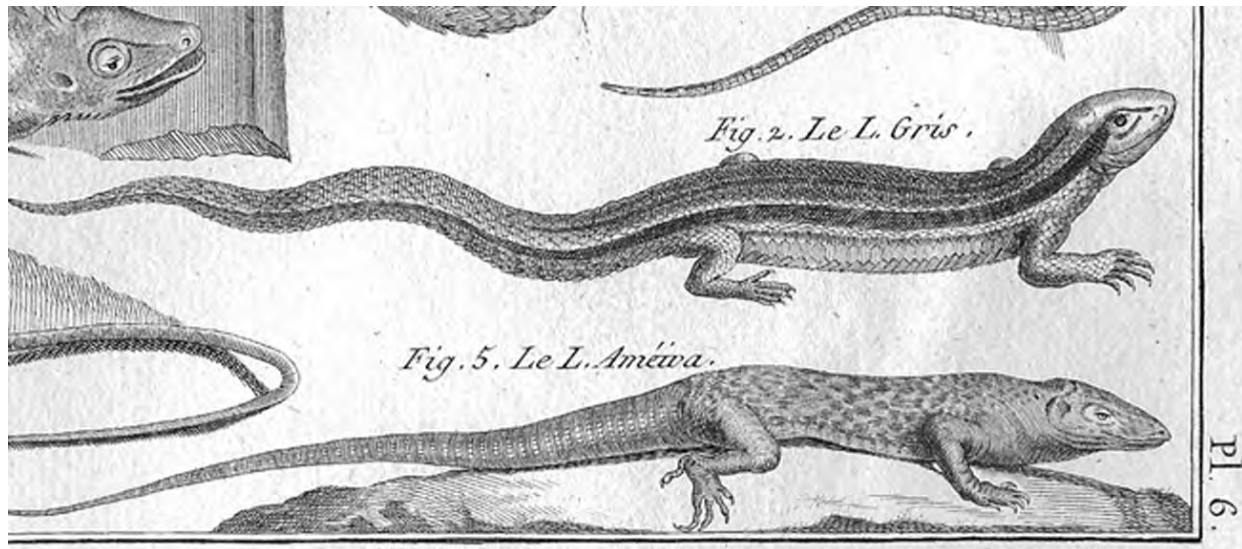


Fig. 5. Excerpt with “Lézard gris (*Lacerta agilis*)” from Bonnaterre (1789: 44 and pl. 6, fig. 2). This copy of Pennant’s Scaly lizard (= *Zootoca vivipara*; see fig. 4) was intended to represent a current French *Podarcis muralis*. See some single falsifications because of this cribbing: The more reduced pileus scalation, the reduced spotting upon the dorsum and the even scalation of the tail compared with the verticillate and rugose formation of the original. – Note 4.

only in their systematics!). Here, Linnaeus (1758) and Lacépède (1788) may be characterised as “lumpers”. In their species *Lacerta agilis* and *Lacertus cinereus* / Lézard gris there are comprised more or less clear at least the sand lizard (currently: *Lacerta agilis* Linnaeus), the green lizard (currently: *Lacerta viridis* Laurenti or *L. bilineata*, Daudin), the wall lizard (currently: *Podarcis muralis* (Laurenti)), the viviparous lizard (currently: *Zootoca vivipara* (Lichtenstein) see the comprehensive discussion in Leydig (1881: 161)). Contrary to them, Laurenti (1768) and Daudin (1802) took the line of an extreme “splitting”. They based new species upon juvenile forms, colour varieties, males and females (for details see: Dumeril &

Bibron 1839, Schmidtler 2004, 2010, Kuzmin 2005: 242). It is noteworthy that *Zootoca vivipara* is not involved in this splitting bacchanal.

As indicated, *Lacertus cinereus* Lacépède (the male gender represents an unjustified emendation; cf. David & al. 2002: 24) comprises also *Zootoca vivipara*. This fact is less identifiable from the ambiguous morphological descriptions, but in fact from a publication on its viviparity, being published covertly (Lacépède 1789: 491, “Additions”), and forgotten later on. This citation worried Lacépède. He only found a way by speculating that the grey lizards could not help but the salamanders in fact could (then also in the Linnean genus *Lacerta*!), the fe-

males of which are sometimes egg-laying and sometimes giving birth to living young. Observations like these began to shake systematics of that time. There intrinsically oviparous quadrupeds and snakes (both in the class of “amphibians”) were facing the viviparous quadrupeds (mammals).

