The type specimens of *Laudakia stellio* (Linnaeus) (Reptilia: Agamidae) and its subspecies

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**Abstract**
Research on the widespread and polytypic lizard *Laudakia stellio* (Linnaeus, 1758) suffers from the lack of type specimens of the taxa included. This paper reviews the valid subspecies and the information about their type specimens, and designates neotypes where necessary.

**Keywords:** Reptilia Agamidae, Agama stellio, hardun, Laudakia stellio, lectotype, neotype, type specimens

**Introduction**
This note complements the study of *Laudakia stellio* (Linnaeus, 1758) by Almog et al. (2005) that validated the subspecies *L. s. daani* (Beutler and Fröhr, 1980) and redefined the morphology and distribution of the nominotypical subspecies. Almog et al. (2005) relied on earlier restrictions of type localities for naming each valid taxon, following previous usage (e.g. Mertens and Wermuth 1960; Daan 1967).

Unfortunately, the original type localities of the name *Lacerta stellio* Linnaeus, 1758 and other old names applied to the species were wide and encompassed the ranges of several valid taxa, and all subsequent type locality restrictions lacked lectotype or neotype designations, invalidating them under Article 76 of the International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature 1999, hereinafter the Code).

For two reasons it is necessary to have type specimens for several taxa within *Laudakia stellio*, even if this requires the designation of neotypes: first, the infra-specific taxonomy of the species is clearly incomplete (Panov and Zykova 1997; Almog et al. 2005) and relevant investigations are in progress (Lachman et al. submitted; Y. L. Werner, unpublished data).
As more taxa are recognised, additional names will be applied, either from older available names, or by creating new names. Choosing among these options will require precise type localities. Second, this species, with its affinity to edificial environments, is prone to transportation and colonisation so that populations can become secondarily mixed. For example, while zoogeographically the subspecies *Laudakia stellio stellio* is restricted to the Mykonos archipelago (southeast of the Greek mainland population), it is believed to have secondarily reached Corfu (northwest of the Greek mainland) (Mertens, 1968). Indeed, upon re-examination, the two females from Corfu, SMF 56762 and 66811, regarded by Almog et al. (2005) as *L. s. daani*, actually belong to *L. s. stellio*. This case exemplifies the need to base taxa on type specimens, and not only on type localities.

The aim of this paper is thus to list all valid names currently applying to *Laudakia stellio* (synonyms or valid subspecies), with the information available on their name-bearing types and type localities, and to designate neotypes when needed, based on the systematic revision currently in progress.

**Methods**

The information provided below for each name is based on our own reading and interpretation of the original descriptions of those names. Citations and information about types or type localities are thus not based on second-hand sources but have all been checked directly by ourselves. We have examined the following type specimens: *Lacerta stellio* Linnaeus, 1758 (ZFMK 2063); *Iguana cordylina* Laurenti, 1768 (Seba, 1734–65, Volume 1, Plate 107, Figure 2); *Cordylus stellio* Laurenti, 1768 (illustration in Tournefort, 1717), *Stellio vulgaris* Latreille in Sonnini and Latreille, 1802 (FMNH 153134); *Agama stellio brachydactyla* Haas, 1951 (HUJ-R 1801); *Agama stellio cypricaca* Daan, 1967 (BMNH 1930.10.5.6). We have only seen topotypes of *Agama stellio picea* Parker, 1935, a rather uniform taxon (Werner 1992), and *Agama stellio daani* Beutler and Frör, 1980 (Almog et al. 2005).

The following abbreviations are used: PERCRA, percentage of RA (Werner 1971); RA, rostrum–anus length (Werner 1971); museum acronyms follow Leviton et al. (1985).

**Results**

*Lacerta stellio* Linnaeus 1758, p 202

**Name-bearing type(s)**

Adult male from Delos, with complete tail, housed in the Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn (Germany): ZFMK 2063, collected by Karl F. Buchholz on 13 June 1952, with field number 582, on “Micro-Delos” (=Delos); neotype by present designation. The original description was based on several syntypes (see below). Among them, we designate here as lectotype the specimen illustrated in the first volume of Tournefort (1717), on the plate facing p 373 (see below). Since this specimen is lost, and for reasons developed below, we had to designate a neotype to permanently attach the name *stellio* to the taxon for which it is used today.

