SUPPLEMENTAL INFORMATION

TAXONOMY, DISTRIBUTION, AND CONSERVATION OF THREATENED STEPPE VIPERS OF WESTERN ASIA: *VIPERA ANATOLICA* AND *VIPERA RENARDI ERIWANENSIS (SENSU LATO)*

KONRAD MEBERT, MERT KARIŞ, MEHMET ZÜLFÜ YILDIZ, NAŞIT IĞCI, NIKOLAUS STÜMPEL, OLEKSANDR ZINENKO, GIORGI IANKOSHVILI, ALISA SANAKOEVA, P. LENNART SCHMID, TIGRAN TADEVOSYAN, GURAM IREMASHVILI, EDVARD MIZSEI, TIBOR SOS, TAVAKKUL ISKENDEROV, ARZU MAMMADOV, KERIM ÇIÇEK, BALKAN MEGA, AZIZ AVCI, MAHDI RAJABIZADEH, DANIEL JABLONSKI, TOM KIRSCHEY, JUSTIN M. ELDEN

The authors formatted this document with small margins to reduce the number of pages and maximize visibility of the maps, which are presented in a horizontal layout. To enable full-page maps, their legends usually follow on the top of the next page.

Photo vouchers of steppe vipers for most localities are placed in folders accessible upon request to the senior author. A 3D-landscape satellite screenshot from a GoogleEarth view is used with a pin maker for the record, where no specimen photo was available, but the locality record has be deemed credible based on expertise of the provider and steppe-like habitat, plus verified records of steppe vipers in the greater surrounding < 50 km (see also Material and Methods). For records from literature that combined mutiple specimens into one location, we either show one representative photo or none, if such was not available.

LOCALITY LIST – MATERIAL AND METHODS

To compile a list of localities of the Anatolian Steppe Viper *Vipera anatolica* and the Southern Steppe Viper *V. renardi eriwanensis* (*sensu lato*) (i.e., former geographic groups or taxa *eriwanensis, shemakhensis,* and *ebneri*), we acquired the distribution data from a variety of data sources. The list includes our unpublished records, previously published literature records, collection lists (e.g., museums, GBIF, private collections), information generously shared by fellow herpetologists, biologists and general naturalists (both professional and amateur), and observations submitted to a variety of webdatabases (e.g., iNaturalist, regional/national nature and photo websites including facebook groups, herpetological fieldtour websites, forums, newspapers, and other online sources). Each locality is usually vouchered, either by a museum specimen, a photograph (a specimen or a Google Earth 3D-landscape/habitat photo, if no voucher photo was available, but the record was deemed credible), an illustration, or a credible literature record.

For published literature records we usually tried to obtain more precise locality information (primarily coordinates) by contacting respective authors. If a contact was not constructive or possible (author deceased or else), we used any description in the corresponding literature text and/or mapped distribution points. Maps were then overlaid on Google Earth Pro to identify habitat suitabilty based on vegetation, rocks, aspects, and region-specific elevation. Because distribution points on literature maps covered relatively large areas, ranging between 3.5 km (Aghasyan 2014) to 7 km (Arakelyan et al. 2011) diameter, we simply used the coordinates of the center of the points, and subsequently evaluated for suitable habitat nearby using satellite images. Furthermore, some mapped locality points appear to be off from the reported settlements by > 5 km, and even > 20 km, particularly in older maps (but also iNaturalist), which may only reflect imprecise reporting, a mapping artifact, a temporary storage site for collected vipers from the greater surrounding, or an intentional disguise to putatively protect a locality against illegal sampling. A description of a locality in a previous article could override a mapped distribution point without adequate geographic information, because description in literature often provide more definite information on locality attributes, whereas maps in general books are for the public and are prone to be less precise. For example, when a locality was described as being above a certain village, yet the mapped distribution point is placed in a 10 km distant valley, then the description has priority. Occasionally, distribution points on maps appear shifted from provided or associated locality names, perhaps representing a printing artifact. For example, all three southern points for *V. r. eriwanensis* in Aghasyan's map (2014) are ca. 8-10 km displaced from the pertinent name provided in Tuniyev et al. (2018b). If no more accurate coordinates could be obtained, such locality records were either omitted or coordinates of a nearest locality potentially providing a suitable habitat were taken (see next paragraph).

The procedure for online sources was similar as for literature records. If coordinates of observations in the posted media files (photographs, videos) were not clear within a reasonable amount of radius, ca. 50–100 m, we

contacted the author or the post provider to obtain greater precision. If coordinates appear to represent a non-suitable habitat (e.g., in the middle of a crowded city, unless such was explicitly described), we placed the coordinates into a nearby suitable habitat. These proxy sites serve as a surrogate locality and should contain natural grass- or scrubland with or without rock formations (from rockslides to man-made stone piles). Even if the locality is not correct, the chances are that the surrogate locality at least represents a suitable habitat with great potential for additional vipers from the same or a nearby population. Indeed, vipers in regions with a temperate to semi-arid climate are often inhabiting interstitial rocky habitat that provide essential resources, such as a warmer microclimate (for thermoregulation, gestation, etc.), shelter (diurnal, hibernation), and ample prey (energy gain). This methodological approach proved to be quite reliable by our field searches in Anatolia, the Caucasus region, and elsewhere over the last decade, that consequently helped to rapidly and massively increase our distribution knowledge of vipers in western Asia (e.g., Mebert et al. 2020; Ahmad et al. 2021).

Habitat photos in literature or online (also videos) are another source for geolocating coordinates of a viper observation, as they often contain important landmark information, such as recognizable silhouettes of mountains and hills, shape of water courses and forest patches, position of lakes, roads, and housings. These landmarks can be searched and aligned with respective structures in satellite imagery using Google Earth Pro. Usually, a locality may represent a single individual, or all specimens observed within 1 km radius. Alternatively, a polygon is drawn for several specimens spread across > 1 km, but with no specimen being > 1 km distant from another one, except for a few areas with higher record density we accepted 500 m distance for inclusion of single records to reflect the increased sampling data. For polygons, we provide coordinates of their centers with the oulines between two polygons exceeding 1 km distance

A few unvouchered observation by people have been included if they appear credible and plausible based on at least one of the following: a) they are made by a known expert of vipers, b) the description of the snake fits a viper (short tail, stout body, color pattern, slow moving) to distinguish against a multitude of sympatric viper-mimics, c) geography, elevation and other environmental features correlate with regionally known habitats of steppe vipers, and d) they are not more than 10 km away from the nearest conspecific locality.

Recorded localities are listed into one of four main categories:

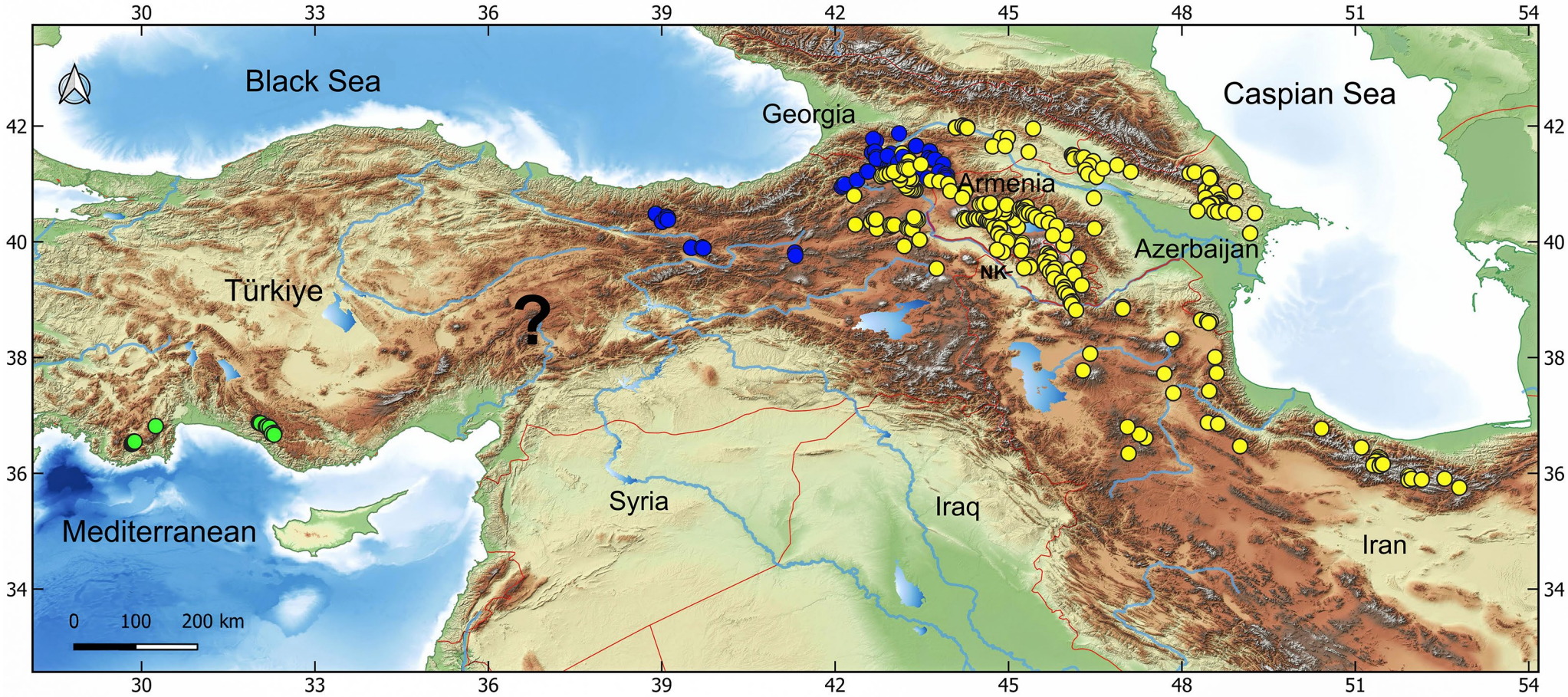
- **New:** if their localities have not been previously published in a peer-reviewed journal and usually are at ≥ 1.0 km distant from an already known locality/coordinates. An exception was made for *Vipera anatolica*, for which we mapped centers of clumped records with even < 500 m distance between specimens to display concentrations of observations in order to improve the dire data situation of such rarely observed species. A new locality might be based on a photograph with sufficient quality for an accurate identification. The authenticity of such a photograph and the pertinent locality information was confirmed by us through contacting the photographer/associate.
- **Corrected:** relates to published records that contained substantially erroneous geographic information.
- **Refined:** refers to published data, including online repositories with mapped geographic information, primarily iNaturalist, Reptile Database, turkherptil.org, Flickr but also Herpmapper, GBIF.org and others (e.g., Durso et al. 2020) for which new information through contact with the author or published data evaluation permits a more precise geographic localization.
- **Published:** relates to published records that are sufficiently precise (10-20 m)

The listing generally follows the format: locality number, loc. Category (mainly New, Refined, or Corrected), locality/political names, coordinates, n (number of specimens), altitude is provided in the format 0,000 m elevation (= meters above sea level), date of the finding (if a finding relates to a literature record without a date, then that finding was evidently before that publication or the oldest in a series of publications), source (literature, online, pers. comm., name of the data provider/collector/photographer, museum voucher, etc.), remarks, and indvidual Field-IDs in red and bold, corresponding to individual IDs in our database, including xcel-spreadsheet entries, KMZ-markers

for Google Earth, voucher photographs/drawings or Google Earth locality screenshots. Photo credits are provided in the figure legends.

About locality names: they usually refer to the nearest settlement name based primarily on Google Maps/Earth Pro, sometimes a mountain, canyon or valley name. It is followed by the names for the 2nd/1st largest administrative divisons (depending on the country either district, county, rayon/province, or region). Settlement names were cross-checked with lists of historically reported geographic names. To verify some potential synonymy of different geographic names, as well as old military and topographic maps, as for example in Azerbaijan. If only a village name is indicated in the original source, the coordinates are placed to the nearest potential habitat (usually rocky steppes). Mapcarta.com, OSM, peakery.com, or Wikimapia have been the source of many mountain and hill names provided in the respective accounts, whereas locality names were mostly drawn from Google or OSM maps. Slight border differences between our locality information retrieved from Google Earth Pro and locality placement in our digital maps drawn with the software QGIS can exist as well, yet the provided locality coordinates remain the same and represent the relevant source. Turkish terms used herein like Dag, Dagi, Daglari means Mountain, Mountains, Massif, and Tepesi means hill or peak. For easy cross-referring with distribution maps below, the locality listing roughly follow from a west to east order, secondarily from north to south in larger, regional maps.

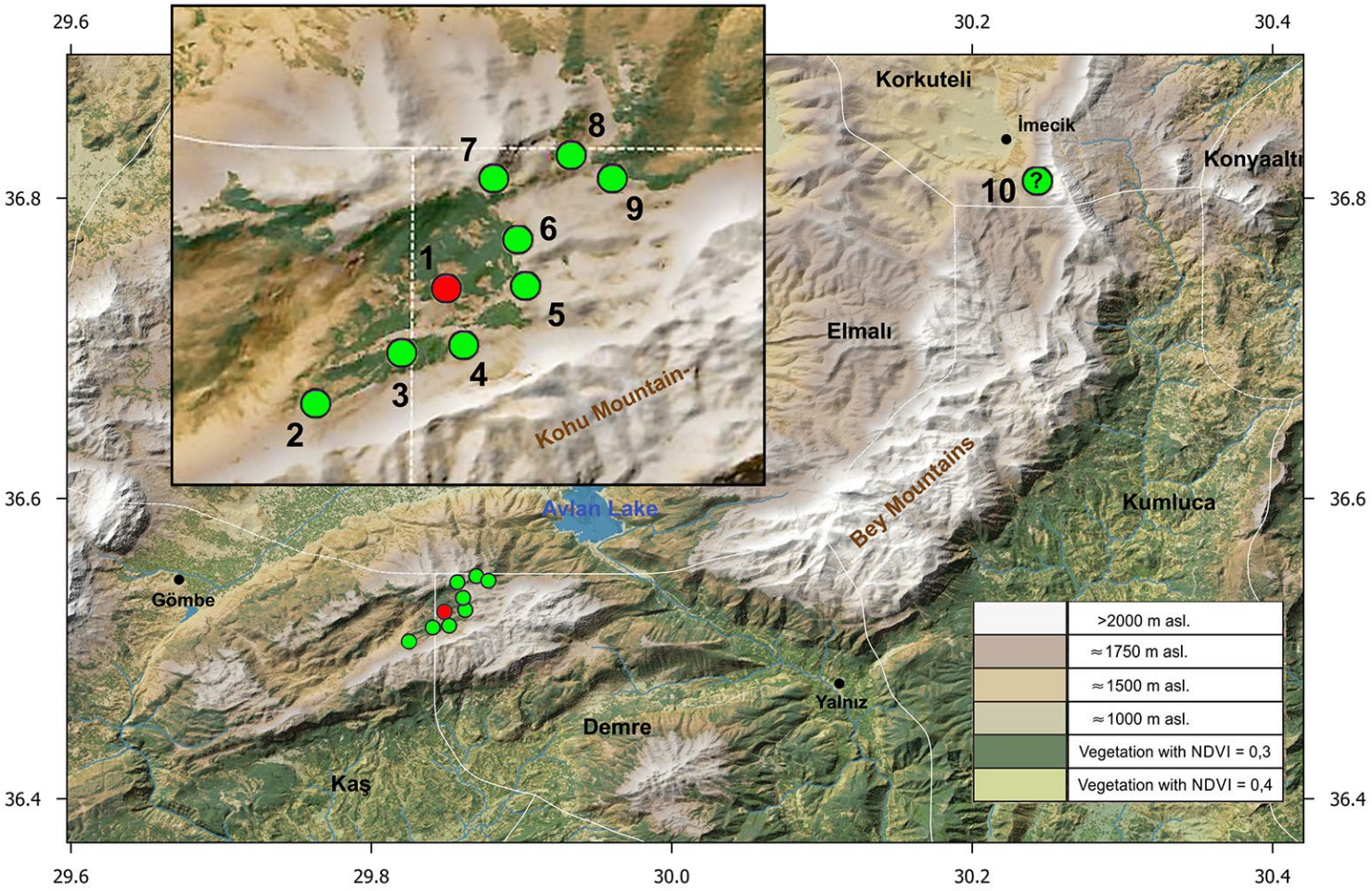
It remains that within 10 years, we have drastically expanded the distribution knowledge of several viper species, because we largely optimized field and desk work, including focusing on new regions and using networks. The matter of their erroneously perceived rarity and elevated threat status on the IUCN Red List of Threatened Species appears to be rather the result of a lack of extended field work by experienced people, as well as the secretive nature of many snake species, in particular those occupying regions with seasonally semi-arid climate. Some researches have estimated a density of about 2–6 individuals/ha of related palearctic grassland vipers that sustain reproducing population even at suboptimal edge habitats (Tuniyev and Tuniyev 2009; Jelic et al. 2014). Therefore, our updated field data shows a significantly extended distribution of these vipers (range limits and gap filling), accompanied by more available habitat that consequently should result in larger population sizes and densities in western Asia, which in turn will reduce negative effects of illegal sampling after revealing locality information as long the habitat remains intact. Furthermore, our inquiry to European hobbyists has not produced evidence for ongoing large imports of vipers for the pet trade or fashion industry, nor have online forums and large terraristic fairs commercially traded high numbers of wild caught vipers. There is likely a number of unreported cases, however, that will become known occasionally. In addition, the pet trade is sufficiently supplied by captive bred vipers, or those hobbies are often replaced by herp-photography tourism, and the commercial trade for West Asian vipers is negligent today. On the other hand a much bigger threat constitutes the ongoing habitat degradation through livestock herding, agriculture, plantation, valley drowning through dam construction, and suburban growth, that will wipe out entire population of 100s to several 1000s of viper specimens locally. The scale of these anthropogenic actions currently poses the biggest threat in an ever-growing human population and its continuous advancing and destroying of vital habitat for these fascinating reptiles.



SUPPLEMENTAL FIGURE S1 - Distribution of three species of grassland vipers in western Asia: light green ● the Anatolian Steppe Viper *Vipera anatolica*, dark blue ● the Darevsky's Viper *V. darevskii* (*sensu lato*), yellow ● the Southern Steppe Viper *V. r. eriwanensis* (*sensu lato*). Question mark denotes the center of a large area of ca. 1,000 km distance between the steppe vipers *V. anatolica* and *V. r. eriwanensis* (*sensu lato*) with potential steppe habitats but no records of either species, neither through our field tours nor from outdoor persons. In contrast, mountain vipers (genus *Montivipera*, see Mebert et al. 2020) and other snakes have been reported (e.g., Hofmann et al. 2018).

Anatolian Meadow Viper (*Vipera anatolica*)

Distribution of the Western Anatolian Meadow Viper *V. a. anatolica* is shown in Fig. S2. This species only occurs in Anatolia (Asian part of Turkey, resp. Türkiye) with two subspecies. Figure S3A shows the nominotypic taxon from the western part of Antalya Province, and Fig. S3B shows a specimen from the subspecies *V. a. senliki* and respective range map in the eastern Antalya Province (Fig. S4). The corresponding list below approximately follows the localities from west to east:



SUPPLEMENTAL FIGURE S2. Distribution of the western Anatolian Steppe Viper *Vipera a. anatolica* with the red locality dot showing the type locality of the species. One light green locality dot may contain > one specimen, respectively includes all specimens within 1 km radius (up to 16 individuals at locality-7, see additional geographic details, coordinates, number of specimens assigned to that specific locality spot, elevation, dates, source, and occasional explanatory remarks in the numbered list below). Question mark in locality-10 indicates unknown imprecision, as it only reflects the appro-ximate locality point for voucher MNHN 4000 (National Museum of Natural History, Paris) mapped in Saint Girons (1978, 1980) with no other information (see voucher files upon request to the senior author). Abbreviation: NDVI = Normalized Difference Vegetation Index: khaki color to grey-brown = steppe, dark green = forest; a low NDVI value of 0.3 for montane forest, and 0.4 for agricultural areas, whereas grassland/steppes values range from 0.1–0.2 (not shown).

-1 **Refined:** northern slope of Kohu Dag (Dag = mountain), Ciglikara Ormanlari, Elmali/Antalya, 36.522969°N, 29.846753°E, n = 2 within 240 m from coordinates, between 1,805–1,839 m elevation, 3 July 1969 (holotype by A. Budak, SZE 170 [= ZDEU], Izmir, Türkiye), 19 June 1969 (paratype by F. Spitzenberger, NHMW 19599). Source: Eiselt and Baran (1970) and A. Budak (pers. data transf.). Individual-IDs: **Van1–2**

-2 **Refined:** Kohu Dag, Elmali/Antalya, 36.504781°N, 29.825050° E, at 1,719 m elevation, year < 1990. Source: from private coll. of Heckes and Sattler, provided to and listed/depicted in Fig. 54 of Nilson and Andrén (2001), deposited as ZIG (now GNM Göteborgs Naturhistoriska Museum); acc. to Uwe Sattler that specimen was coll. by Gerhard Obermaier around type locality. Remarks: coordinates plus elevation are suggested by us, but type locality stretches from 5–10 km. Individual-ID: **Van4**

-3 **Refined:** dolines at lower end of northern slope of Kohu Dag, Ciglikara Ormanlari, Elmali/Antalya, 36.514114°N, 29.840850°E, at 1,883 m elevation, 03 July 1984. Source: Billing (1985), Sigg (1987), Brodmann (1987). Remarks: coordinates are approximative and follow the description and Fig. 6 in Sigg (1987). Individual-ID: **Van3**

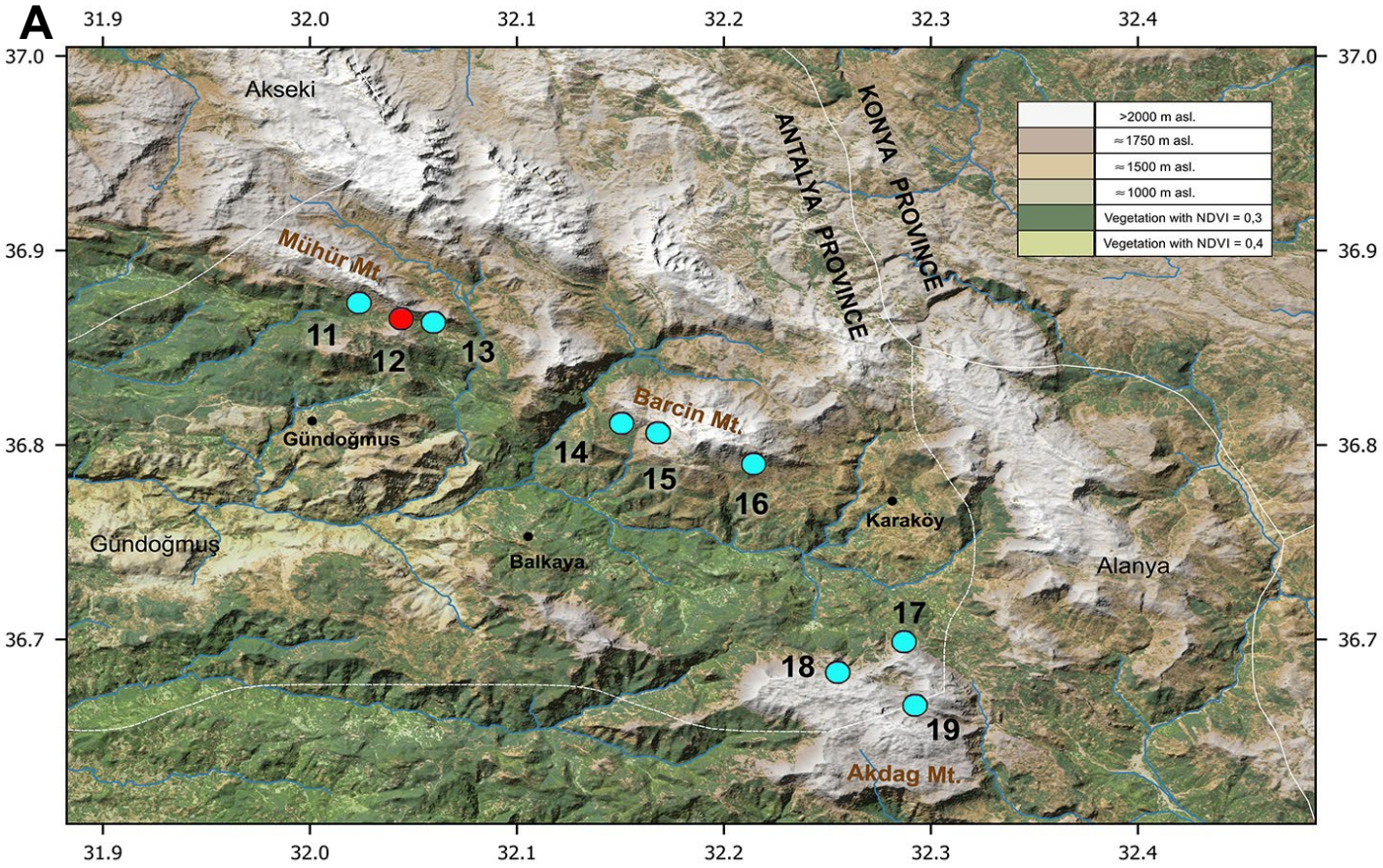
-4 **Refined:** shepherd´s camp northern slope of Kohu Dag, Ciglikara Ormanlari, Elmali/Antalya, 36.515317°N, 29.851833°E, at 1,935 m elevation, 13 July 2013. Source: Site 3 in Zinenko et al. (2016). Individual-ID: **Van31**

-5 **Refined:** near lower end of northern slope of Kohu Dag, Ciglikara Ormanlari, Elmali/Antalya, 36.525759°N, 29.862574°E, at 2,006 m elevation, 30 August 2016. Source: Cemal Varol Tok, Murat Afsar, Kerim Cicek, (pers. data transf.), and Tok et al. (2021). Individual-ID: **Van102**

-6 **Refined:** Kohu Dag, central-eastern part of Ciglikara Ormanlari, Elmali/Antalya, 36.533874°N, 29.861086°E, n = 13 within 70 m from coordinates, between 1,927–2,017 m elevation, 14–16 July/13–18 September 2013, 18–19 September 2014. Source: Site 2 in Zinenko et al. (2016). Individual-IDs: **Van18–30**

-7 **Refined:** on Çıvkuş Tepesi, Kohu Dağı, Ciglikara Ormanlari, Elmali/Antalya, 36.544246°N, 29.857237°E, n = 16 within 745 m from coordinates, between 1,951– 2,269 m elevation, 03 May–05 October 2014, 28 June/28+30 August 2016 (Fig. S3A). Source: Göcmen et al. (2014, 2017), Cemal Varol Tok, Murat Afsar, Kerim Cicek, (pers. data transf.), and Tok et al. (2021). Individual-IDs: **Van6–12, Van53–54, Van96–101, Van103, Van106**

SUPPLEMENTAL FIGURE S3. Anatolian Steppe Viper *Vipera a. anatolica*; in red and **bold** individual IDs: (A) western subspecies *Vipera a. anatolica,* **Van9** and **Van12,** locality-7 in map Fig. S2; (B) eastern subspecies *Vipera a. senliki*, **Van95**, locality-12 in Fig. S4. (A photographed by Bayram Göçmen, B by Konrad Mebert).


