



The taxonomic status of grass snake, *Natrix natrix* (Linnaeus, 1758) (Squamata: Colubridae), with designation of a neotype

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Abstract

As part of an investigation into the status of the near threatened Gotland grass snake, *Natrix natrix gotlandica* Nilson & Andrén, 1981, endemic to the island of Gotland, we discovered that Linnaeus' type series of the common grass snake, *Natrix natrix* (Linnaeus, 1758), is comprised of specimens from three different currently recognized species.

To stabilize the usage of the name *Coluber natrix*, we investigate Linnaeus' type series, and a specimen which Linnaeus in 1741 examined west of the Swedish city of Nyköping is designated lectotype. The lectotype has since been lost, and a newly collected specimen from the same locality is designated neotype for *Coluber natrix*. The neotype is deposited in the herpetology collection of the Swedish Museum of Natural History in Stockholm, Sweden, catalog number NRM 8260.

Key words: lectotype, *Coluber natrix*, COI, COX1

Introduction

We follow Speybroeck *et al.* (2020) in considering the colubrid genus *Natrix* Laurenti, 1768, to include five currently recognized species: *Natrix natrix* (Linnaeus, 1758), *Natrix maura* (Linnaeus, 1758), *Natrix tessellata* (Laurenti, 1768), *Natrix astreptophora* (Seoane, 1884) (raised to the rank of species by Pokrant *et al.* (2016)) and *Natrix helvetica* (Lacépède, 1789) (raised to the rank of species by Kindler *et al.* (2017)), with a distribution in Europe, North Africa, and Western and Central Asia. The type species of the genus is *N. natrix*, originally described as *Coluber natrix* by Linnaeus in his book *Systema Naturae* (1758: 220). *Natrix natrix* is composed of approximately seven subspecies. During an investigation of *Natrix natrix gotlandica* Nilson & Andrén, 1981, endemic to the island of Gotland, we encountered the problem that Linnaeus type series for *Coluber natrix* comprises three currently recognized species of grass snake. To stabilize the usage of the name it is necessary to clarify the taxonomic status of *N. natrix* (Linnaeus, 1758).

Material and methods

Abbreviations used:

The Code = International Commission of Zoological Nomenclature (1999).

NRM = Swedish Museum of Natural History, Stockholm, Sweden.

UPSZTY = Type collection, Museum of Evolution, University of Uppsala, Sweden.

Taxonomy was investigated by examining all relevant references. To interpret the abbreviated references in Linnaeus' papers we used Heller (2007), and to interpret Latin place names in references we used Maxwell & Larson (1997). All translations from Latin, German, and Swedish by author 1.

To determine Linnaeus' type series for the species *Coluber natrix* we analyzed his provided primary and secondary references; tertiary and further references were only investigated if they were obviously seen by Linnaeus. Specimens mentioned or pictured by Linnaeus in his 1758 description of *Coluber natrix*, or by his primary or secondary references, or which were definitely known to Linnaeus in 1758 and identified by him as "*Coluber natrix*", "*Natrix*", or "Snok" (the Swedish name for *N. natrix*) were considered part of the type series. Specimens for which there is no evidence that Linnaeus studied and identified them as *Coluber natrix*, are not included in the type series (see: paragraph 72.4.1 & 72.4.1.1 of the Code).

The standard barcoding region of the mitochondrial cytochrome c oxidase subunit 1 gene (MT-COX1, also known as COI) was extracted, amplified, and sequenced as detailed in Kullander *et al.* (2018), with the modification that we used the primers COI_Rep_F5 (AACCACAAAGAYATYGGAAACCC) and COI_Rep_5R (GGTGGC-CRAARAATCAGAACAG). Total length, snout-vent length and tail length were measured by marking a piece of string, and rounded to the nearest five millimeters (mm). Snout-vent length was measured to the posterior margin of the anal plate. Subcaudals were counted on one side, excluding the terminal scute.

All collection was done with permission from the relevant authorities: permit to use animals in research from the Swedish Department of Agriculture (diary number N85/15), dispensation from protected species legislation from the County Government of Södermanland (diary number 522-5786-2017).

Taxonomic analysis

Coluber natrix was described by Linnaeus in his book *Systema Naturae* (1758: 220). This is the description in full, under the genus *Coluber*:

230. *Natrix*. 170-60. *Faun. Svec.* 259.

It. gotl. 146.

Amoen. acad. I. p. 116. n. 3.

Gron. mus. 2. p. 63 n. 27.

Habitat in Europa; in fimetis pariens.

Niger macula alba utrinque ad collum

Translation, with Linnaeus' abbreviations and references written out for legibility, and Linnaeus' primary references labeled **P1** to **P4**:

Species number 230. *Coluber natrix*. Ventral scutes 170, caudal scutes 60 [note: 170 + 60 = 230 = the species number]

P1: *Fauna Svecica*, Linnaeus (1746), species number 259.

P2: *Iter Gotlandicum* (published together with *Iter Oelandicum* as *Öländska och Gothländska Resa*), Linnaeus (1745a), page 146.

P3: *Amoenitates academicae*, Linnaeus (1749), volume 1, page 116, species number 3.

P4: *Museum Ichthyologicum*, Gronovius (1756), volume 2, page 63, species number 27.

Lives in Europe; spawns in manure.

Black with white spot on each side of the neck.