The species was originally described based on three sources. First, an illustration in Seba’s Thesaurus (Seba 1734–65, Volume 2, Plate 8, Figure 7), that represents an agamid species but does not look particularly like, and is unlikely to be, *L. stellio*. There is no
The type specimens of Laudakia stellio

indication of the origin of the specimen. Second, the travel report of Hasselquist (Hasselquist and Linnaeus 1757): “Lacerta Stellio. The Lizard Stellio. This creature frequents the ruinous walls of Natolia [=Anatolia], Syria and Palaestine [=Palestine]. The Arabs call it Hardun. The Turks kill it, for they imagine that by declining the head, it mimicks them when they say their prayers”. There is little doubt that this text actually refers to *L. stellio*, as no similar species inhabits the area concerned. Third, the first volume of the travel reports of the French Joseph Pitton de Tournefort (Tournefort 1717). This is the most precise reference, as it includes a drawing of a clearly identifiable *L. stellio*. The text (p 372–373) is too long to be reproduced here, but Tournefort specifically states that he saw the species on Delos and on “Mycone” (=Mykonos). The drawing (facing p 373) does not mention where the specimen was collected. The morphological account is scanty, leaving mainly the illustration to link the description to the species known today as *L. stellio*.

Based on Article 73.2.1 of the Code, all the specimens illustrated or seen by Seba, Tournefort or Hasselquist are syntypes of *Lacerta Stellio*. The original type locality (Article 73.2.3) thus includes Delos, Mykonos, Anatolia, Syria (presumably a larger area than present-day Syria), and Palestine. Linnaeus adds to this “Egypt, Africa”, without reference to actual specimens or reports, but presumably based on sources not mentioned.

None of the original syntypes seem to exist. Hasselquist’s specimens were incorporated in the Museum Adolphi Friderici (Kullander, personal communication). There is no specimen of *L. stellio* in what is left of this collection (Lönnberg 1896; Holm 1957; Wallin 1997). There is no trace in France of specimens collected by Tournefort (R. Bour, personal communication). One stuffed specimen labelled *Lacerta stellio* is still kept in Uppsala among other Linnean specimens, but according to Holm (1957) it is not a type. This is fortunate as this specimen is in fact a *Varanus* sp. (P.-A. Crochet, personal observation). No specimen from Seba’s collection fitting the animal depicted in Volume 2, Plate 8, Figure 7, could be traced either in Stockholm (Kullander, personal communication) or in St Petersburg (K. Milto, personal communication). It is thus likely, as already noted by Andersson (1900) and Holm (1957), that all syntypes of *Lacerta stellio* Linnaeus, 1758 have been lost.

The type locality restriction by Mertens and Müller (1928, p 26) to Delos Island, Cyclades is invalid (no lectotype or neotype designation). The type locality thus currently encompasses the whole range of the species and the name could formally apply to any of the valid subspecies. The only way to stabilise the nomenclature is to designate a lectotype or a neotype.

The only original syntype that can clearly be identified as *L. stellio* is the specimen illustrated by Tournefort. Since Seba’s syntype is apparently not a member of this species, we designate here as lectotype of *Lacerta stellio* Linnaeus, 1758 the specimen illustrated in the first volume of Tournefort (1717), on the plate facing p 373. In doing so, we make sure that Seba’s syntype will not threaten current nomenclature even if it is relocated in the future.

The origin of the specimen illustrated in Tournefort (1717) is uncertain. The specimen is illustrated opposite the text concerning the island of Delos. Tournefort explicitly mentions that he saw the species on Delos, but also that specimens of this species were caught for him on Mykonos. However, this drawing does not clearly exhibit the typical features of the nominotypic subspecies as understood today. Indeed, its coloration (dark body with a row of elongated pale spots along the middle of the back, head as dark as the body with some pale spots) could fit the subspecies *daami sensu* Almog et al. (2005) better. This suggests that the specimen may not come from Delos or Mykonos. Indeed, Tournefort must have
seen the species in other places during his extensive travels in the Levant, as it is a very conspicuous part of the fauna of most of the Mediterranean part of Anatolia. The restricted type locality following present lectotype designation is thus “probably Delos or Mykonos but possibly Anatolia”.