A
31.9
32.0
32.1
32.2
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37.0
36.9
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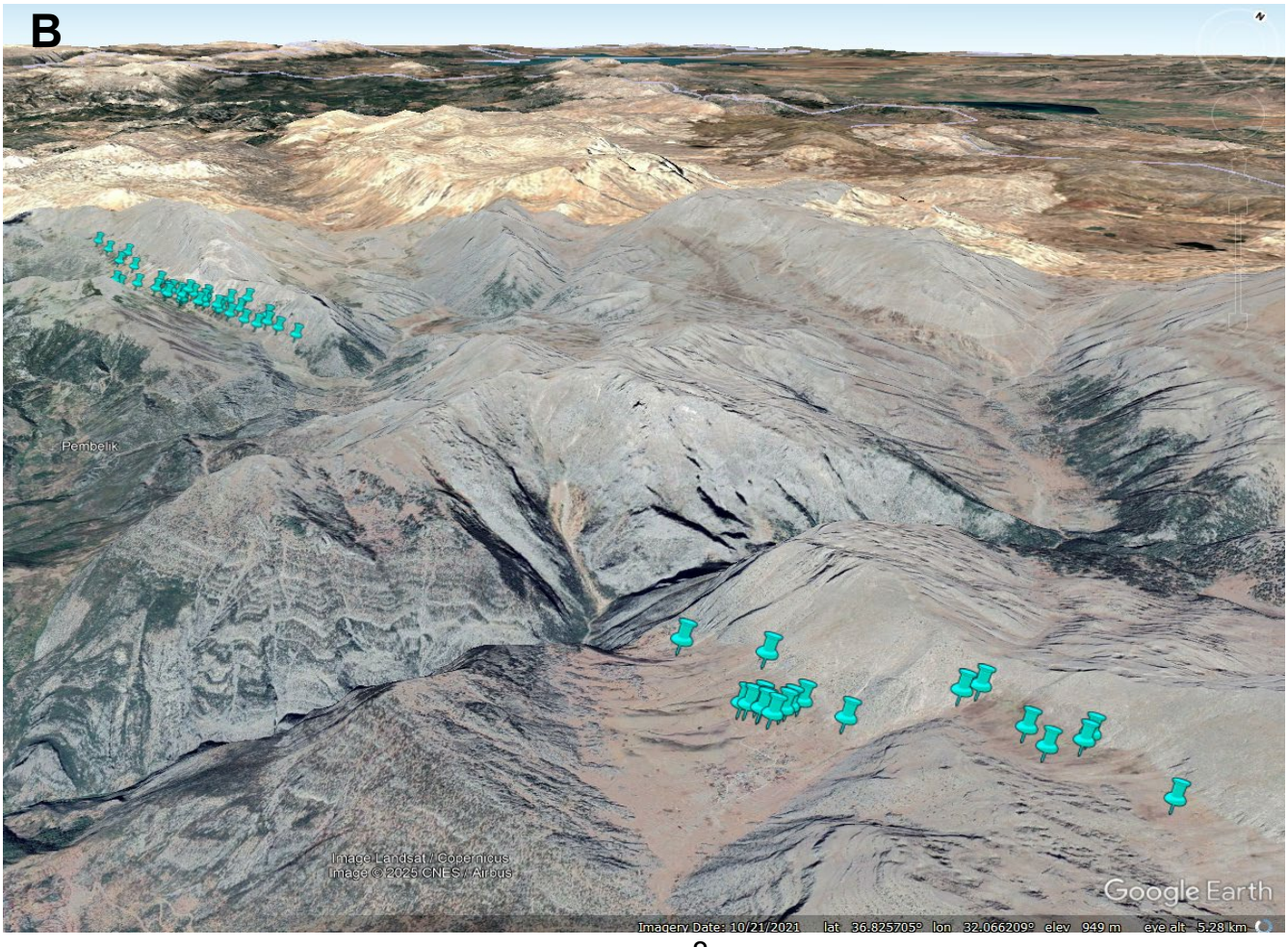
36.7
Akseki
ANTALYA PROVINCE
KONYA PROVINCE
>2000 m asl.
≈1750 m asl.
≈1500 m asl.
≈1000 m asl.
Vegetation with NDVI = 0,3
Vegetation with NDVI = 0,4
Mühür Mt.
11
12
13
Gündoğmus
Barcin Mt.
14
15
16
Karaköy
Gündoğmuş
Balkaya
Alanya
17
18
19
Akdag Mt.


B
Pembelik
Image Landsat / Copernicus
Image © 2025 CNES / Airbus
Google Earth
Imagery Date: 10/21/2021 lat 36.825705° lon 32.066209° elev 949 m eye alt 5.28 km

SUPPLEMENTAL FIGURE S4. (A) Distribution of the Eastern Anatolian Steppe Viper *Vipera a. senliki* with the red locality dot showing the type locality of this subspecies (Göcmen et al. 2017). One locality dot herein may contain between 7–22 specimens within 1 km radius except the four individuals **Van72, Van91–93** from the most eastern localities-16–19. Localities 11–15 have become attractive spots for touristic herpetophotographers due to low effort to obtain good photographs (easy access and high density) of this once extremely elusvie species. (B) Satellite image form Google Earth depicting singly registered specimens of the primarily known populations of *V. a. senliki* on Mühür Dag (localities 11–13) and Barçın Dag (localities 14–16). Abbreviation: NDVI a vegetation index: khaki color to grey-brown = steppe, dark green = forest; see also Fig. S2.

-8 **Refined:** foot of southeast Çıvkuş Tepesi, Kohu Dağı, Ciglikara Ormanlari, Elmali/Antalya, 36.548283°N, 29.869895°E, at 1,888 m elevation, 28 June 2016. Source: no photo, credible obs. by shepherd provided to Cemal Varol Tok, Murat Afsar, Kerim Cicek. Individual-ID: **Van51**

-9 **Refined:** southeast Çıvkuş Tepesi, Kohu Dağı, Ciglikara Ormanlari, Elmali/Antalya, 36.545227°N, 29.877928°E, n = 6 within 175 m from coordinates, between 1,873–1,913 m elevation, 8 and 9 May 2013, 28 June 2016. Source: Site 1 in Zinenko et al. (2016); shepherds' observation to Cemal Varol Tok, Murat Afsar, Kerim Cicek, (pers. data transf.), and Tok et al. (2021). Individual-IDs: **Van13–17, Van52**

-10 **Refined:** Ovacik-Imecik (eastern Bey Dag), Elmali/Antalya, 36.813785°N, 30.242320°E, at 1,826 m elevation, first half 19th century. Source: voucher MNHN 4000 (Paris) and photos and provided by Jérôme Courtois, specimen collected by Boie (Brothers), also cit. in Saint Girons (1978) and Nilson and Andrén (2001). Remarks: A distribution point was mapped in Fig. 3 of Saint Girons (1980) and replaced by us accordingly, but no further information except Türkiye is written in the voucher label for MNHN 4000. This record needs confirmation, but was included herein, as it represents suitable habitat relatively close to the type locality. Individual-ID: **Van5**

-11 **Refined:** Senir (Ayiotu) Plateau, southern slope of Mühür Dag (= Akdag), Geyik Mountains, Gündoğmuş/Antalya, 36.874178°N, 32.023753°E, n = 7 within 1 km east and west from coordinates, between 1,630–1,877 m elevation, 19/21 May/03 June 2016 (Fig. S3B). Source: Göcmen et al. (2017), incl. the first discovered *V. anatolica senliki*. Individual-IDs: **Van32–34, Van41, Van45–46, Van85**

-12 **Refined+New:** Serinyaka Plateau, southern slope of Mühür Dag, Geyik Mountains, Gündoğmuş/Antalya, 36.865229°N, 32.043926°E, n = 22 within 450 m from coordinates, between 1,688–1,768 m elevation, 23 May/03–04 June/23 July 2016, 19 April 2018, 07 June 2022. Source: five specimens in Göcmen et al. (2017) and 15 new ones by Konrad Mebert Team (Bayram Göçmen, Mert Karış, Mehmet Anıl Oğuz), Robin Gloor, Otto B. and Didrik Claesson, and Balkan Mega. Remarks: includes also the holotype (**Van39**) of *V. anatolica senliki* Göcmen et al. (2017). Individual-IDs: **Van38–40, Van44, Van47, Van55–57, Van59, Van84, Van94–95, Van107–110 (n=29)**

-13 **Refined+New:** Gelesandra Plateau, southern slope of Mühür Dag, Geyik Mountains, Gündoğmuş/Antalya, 36.863372°N, 32.059633°E, n = 19 within 900 m primarily east and west from coordinates, between 1,560–1,756 m elevation, 22 May/04 June/23 July/15 September/22 October 2016, August 2017. Source: eight specimens in Göcmen et al. (2017) and nine additional ones subsequently released; two specimens in Tok et al. (2021). Individual-IDs: **Van35–37, Van42–43, Van48–50, Van58, Van60–67, Van104–105**

-14 **Refined+New:** Barçın, lower plateau, Geyik Mts., Gündoğmuş/Antalya, 36.811013°N, 32.151085°E, n = 13 within 650 m from coordinates, between 1,683–1,854 m elevation, 23 June 2017, 29 April 2019 (by Verspui, Fig. 2A main article), 26 May 2019 (by Bettex). Source: seven specimen in Mebert et al. (2017) and five additional through pers. data transf. from Gert and Anniek Verspui (n = 3) and Fabien Bettex (n = 2). Many more specimens from this area have been photographed and posted on various social media, but are not counted here. Individual-IDs: **Van68–71, Van76–79, Van86–90**

-15 **Published:** Barçın, upper plateau, Geyik Mts., Gündoğmuş/Antalya, 36.806978°N, 32.168150°E, n = 7 within 630 m east and west from coordinates, between 2,054–2,232 m elevation, 27 June 2017. Source: Mebert et al. (2017). Individual-IDs: **Van73–75, Van80–83**

-16 **Published**: Başpınar, Geyik Mts., Gündoğmuş/Antalya, 36.790460°N, 32.213593°E, at 1,948 m, 23 June 2017. Source: Mebert et al. (2017). Individual-ID: **Van72**

-17 **New:** Alanya Gökbel Plateau above Çamlıalan, northeastern Akdag, Gündoğmuş, Antalya, 36.698749°N, 32.286573°E, at 1,975 m elevation, 23 May 2018. Source: Halil Tokgöz (pers. data transf.) and photo voucher (Fig. 2D main article). Individual-ID: **Van93**

-18 **New:** Siçanli Yaylasi, northern Akdag, Gündoğmuş/Antalya, 36.683878°N, 32.253650°E, at 1,979 m elevation, September 2017 (Supplemental Fig. S4). Source: Hüseyin Türkeli (pers. data transf.) and photo voucher (Fig. 2C main article), Osman Yilmaz. Individual-ID: **Van92**

-19 **New:** 7.5 km north Alacami, eastern Akdag, Alanya/Antalya, 36.666028°N, 32.292028°E, at 1,972 m elevation, 15 August 2019. Source: Ibrahim Zavlak (pers. data transf.) and photo voucher (Fig. 2B main article). Individual-ID: **Van91**

Southern Steppe Viper (*Vipera renardi eriwanensis* s.l., including groups "shemakhensis" and "ebneri")

Türkiye (Turkey)

A point distribution map with Turkish localities is presented in Supplemental Fig. S5. Information about the localities is provided in the list below. The list begins with the most western Turkish localities in southwestern Kars Province, then south into Agri Province, and continues with the localities in the northern Kars and adjacent Ardahan provinces. This sequence permits to check down the list, while following the localities on the maps without large jumps between subsequent localities:

-1 **New**: Incecay, Senkaya/Erzurum, 40.795456°N, 42.328628°E, at 2,150 m elevation, 25 May 2000 (Fig. 5C main article). Source: Alexandre Teynié, Philippe Geniez, Pierre-André Crochet (pers. data transf.). Individual-ID: **Ver38**

-2 **New**: Sirataslar, Sarıkamış/Kars, 40.297267°N, 42.349333°E, at 2,160 m elevation, May 2007 (Figs. 5A, B main article). Source: Marijn van den Brink (pers. data transf.) and photo on https://photos.v-d-brink.eu/Flora-and-Fauna/Asia/Turkey-Northeastern-part. Individual-ID: **Ver15**

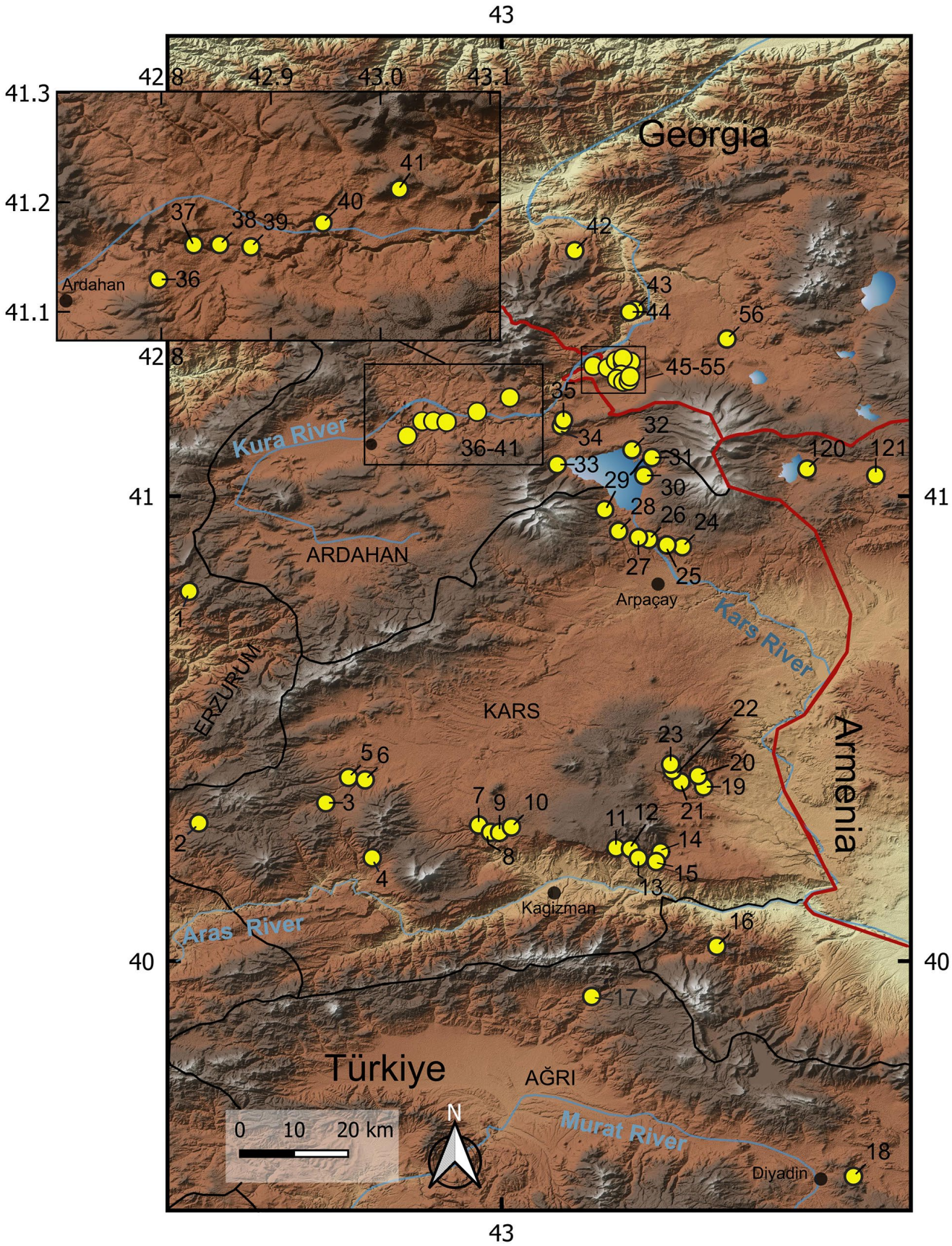
-3 **Refined**: east of Sarıkamış town, Sarıkamış/Kars, 40.340741°N, 42.652217°E, at 2,061 m elevation, before 1947. Source: Basoglu (1947). Remarks: placed by us into suitable habitat east of Sarıkamış. Individual-ID: **Ver321**

-4 **New**: Şehitemin, Sarıkamış, Kars, 40.222684°N, 42.721864°E, at 2,009 m elevation, 15 July 2021. Source: photo voucher by Ali Altaş via Mehmet Zülfü Yildiz, Bahadır Akman, Mahmut Aydoğdu. Individual-ID: **Ver316**

-5 **Refined**: Catak, Sarıkamış/Kars, 40.395375°N, 42.671153°E, at 2,010 m elevation, year 1993. Source: Mulder (1995), and John Mulder (pers. data transf.). Individual-ID: **Ver12**

-6 **Refined**: west Asboga (Asbua), Sarıkamış/Kars, 40.389995°N, 42.706758°E, n > 10 within 1 km both sides of the coordinates, around 2,000 m elevation, before 1948 and in years 1986–1993. Source: Basoglu (1947), Höggren et al. (1993), Nilson et al. (1988, 1994), Nilson and Andrén (2001), Mulder (1995), Baran (1976), Baran et al. (2005), NRM (Swedish Mus. Nat. Hist.) 6755 and 6757, MHNG1354.94–95 (Natural History Museum of Geneva), ZIG140–150 (now GNM Göteborgs Naturhistoriska Museum) and GNM 6921, also Börje Flärdh and John Mulder (pers. data transf.). Individual-IDs: **Ver1–11**

-7 **New**: above Pasli, Kagizman/Kars, 40.292894°N, 42.950578°E, at 1,972 m elevation, 1988–1989. Source: leg. Harry Sigg, provided via Michael Franzen (pers. data transf.). Individual-ID: **Ver32**



SUPPLEMENTAL FIGURE S5. Distribution of the Southern Steppe Viper *Vipera renardi eriwanensis* in Türkiye.The smallest rectangle represents localities-45–55 from Georgia that are singly plotted in an enlarged inset in Supplemental Fig. S8. Red lines are country borders; names with black capital letter represent districts, inset shows a zoomed in view of the rectangle connected by a black line.

-8 **Refined**: Pasli 2 km downroad Rte 965 direction Kötek, Kagziman/Kars, 40.277187°N, 42.976088°E, at 1,891 m elevation, 15 May 1987. Source: one shed, Teynié (1987), and Alexandre Teynié, Didier Daminet (pers. data transf.). Individual-ID: **Ver39**

-9 **New**: Yanlizagaj (Yanlızağaç), Kağızman/Kars, 40.277289°N, 42.995439°E, at 1,930 m elevation, 13 May 2013 (Fig. S6C). Source: Bahadir Akman, Mehmet Z. Yıldız, Konrad Mebert, Mert Karış, Naşit İğci, Mehmet Anıl Oğuz, Bayram Göcmen. Individual-ID: **Ver61**

-10 **Refined**: Kömürlü, Kagizman/Kars, 40.288726°N, 43.020930°E, at 2,078 m elevation, year before 1948. Source: Basoglu (1947), originally noted as *Vipera berus ornata*, also listed in Baran (1976), Basoglu and Baran (1980). Individual-ID: **Ver22**

-11 **New**: Günindi Yaylasi, Kagizam/Kars, 40.243881°N, 43.245464°E, n = 2 (shed) within 100 m, at 2,174 m elevation, 21 May 2015. Source: Konrad Mebert, Mert Karis. Individual-IDs: **Ver67–68**

-12 **New**: Kesiskiran, Kagizman/Kars, 40.241628°N, 43.276761°E, n = 3 within 200 m from coordinates, at 2,140 m elevation, 19 May 2015 (Figs. S6A, B). Source: Konrad Mebert, Mert Karis. Individual-IDs: **Ver63–65**

-13 **Refined**: above Günindi and 3.3 km west of locality-15, Kagizman/Kars, 40.221561°N, 43.293542°E, n = 4 (of total 7 together with locality-15), around 2,050 m elevation, year 1988. Source: voucher NHM (Nat. Hist. Mus. Gothenburg, now GNM Göteborgs Naturhistoriska Museum) 6852, Nilson and Andrén (2001) and Göran Nilson (pers. data transf.). Representative Individual-ID: **Ver29**

-14 **New**: south Yağlıca, Kağızman/Kars, 40.235306°N, 43.341150°E, at 2,012 m elevation, 13 May 2013 m elevation. Source: Mehmet Z. Yıldız, Konrad Mebert, Mert Karış, Naşit İğci, Mehmet Anıl Oğuz, Bayram Göcmen, Bahadir Akman. Individual-ID: **Ver62**

-15 **Refined**: above Aydinkavak-Babakum, Kagizman/Kars, 40.214305°N, 43.331838°E, n = 3 (of 7 total, see locality-13) around 1,916 m elevation, year 1988. Source: Nilson and Andrén (2001) and Börje Flärdh, (pers. data transf.). Individual-ID: **Ver179**

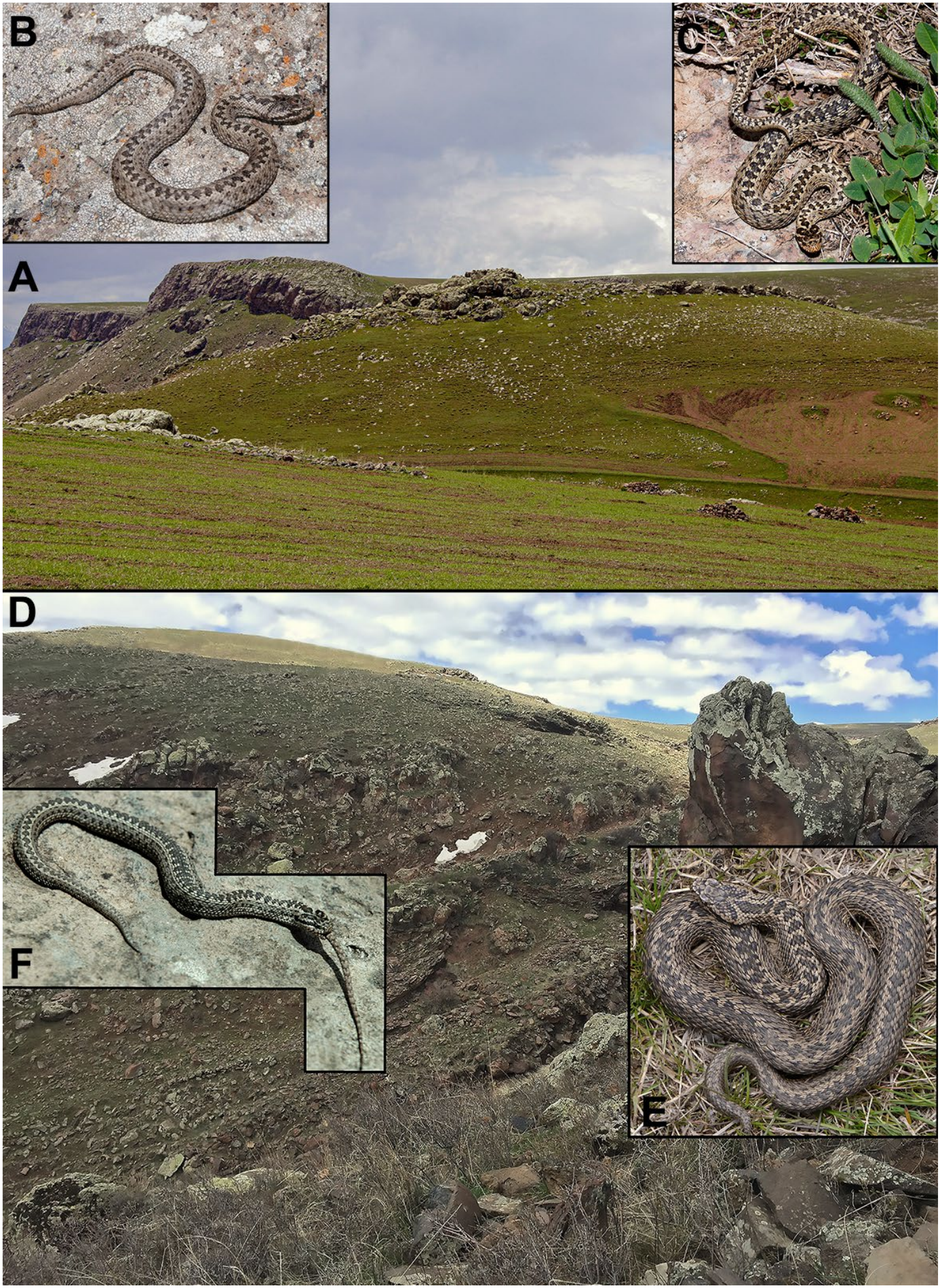
-16 **Refined**: Kozkoparan (Kasikiparan, Kasikkoparan), Tuzluca/Igdir, 40.032294°N, 43.462114°E, at 2,050 m elevation, coll. before 1900 due to the period of Boettger's related work. Source: Nikolsky (1916) verified an observation by Boettger (in Radde 1899) as a site for *Vipera berus* as *V. eriwanensis*, cit. in Nilson et al. (1988), resp. in Baran et al. (2005). Individual-ID: **Ver26**

-17 **New**: Cumaçay, Merkez/Agri, 39.924319°N, 43.193244°E, at 1,991 m elevation, early 1990s. Source: a German entomologist (coleopterist community), provided via John Mulder. This record is included, because it is credible based on; a) the observation was labeled as a *V. berus*, a well-known viper in Gemany and the only one resembling *V. eriwanensis* in that country, b) the standard commitment of exact and objective description inherent in the biological scientific profession of the observer, c) the rocky steppe habitat of the locality around 2,000 m elevation is typical for *V. r. eriwanensis*, d) there is no other *V. r. eriwanensis*-like snake occurring in that region, and e) its proximity to nearby (25 km northeast) locality-16 with equivalent conditions. However, a voucher from the large steppe plateau southeast of Cumaçay would be still required. Individual-ID: **Ver292**

-18 **New**: 3 km northwest Asagitütek Köyü, Diyadin/Agri, 39.537486°N, 43.755603°E, n = 2 within 5 m, at 2,115 m elevation, 02 June 2016 (Fig. 5D, E main article). Source: Mustafa Demir (pers. data transf.). Remarks: currently the most southern record of the Southern Steppe Viper in Türkiye. Individual-IDs: **Ver23–24**

-19 **New**: east Digor/Kars, 40.375097°N, 43.433808°E, at 1,644 m elevation, May 1993. Source: Mario Schweiger (pers. data transf.). Individual-ID: **Ver30**

-20 **New**: Uzunkaya, north Digor/Kars, 40.399459°N, 43.422162°E, at 1,746 m elevation, 06 May 2015. Source: Karim Amri (pers. data transf.). Individual-ID: **Ver356**


B
C
A
D
F
E

SUPPLEMENTAL FIGURE S6. Southern Steppe Vipers *V. renardi eriwanensis* from Kars Province, Türkiye, with localities depicted on map of Fig. S5: (A) the plateau and cliffs east of Kagizman, north of the Aras River, near the village Kesiskiran (locality-12); (B) individual **Ver65** from that site; and (C) **Ver61** from locality-9 farther west. *Vipera r. eriwanensis* from eastern localities in Kars Province: (D) habitat from locality-21 in Digor District; and (E) **Ver25** from that site; (F) **Ver13–14** from Gönülalan south of Çıldır Lake, Arpacay District (locality-27) with one of them consuming a rock lizard, *Darevskia* sp. (A, B, C photographed by Konrad Mebert, D and E by Gerrit Jan Verspui, F by Börje Flärdh).

