

Research article

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Studies of the taxonomy of the *Gekko vittatus* Houttuyn, 1782 complex (Squamata: Gekkonidae): II. Remarks on the nomenclature and synonymy of the Striped Gecko, *Gekko (Lomatodactylus) vittatus* Houttuyn, 1782

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Abstract. In the second part of our work on the taxonomy of the *Gekko vittatus* complex we are dealing with the nomenclature and synonymy of *G. vittatus* Houttuyn, 1782. In particular, two available names are discussed and evaluated: *Lacerta ypsilon* Linck, 1783, and *Lacerta zeulonica* Nau, 1791. Both names which were formerly overlooked in the taxonomic literature, proved to be junior synonyms of *G. vittatus* Houttuyn, 1782.

Key words. *Gekko vittatus*; synonyms; taxonomy.

INTRODUCTION

Gekko Vittatus Houttuyn, 1782 [sic], described by the Dutch physician and naturalist Maarten Willem Houttuyn (1720–1798) belongs to the few new descriptions of geckos (nine in total) which were still described in the 18th century, following the three species described by Linnaeus (1758) in the tenth edition of his „Systema Naturae“ (Uetz et al. 2020). It is the oldest name of any gecko which is unchanged and still valid today in its original combination.

A varied, changeful nomenclature with numerous synonyms is characteristic for many early descriptions of herpetological taxa. This is also true for the gecko dealt with in here, *Gekko vittatus*, which has been described several times under various names, from the end of the 18th to the beginning of the 19th century.

In the following we shall deal with two of these old and forgotten names of the Striped gecko (*Gekko [Lomatodactylus] vittatus* Houttuyn, 1782) and discuss their current taxonomic status.

HISTORY

The generic nomen *Lomatodactylus* was erected by van der Hoeven (1833) who assigned as synonyms of this

name the nomina *Gecko* [sic] Houttuyn and Daud[in] as well as *Stellio* Schn[eider] and *Ascalabotes* Cu[vier]. He divided *Lomatodactylus* in several subgenera and placed his *L. vittatus* (sensu *Gekko vittatus*) in the subgenus *Platydactylus* Cuvier, 1816. As synonyms of the latter species he cited by name *Lac[erta] vittata* Gm[elin] and *Stellio bifurcifer* Schn[eider] and referred additionally to figures of this species in Nau (1791) and Bechstein (1800). However, without referring to the partly differing binomial combinations (see below). Not understandable is why van der Hoeven (1833) initially ignored Linnaeus' (1758) *Lacerta gecko* but recognized it much later (van der Hoeven 1855). It was largely ignored that it was not Smith (1935) but already Stejneger (1907) who synonymized *Lomatodactylus* (type species *L[omatodactylus] vittatus*) from van der Hoeven's (1883) paper with *Gekko* (see Wermuth 1965; Bauer 1994).

According to Wood et al. (2020), *Gekko vittatus* Houttuyn, 1782 is the type species of the subgenus *Lomatodactylus* van der Hoeven, 1833 within the genus *Gekko* Laurenti, 1768. Together with *Gekko (Lomatodactylus) browni* (formerly *Luperosaurus browni* Russell, 1979) and *Gekko (Lomatosaurus) iskandari* (formerly *Luperosaurus iskandari* Brown, Supriatna & Ota, 2000), *Gekko vittatus* is forming a subclade within the subgenus *Lomatodactylus*. According to the molecular data published by

Mulcahy et al. (2022), also *Gekko remotus* Rösler, Ineich, Wilms & Böhme, 2012 can be assigned to this subclade.

RESULTS

Taxonomy

The most complete taxonomic overview of *Gekko vittatus* Houttuyn, 1782 was provided by Bauer (1994). His list, which summarized all published names until 1991, contains more than 120 synonyms and chresonyms of this species, including the belonging bibliographic data. Within geckos, the species name *vittatus* (not *Gonatodes vittatus* [Lichtenstein & von Martens, 1856], not *Diplodactylus vittatus* Gray, 1832, not *Hemidactylus vittatus* Gray, 1845 = *Hemidactylus frenatus* Duméril & Bibron, 1836) has been used in various generic combinations: *Lacerta* Linnaeus, 1758, *Gekko* Laurenti, 1768, *Stellio* Schneider, 1792, *Gecko* Brongniart, 1800, *Platydactylus* Cuvier, 1820, and *Lomatodactylus* van der Hoeven, 1833 (see Bauer, 1994).

The original description and figure of *Gekko vittatus* by Houttuyn (1782: 325, Fig. 2) is followed by *Lacerta unistriata* Shaw (1792: unpaginated, Plate 89) (synonym

fide Daudin 1802: 136), as the earliest synonym according to the chronological list compiled by Bauer (1994). In the same year Schneider (1792: 22) published the name *bifurcifer*, which he introduced as a substitute name for *Gekko vittatus* (synonymy fide Meyer 1795: 31). For both taxa, no type material is known. Subsequently, Duméril & Bibron (1836: 334) described *Platydactylus bivittatus* with the type locality „Nouvelle Guinée, l'autre de l'île Waigiou“ (syntypes MNHN 2285 and 6714, synonymy fide Loveridge 1948). The latest synonym of *Gekko vittatus* is *Gecko trachylaemus*, described by Peters (1873: 774), type locality „Nord-Australien“, holotype ZMB 7511, synonymy fide Peters & Doria (1878).