Since the locality where the lectotype was collected is not known for sure, since the lectotype is lost, and since the characters visible on the illustration of the lectotype do not allow it to be allocated unambiguously to one of the valid taxa recognised today within *L. stellio*, only a neotype designation can clarify the type locality and at the same time permanently attach the name *stellio* Linnaeus, 1758 to the populations for which it is used today (Article 75.3.1 of the Code). The characters separating the nominotypical subspecies from the other valid subspecies of *Laudakia stellio* (see Article 75.3.2 of the Code) can be found in Daan (1967) and Almog et al. (2005).

For stability the neotype should originate from the area that previously has been accepted as restricted type locality. Thus we designate here as neotype of *Lacerta Stellio* Linnaeus, 1758 an adult male from Delos, with complete tail, housed in the Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany: ZFMK 2063, collected by Karl F. Buchholz on 13 June 1952, with field number 582, on “Micro-Delos” (=Delos). This specimen is partly depicted in Almog et al. (2005, Figures 2C, 3C). Delos is part of the original type locality, as requested by Article 75.3.6 of the Code.

The neotype is briefly described here following the methods of Almog et al. (2005). Mensural characters (in mm with PERCRA in parentheses): RA, 105.0; tail length, 162 (154.3); head length, 22.5 (21.4); head width, 34 (32.4); head depth, 17.4 (16.6); head index, 66.2; head flatness, 129.3; forelimb length, 44.7 (42.6); hindlimb length, 68.2 (64.9); fourth toe length, 24 (22.9); limb ratio, 152.6. Meristic characters: supralabialia, L=13, R=11; mid-dorsal scales along 1 cm in the largest scaled area halfway between fore- and hindlimbs, 6; ventral scales along 1 cm in the middle of the belly, transversely from the midline laterad, 10; preanal glandular scales, 36; subdigital lamellae under fourth toe, L=18, R=19. Pattern of dorsal tubercles, halfway between Daan’s (1967) Figures 6a and 6b. Coloration: head dorsally light coloured; back with three vague light spots, each almost twice as long as wide; throat unspotted grey; venter unspotted light-coloured, tail with eight light rings.

**Type locality**

Originally Delos, Mykonos, Anatolia, Syria (presumably a larger area than present-day Syria), Palestine, Egypt, and Africa. Restricted to Nissı´Dı´los (=Delos island), Greece, by present neotype designation.

**Proposed status**

*Laudakia stellio stellio* (Linnaeus, 1758).

**Iguana cordylina** Laurenti 1768, p 47

**Name bearing type(s)**

The description is based on two specimens illustrated in Seba’s thesaurus (1734–65, Volume 1, Plate 107, Figures 1, 2). The specimen in Figure 1 is difficult to identify, but it is
clearly not a *Laudakia stellio*, and probably does not even belong to Agamidae. In contrast, the specimen in Figure 2 is clearly a *Laudakia stellio stellio*, based on its general habitus and coloration, including a series of pale spots on the back and a yellowish head paler than the body. Since this name is widely cited in the synonymy of *Laudakia stellio*, and to stabilise its current position in the synonymy, we here designate as lectotype of *Iguana cordylina* Laurenti, 1768 the specimen illustrated in Seba (1734–65, Volume 1, Plate 107, Figure 2).

**Type locality**

Originally stated to be “America” (either a mistake or an incomplete type locality). There is no indication in Seba about the origin of the specimen in Plate 107, Figure 2, but the specimen is clearly identifiable as *L. stellio stellio*, and hence came from either Delos or Mykonos. Type locality thus restricted to Delos or Mykonos by present lectotype designation.

**Proposed status**

Subjective junior synonym of *Laudakia stellio stellio* (Linnaeus, 1758).

**Remarks**

The name *Cordylus stellio* appears in the same work (Laurenti 1768, p 52) where it is not credited to Linnaeus, but is proposed for the specimen illustrated in Tournefort (1717). This name has not been listed in the synonymy of *Laudakia stellio* by subsequent authors, which indicates that they considered it as a new combination (chresonym) and not as a new name. This interpretation is certainly correct, as Laurenti clearly knew Linnaeus’ work. Other names (e.g. *Rana esculenta*) appear without reference to Linnaeus in the first part of Laurenti’s book, but are credited to Linnaeus later in the book.