-21 **New**: Digor, Digor/Kars, 40.385489°N, 43.384944°E, n = 3, around 1,829 m elevation, 25 April 2019 (Fig. S6D, E). Source: Gert and Anniek Verspui, (pers. data transf.); two additional vouchers NHM (Nat. Hist. Mus. Gothenburg, now GNM Göteborgs Naturhistoriska Museum) 7069, 7070 by Uwe Sattler, respectively Göran Nilson. Individual-IDs: **Ver25a, b, c**

-22 **New**: Saklica, Digor/Kars, 40.410222°N, 43.366367°E, at 2,127 m elevation, 27 September 1987. Source: Michael Franzen (pers. data transf.). Individual-ID: **Ver33**

-23 **New**: between Saklica and Gülhayran, Digor/Kars, 40.423967°N, 43.362783°E, at 2,127 m elevation, 20 June 2020. Source: Burak Akdag and Kaan Yilmaz. Individual-ID: **Ver200**

-24 **Refined**: 2 km north of Polatköy, Arpacay/Kars, 40.891308°N, 43.388031°E, n = 2, around 2,000 m elevation, 15/16 May 1987. Source: Geniez and Teynié (2005), and Philippe Geniez, Alexandre Teynié, (pers. data transf.). Individual-IDs: **Ver19–20**

-25 **Refined**: between Carci and Melikköyü, Arpacay/Kars, 40.895193°N, 43.355091°E, n = 18 within 700 m of coordinates, around 1,955 m elevation, May/June of 1987/1988/1989/2003. Source: Teynié (1987), ZIG (now GNM Göteborgs Naturhistoriska Museum) 262 in Nilson and Andrén (2001), and photos in David and Vogel (2010), Phelps (2010), but also Alexandre Teynié, Didier Daminet, Philippe Geniez, Pierre-André Crochet, G. Pottier, David Jandzik, (pers. data transf.). Individual-IDs: **Ver40–53, Ver55–60**

-26 **Refined**: 1.8 km southwest of Taşlıoğul, labeled as 4 km south of Lake Çıldır, Arpacay/Kars, 40.906890°N, 43.315871°E, around 1,966 m elevation, 25 May 1989. Source: voucher vouchers NHM (Nat. Hist. Mus. Gothenburg, now GNM Göteborgs Naturhistoriska Museum) 6826 by Göran Nilson. Remarks: coordinates placed in suitable habitat and elevation. Individual-ID: **Ver54**

-27 **New**: south Gönülalan, Arpacay/Kars, 40.911035°N, 43.293633°E, n = 2, at 1,925 m elevation, on both sides along the road, May/June 1986 (Fig. S6D). Source: Börje Flärdh (pers. data transf.). Individual-IDs: Individual-IDs: **Ver13–14**

-28 **New**: north Burcali, Arpacay/Kars 40.924717°N, 3 43.251083°E, at 2,050 m elevation, 23 June 2020. Source: Burak Akdag, Kaan Yilmaz. Individual-ID: **Ver201**

-29 **Refined**: Kizir Mt., Kars-Ardahan province border, 40.971070°N, 43.221040°E, at 2,070 m elevation, < 1985. Source: Bruno (1985), cit. in Nilson et al. (1988), resp. in Baran et al. (2005), placed by us on rocks/meadow near Bozyiğit, a typical habitat of the Southern Steppe Viper and well accessible from the road and village. Individual-ID: **Ver27**

-30 **Refined**: southwest Doğruyol and north Canaksu, Arpacay/Kars, 41.044567°N, 43.305353°E, n = 2 around 2,003 m elevation, 25 May 1991, 15 May 1992. Source: Mulder (1995) and John Mulder (pers. data transf.). Individual-ID: **Ver28**

-31 **New**: 1.7 km west of Kaçak, Çıldır/Ardahan, 41.083151°N, 43.322629°E, n = 4, at 2,029 m elevation, June 1993. Source: Börje Flärdh (pers. data transf.). Individual-ID: **Ver183**

-32 **New**: 2.4 km northwest Akçakale, Çıldır/Ardahan, 41.099914°N, 43.279921°E, n = 4, at 2,006 m elevation, 1989 (Nilson and Andrén 2001), 28 May 1991. Source: vouchers NHM (Nat. Hist. Mus. Gothenburg, now GNM Göteborgs Naturhistoriska Museum) 6827 and NRM (Swedish Mus. Nat. Hist., Stockholm) 5104, which is an offspring of original voucher according to Mikael Lundberg, Johan Nylander, Börje Flärdh (pers. data transf.). Individual-ID: **Ver18**

-33 **Refined**: above Gölbelen (slope of Kizir Mt.), Çildir/Ardahan, 41.068039°N, 43.119258°E, at 2.052 m elevation, summer 2011. Source: Tuniyev et al. (2012, 2014) including voucher photo, but locality was cited as (both articles combined): "… above Göbelen, around 2,000 m elevation, on slopes of Mt. Kisir Dag". Hence, our coordinates point to a suitable area (rocks on meadow) near and above the village. Individual-ID: **Ver16**

-34 **New:** Yıldırımtepe, Şeytan Kalesi, Çıldır/Ardahan, 41.151621°N, 43.128042°E, n = 2 within 150 m from coordinates, between 1,964–2,009 m elevation, 24 April 2018, and the year 2021 (Fig. S7B). Source: Çağatay Altın. Individual-IDs: **Ver34, Ver322**

SUPPLEMENTAL FIGURE S7. Two Southern Steppe Vipers *Vipera renardi eriwanensis* from the Türkish Ardahan Province; in red and **bold** individual IDs: A) **Ver66** from Binbaşak, Hanak District, locality-41 on map in Fig. S5, currently the northernmost record in Türkiye; B) **Ver34** from Seytan Kalesi, Çıldır District (locality-34), digitally inserted. (A photographed by Konrad Mebert, B by Cagatay Altin).

-35 **New:** 3.8 km north Cildir, Cildir/Ardahan, 41.163756°N, 43.132689°E, at 2,002 m elevation, July 2019. Source: Mehmet Akif Okutucu, provided via Adem Adakul. Individual-ID: **Ver35**

-36 **Refined:** 3 km west of Camlicatak, Merkez/Ardahan, 41.129497°N, 42.797419°E, at 1,899 m elevation, 01 June 1993. Source: Mulder (1995), and John Mulder (pers. data transf.). Individual-ID: **Ver17**

-37 **New:** west of Balikçilar, Merkez/Ardahan, 41.161150°N, 42.829601°E, n = 2, ca. 130 m from coordinates, between 1,796–1,927 m elevation, 16 May and 17 June 2021. Source: Kemal Çoban, via M. Zülfü Yildiz, Bahadır Akman, Fatma Üçeş. Individual-IDs: **Ver317–318**

-38 **New:** at 1.5 km northeast of Balikçilar, Merkez/Ardahan, 41.161294°N, 42.853165°E, at 1,814 m asl, 28 June 2021. Source: Kemal Çoban, via M. Zülfü Yildiz, Bahadır Akman, Fatma Üçeş. Remarks: 1.9 km east of locality-37. Individual-ID: **Ver319**

-39 **New:** east of Altas (Ölcek), Merkez/Ardahan, 41.159167°N, 42.881728°E, at 1,755 m elevation, 06 May 2003. Source: Geniez and Teynié (2005), Pierre-André Crochet (pers. data transf.). Individual-IDs: **Ver21**

-40 **New:** Ortakent Dilekdere, Hanak/Ardahan, 41.181225°N, 42.947300°E, at 1,858 m elevation, 01 June 2014. Source: Uygun Akpinar (pers. data transf.). Individual-ID: **Ver31**

-41 **New**: Binbasak, Hanak/Ardahan, 41.211933°N, 43.017203°E, at 2,133 m elevation, 31 May 2015 (Fig. S7A). Source: Konrad Mebert, Mert Karis. Individual-ID: **Ver66**

Georgia (excluding potential *renardi lotievi* records from Greater or North Caucasus)

A point distribution map with Georgian localities is presented in Supplemental Fig. S8 with information about the localities presented in the subsequent list below. The list sequence begins on the Erusheti Plateau (Mountains) in southwestern Georiga adjacent to Türkiye (see that information and the Turkish map in Supplemental Fig. S5 above) and continues northeast across Georgia to the border with Azerbaijan.

high-elevation - *eriwanensis* group

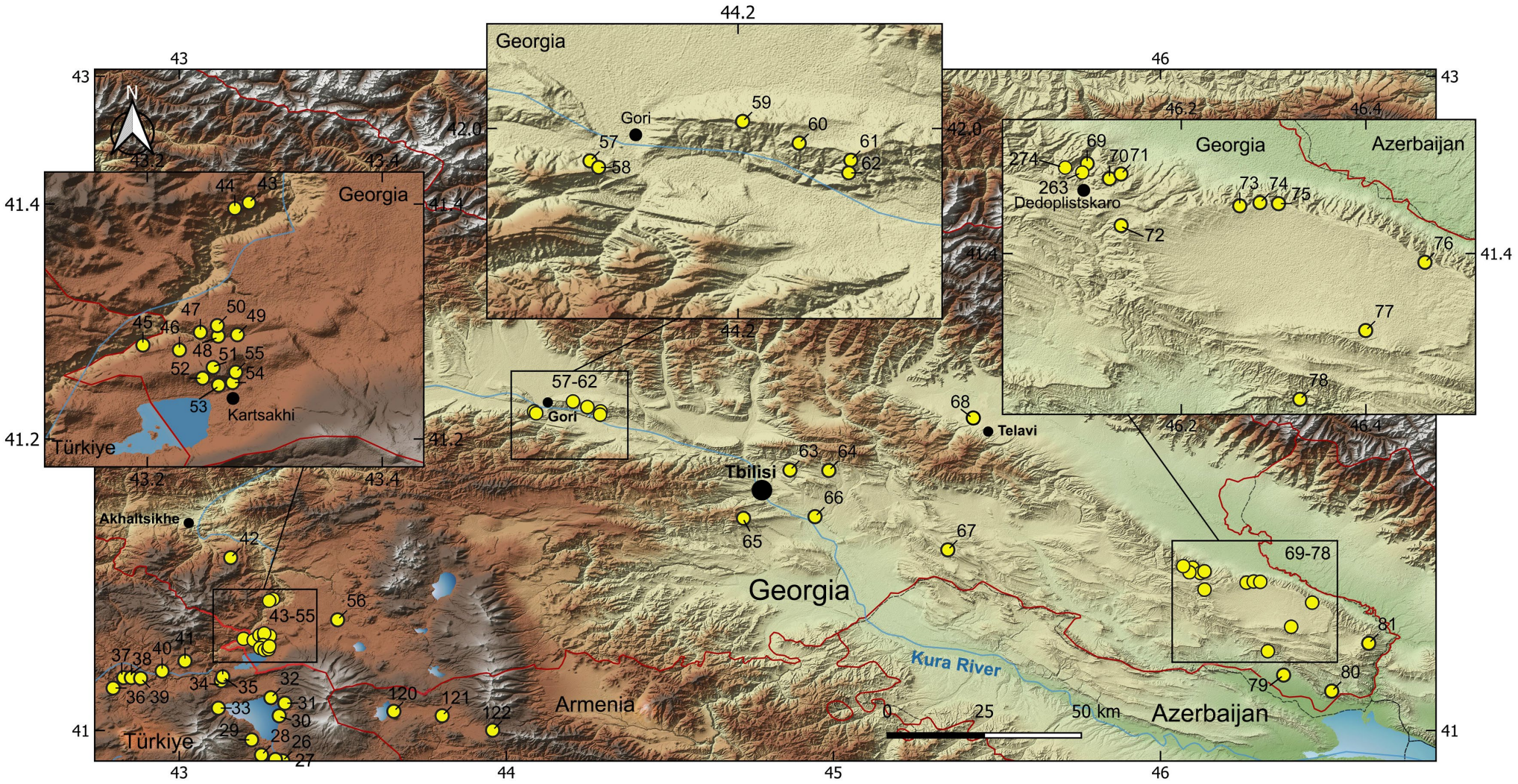
-42 **Refined**: on a southexposed slope above and south Dzveli/Samtskhe-Javakheti, 41.534189°N, 43.161491°E, at 1,985 m elevation, 09 July 1979. Source: coordinates are placed in the center of respective locality marker on the map in Bakradze and Vedmederja (1979). Remarks: Although no voucher is available, we currently follow the suggested species identification (i.e., not being confused with the similar and regionally largely sympatric *V. darevskii*), because there is potential habitat for *V. r. eriwanensis* (grassland at elevation around 2,000 m, inspected by G. Iremashvili) above Dzveli, which is connected with similar habitats to sites occupied by this species 16 km farther south (localities-43, -44). Furthermore, that record from Dzveli was omitted by V.I. Vedmederja in his description of *V. darevskii* seven years later (Vedmederja et al. 1986), which tends to occupy higher elevations in the same general region (Tuniyev et al. 2014; Mebert et al. 2025b). Individual-ID: **Ver315**

-43 **New**: Zeda Tmogvi Church, Aspindza/Samtskhe-Javakheti, 41.401209°N, 43.286528°E, n = 3 around 1,846 m elevation, 1 September 2008, 18 May 2021. Source: Individual-IDs: **Ver181** by Qetevan Trapaidze (pers. data transf.), individuals **Ver300–301** by Alisa Sanakoeva, Giorgi Iankoshvili, Konrad Mebert.

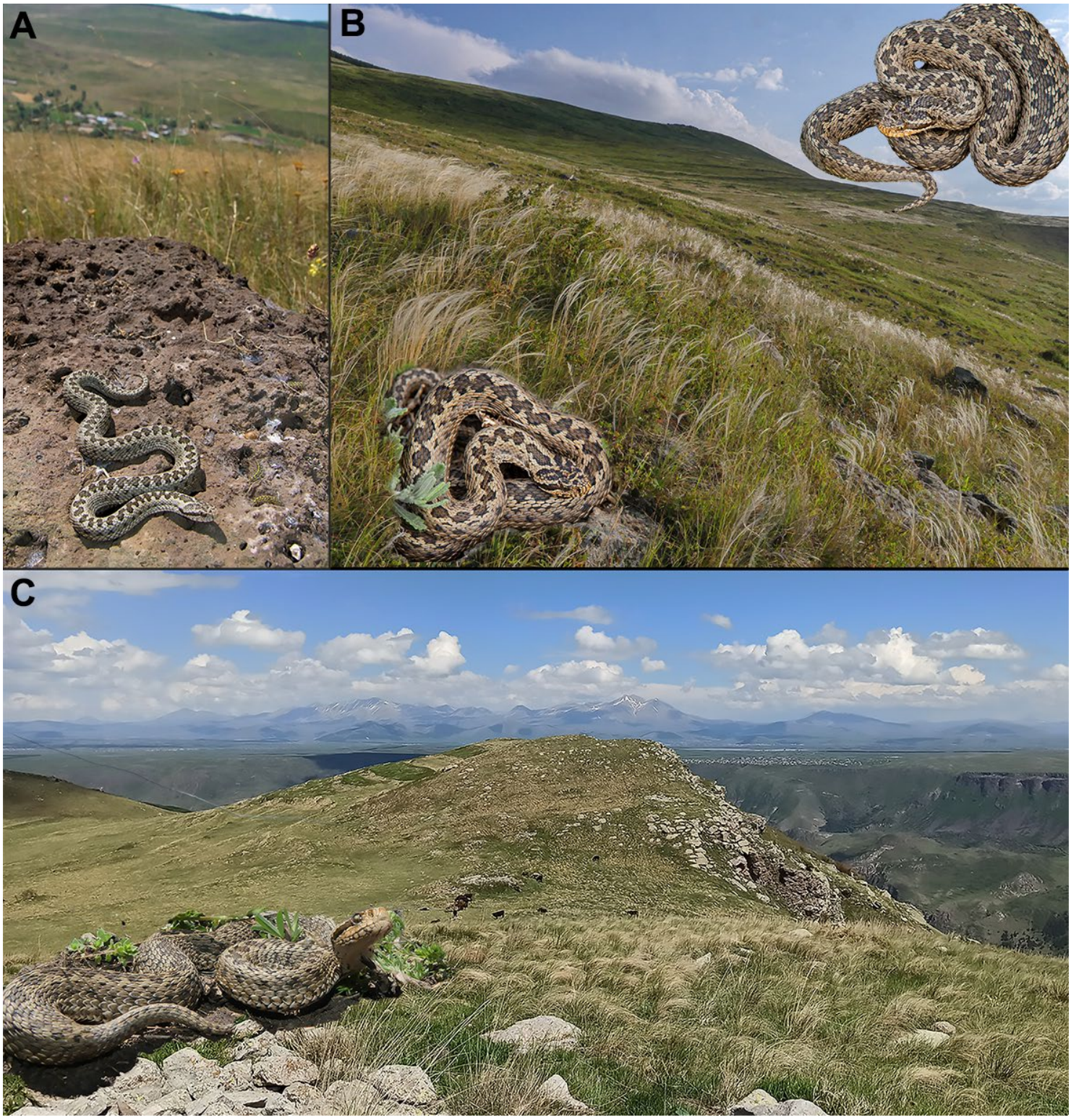
-44 **New**: 1.4 km west of Zeda Tmogvi Church, Aspindza/Samtskhe-Javakheti, 41.396290°N, 43.274479°E, 1,951 m elevation, 18 May 2021 (Fig. S9C). Source: Alisa Sanakoeva, Giorgi Iankoshvili, Konrad Mebert. Individual-ID: **Ver302**

-45 **New**: north-exposed slope above Kura River, 3.5 km west of Khaveti, 41.279980°N, 43.196270°E, 1,632 m asl, 01 July 2021. Source: Nika Paposhvili, via Giorgi Iankoshvili. Individual-ID: **Ver320**

-46 **Refined**: Khaveti, Akhalkalaki/Samtskhe-Javakethi, 41.275780°N, 43.227328°E, n > 8, above 1,700 m elevation, 1976–1977. Source: Vedmederja et al. (2007) with voucher MNKhNU G-1339, cit. in Kukushkin et al. (2012), including a photo. Remarks: coordinates placed by us are representative for all specimens from near the village < 1 km west of its border into a potential remaining habitat next to a small stream with some scattered rocks surrounded by meadows. Today, this area is primarily agriculture, and the viper records from this location might were collected from the nearby localities-47–50. However, since no additional information from above vouchers was available to us, some habitat at the provided locality exists, and more potential and extensive habitat begins only 2–3 km (across agriculture) farther west from the coordinates, also vouchered by individual **Ver320** from locality-45, this set location is viewed as justified. Individual-IDs: **Ver97–103**



SUPPLEMENTAL FIGURE S8. Distribution of the Southern Steppe Viper *V. r. eriwanensis* in Georgia. Evaluation and discussion on mid- to low-elevation "shemakhensis" populations (Tuniyev et al. 2018b), a non-valid taxon, see main article and "Extended Taxonomic Review" below. Red lines are country borders; insets show zoomed-in views of rectangles connected by a line.



SUPPLEMENTAL FIGURE S9. Southern Steppe Viper *Vipera renardi eriwanensis* from southwestern Georgia; in red and **bold** individual IDs: (A and B) *Stipa* Steppe on the Javakheti Plateau, a typcial habitat for this species, between neighboring villages Ernja, Dabnia and Khaveti (locality-48) with individuals **Ver363** (A), **Ver306** and **Ver311** (B); (C) the steppe east of Tmogvi, on Erusheti Plateau, locality-44 on map of Fig. S8, inluding Southern Steppe Viper **Ver302** from that locality. (A and background in B photographed by Konrad Mebert, both vipers in B, digitally inserted, by P. Lennart Schmid, background in C by Giorgi Iankoshvili, viper in C, digitally inserted, by Konrad Mebert).

-47 **New**: north of Khaveti/Samtskhe-Javakethi, 41.290914°N, 43.245168°E, year 2013. Source: third person information via Guram Iremashvili. Individual-ID: **Ver69**

-48 **New**: between Dabnia and Erinja/Samtskhe-Javakethi, 41.287568°N, 43.260344°E, n = 23 within 470 m around coordinates, between 1,728–1,790 m elevation, 26 May 2021, 8/9 August 2022 (Fig. S9A, B). Source: Lennart Schmid, Judith Grünewald in 2021, Team Edvard Mizsei, Tibor Sos, Konrad Mebert, Guram Iremashvili, Shota Zankudeli in 2022. Individual-IDs: **Ver306–311, Ver363, Ver366, Ver369–383**

-49 **New**: Erinja/Samtskhe-Javakethi, 41.288734°N, 43.276701°E, at 1,777 m elevation, 26 May 2021. Source: Lennart Schmid, Judith Grünewald. Individual-ID: **Ver305**

-50 **New**: Khaveti Ridge/Samtskhe-Javakethi, 41.296592°N, 43.259603°E, n = 2 within 10 m of coordinates, between 1,885–1,886 m elevation, 09 August 2022. Source: Shota Zankudeli (leg.), Mebert Team. Individual-IDs: **Ver364–365**

-51 **New**: ridge plateau north Kartsakhi Lake (Aktas Lake in Turkish), Akhalkalaki/Samtskhe-Javakheti, 41.260942°N, 43.256067°E, at 2,126 m elevation, 01 June 2018. Source: Tim Warfel (unpubl., pers. data transf.). Individual-ID: **Ver143**

-52 **New**: middle northwest Kartsakhi Lake, 41.251802°N, 43.247130°E, n = 2 within 200 m from coordinates, between 1,925–1,991 m elevation. Source: 19 July 2013 in Tuniyev et al. (2014), June 2018 by Guram Iremashvili and Kevin Caldwell. Remarks: potential habitats along these slopes reach across the border into Türkiye. Individual-IDs: **Ver144, Ver178**

-53 **New**: lower northwest Kartsakhi Lake, 41.245873°N, 43.260657°E, 1,881 m elevation, 18 August 2021. Source: Jeroen Speybroeck (pers. data transf.). Individual-ID: **Ver360**

-54 **Refined**: Kartsakhi, 41.248098°N, 43.272578°E, n = 10, above 1,914 m elevation, 1976–1977. Source: Vedmederja et al. (2007) with vouchers MNKhNU G-149 and G-1329 (The Museum of Nature at V. N. Karazin's Kharkiv National University), cit. in Kukushkin et al. (2012). Remarks: coordinates placed by us into the nearest potential habitat, represented by the first patch with scattered rocks across the meadow adjacent-north of the village. Individual-ID: **Ver87-96**

-55 **New:** slope northeast of Kartsakhi/Samtskhe-Javakethi, 41.256978°N, 43.275261°E, 1,961 m elevation, 01 August 2018. Source: Bobby Bok (unpubl., pers. data transf.). Individual-ID: **Ver111**

-56 **New**: north Qulalisi (Ghulalisi, Kulalisi), side of Akhalkalaki/Samtskhe-Javakethi, 41.338010°N, 43.483790°E, at 1,765 m elevation, 12 July 2019. Source: no vouchers, two specimens captured, but escaped (Kyle Vargas and Alexander Eppler, pers. comm). Remarks: ID appears credible due to expertism of the observers and general suitable habitat (rocky meadows and grassy slopes at the species-typic elevation), well known populations of this species in < 20 km with unexplored, but suitable, habitat between them. Record is also included due to its proximity to nearby records of another grassland viper, the Darevsky´s Vipera darevskii, and to pay attention to distinguish from it . Record is also included due to its proximity to nearby records of another grassland viper, the Darevsky´s *Vipera darevskii* (Mebert et al. 2025b). Individual-IDs: **Ver176–177**

Low- to mid-elevation – "shemakhensis" populations of *V. r. eriwanensis*

-57 **New:** St. George Church, Gori/Shida Kartli, 41.974732°N, 44.084322°E, n = 4 within 70 m from coordinates, between 792–811 m elevation, 29 July 2012, 27 September 2020, and 13 August 2021 (map Fig. S8; individual **Ver222** Fig. S10A). Source: Leonid Neymark, Giorgi Elbakidze, and Jeroen Speybroeck (all pers. data transf., including photo vouchers). Remarks: currently the western-most locality for the "shemakhensis" group of *V. r. eriwanensis* (*sensu lato*) and at an air-distance of around 90 km from highland *V. r. eriwanensis* localities-42–43 and -56 on the Erusheti and Javakheti Plateaus. Individual-IDs: **Ver132–133, Ver222, Ver361**

-58 **New:** Gori Kaklebi Church, Gori/Shida Kartli, 41.969604°N, 44.091073°E, 831 m elevation, 29 July 2012. Source: Leonid Neymark (pers. data transf.). Remarks: this locality is only about 760 m distant from locality-

57, however it lies on a different ridge with habitat of reduced suitability (dense, shady bush and tree cover) between them. Individual-ID: **Ver134**

-59 **Refined**: Kvernaki Ridge, Gori/Shida Kartli, 42.005539°N, 44.203590°E, at 999 m elevation, historic record, < 1952. Source: voucher in Museum of Russia ZIN, Zoological Museum of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia (in lit. by Kutubidze in Janashvili [=Dzhanashvili in Russian] 1951, Janashvili and Kutubidze 1952). Remarks: coordinates placed in correlation with distribution point in Muskhelishvili (1970) and on the same ridge and habitat as recently confirmed localities-60–62. Individual-ID: **Ver345**

-60 **Refined**: southwest Nadarbazevi Lake, Kvernaki Ridge, border region of Gori and Kaspi districts/Shida Kartli, 41.988620°N, 44.247720°E, at 929 m elevation, 04 May 2021. Source: Giorgi Natsvlishvili (pers. data transf.), posted also on iNaturalist (photo voucher). Individual-ID: **Ver343**

-61 **Refined**: southeast Nadarbazevi Lake, Kvernaki Ridge, border region of Gori and Kaspi districts/Shida Kartli, 41.975241°N, 44.288129°E, n = 9 within 660 m from coordinates, between 832 and 1,039 m elevation, 04 October 2020, 15 April 2022, and 27 May 2023. Source: Giorgi Elbakidze, Alexander Eppler, Gregoire Meier (all pers. data transf.) including photo vouchers. Individual-IDs: **Ver223, Ver358–359, Ver408–410**

-62 **Refined**: southeast Nadarbazevi Lake, Kvernaki Ridge, border region of Gori and Kaspi districts/Shida Kartli, 41.965343°N, 44.286501°E, n = 2 within 330 m from coordinates, from 824–864 m elevation, 09/17 May 2021 (Fig. S10C, D). Source: Lennart Schmid, Judith Grünewald. Individual-IDs: **Ver303–304**

-63 **New**: region of Gldani-Tbilisi, east of Giorgitsminda/Mtskheta-Mtianeti, 41.795825°N, 44.867197°E, at 629 m elevation, 20 September 2020 (Fig. 6B main article). Source: Giorgi Elbakidze (pers. data transf.) including photo vouchers; also collected in the Tbilisi area by Radde (September 1886, cit. in Muskhelishvili 1970). Individual-ID: **Ver221**

-64 **Refined**: Norio, Gardabani/Kvemo Kartli, 41.794663°N, 44.985914°E, at 883 m elevation, 6 June 1933. Source: voucher SMG 125 (State Museum of Georgia), Balavadze (1966), Mukhelishvili (1970) and Fig. 14 in Tuniyev et al. (2018b). Remarks: coordinates placed by us into suitable grass- and bush-habitat 600 m east of village. Individual-ID: **Ver140**