Gecko vittatus Houttuyn, 1782 is, after *Gekko gecko* (Linnaeus, 1758), the second oldest species of the genus *Gekko* Laurenti, 1768. Two more taxa are still belonging to *G. vittatus* in the context of names introduced after Linnaeus (1758):

Lacerta ypsilon Linck, 1783

The diagnosis of this nomen is limited to one single sentence: „Die mit einem Ypsilon vom Kopf über den ganzen Körper gezeichnete Eidechse“ (= the lizard with an ypsilon running from the head along its whole body)

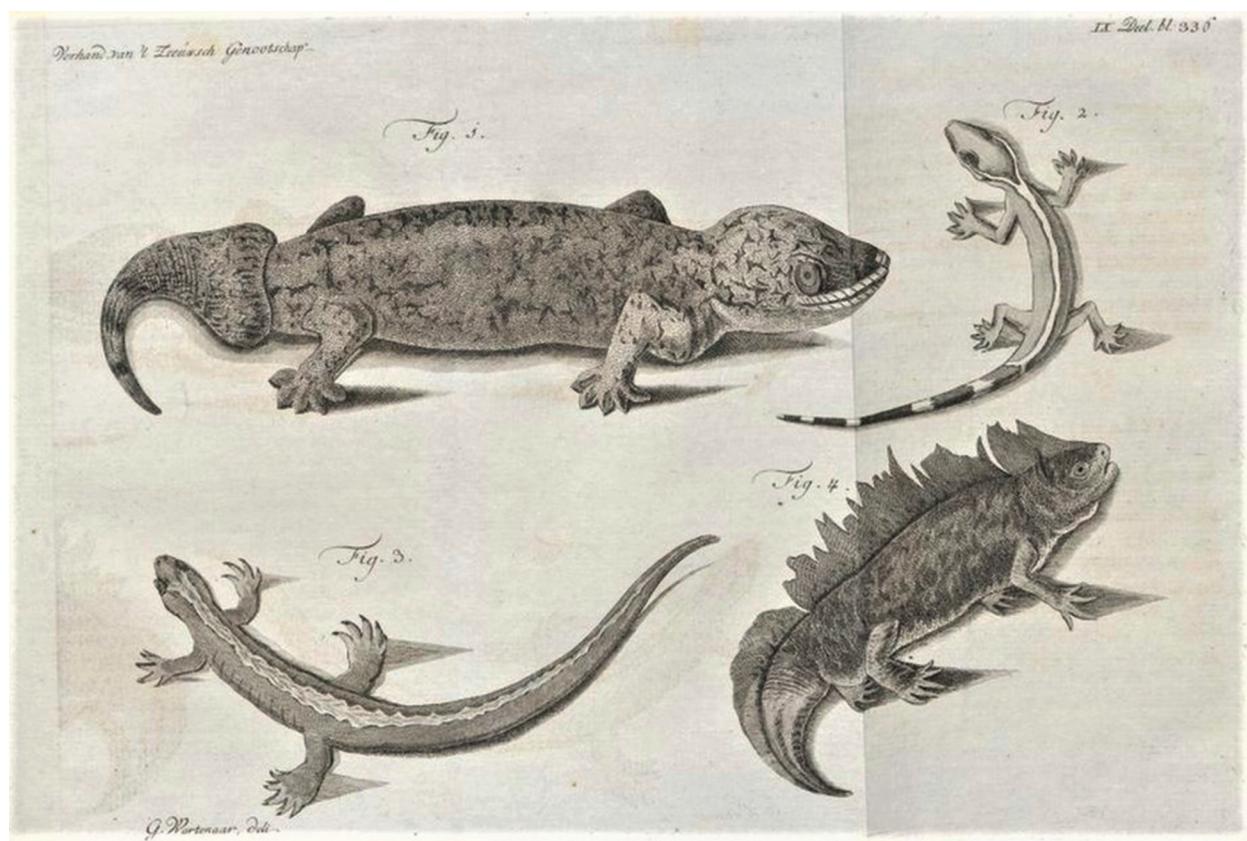


Fig. 1. Plate 9 in Houttuyn (1782). Explanations: Fig. 1. *Gekko Rapicauda* (= *Thecadactylus rapicauda* [Houttuyn, 1782]), Fig. 2. *Gekko Vittatus* (= *Gekko vittatus* Houttuyn, 1782), Fig. 3. *Salamandra Japonica* (= *Onychodactylus japonicus* [Houttuyn, 1782]), Fig. 4. *Salamandra Cristata* (= *Triturus cristatus* [Laurenti, 1768]).



Fig. 2. Plate 6 in Nau (1791) with the iconotype of *Lacerta zeulonica* (= *Gekko vittatus* Houttuyn, 1782).

