

SUPPLEMENTAL INFORMATION

MOUNTAIN VIPERS IN CENTRAL-EASTERN TURKEY: HUGE RANGE EXTENSIONS FOR FOUR TAXA RESHAPES DECADES OF MISLEADING PERSPECTIVES

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LOCALITY LIST

In the following, we list most relevant locality data of *Montivipera wagneri*, *M. b. bulgardaghica*, *M. b. albizona*, and *M. xanthina*, but latter only for its far south-eastern range next to other mountain viper taxa. The list includes our hitherto unpublished records, previously published records for which we obtained more precise locality information (mostly coordinates) from authors, and online sources evaluated directly by us and/or by contacting the authors. Coordinates provided to us were assessed based on accompanying information, such as landscape descriptions or suitable surface structures, altitude by placing locality points on Google Earth Pro maps, etc. Hence, such locality information was not always precise, and some may represent an error by several km. However, they yield sufficient information, i.e., constituents of typical habitat characteristics for these vipers, to serve as proxies or surrogate locality for the exact site, and thereby likely yield other members of the same species and population. Furthermore, administrative names and borders for listed localities are based primarily on Google Earth Pro, even though they sometime differ in relation to other digital maps, even Google Maps, and are not always up-to-date due to modifications of names and border positions by the Turkish government in relative recent (20–30 years) times. 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 given locality coordinates remain the same and represent the relevant source.

Recorded localities are listed into one of three categories:

- **New**, if their localities have not been previously published in a journal and usually are at ≥ 1.5 km distant from an already known locality (80% of individual *Montivipera raddei* moved less than 2 km away from hibernations sites during two complete seasons, Ettling et al. 2013). A new locality might be based on a photograph with sufficient quality for a positive identification. The authenticity of such a photograph and the pertinent locality information was usually confirmed by us through contacting the photographer/associate.
- **Corrected** relates to published records that contained erroneous information.
- **Refined** refers to published data for which new information permits a more precise geographic localization and/or other unpublished information were made available, primarily by the original author.

The listings generally follow the format: category, location name, coordinates, n (number of specimens), altitude, date of the finding, source (literature, online, pers. comm., photographer, museum voucher), and remarks. Photo credits are given in the figure legends. Abbreviation for collection vouchers, if not appended in-text, are: ZDEU (Zoology Department, Ege University, Izmir, Turkey), MHNG (Natural History Museum of Geneva, Switzerland), GNM (Goteborg Natural History Museum, Goteborg, Sweden).

Locality names in the list usually refer to the nearest village name, sometimes a mountain or valley name, followed by the names for district/province, which is the Turkish standard format for locality references. Mapcarta.com and peakery.com have been the source of many mountain and hill names given in the respective accounts, whereas locality names were mostly drawn from Google Earth maps. Turkish terms used herein like Dag, Dagi, Daglari means Mountain, Mountains, Massif, and Tepesi means hill or peak. Elevations (or elev.) refer to meters above sea level. Each listing refers to one specimen if not otherwise mentioned by the number term ‘n’. For easy cross-referring with corresponding maps in the primary article, the listings follow approximately from a north-eastern to south-western direction for each taxon. Taxon maps were copied in from the primary article for rapid crossreferencing between listed accounts, depicted specimens and locations on maps, whereas Supplemental Figures (e.g., Fig. S3) are exclusively placed herein.

Wagner’s Viper (*Montivipera wagneri*)

Distribution of the Wagner’s Viper is shown in Fig. 2 (copied in from primary article). The list below begins with localities from its northeastern range limit:

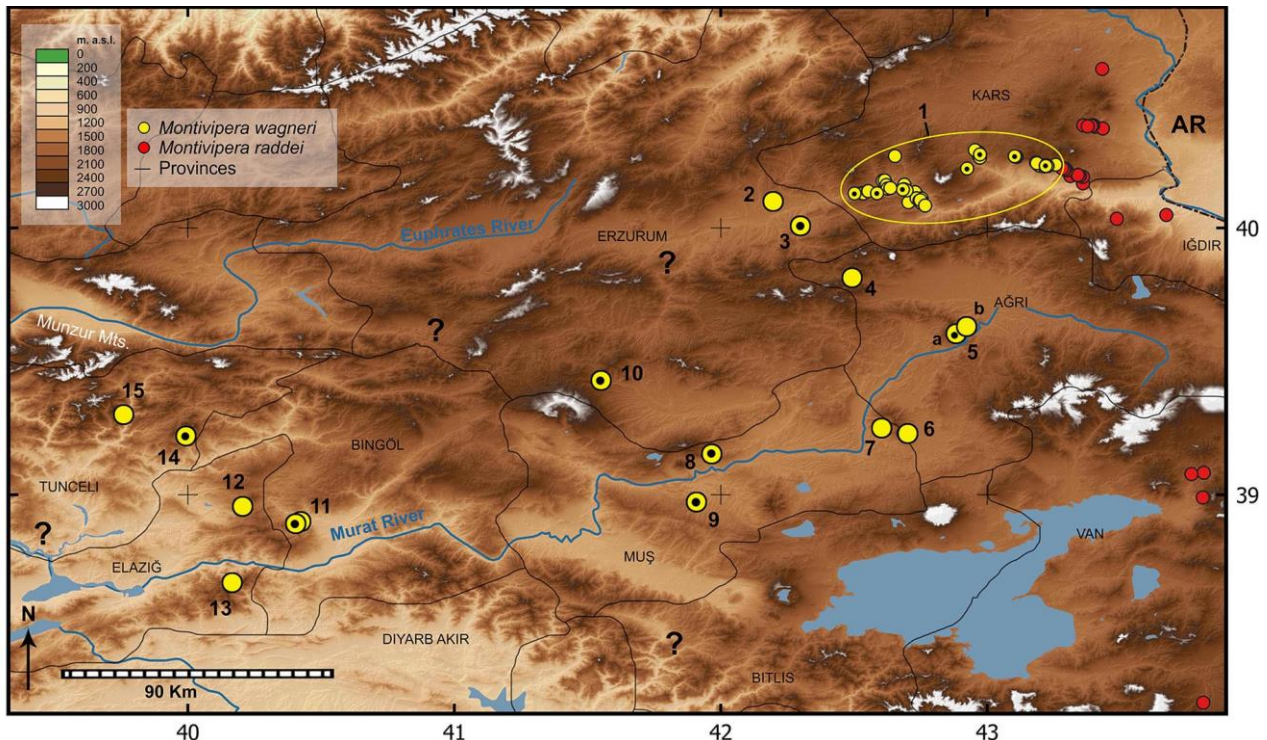
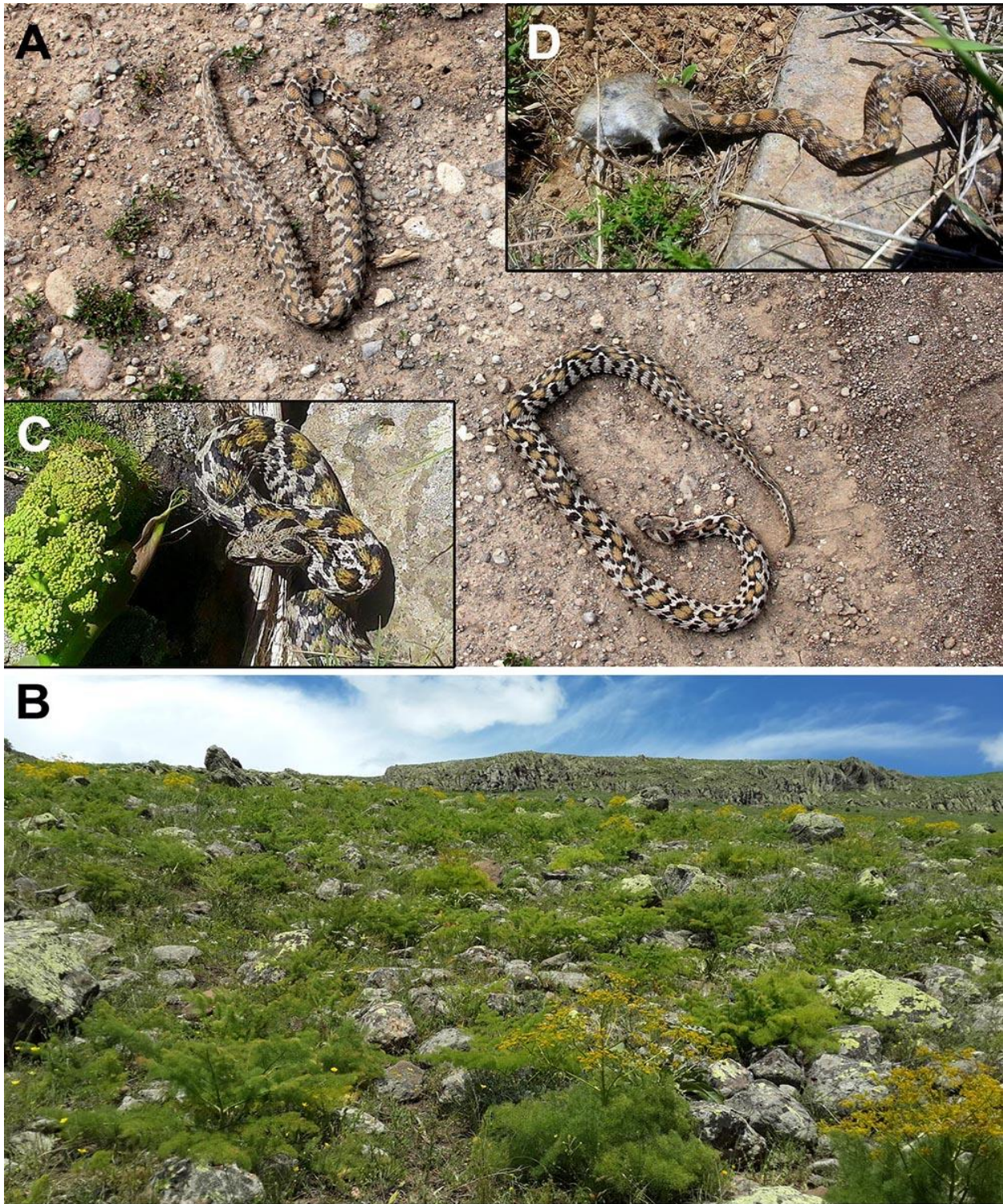


FIGURE 2-inserted from primary article. Updated distribution of Wagner’s Viper (*Montivipera wagneri*) and adjacent locations of Radde’s Viper (*M. raddei*) in Turkey. Numbers refer to the Locality List, but only for *M. wagneri*, as *M. raddei* is not the focus of this study. Several samples used for genetic analysis originate from Aras Valley (circled locality-1) and other single locations that are indicated with a black center. Question marks indicate areas where further *Montivipera* populations are expected but require confirmation.

- 1 **Refined:** The known and published range of *Montivipera wagneri*, shown as a yellow oval in Figure 2, is concentrated in the western Aras River Valley (habitats shown in Supplemental Fig. S1) of north-eastern Turkey with its eastern margin north of Kağızman, where it is replaced by *M. raddei* farther east (Mebert et al. 2015a, 2016; specimen in Fig. 3A of primary article), whereas its range extends in westerly direction outside the valley to Horasan (locality-2). Sequence data are shown in Supplemental Table S1 or labeled as specimens wg3 to wg8 and wg10 to wg16, including nr. 17462, in Stümpel (2012) and Stümpel et al. (2016). Although the range map on the IUCN Red List of Threatened Species (IUCN. 2020. op. cit.) shows a range extending 70 km south of the Aras Valley through far-eastern Erzurum province (ca. 20 km in the longitudinal direction from the eastern provincial border) and similarly into most western Ağrı province (Kaska et al. 2009), no supportive locality information was provided. Up till now, only two concrete localities have been published from outside the proximity of the Aras Valley, referring to records from the provinces Ağrı (Yildiz et al. 2018) and Muş (Göçmen et al. 2014), both relisted below.
- 2 **Refined:** hills in the agricultural landscape 4.5 km southeast of Akçataş, district Horasan/Erzurum, 40°05'43N, 42°11'04E, at 1,718 m elevation, 21 July 2013. Source: Kumlutaş et al. (2015), Yusuf Kumlutaş (pers. comm.), and also photos by Mustafa Sözen on <http://dogalhayat.org/property/cok-ozel/#prettyPhoto>.
- 3 **Refined:** Aras town, district Horasan/Erzurum, 39°59'26N, 42°17'59E, at 1,650 m elevation, 16 May 1989. Source: J. Bergman, also sequence data in Supplemental Table S1 or labeled as specimen wg9 in Stümpel (2012) and Stümpel et al. (2016).
- 4 **Refined:** branch of Güzeldere Gorge (Tahir Mts.), below Sariköy (Sarican, Sarizhan), dstr. Eleskirt/Agri, 39°47'19N, 42°29'08E, at 2,068 m elevation, year 2007. Source: Tuniyev et al. (2014, 2019) Remarks: coordinates placed by us, but reflecting all four points mentioned in respective publications: 1) branch of Güzeldere Gorge, below village Sarizhan (= Sariköy, Sarican), 3) upper Murat River Basin, 4) boundary of Caucasus Ecoregion.
- 5 **Refined+New:**
- a. **Refined:** approximately 2.9 km northeast of Otluca, district Tutak/Ağrı, 39°36'47N, 42°53'46E, n = 4 within 400 m from coordinates, between 1,847–1,873 m elevation, 29 May 2014 (Fig. 3B of primary article, habitat in Supplemental Fig. S2B). Source: Naşit İğci, Mehmet Zülfü Yıldız, and Yıldız et al. (2018). Remarks: two of these specimens were killed by locals (Supplemental Fig. S2A).
- b. **New:** 3.3 km southwest of Ceylanlı, district Hamur/Ağrı, 39°37'01N, 42°54'58E, n = 6, around 1,989 m elevation, 12 May 2017 and 04 June 2017 (Supplemental Fig. S2C, D). Source: photos taken and provided by Garip Çağirci.
- 6 **Refined:** Koçaklar, district Patnos/Ağrı, 39°13'50N, 42°41'07E, at 1,895 m elevation, 28 May 2014. Source: Naşit İğci, Mehmet Zülfü Yıldız, and Yıldız et al. (2018). Remarks: based on credible local reports and photo-ID questionnaire, ca. 7 km east from nearby locality-7 in Muş province with continuous habitat between localities-6 and -7 (Göçmen et al. 2014).
- 7 **Refined:** Dolabaş, district Malazgirt/Muş, 39°15'11N, 42°36'37E, at 2,146 m elevation, 18 May 2013 (Supplemental Fig. S3). Source: Bayram Göçmen, Bahadır Akman, Naşit İğci, Mehmet Anil Oğuz, voucher ZMADYU 2013/81 (Zoology Museum of Adiyaman University Turkey) and Göçmen et al. (2014).
- 8 **New:** ca. 2 km southwest of Akçakaynak, district Bulanık/Muş, 39°09'17N, 41°58'01E, n = 5, between 1,972–2,043 m elevation, 15 June 2017 (Fig. 3C of primary article). Source: Konrad



SUPPLEMENTAL FIGURE S1. Typical habitats of Wagner’s Viper (*Montivipera wagneri*) in the Aras Valley, locality-1. A) small to large rock slides below cliffs, near Karabağ, district Kağızman/Kars; B) alpine meadows strewn with rocks near Karakurt, district Sarikamiş/Kars. These habitats occur extensively with little interruptions over > 100 km along slopes of the Aras-Kötek Valley from Günindi/Kars in the east to the province border with Erzurum, providing a massive biotope, even when not counting the many side valleys of Aras Valley with more suitable habitats. (Photographs by Konrad Mebert).