-65 **Refined**: Kojori (Khodzori)/Kakheti, 41.648476°N, 44.724999°E, at 1,054 m elevation, historic, < 1914. Source: voucher in State Museum of Georgia, Radde (1899), Nikolsky (1913), Janashvili and Kutubidze (1952), see also Mukhelishvili (1970). Remarks: coordinates placed by us into dry grass-rocky southern slope below the village. This record correlates to one of the typical climate zones (O: Thermo-moderate and humid mountain) occupied by *V. r. eriwanensis* in central-eastern Georgia and western Azerbaijan according to Kurtubadze (2015). Individual-ID: **Ver344**

-66 **Refined**: steppe slopes east of Soganlug Air Base, Samgori District/Kemo Kartli, 41.653475°N, 44.943638°E, n = 3, at 400 m elevation, historic, < 1967. Source: Balavadze (1966), also cit. in Muskhelishvili (1970). Remarks: no voucher, but low to mid-elevation steppe habitat is typical for *V. renardi*-group and is still present between the the military air base and the Tbilisi International Airport. Individual-ID: **Ver354**

-67 **Refined**: 5 km nw. Udabno/Kakheti, 41.552015°N, 45.385921°E, at 934 m elevation, historic, < 1952. Source: Janashvili (1951, 1963), and its cit. in Muskhelishvili (1970). Remarks: no voucher, coordinates placed between respective map point in Muskhelishvili (1970) and Udabno, reflecting low to mid-elevation steppe habitat typical for *V. renardi*-group. Individual-ID: **Ver346**

-68 **Refined**: Ruispiri, Telavi/Kakheti, 41.955186°N, 45.427802°E, at 572 m elevation, historic, < 1952. Source: Janashvili (1951) and Janashvili and Kutubidze (1952), also cit. in Muskhelishvili (1970). Remarks: no voucher, but the low to mid-elevation steppe habitat of that location is typical for the *V. renardi*-group. Individual-ID: **Ver347**

-69 **Refined**: phaesant farm, north foot of Mt. Artsivis Kheoba (Eagle Gorge Natural Monument/Mt.), Dedoplistskaro/Kakheti, 41.500447°N, 46.092803°E, at 561 m elevation, summer 2016. Source: leg. Zura Javakhishvili and Nika Paposhvili, depicted also in Fig. 13 of Tuniyev et al. (2018b). Remarks: coordinates placed into the phaesant outdoor enclosure, on the north foot of Artsivis Kheoba Mountain (Eagle Gorge Monument. Individual-ID: **Ver141**

-70 **New**: Dedoplistskaro, trail-start to Khornabudji Fortress/Kakheti, 41.481099°N, 46.122214°E, at 838 m elevation, 19 May 2021. Source: photo voucher and pers. data transf. by Tomoyuki Matoba to G. Iankoshvili. Individual-ID: **Ver353**

-71 **Refined**: near Khornabudji Fortress, Dedoplistsqaro/Kakheti,41.486185°N, 46.134620°E, n = 2 within 170 m around coordinates, 685–743 m elevation, June 2016 and 19 May 2019. Source: N. Seturidze SNP1059 (Herpetological Collection Sochi National Park, Russia), Genbank MG729486, in Tuniyev et al. (2018b); voucher photo by Tomoyuki Matoba (pers. data transf.), posted also on iNaturalist. Remarks: holotype of "*V. shemakhensis kakhetiensis*", which we consider invalid due to low genetic divergence from *V. r. eriwanensis* (Freitas et al. 2020) or *V. renardi* in general. Indeed, Georgian "kakhetiensis" are closer related to highland "*eriwanensis*" of Gergia, Armenia, and Türkiye (Mebert et al. 2025a). Furthermore, geographic isolation is apparently reduced exemplified by recent new sampling (this article). Individual-IDs: **Ver175, Ver342**

-72 **New**: hill above Kochebi Lake, Dedoplistskaro/Kakheti, 41.430393°N, 46.134805°E, 861 m elevation, < 2022. Source: local observation, no name, but pers. data transf. to L. Schmid. Remarks: observation is credible due to suitable habitat, realistic specimen description, and close proximity to confirmed localities-69–71 about 6 km northwest, and 10 km northeast to localities-73–75. Individual-ID: **Ver259**

-73 **Refined**: Chinkani house, about 9 km east of Samreklo, Dedoplistsqaro/Kakheti, 41.451731°N, 46.263336°E, n = 3 within 250 m east and west from coordinates, 630–652 m elevation, years 2016/2017. Source: Tuniyev et al. (2018b) with the two vouchers SNP1053 (Herpetological collection of the Sochi National Park, Sochi Russia) and Genbank MG729489, April 2016 by Guram Iremashvili and one photo voucher in Fig. 17 (July 2017). Individual-IDs: **Ver139, Ver173–174**

-74 **Refined**: about 1.8 km east of Chinkani house, Dedoplistsqaro/ Kakheti, around 41.452174°N, 46.286526°E, n = 9 within 530 of coordinates, between 581–645 m elevation, Sept 2015, 20 April and 01/06 May 2021, 09 September 2022, 06 May 2024. Source: vouchers SNP1052 (Genbank MG729487/8) by Guram Iremashvili and photo voucher Fig. 10 in Tuniyev et al. (2018b), Giorgi Iankoshvili, Niklas Banowski, Lennart Schmid and Judith Grünewald. Individual-IDs: **Ver169-172, Ver312–313, Ver434–436**

-75 **Refined**: about 5.4 km northwest of western urban end of Zemo Kedi and 1.5 km east of locality-74, Dedoplistsqaro/Kakheti, within 46 m from 41.454140°N, 46.305299°E, n = 3, at 632 m elevation, years 2014, 2018 and 2021 (Fig. 6A main article). Source: Guram Iremashvili, Lennart Schmid, Judith Grünewald. Individual-IDs: **Ver110, Ver168, Ver314**

-76 **Refined**: along 15 km road between Zemo Kedi to Kvemo Kedi, Shirak Plain, Iori Plateau, Dedoplistsqaro/ Kakheti, around 41.390605°N, 46.463912°E, between 693–730 m elevation, year 1944. Source: Janashvili (1951), also cit. in Tuniyev et al. (2018b); 13 vipers killed during construction work; coordinates placed by us representatively at midpoint between the centers of the two villages. Individual-ID: **Ver137**

-77 **Refined**: Mt. Shua (Khrebet Shuva-Alta)/Kakheti, 41.316667°N, 46.399722°E, 642 m elevation, historic, < 1952. Source: Janashvili (1951), Balavadze (1959), also cit. in Muskhelishvili (1970). Remarks: no voucher, but in the past a typical low- and mid-elevation steppe habitat for *V. renardi*-group, today replaced by intensive agriculture. Individual-ID: **Ver349**

-78 **Refined**: Patara Shiraki/Kakheti, 41.242145°N, 46.328401°E, 441 m elevation, historic, < 1952. Source: Janashvili (1951), Balavadze (1966), also cit. in Muskhelishvili (1970). Remarks: no voucher, but typical low- and mid-elevation steppe habitat for *V. renardi*-group. Individual-ID: **Ver350**

-79 **Refined**: Eldari Steppe/Kakheti, 41.169087°N, 46.376655°E, 169 m elevation, historic, < 1967. Source: E.S. Balavadze (1966), also cit. in Muskhelishvili (1970). Remarks: no voucher, but typical low- and mid-elevation steppe habitat for *V. renardi*-group. Individual-ID: **Ver351**

-80 **Refined**: Bugamoedani/Kakheti, 41.120060°N, 46.523788°E, 190 m elevation, historic, < 1967. Source: E.S. Balavadze (1966), also cit. in Muskhelishvili (1970). Remarks: no voucher, but typical low- and mid-elevation steppe habitat for *V. renardi*-group. Individual-ID: **Ver352**

-81 **Refined**: Shavi Mta (Mt. Zilcha Kosmatka), Sabatlo/Kakheti, 41.266292°N, 46.636933°E, 831 m elevation, historic, < 1960. Source: E.S. Balavadze (1959), also cit. in Muskhelishvili (1970). Remarks: no voucher, but typical low- and mid-elevation steppe habitat for *V. renardi*-group. Individual-ID: **Ver348**

SUPPLEMENTAL FIGURE S10. Shemakhan Viper *Vipera r. eriwanensis* "shemakhensis" group from central Georgia; in red and **bold** individual IDs: (A) **Ver222** from St. George Church, Gori, Shida Kartli, Georgia, locality-57 (map Fig. S8); (B, C, D) Kvernaki Ridge, east of Gori with localities-61 and -62 and individuals **Ver303** (C) and **Ver304** (D). (A Photographed by Giorgi Elbakidze, B by Giorgi Iankoshvili, C and D by P. Lennart Schmid).

See recently added localities from Georgia at "Late Additions" below

Azerbaijan including Karabakh Region (geographically separated southern records of Azerbaijan placed in a its own chapter following Armenia).

A point distribution map with Azerbaijan localities is presented in Supplemental Fig. S11 with information about the localities presented in the subsequent list below. The list sequence begins with localities in western Azerbaijan, continuing east towards the Caspian Sea, returns south and west across the Karabakh Region, followed by separate chapters on Armenia, Nakhichevan of southwestern Azerbaijan, and the Talysh region of southeastern Azerbaijan.

-82 **Refined**: Karatala (Qaratala, ex. Gazakend)/Qakh (Kakhi), 41.325664°N, 46.883637°E, at 269 m elevation, May 1907. Source: Nikolsky (1913, 1916) with two vouchers in the State Museum of Georgia (Tiblisi) as cit. in Alekperov (1978), listed as Gazakend (previous name) in Aliev (1973), but changed to Karatala (newer name) in Aliev and Ganiev (1985), also in Tuniyev et al. (2013, 2018). Remarks: exact coordinates placed on a natural field northeast of Karatala; Alekperov (1978) and Tuniyev et al. (2013, 2018) placed locality correctly near Karatala, west of Sheki, whereas Aliev and Ganiev (1985) placed it incorrectly 55 km farther west in Oghuz as distribution point Nr. 1 of Figure 1. Individual-IDs: **Ver136**

-83 **Refined**: Sheki, town and district (prev. Nukhi, Nukha, Nuha), 41.210515°N, 47.116702°E, around 435 m elevation, 21 March 1905. Source: Alekperov (1978) with a voucher in the State Museum of Georgia (Tiblisi). Remarks: exact coordinates placed on natural alluvial field west of Sheki town. Individual-IDs: **Ver219**

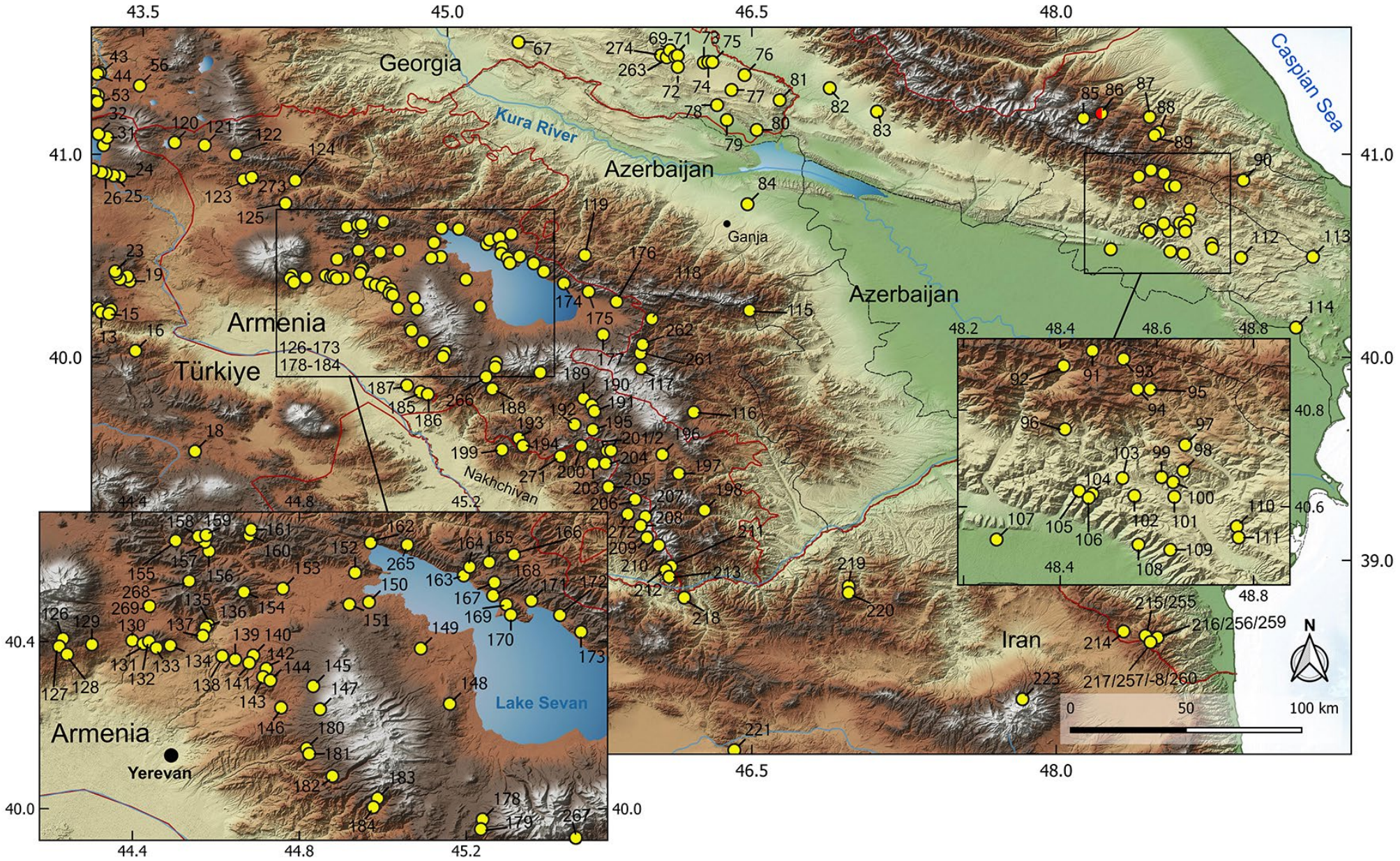
-84 **Refined**: Ahmedbejli (Ahmedbegli, Ahmadbayli), north of Ganja (Gansa)/Samuk, 40.754158°E, 46.478359°N, at 224 m elevation, < 1974. Source: collected by Aliev (1973) and Aliev and Ganiev (1985) who listed it as Ahmedbejli, Sheki, with a voucher in the State Museum of Georgia (Tiblisi). However, we couldn't locate a village Ahmedbejli near Sheki nor could we retrieve any vouchers from the State Museum of Georgia. On the other hand, Alekperov (1978) mentions that ZISP (Zoological Institute of the Russian Academy of Sciences, St. Petersburg) contains a voucher that originates from the vicinity of existing Ahmedbegli, just north of Elisabethpol that was later renamed to Ganja, as per administrative of the Azerbaijan Democratic Republic on August 30, 1918. This is likely the correct locality, as Sheki was part of Elisabethpol Governorate >100 years ago. Hence, the Ahmedbejli specimen should be referred to this village, today in Samuk district near Ganja, and not Sheki district. Remarks: Aliev and Ganiev (1985) mention their pers. obs. from Ahmedbejli, Sheki, but we are not sure to which village that refers today, the equally named village near Ganja or another one. Individual-IDs: **Ver218**

-85 **Refined**: Khinaliq (Khynalyk, Khanalyk, Khnalik, Khynalyg, Xinaliq, Khinalug)/Quba (Guba), 41.177379°E, 48.133893°N, n = 4 within 720 m from coordinates, between 1,973–2,087 m elevation, 04/21/23 July 2015. Source: leg. Islam Husseinov and T. Iskenderov (Iskenderov et al. 2017). Remarks: two specimens were found killed at the bank of Gudiyalchay River, two were observed alive near the village. Two steppe vipers were additionally collected in 2021 by O. Zinenko with one sequenced, showing an *eriwanensis* haplotye (O. Zinenko, see phylogenetic tree in Fig. 3 main article). Individual-IDs: **Ver398–399, Ver404–405**

-86 **Refined**: Jek (Dzhek), 8 km east of Khinaliq/Quba, 41.201406°E, 48.221983°N, n = 4 juveniles, 1,969 m, 06 July 2015 (Fig. 6A main article). Source: Iskenderov et al. (2017). Remarks: all juveniles found within 15 m radius, two of three cyt *b* sequences showed *eriwanensis* haplotypes and the other a *lotievi* haplotype. Individual-IDs: **Ver-lo400–403** (Ver-lo = population containing both haplotypes *Vipera r. eriwanensis* and *V. r. lotievi*)

-87 **Refined**: Zikhir (Zixir, Khyrt)/Quba, 41.183611°N, 48.460278°E, at 1,551 m elevation, July 2022 (Fig. 6B main article). Source: Iskenderov (2022). Remarks: traditionally placed as *V. lotievi*, and together with vipers from Khinaliq and Jek (localities-85 and -86) the sole representative in this study from the northern rim of the Greater Caucaus, Azerbaijan. Individual-ID: **Ver-lo397**

-88 **New:** Valley south of Mount Kizilnuhur, between Yerfi and Nohurdyuzyu/Quba, 41.110097°N, 48.507778°E, at 1,495 m elevation, 2 July 2023. Source: Shepherd Agil via T. Iskenderov. Individual-ID: **Ver411**



SUPPLEMENTAL FIGURE S11. Distribution of the Southern Steppe Viper *V. r. eriwanensis* (*sensu lato*) in Azerbaijan and Armenia. Half-red dot indicates locality where *eriwanensis*- and *lotievi*-haplotypes were found together. Red lines are country borders; insets show zoomed-in view of rectangles connected by a line. Records from inland Armenia are only a selected few for representation due to insufficient resolution at this map size. More inland localities can be found in Arakelyan et al. (2011), Aghasyan and Aghasyan and Aghasyan (2014), or online sources, such as iNaturalist.

-89 **New:** alluvial plain of small tributary to Babachay River, south of Yerfi/Quba, 41.093439°N, 48.484258°E, at 1,270 m elevation, < 2023. Source: Shepherd Agil via T. Iskenderov. Remarks: Agil and other shepherds found these vipers on both sides of the river around Yerfi. Individual-ID: **Ver412**

-90 **Refined**: Altiaghach/Khizi, 40.871834°N, 48.921739°E, at 1,308 m elevation, < 1982. Source: Effendi (1981) cit. in Aliev and Ganiev (1985). Remarks: coordinates placed into suitable habitat north of named locality, 56 km north of distribution point Nr. 11 in Aliev and Ganiev (1985), which erroneously points to a site in southern Gobustan Province. Individual-ID: **Ver165**

-91 **Refined**: 7 km upstream Pirsaat River northwest from Zarat-Kheibar/Shamakhi, 40.922801°N, 48.466724°E, n = 4, around 1,899 m elevation, July 2021 (Fig. S12A). Source: Iskenderov and Najafov (2022). Individual-IDs: **Ver324–327**

-92 **Refined**: Haftasov near Qoydan (Koydan)/Ismailli, 40.891262°N, 48.406886°E, at 1,589 m elevation, 31 July 2021. Source: collected by I. Kerimova and N. Snegovoy (Iskenderov and Najafov 2022). Remarks: coordinates placed north of town into steppe habitat. Individual-ID: **Ver323**

-93 **Refined**: west of Zarat-Kheibar/Shamakhi, 40.905602°N, 48.531043°E, at 1,750 m elevation, July 2021 (Fig. S12D). Source: Iskenderov and Najafov (2022). Individual-ID: **Ver328**

-94 **Refined**: Demirci (Demirchi)/Shamakhi, 40.842745°N, 48.559582°E, n = 3, around 1,580 m elevation, 1937 and July 2019 (Fig. S12B). Source: museum vouchers IZ (or ILSAR today) 92, 94 at the Institute of Living Systems of the Ministry of Science and Education of the Republic of Azerbaijan (leg. Azfan 1937, cit. in Jafarov 1948, Aliev and Ganiev 1985, Kukushkin et al. 2012) also representing a point in Alekperov (1978); recent collection of two specimens by Iskenderov and Najafov (2021, and Fig. S12A). Remarks: coordinates in acc. with point in Alekperov (1978), at 47 km north of mis-placed distribution point Nr. 4 in Aliev and Ganiev (1985), yet the recent collection by Iskenderov and Najafov (2022) confirms the locality. Individual-IDs: **Ver105–106, Ver329**

-95 **Refined**: Safali/Shamakhi, 40.842778°N, 48.586389°E, n = 2, at 1,598 m elevation, July 2019 (Fig. S12C). Source: collected by Iskenderov and Najafov (2022). Individual-ID: **Ver330–331**

-96 **Refined**: Khankend-Baskal (Khankendi-Basqal)/Ismailli, 40.760332°N, 48.409672°E, at 1,027 m elevation, no date provided, but likely < 1973, the main collection period by T.R. Aliev. Source: collected by Aliev (1973, cit. in Aliev and Ganiev 1985). Remarks: coordinates placed north of village into steppe habitat. Individual-ID: **Ver159**

-97 **Refined**: Chukhuryurd/Shamakhi, 40.727840°N, 48.658921°E, at 1,032 m elevation, July 2019 (Fig. S12E). Source: observed and published by Iskenderov and Najafov (2022). Remarks: placed next to a small water reservoir inside distribution point Nr. 1 accordingly Iskenderov and Najafov (2022). Individual-ID: **Ver337**

-98 **Refined**: Engexaran (Engekharan, Engekharan)/Shamakhi, 40.674523°N, 48.655005°E, at 1,028 m elevation, < 1979. Source: Alekperov (1978) collected these vipers at the foot of Pirdirechidag (or Engexaran Mountain), also cit. in Tuniyev et al. (2013). Remarks: coordinates placed into suitable habitat just north of village border, also in acc. with distribution point Nr. 3 in Aliev and Ganiev (1985). Individual-ID: **Ver135**

-99 **Refined**: Gulustan Castle (Gyzkalasy), Khinisly (Hynysly)/Shamakhi (Samaxi), 40.661121°N, 48.609665°E, multiple specimens around the village and nearby castle at around 959 m elevation, 25 April 1972 or 14 April 1974 (both dates are provided for the HOLOTYPE in Tuniyev et al. 2013), further collections from 1937–1976. Source: L.A. Erukh in Tuniyev et al. (2013) with HOLOTYPE of *V. s. shemakhensis* ZISP 21720 (Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia), Alekperov (1978, 1982), Nilson and Andrén (2001), Kukushkin et al. (2012), incl. vouchers MNKhNU 27070 (Museum of Nature at V. N. Karazin Kharkiv National University, Kharkiv, Ukraine, leg. A. P. Boguslavskyi), MNKhNU G-148 (leg. A. Broido, V. I. Vedmederja, and I. Vlasyuk), and IZ (or ILSAR) 92, 94, 102, 103, 106-111 a the Institute of Living Systems of the Ministry of Science and Education of the Republic of Azerbaijan. Remarks: representatively placed on the slope west of the castle above the village Khinisly. Individual-ID: **Ver104**

SUPPLEMENTAL FIGURE S12. Recent finds of *Vipera r. eriwanensis* ("shemakhensis" group) from the upper Pirsaat River Valley, Shamakhi, Province, Azerbaijan, with localities depicted on map Fig. S11; in red and **bold** individual IDs: A) steppe and scrub habitat and two of three Shemakha Vipers **Ver324–327**, digitally inserted, from upstream

Zarat Kheibar, locality-91; B) habitat and individual **Ver329** from Demirci, locality-94; C) habitat and a Shemakha Viper **Ver330–331** found above Safali, locality-95; D) individual **Ver328** from Zarat Kheibar, locality-93; and E) **Ver337** from Chukhuryurd, locality-97. (A, B, C, D, and E photographed by Tavakkul Iskenderov, all vipers digitally inserted], lower background by Konrad Mebert).