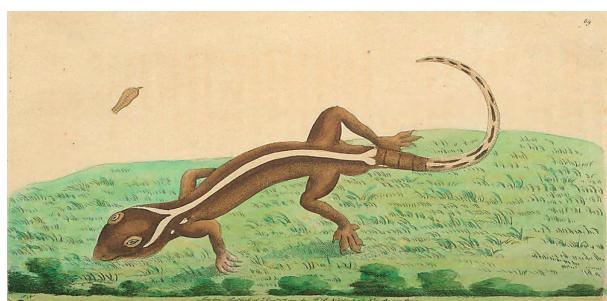


Fig. 3. Plate 89 in Shaw (1792) with *Lacerta unistriata* (= *Gekko vittatus* Houttuyn, 1782).

(Linck 1783: 68). The author was the pharmacist Johann Heinrich Linck the Younger (1734–1807) (Bauer & Wahlgren 2003; Böhme 2015; Engelmann 2018). Linck (1783) identified the herpetological items and arranged them according to the descriptions and figures in Seba (1734, 1735), Scheuchzer (1735), Linnaeus (1766) and of the latter author also according to the German translation by Müller (1774). Because Linck the Younger has always carried out conscientious research (in respect to exact name citations, distribution data, bibliographic hints), it is likely that he was unaware of Houttuyn's paper with

the description of *Gekko vittatus*. It is not known how the single specimen of *Lacerta ypsilon* had entered the collection. It is possible that it was present already in the collection of his (homonymous) father, Johann Heinrich Linck the Elder (1674–1734), but it is mentioned neither in the cursorily compiled list of his natural history cabinet nor by any other hint (Neickelio 1727).

Schneider (1792), after his intensive research on *Gekko vittatus* Houttuyn, 1782, coined a new name for species, viz. *Stellio bifurcifer* referring to the dorsal pattern (*bifurcifer* from Latin *furca* = fork, -*fer* from *ferre* = to bear, thus bearer of a double fork). He, as the first revisor of this species, criticized that Houttuyn (1782) did not mention the earlier description by Valentyn (1726) under the name „De Pandang hagedis“. In addition, he referred to Boddaert (1783) and Gevers (1787), where the same species (sensu Houttuyn 1782) was cited as „Salamandra Pandang“ and „Lacerta Pandang“ respectively. Notwithstanding the parsimonious data found in Linck's (1783) diagnosis of *Lacerta ypsilon*, Schneider (1792) recognized, obviously based on Linck's figure, that *Gekko vittatus* Houttuyn, 1782 and *Lacerta ypsilon* Linck, 1783 are conspecific. Therefore he synonymized the latter under the name „*lacerta Ypsilon*“ [sic] with *Stellio bifurcifer* Schneider, 1792.

In his second monograph on geckos (= *Stellio*), Schneider (1812) complemented his former literature sources on the synonymy of *Stellio bifurcifer* with reference on the publications of Shaw (1792), Bechstein (1800) and Daudin (1802). He mentioned that the paper by Brongniart (1800) was unavailable for him but did not refer to the work by Latreille (1801/1802) although this was cited by Daudin (1802). Likewise, unmentioned by him remained the work by Donndorf (1798) which would have been important here because of its voluminous synonymy list for *Lacerta vittata*.

The synonymization of *Lacerta ypsilon* with *Stellio bifurcifer* by Schneider (1792) is accepted and followed by, e.g., Donndorf (1798) and Bechstein (1800) under the genus name *Lacerta*, and by Tilesius von Tilenu (1817) under *Stellio*. *Lacerta ypsilon* as a junior synonym of *Gekko vittatus* has, however, been left unrecognized by numerous later authors (e.g., Gmelin 1798; Suckow 1798; Daudin 1802; Merrem 1820; Gray 1831; Duméril & Bibron 1836; Fitzinger 1843; Boulenger 1885; Werner 1900; Wermuth 1965; Kluge 1991 and 1993; Bauer 1994; Rösler et al. 2012).

Sherborn's (1932) list does not include the names *Gekko vittatus* and *Lacerta ypsilon*, and he was wrong with the allocation of *Triton vittatus* Guérin-Ménéville, 1838 (= *Ommatotriton vittatus* [Gray, 1835] to the reptiles and not to the urodelan amphibians. Bauer & Wahlgren (2003) cited the name *Lacerta ypsilon* repeating Linck's (1783) list of his natural history collection items, but without referring to its actual status. The last author