As was customary at the time, no holotype was designated. To determine Linnaeus' type series for *Coluber natrix* we analyzed his provided primary and secondary references. Primary references are numbered **P1–P4**, secondary references **R5–R23**. References are organized so that secondary references are listed under their respective primary reference. Two additional sources which are not explicitly given in Linnaeus' description in 1758, but are mentioned in the preface (1758: 2), are included last in the list as **R24–R25**. There are 14 members of the type series, labeled **TS1–TS14**:

P1. Faun. Svec. 259. Linnaeus' own *Fauna Svecica* (1746: 96–97) contains a description of grass snake (species number 259, *Anguis scutis abdominalibus CLXXVII, squamis caudae LXXXVI*) obviously based on a speci-

men (TS1), but without locality data. The description contains eight secondary references (R5–R12; see below).

- R5. Amph. Gyllenb.** = *Amphibia Gyllenborgiana*, Linnaeus (1745b); earlier edition of *Amoenitates academicae* (1749) (R3); on page 8 is a description of a snake (TS2) which is still in the Uppsala University Museum of Evolution collection (catalog number UPSZTY 3). It should be noted here that many of Linnaeus' papers are his student's dissertations. In *Amoenitates academicae*, Linnaeus collected these and republished them (with different pagination). *Amphibia Gyllenborgiana* is one of these, published in 1745 and 1749. The student here was Barthold Rudolf Hast who later became a medical doctor in Finland. He made the oral presentation and the defence of the dissertation, but he did not write the text. Linnaeus is the single author. Only one of Linnaeus' students wrote his own dissertation: Anders Sparrman in 1768 (Löwegren, 1952: 365).
- R6. Raj. quadr. 334. *Natrix torquata*** = *Synopsis methodica animalium quadrupedum et serpentine*, by Rajus (1693); on page 334–336 is a detailed description of a grass snake (TS3).
- R7. Gesn. serp. 43. *Anguis*** = *Historiae animalium. Lib. V, qui est de serpentium natura*, Gesnerus (first published in 1587, but Linnaeus seems to have used the 1621 edition). On page 43 is “*De Angue*”, a general discussion about the snakes which live in water. There is no indication the discussion is based on any specimen. However, contrary to Linnaeus citation, Gesnerus does not use the name *Anguis* for grass snake, but the name *Natrix torquata*, on page 110. Gesnerus description and drawing is obviously based on a specimen, but as there is no indication Linnaeus saw Gesnerus description of *Natrix torquata*, much less considered it to be *Coluber natrix*, it is not included in the type series.
- R8. Aldr. serp. 287. *Natrix torquata*** = *Serpentum et Draconum Historiae. Libri duo*, Aldrovandi (1640). Starting on page 287 is a detailed description and one drawing of a grass snake (TS4).
- R9. Charl. onom. 33. *Natrix torquata*** = *Onomasticon Zoicon* [...], by Charleton (1668). Page 33 contains the name *Natrix torquata* and lists common names in Italian and English. There is no indication the text is based on any specimen.
- R10. Merr. pin. 204. *Anguis Coluber*** = *Pinax rerum naturalium britannicarum* [...], Merrett (1666). The reference is in error, there is no mention of any snakes on page 204. On page 208 is just a listing of “*Anguis, Coluber, a snake*” and references. There is no indication the text is based on any specimen.
- R11. Pet. mus. 17. n. 101. *Anguis vulgaris fuscus, collo flavescente, ventre albis maculis distincto.*** = *Musei petiveriani centuria secunda & tertia* (Petiver, published 1695–1703). On page 17 is a very brief description of species number 101, *Anguis vulgaris fuscus, collo flavescente, ventre albis maculis distincto*, “The Common English Snake”, based on Rajus (R6). There is no indication the text is based on any specimen.
- R12. It. gottl. 226. *Serpens* & It. oel. 6. 154. *Coluber*** = *Iter Gotlandicum* and *Iter Oelandicum*, published together as *Öländska och Gothländska resa* (“Journey to the islands of Öland and Gotland”), Linnaeus (1745a). On page 6 is a careful description of a grass snake found on 18 May 1741 on the Swedish mainland, west of the Swedish city Nyköping, close to present-day Berga-Tuna estate (TS5). On page 154 is a note on a grass snake found at Horn on the island Öland (TS6). On page 226 is a description of a grass snake found at Kräklingebo church on the island of Gotland (TS7).
- P2. I. gottl. 146.** This appears to refer to Linnaeus' book *Öländska och Gothländska resa* (1745a) (R12), but this is in error as there are no snakes mentioned on page 146. Most likely the page number is wrong and should refer to page 226 (in Linnaeus (1754: 27) page 227 is given!), as that is the page with the only grass snake Linnaeus reports from Gotland (TS7), but it may refer to Linnaeus' book *Wästgöta-Resa* (1747), “Journey to West Gothland”, which Linnaeus in other places cited as *I. wgoth.*, where on page 146 is a detailed description of a grass snake caught near the Swedish city Göteborg (TS8). This error was not corrected in the 12th edition of *Systema Naturae* (Linné, 1766), and the resulting ambiguity cannot be resolved. However, both specimens were explicitly identified by Linnaeus as grass snakes, and hence members of the type series.
- P3. Amoen. acad. I. p. 116. n. 3.** = *Amoenitates Academicae* by Linnaeus (1749), this is a renamed later edition of *Amphibia Gyllenborgiana* (Linnaeus, 1745b) (R5). On pages 116–117 is a long description of species number three, *Coluber scutis abdominalibus CLXXVII, caudalibus LXXV* (TS9; this is the same specimen as TS2 in R5). There are eight secondary references: (R13–R19).
- R13.** = reference R7
- R14.** = reference R11
- R15. *Serpens Anguis. Schwenck rept. pag. 157*** = *Theriotropheum Silesiae* [...], Schwenckfeld (1603). The refer-