-100 **Refined**: in the rgion around Shamakhi, 40.650842°N, 48.633756°E, at 886 m elevation, 1937–1978. Source: represent collectively several literature records provided solely as Shamakhi region without precise data (Azfan 1937, Bogachev 1938, Vereshchagin 1938, all cited in Aliev and Ganiev 1985), but also observations by Alekperov (1978). Remarks: coordinates collectively placed to nearest habitat, a hill north of the town limit at 1–2 km east of the confirmed habitat above Khinisly (see locality-99). Individual-ID: **Ver145**

-101 **Refined**: Yeddi Kumbez (Yeddi Gumbaz) Mausoleum/Shamakhi, 40.620560°N, 48.636248°E, at 646 m elevation, < 1974. Source: leg. Aliev (1973, cit. in Aliev and Ganiev 1985). Remarks: coordinates represents the name given by Aliev and Ganiev 1985. Individual-ID: **Ver161**

-102 **Refined**: Madras/Shamakhi, 40.622500°N, 48.553611°E, at 686 m elevation, year 1984. Source: Iskenderov and Najafov (2022), leg. reptile collector Mammadov Iskender in pers. comm. to T. Iskenderov. Individual-ID: **Ver152**

-103 **Refined**: Muğanlı (Muganly)/Shamakhi, 40.659204°N, 48.529014°E, n = 2, at 783 m elevation, July 2019. Source: collected by Iskenderov and Najafov (2022). Individual-IDs: **Ver332–333**

-104 **Refined**: Shemaka Palace Hotel, Sharadil/Shamakhi, 40.626630°N, 48.467020°E, n = 2, at 772 m elevation, July 2019. Source: collected by Iskenderov and Najafov (2022). Individual-IDs: **Ver334–335**

-105 **Refined**: ca. 2.3 km below and west of Agsu Pass, border area between districts Shamakhi and Agsu, Azerbaijan, 40.632743°N, 48.439141°E, at 410 m elevation, 1985. Source: observed by N. Novruzov (Institute of Zoology, Baku), cit. in Iskenderov and Najafov (2022). Remarks: coordinates placed by us into a suitable habitat on the slope below the pass representing point 10 in Iskenderov and Najafov (2022). Individual-ID: **Ver336**

-106 **Refined**: Agsu Pass, border area between districts Shamakhi and Agsu, 40.618449°N, 48.459006°E, at 812 m elevation, < 1986. Source: collected by Aliev and Ganiev (1985). Remarks: coordinates placed by us into a suitable habitat on the pass representing distribution point Nr. 17 in Aliev and Ganiev (1985). Individual-ID: **Ver151**

-107 **Refined**: Böyük Kangarli (Kangerli, Kengerli, Ismayili-Agsu), Kürdemir (Kurdamir)/Agsu, 40.532114°N, 48.268213°E, at 28 m elevation,< 1970. Source: leg. F.K. Sharifov, cit. in Alekperov and Sharifov (1969), or cited as Akhsu "region" in Aliev and Ganiev (1985). Remarks: coordinates placed by us west of Kangarli into potential habitat with grass- and bushland along the bank of Nadir Stream (mapcarta.com), representing distribution point Nr. 6 in Aliev and Ganiev (1985). If correct, this site and the one from historic locality-163 (Ahmedbeyli, Ganja) would represent the only flat lowland *Artemisia* steppe records from the Kura River flood plain, and may indicate a once much wider distribution of steppe vipers in this habitat, which now is largely degraded or destroyed by conversion into agriculture. Individual-ID: **Ver153**

-108 **Refined**: Bico (Bijo, Biko)/Agsu, 40.521582°N, 48.562021°E, at 426 m elevation, < 1970. Source: Alekperov and Sharifov (1969). Remarks: coordinates placed by us into steppes (bushes and grass) above the village. Individual-ID: **Ver341**

-109 **Refined**: Ortabulag (Ortabulaq Ayrigi), between Nüyidi and Dag Bagirli/Shamakhi, 40.510824°N, 48.627903°E, at 606 m elevation, < 1974. Source: collected by Aliev (1973) cit. in Aliev and Ganiev (1985). Remarks: coordinates placed into suitable habitat on Ortabulaq Ayrigi (mapcarta.com), between Dag Bagirli and Nuyidi; Ortabulag is also mentioned as the third locality in north-south sequence of the four localityies Karkanj-Langabiz-Ortabulag-Goylar (Alizadeh et al. 2016, Geosciences of Azerbaijan). Individual-ID: **Ver160**

-110 **New**: Acidere (Ajidere) Valley, Maraza/Gobustan, 40.558889°N, 48.765556°E, at 530 m elevation, years 1950s. Source: voucher at Zoological Institute, Baku. Remarks: coordinates placed by T. Iskenderov. Individual-ID: **Ver162**

-111 **New**: Sheikh Eyub-Acidere, Maraza/Gobustan, 40.536203°N, 48.769310°E, at 652 m elevation, June 2011. Source: obs. by T. Iskenderov. Individual-ID: **Ver340**

-112 **Refined**: vicinity of Qobustan town (= Maraza)/Gobustan, 40.490922°N, 48.910708°E, at 719 m elevation, 11 May 2012. Source: Tuniyev et al. (2013). Remarks: photo voucher by S.O. Kakunin during an entomological expedition, coordinates placed by us near and southwest of Maraza, as listed coordinates in Tuniyev et al. (2013) were erroneously ca. 40 km southwest of the town. Individual-ID: **Ver142**

-113 **New**: Jangi (Cengi, Dzhangi)/Gobustan, 40.495000°N, 49.264722°E, 357 m elevation, July 2015. Source: obs. by Anar Jafarov (Institute of Zoology, Baku), pers. comm. to T. Iskenderov. Individual-ID: **Ver338**

-114 **Refined**: hills in Pirsaat (Pirsagat) Valley north of Salyan region, Hajigabul/Absheron, 40.146828°N, 49.181396°E, 269 m elevation, < 1979. Source: N.I. Burchak-Abramovich, cit. in Alekperov (1978). Remarks: placed by us acc. to the distribution point in Alekperov (1978). However, precise locality is not certain, as latter author also placed a question mark next to that locality. Individual-ID: **Ver260**

-115 **Refined**: Karabakh Mountains, about 8 km north of Hasanriz/Tartar, 40.231001°N, 46.488431°E, about 1,997 m elevation, July 2012. Source: Tuniyev et al. 2018b with vouchers SNP1049 (Herpetological collection of the Sochi National Park, Sochi Russia) and Genbank Nr. MG543325. Remarks: coordinates are placed by us acc. to the respective distribution point in Fig. 1 of Tuniyev et al. (2018b); this specimen is indicative, that *V. renardi eriwanensis* occurs in suitable habitats east of Armenia along the Lesser Caucasus through south-western Azerbaijan and possibly connect with *V. r. eriwanensis* group "ebneri" in adjacent Iran. Individual-ID: **Ver108**

-116 **Refined**: Karabakh Plateau, Lachin District, 39.730260°N, 46.213291°E, from 2,000–3,000 m elevation, < 1983. Source: Alekperov (1982). Remarks: coordinates are placed by us to represent suitable habitat/elevation of subalpine meadow; 3–4 snakes per ha Alekperov (1982). Individual-ID: **Ver146**

-117 **Refined**: Karabakh Mountains, Istisu/Kalbajar, 39.946028°N, 45.953585°E, 2,361 m elevation,< 1979. Source: Bannikov (1977), Alekperov (1978, 1982). Remarks: coordinates are placed by us to a suitable habitat west of the locality, a region with continuous rock slides on grassy slopes for several kilometers. Individual-ID: **Ver147**

-118 **Refined**: Karabakh Mountains, above Seyidlyar/Kalbajar (Kelbeijer), 40.265938°N, 46.036028°E, 2,359 m elevation, 20 June 2021. Source: leg. Ilgar Guliyev (Kuliev) with video clip (pers. data transf.), listed in Iskenderov (2022). Individual-ID: **Ver357**

-119 **Refined**: Karabakh Mountains, Arisu/Gadabay (= Kedabek), Azerbaijan, 40.503182°N, 45.676893°E, at 1,741 m elevation, < 1986. Source: Aliev and Ganiev (1985). Remarks: only name was mentioned, so coordinates placed into a suitable habitat close to the center of the district and west of Arisu. Individual-ID: **Ver166**

See recently added localities from Azerbaijan at "Late Additions" below

Armenia

A point distribution map with localities for Armenia (together with Azerbaijan) is presented in Fig. S11 with information about southern localities presented in the subsequent list below. A selection of voucher photos is depicted in Fig. S13. For the mapped localities in Armenia, only a subselection of distribution points are shown; a) representing the outer limits within the country, and b) some localities representing the inner distritbution (see for more distribution points in Arakelyan et al. 2011; Aghasyan & Aghasyan 2014). Some distribution points in Aghasyan & Aghasyan (2014) are in conflict by 5–10 km with their locality listing or references in earlier studies. A request to the authors for precise data was left unresponded. These conflicting points might represent artifacts of map production or a choice of a more general display of distribution instead of exact localities, and even some intentional displacement to disguise true localities for so called conservation purposes rather than personal self-esteem reasons to a "sole finder, explorer, or therelikes". Such map localities were adjusted in accordance with consulting other references and their author(s), as well as personal experience on regional suitability of habitats.

-120 **Refined**: Paghakn, Arpi Lake/Shirak, 41.058303°N, 43.655888°E, at 2,039 m elevation, < 1997. Source: distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014), and Arakelyan et al. (2011). Remarks: coordinates placed into suitable habitat by T. Tadevosyan. Individual-ID: **Ver76**

-121 **Refined**: Pokr Sepasar, Ashotsk/Shirak, 41.044718°N, 43.803537°E, at 2,036 m elevation, 20 July 1936. Source: Chernov (1939) named as Pokr Sarjan, used also in Aghasyan (1996), Aghasyan & Aghasyan (2014), and Arakelyan et al. (2011). Remarks: coordinates placed into suitable habitat by T. Tadevosyan and K. Mebert. Individual-ID: **Ver78**

-122 **Refined**: Musyelyan, Ashotsk/Shirak, 41.000425°N, 43.957903°E, ca. 2,142 m elevation, < 1997. Source: distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014), and Arakelyan et al. (2011). Remarks: coordinates placed into suitable habitat by T. Tadevosyan and K. Mebert. Individual-ID: **Ver70**

-123 **Refined**: near Jajur-Pass, Gyumri/Shirak, 40.870424°N, 43.982862°E, at 1,934 m elevation, < 1997. Source: Darevsky (1957). Remarks: reflect also a distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014, although displaced) and Arakelyan et al. (2011); coordinates placed into a suitable habitat by T. Tadevosyan acc. to the original description as being close to the pass from Jajuravan. Individual-ID: **Ver77**

-124 **Refined**: Shenavan (Kurasli), Spitak/Lori, 40.871717°N, 44.249900°E, ca. 1,669 m elevation, < 1997. Source: M. Arakelyan (pers. data transf.). Remarks: reflects also a distribution citation/point in Aghasyan (1996), Aghasyan & Aghasyan (2014), and Arakelyan et al. (2011). Individual-ID: **Ver83**

-125 **New:** 4.1 km north Tsilkar/Argatsotn, in a valley leading to Jrashen/Lori, 40.758100°N, 44.201700°E, at 2,040 m elevation, < 1997. Source: M. Kalashyan (pers. data transf.) via M. Arakelyan. Remarks: reflect also a distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014). Individual-ID: **Ver203**

-126 **New**: 2.3 km north Amberd Church, southern versant of Mt. Aragats/Aragatsotn, 40.406693°N, 44.233338°E, n = 2 within 420 from coordinates, between 2,236–2,304 m elevation, 22 July 2015 (Jablonski, Fig. S13B), no date provided (Grejyan). Source: leg. Daniel Jablonski (author) and T. Grejyan (pers. data transf. to author T. Tadevosyan). Individual-IDs: **Ver112, Ver263**

-127 **New**: around Amberd Church, far southern slope of Mt. Aragats, 4.6 km north Orgov/Aragatsotn, 40.388091°N, 44.224384°E, n = 2 within 230 m from coordinates, between 2,070–2,112 m elevation, 02 June 2012 (Klooiplek), no date provided (Arakelyan). Source: Klooiplek.com, a Dutch herpetological society (pers. data transf.) and M. Arakelyan (pers. data transf. to T. Tadevosyan), possibly also representing a distribution point from Mt. Aragats in Aghasyan & Aghasyan (2014). Individual-IDs: **Ver72, Ver264**

-128 **New**: Kasakh Canyon near Byurakan, Aragatsotn, 40.369131° N, 44.243719°E, at 1,762 m eleavtion, < 1997. Source: Ashot Yengibaryan (pers. data transf. to T. Tadevosyan), we include the citation in Aghasyan (1996) and distribution point in Arakelyan et al. (2011), possibly also representing a distribution point from Mt. Aragats in Aghasyan & Aghasyan (2014). Individual-ID: **Ver277**

-129 **Refined**: 5.8 km north Ghazaravan/Aragatson, 40.392928°N, 44.302741°E, at 1,994 m elevation, 07 August 2016 (Fig. S13C. Source: Artem Mouradkhanyan and his post on iNaturalist obs. 3891715. Remarks: exact coordinates obtained by Tigran Tadevosyan. Individual-ID: **Ver217**

-130 **New**: Kasakh Valley, west of Mount Ara (Arai Ler)/Aragatsotn, 40.402433°N, 44.399641°E, at 1,643 m elevation, < 1991. Source: Orlov and Tuniyev (1990). Remarks: placed by us into a rockslide along the slope of the valley (canyon) roughly reflecting the indication in the publication. Individual-IDs: **Ver355**

-131 **New**: western slope Mount Ara (Arailer)/Aragatsotn, Armenia, 40.394992°N, 44.426491°E, n = 6 within 340 m form coordinateas, between 1,872–2,117 m elevation, 22 July 1997 and 26 October 2006 (Tadevosyan), 04 June 2012 (Klooiplek). Source: Klooiplek.com, Tigran Tadevosyan. Individual-IDs: **Ver73, Ver184, Ver191–194**

-132 **Refined**: southern slope Mt. Arailer, Aragatsotn, 40.400359°N, 44.439901°E, at 2.152 m elevation, < 2012. Source: Arakelyan et al. (2011), and M. Arakelyan (pers. data transf. to Tigran Tadevosyan), possibly also representing a distribution point from the Mt. Arai ler area in Aghasyan & Aghasyan (2014). Individual-ID: **Ver265**

SUPPLEMENTAL FIGURE S13. *Vipera r. eriwanensis* from Armenia with localities depicted on map in Fig. S11; in red and **bold** individual IDs: A) individual **Ver362** from north of Marmarik Reservoir, Pambak Ridge locality-158; B) **Ver112** from north of Amberd Church (locality-126); C) **Ver217** from north Ghazaravan, Aragatson (locality-129); D) **Ver367** from Mount Gutanasar, Fantan (locality-141); E and F) **Ver113** and **Ver114** from south of Nshkhark (locality-178). (A photographed by Mikhail Rusin, B, E, and F by Daniel Jablonski , C by Artem Mouradkhanyan, D by Justin M. Elden).

-133 **New**: southern slope of Mount Ara (Arailer)/Aragatsotn, 40.392698°N, 44.457451°E, at 2,291 m elevation, 22 July 1997. Source: Tigran Tadevosyan. Individual-ID: **Ver190**

-134 **Refined**: west of Saralanj, southeastern slope Mount Ara (Arailer)/Kotayk, 40.390443°N, 44.490834°E, at 1,818 m elevation, May 1972. Source: I. Darevsky and voucher ZISP 21138.2 (Zoological Museum of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg). Remarks: coordinates placed by us into a suitable habitat within the center of one of three distribution points around Mt. Arailer in Aghasyan & Aghasyan (2014). Individual-ID: **Ver266**

-135 **New**: Arzakan-Teghenik, Hrazan/Kotayk, 40.440265°N, 44.581439°E, at 1,770 m elevation, 07 July 2001. Source: Tigran Tadevosyan. Individual-ID: **Ver214**

-136 **Refined**:Teghenik (Tghit)/Kotayk, 40.433364°N, 44.575014°E, at 1,721 m elevation, < 1958. Source: Darevsky (1957). Remarks: coordinates placed by us into suitable habitat north of the town; it also reflects distribution points in Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al. (2011). Individual-ID: **Ver213**

-137 **New**: Karashamb/Kotayk, 40.413636°N, 44.568747°E, at 1,535 m elevation, April 2017. Source: M. Arakelyan (pers. data transf.). Individual-ID: **Ver267**

-138 **Refined**: Nurnus, Abovyan/Kotayk, 40.365293°N, 44.615118°E, at 1,532 m elevation. Source: Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al (2011). Position estimated based on the potentially suitable habitat by T. Tadevosyan. Individual-ID: **Ver275**

-139 **Refined**: Jraber, Abovyan/Kotayk, 40.356995°N, 44.646443°E, at 1,800 m elevation, < 1940. Source: Chernov (1939), Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al. (2011). Position estimated based on the potentially suitable habitat by T. Tadevosyan. Individual-ID: **Ver274**

-140 **Refined**: Mount Gutanasar, Fantan Village/Kotayk, 40.366773°N, 44.689984°E, at 2,251 m elevation, 3 June 1936. Source: leg. Izmailov, specimen # 638 at the Zoological Institute of the Russian Academy of Sciences (ZIN RAS) in Saint Petersburg, Russia, Chernov (1939), Darevsky (1957), Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al. (2011), Tuniyev et al. (2018a, b). Remarks: coordinates evaluated by T. Tadevosyan. Individual-ID: **Ver276**

-141 **New:** 1.9 km southwest of Mount Gutanasar, Kaputan Village/Kotayk, 40.348481°N, 44.679783°E, at 1,907 m elevation, 16 May 2018 (Fig. S13D). Source: leg. Justin Elden. Individual-IDs: **Ver367**

-142 **Refined:** slope above Hatis Village/Kotayk, 40.335000°N, 44.721000°E, multiple specimens, around 2,160 m elevation, 15 May/08 August 2006. Source: voucher specimens ROM 406xx (Royal Ontario Museum ; xx = variable nrs.); leg. R.W. Murphy, N.L. Orlov, A. Aghasyan, A. Malkhasyan, L. Lowcock; data on gbif.org incl. coordinates, one photo voucher in Tuniyev et al. (2009, 2019). Individual-IDs: **Ver256**

-143 **Refined**: on Mt. Hatis, southeast of Kaputan/Kotayk, 40.314927°N, 44.713086°E, at 2,206 m elevation. Source: Darevsky (1957). Remarks: coordinates placed by K. Mebert east end of town within a distribution point in Darevsky (1957). Individual-ID: **Ver167**

-144 **New**: Mount Hatis, west of Zovashen/Kotayk, 40.306849°N, 44.730796°E, n = 3 within 500 m from coordinates, between 2,213–2,447 m elevation, 02 June 1998, 04 October 2006, 13 June 2007. Source: Tigran Tadevosyan. Individual-IDs: **Ver189, Ver195, Ver212**

-145 **New**: Gegham Mountains, northeast Sevaberd/Kotayk, 40.293111°N, 44.833274°E, n = 2, at 2,358 m elevation, 26 May 1996. Source: Tigran Tadevosyan. Individual-ID: **Ver196**

-146 **Refined:** Geghashen, Abovyan/Kotayk, 40.241600°N, 44.7562838°E, at 1,833 m elevation, < 2012. Source: Arakelyan et al (2011). Remarks: coordinates placed by us into suitable habitat 2.5 km east of the town by M. Arakelyan. Individual-ID: **Ver293**

-147 **New**: Kathnanush, Gegham Mountains southeast of Sevaberd/Kotayk, 40.237777°N, 44.849682°E, at 2,699 m elevation, 12 August 1996. Source: Tigran Tadevosyan. Individual-ID: **Ver188**

-148 **New**: hill east of Gegharkunik town/Gegharkunik, 40.250694°N, 45.160528°E, at 2,241 m elevation, no date provided. Source: T. Ggejyan (pers. data transf.). Individual-IDs: **Ver268**

-149 **Refined**: northeast old (abandoned) airstrip at Gavar, Gegharkunik, 40.383205°N, 45.091162°E, at 2,012 m elevation, < 2015. Source: distribution point in Aghasyan & Aghasyan (2014). Individual-IDs: **Ver269**

-150 **Refined**: Chkalovka, Sevan/Gegharkunik, 40.494438°N, 44.967031°E, at 2,015 m elevation, < 1940. Source: Chernov (1939), Darevsky (1957). Remarks: coordinates placed by us into suitable habitat 1.7 km southwest of the town, it also reflects a distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014), and in Arakelyan et al. (2011). Individual-IDs: **Ver211**

-151 **Refined**: Lchashen/Gegharkunik, 40.488795°N, 44.919881°E, at 2,001 m elevation, < 1940. Source: Chernov (1939). Remarks: coordinates placed by us into suitable habitat southwest of the town, also reflect a distribution point in Darevsky (1957) and Arakelyan et al. (2011). Individual-ID: **Ver204**

-152 **Refined**: Gomadzor, Sevan/Gegharkunik, 40.565116°N, 44.933716°E, at 2,221 m elevation, < 1958. Source: Darevsky (1957). Remarks: the locality also reflect a distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014), but coordinates placed by us into suitable habitat closer to the residential areas of Gomadzor. Individual-ID: **Ver205**

-153 **Refined**: southwest of Hrazdan/Kotayk, 40.526939°N, 44.760653°E, at 1,830 m elevation, < 1940. Source: Chernov (1939), Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al. (2011). Remarks: coordinates placed by us into suitable habitat on the hill southwest of the town; it reflects also distribution points in sourced references. Individual-ID: **Ver270**

-154 **Refined**: west Tzaghkadzor, Hrazdan/Kotayk, 40.518773°N, 44.667372°E, at 2,341 m elevation, < 1958. Source: Darevsky (1957). Remarks: coordinates placed by us into suitable habitat 5 km west of the twon, near the distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014), whereas corresponding distribution point in Arakelyan et al. (2011) is closer to the town. Individual-ID: **Ver197**

-155 **Refined**: above Hankavan (Miskhana)/Kotayk, 40.641565°N, 44.503572°E, n = 2 around 2,162 m elevation, 04 August 1930, 08 June 2007. Source: Chernov (1939), Aghasyan (1996), Aghasyan & Aghasyan (2014), Roberto Sindaco in Arakelyan (2011) and iNaturalist obs. 582961, incl. coordinates confirmed by M. Arakelayn (pers. data transf.). Individual-ID: **Ver115**

-156 **New**: Pyunik (Akunk), Hrazdan/Kotayk, 40.616509°N, 44.583502°E, at 1,946 m elevation, 23 July 2002. Source: Tigran Tadevosyan. Individual-IDs: **Ver185**

-157 **New**: valley north Artavaz, Hrazdan/Kotayk, 40.638599°N, 44.573635°E, n = 3, within 220 m from coordinates, between 2,093–2,192 m elevation, 24 July 2002, 01 June 2009. Source: T. Tadevosyan, M. Arakelyan (pers. data transf.), and Klooiplek, a Dutch herpetological society (pers. data transf.). Individual-IDs: **Ver71, Ver186, Ver261**

-158 **New**: valley north of Marmarik Reservoir, Pambak Ridge, 40.651979°N, 44.557984°E, at 2,304 m elevation, 03 July 2015 (Fig. S13A). Source: Mikhail Rusin, posted in Ukrainian Biodiversity Information Network https://ukrbin.com/. Individual-ID: **Ver362**

-159 **Refined+New**: upper Mount Tezh, Artavaz/Kotayk, 40.654874°N, 44.576967°E, n = 3, within 370 m from coordinates, between 2,378–2,665 m elevation, 24 July 2007, 25 June 2003, 07 June 2007. Source: T. Tadevosyan, M. Arakelyan (pers. data transf.), and Klooiplek, a Dutch herpetological society (pers. data transf.) and reflecting a distribution point in Aghasyan & Aghasyan (2014). Individual-IDs: **Ver37, Ver187, Ver262**

-160 **Refined**: valley north Meghradzor, Hrazdan/Kotayk, 40.654602°N, 44.680489°E, n = 3, around 2,131 m elevation, 09 May 2019. Source: Pieter Dhaluin listed in gbif.org and observation.org. Individual-ID: **Ver255**

-161 **Refined**: above valley north Meghradzor, Hrazdan/Kotayk, 40.668350°N, 44.684105°E, at 2,525 m elevation, 28 August 2015. Source: Serda Ozbenian, obscured locality on iNaturalist (obs.2713156); exact coordinates obtained by T. Tadevosyan. Individual-ID: **Ver216**

-162 **Refined**: Tsovagyugh, Sevan/Gegharkunik, 40.636745°N, 44.970734°E, ca. 2,038 m elevation, < 1997. Source: Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al. (2011). Remarks: a periphery locality showing the currently known range limit within Armenia. Individual-ID: **Ver84**

-163 **Refined:** Canghal, northern shore Lake Sevan, Gegharkunik, 40.558000°N, 45.194000°E, > 10 specimens around 1,998 m elevation, 13 August 2006. Source: voucher specimens ROM 40699-703 (Royal Ontario Museum); leg. R.W. Murphy, N.L. Orlov, A. Aghasyan, A. Malkhasyan, L. Lowcock; data on gbif.org incl. coordinates. Individual-ID: **Ver257**

-164 **Refined**: Drakhtik (Tokhluja), Chamabrak/Gegharkunik, 40.578683°N, 45.208500°E, n = 2, around 2,152 m elevation, 19./20. May 2012. Source: S. Tuniyev, vouchers SNP890 (Herpetological Collection of the Sochi National Park, Sochi Russia) and Genbank MG543319, Aghasyan & Aghasyan (2014), Tuniyev et al. (2013, 2018a, b), Arakelyan et al. (2011), and M. Arakelyan (pers. data transf.). Individual-ID: **Ver138**

-165 **Refined**: slopes of neighboring Chaldag and Chaldash Mts., northeast of Drakhtik, Gegharkunik, 40.590000°N, 45.255000°E, n = 8 adults (+ vouchered embryos), around 2,300 m elevation, 13 August 2006. Source: voucher specimens ROM 40704-8 (Royal Ontario Museum); leg. R.W. Murphy, N.L. Orlov, A. Aghasyan, A. Malkhasyan, L. Lowcock; data on gbif.org incl. coordinates. Individual-ID: **Ver258**

-166 **Refined**: Chambarak and Areguni Mts. (Arangunyi Ridge), Chamabrak/Gegharkunik, 40.607813°N, 45.314422°E, ca. 1,968 m elevation, June 1992. Source: Nilson and Andrén (2001) and their reference to the Arangunyi Ridge (Areguni Mts.). Remarks: coordinates placed by us into suitable habitat 3.4 km northwest and above the town; it also reflects a distribution point in Arakelyan et al. (2011). Individual-ID: **Ver85**

-167 **New:** Aghberk/Gegharkunik, 40.541556°N, 45.267556°E, at 2,072 m elevation, no date provided. Source: T. Grejyan (pers. data transf. to T. Tadevosyan). Remarks: coordinates placed by us into nearest suitable habitat, 1.8 km northwest of the town. Individual-ID: **Ver271**

-168 **Refined**: Shorzha (Shoghakat)/Gegharkunik, 40.506479°N, 45.267358°E, at 2,004 m elevation, 02 September 2027. Source: holotype of *V. r. eriwanensis* Reuss, 1933, ZMB 55160 (Zoological Museum of Berlin, Germany), also in Krecsak (2007). Remarks: leg. S.G. Ramme-Richter, coordinates placed by us into nearest suitable habitat, 700 m northwest of the town; it also reflects the potential site of the distribution points in Chernov (1939), Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al. (2011). Individual-ID: **Ver206**

-169 **Refined**: Mt. Adatapa, Shorzha (Shoghakat)/Gegharkunik, 40.488654°N, 45.296124°E, 2,038 m elevation, 24 May 1922. Source: Chernov (1939). Remarks: coordinates placed by us into suitable habitat of the named mountain, 2.3 km southeast of the town; it also reflects distribution points in Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al. (2011). Individual-ID: **Ver278**

-170 **Refined**: beach front 5 km southeast Shorza/Gegharkunik, 40.463938°N, 45.307072°E, at 1,915 m elevation, 27 June 2005. Source: M. Arakelyan (pers. data transf.); also in Arakelyan (2011). Remarks: coordinates place this specimen into the beach vegetation. Individual-ID: **Ver294**

-171 **Refined**: Artanish, Chamabrak/Gegharkunik, 40.497949°N, 45.356264°E, at 2,286 m elevation, < 1940. Source: Chernov (1939). Remarks: coordinates placed by us into suitable habitat next above the village; it also reflects distribution citation/points in Darevsky (1957), Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al. (2011). Individual-ID: **Ver207**

-172 **Refined**: Jil, Gegharkunik, 40.463250°N, 45.424767°E, at 1,957 m elevation, < 2012. Source: Remarks: coordinates placed by us into suitable habitat 1.5 km west of the village; it reflects also a distribution point in Arakelyan et al. (2011). Individual-ID: **Ver295**

-173 **Refined**: Tsapatagh (Babadjan), Vardenis/Gegharkunik, 40.423211°N, 45.475206°E, n = 9 around 2,200 m elevation, 30 August 1927, 7 July 1928. Source: specimen No 606 (4 individuals, 1927), and No 600 (5 individuals, 1928). Source: Chernov (1939). Remarks: coordinates placed by us into suitable plateau habitat above the town, but specimens may were collected in various sites around the town; it reflects also a distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014). Individual-ID: **Ver208**

-174 **Refined**: Daranak-Pambak/Gegharkunik, 40.364200°N, 45.573500°E, at 1,999 m elevation, < 1997. Source: Aghasyan (1996), Aghasyan & Aghasyan (2014), Arakelyan et al. (2001). Remarks: coordinates placed by us into suitable habitat next to Daranak; it reflect also distribution points in Aghasyan (1996), Aghasyan & Aghasyan (2014), and Arakelyan et al. (2011) being closer to that village than Pambak. Individual-ID: **Ver296**

-175 **Refined**: Geghamasar (Shishkaya River Canyon), Vardenis/Gegharkunik, 40.323656°N, 45.695552°E, at 2,268 m elevation, 19 June 1923. Source: voucher specimen No 601 ZIN Yerevan (ZIRA today: Scientific Center of Zoology and Hydroecology of the National Academy of Sciences of Republic Armenia), Chernov (1939). Remarks: coordinates placed by us into suitable habitat 2 km northeast of the village; it also reflects a distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014). Individual-ID: **Ver209**