SUPPLEMENTAL FIGURE S2. Wagner's Viper (*Montivipera wagneri*) in the Kiliç Dağları (= Mountains), central Ağrı province. A) locality-5a, two Wagner's Viper killed by locals northeast of Otluca, district Tutak/Ağrı; B) habitat of locality-5a, ca. 1 km west of the killed vipers depicted in A); patches of such viper habitat, including rock fields, plateaus and cliffs, occur regularly across the entire mountainous landscape as far as ca. 70 km south into district Patnos/Ağrı, and into adjacent provinces Van and Muş; C) and D) two specimens from locality-5b, south of Ceylanli, district Hamur/Ağrı, ca. 2 km east of killed specimens in A). (Photographed by photo by Naşit İğci [A and B.], by Garip Çağirci [C and D]).



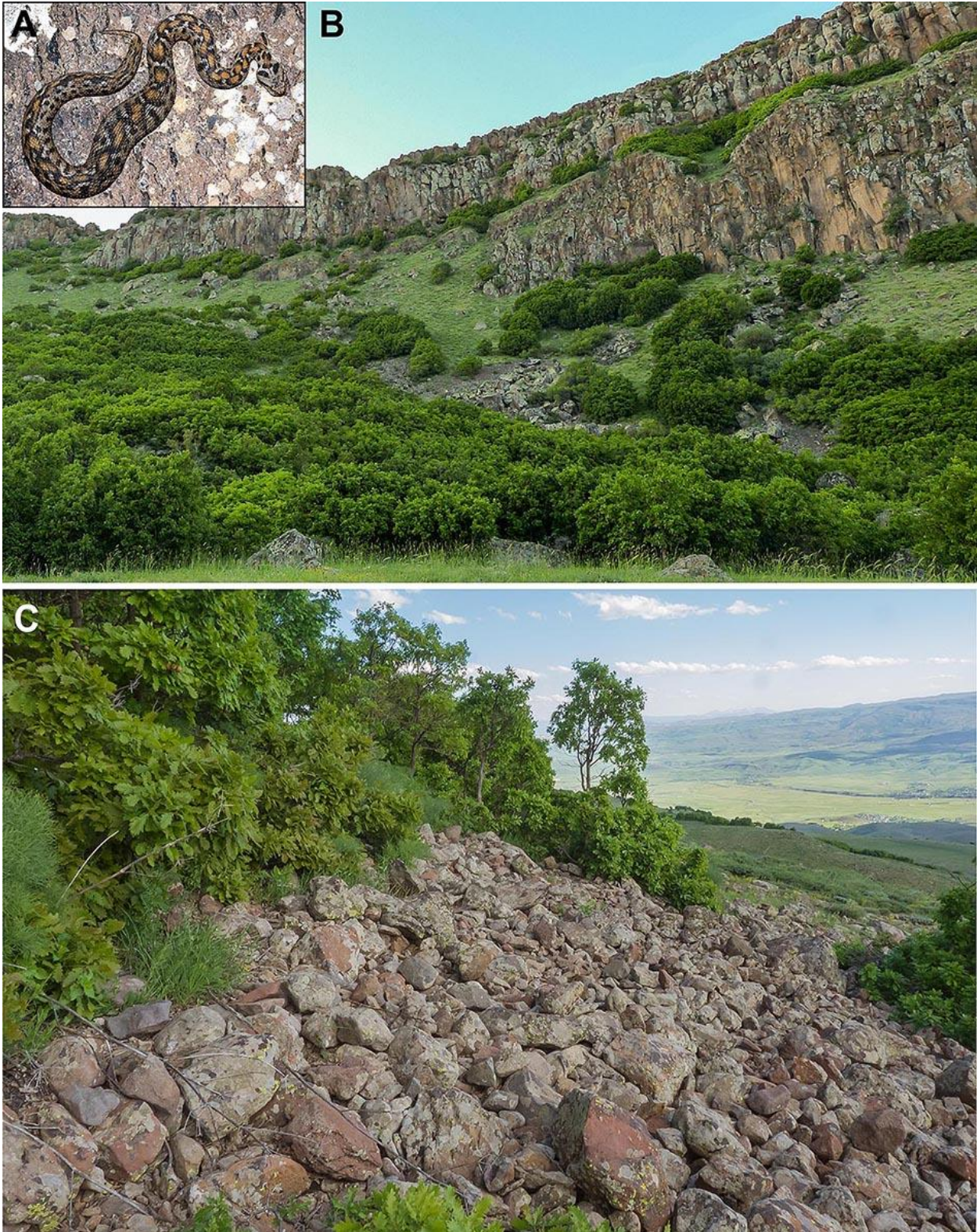
SUPPLEMENTAL FIGURE S3. Wagner's Viper (*Montivipera wagneri*) Dolabaş, district Malazgirt/Muş. A) locality-7, female; B) locality-7, montane steppe above 2,100 m elevation. (Photographed by Bayram Göçmen [A], by Naşit İğci [B]).

Mebert, Mert Kariş, Naşit İğci, Mehmet Anil Oğuz. Remarks: According Mehmet Akif Bozkurt (pers. comm.), locals from Akçakaynak confirmed this viper to be common in the small canyons near the village (39°10'10N, 41°58'08E, at 1,950 m elevation) which are adjoined by rock slides/piles and oak trees across the meadow south of the village up to locality-8.

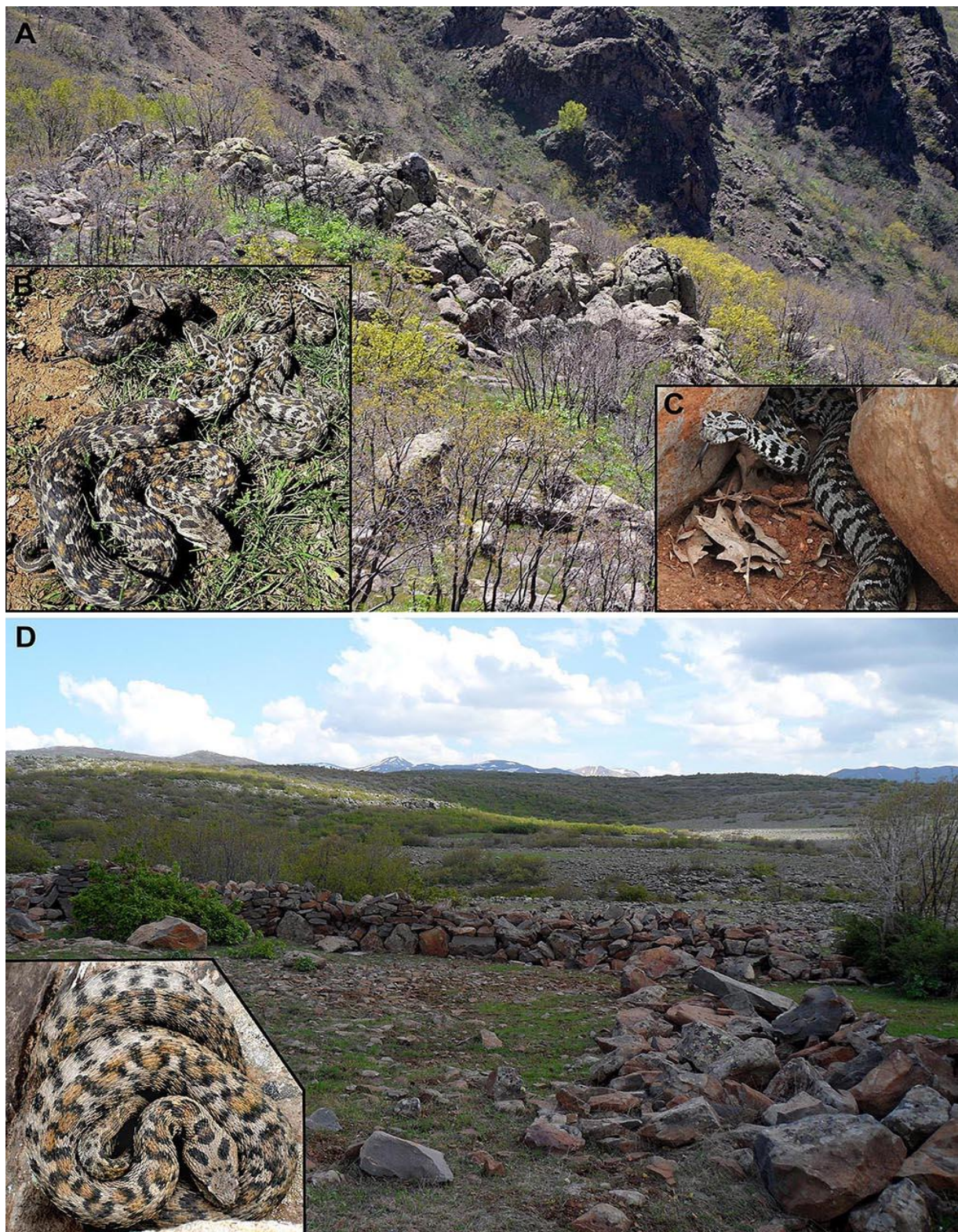
- 9 **New:** Çatakli, district Bulanik/Muş, 38°58'13N, 41°55'13E, at 1,628 m elev., 28 September 2019. Source: Konrad Mebert, Mert Elverici, Burak Akdağ. Remarks: this site together with locality-8 represents the second region for *M. wagneri* in the province Muş. It begins at a distance of max. 56 km (or 35 km acc. to multiple anecdotal information around Bilincan Mountain, south of Bulanik) west of the Dolabaş record (locality-7). Large stretches with patches of the same habitat and potentially dense populations of mountain vipers extend from locality-8 at least 40 km (or 65 km from Bilincan Mountain) westward on both sides along the Murat River, inc. riparian rock ledges, large grassy plains with stone piles, on rocky montane plateaus and slopes up to 10 km inland from the river (Supplemental Fig. S4).
- 10 **New:** Ilica, district Hınıs/Erzurum, 39°25'46N, 41°33'07E, n = 2, at 1,960 m elevation, 13 June 2017 (Supplemental Fig. S5A, B, and related habitat in C). Source: Konrad Mebert, Mert Kariş, Naşit İğci, Mehmet Anil Oğuz. Remarks: the site is 87 km southwest of Horasan (locality-2, the previously most-western published record by Kumlutaş et al. 2015), and > 60 km west of range limit by the IUCN Red List of Threatened Species (IUCN. 2020. *op. cit.*).
- 11 **New:** below the edge of the southern slope, ca. 1.9 km southwest of Topalan Köyü, district Merkez/Bingöl, 38°53'39N, 40°24'49E, at 1,715 m elevation. Molecular analysis confirmed its allocation to *M. wagneri* (cytochrome-*b* sequence Supplemental Table S1) which is similar to haplotypes wg3 to wg13 and wg16 in Stümpel et al (2016). Remarks: first records for province Bingöl.
- multiple specimens being collected and/or killed at the putative hibernation site, a rocky escarpment, on 05 May 2015. Source: video clip posted on <http://www.sabah.com.tr/webtv/yasam/bu-koyu-yilanlar-basti> and downloaded by us.
 - same general escarpment as site a., 38°53'41N, 40°24'49E, n = 8, around 1,724 m elevation, 08 April 2018 (Supplemental Fig. S6A, B). Source: Mehmet Zülfü Yıldız and Mehmet Akif Bozkurt.
 - a single specimen 0.8 km southwest of Topalan (and northeast of subsites a. and b.), 38°52'41N, 40°22'46E, at 1,681 m elevation, 06 June 2017 (Supplemental Fig. S6C). Source: photo taken and provided by Mehmet Fidan.
- 12 **New:** northeast from Bulgurcuk, district Karakoçan/Elazığ, 38°57'47N, 40°12'14E, 1,708 m elev., 16 May 2012 (Supplemental Fig. S6D). Source: photos taken and provided by Anton Kozlov. Remarks: first record for province Elazığ. Currently allocated to the *wagneri*-clade based on geographic proximity of 20 km to the genetically confirmed *wagneri*-locality-10.
- 13 **New:** west of Sirmaliöya, district Genç/Bingöl (acc. to Google Earth Pro), near the border to district Palu/Elazığ, 38°40'00N, 40°19'17E, at 2,148 m elevation, 16 June 2018 (Supplemental Fig. S7A). Distribution map generated by QGIS shows locality-13 within Elazığ province (Fig. 2). Source: photo and video clip taken and provided by Murat Bahçeci. Remarks: currently allocated to the *wagneri*-clade based on geographic proximity of 31 km to confirmed *wagneri*-locality-10, representing the currently most southern record for *M. wagneri*.