ence is in error, there are no mentions of any snakes on page 157. There is mention of “*Serpens, Anguis*” on page 137, but this explicitly refers to all animals which crawl on the ground, including lizards and scorpions. A general discussion of *Coluber*, “Ein Wasser Schlange”, also referred to as *Enhydris*, *Cherhydrus* and *Natrix*, on page 145 does not appear to be based on any specimen.

R16. = reference **R10**

R17. *Natrix torquata*. Aldrovand serp. pag. 287. Jonst. serp. pag. 89. Raj. quadrup. pag. 334. Charlet. exercit. pag. 35 = Linnaeus here gives four references for the name *Natrix torquata*:

1) Aldrovand serp. pag. 287 = **R8**;

2) Jonst. serp. pag. 89 = *Historiae Naturalis de Serpentina, Libri II.*, Jonstonus (1657). This reference is in error, there is no page 89, but on page 29 (page 32 in 1653 edition; page 44 in 1757 edition) is a description of grass snake based on Aldrovandi (**R8**);

3) Raj. quadrup. pag. 334 = **R6**;

4) Charlet. exercit. pag. 35 = *Exercitationes de differentiis et nominibus animalium*, Charlton [= Walter Charleton] (1677), page 35; little more than a mention of the name *Natrix torquata* and that this refers to “the Ring’d Water-Snake”.

R18. *Natrix torquata ex subcaeruleo nigro & albo varia*. Mus. Petrop. I. p. 475. n. 451 = *Musei Imperialis Petropolitani. Vol. I, Pars prima* [...], Anonymous (1742). On page 475 is a description of *Natrix torquata ex subcaeruleo nigro et albo varia* (**TS10**). No locality information.

R19. = reference **R12**

P4. Gron. mus. 2. p. 63 n. 27. = *Museum Ichthyologicum* [...] by Gronovius (1756). Species number 27 on page 63 is *Coluber scutis abdominalibus CLXIV, & squamarum caudalium paribus LVIII* (**TS11**). Four secondary references (**R20–R23**).

R20. = reference **R11**

R21. *Ophis indigena, tuberosus*. Seb. thes. vol. I. p. 6. tab. 4. fig. 2 & 3 = *Locupletissimi rerum naturalium thesauri*, by Seba (1734–1764). The reference is slightly in error, and refers to Volume II. On page 6 is a brief text noting that figures 2 and 3 on Table 4 shows a male and a female (**TS12, TS13**).

R22. = reference **R1**.

R23. = reference **R5**.

R24. Linnaeus (1758) on page 2, before the introduction, lists the collections and other sources used for the *Systema Naturae*. Among them is “*C. De Geer Museum Amphibiis, Insectis aliisque rarioribus dives*”. From letters it is known that Linnaeus made visits to Charles De Geer’s collections on several occasions and a number of snakes in Linnaeus (1758) are explicitly based on a specimen in De Geer’s collection. In 1778 that collection was donated by De Geer’s widow to the Royal Swedish Academy of Sciences and in 1848 it was formally transferred to the NRM. At least one *N. natrix* from that collection, NRM 7273, still exist, but there is no evidence that Linnaeus examined this specimen, or that he considered it to be *Coluber natrix*, and it is not included in the type series.

We do not know when De Geer added NRM 7273 to his collection, but we do know that there were specimens of *N. natrix* in the collection prior to 1766. It appears that De Geer himself tried to identify his snakes according to Linnaeus’ system, as his label for NRM 7273 includes a scute count: “169 [+] 57 = 226”.

R25. Linnaeus (1758) on page 2, before the introduction, lists the collections and other sources used for the *Systema Naturae*, and first of all is “*S:i Adolphi Friderici Regis Museum*” (Linnaeus, 1754). In the early 1750’s Linnaeus examined the collections of King Adolf Fredrik. It was published in two parts, in the first part (Linnaeus, 1754: 27) is a description of *Coluber scutellis abdominalibus 170, squamis caudalibus 60*, with four references: **R1**; **R2** (but with page 227 given); **R3**; and Linnaeus 1747: 146. In the margins Linnaeus writes “*Natrix*” and “snok-ormen” (“the grass snake”). Linnaeus clearly considered this specimen to be the same species he would later name *Coluber natrix*, and it is included in the type series (**TS14**).

Analysis of the *Coluber natrix* type series

Linnaeus type series for *Coluber natrix* comprises 14 specimens, **TS1–TS14**.