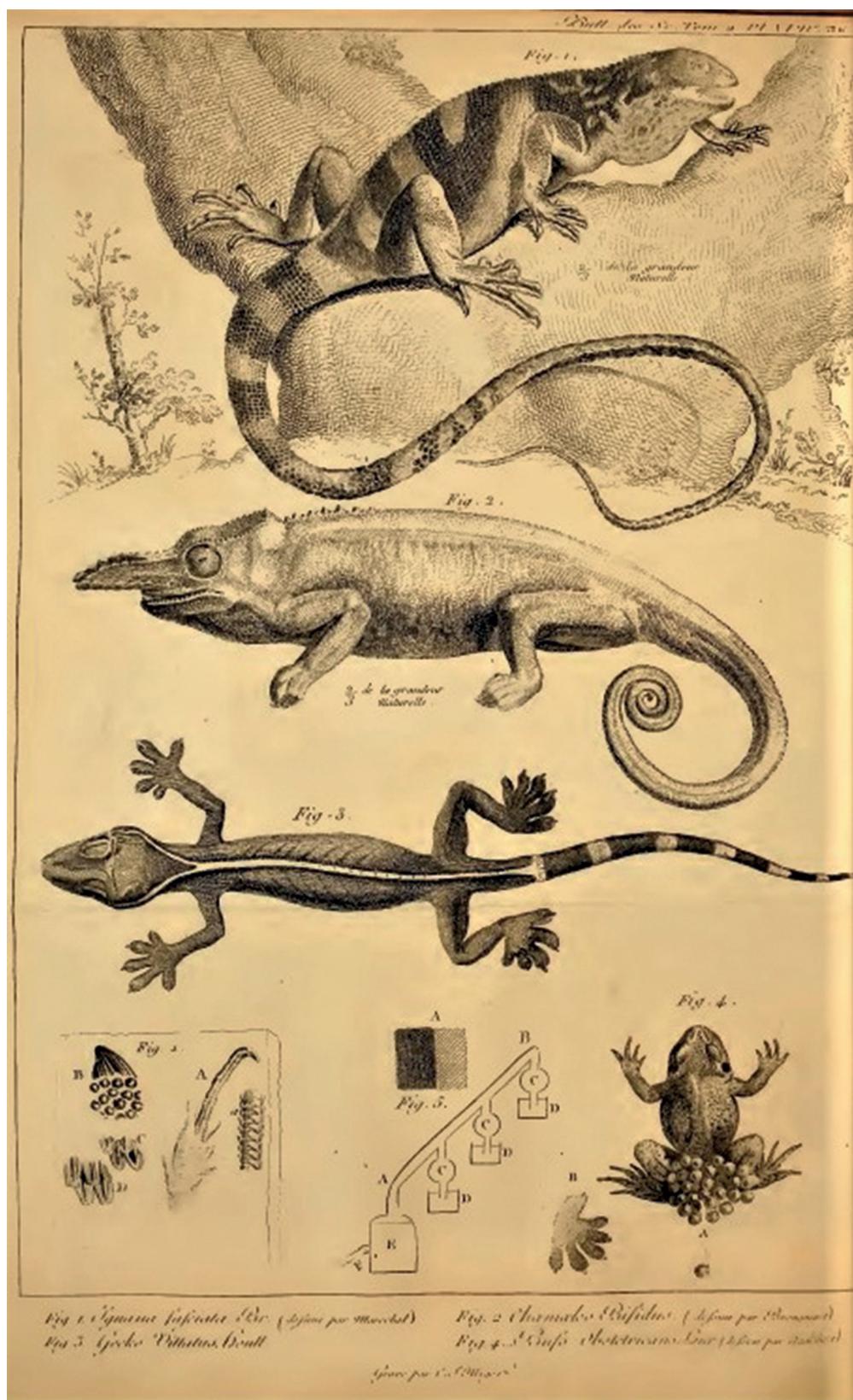


Fig. 4. Plate 6 in Brongniart (1800). Explanations: Fig. 1. *Iguana fasciata* (= *Brachylophus fasciatus* [Brongniart, 1800]), Fig. 2. *Chamaeleo Bifidus* (= *Furcifer bifidus* [Brongniart, 1800]), Fig. 3. *Gecko Vittatus* (= *Gekko vittatus* Houttuyn, 1782), Fig. 4. *Bufo Obstetricans* (= *Alytes obstetricans* [Laurenti, 1768]).

pointing on the synonymy of *Lacerta ypsilon* with *Gekko vittatus* is Engelmann (2018).

Lacerta zeulonica Nau, 1791

Bernhard Sebastian von Nau (1766–1845) was a German naturalist (Rössler & Böhme 2022) and is (1791: 245) the author of *Lacerta zeulonica* (see the review by Beckmann 1791). He published the description and the illustration of this gecko assuming that it was a new species, one year earlier than Shaw's (1792) *Lacerta unstriata*. Shaw (1792) pointed out that there was no counterpart of his lizard to be found which he termed with the vernacular name „single-stripes lizard“, neither in Seba (1734, 1735) nor in Linnaeus (1758). Shaw (1792) considered (with a question mark) „? *Lacerta vittata* Gmelin, 1789“ as a possible synonym of his *L. unstriata* but ignored the source cited by Gmelin (1789) “Houttuyn act. Vlissing. 9. P. 325. t. 2“.

In nomenclatural deviation from his former opinion, Shaw published (1802) a second description of the same species, this time under the name *Lacerta Vittata* [sic], adding the vernacular name „white-striped gecko“. In the accompanying synonymy list, he cited earlier names and data from Houttuyn (1782), Gmelin (1789) and Schneider (1792), but not from Nau (1791). Remarkably, he omitted also his own earlier description of *Lacerta unstriata* Shaw, 1792 completely.

Schneider (1792) when describing *Stellio bifurcifer*, commented briefly on the original descriptions of *Gekko vittatus* und *Lacerta vittata* Gmelin, 1789. In more detail he dealt with Nau's (1791) species description, but emended unjustifiably Nau's name to „*Lacertae Zeylonicae*“ (plural of *Lacerta zeulonica*).