SUPPLEMENTAL FIGURE S4. Habitat of Wagner’s Viper (*Montivipera wagneri*) with rocky shores (upper image) and plateau with rock piles (lower image) along the Murat River west of locality-8 in Muş province, indicating extensive suitable habitat for this species between Oğlakkaya, district Bulanik, west to Mescitli, district Merkez, and Kuşluk, district Varto. (Photographed by Konrad Mebert).



SUPPLEMENTAL FIGURE S5. A) and B) locality-10, Wagner's Viper (*Montivipera wagneri*) and habitat from Ilica, district Hınıs/Erzurum, ca. 1,950 m elevation; B) Potential habitat of Wagner's Viper (*Montivipera wagneri*) at Çobandağı, district Varto/Muş, ca. 2,200 m elevation, 20 km southwest of locality-10. (Photographed by Konrad Mebert).



SUPPLEMENTAL FIGURE S6. Distribution updates of western Wagner's Viper (*Montivipera wagneri*). A) locality-11b, habitat; B) specimens below the edge of the southern slope south of Topalan, district Merkez/Bingöl; C) specimen from locality-11c, Wagner's Viper from northern slope near Topalan, district Merkez/Bingöl; D) locality-12, habitat and Wagner's Viper near Bulgurcuk, district Karakoçan/Elazığ. (Photographed by Mehmet Zülfü Yıldız [A and B], by Mehmet Fidan [C], by Anton Kozlov [D plus inset]).

- 14 **New:** Tahkini Yaylasi (Plateau)-Pohoz Mevki, ca. 5.2 km northeast of Turnayolu, district Nazimiye/Tunceli, 39°12'38N, 39°56'17E, n = 3 within 200 m, between 1,831–1,860 m elevation, 14 June 2019 (Fig. 4 of primary article). Source: Mert Elverici, Konrad Mebert, Naşit İğci, Mahmut Aydoğdu. Remarks: first official and first genetically confirmed records for *M. wagneri* from Tunceli province (Supplemental Table S1).
- 15 **Refined+Corrected:** Hengirvan Plateau, 7.8 km northeast of Alacik, district Merkez/Tunceli, 39°17'48N, 39°45'13E, at 1,884 m elevation, 18 May 2014 (Supplemental Fig. S7B). Source: Göçmen et al. (2014) with photos by Celal Çiçek posted on Turkherptil (www.turkherptil.org), erroneously under *M. albizona* and repeated as such in Çiçek et al. (2017) and pictured also by TUDAK ([/www.facebook.com/TunceliDagcilikVeKampSporlariKulubu](http://www.facebook.com/TunceliDagcilikVeKampSporlariKulubu)). Remarks: we currently associate this specimen to the *wagneri*-clade due to its location east of Euphrates River Valley and simultaneously south of the Munzur Mountains; the regular vertical lateral blotches tend more to *M. wagneri* than *M. b. albizona* (see Table 1 and Supplemental Fig. S7B, C, D), and in particular its close proximity to the newly confirmed *wagneri*-site 18 km farther southeast (locality-14). It represents the currently most western populations for *M. wagneri*. On the other side, the nearest *albizona*-clade record (locality-16 in Fig. 5) is ca. 78 km north across these mountains, whose high elevations of mostly > 2,500 m elevation may have acted as an eco-topographic barrier due to harsh climate. Hence, molecular analysis is required for a definitive allocation of populations in between these taxa, in particular from the southern slopes of the Munzur Mountains, which are not available at this time.

Albizona Viper or Central Turkish Mountain (*Montivipera bulgardaghica albizona*)

Distribution of the Albizona Viper is shown in Fig. 5 (copied in from primary article). The locality list below is sorted approximately from north-east to north-west, followed by more southern localities:

- 16 **Refined:** between Gökaynak and Taşbulak (Ziyaret Tepesi), district Kemah/Erzincan, 39°38'00N, 38°56'59E, at 1,500 m elevation, 11 September 1994. Source: John Mulder (pers. comm. 2015), Mulder (1995) and mentioned in Göçmen et al. (2014). Remarks: this record is based only on a shed that has been lost (John Mulder, pers. comm.). It represents the nearest record to *M. wagneri* (historically 280 km to locality-2, herein adjusted to 78 km, see locality-15 for details) and is still the most northern and eastern record of the *albizona*-clade, but it requires confirmation due to its limited information and sole indication for this taxon north of the Munzur Mountains, yet the habitat, visited by us, appears suitable.
- 17 **New:** Kabataş Plateau, district Kemaliye/Erzincan, 39°21'39N, 38°36'17E, at 2,110 m elev., 07 June 2019 (Supplemental Fig. S7C). Source: photo taken and provided by Sema Sağı.
- 18 **New:** Kabataş (Karadağ), district Kemaliye/Erzincan, 39°21'03N, 38°35'59E, n = 2, at 1,796 m elevation, year 2012. Source: photo taken and provided by Kenan Görkem Gültekin. Remarks: 1.2 km across a mountain peak southwest of locality-17.
- 19 **New:** Kaynar Yaylasi (Plateau), 2 km southwest Yeşilyurt, district Kemaliye/Erzincan, 39°10'31N, 38°33'08E, at 1,667 m elevation, years 2013–2016. Source: information provided by Şevket Gültekin (pers. comm.).
- 20 **Refined:** Sariçiçek Plateau, Sandik, district Kemaliye/Erzincan, 39°15'22N, 38°26'52E, at 1,791 m elevation, 01 June 2013, ZMHRU 2013/90 (Zoology Museum of Harran University, Şanlıurfa, Turkey). Source: Şevket Gültekin, Bayram Göçmen, Mert Kariş, Deniz

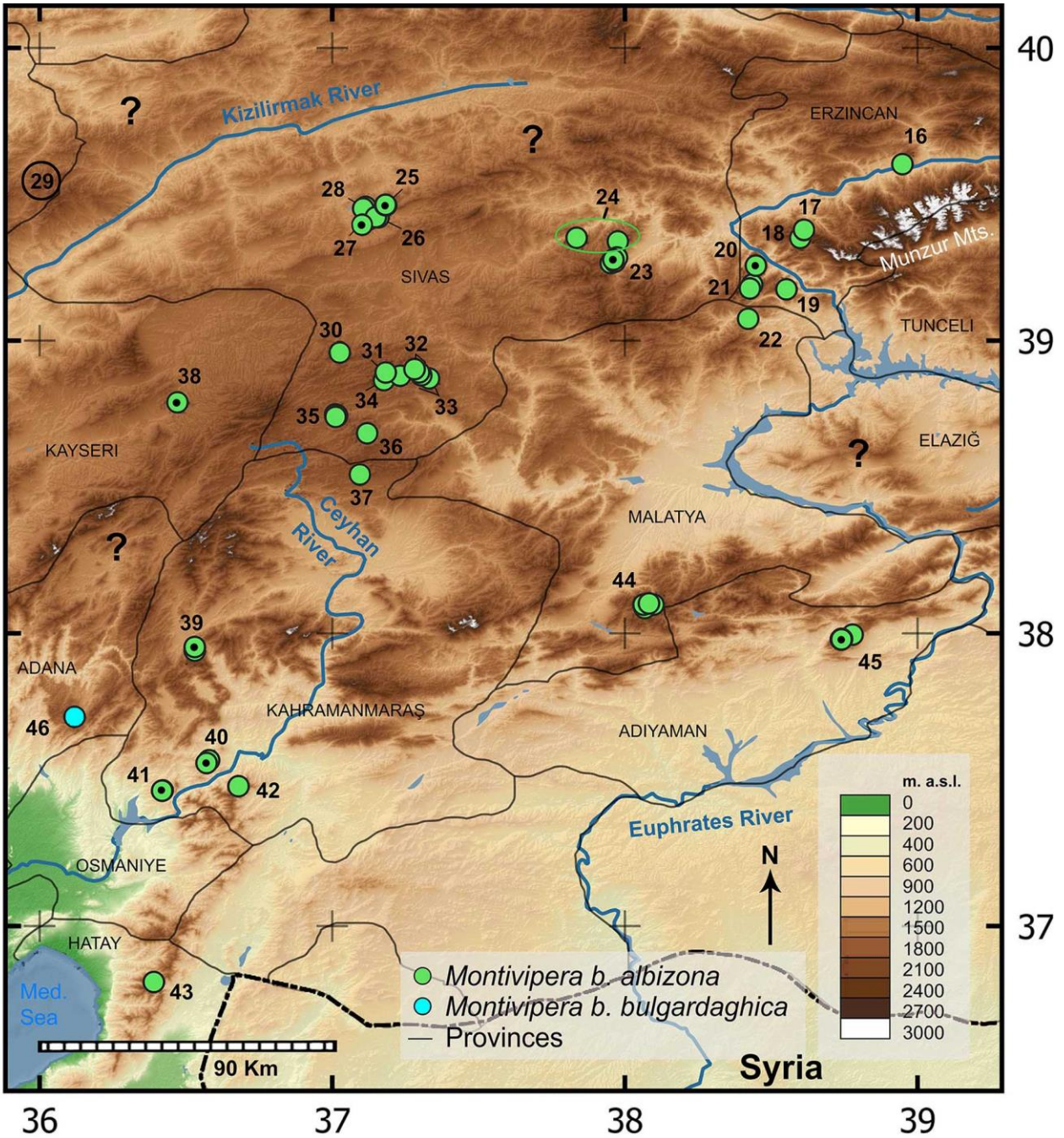


FIGURE 5-inserted from primary article. Updated distribution of Albizona Viper (*Montivipera bulgardaghica albizona*) and nearest record of the Bolkar Viper (*Montivipera b. bulgardaghica*). Numbers refer to the Locality List. Samples used for genetic analysis are indicated with a black center, except for locality-40 from Başkonuş, Merkez/Kahramanmaraş, which refers to an albumin analysis by Göçmen et al. (2009). Question marks indicate regions where further *Montivipera* populations are expected but require confirmation.

Yalçinkaya, also listed in Göçmen et al. (2014) and photos on Turkherptil (*op. cit.*), confirmed by genetic data (Supplemental Table S1).

-21 **New:** Kuluyar, 6.7 km southeast of Gözaydin, district Kemaliye/Erzincan, 39°10'42N, 38°25'38E, n = 2, at 1,850 m elevation, 31 May 2017 (Supplemental Fig. S7D), and another specimen from 1.5 km farther north at Mazman Başı, 6 km southwest Sirakonak Köyü,



SUPPLEMENTAL FIGURE S7. Distribution updates of western Wagner's Viper (*Montivipera wagneri*) and Albizona Viper (*Montivipera bulgardaghica albizona*). A) locality-13, *M. wagneri* west of Sirmalioya, district Genç/Bingöl, image contrast-enhanced for color pattern clarity; B) locality-15, *M. wagneri* Hengirvan, district Merkez/Tunceli, currently the western-most *M. wagneri*; C) locality-17, *M. b. albizona* from Kabataş Plateau, district Kemaliye/Erzincan, ca. 78 km from nearest *M. wagneri* site in B); D) locality-21, *M. b. albizona* Kuluyar, district Kemaliye/Erzincan; E) locality-25, *M. b. albizona* Ovacik, district Ulaş/Sivas; F) locality-36, *M. b. albizona* Karakuyu, district Gürün/Sivas; G) locality-40, *M. b. albizona* Başkonuş Sersem Plateau, district Merkez/Kahramanmaraş. (Photographed by Murat Bahçeci [A], by Celal Çiçek [B], by Sema Sağı [C], by Şevket Gültekin [D], by Konrad Mebert [E], via Ferhat Yıldız [F], by Selcen Ünüvar [G]).

district Kemaliye/Erzincan, 39°11'28N, 38°26'06E, at 1,868 m elevation, 15 May 2012.

Source: Şevket Gültekin, and photos for both sites on Turkherptil (*op. cit.*).

-22 **New**: Kozluk Stream, Kengerli Yazı, 4.2 km northwest of Sekizsu, district Arapgir/Malatya, 39°04'29N, 38°25'17E, at 1,603 m elevation, year 2017 (Supplemental Fig. S8A). Source: photo taken and provided by Ayfer Zincirkaya.



SUPPLEMENTAL FIGURE S8. Distribution updates of northern Albizona Viper (*Montivipera bulgardaghica albizona*). A) locality-22, Kengerli Yazı, northwest of Sekizsu, district Arapgir/Malatya; B) locality-35a, Osmandede, district Gürün/Sivas; C) locality-38, dead on road (DOR) Albizona Viper near Karaboğaz, district Pinarbaşı/Kayseri, the only record from the province Kayseri. (Photographed by Ayfer Zincirkaya [A], by Konrad Mebert [B], photo and scan by Mario Schweizer [C]).