-176 **Refined**: Kutakan (Janahmed-Gjunashli), Vardenis/Gegharkunik, 40.274402°N, 45.832966°E, at 2,267 m elevation, 11 August 1927. Source: voucher specimen 596 ZIN Yerevan (ZIRA today: Scientific Center of Zoology and Hydroecology of the National Academy of Sciences of Republic Armenia), Chernov (1939). Remarks: coordinates placed by us into suitable habitat above the village; it reflect also a distribution citation/point in Darevsky (1957), Aghasyan (1996), Aghasyan & Aghasyan (2014). Individual-ID: **Ver210**

-177 **Refined**: Ayrk (Dashkend)/Gegharkunik, 40.111706°N, 45.766652°E, at 2,225 m elevation, < 1997. Source: Aghasyan (1996), Aghasyan & Aghasyan (2014). Remarks: coordinates placed by us into suitable habitat 2.4 km west of the village; it also reflects a distribution point (though displaced east) in Aghasyan (1996), Aghasyan & Aghasyan (2014). Individual-ID: **Ver86**

-178 **New:** 3 km south Nshkhark, Martuni/Gegharkunik, 39.974250°N, 45.239270°E, n = 2, at 2,291 m elevation, 18 July 2015 (Fig. S13E and F). Source: Daniel Jablonski (pers. data transf.). Individual-IDs: **Ver113–114**

-179 **Refined**: Vardenyats Pass, Martuni/Gegharkunik, 39.950566°N, 45.235131°E, at 2,374 m elevation, 06 August 2019. Source: Rafa Benjumea (pers. data transf.) and posted on iNaturalist. Remarks: skeleton with well-maintained skin present. Individual-ID: **Ver116**

-180 **Refined:** Geghard (Monastery), Abovyan/Kotayk, 40.144073°N, 44.817726°E, at 2,006 m elevation, < 1997. Source: Aghasyan (1996), Aghasyan & Aghasyan (2014), and Arakelyan et al (2011). Remarks: coordinates placed into suitable habitat by T. Tadevosyan. Individual-ID: **Ver272**

-181 **Refined**: above Goght, Artashat/Ararat, 40.130936°N, 44.823532°E, at 2,106 m elevation, 21 October 2012. Source: Artem Mouradkhanyan on iNaturalist obs. 137632, exact coordinates obtained by Tigran Tadevosyan. Individual-ID: **Ver215**

-182 **Refined**: above Kakavaberd (Keghi Fortress), Khosrov Forest Reserve, Artashat /Ararat, 40.077715°N, 44.879223°E, n = 5, ca. 2,175 m elevation, June 2011. Source: vouchers ZIRA 40715/17/13/18/14 (Scientific Center of Zoology and Hydroecology of the National Academy of Sciences of Republic Armenia, Yerevan, Armenia), A. Malkhasjan in Tuniyev et al. (2012, 2018a, b), Aghasyan & Aghasyan (2014). Remarks: coordinates placed by us to a potential habitat within a rocky/meadow ridge. Individual-ID: **Ver74**

-183 **Refined**: Yazdi Camp (Khosrov Forest St. Res), Vedi/Ararat, 40.021467°N, 44.987722°E, at 2,372 m elevation, 06 June 2007. Source: a record by Roberto Sindaco on iNaturalist obs. 582948, also mapped in Arakelyan et al. (2011), and reflecting a displaced distribution point in Aghasyan (1996), Aghasyan & Aghasyan (2014). Individual-ID: **Ver155**

-184 **New**: Khosrov State Reserve, Ararat, 40.003183°N, 44.977350°E, at 1,984 m elevation, year 2019. Source: M. Arakelyan (pers. data transf.). Individual-ID: **Ver297**

-185 **Refined**: near Asni (a couple of abandoned houses [mindat.org], above and 4 km east from Surenavan and Amash), Vedi/Ararat, 39.830117°N, 44.866806°E, n = 2 around 2,210 m elevation, 8/18 May 1939. Source: ZIRA 708 in Dahl (1945, 1949), also in Darevsky (1957), Aghasyan (1996), Aghasyan and Aghasyan (2014), and Tuniyev et al. (2018a, b). Remarks: coordinates placed by us into suitable habitat ca. 4 km northeast and above Asni; it also reflects distribution points in Aghasyan (1996), Aghasyan & Aghasyan (2014). The two specimens may were collected a little lower near northwest facing rock slides. Individual-ID: **Ver198**

-186 **Refined**: Mt. Urtz Ridge, Vedi/Ararat, 39.818327°N, 44.902716°E, n = 2, around 2,264 m elevation, 10 May 1950. Source: ZIRA 812 (Scientific Center of Zoology and Hydroecology of the National Academy of Sciences of Republic Armenia), P.P. Gambarjan, Aghasyan (1996), Aghasyan & Aghasyan (2014), Tuniyev et al. (2018a, b). Remarks: coordinates placed by us into suitable habitat on the ridge ca. 5 km northwest of Tigranashen, represents also the displaced record at Yeraskh in Arakelyan et al. (2011). Individual-ID: **Ver129**

-187 **Refined**: south of Urtsadzor, lower Mt. Urtz Ridge, Vedi/Ararat, 39.861424°N, 44.800416°E, at 1,593 m elevation, 17 June 2014. Source: photo voucher by Vahe Martirosyan on iNaturalist, detailed data request by Tigran Tadesvosyan. Individual-ID: **Ver339**

-188 **New**: Hors/Vayots Dzor, 39.844433°N, 45.220656°E, at 2,074 m elevation, year 2018. Source: M. Arakelyan (pers. data transf.). Individual-ID: **Ver298**

-189 **Refined**: Kechut, Jermuk/Vayots Dzor, 39.797732°N, 45.670518°E, at 2,001 m elevation, Sept 2015. Source: P.-A. Crochet, Mxitar Arshakyan (pers. data transf.) as Treweek Environmental Consultants (TEC) in Treeweek (2015). Remarks: coordinates placed by us to a potential habitat within a rocky/meadow ridge. Individual-ID: **Ver79**

-190 **Refined**: Jermuk south, Jermuk/Vayots Dzor, 39.764478°N, 45.710691°E, ca. 2,590 m elevation, September 2015. Source: P.-A. Crochet, Mxitar Arshakyan in Treeweek (2015). Individual-ID: **Ver80**

-191 **New**: Mount Amulsar (Gora Kysyr), Saravan, Jermuk/Vayots Dzor, 39.734565°N, 45.723875°E, multiple specimens around 2,650 m elevation, years 2010–2020. Source: T. Grejyan, M. Arakelyan (pers. data transf.). Remarks: coordinates evaluated by Tigran Tadevosyan. Individual-ID: **Ver180**

-192 **New:** Mt. Aghiarghan, 3.3 km northeast of Artavan/Vayotz Dzor, 39.669186°N, 45.626369°E, at 2,046 m elevation, year 2019. Source: M. Arakelyan (pers. data transf.). Individual-ID: **Ver299**

-193 **Refined**: 6.8 km northwest Oghbin-Khndzorut, Jermuk Municipality/Vayots Dzor, 39.601414°N, 45.351442°E, at 2,173 m elevation, < 1946. Source: Dahl (1945, 1949). Remarks: coordinates evaluated by Tigran Tadevosyan. Individual-ID: **Ver199**

-194 **Refined**: 2.8 km northwest Khndzorut, Jermuk/Vayots Dzor, 39.563892°N, 45.372200°E, at 1,851 m elevation, < 1946. Source: Dahl (1949), reflects distribution points in Arakelyan et al. (2011) and Aghasyan (1996), Aghasyan & Aghasyan (2014). Remarks: coordinates evaluated by Tigran Tadevosyan. Individual-ID: **Ver202**

-195 **Refined**: South of Gorayk/Syunik, 39.633202°N, 45.715403°E, at 2,599 m elevation, < 2015. Source: distribution point in Aghasyan & Aghasyan (2014). Remarks: coordinates placed by us into the center of the mapped distribution point, east of the border between Syunik and Vayots Dzor regions (= provinces), which also represnts a suitable rocky steppe habitat acc. to our evaluation. Individual-ID: **Ver273**

-196 **Refined**: Sisian/Syunik, 39.521346°N, 46.058654°E, at 1,730 m elevation, < 2019. Source: voucher ZIRA n/n (Scientific Center of Zoology and Hydroecology of the National Academy of Sciences of Republic Armenia), Genbank MG543326, by Aghasyan in Tuniyev et al. (2018a, b). Remarks: placed by us into a suitable habitat 1 km east from the outskirt of Sisian, northeast of a corresponding distribution point in Aghasyan & Aghasyan (2014), most likely representing this locality. Individual-ID: **Ver109**

-197 **Refined**: between Getatagh (Getatakh) and Lor, Sisian/Syunik, 39.427864°N, 46.139639°E, n = 5, around 2,259 m elevation, 12 May 2006. Source: vouchers ZIRA 40716/21/19/-/20, by A. Malkhasjan in Tuniyev et al. (2012, 2018a, b), northwest of a distribution point in Aghasyan & Aghasyan (2014), most likely representing this locality. Remarks: coordinates placed by us to a potential plateau habitat within a rocky/meadow ridge west between the mentioned villages. Individual-ID: **Ver75**

-198 **Refined**: slope of Katar Mt., above Giratakh Village (Bargushat Ridge), Kapan/Syunik, 39.247224°N, 46.266721°E, n = 4, around 1,940 m elevation, 11 May 2012. Source: B. Tuniyev and A. Malkhasjan in Aghasyan & Aghasyan (2014) and Tuniyev et al. (2018a, b); vouchers SNP894 (Herpetological Collection Sochi National Park, Russia) and ZIRA n/n (Scientific Center of Zoology and Hydroecology of the National Academy of Sciences of Republic Armenia) and Genbank Nr. MG543320/21. Remarks: coordinates placed by us to a potential habitat above the named village according to the description in the articles, east of a distribution point in Aghasyan & Aghasyan (2014), most likely representing this locality. Individual-ID: **Ver107**

See recently added localities from Armenia at “Late Additions” below

Nakhichevan, southeastern Azerbaijan

Records from the exklave Nakhichevan of far southwestern Azerbaijan are listed below. They represent the continuous distribution from adjacent western Armenia.

-199 **Refined**: 6.7 km south Havus, on Lizbirt-Garagush plateau, Babek/Nakhichevan, 39.545100°N, 45.268450°E, at 2,188 m elevation, 05 October 2011. Source: leg. A. Mammadov, listed as *V. dinniki* of location point 13. in Mammadov and Bayramov (2015), however, only *V. renardi eriwanensis* occurs in Nakhichevan; coordinates herein adjusted by A. Mammadov. Individual-ID: **Ver291**

-200 **Refined**: environment of Kjukju (Kükü), near Lake Kanligöl (Qanligol), Shahbuz/Nakhichevan, 39.563602°N, 45.659531°E, n = 3 within ca. 700 m from coordinates, around 2,500 m elevation, 11 July 1946, 26 July 1947, and more. Source: Azfan 1947, cit. in Aliev and Ganiev (1985) with vouchers at Institutes of Zoo. Acad. Sciences, Azerbaijan and Armenia, citations in Alekperov (1970, 1978, 1982), Mammadov and Bayramov (2015). It also refers to sites Nr. 7 and 8 in Aliev and Ganiev (1985), and location point Nr. 1 in lower inset of Fig. 2 in Iskenderov et al. (2023). Individual-IDs: **Ver36, Ver148, Ver154**

-201 **Refined**: Lower Batabat Lake, Shahbuz/Nakhichevan, 39.540706°N, 45.786084°E, at 2,133 m elevation, < 1986. Source: pers. obs. by Aliev and Ganiev (1985); yet likely sampled during the years 1970–1973. Remarks: coordinates placed northeast, next to the lake. Individual-ID: **Ver164**

-202 **Refined**: northeast of 3rd, upper Batabat Lake, Zorbulak, Shahbuz/Nakhichevan, 39.540869°N, 45.805737°E, n = 3 within 100 around coordinates, between 2,229–2,247 m elevation, 14 April 2014 and 26 May 2021 (Fig. S14). Source: Mammadov and Bayramov (2015), but coordinates herein adjusted by A. Mammadov, incl.

SUPPLEMENTAL FIGURE S14. Two *Vipera r. eriwanensis* from locality-202 at Upper Batabat Lake, Shahbuz District, Nakhichevan, Azerbaijan (map in Fig. S11); individual IDs **Ver368** and **Ver280** (inset). (Photographed by Arzu Mammadov).

photo vouchers, and posted as location point 6, but listed in writing as location point 5, in lower inset of Fig. 2 in Iskenderov et al. (2023). Individual-IDs: **Ver279–Ver280, Ver368**

-203 **Refined**: above and north of Kolani, Shahbuz/Nakhichevan, 39.480103°N, 45.676173°E, at 1,846 m elevation, year 1973. Source: pers. coll. by Aliev (1973), Aliev and Ganiev (1985). Remarks: location name changed from Bichenek (Aliev 1973) to Kolani (Aliev and Ganiev 1985), and location point Nr. 2-Bichenek in lower inset of Fig. 2 in Iskenderov et al. (2023). Individual-ID: **Ver163**

-204 **Refined**: 2.7 km northeast Gömür or Gemür, Shahbuz/Nakhichevan, 39.478028°N, 45.778028°E, at 2,186 m elevation, 18 July 2015. Source: Mammadov and Bayramov (2015). It is posted as location point 5 in lower inset of Fig. 2 in Iskenderov et al. (2023), but listed in writing as location 6. with false coordinates. These coordinates are herein adjusted by A. Mammadov. Individual-ID: **Ver281**

-205 **Refined**: Khezinedere, 6.4 km north of upper Arafsa town limit, Jolfa//Nakhichevan, 39.361306°N, 45.793028°E, at 2,671 m elevation, 24 May 2014. Source: Mammadov and Bayramov (2015), but coordinates herein adjusted by A. Mammadov. It also posted as location point 7, but with the coordinates of location point 5, in lower inset of Fig. 2 in Iskenderov et al. (2023). Individual-ID: **Ver282**

-206 **Refined**: 7.8 km east of Lekedakh, Ordubad/Nakhichevan, 39.300028°N, 45.924111°E, at 2,783 m elevation, 11 August 2011. Source: Mammadov and Bayramov (2015), but coordinates herein adjusted by A. Mammadov. Individual-ID: **Ver283**

-207 **Refined**: Gogyol (Goygol, Geygyol) plateau, Ordubad/Nakhichevan, 39.215277°N, 45.975704°E, n = 2 within 450 m from coordinates, at 2,984–3,107 m elevation, 18 July 2015 and 14 July 2018. Source: Mammadov and Bayramov (2015), but coordinates herein adjusted by A. Mammadov. It also replaces coordinates and misplaced location points Nr. 8 and 9 in lower inset of Fig. 2 in Iskenderov et al. (2023). Individual-IDs: **Ver284–Ver285**

-208 **New**: east of Nasrivaz, lower Gazangoldag, Ordubad/Nakhichevan, 39.171519°N, 45.951383°E, at 2,298 m elevation, 14 July 2018. Source: Arzu Mammadov. Individual-ID: **Ver286**

-209 **Refined**: above Paragacay (southern flank of Mount Kapudjugh), Ordubad/Nakhichevan, 39.111661°N, 45.982658°E, at 2,517 m elevation, 16 August 2011. Source: Mammadov and Bayramov (2015), but coordinates herein adjusted by A. Mammadov. Individual-ID: **Ver149**

-210 **Refined**: Pazmari, Ordubad/Nakhichevan, 39.074536°N, 46.041072°E, at 3,110 m elevation, < 2016. Source: Mammadov and Bayramov (2015), but coordinates herein adjusted by A. Mammadov. Individual-ID: **Ver150**

-211 **Refined**: Kiçik Soyuqdağ (Little Soyuqdag), northeast Ganza (Gənzə), Ordubad/Nakhichevan, 38.974657°N, 46.098415°E, at 2,673 m elevation, 15 August 2011. Source: Mammadov and Bayramov (2015), but coordinates herein adjusted by A. Mammadov. Individual-ID: **Ver287**

-212 **New**: above Ganza (Gənzə), Ordubad/Nakhichevan, 38.951900°N, 46.074650°E, n = 2, 26 m apart, around 2,104 m elevation, 23 September 2020. Source: A. Mammadov. Remarks: coordinates situated on steep north-faced slope, subsequently confirmed with a photo taken from that site by the author, evaluated by us and found matching the coordinates. Individual-IDs: **Ver288–Ver289**

-213 **Refined**: between and below Xaşlıdağ and Böyük Soyuk peaks in Kotamchay (valley), Ordubad/ Nakhichevan, 38.926533°N, 46.104699°E, at 1,927 m elevation, 28 July 2014. Source: Mammadov and Bayramov (2015), but coordinates herein adjusted by A. Mammadov. Remarks: It also represents location point Nr. 4 in lower inset-map of Fig. 2 in Iskenderov et al. (2023). However, this location is largely misplaced in former map, as Kiçik Soyuqdağ is located ca. 40 km south of location point 9 (Gogyol Lake locality-207 above). Individual-ID: **Ver290**

See recently added localities from Nakhichevan-Azerbaijan at “Late Additions” below

Talysh Mountains, southeastern Azerbaijan

Records of steppe vipers from the Talysh Mountains in far southeastern Azerbaijan are listed below.They occur isolated from the principal known distribution of steppe vipers in central and northern Azerbaijan (Mebert et al. 2025b).

-214 **Refined**: Kelvaz/Lerik, 38.650347°N, 48.331562°E, at 1,666 m elevation, 1970–1972. Source: leg. Aliev and Ganiev (1985). Remarks: coordinates placed into suitable habitat above village Kelvaz, 13 km southeast of distribution mark Nr. 12 in Aliev and Ganiev (1985), but near the village, as mentioned by these authors. The years 1970, 1971, and 1972 were mentioned in the text regarding their field observation, likely coinciding with their most intense field time. Individual-ID: **Ver157**

-215 **Refined**: Mistan/Lerik, 38.633030°N, 48.436820°E, at 1,949 m elevation, < 1911. Source: Shelkovnikov (1910, cit. in Aliev 1973). Remarks: representing numbered location 10a ("a" refers to Shelkovnikov) in Aliev and Ganiev (1985) who mentioned village Mount Qizyurdu (Kyz Yurdu), which, however, is the name of the highest peak in ther area (> 2,410 m asl). It possibly refers to Mistan, the largest village in the mountainous proximity (5 km) of Mt. Qızyurdu on the Azerbaijan side, and best accessible by roads in the early 20st century of Shelkovnikov´s publication. The entire zone of this region (10s of km) along the border with Iran consists of mountain steppes likely suitable for steppe vipers (see more records in this list, including late additions). Coordinates were placed above the village Mistan, close to a recently confirmed locality-255 (Mebert et al. 2025a). Individual-ID: **Ver220**

-216 **Refined**: above Coni (Conu, Dzhoni, Joni)/Lerik, 38.617500°N, 48.500566°E, at 1,602 m elevation, 1970–1972. Source: leg. Aliev (1973) It refers to numbered location 13 in Aliev and Ganiev (1985), although is wrongly placed north of their numbered location 10, because Dzhoni is southeast of loc. 10). Remarks: coordinates placed into suitable habitat west and above the village, as mentioned by these authors. The years 1970, 1971, and 1972 were mentioned in the text regarding their field observation, likely coinciding with their most intense field time. Individual-ID: **Ver158**

-217 **Refined**: Qizyurdu (Kyz Yurdu)/Lerik, 38.595019°N,48. 488972°E, at 1,617 m elevation, 1970–1972. Source: representing numbered location 10b ("b" refers to material observed/collected by Aliev and Ganiev (1985), who mentioned village Kyz Yurdu, which, however, is the name of the highest peak in ther area (> 2,410 m asl), leg. Aliev and Ganiev (1985). Remarks: no village of that name could be found on historic and contemporary maps. However, the principal mountain in this region is Mt. Qizyurdu (2,437 m asl according to peakvisor.com), and Aliev and Ganiev (1985) mention the observation near the village, with Tülü being the nearest settlement with a straight distance of 3.5 km to the Qizyurdu peak. Accordingly, coordinates were placed into suitable habitat (south-faced slopes of steppes and rocks) between peak Qizyurdu and Tülü, ca. 1 km west of the village. Individual-ID: **Ver156**

See recently added localities from the Talysh Mountains, Azerbaijan at "Late Additions" below

Iran

We summarize distribution points from northwestern Iran south to central-northern Iran to understand the current status quo of distances among the sites (map in Fig. S15). The records displayed in Latifi (2000) are not used due to uncertainties about the true origin of these samples and imprecision of localities, e.g., the localities represent the home site of the snake hunters acc. to pers. data transf. received by one author herein (KR). Yet, Latifi's sites could be replaced herein by regionally (< 40 km) close and vouchered new records.

-218 **Refined**: Kantal (Komtal, Kemtal) National Park, Jolfa/East Azerbaijan, 38.816667°N, 46.166667°E, n = 2, around 1,830 m elevation, < 2012. Source: Rajabizadeh et al. (2011) and vouchers ZMGU473-474 at the Zoological Museum of Gorgan University, Iran. Remarks: coordinates in Rajabizadeh et al. (2011) point to the peak of the Kantal National Park and not Kiamaki Mountain, which is a peak ca. 25 km farther west across a depression; the Kantal specimens are about 13 km distance to the nearest *V. r. eriwanensis* in Armenia at locality-213. Individual-IDs: **Ver117–118**

-219 **New:** north Babak Khorramdin Fortress, East Azerbaijan, 38.87250°N, 46.976667°E, at 2,342 m elevation, 20 September 2008. Source: MohammadReza Ehsanimarani (pers. data transf.). Remarks: voucher photos exist, but are currently not accessible, but source person is well experienced (e.g., locality-225) and habitat is suitable. Individual-ID: **Ver407**

-220 **New:** 3.1 km southeast of Kalestan Bala/Ardabil, 38.840328°N, 46.976786°E, at 2,554 m elevation, 05 June 2020. Source: MohammadReza Ehsanimarani (pers. data transf.). Remarks: voucher photos currently not accessible, but naturalist is well experienced (e.g., locality-225) and habitat is suitable: Individual-ID: **Ver406**

-221 **Refined**: 1 km northeast Tabriz, East-Azerbaijan, 38.065411°N, 46.413269° E, at 1,739 m elevation, < 1986. Source: Latifi (1985, 1991, 2000) by providing only city´s name. Remarks: placed into a suitable habitat (steppe with small bushes and rocks, elevation > 1,700 m) just northeast of the city's periphery; also cited in Nilson and Andrén (2001). Individual-ID: **Ver386**

-222 **New**: 4.2 km southeast of Kandovan, Azar Shahr/East Azerbaijan, 37.774513°N, 46.287905°E, at 2,698 m elevation, year 2017. Source: preserved specimen at the DOE (Department of Environment) of East Azerbaijan, provided by Mr. Hajizadeh to Khosrow Rajabizadeh. Remarks: this locality serves to complement the unvouchered distribution point near Tabriz in Latifi´s publications (1985, 1991, 2000). It is part of the Sahand Protected Area. Individual-ID: **Ver125**

-223 **Refined**: northern slope of Sabalan Mountain, near Shabil, Meshkinshahr/Ardabil, 38.316667°N, 47.833334°E, at 3,058 m elevation, < 2012 . Source: Rajabizadeh et al. (2011), voucher ICSTZM7H1099 in private collection of A. Naderi. Remarks: about 57 km southwest of the steppe viper, *V. r. eriwanensis* (potentially admixed with group "ebneri") of locality-214 across the border in Azerbaijan. Individual-ID: **Ver120**

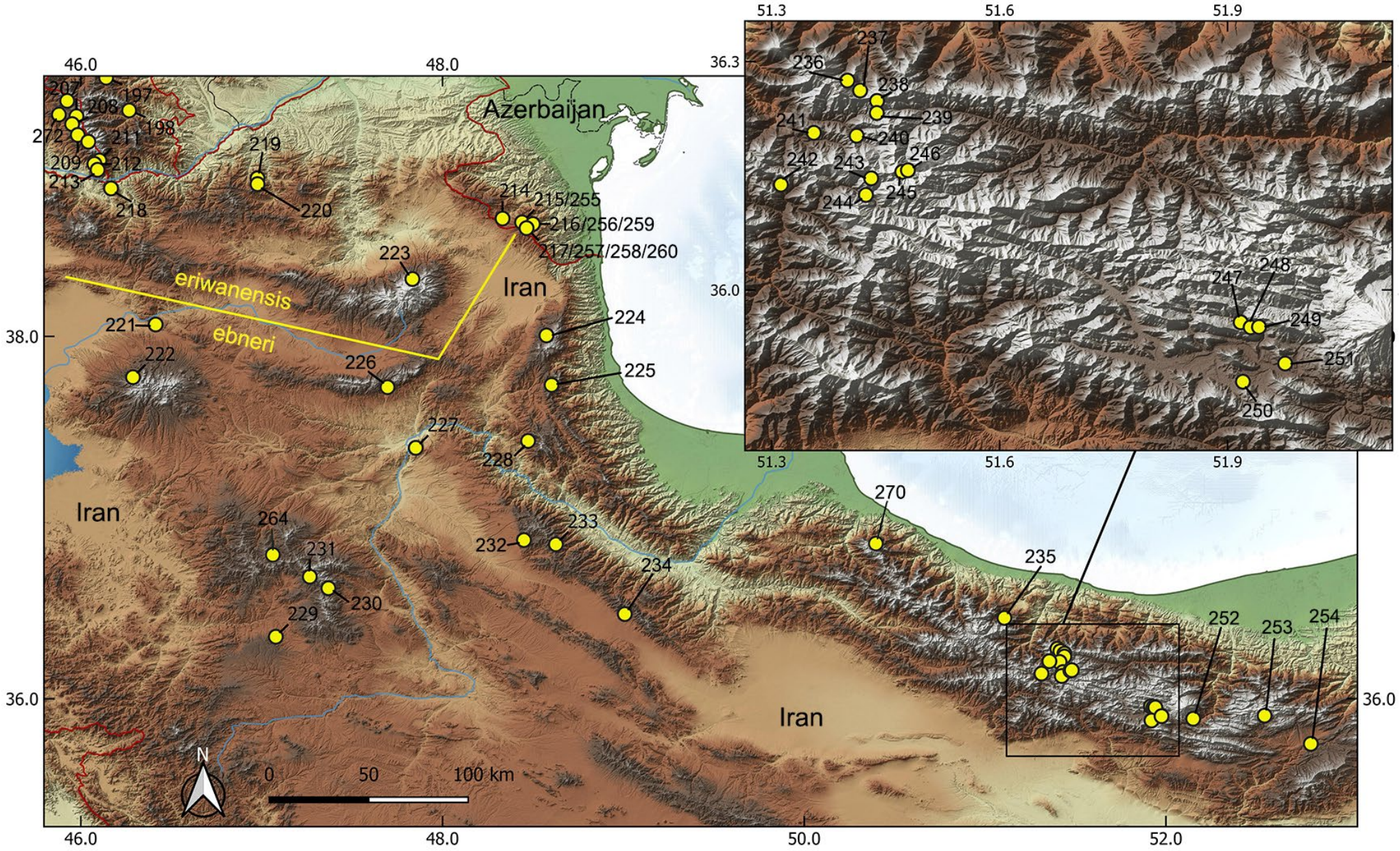
-224 **Refined**: northeastern shore of Neor Lake, Talesh/Ardabil, 38.005060°N, 48.574480°E, at 2,501 m elevation, years 2012–2013. Source: Mahtab Yazdanian (unpubl. MS and pers. data transf.) and Yazdanian et al. (2016). Remarks: the lake is part of the Lisar Protected Area. Individual-ID: **Ver224**