Early illustrations of *Gekko vittatus* Houttuyn, 1782

Pictorially, body shape and external characters of *Gekko vittatus*, partly including also its synonyms, are relatively well documented. Houttuyn (1782) provided together with his species description also an adequate drawing where the typical dorsal pattern is well recognizable (Fig. 1). The first color illustration was published by Nau (1791), simultaneously with his *Lacerta zeulonica* (Fig. 2). One year later, Shaw (1792) provided the second colored illustration of his *Lacerta unstriata*. The gecko figured by him has a partly regenerated tail, whereas all other figures of *Gekko vittatus* documented and discussed here are based on specimens with original, complete tails. Unicolored images of *Gekko vittatus* are found in the works of Brongniart (1800, 1806), Bechstein (1800), Latreille (1801/02), Daudin (1802) and Reichenbach (1892). They differ from each other remarkably in respect to their quality (Figs 4–7, 9, 11). It is obvious, for instance, that the configuration of the toes shows marked differences, particularly the missing claws at the inner toes remained unrecognized when the print templates had



Fig. 5. Plate 18 in Bechstein (1800). Explanations: Fig. 1. Der Japanische Salamander (= *Onychodactylus japonicus* [Houttuyn, 1782]), Fig. 2. Der punctierte Salamander (*Lacerta punctata* Linnaeus, 1766 = *Ambystoma maculatum* [Shaw, 1802], non *Lacerta punctata* Linnaeus, 1758 = *Riopa punctata* [Linnaeus, 1758], fide Bauer 2003), Fig. 3. Der gabelstreifige Gecko (= *Gekko vittatus* Houttuyn, 1782).