- 23 **Corrected:** Type locality, originally given as Kulmaç Dağları, a mountain range south of Altinyayla/Sivas, Nilson et al. (1990). However, adjusted coordinates were provided by Göran Nilson in 2015 (pers. comm.); hence, the terra typica lies 100 km farther east on the eastern slopes of Beşoyuk Tepesi/ Dağı (= B. Hills/Mts.) with Ulu Tepe/ Dağı (= U. Hills/Mts.) adjacent south, and the principal Yama Dağı farther south (source mapcarta.com). The locality is Karasar, district Divriği/Sivas, (Nilson et al. 1990), 39°15'55N, 37°57'06E, at 1,630 m elevation, vouchers GNM Re.ex. 5022/ZIG (Department of Zoology, University of Göteborg, Sweden) No. 0254 (= holotype/paratype), female/male, 02 June 1989 (sequence data in Supplemental Table S1), and labeled as specimens az9, and possibly az6, in Stümpel (2012) and Stümpel et al. (2016). Further records within 2 km north and east towards Uzunkaya have been confirmed with vouchers MHNG 2537.038, 2547.028 (Fabien Bettex pers. comm., and Bettex [1993]), and records provided by a Swedish team (Johan Nylander, Börje Flärdh, pers. comm.) as far as 39°16'35N, 37°57'39E. The Yama Dağı reported in Tok et al. (2009), repeated in Çiçek et al. (2017), appears to refer also to this area (type locality) according to the potential sources listed in respective references.
- 24 **New:** sites ca. 10 km north of the type locality near the villages Soğucak (39°21'05N, 37°50'07E), Dumluca (39°20'21N, 37°58'33E) and Karağaçlı (39°22'11N, 37°57'27E) in district Divriği/Sivas (encircled localities in Fig. 5). Source: approximate location evaluated by us via comparing 3D-format of satellite images (Google Earth Pro) with topography and vegetation structure of photographic documentation by Deniz Şimşek for Soğucak, and by Ümit Yalçın for Dumluca and Karağaçlı (personal facebook sites), photos stored by us.
- 25 **New:** 4 km west of Ovacık, Tecer Dağları, district Ulaş/Sivas, 39°27'49N, 37°10'56E, n = 5 within 300 m, ca. 1,755 m elevation, 17 May 2015 and 11 June 2016 (Supplemental Figs. S7E, S9). Source: Eray Şimşek, Güray Tayyar Şimşek, Mert Kariş, Naşit İğci, Mehmet Anil Oğuz, Bayram Göçmen, Konrad Mebert and photos on Turkherptil (*op. cit.*).

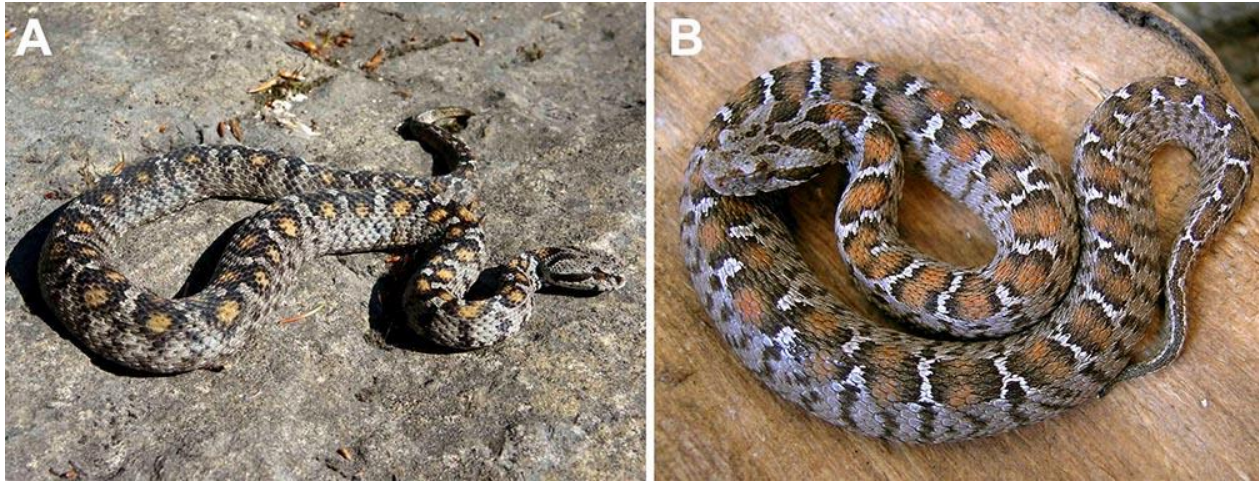


SUPPLEMENTAL FIGURE S9. Albizona Viper (*Montivipera bulgardaghica albizona*) in its habitat at locality-25, northern slopes of Tecer Mountains near Ovacık, district Ulaş/Sivas. (Photograph by Konrad Mebert).

- 26 **Refined:** Kayapinar, Tecer Dağları, district Ulaş/Sivas, 39°25'17N, 37°09'29E, n = 3 within 1 km, between 1,671–1,740 m elevation, 05 June 2002, 10–11 June 2004. Source: David Jandzik (pers. comm.) and photos in David and Vogel (2010).
- 27 **Refined:** Tecer, Tecer Dağları, district Ulaş/Sivas, 39°24'50N, 37°07'18E, n = 13 within 1 km, ca. 1,680 m elevation, May and June 1992–1993 (sequence data in Supplemental Table S1). Source: John Mulder (pers. comm.), Mulder (1995), and specimens az3 and az4, and possibly also az5 or nr. 18020 in Stümpel (2012) and Stümpel et al. (2016).
- 28 **New:** Demircilik, Tecer Dağları, Ulaş/Sivas, 39°27'20N, 37°06'42E, at 1,682 m elevation, 30 April June 2014 and multiple specimens pictured by a wildlife photographer (contact information and photos deposited by us) within 1 km in 2012. Source: Gerrit Jan Verspui (pers. comm.) and J.R. (stored by us).
- 29 **Corrected:** a locality point in Fig. 1 of Stümpel et al. (2016) pointing to approximately Kizilcaova, Yozgat province (see circled nr. 29 in upper left of Fig. 5), putatively represents the northwestern-most *albizona*-locality and the only record for this taxon north of the Kizilirmak River (= Red River). After consulting respective sources, it actually refers to locality-27 reported by Mulder (1995) for the Tecer Mountains. Hence, up to now, there are no published records of the *albizona*-clade from north and west of the Kizilirmak River.
- 30 **Refined:** Çipil, district Kangal/Sivas, 38°56'54N, 37°01'52E, ca. 2,000 m elevation, 16 June 2016. Source: Konrad Mebert, Mert Kariş, Naşit İğci, Mehmet Anil Oğuz via photo of local shepherd. Remarks: Çiçek et al. (2017) also mention Kangal as a locality, but without coordinates.
- 31 **Refined:** Yılanhöyük, district Gürün/Sivas, 38°52'45N, 37°13'56E, at 1,860 m elevation, year 2017. Source: coordinates placed according to Figs. 4 and 10 (= Şekil 4 and 10) in Çiçek et al. (2017).
- 32 **Refined:** Karadag, east of Konakpınar and surrounding, district Gürün/Sivas, 38°52'58N, 37°18'17E, at 1,856 m elevation, year 2017. Source: coordinates placed according to Figs. 3 and 19 (= Şekil 3 and 19) in Çiçek et al. (2017).
- 33 **New:** Karadoruk, district Gürün/Sivas, 38°50'20N, 37°22'38E, at 1,783 m elevation, 16 June 2016. Source: Konrad Mebert, Mert Kariş, Naşit İğci, Mehmet Anil Oğuz.
- 34 **New:** Çiçekyurt, district Gürün/Sivas, 38°50'14N, 37°06'20E, n = 2, near 1,931 m elevation, 16 June 2016. Source: Konrad Mebert, Mert Kariş, Naşit İğci, Mehmet Anil Oğuz. Remarks: Çiçek et al. (2017, 2018) listed local, unvouchered (no specimens or photos) observations of *M. b. albizona* for additional districts in Sivas province, that would extend its range farther north and west. However, these reports require confirmation due to potential confusion with other species. The observations from districts Altınyayla, Gürün, Ulaş, Kangal, and Divriği are plausible in the sense, that they are within the known range or would connect via mountains to locality-38 in Kayseri province. Those from western Sivas districts Gemerek, Şarkışla, and Yıldızeli may be correct, but approach *M. xanthina* in the south, and *Vipera (ammodytes) transcaucasiana* in the north (Mulder 2017), two viper species with which these observations might have been confused. Should *M. b. albizona* indeed exist in those western Sivas districts, they likely would occur in parapatry to one of the other viper species due to potential competition for similar resources (food, rocky shelters, etc.). *Montivipera b. albizona* possibly exists in the north-eastern districts of Sivas province including Sivas Merkez, Hafik, Zara, and Imranlı, at least in their southern portions that are continuous extensions of its habitat in the Tecer Mountains (*albizona* localities-25–28). A question mark

is placed in these regions and the western districts of Sivas province that require confirmation by identifiable vouchers. The region adjacent north of the Tecer Mountains may represent a range limit, as it is composed of large flat plains, mostly agriculturally used, or hills and mountains with relatively fine sediments. Such landscapes appear less suitable for mountain vipers, as they are poor on stable and complex rock structure and subterranean holes and crevices, which are important habitat constituents for Anatolian mountain vipers (Mebert et al. 2016).

- 35 **New+Corrected:** Osmandede, slopes of the eastern extension of the Göbekören Hüyüğü (= G. Hills) and adjacent north of Uzunöz Tepesi (= U. Hills), district Gürün/Sivas. This site was originally named as Tahtali Mountains in Teynié (1991) and extrapolated to this entire mountain range in Çiçek et al. (2017), but the observed *M. b. albizona* refers to sites adjacent-east of the principal ridges of the Tahtali Mountains and may or may not be viewed as part of those mountains (see source):
- 38°44'22N, 37°00'41E, at 1,748 m elevation, 15 June 2016 (Supplemental Fig. S8B). Source: Konrad Mebert, Mert Kariş, Naşit İğci, Mehmet Anil Oğuz.
 - 38°44'42N, 37°0'58E, n = 4 within 1 km from coordinates, between 1,650–1,740 m elevation, 30 May 1991, 30 May 2000, 07 June 2001. Source: Alexandre Teynié, Philippe Geniez, Pierre-André Crochet, F. Durand and photos depicted in David and Vogel (2010).
- 36 **New:** Karakuyu, east of Osmançali Tepesi (= O. Hills), district Gürün/Sivas, 38°41'00N, 37°07'09E, at 1,800 m elevation, 18 April 2018, approximately 11 km from the nearest known population at locality-35. Source: shepherd's photo (Supplemental Fig. S7F) and locality information sent via Ferhat Yıldız and posted on Türkiye Yaban Hayati-Wild Life Turkey (facebook.com/groups/turkiyedogalhayati/), ID confirmed by Konrad Mebert.
- 37 **New:** 3.7 km north of Alkayaoğlu, district Elbistan/Kahramanmaraş, 38°34'03N, 37°06'00E, at 1,986 m elevation, 3 July 2019. Source: photo of killed specimen taken by a shepherd and provided via mammalogist Tarkan Yorulmaz (pers. comm.). Remarks: the shepherd explained to have killed ca. 20 vipers within 1 km of this locality in the first half of 2019. The habitat is an extensive ca. 20 x 30 km rocky plateau > 2,000 m elevation to which also locality-36 belongs.
- 38 **Refined:** Karaboğaz, district Pinarbaşı/Kayseri, 38°47'21N, 36°28'15E, at 1,540 m elevation, May 2000 (Supplemental Fig. S8C and sequence data in Supplemental Table S1). Source: Mario Schweiger (pers. comm.) and specimen labeled as az7 in Stümpel (2012) and Stümpel et al. (2016). Remarks: this is the only record of Albizona Viper from the province Kayseri. The nearest record of an Ottoman Viper (*M. xanthina*) is in the Erciyes Mountains 83 km southwest (locality-63), yet, shorter distances to Ottoman Vipers likely exist along the interjacent mountain ridges and valleys.
- 39 **Refined:** Kurucaova (Armutyücesi Mountains), district Göksun/Kahramanmaraş, 37°56'27N, 36°31'49E, at 1,902 m elevation, 17 May 2011 (Supplemental Fig. S10A and sequence data in Supplemental Table S1). Source: Nikolaus Stümpel, and specimen labeled as spec1 in Stümpel (2012) and Stümpel et al. (2016). This record is 1.4 km south of a specimen found dead on the road to the Püren Pass (Püren Gecidi, Armutyücesi Mountains), Değirmendere, district Göksun/Kahramanmaraş, 37°57'12N, 36°31'48E, at 1,520 m elevation, mid-1990s. Source: Joseph Schmidtler (pers. comm.) and Stümpel (2012).



SUPPLEMENTAL FIGURE S10. Distribution vouchers and pattern variations of southern Albizona Viper (*Montivipera bulgardaghica albizona*). A) locality-39, Kurucaova (Armutyücesi Mountains), district Göksun/Kahramanmaraş; B) locality-40, Başkonuş Plateau, district Merkez/Kahramanmaraş. (Photographed by Nikolaus Stümpel [A], by Bayram Göçmen [B]).

-40 **New:** Başkonuş Sersem Plateau, south of Yaylaüstü (Balik Mountain Range), district Merkez/Kahramanmaraş, 37°33'24N, 36°34'13E, at 1,415 m elevation, 15 May 2016 (Supplemental Fig. S7G). Source: photo provided by Selcen Ünüvar. Remarks: this specimen was found ca. 1.3 km south of a specimen (see Supplemental Fig. S10B) found by Ersen Aydın Yağmur on a resort at 37°33'59N, 36°34'43E, 1,300 m elevation, 06 July 2006, voucher ZDEU 188/2006, male, also depicted in Turkherptil (*op. cit.*) and in Göçmen et al. (2009).