TS1: Linnaeus (1746: 96–97) description is clearly of a grass snake, and obviously based on a specimen, but with-

out locality data. The snake is black. Ventral scales black with white lateral ends. Throat white. “Ear region” yellow. “The temples”, by which Linnaeus appears to mean the upper labial scales, white with black transverse lines. Dorsal scales varying in color, some are entirely black and some have a gray longitudinal stripe. In the later 1761 edition (Linné, 1761: 104–105) the scale count is changed from CLXXVII (177) ventral scutes and LXXXV (85) subcaudal scutes to CLXX (170) ventral scutes and LX (60) subcaudal scutes. This may refer to two different specimens. The first one is probably lost, but may possibly still be stored at the Museum of Evolution in Uppsala. It is unlikely that Linnaeus kept alcohol specimens in his private collection, which ended up in the Linnaean Society, London. We could not find this specimen. The second one is published after 1758 and is not part of the type series.

TS2: Linnaeus (1745b: 8) describes *ANGUIS scutis abdominalibus CLXXVII, caudalibus LXXXV*, based on an alcohol-preserved specimen from the Gyllenborg collection. Gyllenborg donated collections to the universities in both Uppsala and Lund. Most of the specimens of the Gyllenborg collection are North American in origin and were received from two brothers named Hesselius who had emigrated to North America (Löwegren, 1952: 347). Linnaeus states the snake is entirely dark (“*ater*”) but also that it has bluish-gray or leaden (“*lividus*”) marks on both sides of the “ear region”, white throat, and white upper lip with black cross lines, has 177 ventral scutes, and 85 subcaudal scutes. There is no locality data, but Linnaeus states that the species in Sweden is especially common in the plains of Scania (“*per sueciam frequens praesertim in Scania campestri*”). This specimen is still in the collection of the Museum of Evolution (UPSZTY 3; Wallin, 2001) in Uppsala, Sweden. Curator Erica Mejlon kindly provided photos of the specimen, which is faded but otherwise in average condition. Despite being part of the Gyllenborg collection, **TS2** is not a North American species, but appears to be a melanistic grass snake with traces of lunar spots, 650 mm total length, with 170 ventral and approximately 66 subcaudal scutes. Based on scale counts from Pokrant *et al.* (2016) it is not a member of the morphologically divergent grass snake taxa *astreptophora* or *cetti*, but identification beyond that is difficult. Linnaeus’ scale counts were often not exact, but the difference is here too great to be explained by carelessness. Holm (1957), in a study of the Linnaean collection in Uppsala, states that this specimen is “not a type”, but without motivation. However, for other specimens which Holm marked as “not a type”, the stated motivation is that the specimen has been replaced, or that its identification as part of Linnaeus’ collection is in error. Wallach *et al.* (2014) erroneously list this specimen as holotype for *N. natrix*; their listing does not constitute a valid lectotype designation (see paragraph 74.5 of the Code).

TS3: Rajus (1693: 334) describes “*NATRIX torquata, The common Snake*”, a black or rust-brown (“*ferreus*”, lit. “iron-colored”) snake which is distinguished by its whitish spots on the neck. Rajus was British, but traveled to France, Germany, Sweden and Italy. No locality is given for the snake.

TS4: Aldrovandi (1640: 287) drawing shows a strongly banded snake with dark triangular neck spot but no lunar spot; there is no locality but the species is mentioned to occur in southern Germany, Flanders, and Lago Maggiore, and that Gesnerus observed it near Locarno. The drawing is consistent with a barred grass snake, *N. helvetica*, which is the only grass snake occurring in Belgium, and which also occur in Locarno/Lago Maggiore.

TS5: Linnaeus (1745a: 6) gives a careful description of a grass snake found 18 May 1741 on the Swedish mainland, west of the Swedish city Nyköping, close to present-day Berga-Tuna estate, at the time owned by the von Berchner family (“Baerchners Gård Bärge kallad”). The snake was gray in color, with a few black scales on the side making the dorsal “slightly spotted”. Ventral scales black, lighter in color laterally and progressively lighter nearer the head. “At the ears” black with large white spots. There is no indication the specimen was preserved, and it is assumed lost.

TS6: Linnaeus (1745a: 154) notes a grass snake killed at Horn on the island Öland on 20 June 1741. The “back was gray and belly black; a row of white scales on either side of body; under chin and neck he was whitish, at the ears light yellow”. There is no indication the specimen was preserved, and it is assumed lost.

TS7: Linnaeus (1745a: 226) gives a brief description of a grass snake found at Kräklingebo church on the island Gotland on 3 July 1741. The scales on the ventral side shiny, black, laterally white. Underside of head white. The only mention of dorsal coloration is that the snake was “yellow around the ears”, and that the “temples” were white with black crosslines. There is no indication the specimen was preserved, and it is assumed lost.

TS8: Linnaeus (1747: 146) describes a snake captured on 12 July 1746 in the vicinity of present-day Kallebäck in the city of Göteborg, Sweden. Linnaeus states that the specimen was “very big and long; he was gray with some dark spots on the sides; but underneath mottled in white and black, with 173 abdominal scutes --- and 63 pairs

of scales under the tail. On both sides of the neck white, and mouth without fangs; from this one can confidently state that he is a NATRIX 259 [Linnaeus here references **R1**], or grass snake". There is no indication the specimen was preserved, and it is assumed lost.

TS9: Linnaeus (1749: 116–117) gives a long description of a *Coluber* with 177 ventral scutes, and 85 subcaudal scutes. No locality, just a note that the species is common in Sweden. This is the same specimen as **TS2**.