-225 **New:** 3.1 km southeast of Kalestan Bala/Ardabil, 37.731667°N, 48.602778°E, at 2,554 m elevation, 05 June 2020 (Fig. 8B main article). Source: MohammadReza Ehssani (pers. data transf.). Remarks: photos are posted on www.jungledragon.com/image/97373/vipera_eriwanensis_ebneri.html. Individual-ID: **Ver394**

-226 **New**: 2.3 km north of Sorkheh Hesar (north Miyaneh), Sarab/East Azerbaijan, 37.719436°N, 47.695609°E, at 2,115 m elevation, year 2017. Source: pers. obs. of Mr. Hajizadeh, ranger of the DOE of East Azerbaijan, provided to Khosrow Rajabizadeh. Remarks: this locality serves to complement the unvouchered distribution point near Miyaneh in Latifi´s publications (1985, 1991, 2000). Individual-ID: **Ver126**

-227 **Refined**: east of Miyaneh/East-Azerbaijan, 37.384513°N, 47.851866°E, at 1,835 m elevation, < 1986. Source: Latifi (1985, 1991, 2000) by providing only city´s name. Remarks: placed by us into a suitable steppe habitat on nearest mountain 12 km east of the city's periphery; also cited in Nilson and Andrén (2001). Individual-ID: **Ver387**

-228 **Refined**: near Susahab village, Khalkhal/Ardabil, 37.422636°N, 48.472937°E, at 1,854 m elevation, < 2012 . Source: coordinates are at the same elevation as those provided in Rajabizadeh et al. (2011), but placed 850 m farther northeast at the southern slope, reflecting a more suitable rocky steppe habitat; voucher ICSTZM7H1098 in private collection of A. Naderi. Remarks: Rajabizadeh et al. (2011) suggested that based on the lack of supralabial patterning and scalation, this specimen is regarded as *V. r. eriwanensis* "ebneri" group and sympatric with *V. r. eriwanensis* in the Azerbaijan Mountains of East Azerbaijan Province, Iran, is possible. However, since there is a great lack of geographic variation data, which usually is rather large in



SUPPLEMENTAL FIGURE S15. Southern distribution of the Southern Steppe Viper *V. r. eriwanensis* (*sensu lato*). The traditional "*eriwanensis*" is replaced by its geographic variant, the Iranian Steppe Viper *V. r. eriwanensis* "ebneri" group, in southeastern Azerbaijan and Iran, see yellow division line according to Rajabizadeh et al. (2011) and adjusted by Mebert et al. (2025a). However, many more samples are required to demonstrate the realistic nature of a steep or gradual transition between them, respectively reflecting two species or subspecies. Red lines are country borders; inset is a zoomed in view of rectangle connected by a line.

mountainous species, taxon allocation and assessment of independent species requires more data. Genetic data do show that the difference between the "ebneri" group of *V. r. eriwanensis* and the traditional *V. r. eriwanensis* is very low and reflect rather divergence by distance of local variations, and might be best regarded as subspecies or even as a morph, a single population (Zinenko et al. 2015; Freitas et al. 2020; Mebert et al. 2025a). Individual-ID: **Ver119**

-229 **Refined**: Takab/West-Azerbaijan, 36.341720°N, 47.077717°E, at 2,006 m elevation, < 1986. Source: Latifi (1985, 1991, 2000) by providing only city´s name. Remarks: placed by us 6.5 km south-southwest of the city's periphery into a patch of steppe along a valley slope; also cited in Nilson and Andrén (2001). Individual-ID: **Ver390**

-230 **New**: Amirabad, 4 km northwest of Kaka and 4.7 km east of Gharavolkhane, Mahneshan/Zanjan, 36.609653°N, 47.368814°E, at 2,477 m elevation, year 2012. Source: provided by natural environment experts of the DOE of Zanjan to Khosrow Rajabizadeh. Remarks: this locality serves to complement the unvouchered distribution point near Takab in Latifi´s publications (1985, 1991, 2000). Individual-ID: **Ver127**

-231 **New**: 8 km north of Gharavolkhane, Mahneshan/Zanjan, 36.673155°N, 47.265779°E, between 2,532–2,620 m elevation, years 2014–2019. Source: Jan Dohnal (pers. data transf.). Remarks: site is included in the Takht-e Solyman UNESCO World Heritage Site and Angoran Protected Area. Individual-ID: **Ver182**

-232 **Refined**: Zohrun (Zahron, Soharin)/Zanjan, 36.875356°N, 48.450164°E, at 2,020 m elevation, < 1986. Source: Latifi (1985, 1991, 2000) providing only village name. Remarks: placed by us into a suitable habitat 3 km east of the village's periphery, near the road leading into the moutains; also cited in Nilson and Andrén (2001). Individual-ID: **Ver388**

-233 **New**: 5 km northwest of Shilandar, Taham/Zanjan, 36.852084°N, 48.626846°E, n = 21 within 700 m from coordinates, between 2,324–2,423 m elevation, years 2016, 2017, 2019 (Fig. S16A1–2, Fig. 8A main article). Source: Börje Flärdh (pers. data transf.). Remarks: *V. r. eriwanensis* s.l. were found within ca. 2 km around the coordinates acc. to Jan Dohnal (pers. data transf.). Individual-IDs: **Ver121–122**

-234 **Refined**: Valayesh (Valaiosh)/Zanjan, 36.467042°N, 49.007713°E, at 2,117 m elevation, < 1986. Source: Latifi (1985, 1991, 2000) providing only village name. Remarks: placed by us 1.7 km east and above the village into suitable steppe habitat; also cited in Nilson and Andrén (2001). Individual-ID: **Ver389**

-235 **Refined**: Kalardasht/Mazandaran, 36.445719°N, 51.107139°E, at 2,790 m elevation, < 1986. Source: Latifi (1985, 1991, 2000) providing only city`s name. Remarks: placed by us 3 km south and above the city's periphery into suitable montane steppe; also cited in Nilson and Andrén (2001). Individual-ID: **Ver391**

-236 **Refined**: north Basham Sardi Summit, 6 km south of Kikuh, Nowshahr/Mazandaran, 36.275135°N, 51.399790°E, n = 3 within 500 m from coordinates, between 2,988–3,160 m elevation, years 2012–2013. Source: Mahtab Yazdanian (pers. data transf.) and Yazdanian et al. (2016); representative photo vouchers from that study site by Reza Soltani on CalPhotos (https://calphotos.berkeley.edu/). Individual-IDs: **Ver240–242**

-237 **Refined**: north Borz Summit, north of Kamarbon (Nur County), west of Nesen and south of Kikuh, Nowshahr/Mazandaran, 36.262055°N, 51.416422°E, n = 11 within 730 m from coordinates, between 2,810–3,126 m elevation, years 2012–2013 and 02 October 2020 (Fig. S16C). Source: Mahtab Yazdanian (pers. data transf.) and Yazdanian et al. (2016); representative photo vouchers for that study site by Soheyl Sami and Reza Soltani on CalPhotos (https://calphotos.berkeley.edu/), by Behzad Zadhoush (pers. data transf.), whereas the record from 2020 by naeimophio on iNaturalist was allocated to that site by us. Individual-IDs: **Ver225–230, Ver236–239, Ver243, Ver395–396**

-238 **Refined**: south Siah Band Summit above Lavash Pass, northeast Kamarbon (west of Nesen), Nur/Mazandaran, 36.248329°N, 51.438740°E, n = 2 within 260 m from coordinates, between 3,314–3,340 m elevation, years 2012–2013. Source: Mahtab Yazdanian (pers. data transf.), Yazdanian (2013), and Yazdanian et al. (2016); representative photo vouchers for that study site by Reza Soltani on CalPhotos (https://calphotos.berkeley.edu/). Individual-IDs: **Ver235, Ver244**

SUPPLEMENTAL FIGURE S16. Iranian Steppe Viper *Vipera renardi eriwanensis* "ebneri" group with localities depicted on map in Supplementary Fig. S15; in red and **bold** individual IDs: (A1–2) an individual leaving its shelter,

Taham, Zanjan Province, locality-233, **Ver122**; Iranian Steppe Vipers from the Central Alborz Mountains: (B) steppe viper in situ at western foot of Azad Kuh, Mazandaran Province, locality-246, **Ver384**; (C) north of Kamarbon, Mazandaran Province, locality-239, **Ver395**; (D and E) Sefidab River (Alarm River), Tehran Province, localities-247 and -248, **Ver123** (D) and **Ver124** (E). (A1-2 photographed by Börje Flärdh], B by Alexander Hutwalker, C by Behzad Zadhoush, D and E, digitally inserted, by Börje Flärdh).

-239 **Refined**: Lavash Pass, east Kamarbon (west of Nesen), Nur/Mazandaran, 36.232521°N, 51.438432°E, n = 6 within 170 m from coordinates, between 2,958–3,019, years 2012–2013. Source: Mahtab Yazdanian (pers. data transf.), and Yazdanian et al. (2016); representative photo voucher by Soheyl Sami on CalPhotos (https://calphotos.berkeley.edu/). Individual-IDs: **Ver234, Ver246–248**

-240 **Refined:** Alika, Nur/Mazandaran, 36.202630°N, 51.411880°E, at 2,606 m elevation, years 2012–2013. Source: Mahtab Yazdanian (pers. data transf.) and Yazdanian et al. (2016). Individual-ID: **Ver245**

-241 **Refined:** Duna, Nur/Mazandaran, 36.206450°N, 51.355550°E, at 2,806 m elevation, years 2012–2013. Source: Mahtab Yazdanian (pers. data transf.) and Yazdanian et al. (2016). Individual-ID: **Ver233**

-242 **New**: slopes leading up (south and before) Kandovan Tunnel, 4 km north of Gachsar, Karaj/Alborz, 36.138322°N, 51.312182°E, at 2,664 m elevation, < 2001. Source: M. Jahan (reliable pers. data transf.) to Khosrow Rajabizadeh. Remarks: this locality serves to replace the unvouchered distribution point for Kandovan in Latifi (2000). Individual-ID: **Ver254**

-243 **Refined:** north Kharsalak (Küh-e-Khersak) Summit, Shir Kamar Valley, 4.5 km south of Kalavangah, Nur/Mazandaran, 36.146635°N, 51.431045°E, n = 4 within 490 m of coordinates, between 3,276–3,612 m elevation, years 2012–2013. Source: Mahtab Yazdanian (pers. data transf.) and Yazdanian et al. (2016). Individual-IDs: **Ver249–252**

-244 **Refined:** east of Darreh-ye Khoshkeh Now Valley, a side valley of Varangeh Rud Valley, Nur/Mazandaran side, 36.124860°N, 51.424120°E, at 2,744 m elevation, years 2012–2013. Source: Mahtab Yazdanian (pers. data transf.) and Yazdanian et al. (2016). Individual-ID: **Ver231**

-245 **New:** west of Azad Kuh/Mazandaran, 36.155208°N, 51.471927°E, at 3,511 m elevation, 21 May 2017. Source: Alexander Hutwalker (Hutwalker 2017; pers. data transf.). Individual-ID: **Ver385**

-246 **New:** foot of Mt. Azad Kuh/Mazandaran, 36.157248°N, 51.479355° E, at 3,319 m elevation, 21 May 2017 (Fig. S16B). Source: Alexander Hutwalker (Hutwalker 2017; pers. data transf.) and photo voucher. Individual-IDs: **Ver384**

-247 **New**: Sefidab Valley (Alarm River), Lar National Park/Tehran side, 35.957465°N, 51.917382°E, at 2,695 m elevation, year 2019. Source: Börje Flärdh (pers. data transf.). Individual-ID: **Ver124**

-248 **New**: Sefidab Valley (Alarm River), Lar National Park/Tehran side, 35.950883°N, 51.930517°E, at 2,665 m elevation, year 2019. Source: Börje Flärdh (pers. data transf.). Individual-ID: **Ver123**

-249 **Refined**: Sefidab Valley (Alarm River), Lar National Park/Mazandaran side, 35.951353°N, 51.941482°E, n = 2 within 60 m on both sides from coordinates around 2,766 m elevation, years 2007 and 2013. Source: Nikolaus Stümpel, Khosrow Rajabizadeh (2007), Rajabizadeh et al. (2011), Mahtab Yazdanian (pers. data transf.) and Yazdanian et al. (2016). Individual-IDs: **Ver130, Ver253**

-250 **Refined**: south side of Lar Dam, Lar National Park/Tehran side, 35.879420°N, 51.920350°E, at 2,678 m elevation, 25 May 2012. Source: Mahtab Yazdanian (pers. data transf.) and Yazdanian et al. (2016), photo voucher by Barbod Safaei Ahrod. Individual-ID: **Ver232**

-251 **Refined**: north of Lar Lake/Mazandaran, 35.903318°N, 51.975933°E, at 2,586 m elevation, < 1986. Source: Latifi (1985, 1991, 2000) by providing only name of lake and mountain (Lar Damavand). Remarks: placed by us into suitable steppe habitat above the lake and a road; also cited in Nilson and Andrén (2001). Individual-ID: **Ver392**

-252 **Refined**: above Rineh, southeastern foot of Mt. Damavand, Amol/Mazandaran, 35.888963°N, 52.150854°E, at 2,494 m elevation, < 2007. Source: Darvish Sefat (2006, cit. in Sindaco et al. 2013). Individual-ID: **Ver128**

-253 **New**: Mish Marg, 4 km north Lazoor, Firuzkuh/Tehran, 35.906374°N, 52.545838°E, at 2,932 m elevation, year 2018. Source: provided by Parham Beihaghi, field herpetologist, to Khosrow Rajabizadeh. Remarks: this locality serves to complement the unvouchered distribution point for Firuzkuh in Latifi (1991, 2000), see next locality. Individual-ID: **Ver131**

-254 **Refined**: Mt. Firuzkuh (Firouz Koh)/Tehran, 35.750533°N, 52.801569°E, at 2,416 m elevation, < 1986. Source: Latifi (1985, 1991, 2000) by providing only mountain´s name. Remarks: placed by us into a montane steppe just south of the city; also cited in Nilson and Andrén (2001). Individual-ID: **Ver393**

See recently added localities from Iran at "Late Additions" below

Late Additions

-255 **Refined:** 2.5 km east of Mistan (Conu, Dzhoni, or Joni)/Lerik, Azerbaijan, 38.627011°N, 48.456468°E, at 1,920 m elevation, 02 October 2023. Source: leg. Adiev Hrakim (Iskenderov and Gasimova 2023), now IZKM/R-11 (Institute of Zoology of the Ministry of Science and Education of the Republic of Azerbaijan). Remarks: first life confirmation of historic records (Aliev 1973) from the Iran-Azerbaijan border, refined from the original coordinates in Mebert et al. (2025a). Individual-ID: **Ver413**

-256 **Refined:** slope east of Mt. Qizyurdu (Kyz Yurdu), west of Conu (Coni, Joni, Dzhoni)/Lerik, Azerbaijan, 38.616394°N, 48.4486917°E, at 1,814 m elevation, year 2023. Source: locals Mirzoyev Makhabbat and Adiyev Emin providedk, a photo voucher of a killed specimen (pers. data transf. to T.M. Iskenderov in Iskenderov and Gasimova 2023). Remarks: new confirmation of historic, old (half a century) records by Aliev (1973) from the Iran-Azerbaijan border. Coordinates were slightly refined ca. 300 m farther east from the original publication's coordinates in Mebert et al. (2025a) and placed into the largest alpine meadow used by the shepherds and habitat for the steppe vipers. Individual-ID: **Ver414**

-257 **Refined**: eastern slope and near the foot of Mt. Qizyurdu (Kyz Yurdu)/Lerik, Azerbaijan, 38.599482°N, 48.478701°E, at 1,856 m elevation, 20 August 1932. Source: ZISP No. 13127 (Zoological Institute of the Russian Academy of Sciences, St. Petersburg), leg. D. Znoiko, cit. in Kidov (2022). Remarks: slightly refined by ca. 400 m west from the shortened coordinates in Mebert et al. (2025a) and placed on rocky montane steppe of the southeastern slope at ca. 1.7 km surface distance below the peak of Mt. Kyz Yurdu. Individual-ID: **Ver415**

-258 **Refined**: eastern slope of peak Mt. Qizyurdu (Kyz Yurdu), west of Conu/Lerik, Azerbaijan, 38.606311°N, 48.469750°E, at 2,019 m elevation, and 11 March 2024. Source: Adiev Khakim photogaphed the steppe viper Mebert et al. (2025a). Remarks: A. Khakim provided voucher and coordinates to T. Iskenderov who also visited the site subsequently. Individual-ID: **Ver416**

-259 **Refined:** northeast foot of Qizyurdu (Kyz Yurdu)/Lerik, Azerbaijan, 38.615956°N, 48.467758°E, at 2,190 m elevation, 24 April 2024. Source: Mebert et al. (2025a). Remarks: local Mirzoyev Makhabbat caught the specimen and tranferred it on 06 June 2024 to T. Iskenderov after bringing him to the capture site. Individual-ID: **Ver417**

-260 **Refined**: southeast of peak Mt. Qizyurdu (Kyz Yurdu), west of Tülü/Lerik, Azerbaijan, 38.591242°N, 48.473809°E, at 2,068 m elevation, May 2023. Source: Adiev Khakim, pers. data inf. to T. Iskenderov. Remarks: killed specimen. This individual **Ver418**, together with individuals **Ver413** and **Ver414** (see also Iskenderov and Gasimova 2023, Mebert et al. 2025a) are the first records confirming the presence/influence of the Iranian steppe vipers in the Talysh Mountains of Azerbaijan after half a century. Individual-ID: **Ver418**

-261 **New**: construction site above Zeylik, Kalbajar, Azerbaijan, 40.032674°N, 45.932792°E, at 2,334 m elevation, 04 April 2024. Source: Sadi Qurbanli (pers. data transf. to T. Iskenderov). Individual-ID: **Ver419**

-262 **New**: north Zeylik, Kalbajar, Azerbaijan, 40.048546°N, 45.935814°E, at 2,354 m elevation, 15 June 2024. Source: Sadi Qurbanli (pers. data transf. to T. Iskenderov). Individual-ID: **Ver420**

-263 **New**: south Eagle Gorge complex (Artsivis Kheoba), Dedophlistskaro, Karkheti, Georgia, 41.489891°N, 46.094044°E, n = 2 within 340 m from coordiantes, between 796–809 m elevation, April 2024, 14 October 2023. Source: Marcus Lucassen, Brecht Heusequin, George Dvali+iNat (all pers. data transf.). Individual-ID: **Ver421, Ver438**

-264 **Refined:** Arabshah, Takht-e Soleyman, Takab, West Azarbaijan, Zareh Shuran, Takab, West Azerbaijan, 36.782465°E, 47.053682°N, n = 2, at 2,354 m elevation, October 2017. Source: Mossa Ghorbani, iNaturalist and pers. data transf. Individual-ID: **Ver422–423**

-265 **Refined:** 2 km north Arevik, Gegharkunik, Armenia, 40.632800°N, 45.045820°E, at 2,395 m elevation, May 2024. Source: Polsha Sinitsina, iNaturalist and pers. data transf. Individual-ID: **Ver424**

-266 **Refined:** 4.6 km west Aghnjadzor, Vayots Dzor, Armenia, 39.907980°N, 45.191400°E, at 2,397 m elevation, May 2024. Source: Polsha Sinitsina, iNaturalist and pers. data transf. Individual-ID: **Ver425**

-267 **Refined:** north Sevazhire, Vayots Dzor, Armenia, 39.923715°N, 45.468252°E, n = 2 within 220 m from coordinates, between 2,203–2,266 m elevation, 24 August 2023. Source: Irene Vertua, iNaturalist and pers. data transf. Individual-ID: **Ver426–427**

-268 **New:** ca. 700 m west Tsaghkunyats Lake, Aragatsotn, Armenia, 40.545582°N, 44.564929°E, at 2,458 m elevation, 24 July 2024. Source: Bart de Witte on observation.org. Individual-ID: **Ver428**

-269 **New:** east Irambar, Aragatsotn, Armenia, 40.485400°N, 44.445700°E, at 1,883 m elevation, 08 October 2024. Source: Stijn Vanacker on observation.org. Individual-ID: **Ver429**

-270 **New:** Pass area Javaher Dasht-Rudsar Mine-Pishavar, Gilan province, next to border with Mazandaran Province, west and above Javaherdeh, Ramsar, Iran, 36.835182°N, 50.426905°E, at 2,985 m elevation, 29 May 2009. Source: Alireza Naderi, photo voucher on flickr.com. Remarks: photo location of specimen evaluated with other photos taken shortly before/after the viper photo using EXIF data. ID: **Ver430**

-271 **Refined**: Mashedi Kerim, below Kukudag, Shahbuz/Nakhichevan-Azerbaijan, 39.557357°N, 45.586496°E, around 2,390 m elevation, 08 May 2016. Source: A. Mammadov and location point Nr. 3 in lower inset of Fig. 2 in Iskenderov et al. (2023). Individual-IDs: **Ver431**

-272 **Refined**: Nürgüt village, Ordubat/NakhichevanAzerbaijan, 39.223611°N, 45.903056°E, at 1,962 m elevation, 14 July 2018. Source: location point Nr. 10 in lower inset of Fig. 2 in Iskenderov et al. 2023, but coordinates herein adjusted by A. Mammadov. Individual-IDs: **Ver432**

-273 **New**: between Eghjerva Mountain and Jajur Pass, Krashen, Gyumri/Shirak, Armenia, 40.875800°N, 44.001700°E, at 2,140 m elevation, 19 July 2025. Source: Kseniia Marianna Prondzynska (pers. data transfer), also on iNat. **Ver433**

-274 **New**: southwest Eagle Gorge complex (Artsivis Kheoba), Dedoplistskaro, Karkheti, Georgia, 41.492492°N, 46.078487°E, at 684 m elevation, 03 June 2025. Source: Andro Solomanashvili (pers. data transf.), Kat Trin, Anna Zender, Marcel Wölbert. Individual-ID: **Ver437**

More photo vouchers of steppe vipers for most localities are placed in folders accessible upon request to the senior author. For credible localities without a voucher (museum specimen, photograph, or tissue sample) satellite screenshot taken from GoogleEarth was used to reflect the suitability of a habitat.

ORIGINALLY SUBMITTED TAXONOMIC REVIEW - ADAPTED

This following taxonomic section basically represents the original version upon first submission with a few grammar and wording improvments. It is included herein to provide the extra information to improve understanding of the taxonomic history of ths grassland vipers without having to resort to additional sources, such

as original descriptions, other papers, and reports. The version in the main article is basically a shortened text of the version below.

EXTENDED TAXONOMIC REVIEW: WEST ASIAN *VIPERA* SPECIES

The mountainous regions of West Asia exhibits a high and fascinating viper diversity, reflecting its complex biogeography, shaped by a rich history of changes in topography, seas, and climate zones. For example, no less than 14 *Vipera* species (incl. subgenus *Pelias*) have been recognized in a recent summary book for the Caucasus region (Tuniyev et al. 2019 with species epithets: *transcaucasiana, barani, darevskii, dinniki, ebneri, eriwanensis, kaznakovi, lotievi, magnifica, olguni, orlovi, pontica, renardi, shemakhensis*), summed up to 17 species by adding another Caucasus viper *tuniyevi* (Ananjeva et al. 2021), and two more species restricted to Anatolia outside the Caucasus region; *anatolica* by Eiselt and Baran (1970) and *sakoi* by Tuniyev et al. (2018a). More viper taxa occur in West Asian mountain ranges from Lebanon to Iran.

Most of the "traditional or commonly used" species have been analysed, revised and/or described several times throughout the last 40 years, primarily based on differences in morphology, with some studies having added early techniques of molecular markers, such as enzymes and more recently also the mitochondrial gene cytochrome *b* (e.g., Vedmederja et al. 1986; Nilson et al. 1995; Nilson and Andrén 2001; Tuniyev et al. 2018a, b). These studies were all very important to understand and appreciate the high diversity and polymorphism of viperids in the Caucasus and western Asian regions. They reflect a high diversity pattern that is inherent to species that have their ranges contracted and expanded over geological periods measured in 100 thousand to millions of years, with temporary geographic isolation that acted as natural laboratories for allopatric diversification (e.g., Nilson et al. 1999). However, the high polymorphism and apparent different degrees of variations among West Asian vipers has led to a taxonomic inflation (Freitas et al. 2020), whereby vipers have been described as new species despite the sampling was often insufficient to fill the geographic gap among closely related species that would permit testing the degree of gene flow or the lack thereof to evaluate species integrity (Mebert 2008; Mebert et al. 2020; Dufresnes et al. 2023; 2024).

It needed further development of molecular techniques, in particular the analysis of sequences of both mitochondrial and nuclear genes, to enable fine tuning of phylogenetic relationships among Eurasian viper species, which often revealed insufficient divergence and/or cases of pronounced genetic introgression between some previously described species (e.g., Zinenko et al. 2015, 2016; Mizsei et al. 2017; Freitas et al. 2020; Doniol-Valcroze et al. 2021). Recently, 10 of the 17 "most commonly used" and described *Vipera* species of western Asia have been relegated to subspecies status, or their species status was seriously questioned primarily based on molecular evidence, affecting following viper taxa: *Vipera dinniki* (Freitas et al. 2020), *V. ebneri* (Rajabizadeh et al. 2011; Freitas et al. 2020), *V. eriwanensis* (Rajabizadeh et al. 2011; Tuniyev et al. 2018b; Freitas et al. 2020), *V. lotievi* (Tuniyev et al. 2018b; Freitas et al. 2020), *V. magnifica* (Zinenko et al. 2016), *V. olguni* (Tuniyev et al. 2018a), *V. orlovi* (Zinenko et al. 2016; but see Joger and Zinenko 2021), *V. pontica* (Zinenko et al. 2013; Mebert et al. 2014, 2015a), *V. shemakhensis* (Tuniyev et al. 2018b; Freitas et al. 2020), *V. transcaucasiana* (Freitas et al. 2020; Thanou et al. 2023).

In their large-scaled review of Eurasian viperids using multiple nuclear and mitochondrial sequences, Freitas et al. (2020) suggested a > 5% sequence divergence in cyt *b* to be a first minimum threshold of indicating species level divergence in snakes, a conclusion based on reduced gene flow and nature of hybridizaton of closely related species in sympatry (Mebert 2008; 2010, and further examples discussed in Hofmann et al. 2018; Mebert et al. 2020; Schöneberg et al. 2023). Although natural hybridization is meanwhile well documented among Eurasian species of the genus *Vipera* and by itself not a sign of species level (e.g., Pavlov et al. 2011; Tarroso et al. 2014; Mebert et al. 2015b; Joger and Zinenko 2021; Zwahlen et al. 2022), it still requires analysing the degree of genetic exchange between two closely related taxa living in sympatry, or their most proximate populations in case of absence of sympatry. Only such analysis would provide the necessary information on their integrity as a species, or alternatively subspecies or ecophenotypes, if main differences are only morphological (Mebert 2008, 2010).