-41 **New:** Bostanlı, district Andirin/Kahramanmaraş, 37°27'49N, 36°25'13E, n = 5 within 600 m from coordinates: a) one specimen basking in/near the periphery of a wheat field at 1,028 m elev. on 05 July 2015; b) one specimen on a forest path at 1,026 m elev. on 22 May 2018, and c) three killed specimens at 999 m elev. on 4 May 2019. Source: a) Deniz Yalçinkaya, Eda Sami pers. comm. (Supplemental Fig. S11A); b) Bayram Göçmen, Mert Kariş, Deniz Yalçinkaya and photos on Turkherptil (*op. cit.*) and (Supplemental Fig. S11B); c) photo by shepherd Akif Karpuz (Supplemental Fig. S11C). Remarks: Bostanlı is ca. 38 km southeast across mountainous habitat from the nearest *bulgardaghica*-like specimen in the province Adana (locality-46). The Bostanlı locality represents the lowest altitude confirmed for the *albizona*-clade. The habitat consists of a few wheat fields and meadows with partly rocky peripheries, surrounded by deciduous broadleaf forest, indicating increased and year-round precipitation associated with rather cool diurnal temperatures for such an elevation (precipitation data for Andirin and other sites in Kahramanmaraş province, see Karabulut and Cosun 2009). This could contribute to the reasons why the Albizona Viper occurs here at lower elevations in broad sympatry with the more frequent *Macrovipera lebetina*. Even lower is an anecdotal observation by a local woman, interviewed by us, who reported her first ever observation during > 40 years residence of an orange-blotched viper in her backyard at Boğazören, Andirin/Kahramanmaraş, 37°28'59N, 36°24'45E, at 765 m elev. m, year 2018. A potential source population likely exists on the slopes above up to 930 m elevation.



SUPPLEMENTAL FIGURE S11. Lowest elevation habitat of southern Albizona Viper (*Montivipera bulgardaghica albizona*) at locality-41, Bostanlı, district Andirin/Kahramanmaraş, ca. 1,000 m a.s.l: A) approximative site of observed specimen indicated by black line; B) this specimen was found ca. 200 m more to the left (= west) of A); C) three specimens killed by locals. (Photographed by Deniz Yalcinkaya and Mehmet Zülfü Yıldız [habitat, A and B], by Akif Karpuz [C]).

-42 **New:** Gürün Tepesi, Karadere, district Merkez/Kahramanmaraş, 37°30'14N, 36°39'58E, > 1,000 m elev., summer 2014 (Supplemental Fig. S12B). Source: Durdu Mehmet Okutucu (pers. comm.) and photo on durdumehmetokutucu.blogspot.com/2015/ by the same author. Localities-40 to -42 represent the northern portion of the forested, rain-rich Nur Mountains.



SUPPLEMENTAL FIGURE S12. Distribution updates and pattern variations of southern Albizona Viper (*Montivipera bulgardaghica albizona*). A) locality-43, peak of Uzunziyaret (or Bozdağ) Tepesi (Amanos or Nur Mountains), district Hassa/Hatay; B) locality-42, Gürün Tepesi, Karadere, district Merkez/Kahramanmaraş. (Photographed by Ümit Kaplan [A], by Durdu Mehmet Okutucu [B]).

-43 **Refined:** near peak of Uzunziyaret (or Bozdağ) Tepesi (Amanos or Nur Mountains), district Hassa/Hatay, 36°48'31N, 36°23'25E, at 2,200 m elevation, 13 October 2010 (Supplemental Fig. S12A). Source: Ümit Kaplan provided photos and videos, also depicted on *Turkherptil* (*op. cit.*) and mentioned in Göçmen et al. (2014); herein we publish the first coordinates and journal-based photographs. Remarks: currently, this is the southern-most and highest altitudinal record of the *albizona*-clade. During field expeditions in 2019, we have received information by locals that mountain vipers resembling the *albizona*-clade occur farther south along the Nur Mountains and even into the Ziyaret Mountains in southern Hatay province, thus, approaching the Syrian congeners (e.g., see Stümpel et al. 2016).

-44 **New:** Asipinar, district, Doğanşehir/Malatya, 38°05'57N, 38°04'59E, between 1,708–1,828 m elevation, year 2016 and before. Source: shepherd Ali (interviewed by us) observed several corpulent and slow vipers with yellow-orange blotches within half a km around his house (see coordinates), most frequently in May. Furthermore, a man was bitten by a viper 2 km farther west at 38°05'10N, 38°04'04E, at 2,007 m elevation, and an orange-blotched viper was observed by another local shepherd at 38°05'52N, 38°03'49E, about 1,814 m elevation and 2 km farther east. This region requires confirmation, but viper descriptions, geographic position/elevation, and habitat render these records plausible, hence credible.

-45 **New:** Mount Nemrut National Park in Adiyaman province, 37°58'50N, 38°44'27E (coordinates represent the peak of Nemrut Dağ at 2,168 m elevation). Source: the first pictures we received related to a specimen posted on Türkiye Yaban Hayati-Wild Life Turkey ([facebook.com/groups/turkiyedogalhayati/](https://www.facebook.com/groups/turkiyedogalhayati/)) on 23 March 2017 with the locality label “Gerger, Mt. Nemrut, 2,000 m elevation”. However, peak and the archeological site of Mt. Nemrut are located in Kahta district, whereas Gerger district begins 3.6 km farther east of Mt. Nemrut at ca. 1,960 m elevation (37°59'44N, 38°46'42E), represented by a second locality marker east of locality-45, but no separate number is given herein due to uncertainty, even though suitable rocky habitat > 1,700 m elevation continues 10 km eastward. Copies of these pictures were

stored by us before they were removed from the website, but no further information could be acquired anymore. In 2018, park rangers Hakan Akel and Bilal Mente, as well as members of our team, reported/found several specimens ($n = 6$) within a 300 m radius around the peak of Mt. Nemrut at elevations between 2,100–2,156 m elevation (Fig. 6 of primary article and Supplemental Fig. S13A, B). In 2019, a few more specimens were located as low as 2,081 m elevation, including one with black to grey-filled dorsal blotches (Supplemental Fig. S13C). Remarks: one specimen analysed exhibits eight *cyt-b* mutations over 750bp to both, *M. b. albizona* from Göksun (locality-39) and to *M. b. bulgardaghica* from Kar Bogaz Valley (localities-48 to -52), indicating some gene flow between *albizona*- and *bulgardaghica*-clades.



SUPPLEMENTAL FIGURE S13. Habitat and specimens of Albizona Viper (*Montivipera bulgardaghica albizona*) from the currently southeastern-most locality around the peak of Mount Nemrut, district Kahta/Adiyaman, locality-45. A) and B) specimens from the Nemrut Archeological site; and C) a dark specimen from Mount Nemrut. (Photographed by Hakan Akel with mobile phone [A and B], by Mehmet Zülfi Yıldız [C]).

Bolkar Viper (*Montivipera b. bulgardaghica*)

A point distribution map with new localities is presented in Fig. 7, copied in from primary article. Information about the localities is given in the list below. The localities are sorted from east to west:

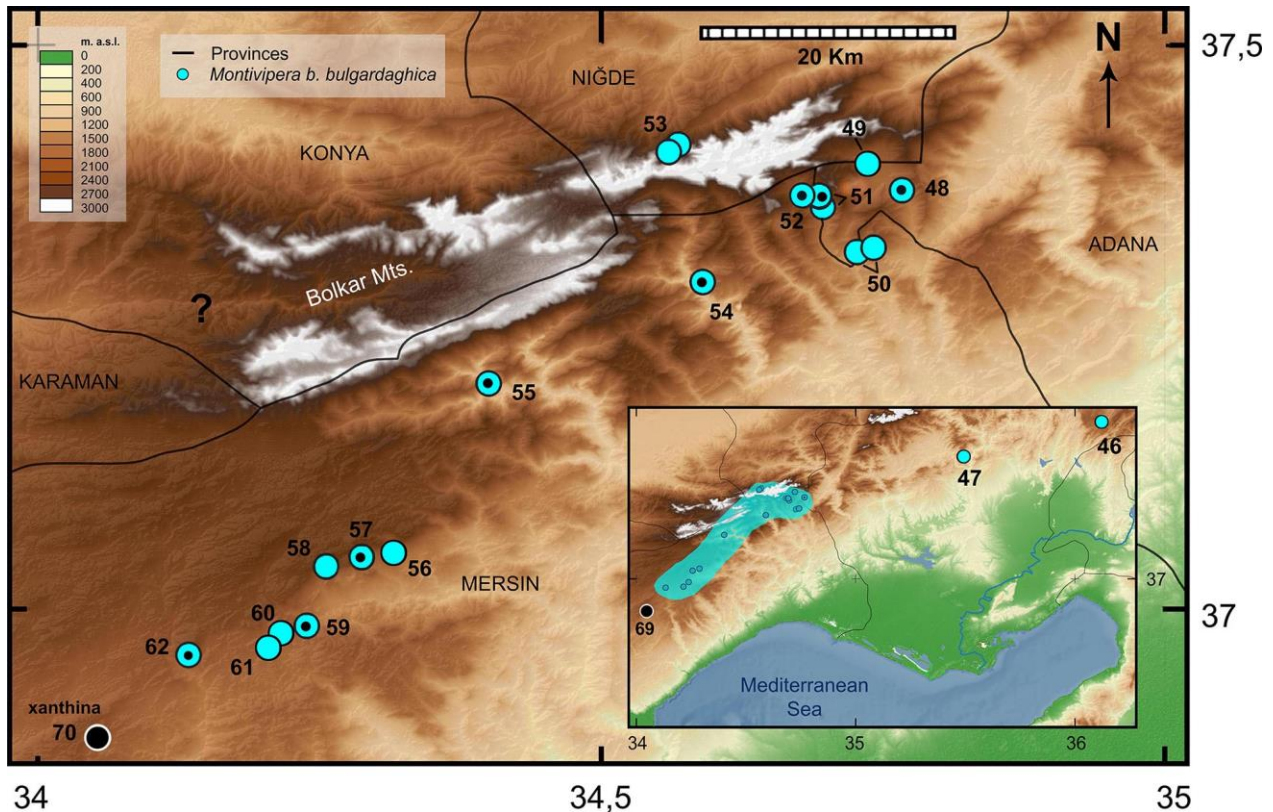
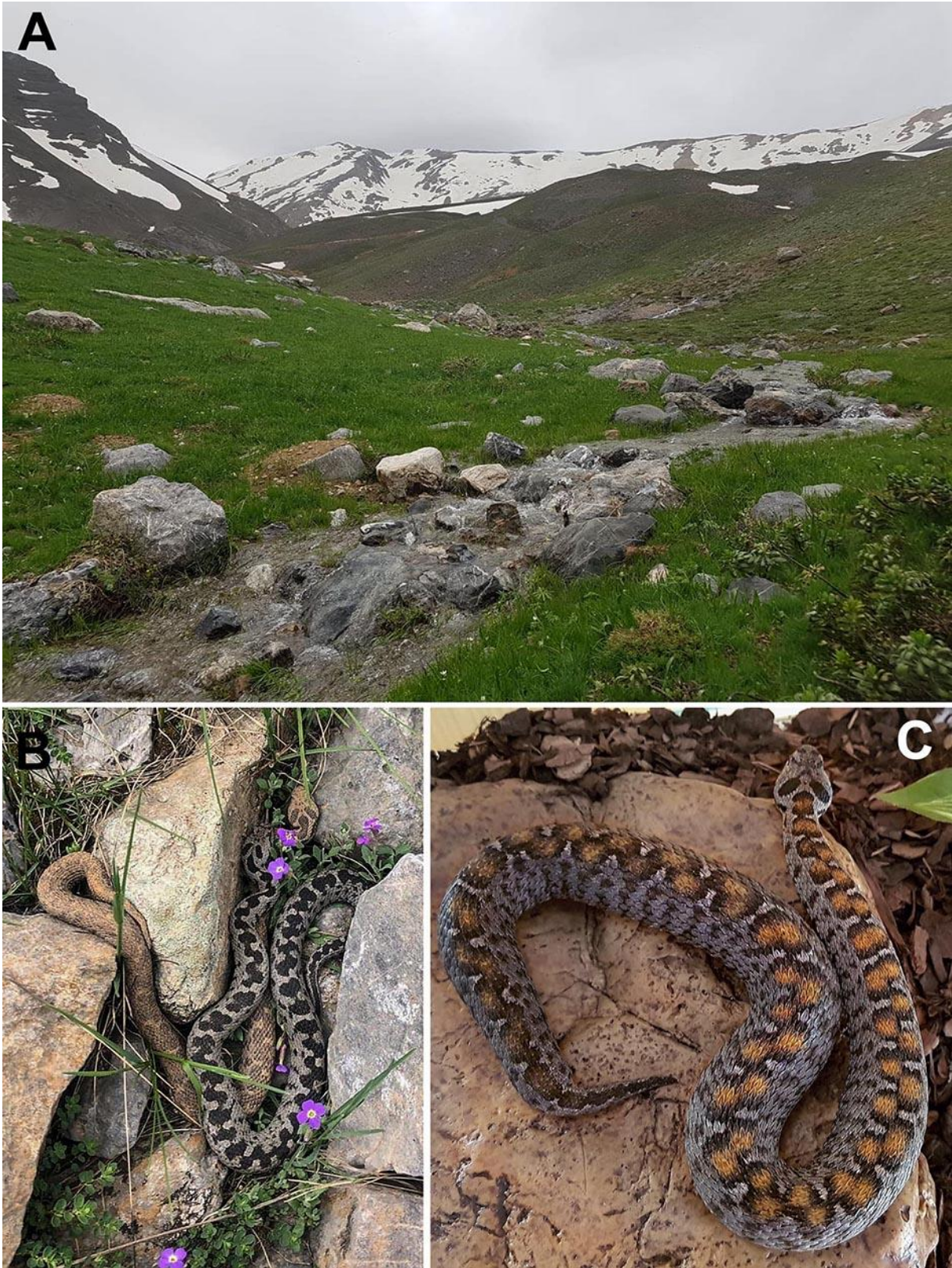


FIGURE 7-inserted from primary article. Updated distribution of Bolkar Viper (*Montivipera b. bulgardaghica*). Inset map repeats the same sites overlaid by a light blue shading but enlarged to show the two eastern-most sites (localities-46 and -47, see vouchers in Fig. 8 of primary article). Numbers refer to the Locality List. Samples used for genetic analysis are indicated with a black center. Question marks indicate areas where further *Montivipera* populations are expected but require confirmation. A newly discovered *M. xanthina* (black dot-70) near *bulgardaghica*-locality-62 indicates a potential contact zone between them.