TS10: Anonymous (1742: 475) provides a description of species number 451, "*Natrix torquata ex subcaeruleo nigro et albo varia* [lit. "Collared snake of the bluish black and white variation"], head and neck thin, incompletely encircled by two characteristic white spots; scales on the belly are long and with white and black patterning in the form of parallelograms". No locality information. If this specimen still exists it should be in the Zoological Museum of the Zoological Institute of the Russian Academy of Sciences (ZISP) in St. Petersburg, but an attempt in March 2020 to locate the specimen was not successful (Dr. K. Milto, pers. comm.), and the specimen is presumed lost.

TS11: Gronovius (1756: 63) describes *Coluber scutis abdominalibus CLXIV, & squamarum caudalium paribus LVIII*, which is clearly a grass snake. No locality, but stated to be very common in Geldria (approximately corresponding to present-day Gelderland in the Netherlands); the only grass snake in that area is barred grass snake, *N. helvetica*, and Gronovius' stated scale counts (164 ventral scutes, 58 subcaudal), is compatible with the specimen being a *N. helvetica*.

TS12, TS13: Seba (1735: 6) states that figures 2 and 3 on Table 4 show male and female of *Ophis indigena, tuberosus* [lit. "indigenous snake, lumpy"]. Table 4 shows two brown snakes with two lateral staggered lines of black spots and a complete white and black band across the neck (**TS12, TS13**), both with a pathological lump approximately mid-body. No locality. "Indigenous" could mean that the snakes are from Seba's native Netherlands; if so they would be barred grass snakes, *N. helvetica*, the only grass snake in the Netherlands, but the pigmentation of the depicted snakes is typical of juvenile *N. astreptophora*. Seba's collection was sold and dispersed after his death (Boeseman, 1970) and the fate of these specimens unknown; if they still exist they may be in any of the collections of the natural history museums in St. Petersburg, London, Leiden, Paris, Stockholm, Bremen or Berlin. King Adolf Fredrik bought objects at the auction of the Seba collection in 1752. We can, however, state that the two specimens **TS12** and **TS13** are not identical to NRM 3056 (one lot with two young specimens), which was once owned by the king.

TS14: Linnaeus (1754: 27) describes *COLUBER scutellis abdominalibus 170, squamis caudalibus 60* and lists *Coluber scutis abdominalibus 177, squamis caudalibus 85* as an alternative name.

Linnaeus states it is "Easily recognized by its white spots at the sides of the back of the head towards the neck. Ventral scutes varies; the number of scutes and scales in combination usually 230 or 231."

The specimen from King Adolf Fredrik's collection on which Linnaeus based his description seems to be lost. The old manuscript catalogues indicate that there might have been several specimens of *Coluber natrix* present in the Royal Collection when it was transferred to the Academy of Sciences in 1801. We are able to locate a single lot with an origin in that collection: NRM 3056 with two juvenile *N. natrix*. They do not match the description in Linnaeus (1754) and there is only a fragment of the original label left.

Selecting a lectotype and neotype for *Coluber natrix*

At least one physical specimen, **TS2**, of the type series still exist, however it lacks collection data, which makes it unsuitable as a lectotype, and in addition there is doubt that it is the same specimen as was seen by Linnaeus. **TS10** should be in the collection of the Zoological Museum in St. Petersburg, but could not be found and is presumed lost (Dr. K. Milto, pers. comm.). Based on illustrations, descriptions, or implicit collection locality, at least four of the other specimens of the type series appear to be what today is considered *N. helvetica* (**TS4** and **TS11**) or *N. astreptophora* (**TS12** and **TS13**). The only specimens of the type series which have explicit collection data are **TS5, TS6, TS7**, and **TS8**, all now lost.

To stabilize the usage of the name *Coluber natrix*, we hereby designate specimen **TS5**, studied in 1741 by Linnaeus in the vicinity of Berga-Tuna estate, west of the Swedish city of Nyköping (Linnaeus, 1745a), as lectotype of *Coluber natrix* Linnaeus, 1758. By designating a lectotype all other members of the type series lose their name-bearing status, becoming paralectotypes.

As **TS5** is lost, we hereby designate NRM 8260, collected by M. Norén on 14 May 2018 at the Fada mill pond (coordinates in decimal degrees: 58.72865 N, 16.83916 E), approximately two kilometers southeast of the Berga-Tuna estate, as neotype for *Coluber natrix* Linnaeus 1758 (Fig. 1). NRM 8260 is a subadult male, 560 mm total length, tail length 115 mm; snout-vent length 445 mm. Ventral scutes 175; anal plate divided; subcaudal scutes divided, 68; midbody transverse scales 17. The alcohol-preserved specimen is dorsally dark gray with scattered small irregular black spots consisting of one or more rarely two scales with black lateral edges; lunar spots large, distinct, white, separated from each other by one black-edged scale; dorsal surface of head very dark, temporals and parietals posteriorly black, black blotch on left parietal. Ventral side predominantly black with white scute edges laterally, scutes increasingly black posteriorly. Ventral side of head and the first eight ventral scutes entirely white. Live coloration similar but slightly darker, and lunar spots with very faint yellow tinge.