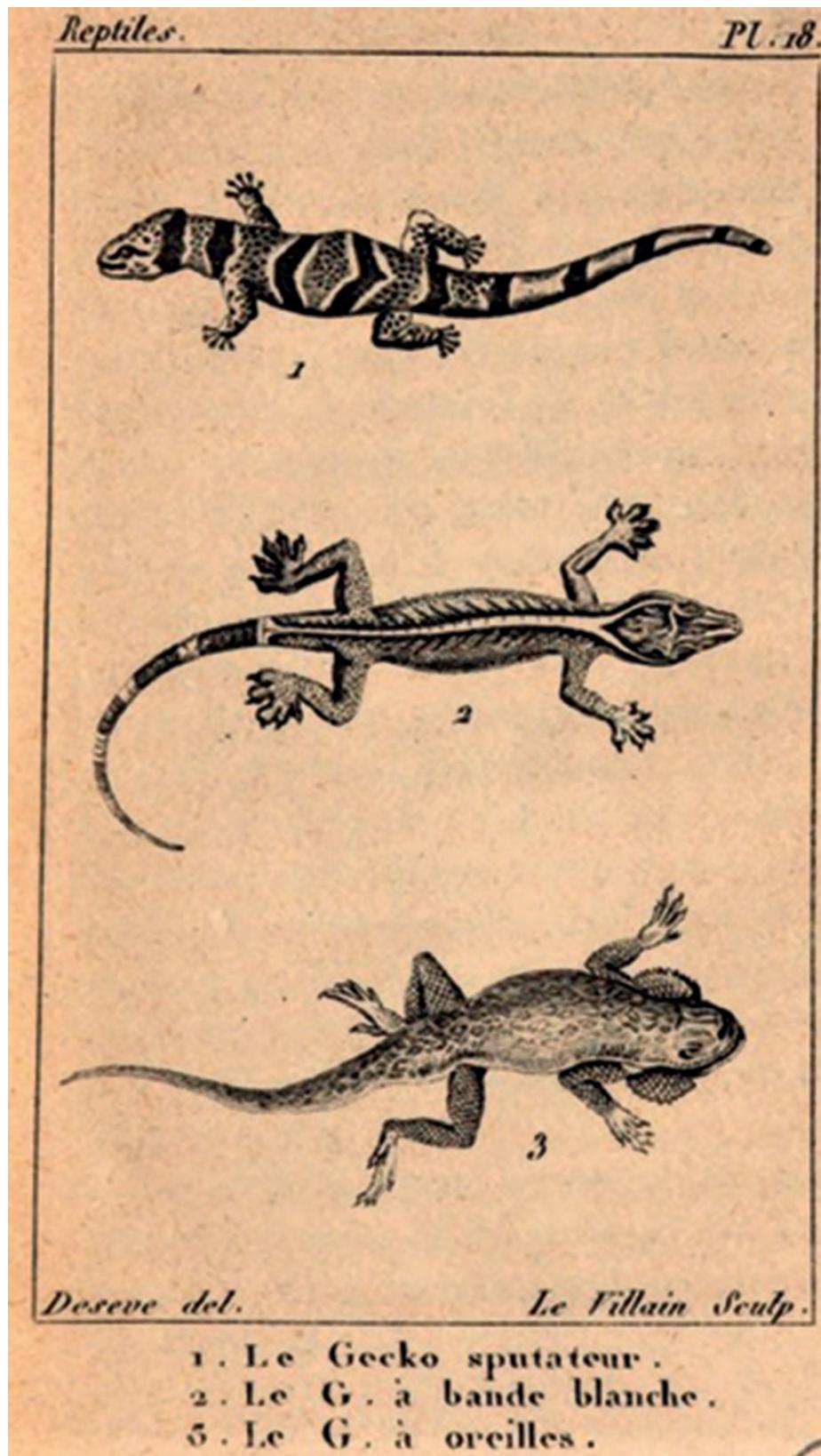


Fig. 6. Plate 18 in Lattreille (1801/1802). Explanations: Fig. 1. Le Gecko sputateur (= *Sphaerodactylus sputator* [Sparrman, 1784], Fig. 2. Le G[ecko] à bande blanche (= *Gekko vittatus* Houttuyn, 1782), Fig. 3. Le G[ecko] oreilles (= *Phrynocephalus mystaceus* [Pallas, 1776]).

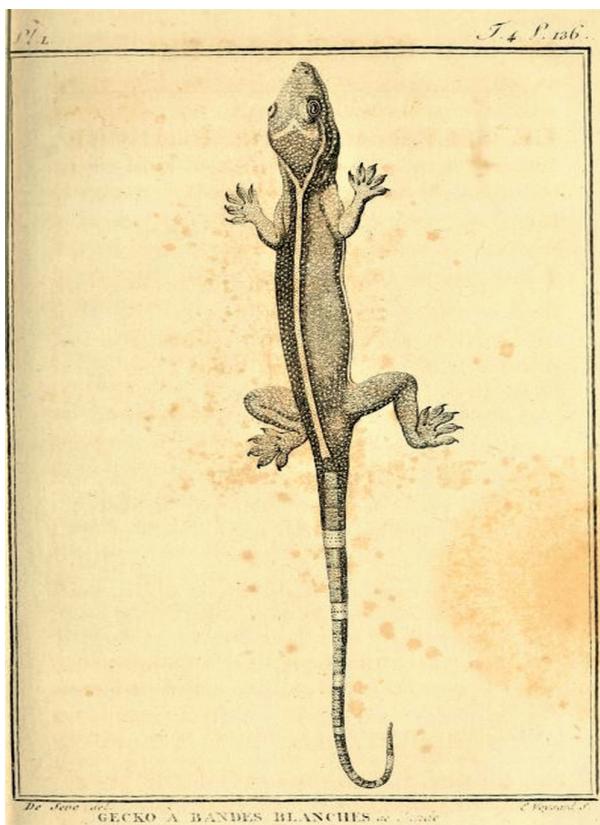


Fig. 7. Plate 50 in Daudin (1802) with Gecko à bandes blanches (= *Gekko vittatus* Houttuyn, 1782).

been prepared. The figures in Bechstein (1800) and Reichenbach (1829) were most likely inspired by the color plate in Nau (1791). Just as in this plate, the tail pattern is figured with the same number of white, oval-shaped flecks, rather than with the sharply limited crossbands as in the other figures. Strack (1820) copied off the portraits of three urodelans and of the gecko from plate 14 in Bechstein (1800), but the combination of colors of different body parts (upperside bluish, underside yellowish white) in this hand-colored plate is incorrect (Fig. 10). Illustrations with a high level of exactness in respect of the diagnostic characters of *Gekko vittatus* are those by Oppel (see Rösler & Schmidtler 2014) and by Duvernoy (1839) (Figs 8 and 12).

All illustrations presented here show the typical morph of *Gekko vittatus* which is characterized by a white dorsal stripe which bifurcates in the nape, both branches extending to the hind margin of the eyes. A stylized picture series of phenotypically differing *G. vittatus*-forms, which were mentioned already in word and picture by Werner (1900), Mertens (1934), McCoy (2006), and Rösler et al. (2012), has been compiled by Grossmann & Kreuzer (2012).

Distribution

The distribution center of *Gekko vittatus* is New Guinea. Other populations are known from numerous Indo-Australian islands (Lesson 1830 a, b; Werner 1900; de Rooij 1913 and 1915; Sternfeld 1920).

Based on the place of origin „zekerlyk uit de Indië“ in Houttuyn (1782), Gmelin (1789) gave „India“ as the type locality of *G. vittatus*. However, an occurrence of this species in India has neither temporarily nor permanently been recorded (Günther 1864; Boulenger 1890; Smith 1935; Sharma 2002; Das 2003; Aengals et al. 2018). The earliest verifiable statement for the correct distribution range of *G. vittatus* is to be found in Valentyn (1726). According to his data this gecko is present in Amboina (= Ambon, Moluccas, Indonesia), but is found rarely on „Strand Padang“ plants (*Cinnamomum* sp.). It is very likely that that Houttuyn's specimen reached Europe from the Moluccas on one of the „Netherland's East Indian Company“ sailing ships involved in the most profitable spice trade.