We continue to use the genus epithet *Vipera* instead of *Pelias* for the shield-headed vipers, such as *V. anatolica, V. berus, V. kaznakovi, V. renardi,* and *V. ursinii* (Merrem, 1820), as further splitting of palearctic vipers into new genera would be required to reflect equivalent phylogenetic distances at the genus level of Eurasian vipers, and

thus causing more confusion (Freitas et al. 2020). The genus *Acridophaga* (Reuss 1927) for all meadow and steppe vipers, combined in Nilson and Andrén (2001) is not monophyletic by missing *V. anatolica* (Freitas et al. 2020). Albeit such names might be deemed more appropriate with future research, the use of subgenera would provide names at the current *status quo* without disrupting the binomial nomenclature (Wallach et al. 2009), and thus, reduce confusion, retain greater taxonomic stability, and discourage from further splitting procedures by lacking an objective basis (Vences et al. 2013). On the other hand, we have simply applied the term "group" to denote a somewhat different (geographically, phenotypically) collection of individuals of 1) unclear relationship, or 2) below the subspecies level.

Anatolian Steppe Viper (*Vipera anatolica*)

History of Taxonomy.

This steppe viper, aptly named the Anatolian Steppe Viper (*Vipera anatolica* Eiselt and Baran 1970) due to its endemic status, is a small species that mainly feeds on invertebrates and inhabits high altitude stony bush- and grasslands in southern Anatolia. The first specimen and holotype of *V. anatolica* was a juvenile female collected in June 1969 by Austrian biologist F. Spitzenberger and her team. It was an accidental bycatch during a mammalogical expedition in the subalpine montane steppes in and around the Çığlıkara Forest Reserve, northern slope of Kohu Dağ (Dağ=Mountain) of the western Taurus Mountains, Elmalı District, Antalya Province, Türkiye. A second specimen, the paratype, was an adult female collected nearby in the following month by A. Budak. Both specimens were captured on the karst plateau above 1,800 m a.s.l. (corrected from 1,650-1,750 m in the first publication), and were initially described as a subspecies of *V. ursinii* based on a few morphological differences (Eiselt and Baran 1970), later synonymized by Saint Girons (1980). However, contemporary studies have adjusted these morphological findings (e.g., Göçmen et al. 2017). After the discovery of the type specimens, a third often overlooked specimen was reported that was collected in the 19th century by one of the Boie brothers (Saint Girons 1978; Nilson and Andrén 2001) indicated on the Bey Dağları (mountain range) northeast of Mount Kohu and deposited at the French National Museum of Natural History, Paris (MNHN 4000).

It was not until July 1984 that a fourth individual became known to science, which was found by H. Sigg at the species' type locality, representing the first male of this steppe viper (Billing 1985; Sigg 1987). The fifth and last record relates to an individual from near the type locality, but without more precise information, and kept in a private European collection in the mid-1990s (Nilson and Andrén 2001). This would mark the beginning of approximately two decades of last sighting, or four decades since its description, in which this elusive species evaded extensive search efforts by multinational herpetological research teams to the type locality at Mount Kohu, Antalya Province, yet, it remained unconfirmed (Nilson et al. 1988).

Nonetheless, the great scientific interest in the taxon continued despite the lack of new material to work with. By the end of the 20th century, the tentative subspecies of *V. ursinii* was elevated to the species level based on morphological and immunological data and assessed to be closer to the *eriwanensis-renardi* branch within the *V. ursinii* group at that time (Joger et al. 1992; Nilson and Andrén 2001). Correspondingly, its subgeneric assignment was altered several times in line with that of *V. ursinii*, having been placed in *Acridophaga* (Reuss, 1927) by Nilson and Andrén (2001) and *Pelias* Merrem, 1820 by Wallach et al. (2014). However, the phylogenetic standing of this taxon was corrected by Kalyabina-Hauf et al. (2004), as mtDNA sequence analyses revealed it as sister to the *kaznakovi-ursinii* group. The *anatolica* taxon was once again placed within the *ursinii-renardi* group in a more recent phylogeographical study (Ferchaud et al. 2012), but this resolution was rejected by Zinenko et al. (2015) in accordance with the latest genetic evidence, and *V. anatolica* was confirmed as the oldest lineage and sister to all meadow and steppe vipers (*V. renardi* and *V. ursinii* complexes) and Caucasusian vipers (*V. kaznakovi-V. darevskii* complexes). Together with the latter two groups, *Vipera anatolica* is also sister to the *V. berus/seoanei* clade which became the widely accepted phylogenetic position (Freitas et al. 2020). However, a new study using

genomic data suggests *V. anatolica* as a sister lineage to the clade comprising *V. renardi* and *V. ursinii* complexes, which all together are sister to the *V. kaznakovi-darevskii* complex (Dufresnes et al. 2024).

Southern Steppe Viper (*Vipera renardi eriwanensis* s.l., including regional groups "shemakhensis", and "ebneri")

History of Taxonomy.

The first member of the Southern Steppe Viper was described as the Armenian Steppe Viper (Vipera renardi eri*wanensis*) in 1933 by Reuss, originally as *Acridophaga renardi eriwanensis*, viewed as a subspecies of the Northern or Eastern Steppe Viper *Vipera renardi* (Christoph, 1861). The holotype originated from above Shorzha (Shoghakat) near Lake Sevan in former Eriwan Province (today Gegharkunik Province), eastern central Armenia, providing the scientific epithet "*eriwanensis*" and original English name "Armenian Steppe Viper" (Aghasyan 1996; Krecsak 2007; Arakelyan et al. 2011). It has experienced rather frequent taxonomic changes (Uetz et al. 2023) of which only the major ones are presented herein.

In 1955, Knoepfler and Sochurek described Vipera ursinii ebneri as a new subspecies from an elevation around 2,700 m of the Elburz (Alborz) Mountains in northern Iran. These authors and others combined all small grassland vipers into the ursinii group up into the early 1990s (e.g., Joger 1984; Nilson et al. 1988). Nowadays, the taxon ursinii is only used for European meadow vipers following their close immunological relationships and distinctiveness from the northeastern group of steppe vipers known as renardi complex (Joger et al. 1992; Nilson et al. 1999).

Höggren et al. (1993) elevated steppe vipers from Türkiye (Turkey) and Armenia to the species level Vipera eriwanensis, a separation generally followed in subsequent treatments. In 2001, Nilson and Andrén also elevated steppe vipers from the Talysh and Alborz Mountains (Azerbaijan and Iran) to the species level V. ebneri, a practice also followed for years. Based on a few morphological characters, Rajabizadeh et al. (2011) reassigned the populations from far northwestern Iran to V. eriwanensis. A last species-level split considered the low to mid-elevation V. eriwanensis of north-eastern Azerbaijan, rediscovered from museum material by Kukushkin et al. (2012) and later described as the Shemakha Viper V. shemakhensis by Tuniyev et al. (2013). Additional samples from the Georgian lowland were subsequently assigned a subspecies level, V. shemakhensis kakhetiensis by Tuniyev et al. (2018b). This description included a genetic analysis (cyt b), that placed V. shemakhensis on a neighboring branch to V. eriwanensis with very low genetic divergence of 1.1%. Finally, morphological differences between the taxa are small, statistically little reliable because they are based on small samples, and reflect common geographic variation for a species with a very wide distribution.

Moreover, recent genetic studies have repeatedly questioned the reliability of the species status for Southern Steppe Vipers "*eriwanensis*, *ebneri*, *shemakhensis*". For example, mitochondrial results of the meadow and steppe viper complex by Zinenko et al. (2015) suggested a very close genetic relationship between "*eriwanensis* and *ebneri*" (cyt *b* difference of 1.4%). As a reply to taxonomic inflation in the *Vipera* genus (incl. subgenus *Pelias*), Freitas et al. (2020) re-evaluated the status of all the contemporarily recognized species and cross-analyzed genetic divergence and morphological cohesion. The results showed very low genetic divergence of < 1% also between"*eriwanensis* and *shemakhensis*". Additionally, all three southern steppe viper taxa were closely related (mostly with 2–3% genetic divergence of cyt *b*) to all northern and eastern steppe viper taxa (*V. renardi*, *V. lotievi*, *V. altaica*) and their subgroups from northwest of the Greater Caucasus to eastern Central Asia (Freitas et al. 2020). Indeed, closely related species of snakes in sympatry without or with only restricted hybridization generally showed a threshold > 5% cyt *b* divergence, and thus, corroborate a classification as independently evolving species (examples are Kindler et al. 2017; Neumann et al. 2024; some summary in Hofmann et al. 2018; Mebert et al. 2020). Based on the 5% threshold and aside from uncommon cases of ancient admixture and contemporaneous introgressive hybridization leading to cyto-nuclear discordance in vipers (e.g., Doniol-Valcroze et al. 2021; Dufresnes et al. 2024), we currently classify all steppe vipers from south of the Greater Caucasus as subspecies of *Vipera renardi*: i.e., *Vipera renardi eriwanensis* (incl. "shemakhensis" group), and *V. r. eriwanensis* "ebneri"

group, together labeled as *V. r. eriwanensis* s.l. Each subspecies potentially shares a respective regional consensus in morphology, genetics, and ecology, as suggested by their describer and/or some follow up studies (e.g., Rajabizadeh et al. 2011; Tuniyev et al. 2018b). However, these differences are insufficient for species level classification, and potentially even become insufficient as subspecies delimitations once increased widespread sampling permits a more fine-tuned geographic analysis for cohesive structure of molecular and morphological traits between the current subspecies. Thus, we are leaving the elaboration of subspecific validation and the strength of a barrier to cross-taxa gene flow among southern groups, as well as with the northern groups, up for future studies. Such studies likely require large-scale nDNA analyses (e.g., genomic ddRADseq), since mtDNA appeared to have been shared among *Vipera* species in the Caucasus region, with a few cases of gene flow among taxa within and between both *V. renardi* and *V. kaznakovi* complexes, and even other Eurasian *Vipera* species (e.g., Pavlov et al. 2011; Zinenko et al. 2015; Doniol-Valcroze et al. 2021; Joger and Zinenko 2021; Dufresnes et al. 2024).

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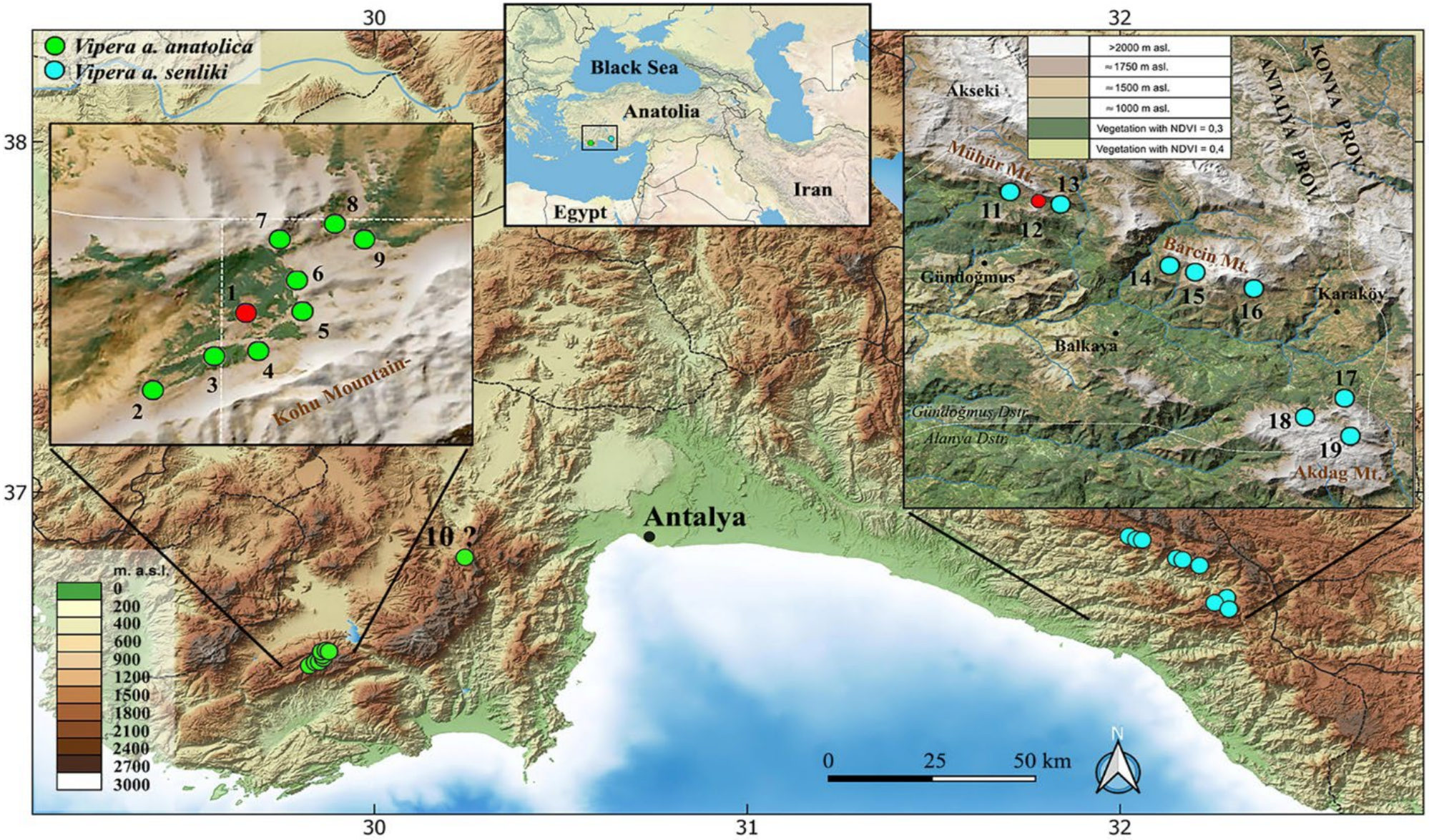

FIGURE 1-inserted from main article. Currently known distribution of the Anatolian Steppe Viper; western cluster *Vipera a. anatolica*, eastern cluster *V. a. senliki*, with enlarged distribution display in the insets above both taxa. An overview map of western Asia is in the upper center inset with a rectangle representing the entire Fig. 1 map and two dots for the two subspecific core populations. Numbered localities mostly represent more than one individual, as they include all that were observed within 1-km radius (see details for corresponding locality numbers in Supplemental Information file, including additional geographic details, coordinates, number of specimens assigned to a specific locality dot, elevation, dates, source, and occasional explanatory remarks). Red dots show the type localities of the nominate taxon *V. a. anatolica* and the subspecies *V. a. senliki*. The question mark in locality-10 indicates unknown imprecision, as it only reflects the approximate locality point for voucher MNHN 4000 in Saint Girons (1978, 1980) with little more information. The abbreviation NDVI = Normalized Difference Vegetation Index: khaki color to grey-brown = steppe, dark green = forest. A low NDVI value of 0.3 is for montane forest and 0.4 for agricultural areas, whereas grassland/steppes values range from 0.1–0.2 (not indicated).

FIGURE 2-inserted from main article. Eastern Anatolian Steppe Viper *V. a. senliki*, including first records from Akdag Mountain, Alanya and Gündoğmuş Districts, Antalya Province (in red and **bold** individual IDs): (A) Barcin Mountain, locality-14, **Van86**; (B) Akdag Mountain locality-19, **Van91**; (C) Akdag Mountain, locality-18, **Van92**; (D) Akdag Mountain, locality-17, **Van93**. All localities are numbered and mapped in Fig. 1 of main article and Fig. S2 above. (A photographed by Gerrit Jan Verspui, B by Ibrahim Zavlak, C by Osman Yilmaz via Hüseyin Türkeli, and D by Halil Tokgöz).

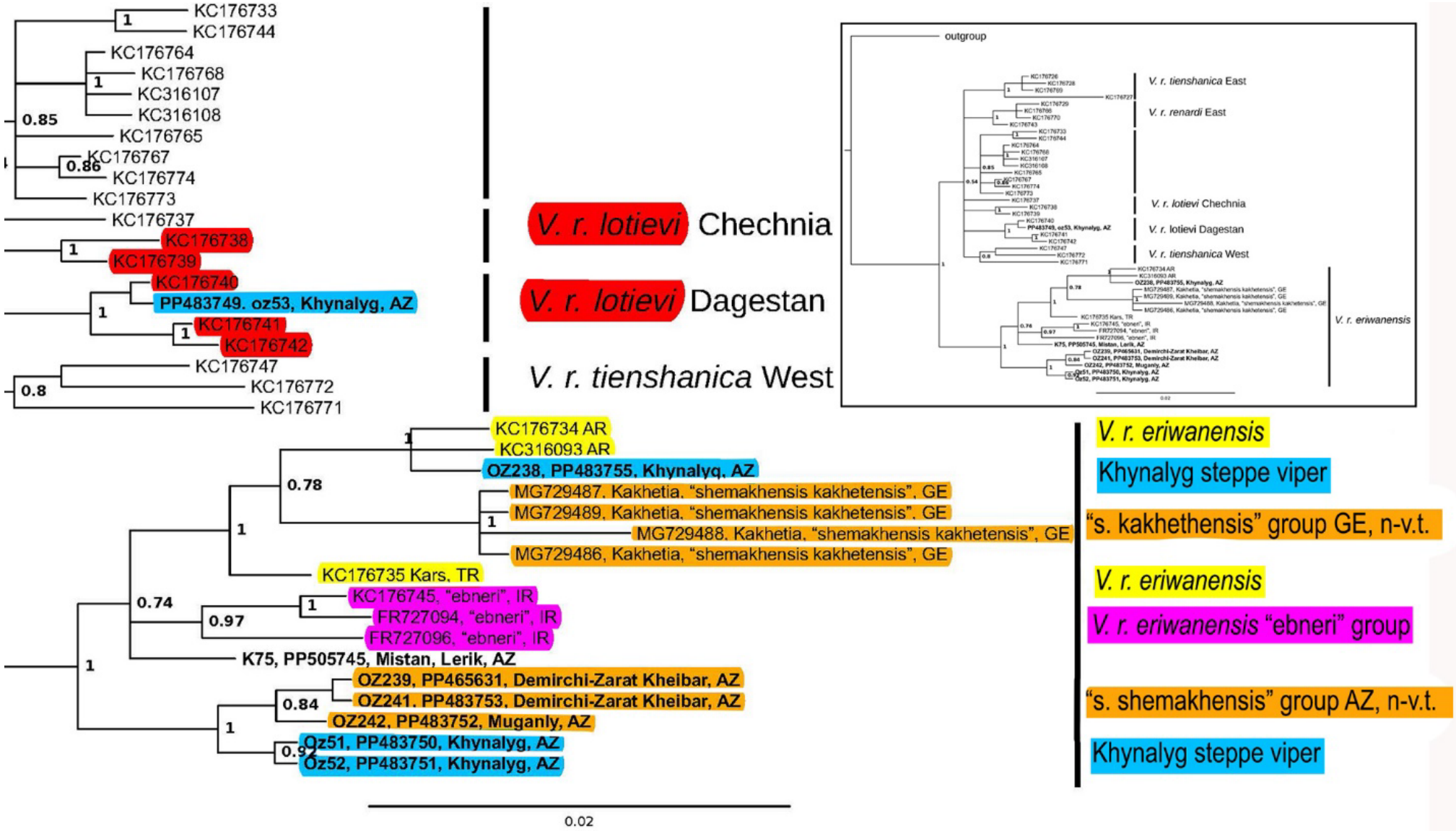

FIGURE 3-inserted from main article. Bayesian Inference (BI) phylogenetic tree (inset with full tree) reconstructed using 53 haplotypes of cyt *b* of the Southern Steppe Viper *V. renardi eriwanensis (sensu lato)* primarily from northeastern Greater Caucasus and the contact zone with Lotiev`s Viper *V. r. lotievi* (our new data). Posterior probabilities > 0.7 are indicated in the main figure, which is a reasonable minimum value for showing a trend when analyzing data of one or very few genes (e.g., Hinojosa et al. 2018) and the geographic data distribution is uneven and/or scarce with many holes. PP-values of 0.8 and 0.9 represent strong support for the phylogenetic tree in this situation. Currently accepted species names are displayed in italic font and other types of groups in regular font. Lineage of original *V. r. eriwanensis* (yellow), its shemakhensis group from Georgia GE and Azerbaijan AZ, a non-valid taxon (n-v.t.; orange, see text), *V. r. lotievi* (red), and *V. r. eriwanensis* ebneri group (pink), a cohesive geographic variation, but insufficiently distinct from the *eriwanensis* group. The blue samples represent admixed steppe vipers from Khynalyg and Jek villages, Quba Province, Azerbaijan (locality-85 and Fig. S11 above), showing the co-existence of both haplotypes (*eriwanensis* and *lotievi*).

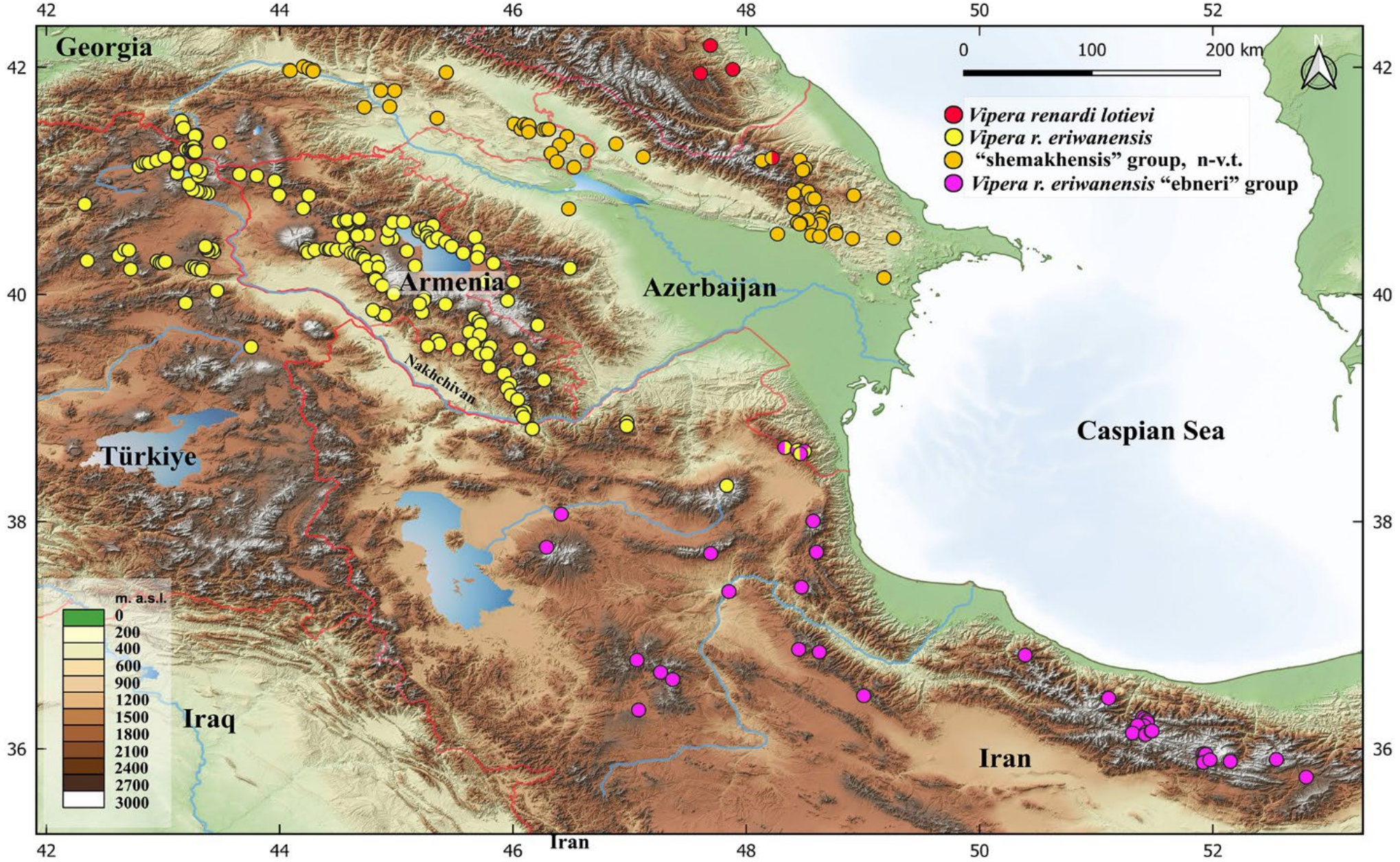

FIGURE 4-inserted from main article. Distribution of the Southern Steppe Viper *V. r. eriwanensis* (*sensu lato*) with the Armenian Steppe Viper *V. r. eriwanensis*, including its junior subjective synonym *V. shemakhensis* or shemakhensis group, an n-v.t. (= non-valid taxon), and its contact zone with Lotiev's Viper *V. r. lotievi* (half red dot, with full red dots showing localities of pure *lotievi*-haplotypes from the north slope of Greater Caucasus (localities Shari, Rugudzt, and Gunakari, see Fig. 6 of main article, not further treated herein), and also the Iranian steppe viper *V. r. eriwanensis* ebneri group. Locality for viper groups are the same as the phylogenetic tree in Fig. 3 of main article and also inserted above.

FIGURE 5-inserted from main article. *Vipera r. eriwanensis* from its currently westernmost localities, both in Türkiye (in red and **bold** individual IDs): (A and B) Sirataslar, Sarikamis District, Kars Province, locality-2, **Ver15**; (C) Incecay, Senkaya District, Erzurum Province, locality-1, **Ver38**; (D and E) two Armenian Steppe Viper *V. r. eriwanensis* from the currently southernmost site in Türkiye east of Diyadin, Agri Province, locality-18, **Ver23** and **Ver24**. All localities are numbered and mapped Fig. S5 above. (A and B photographed by Marijn van den Brink, C by Philippe Geniéz, and D and E by Mustafa Demir).

FIGURE 6-inserted from main article. *Vipera r. eriwanensis* (shemakhensis group) from eastern Georgia (in red and **bold** individual IDs): (A) habitat and Shemakhan Viper (inset) from Chinkani House, Dedoplistskaro, locality-74, **Ver314**; (B) from Gldani, Tbilisi locality-63, **Ver221**. Localities are numbered and mapped in Fig. S8 above. (A photographed by P. Lennart Schmid, and B by Giorgi Elbakidze).

FIGURE 7-inserted from main article. Two steppe vipers from the contact zone of *V. r. eriwanensis* (shemakhensis group) and *V. r. lotievi* from the northeastern Caucasus rim in Quba Province, Azerbaijan (in red and **bold** individual IDs): (A) Khynalyg (Xinaliq) village, Quba Province, locality-85, **Ver405**; (B) Zikhir village, locality-87, **Ver397**. Localities are numbered and mapped in Fig. S11 above. (Photographed by Tavakkul Iskenderov).

FIGURE 8-inserted from main article. Iranian Steppe Viper *V. r. eriwanensis* group ebneri from northwestern Iran (in red and **bold** individual IDs): (A) habitat and individual (inset A) and pointed with black line on background image, Taham, Zanjan Province, locality-233, **Ver122**; (B) west of Kalestan Bala, Ardabil Province, locality-225, **Ver394**. Localities are numbered and mapped in Fig. S15 above. (A photographed by Börje Flärdh, and B by MohammadReza Ehsanimarani).