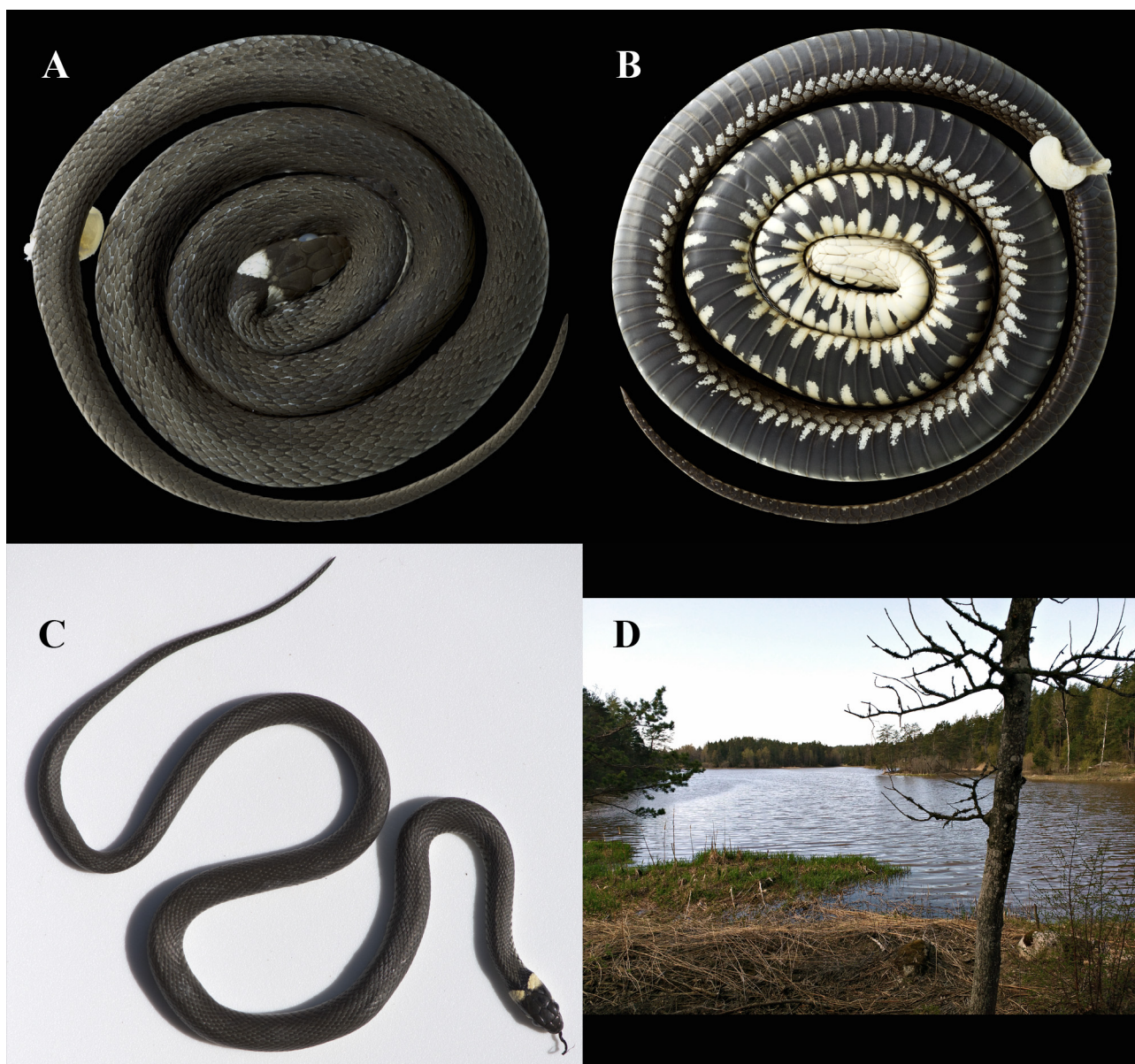


FIGURE 1. NRM 8260, neotype for *Coluber natrix*. A) Dorsal view B) Ventral view. C) Immediately after being euthanized. D) Photo of the capture locality, Fada mill pond.

A second specimen, NRM 8261, not shown, was collected at the same locality at the same time. It has no nomenclatural status, but is a “topotype”. It is a subadult male, 480 mm total length, tail length 90 mm, snout-vent length 390 mm. Ventral scutes 172; anal plate divided; subcaudal scutes divided, 66. The alcohol-preserved specimen is dorsally medium gray with three lateral rows of irregular black spots consisting of two or three scales with dark edges; dorsal surface of head very dark, temporals and parietals mostly black; lunar spots large, distinct, white,

separated by one black scale. Body ventrally mostly black with white scute edges laterally. Ventral side of head and the first 4 ventral scutes entirely white. Live coloration similar but slightly darker and lunar spots very faint yellow.

NRM 8260 and NRM 8261 are deposited in the herpetological collection of the Swedish Museum of Natural History, Stockholm, Sweden. The standard barcoding section of the COX1 gene has been sequenced for both specimens and submitted to the Barcode of Life database and published to GenBank. The COX1 sequences from NRM 8260 and NRM 8261 have GenBank accession numbers MT884841 and MT884840, respectively.