*Stellio vulgaris* Latreille in Sonnini and Latreille 1802, p 22

**Name-bearing type(s)**

Adult male from El Amiria, Alexandria Gov., Lower Egypt, with complete tail, housed in the Field Museum of Natural History, Chicago, USA: FMNH (CNHM) 153134, collected by H. Hoogstraal, November 1963; neotype by present designation.

The description of *Stellio vulgaris* contains no reference to any precise specimen, or to any external source except a citation from Cetti (our translation): “Inhabits Africa ... also under latitudes far away from this part of the Old World ... and even in Sardinia, where Cetti says that it lives insides houses and is called there *tarentole*”. Hence several species were mixed in the description of *Stellio vulgaris*, since the reference to Cetti clearly concerns *Tarentola mauritanica* (Linnaeus, 1758) or *Hemidactylus turcicus* (Linnaeus, 1758).

The morphological description is vague enough to preclude any firm identification (our translation): “…most often marbled with white, black, grey and sometimes green. Looks a bit like a toad because of its head. This part, as well as the body, and especially the tail, exhibits tubercles and spines”.
The type locality is wide and vague: Africa, islands of the Archipelago [Greek islands?], Sardinia, Egypt. Only this last locality is elaborated (our translation): “This animal is very abundant in Egypt, it is especially found around the pyramids and the ancient tombs”.

The restriction of the type locality to “Lower Egypt” by Mertens and Wermuth (1960) is invalid, lacking lectotype or neotype designation. Clearly, the information in the original description prevents linking the name *Stellio vulgaris* to any current valid taxon. Moreover, the name is based on a mix of several species. Currently, this name is used for the distinct subspecies of *Laudakia stellio* inhabiting the Lower Nile valley in Egypt (Daan 1967).

Stabilisation of the current usage requires, as explained above, designation of a neotype of *Stellio vulgaris* Latreille in Sonnini and Latreille, 1802, from the previously accepted restricted type locality. We thus here designate as neotype of *Stellio vulgaris* Latreille in Sonnini and Latreille, 1802 an adult male from El Amiria, Alexandria Gov., Lower Egypt, with complete tail, housed in the Field Museum of Natural History, Chicago, USA: FMNH 153134. Lower Egypt is part of the original type locality, as requested by Article 75.3.6 of the Code. The neotype is briefly described here following the methods of Almog et al. (2005). The characters distinguishing *vulgaris* from other taxa in *L. stellio* are listed in Daan (1967).

Mensural characters (in mm with PERCRA in parentheses): RA, 117.0; tail length, 172 (147.3); head length, 31.9 (27.3); head width, 30.9 (26.4); head depth, 22.8 (19.5); head index, 103.2; head flatness, 139.3; forelimb length, 69.9 (59.7); hindlimb length, 97.8 (83.6); fourth toe length, 31.5 (26.9); limb ratio, 139.9. Meristic characters: supralabialia, L=5, R=11; mid-dorsal scales along 1 cm in the largest scaled area halfway between fore-and hindlimbs, 11; ventral scales along 1 cm in the middle of the belly, transversely from the midline laterad, 11; preanal glandular scales, 37; subdigital lamellae under fourth toe, L=27, R=27. Pattern of dorsal tubercles, as in Daan’s (1967) Figure 6d. Coloration (preserved): Head dorsally dark grey, like dorsum; back with four very vague light spots, each about as long as wide; throat grey, spotted white anteriorly and laterally; venter light-coloured, some scattered scales darker; tail with 12 light rings on posterior three-quarters, fading cranial.

**Type locality**

Originally Africa, islands of the Archipelago [= Greek islands?], Sardinia, Egypt. Restricted to El Amiria, Alexandria Gov., Lower Egypt, by present neotype designation.

**Proposed status**

*Laudakia stellio vulgaris* (Latreille in Sonnini and Latreille, 1802).

**Remarks**

As explicitly stated in the introductory part of Sonnini and Latreille (1801), the lizard part of Sonnini and Latreille (1802) had been written by Latreille alone. Latreille is thus the author of the name (see Article 50.1 of the Code). See recommendation 51E for the citation of the name.