- 46 **New:** Göller Yaylasi and Çamlarca, districts Kozan-Sumbas/Adana, 37°42'53N, 36°07'09E, at 1,482 m elevation, 05 August 2017. Source: photograph by Şensu Küçükateş provided via Abdurrahman Sefali (Fig. 8A of primary article). Remarks: this specimen is provisionally set as the currently eastern-most *Montivipera* with a traditional *bulgardaghica* color pattern, consisting of longitudinally elongated ‘rectangular’ black and grey, smooth-edged dorsal blotches. Beginning at locality-42, specimens farther east show rounded ‘yellow to orange filled’ dorsal blotches that resemble typical *M. b. albizona* (see examples in Figs. S10-S12). This new record from Göller reduces the distance between the previously published distance of 160 km between *M. b. bulgardaghica* at locality-48 (see below) and *M. b. albizona* at locality-40 down to 38 km between *bulgardaghica*-locality-46 and *albizona*-locality-41.
- 47 **New:** ca. 3.5 km north of Kizildam, district Aladağ/Adana, 37°33'46N, 35°29'32E, at 1,412 m elevation, 14 July 2014. Source: provided by Karim Amri (Fig. 8B of primary article). Remarks: this specimen represents a color pattern with rounded and ‘orange filled’ dorsal blotches reminiscent of northern *M. b. albizona*, indicating a transition zone between the two

- M. bulgardaghica* subspecies. However, singly occurring *albizona*-like specimens are known from within the range of typical *M. b. bulgardaghica* (Schätti et al. 1991, and specimen in Supplemental Fig. S14C from locality-51).
- 48 **Refined:** lower Elmali Boğaz Valley, district Pozanti/Adana, 37°22'16N, 34°46'00E, coordinates point to 1,625 m elevation in the valley, north Akçatekir, parallel and east to the Kar Boğaz Valley (*cyt-b* sequence data in Supplemental Table S1). Source: Nikolaus Stümpel and specimen labeled as bg10 (nr. 17465) in Stümpel (2012) and Stümpel et al. (2016).
 - 49 **New:** upper Elmali Boğaz Valley, district Pozanti/Adana, 37°24'13N, 34°42'55E, n = 3 within 130 m from coordinates, around 2,210 m elevation, 23 May 2019 (Supplemental Fig. S14). Source: Fabien Bettex (pers. comm.).
 - 50 **Refined:** Kar Boğaz (Karboğazi) Valley, district Pozanti/Adana and district Tarsus/Mersin (acc. to Google Maps), 37°18'59N, 34°43'36E, n = 12 within 1.5 km from coordinates at the center of samples found between 1,450–1,800 m elev. Source: Schätti et al. (1991, also pers. comm.) and vouchers (sampling year) MHNG 2497.046–50 (1990), 2542.066–67 (1992), 2522.008 (1990), 2547.025 (1990), 2527.085 (1992), 2541.033–34 (1993), Bettex (1993), Fabien Bettex (pers. comm.) with two specimens depicted in Fig. 8E of primary article.
 - 51 **Refined:** Kar Boğaz Valley, district Pozanti/Adana (acc. to borders on Google Earth Pro), 37°21'56N, 34°41'36E, n = 7 within 200 m, ca. 2,020 m elevation, 10 May 2014 (Fig. 8D of primary article) and late April 2015. Source: Bayram Göçmen, Mehmet Zülfü Yıldız, Bahadır Akman, Mehmet Akif Bozkurt, incl. photos on Turkherptil (*op. cit.*), and Fabien Bettex (pers. comm.), including one specimen with a color pattern reminiscent of *M. b. albizona* (Fig. S14C). Further records from within 1 km farther south on the slope at 37°21'23N, 34°41'47E, n = 2, 1,774 m elevation, 27/28 May 1993, by Johan Nylander, Börje Flärdh, J. Karlsson, Mikael Lundberg (pers. comm.) and from next to the river at 37°21'29N, 34°41'31E, n = 3, at 1,763 m elevation, 28 April 2019, by Gerrit Jan Verspui (pers. comm.).
 - 52 **Refined:** Kar Boğaz (Karboğazi) valley, north of Gülek, district Tarsus/Mersin (Google Earth Pro) or Pozanti/Adana (Google Maps), 37°21'59N, 34°40'54E, at 1,887 m elevation, 17 May 1993. It's only ca. 1 km west of locality-51, but in another province and across the valley's river. Source: Johan Nylander, Börje Flärdh, J. Karlsson, Mikael Lundberg (pers. comm.) and voucher NRM 5102 (Swedish Museum of Natural History, Stockholm), which possibly relates to specimen labeled as bg16 (*cyt-b* sequence data in Supplemental Table S1), also in Stümpel (2012) and Stümpel et al. (2016). Further records on the same slope ca. 1.1 km farther south at 37°21'18N, 34°41'12E, n = 3 within 250 m, at 1,899 m elevation, May 2016 and 2019, by Fabien Bettex (pers. comm.), and at 37°21'28N, 34°41'6E, n = 2 within 100 m, at 1,849 m elevation, May 23 August 2019, by Burak Akdağ (pers. comm.).
 - 53 **Refined:** Type locality: Kar Boghaz-Bulgar Dag (Karbogaz-Bolkar Dağı), border Niğde-Mersin, 37°24'18N, 34°33'32E, coordinates for holotype (coll. 1897) and two paratypes (coll. 1897, 1899) placed representatively at 2,500 m elevation on a southern exposed slope of Bolkar Dağı, between 2,854–2,862 m elevation (available from <https://peakery.com>, <https://mapcarta.com>), which is a peak within the similarly named Bolkar Dağlari, rising up from Maden Lake, or Maidan Göl (Karagöl), and located 6 km south of the next larger village, Darboğaz. Source: Martin Holtz and Steindachner in Werner (1898), Nilson and Andren (1985), with vouchers, including the male holotype GNM 1618, and female



SUPPLEMENTAL FIGURE S14. Distribution updates of the Bolkar Viper (*Montivipera b. bulgardaghica*) from eastern Bolkar Mountains. A) habitat of locality-49, upper Elmalı Boğaz Valley, district Pozanti/Adana; B) female and male, in situ, from locality-49; C) specimen from locality-51, Kar Boğaz Valley, with orange-filled dorsal blotches resembling *M. b. albizona*. (Photographed by Fabien Bettex).

paratypes BM -1946.1.19.67 (British Museum of Natural History, London) and NHMW15136 (Natural History Museum of Vienna, Austria). Even though no further specimens have been found on that northern versant (slopes) of the Bolkar Mountains and its *terra typica* status has been doubted among experts or indicated as being confused with the similarly named localities-50 to -52 (e.g., Schmidtler et al. 1990), we visited the area and perceived it as potentially correct, or at least suitable for mountain vipers. Reasons are: 1) there is suitable habitat, 2) a specific mountain Bolgar Dağı (or Bolkar Dağı) exists, 3) the next large locality is called Darboğaz, indicating a potential name confusion, requiring the change of only the first letter from Karboğaz to Darboğaz. Data recording and language translation certainly have been more error-prone in the 19th century than today. Nonetheless, a positive or negative confirmation is still required, in particular also whether the Ottoman Viper (*M. xanthina*) may approach or occupies the northern slopes of the Bolkar Mountains, as there is currently only 80 km distance to the nearest *xanthina*-record at locality-68.

- 54 **Refined:** Kozpinari, district Çamlıyayla/Mersin, 37°17'24N, 34°35'24E, n = 2, coordinates point to an open forest on a slope at 1,410 m elevation (sequence data in Supplemental Table S1). Source: Svetlana Kalyabina-Hauf and specimens labeled as bg12 and bg13 in Stümpel (2012) and Stümpel et al. (2016).
- 55 **Refined:** Cocakdere National Park (Bolkar Dağları), north Atlılar, district Toroslar/Mersin, 37°12'00N, 34°23'59E, coordinates point to an open forest on a slope at 1,260 m elevation (sequence data in Supplemental Table S1). Source: specimen xt12 (or nr. 18017) in Stümpel (2012) and Stümpel et al. (2016).
- 56 **New:** 3 km west of Tirtar, district Toroslar/Mersin, 37°02'59N, 34°18'37E, at 1,864 m elevation Source: photo by Özkan Kurtuluş provided via Sezgin Ozlem Sahin.
- 57 **Refined:** Arslanköy, district Toroslar/Mersin 37°02'45N, 34°17'13E, n = 2, around 2,071 m elevation (sequence data in Supplemental Table S1). Source: Nikolaus Stümpel and specimens labeled as bg3 and bg4 in Stümpel (2012) and Stümpel et al. (2016).
- 58 **New:** Gazi-Arslanköy, district Toroslar/Mersin, 37°02'15N, 34°15'21E, at 2,060 m elevation, 07 June 2017. Source: Mert Kariş.
- 59 **Refined:** Çatak (Arslanköy), district Toroslar/Mersin, 36°59'06N, 34°14'18E, at 1,694 m elevation (sequence data in Supplemental Table S1). Source: Nikolaus Stümpel and specimen labeled as bg5 in Stümpel (2012) and Stümpel et al. (2016).
- 60 **Refined:** Çatak (Arslanköy), district Toroslar/Mersin, ca. 1.5 km west of locality-58 surrounding of 36°58'46N, 34°13'23E, n = 8 within 1.3 km from coordinates, between 1,733–1,895 m elevation. Source: Fabien Bettex (pers. comm.) and Bettex (1993), vouchers MHNG 2522.009-011 from 1990 and 1991, MHNG 2524.003 and MHNG 2524.005 from 4 May 1991 (Supplemental Figs. S15 and S16B).
- 61 **New:** eastern Hacialani-Gavuruçtuğu, district Erdemli/Mersin, ca. 1.6 km west of locality-60 surrounding of 36°58'11N, 34°12'37E, n = 2 within 300 m, around 1,785 m elevation, May 2015 and 2017 (Supplemental Fig. S16A). Source: Fabien Bettex (pers. comm.).
- 62 **New:** Ünlük Tepesi, Gavuruçtuğu, district Erdemli/Mersin, 36°57'33N, 34°08'01E, n = 2, around 1,985 m elevation, 07 June 2017 (Figs. 8D, E of primary article). Source: Mert Kariş. Remarks: these *Montivipera b. bulgardaghica* inhabit the currently most western site for this taxon which is only 11 and 16 km northeast from new records of *M. xanthina* at



SUPPLEMENTAL FIGURE S15. A) and B) Bolkar Viper (*Montivipera b. bulgardaghica*) from its western range, locality-60, Çatak, west of Arslanköy, district Toroslar/Mersin. (Photographed by Fabien Bettex).

localities-70 and -71 with continuous suitable habitat of south-exposed rocky slopes at > 1,700 m elevation between them (Figs. 7, 9, and 10C, D, E of primary article). It suggests that the north-south valleys with the villages Sorgun and Toros in Erdemli/Mersin may constitute a contact zone between these mountain viper species.



SUPPLEMENTAL FIGURE S16. Distribution updates of Bolkar Viper (*Montivipera b. bulgardaghica*) from its western range. A) locality-61, eastern Hacialani-Gavuruçtuğu, district Erdemli/Mersin, 1.6 km west of locality-60; B) locality-60, Çatak, west of Arslanköy, district Toroslar/Mersin. (Photographed by Fabien Bettex).

Ottoman Viper (*Montivipera xanthina*)

A point distribution map with new localities is presented in Fig. 9, copied in from primary article, followed by a list of southeastern records of the Ottoman Viper, sorted approximately from east to west. Aside from three isolated range patches in south-central Turkey (see locality list below), the distribution map in the IUCN Red List of Threatened Species (Böhme et al. 2009) shows a continuous range of *M. xanthina* extending as far southeast as the Göksu River from southern Konya province to the coastal city Silifke in Mersin province. However, neither locality information or vouchers nor listed references were provided that would indicate its southeastern-most presence in Mersin and Karaman provinces.

- 63 **Refined:** ca. 5 km west of Cebir (eastern slopes Erciyes Dağı = E. Mountain), district Melikgazi/Kayseri, 38°33'43N, 35°33'40E, at 2,334 m elevation, June 1988. Source: Göran Nilson (pers. comm.), and Nilson et al. (1988, 1990).
- 64 **New:** south of Erciyes Dağı and 9 km north of Develi, district Develi/Kayseri, 38°28'02N, 35°31'11E, at 1,840 m elevation, 07 June 2002. Source: Alexandre Teynié, Philippe Geniez, Gilles Pottier.
- 65 **Refined:** south of Erciyes Dağı, ca. 4.5 km north of Develi, district Develi/Kayseri, 38°25'48N, 35°28'52E, at 1,529 m elevation, year 2009. Source: Göçmen et al. (2009) and others by F. Bettex (pers. comm.).
- 66 **New:** west of Erciyes Dağı and 3.5 km east of Subaşı, district Incesu/Kayseri, 38°32'39N, 35°15'41E, at 1,423 m elevation, 18 May 1993 (Fig. 10A of primary article). Source: Johan Nylander, Börje Flärth, Mikael Lundberg, J. Karlsson (pers. comm.).