#### 4.3. Problems of specific identification: Different in every country.

Ultimately Bell (1839: 22) hit the mark when discussing the use of the name “*Lacerta agilis*”: „...that the Linnean term *agilis* has been applied by zoologists of different countries to that species of Lizard which is best known or most common in their own. Thus the *Podarcis muralis*, the common lizard of Italy and of France, has been so called by Italian or French writers; and our own little indigenous species, so frequent in almost all parts of England, which I shall presently describe under its proper appellation of *Zootoca vivipara*, has hitherto received the same name from every British naturalist who has written on the subject“.

A good example is the unscrupulous cribbing of Pennant’s “Scaly lizard” (1776: fig. 4 this paper; definitely the female of a British *Zootoca vivipara*) by Bonnaterre (1789; fig. 5 this paper), who believed it a (current) French *Podarcis muralis* but named it still *Lacerta agilis* (“Lézard gris”)!

The fact that today the binomen “*Lacerta agilis*” is identified with the sand lizard and not with the viviparous lizard, depends lastly on Wolf in Sturm who had uncovered both taxa, living in Nuremberg, to be independent species and to describe and depict them elaborately (See Wolf in Sturm 1799: some coloured images of males and females of the sand lizard *Lacerta agilis*; depicted also by Schmidtler 2004. Wolf in Sturm 1805: below notes 6–8 and figs 6, 7 hoc loco). It was finally Wagler (1830; see note 1) who leveraged Wolf’s nomenclatural classifications together with its basic systematical contents (see also Koch in Sturm 1828).

#### 5. *Lacerta oedura* Sheppard, 1804

“At different times found in vast abundance“: Sheppard offers no exact information on the geographical origin of his new species. However, it results from the caption and introduction of his article (“British lizards”) that Britain has to be understood as type locality.

This taxon is cited by Tschudi (1837: 3) under the name “*Lacerta oedura* Scheppard” (sic!) and undergoes a further “mutation” in the paper by Schinz (1840: 19 as “*Lacerta aedura* Scheppert” (sic! See fig. 10), a spelling which can be found again in some later references (Erber 1868).

By the way, Sheppard’s article contains two further new “*Lacerta*” species: *Lacerta anguiformis* (“\*An *Lacerta aquatica* Linn.?” = *Lissotriton vulgaris* ?) and *Lacerta maculata* (a younger homonym of both *Lacerta maculata* Shaw, 1802 (now: *Ambystoma maculatum*) und *Lacerta maculata* Daudin, 1802); the latter dubious taxon is apparently not enclosed in later synonymy listings.

#### 6. *Lacerta montana* Mikan in Sturm, 1805 (Fig. 6)

The „Riesengebirge“: This mountain range forms today the border between Poland and the Czech Republic. See also *Zootoca montana* Tschudi, 1837 (note 16).

See in detail Leydig (1881 : 166) who showed that Linnaeus (1758: 203 and 1766: 363 ) had lumped together at least the current species *Lacerta agilis* and *Zootoca vivipara* under the name *Lacerta agilis*. Wolf and Mikan were the first who partitioned the Linnean collective species *L. agilis* in the fourth issue of Sturm’s “Deutschlands Fauna”(1805) The first important progress had been made by Wolf in the second issue of Sturm’s work when he described and magnificently figured the male and the female of the current species *L. agilis* under this name (see also Schmidtler 2004). However, the current species *Z. vivipara* was introduced by Mikan and Wolf as no less than three different species see Note 7 & 8)! The mingling of the two species is still to be found as late as Brandt & Ratzeburg (1829) who reported under *L. agilis* also viviparous individuals. – For more details about the complex problems within collective species see note 4.

#### 7. *Lacerta nigra* Wolf in Sturm, 1805 (Fig. 6)

The type locality is “Schneegebirge, so genannte Wenger-Alpe”, in the canton of Berne, Switzerland. See also Tschudi (1837: tab. 1), who regarded this black variant as a variety of his *Zootoca montana* (note 16).