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References

- Aldrovandi, U. (1640) *Serpentum et Draconum Historiae. Libri duo*. C. Ferronium, Bononiae (Bologna), 486 pp.
<https://doi.org/10.5962/bhl.title.64364>
- Anonymous (1742) *Musei Imperialis Petropolitani. Vol. I. Pars prima qua continentur res naturales ex regno animali*. Academiae Scientiarum Petropolitanae, Petropolitanae (St. Petersburg), 227 pp.
- Boeseman, M. (1970) The vicissitudes and dispersal of Albertus Seba's zoological specimens. *Zoologische Mededelingen uitgegeven door het Rijksmuseum van Natuurlijke Historie te Leiden*, 44 (13), 177–206, pls.
- Charleton, G. (1668) *Onomasticon zoicon, plerorumque animalium differentias & nomina propria pluribus linguis exponens. Cui accedunt mantissa anatomica; Et quaedam de variis fossilium generibus*. J. Allestry, Londini (London), 309 pp., index
- Charleton, G. (1677) *Exercitationes de differentiis et nominibus animalium. Quibus accedunt mantissa anatomica, et quaedam de variis fossilium generibus, deque differentiis et nominibus colorum. Editio secunda, duplo fere auctior priori, novisque iconibus ornata*. Theatro Sheldoniano, Oxoniae (Oxford), 360 pp.
- Gesnerus, C. (1587) *Historiae animalium. Lib. V, qui est de serpentium natura*. Officina Froschoviana, Tiguri (Zurich), 202 pp.
- Gesnerus, C. (1621) *Historiae animalium. Lib. V, qui est de serpentium natura*. H. Laurentius, Francofurti (Frankfurt am Main), 170 pp.
- Gronovius, L.T. (1756) *Museum Ichthyologicum, sistens piscium indigenorum & quorundam exoticorum, qui in Museo Laurentii Theodori Gronovii, J.U.D. adservantur; descriptiones ordine systematico. Vol II*. T. Haak, Lugduni-Batavorum (Leiden), 194 pp.
- Heller, J.L. (2007) *Index of the books and authors cited in the zoological works of Linnaeus*. Ray Society, London, lxiii + 174 pp. [edited by J.M. Penhallurick]
- Holm, Å. (1957) Specimina Linnaeana, i Uppsala bevarade zoologiska samlingar från Linnés tid. *Acta Universitatis Upsalien-sis*, 6, 1–68.
- International Commission on Zoological Nomenclature [ICZN] (1999) *International code of zoological nomenclature. 4th Edition*. International Trust for Zoological Nomenclature, London, xxix + 306 pp.
- Jonstonus, J. (1657) *Historiae Naturalis de Serpentina, Libri Duo*. J.J. fil. Schipper, Amstelodami (Amsterdam), 38 pp., pls. [also other editions with other paginations, like 1653 and 1757]
- Kindler, C., Chèvre, M., Ursenbacher, S., Böhme, W., Hille, A., Jablonski, D., Vamberger, M. & Fritz, U. (2017) Hybridization patterns in two contact zones of grass snakes reveal a new Central European snake species. *Scientific Reports*, 7 (7378), 1–12.
<https://doi.org/10.1038/s41598-017-07847-9>
- Kullander, S.O., Rahman, M.M., Norén, M. & Mollah, A.R. (2018) *Laubuka tenella*, a new species of cyprinid fish from south-eastern Bangladesh and southwestern Myanmar (Teleostei, Cyprinidae, Danioninae). *ZooKeys*, 742, 105–126.
<https://doi.org/10.3897/zookeys.742.22510>
- LaCépède, de, B.G.É. (1789) *Histoire naturelle des serpens*. Hôtel de Thou, rue des poitevins, Paris, 527 pp.
- Laurenti, J.N. (1768) *Specimen medicum, exhibens synopsis reptilium emendatam cum experimentis circa venena et antidota*