*Agama cordylea* Merrem 1820, p 55

Substitute name for *Lacerta Stellio* Linnaeus, 1758.
Name-bearing types and type locality
Same as *Lacerta Stellio* Linnaeus, 1758.

Proposed status
Objective junior synonym of *Laudakia stellio stellio* (Linnaeus, 1758).

Remarks
Contra Wermuth (1967), this name is not a substitute name of *Iguana cordyлина* Laurenti, 1768.

*Agama sebae* Merrem 1820, p 55
Substitute name for *Iguana cordyлина* Laurenti, 1768.

Name-bearing types and type locality
Same as *Iguana cordyлина* Laurenti, 1768.

Proposed status
Subjective junior synonym of *Laudakia stellio stellio* (Linnaeus, 1758).

*Stellio antiquorum* Eichwald 1831, p 187
Substitute name for *Lacerta Stellio* Linnaeus, 1758.

Name-bearing types and type locality
Same as *Lacerta Stellio* Linnaeus, 1758.

Proposed status
Objective junior synonym of *Laudakia stellio stellio* (Linnaeus, 1758).

*Uromastyx horrida* Wagler in Michahelles 1833, p 902
Substitute name for *Lacerta Stellio* Linnaeus, 1758.
Substitute name for *Agama cordylea* Merrem, 1820.
Substitute name for *Agama sebae* Merrem, 1820.

Name-bearing types and type locality
Same as *Lacerta Stellio* Linnaeus, 1758.
Proposed status

Objective junior synonym of *Laudakia stellio stellio* (Linnaeus, 1758).

**Stellio cyprius** Fitzinger 1843, p 85

*Name bearing type(s)*

No particular specimen(s) designated but name based on specimens from the Vienna Museum (see below).

*Type locality*

Cyprus.

*Name not available: nomen nudum*

The original citation (reproduced here: [2. *Stellio cyprius*. Asia. Ins. Cyprus. Mus. Vindob.]) contains no description, definition of the taxon or indication in the sense of the code (see Article 12 of the Code).

**Agama stellio picea** Parker 1935, p 137, Plate 1

*Name bearing type(s)*

Four syntypes, BMNH 1946.8.28.53–56 (formerly BMNH 1933.11.19.9–12), two males and two females, coll. Col. Meinerzhagen, 24 April 1933.

*Type locality*

Black Lava Desert of Jordan (“Transjordania”), 32°10′N, 36°40′E.

Proposed status

*Laudakia stellio picea* (Parker, 1935).

**Agama stellio brachydactyla** Haas, 1951, p 1052

*Name-bearing type(s)*

Holotype by original designation: HUJ-R 1801, male, collected by J. Wahrman, 3 December 1949.

*Type locality*

Foot of Jebel Lussan (=Har Loz, 30°28′N, 34°36′E; Wahrman probably collected on the northern or eastern side), near Israel–Sinai frontier, SSW of Be’er-Sheva, Israel.
Proposed status

*Laudakia stellio* brachydactyla (Haas, 1951).

*Agama stellio cypriaca* Daan 1967, p 129

Name-bearing type(s)

Holotype by original designation: BMNH 1930.10.5.6, male, collected by R. L. Cheverton, 1930.

Type locality

Limassol, Cyprus.

Proposed status

*Laudakia stellio* cypriaca (Daan, 1967).

*Agama stellio daani* Beutler and Frör 1980, p 270

Name-bearing type(s)

Holotype by original designation: ZSMH (=ZSM) 201/1978-1, adult male, collected by A. Beutler on 17 April 1978.

Type locality

Between Agh. Kirikos and Evdilos, Ikaria, Samos Region, Greece.

Proposed status

*Laudakia stellio* daani (Beutler and Frör, 1980).

*Agama stellio mykonensis* Xyda 1983a, p 115 (but see also Xyda 1983b)

Name-bearing type(s)

The name is based on 25 males and 30 females from Delos and Mykonos, which are all syntypes. No holotype has been designated. These specimens are apparently all lost (A. Legakis, personal communication).

Type locality

Mykonos and Dilos (=Delos).

Proposed status

New subjective junior synonym of *Laudakia stellio* stellio (Linnaeus, 1758).
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