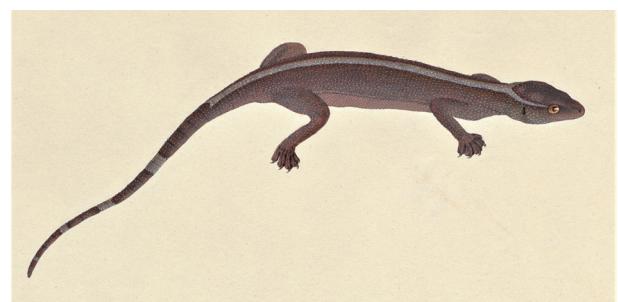


Fig. 8. Watercolor with *Gekko vittatus* Houttuyn, 1782, drawn between 1807–1809 by Nikolaus Michael Oppel from Rösler & Schmidtler (2014).

The place of origin of *Lacerta ypsilon* is unknown. The label inscription (see Fig. 375 in Engelmann 2018) is likely not based on an information by Linck the Younger because he had listed all locality data as far as known to him, most carefully in his „Index Musaei.“ Both geographical hints can likely be deduced from the re-arrangement and re-identification of the zoological subjects by Konstantin Wöpke (1903–1944) where the data have retroactively been added (Seifert 1934; Wöpke 1937). Possibly this was influenced by earlier notes of various taxidermists which were concerned with the curation of Linck's natural history collection between 1849 and 1927 (see Zinke 2015). With missing locality data and based only on its morphological characters, *Lacerta ypsilon* can only be assigned to the nominotypic form of *Gekko vittatus*.

The description of *Lacerta zeulonica* is based on a specimen which Nau has likely received from the Dutch naturalist Arnout Vosmaer (1720–1799) who was a fanatic collector of zoological items (Adler 2012). The lat-



Fig. 9. Plate II, Figur 6: Gecko rayé, *G. vittatus* (= *Gekko vittatus* Houttuyn, 1782) in Brongniart (1806: 622). Source: Calames, Muséum national d'histoire naturelle (Paris) – Direction des bibliothèques et de la documentation.

ter (in Nau 1791 spelled „Vosmär“) assured him that the specimen originated from „Zeulon“ (Ceylon = Sri Lanka). This seemingly precise locality obviously influenced Nau to choose the corresponding geographic epitheton. It cannot be decided here who was lastly responsible for the denomination, since Houttuyn and Vosmaer knew each other, and Houttuyn was at least familiar with the description of *Gekko vittatus*. Amarasinghe et al. (2009) did not mention *Lacerta zeulonica* in their treatment of Sri Lankan geckos described in three centuries, and according to Silva (1994), there are no species of the genus *Gekko* occurring on this island. On the other hand, description and figure of *Lacerta zeulonica* leave no doubt for its identity with *Gekko vittatus* so that its true geographic origin lies certainly within the distribution range of *G. vittatus* as outlined by Bauer (1994).

The records of various *Gekko vittatus* populations without the characteristic phenotypic white and anteriorly forked dorsal stripe stem from various archipelagos widely separated from each other. Differences in morphology and color pattern of *G. vittatus* sensu lato have been described by Werner (1900) and Sternfeld (1930). A relatively dark form from Nissan Atoll (Papua New Guinea) was figured by Mertens (1934) with the comment that a dark (melanistic) color phase is known from many Papuan islands. Photographic records of a second, more intensively light/dark marbled form have been published from some Solomon Islands (Malaupaina Id., Olu Malau Ids.) by McCoy (1980 and 2006).

Preliminarily described from Micronesian Palau islands was *Gekko remotus*, a member of the *G. vittatus* species complex (Rösler et al. 2012; Mulcahy et al. 2022), but

the status of several other geographic island populations deserves further morphological and molecular studies.

Nomenclature

Lacerta ypsilon Linck, 1783 has been published before 1931 and meets therefore the requirements of availability (art. 12 ICZN). The type specimen is deposited in the Natural History Cabinet of the Museum in Waldenburg (catalog number in Linck 1783: 290; Inventory number of the Museum Waldenburg: NAT 2027). The name has to be considered as a junior synonym of *Gekko vittatus* Houttuyn, 1782 (sensu stricto), if the conspecificity of both taxa is corroborated. If not, *Lacerta ypsilon* is an available name (ICZN Code, Article 23).

Lacerta zeulonica Nau, 1791, also published before 1931, is likewise a valid, available name. The whereabouts of the type material is unknown. Based on the description and figure, its former allocation (see above) as a junior subjective synonym of *Gekko vittatus* Houttuyn is maintained.

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Fig. 10. Plate 14 in Strack (1820). Explanations: Fig. 1. Der gemeine Erdsalamander, *Lacerta salamandra* (= *Salamandra salamandra* [Linnaeus, 1758]), Fig. 2. Der Japanische Salamander, *Lacerta salamandra iaponica* sic (= *Onychodactylus japonicus* [Houttuyn, 1782]), Fig. 3. Der punktierte Salamander, *Lacerta salamandra punctata* (= *Ambystoma maculatum* [Shaw, 1802], cf. Fig. 5), Fig. 4. Der gabelstreifige Gecko, *Lacerta bifurcifer* (= *Gekko vittatus* Houttuyn, 1782).