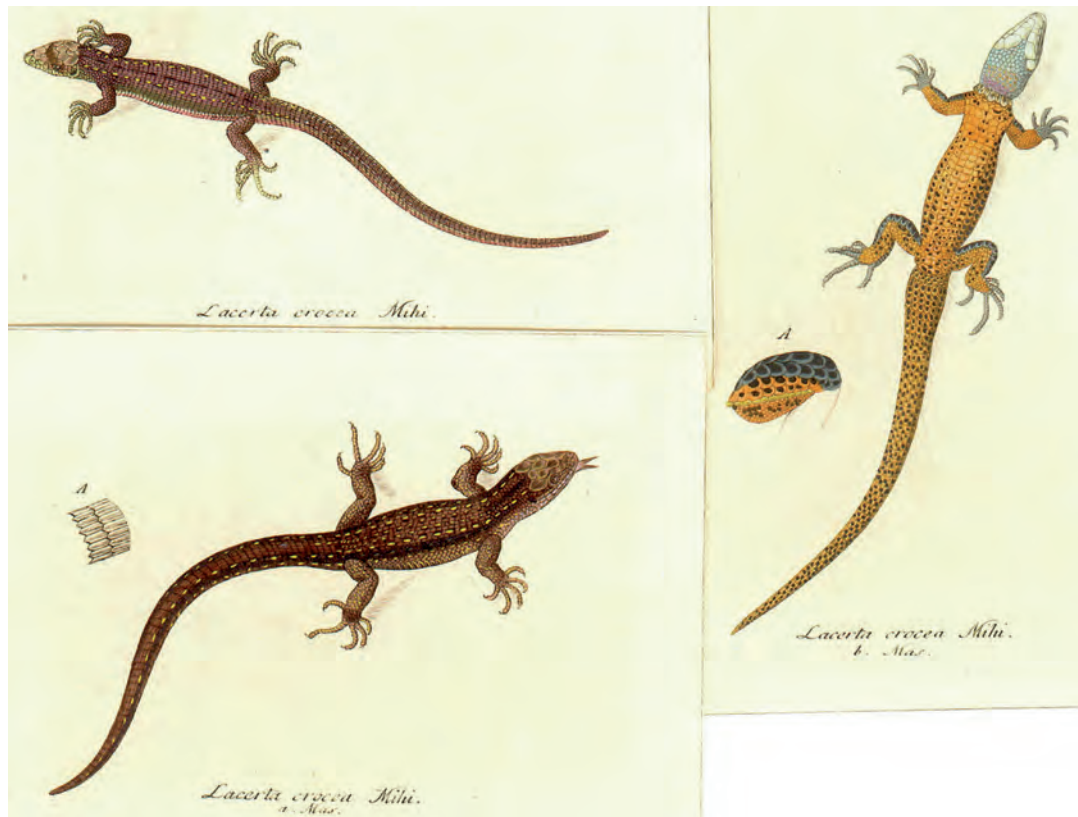
#### 8. *Lacerta crocea* Wolf in Sturm, 1805 (Fig. 7)

Wolf wrote that he had received this lizard from “hiesiger Gegend” (= “local region”) whereby he meant his habitation, the then Imperial City of Nuremberg (Nürnberg). This taxon was considered by Wagler (1830) as a synonym of *Zootoca vivipara* (cf. note 1 and Duméril & Bibron 1839), but nevertheless persisted in the literature some decades as an independent species.

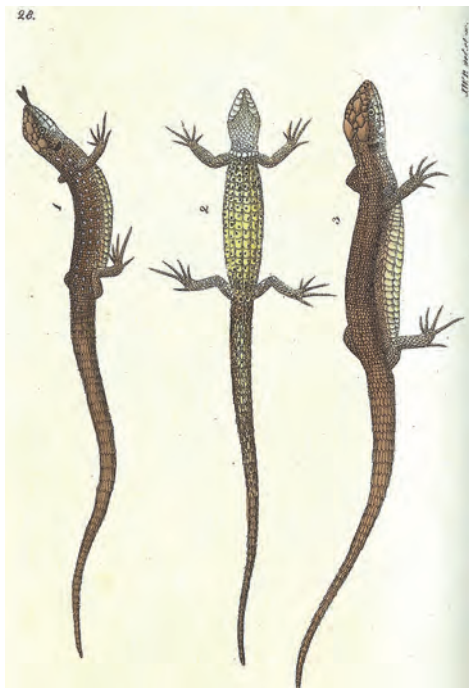
The viviparous lizard was first depicted by Nikolaus M. Oppel (1782–1820) in a perfect manner (Schmidtler 2008: 22, fig. 12), but remained subsequently unpublished. This figure stimulated Leydig to a hymn of praise in his (1872: 224) historical chapter on “*Lacerta vivipara*“.