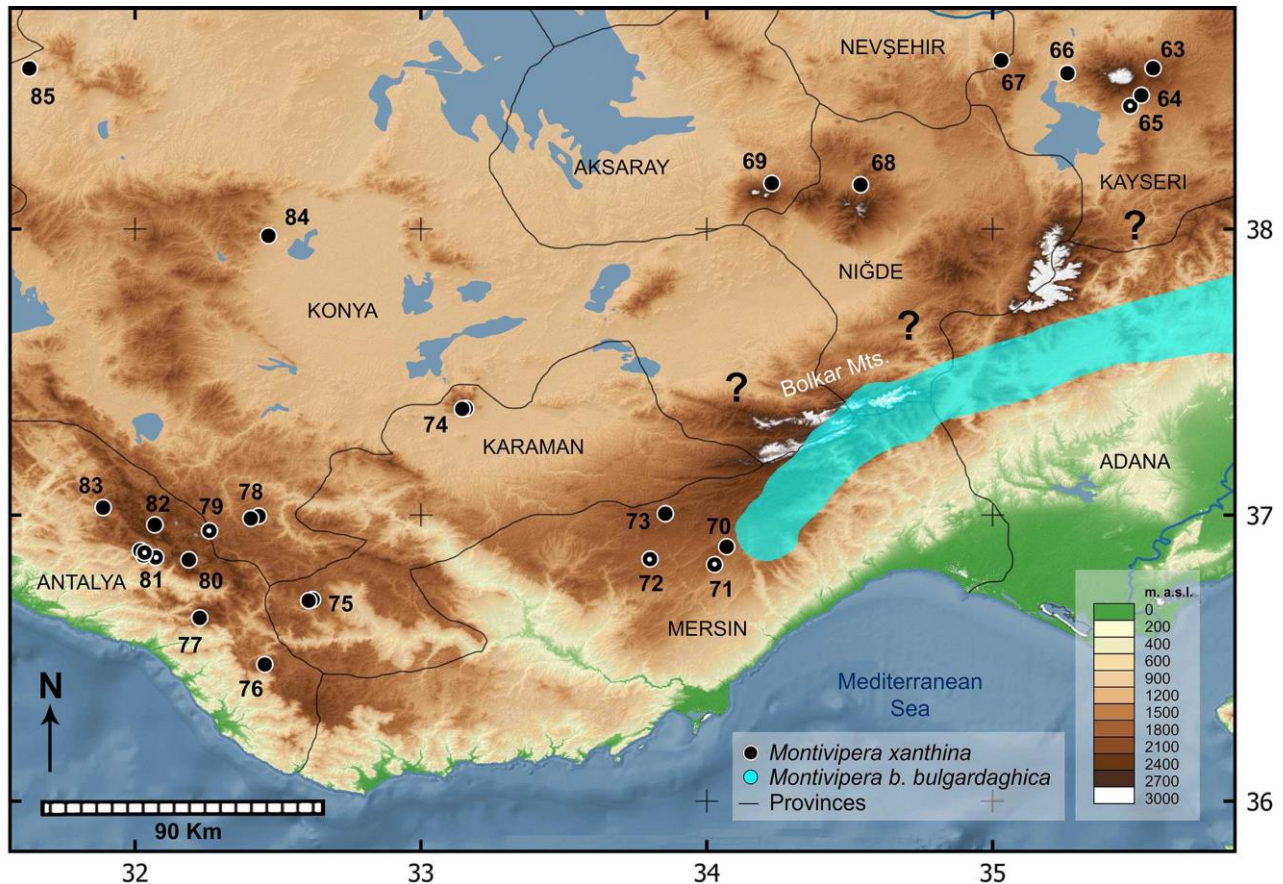


FIGURE 9-inserted from primary article. Southeastern distribution of Ottoman Vipers (*Montivipera xanthina*) in Turkey. Numbers refer to the Locality List. The corresponding IUCN map also includes an area for *M. xanthina* near where Adana, Niğde and Kayseri provinces meet. Since none of the literature in the IUCN assessment (IUCN. 2020) includes such a reference, we presume that area may represent district Ulukişla/Niğde and relates to the listing of *M. xanthina* for “Bolkar Dağı Ulukişla” in Başoğlu and Baran (1980), which later was described as *M. bulgardaghica* (Nilson and Andren 1985). Samples used for genetic analysis are indicated with a white center dot and are either listed in Supplemental Tab. S1, except for locality-65 from south Mt. Ercyies, Develi/Konya, which refers to an albumin analysis by Göçmen et al. (2009). Question marks indicate areas but require confirmation of taxon allocation.

- 67 **New:** Topuzdağı Gecidi (= T. Pass), between Dört Yol and Başdere, district Ürgüp/Nevşehir, 38°32'10N, 35°05'27E, at 1,548 m elevation, year 1992. Source: Bettex (1993), Fabien Bettex (pers. comm.), and voucher MHNG 2547.024.
- 68 **New:** Azatlı Dam, Çiftlik/Niğde, 38°09'16N, 34°32'16E, at 1,682 m elevation, 28 June 2017, DOR (Fig. 10B of primary article). Source: Mert Kariş.
- 69 **New:** ca. 2 km southwest Yenipinar, district Merkez/Aksaray, 38°09'34N, 34°13'37E, n = 2, at 1,800 m elevation, 30 May 1994. Source: V. Joubert, F. Gilles (pers. comm.).
- 70 **New:** ca. 3 km northwest Kuşluca, district Erdemli/Mersin, 36°52'50N, 34°03'37E, at 1,859 m elevation, 21 May 2019 (Fig. 10C). Source: Fabien Bettex (pers. comm.). Remarks: this specimen represents the currently shortest distance of *M. xanthina* to *M. b. bulgardaghica* (see locality-62, north Gavuruçtuğu, and also Figs. 8 and 10 of primary article) with a distance of 11 km of suitable habitat and a potential contact zone between them.

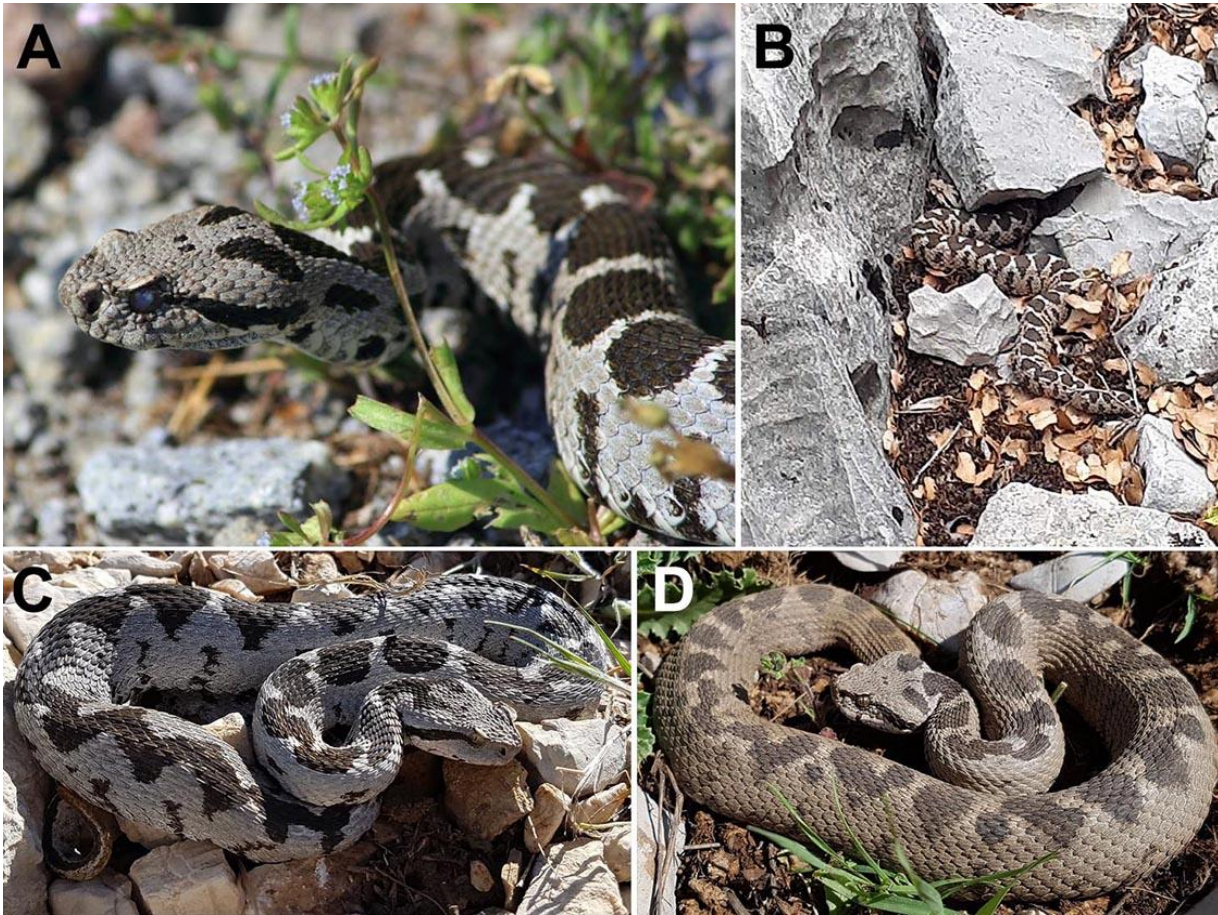
- 71 **New**: ca. 3.5 km north of Akpınar, district Erdemli/Mersin, 36°50'36N, 34°01'19E, at 1,902 m elevation, 2 May 2019 (Fig. 10E). Source: Konrad Mebert, Mehmet Z. Yildiz. Remarks: taxon allocation according to color pattern (*xanthina*-like completely filled anterior dorsal blotches). Preliminary *cyt-b* analysis (our unpubl. data) confirms this specimen indeed being closest to *M. xanthina*.
- 72 **New**: 2 km southwest of Dervişli and 14 km straight north of Magara-Kirobasi, district Silifke/Mersin, 36°50'45N, 33°48'03E, at 1,722 m elevation, 23 April 2018 (Supplemental Fig. S17A). Source: Konrad Mebert, Anil Oğuz, Mert Kariş. Remarks: this specimen represents the first dated record of *Montivipera xanthina* from the province Mersin.
- 73 **New**: 8.5 km east of Özboynuinceli, district Erdemli/Mersin, 36°59'17N, 33°50'09E, n = 5 within 400 m east and west from coordinates, around 2,091 m elevation, 2 May 2019 (Supplemental Fig. S17B). Source: Fabien Bettex (pers. comm.). This locality and localities 70 and -72 indicate that *M. xanthina* inhabits rocky-hilly plateaus > 1,700 m elevation and is replaced by *M. bulgardaghica* on the southern versant of the Bolkar Mountains beginning at locality-62.
- 74 **Refined**: Karadağ, district Merkez/Karaman, 37°22'22N, 33°09'24E, at 1,900 m elevation, 02 July 2012, and 1 km farther west at 37°22'16N, 33°08'39E, at 1,600 m, 08 June 2011 (Supplemental Fig. S18A). Source: photographs by Kürsat Akin and Özgür Kocak, respectively, both on *Turkherptil* (*op. cit.*).
- 75 **New**: Sariveliler, district Sariveliler/Karaman, 36°42'03N, 32°36'57E, n = 2 within 600 m east and west from coordinates, around 1,640 m elevation, June 2017 and 2018 (Supplemental Fig. S18B). Source: Bayram Göçmen and Gülay Bozkir.
- 76 **Refined**: Belbaşı, district Gazipaşa/Antalya, 36°28'39N, 32°27'13E, at 1,497 m elevation, 24 June 1997. Source: Kumlutas et al. (2004), Y. Kumlutas (pers. comm.), voucher ZDEU 250/1997.
- 77 **New**: Üçmuar Çeşmesi, Öteköy (Akdağ), district Alanya/Antalya, 36°38'25N, 32°13'34E, at 1,661 m elevation, 22 August 2018. Source: Ibrahim Zavlak (pers. comm.) and his photos on *Turkherptil* (*op. cit.*).
- 78 **Refined**: Ak Dağ, Hadim, district Hadim/Konya:
- north of village Hadim, 36°59'46N, 32°25'55E, n = 4, at > 2,000 m elevation, year 1983. Source: Schätti and Baran (1988), Schätti et al. (1991) with four vouchers MHNG 2403.004–05 and 2457.026–27.
 - west of Hadim at 36°59'16N, 32°24'17E, at 1,738 m elevation, 12 May 1995. Source: Mulder (1995, and pers. comm.).
- 79 **New**: Hisarlık Plateau, district Hadim/Konya, 17 km west of village Hadim, 36°56'41N, 32°15'36E, at 2,073 m elevation. Source: Mert Kariş. Remarks: our data show a divergence of one mutation over 750bp *cyt-b* to *M. xanthina* xt6, xt5, xt4 in Stümpel (2012) and Stümpel et al. (2016) from locality-81.
- 80 **New**: Mount Barçın (Geyik Mountains), district Gündoğmuş/Antalya, 36°48'42N, 32°08'57E, n = 4 within 500 m from coordinates, between 1,683–1,901 m elevation, 26 May 2019 (Supplemental Fig. S18C). Source: Fabien Bettex and Karim Amri (pers. comm.).
- 81 **New and Refined**: Geyik Mountains, Gelasandra Mahallesi, district Gündoğmuş/Antalya:
- New**: Senir Yaylasi (Plateau), 36°52'03N, 32°01'24E, n = 3 within 1.1 km from coordinates, between 1,687–1,777 m elevation, 26 May 2019. Source: Bayram Göçmen,



SUPPLEMENTAL FIGURE S17. Updates on high elevation plateau localities of Ottoman Viper (*Montivipera xanthina*). A) locality-72 at about 1,720 m elevation, extensive rocky plateau habitat and specimen north of Mağara-Kirobasi, district Silifke/Mersin; B) locality-73 at ca. 2,080 m elevation, ca. 8.5 km east of Özboynuinceli, north of Evdilek Mahallesi, district Erdemli/Mersin, and ca. 16 km north of locality-72 in A), indicating continuous plateau habitat. (Photographed by Konrad Mebert [A and inset], by Fabien Bettex [B and both insets].)