- reptilium austracorum, quod autoritate et consensu*. J. Thomae, Viennae (Wien), 215 pp.
<https://doi.org/10.5962/bhl.title.5108>
- Linnaeus, C. (1745a) *Öländska och Gothländska resa, på riksens högloflige ständers befallning förrättad åhr 1741*. G. Kiesewetter, Stockholm & Upsala, 458 pp.
- Linnaeus, C. (1745b) *Amphibia Gyllenborgiana, dissertatione academica, cum consensu ampliss. facultatis medicae in Regia Academia Upsaliensi, [...] Descripta et publico examini subjecta a Barth. Rudolpho Hast, Ostrobothniensi stipendario regio. In audit. Carolino Majori die XVIII, Junii. Anni MDCCXLV. Horis, ante Meridiem, solitis*. Upsaliae (Uppsala), 44 pp.
- Linnaeus, C. (1746) *Fauna Svecica sistens animalia Sveciae regni: qvadrupedia, Aves, Amphibia, Pisces, Insecta, Vermes, distributa per classes and ordines, genera and species*. L. Salvius, Stockholm, 475 pp.
<https://doi.org/10.5962/bhl.title.34892>
- Linnaeus, C. (1747) *Wästgöta-resa, på riksens högloflige ständers befallning förrättad år 1746 med anmärkningar uti oekonomien, naturalkunnogheten, antiquiteter, invånarnes seder och lefnads-sätt med tillhörige figurer*. L. Salvius, Stockholm, 284 pp.
<https://doi.org/10.5962/bhl.title.106703>
- Linnaeus, C. (1749) *Amoenitates academicae seu dissertationes variae physicae, medicae, botanicae; antehac seorsim editae, nunc collectae et auctae cum tabulis aenaeis. Vol I*. G. Kiesewetter, Holmiae & Lipsiae (Stockholm & Leipzig), 563 pp.
<https://doi.org/10.5962/bhl.title.910>
- Linnaeus, C. (1754) *Hans maj:ts Adolf Frideriks vår allernådigste konungs naturalie samling innehållande sälsynte och främmande djur, som bevaras på kongl. lust-slottet Ulriksdahl; beskrefne och afritade samt på nådig befallning*. P. Momma, Kongl. Tryckeriet, Stockholm, 103 pp., 33 pls.
- Linnaeus, C. (1758) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decima, reformata*. L. Salvius, Holmiae (Stockholm), 824 pp.
<https://doi.org/10.5962/bhl.title.542>
- Linné, C. (1761) *Fauna Svecica : sistens animalia sveciae regni: mammalia, aves, amphibia, pisces, insecta, vermes, distributa per classes & ordines, genera & species, cum differentiis specierum, synonymis auctorum, nominibus incolarum, locis natalium, descriptionibus insectorum*. L. Salvius, Stockholm, 578 pp., 2 pls.
<https://doi.org/10.5962/bhl.title.46380>
- Linné, C. (1766) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio duodecima, reformata*. L. Salvius, Holmiae (Stockholm), 532 pp.
<https://doi.org/10.5962/bhl.title.68927>
- Löwegren, Y. (1952) Naturaliekabinett i Sverige under 1700-talet, ett bidrag till zoologiens historia. *Lychnos-bibliotek*, 13, 1–407.
- Maxwell, R.L. & Larson, K. (1997) *Latin Place Names Found in the Imprints of Books Printed Before 1801 and their Vernacular Equivalents in RDA (Resource Description and Access) Form*. Available from: <http://rbms.info/lpn/> (accessed 5 June 2020)
- Merrett, C. (1666) *Pinax rerum naturalium britannicarum, continens vegetabilia, animalia, et fossilia, in hac insula reperta inchoatus*. Impensis Cave Pulleyn, Londini (London), 256 pp. [also editions 1667 and 1704]
- Nilson, G. & Andrén, C. (1981) Morphology and taxonomic status of the grass snake, *Natrix natrix* (L.) (Reptilia, Squamata, Colubridae) on the island of Gotland, Sweden. *Zoological Journal of the Linnean Society*, 72 (4), 355–368.
<https://doi.org/10.1111/j.1096-3642.1981.tb01576.x>
- Orlov, N. & Tuniyev, B.S. (1992) A New Species of Grass Snake, *Natrix megaloccephala*, from the Caucasus (Ophidia: Colubridae). *Asiatic Herpetological Research*, 4, 42–54.
- Petiver, J. (1695–1703) *Musei Petiveriani centuria prima-[decima] rariora naturae; continens: viz. animalia, fossilia, plantas, ex variis mundi plagis advecta, ordine digesta, et nominibus proprii signata*. S. Smith & B. Walford, Londini (London), 101 pp.
<https://doi.org/10.5962/bhl.title.152179>
- Pokrant, F., Kindler, C., Ivanov, M., Cheylan, M., Geniez, P., Böhme, W. & Fritz, U. (2016) Integrative taxonomy provides evidence for the species status of the Ibero-Maghrebian grass snake *Natrix astreptophora*. *Biological Journal of the Linnean Society*, 118 (4), 873–888.
<https://doi.org/10.1111/bij.12782>
- Rajus, J. (1693) *Synopsis methodica animalium quadrupedum et serpenti generis. Vulgarium notas characteristicas, rariorum descriptiones integras exhibens: cum historiis & observantionibus anatomicis perquam curiosis: praemittuntur nonnulla De animalium in genere, sensu, generatione, divisione, &c..* S. Smith & B. Walford, London, 344 pp.
- Schwenckfeld, C. (1603) *Theriotropheum Silesiae, in quo animalium, hoc est, quadrupedum, reptilium, avium, piscium, insectorum natura, vis & usus sex libris perstringuntur: concinnatum & elaboratum*. D. Albert, Lignicii (Legnica/Liegnitz), 586 pp.
- Seba, A. (1735) *Locupletissimi rerum naturalium thesauri accurata descriptio, et iconibus artificiosissimis expressio, per universam physices historiam: opus, cui, in hoc rerum genere, nullum par exstitit. Tomus II*. J. Wetstenium, G. Smith & J. Waesbergios. Amstelaedami (Amsterdam), 496 pp.
<https://doi.org/10.5962/bhl.title.62680>
- Seoane, V.L. (1885) *Identidad de Lacerta schreiberi (Bedriaga) y Lacerta viridis var. Gadovii (Boulenger): é investigaciones*

herpetologicas de Galicia. V. Abad, La Coruña, 19 pp.

Speybroeck, J., Beukema, W., Dufresnes, C., Fritz, U., Jablonski, D., Lymberakis, P., Martínez-Solano, I., Razzetti, E., Vamberger, M., Vences, M. & Vörös, J. (2020) Species list of the European herpetofauna—2020 update by the Taxonomic Committee of the Societas Europaea Herpetologica. *Amphibia-Reptilia*, 1 (aop), 1–51.

<https://doi.org/10.1163/15685381-bja10010>

Wallach, V., Williams, K.L. & Boundy, J. (2014) *Snakes of the world: a catalogue of living and extinct species*. CRC press, Boca Raton, Florida, 1237 pp.

Wallin, L. (2001) *Catalogue of type specimens. 4. Linnaean specimens*. Zoology section, Museum of Evolution, Uppsala University, Uppsala, 128 pp.