**Fig. 6.** "Iconotypes" of *Lacerta nigra* Wolf in Sturm, 1805 (above) and *Lacerta montana* Mikan in Sturm, 1805 (undesignated plates). – Notes 6 and 7.



**Fig. 7.** Different specimens in different positions of *Lacerta crocea* Wolf in Sturm, 1805 (Undesignated plates; “iconotypes”). – Note 8.



**Fig. 8.** *Lacerta agilis* resp. “*Lacerta fragilis*” from Palmstruch & Swartz (1808). – Note 9.

### 9. *Lacerta fragilis* Palmstruch & Swartz, 1808 (Fig. 8)

The name *Lacerta “fragilis”* turns up only in the “Systematiskt Register” at the end of volume I of “Svensk Zoologi”. There is a hint to no. 27 (bearing the caption : “Grå Ödla *Lacerta agilis*... “ in the first volume (part 5)) of this work. According to the main title page of «Svensk Zoologi» this work was founded in 1806 by C. Quensel and J.W. Palmstruch. After Quensel’s death in 1806 it was continued by J.W. Palmstruch and O. Swartz as displayed upon a new title page having been sent by the editor with part six in 1808 (R. Wahlgren and B. Dal in litt. 2011).

According to the situation described above, this naming of “*Lacerta fragilis*” is therefore probably a lapsus. It refers indeed to the authors’ “*Lacerta agilis*” (currently : *Zootoca vivipara*) , then the collective species first described by Linnaeus (1758; see also 1766 and Gmelin 1788: 1070; the latter reference being explicitly cited by the authors). Concerning this Linnean collective species “*Lacerta agilis*”, more details can be found under note 4 and 6.

**10. *Lacerta unicolor* Kuhl, 1820**

Origin and fate of the holotype are unknown. Wagler (1830: 155) quoted it under the comment “Männchen adult. decolor.” in the list of his synonyms of *Zootoca vivipara*. Cocteau (1835: 10) assumed that Wagler might have examined this specimen since the original description was very enigmatic and highly insufficient (“à peu près énigmatique et au dessous de toute critique”). Kuhl’s consideration beside the vacuous description is remarkable: that the shape and size resemble entirely *L. ptychodes* (see the following note 11). Subsequently *L. unicolor* was regarded a dubious synonym of *Zootoca* respectively *Lacerta vivipara*, cf. Mertens & Wermuth 1960). According to Hildenhagen (in litt. 2011) the acronym “Icon O.” applied here and in some other of Kuhl’s species descriptions, means probably that no figure was available (“Icon: zero”).

**11. *Lacerta ptychodes* Kuhl, 1820 („mihí“) and *Lacerta ptychodes* Merrem, 1820**

It seems to be intriguing that in 1820 the same specimen of unknown origin was documented with the same name by two different authors independently from each other. Indeed, Kuhl (1820: 121) mentioned an earlier contact with Merrem because of this specimen, but both articles reveal in each case that the original descriptions were authored without any reference whatsoever. Both descriptions are comparatively comprehensive, in which Kuhl accentuated the colour pattern and Merrem the pholidosis (Merrem: die „runzelige Eidechse“ = “rugose lizard”). In both cases, *Zootoca vivipara* might have been hold very well. In the later literature a lizard named *Lacerta ptychodes* did never appear again. (see also Hildenhagen 2010: 53 and Hildenhagen & Hallermann 2010: 61).

**12. *Lacerta pyrrhogaster* Merrem, 1820**

Tschudi (1837: 27) apparently interpreted Merrem’s species name “*pyrrhogaster*” as an adjective and therefore adapted the ending to feminine gender (*Zootoca pyrrhogastra*). He interpreted *Zootoca* as a subgenus comprising two species: *Z. pyrrhogastra* and “*Z. montana nobis*” (see note 16).