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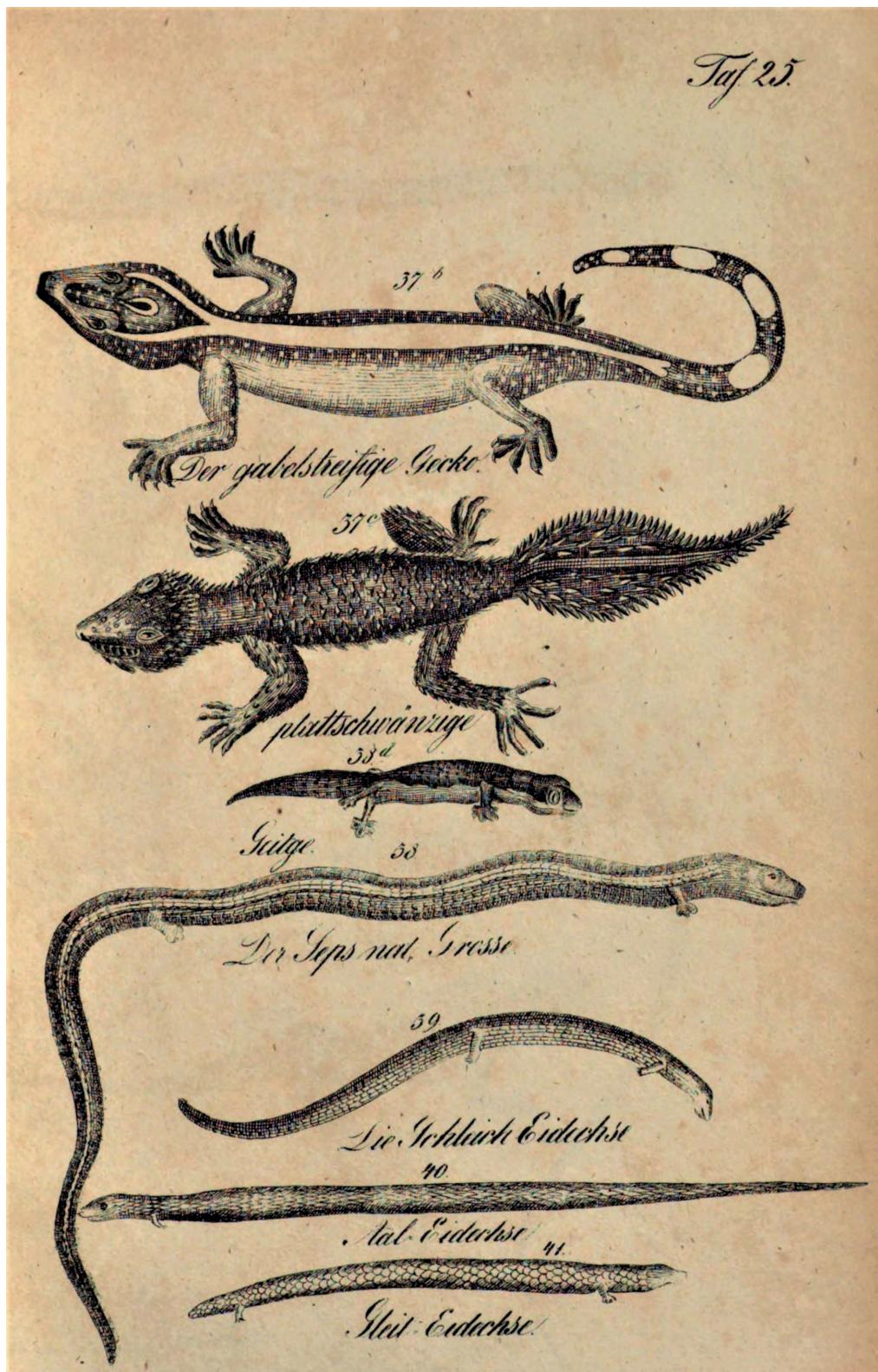


Fig. 11. Plate 25 in Reichenbach (1829). Explanations: Fig. 37b. *Der gabelstreifige Gecko* (= *Gekko vittatus* Houttuyn, 1782), Fig. 37c. [Der] *plattschwänzige* [Gecko] (= *Phyllurus platurus* [Shaw, 1790]), Fig. 37d. *Geitge* (= *Pachydactylus geitje* [Sparrman, 1778]), Fig. 38. *Der Seps* (= ? *Bachia* sp., non *Lacerta seps* Linnaeus, 1758 = *Tetradactylus seps* [Linnaeus, 1758]), Fig. 39. *Die Schleich Eidechse* (= *Lygosoma quadrupes* [Linnaeus, 1766]), Fig. 40. *Aal Eidechse* (= *Chamaesaura anguina* Linnaeus, 1758), Fig. 41. *Gleit Eidechse* (= ? *Lygosoma quadrupes* [Linnaeus, 1766])



Fig. 12. Plate 20 in Duvernoy (1839). Explanations: Fig. 1. Platydactyle à Bandes. (*Platydactylus vittatus* Dum: et Bib:) (= *Gekko vittatus* Houttuyn, 1782), Fig. 2. Hémidactyle Tacheté (*Hemidactylus maculatus* Dum: et Bib:) (valid).

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