Tschudi’s footnote on page 30 reveals that the principles of priority and a common authoritative terminology were not yet comprised in the then usual understanding of nomenclature: „*Zootoca pyrrhogastra* schien mir der passendste Name für diese Gattung des Wagler’schen Genus *Zootoca*, da es die Färbung (= “feuerbauchig“, Anm. d. Verf.) genau kennzeichnet. *Zootoca vivipara* ist Unsinn, da beide Namen das Gleiche bedeuten“ (translat-

ed: *Zootoca pyrrhogastra* seemed to be the most adequate name for this genus (meant is species) of Wagler’s genus *Zootoca*, because it characterizes exactly the coloration (pyrrhogaster = “fire bellied”). *Zootoca vivipara* is nonsense since both names are meaning the same”). See also note 19.

**13. *Lacerta schreibersiana* Milne Edwards, 1829**

“Envoyés de Vienne... par M. Schreibers“ (see Milne Edwards 1829: pl. 5, fig. 5.): Carl Franz Anton Ritter von Schreibers (1775–1852) was then director of the Vienna „Naturalienkabinette“. The specimens were „sent from Vienna“ by him. This wording does not necessarily mean that the specimens were also collected in or near Vienna. According to our present knowledge the viviparous lizard does not occur today in the immediate vicinity of Vienna but has few relict populations in the Viennese Basin (Cabela et al. 2001).

**13a *Lacerta Schreibersiana* var. a. *fusca* Gachet, 1832 (p. 238) and *Lacerta Schreibersiana* var. b. *lutea* Gachet, 1832 (p. 239)**

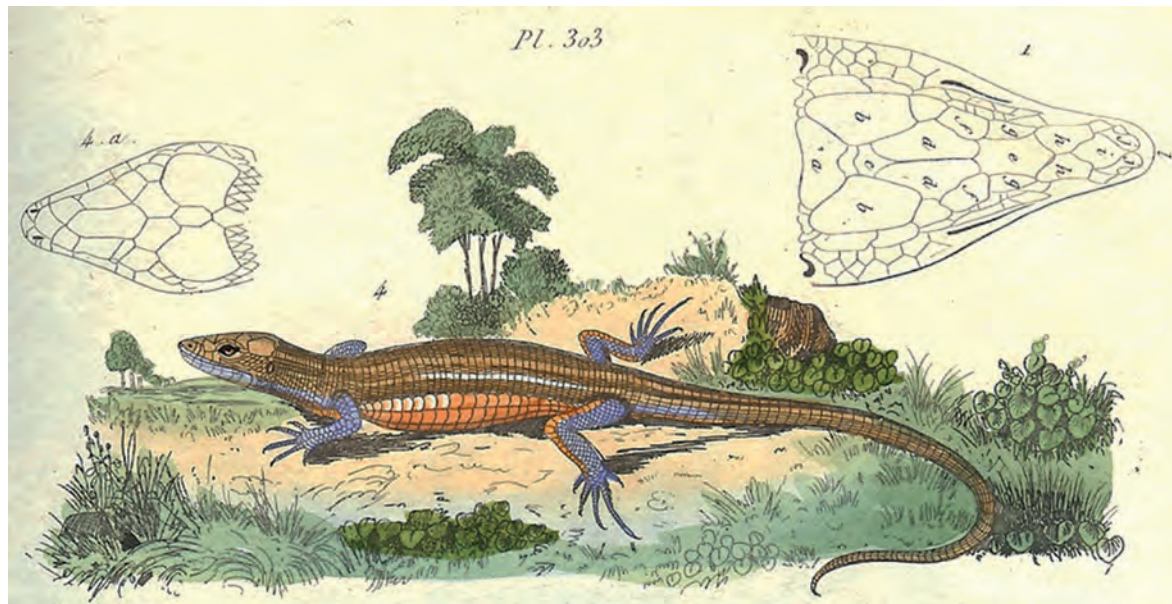
*Fusca* and *lutea* are nomina oblita, but surprisingly not comprised in Duméril & Bibron (1839), and apparently for the last time mentioned by Lataste (1876 : p. 82 + footnote). Gachet’s *fusca* represents also a younger homonym of *Lacerta fusca* Daudin 1802 (nomen substitutum pro *Septs terrestris* Laurenti 1768 = *Lacerta viridis viridis* Laurenti). On the other hand *lutea* is an available name endangering *Zootoca vivipara louisiantzi* Arribas, 2009. The description of *lutea* is very detailed but does not seem to be absolutely certain in order to ascertain synonymy (Arribas in litt. 2010). Further investigations are necessary.

**14. *Lacerta chrysogastra* Andrzejowski, 1832**

“In vallibus circa Cremenecum“ (Latin): “The valleys around Cremenecum”. Cremenecum is today Cremenec, a city situated 100 km East of Lemberg (= Lwiw, Ukraine).

**15. *Lacerta dejacquin* Cocteau, 1835**

Cocteau’s quotation of de Jacquin’s article suggests an original description with a new name but is rather a replacement name, at least with respect to *Lacerta vivipara* Lichtenstein, 1823 with the same type locality “Schneeberg”. From his point of view Jacquin’s publication in 1787 did not constitute a valid description of a new species (so explicitly upon his page (6; not paginated).



**Fig. 9.** *Lacerta guerin* Cocteau, 1835. Excerpt from Meunier in Guérin (1836: pl. 303 above; partial copy of the original figure in Cocteau). Left: pileus of *L. guerin*; right: for comparison the pileus of *L. ocellata* (currently *Timon lepidus*). – Note 16.

Cocteau classified both his new species, *Lacerta de jacquin* (to be quoted as “*Lacerta dejacquin*” according to the Code) and *Lacerta guérin* (note 16) under the “genre *Zootoca*”, corresponding to a subgeneric allocation in its present sense.

*Lacerta dejacquin* and *Lacerta guérin* (see note 16) were cited in Duméril & Bibron’s comprehensive *Erpétologie générale* under «*Lacerta vivipara* Jacquin» only with respect to their viviparity; but Cocteau’s nomenclatural and systematical conclusions were completely omitted in this reference. Subsequently the authority of the famous “*Erpétologie Générale*” assisted that the taxon “*Lacerta vivipara*” obtained general acknowledgement (cf. also note 4.3).

#### 16. *Lacerta guérin* Cocteau, 1835 (Fig. 9)

The collection originates from Forêt d’Eu (type locality), situated in the French Département Seine-Maritime, Haute Normandie. The general distribution of *Lacerta guérin* (to be quoted as *Lacerta guerin* without accent; according to the Code) is given as “Hab. In pratoris Europae centralis” (= lives in meadows of Central Europe). Cocteau thought it to be different from *Lacerta dejacquin* (Note 15).

#### 17. *Zootoca montana* Tschudi, 1837

“Wahrscheinlich das seltenste schweizerische Reptil... Gebirgsbewohnerin”. (= “Probably the rarest Swiss reptile... inhabitant of mountains”)

The caption on p. 31: “2. Species. *Zootoca montana* nob.” indicates an original description. However the wording with his confusing terminology („Synonyma: *Lacerta montana*, Mikan in Sturm’s Deutschlands Fauna...“; cf. also note 11) urges rather the supposition that Tschudi did not intend to describe a new species here beside Mikan’s taxon (see also note 6 and Duméril & Bibron 1839: 210, footnote 1).

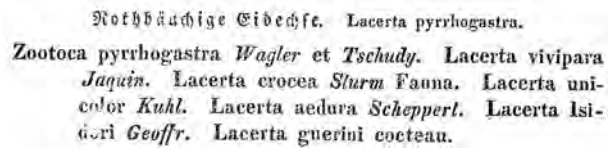
#### 18. *Zootoca alpina* Tschudi, 1837

In his chapter on *Zootoca montana* (p. 33) Tschudi advances his opinion that Switzerland is inhabited by a third species, „namely a *Zootoca alpina*“. There is however lacking any description so that it has to be regarded as a „Nomen nudum“.

#### 19. “*Lacerta isidori* Geoffr.” (sic!), Schinz, 1840 (Fig. 10)

This taxon being understood as a synonym of *Lacerta pyr-rhogastra* (note 12) by Schinz (1840) was derived and misspelled from Tschudi’s (1837: 31) : “*Lacerta Isidore* Geoffroy Saint-Hilaire pull. ?” (sic!). It is among others later on mentioned by Bedriaga (1886 : 330) under (*Lacerta*) “*Isidori* Geoffroy St. Hilaire” (sic!).

The origin of Tschudi’s taxon could not be verified. Tschudi refers here apparently to the first name of Geoffroy Saint-Hilaire (son : Isidore; father : Étienne), both having worked together herpetologically in the “*Déscription*



**Fig. 10.** Synonymy list of Schinz (1840: 19) exhibiting some negligent and extremely curious citations: On “*Lacerta aedura* *Scheppert*” see under note 5; on “*Lacerta Isidori* *Geoffr.*” see under note 19.

de l’Égypte” (1827/1829). The misspelling of “*Isidore*” in italics may have pretended here a species description by Tschudi.

See also under chapter 5 on a further extremely curious confusion by Schinz (1840: 19).

#### 20. *Lacerta vivipara* var. *pallida* Fatio, 1872

Fatio (1872: 88) described here a pale colour variety which came across to him in „our“ (Swiss) Alps and in the Jura mountains.

#### 21. *Lacerta vivipara* var. *carniolica* Werner, 1897 and *Zootoca vivipara carniolica* Mayer, Böhme, Tiedemann & Bischoff, 2000

According to Mayer et al. (2000) *Lacerta vivipara* var. *carniolica* Werner, 1897 is a “nomen nudum”. The similar origin and identical name of their new taxon were intended like that by them. This egg-laying subspecies is mainly distributed in the Southeastern Alps. A molecular study carried out at a parapatric suture of oviparous *carniolica* and live-bearing *vivipara* in Carinthia revealed reduced gene flow between both which can be interpreted as an incipient speciation event (Lindtke et al. 2010).

#### 22. *Lacerta (Zootoca)* var. *melanogastra* Prazák, 1898

According to Litvinchuk & Borkin (2009: 227), earlier papers, viz. a catalogue of the vertebrates of Bohemia (1893) with some additions (1894) by the same author do not fulfill the requirements of formal taxonomic publications, so that 1898 has to be considered as the valid publication date of Prazák’s “variety” names, among them also *melanogastra*.

#### 23. *Lacerta vivipara* var. *barabensis* Kashchenko, 1902

This taxon, cited as a synonym by Nikolsky (1918: 317, see also Kuzmin & Semjonov 2006), has been named and described by Kashchenko (1902) on the basis of morphometric comparisons which makes this name clearly available.

#### 24. *Lacerta vivipara* var. *Gedulyi* Fejerváry, 1923

This form which occurs in some isolates of the Great Hungarian Plain had been briefly dealt with by Geduly (1923) who stressed the peculiarity of its occurrence – despite the southern latitude - in lowland habitats. Fejerváry (1923) created this patronym despite his own statement that this form is not sufficiently distinct (“*In case that future research on more material will allow me to change my opinion about this topic I would wish to name this form var. Gedulyi, in honour of my friend Prof. Geduly who had discovered it*”: our translation). Because published before 1960 *gedulyi* is not unavailable because of its clearly conditional erection, but, as a diagnosis is lacking and even, as explicitly stated, is non-existent, this name should be also considered as a “nomen nudum”.

#### 25. *Lacerta vivipara sachalinensis* Pereljeshin & Terentjev, 1963

Described by its authors on the basis of morphometric comparisons which were, however, at the same time identified as clinal variations, Kuzmin & Semjonov (2006) considered *sachalinensis* as a “nyeprirodnoye nazvaniye” (= a useless denomination) which is of course not a “nomen nudum”. That’s why we regard this name as available.

#### 26. *Lacerta vivipara pannonica* Lác & Kluch, 1968

Based on morphometric comparisons, this nominal subspecies was originally described from the eastern Slovakian lowlands. Subsequently, the name *pannonica* was also applied to much more westernly distributed populations, e.g. the Neusiedlersee (Lake Neusiedl) area and the Viennese Basin (see Cabela et al. 2001 and references cited therein).

### 27. *Zootoca vivipara lousilantzi* Arribas, 2009

This recently described subspecies is restricted to the Cantabro-Pyrenean axis, coming down to sea level at the Biscayan coast, but is nonetheless isolated from the main range of the species. See Note 13a on possible synonymy.

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