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- b. **Refined:** Geyik Mountains, Gelasandra Plateau, 3 km east of locality-81a, 36°51'29N, 32°04'07E, n = 5 within 500 m, 1,460 m elevation, 17 May 2011. Source: xt6, xt5, xt4 in Stümpel (2012) and Stümpel et al. (2016, 2018) and Afsar et al. (2019), latter describing it as a new subspecies, *M. xanthina varoli*; one specimen 700 m farther south on Aşağı Yayla, 36°51'06N, 32°04'20E, at 1,496 m elevation, 20 April 2018. Source: Konrad Mebert, Mert Kariş, Mehmet Anil Oğuz.
- 82 **New:** Kozağacı Mahallesi (Geyik Mountains), district Gündoğmuş/Antalya, 36°53'40N, 32°03'E, n = 3 within 220 m from coordinates, around 1,601 m elevation, 19 May 2019 (Supplemental Fig. S18D). Source: Fabien Bettex (pers. comm.).
- 83 **New:** 3 km east of Cimiköy, district Akseki/Antalya, 37°01'33N, 31°53'016E, n = 2, at 1,722 m elevation, 27 May 1996. Source: M. Geniez, T. Menut, F. Melki (pers. comm.).
- 84 **New:** Yazir Mahallesi, district Selçuklu (northwestern margin of greater Konya City)/Konya, 37°58'23N, 32°27'19E, 1,179 m elevation, 30 July 2018. Source: Fire Department of Konya, posted online by www.memleket.com.tr and provided by Mehmet Şekerci (pers. comm.).
- 85 **New:** Mevlütlü (30 km north-east Akşehir), district Tuzlukçu/Konya, 38°33'40N, 31°37'47E, 1,086 m elevation, year 1973. Source: Jean Garzoni via Alexandre Teynié, Philippe Geniez.



SUPPLEMENTAL FIGURE S18. Distribution updates of the Ottoman Viper (*Montivipera xanthina*) from elevations > 1,600 m elevation in its southeastern range. A) locality-74 at ca. 1,600 m elevation, Karadağ, district Merkez/Karaman; B) locality-75, Sariveliler, district Sariveliler/Karaman; C) locality-80, Barçın Mountain, district Gündoğmuş/Antalya; D) locality-82, Kozağacı Mahallesi, district Gündoğmuş/Antalya. (Photographed by Özgür Kocak [A], by Gülay Bozkir [B], by Fabien Bettex [C and D]).

SUPPLEMENTAL TABLE S1: Variation of cytochrome *b* sequence among selected specimens of *Montivipera* taxa from southern to eastern Turkey. Locality-numbers refer to the geographic origin of specimens shown in maps and locality list (above). Location district and province are given right before, resp. after the forward slash “/”. Abbreviation for initial taxon allocation: Mbu (*M. b. bulgardaghica*), Mal (*M. b. albizona*), Mwa (*M. wagneri*), Mxa (*M. xanthina*); in parenthesis the source of molecular data, e.g., our data ID-label or the cyt-*b*-label used in Stümpel (2012), Stümpel et al. (2016).

Geographic origin	6	1	1	2	3	8	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	4	4	4	5	5	6	6	6	6	7	7	7	7	7	7	8	8	8	8	9	
locality-48-Mbu (bg10): Elmali-Kar Boğaz, Pozanti/Adana	G	T	A	G	C	G	C	G	G	G	G	G	G	T	T	G	G	C	A	G	C	C	C	G	C	T	A	C	C	C	C	C	C	C	G	C	A	C	G	T	C	C	
locality-51-Mbu (our data Mbu13-17): Kar Boğaz Valley, district Pozanti/Adana	G	T	A	G	C	G	C	G	G	G	G	G	T	T	G	G	C	A	G	C	C	C	G	C	T	A	C	C	C														
locality-52-Mbu (bg16): Kar Boğaz, north of Gülek, Tarsus/Mersin	A	T	G	G	C	G	C	G	G	G	G	G	T	T	A	A	C	A	G	C	C	C	G	C	T	A	C	C	T	C	C	C	G	C	A	C	G	T	C	C			
locality-54-Mbu (bg12): Kozpinari, Çamliyayla/Mersin	G	T	G	G	A	G	C	G	A	G	G	A	G	T	T	G	A	C	G	G	C	C	C	G	C	T	G	T	C	C	C	C	A	T	T	C	G	T	T	C			
locality-54-Mbu (bg13): Kozpinari, Çamliyayla/Mersin	G	T	G	G	A	G	C	G	A	G	G	A	G	T	T	G	A	C	G	G	C	C	C	G	C	T	G	T	C	C	C	C	A	T	T	C	G	T	T	C			
locality-55-Mbu (xt12): Cocakdere NP, north Atllilar, Toroslar/Mersin	G	T	G	G	A	G	C	G	A	G	G	A	G	T	T	G	A	C	G	G	C	C	C	G	C	T	G	T	C	C	C	C	A	T	T	C	G	T	T	C			
locality-57-Mbu (bg3): Catak-Arslanköy, Toroslar/Mersin	G	T	G	G	A	G	C	G	A	G	G	A	G	T	T	G	A	C	G	G	C	C	C	G	C	T	G	T	C	C	C	C	A	T	T	C	G	T	T	C			
locality-57-Mbu (bg4): Catak-Arslanköy, Toroslar/Mersin	G	T	G	G	A	G	C	G	A	G	G	A	G	T	T	G	A	C	G	G	C	C	C	G	C	T	G	T	C	C	C	C	A	T	T	C	G	T	T	C			
locality-57-Mbu (bg5): Catak-Arslanköy, Toroslar/Mersin	G	T	G	G	A	G	C	G	A	G	G	A	G	T	T	G	A	C	G	G	C	C	C	G	C	T	G	T	C	C	C	C	A	T	T	C	G	T	T	C			
locality-62-Mbu (our data Mbu19-20): Gavuructugu, Erdemli/Mersin	G	T	G	G	A	G	C	G	A	G	G	A	G	T	T	G	A	C	G	G	C	C	C	G	C	T	G	T	C	C													
locality-20-Mal (our data Mal26): Sandik, Kemaliye/Erzincan	G	T	G	G	C	G	C	G	G	G	G	A	G	T	T	G	A	C	A	A	C	C	C	G	T	T	A	C	C	T													
locality-23-Mal (az9): Karasar-Uzunkaya, Divriği/Sivas	G	T	G	G	C	G	C	G	G	G	G	A	G	T	T	G	A	C	A	A	C	C	C	G	T	T	A	C	C	T	C	C	C	G	C	A	C	G	C	C	C		
locality-23-Mal (az6): Karasar-Uzunkaya, Divriği/Sivas	G	T	G	G	C	G	C	G	G	G	G	A	G	T	T	G	A	C	A	A	C	A	C	G	T	T	A	C	C	T	C	C	C	G	C	A	C	G	C	C	C		
locality-25-Mal (our data Mal54): Ovacik, Tecer Mountains, Ulaş/Sivas	G	T	G	G	C	G	C	G	G	G	G	A	G	T	T	G	A	C	A	A	C	C	C			T	T	A	C	C	T												

locality-27-Mal (az3): Kayapinar, Tecer Mountains, Ulaş/Sivas
locality-27-Mal (az4): Kayapinar, Tecer Mountains, Ulaş/Sivas
locality-27-Mal (az5): Kayapinar, Tecer Mountains, Ulaş/Sivas
locality-38-Mal (az7): east of Karaboğaz, Pinarbaşı/Kayseri
locality-39-Mal (spec1): Kurucaova, Göksun/Kahramanmaraş
locality-41-Mal (our data Mal48): Bostanlı, Andirin/Kahramanmaraş
locality-45-Mal (our data Mal62): Nemrut Mt., Kahta/Adiyaman
locality-1-Mwa (wg15): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg:10): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg11): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg12): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg13): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg16): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg3): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg4): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg5): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg6): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg7): Aras Valley, districts Sarikamis and Kagizman/Kars
locality-1-Mwa (wg8): Aras Valley, districts Sarikamis and Kagizman/Kars

G T G G C G C G G G G A G T T G A C A A C C C G T T A C C T C C C G C A C G C C C
G T G G C G C G G G G A G T T G A C A A C C C G T T A C C T C C C G C A C G C C C
G T G G C G C G G G G A G T T G A C A A C C C G T T A C C T C C C G C A C G C C C
G T G G C G C G G G A A G T T G A C A G T C C G C T A C C T C C C G C A C G C C C
G T G G C G C T G G G A G T T G A C A G C C C G C T A C C T C C C G C A C G C C C
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G C A G C G T G A A A A A T T G A T A A C C T G T T G C T C C T T A C A T A T C T
G C A G C G T G A A A A A T T G A T A A C C T G T T G C T C C T T A C A T A T C T
G C A G C G T G A A A A A T T G A T A A C C T G T T G C T C C T T A C A T A T C T

locality-3-Mwa (wg9): Aras town,
 Horasan/Erzurum
 locality-8-Mwa (our data Mwa77, 78):
 Bostancilar-Akcaaynak Bulanik/Muş
 locality-10-Mwa (our data Mwa74): Ilica,
 Hınıs/Erzurum
 locality-11b-Mwa (our data Mwa83):
 Topalan, Merkez/Bingöl
 locality-14-Mwa (our data Mwa93): Tahkini
 Plateau-Pohoz Mevki, Nazimiye/Tunceli
 locality-14-Mwa (our data Mwa95): Tahkini
 Plateau-Pohoz Mevki, Nazimiye/Tunceli

G C A G C G T G A A A A A T T G A T A A C C T G T T G C T C C T T A C A T A T C T
 A G C G T G A A A A A T T G A T A A C C T G T C G C T C C T T A C A T A T C
 G T G A A A A A T T G A T A A C C T G T T G C T C T T T A C A T A T
 G C A G C G T G A A A A A T T G A T A A C C T G T T G C T C C T T A C A T A T C T
 G C A G C G T G A A A A A T T G A T A A C C T G T T G C T C
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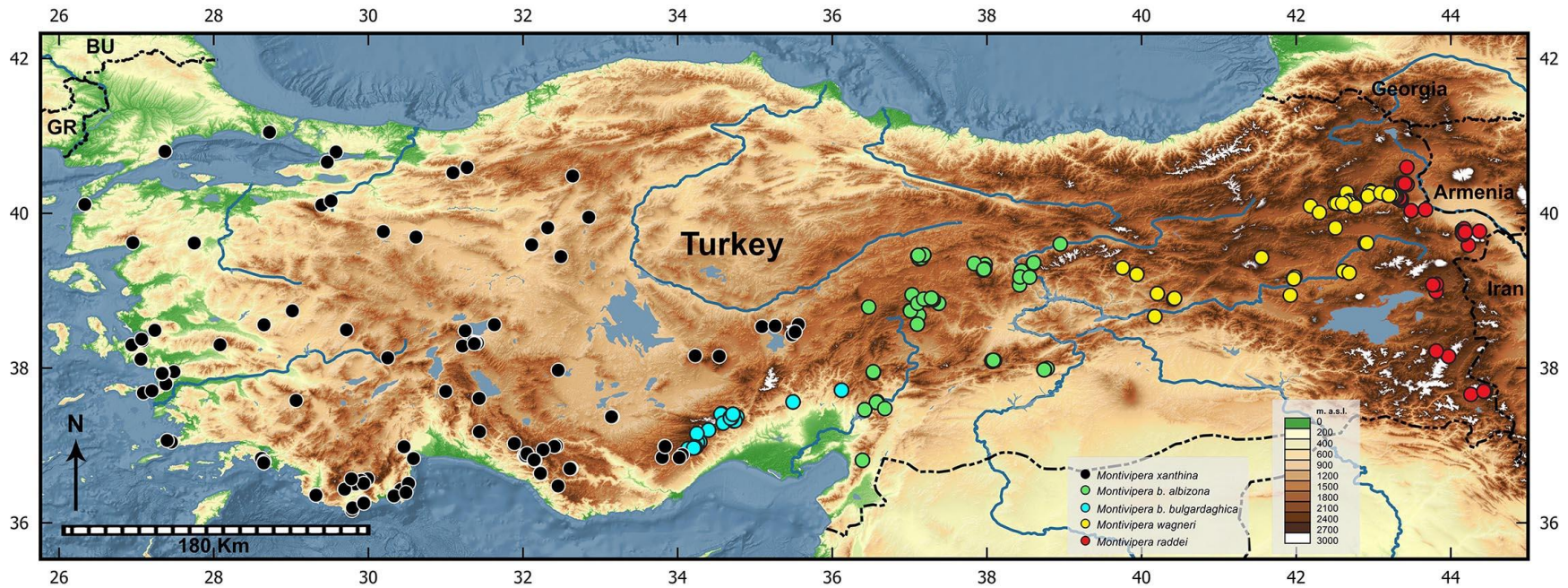


FIGURE 1-from primary article-enlarged. Distribution of mountain vipers in Turkey: *Montivipera xanthina* (black), *M. b. albizona* (green), *M. b. bulgardaghica* (light blue), *M. wagneri* (yellow), and *M. raddei* (red). Locality marks for western Ottoman Viper (*M. xanthina*) are incomplete, but sufficiently representative.

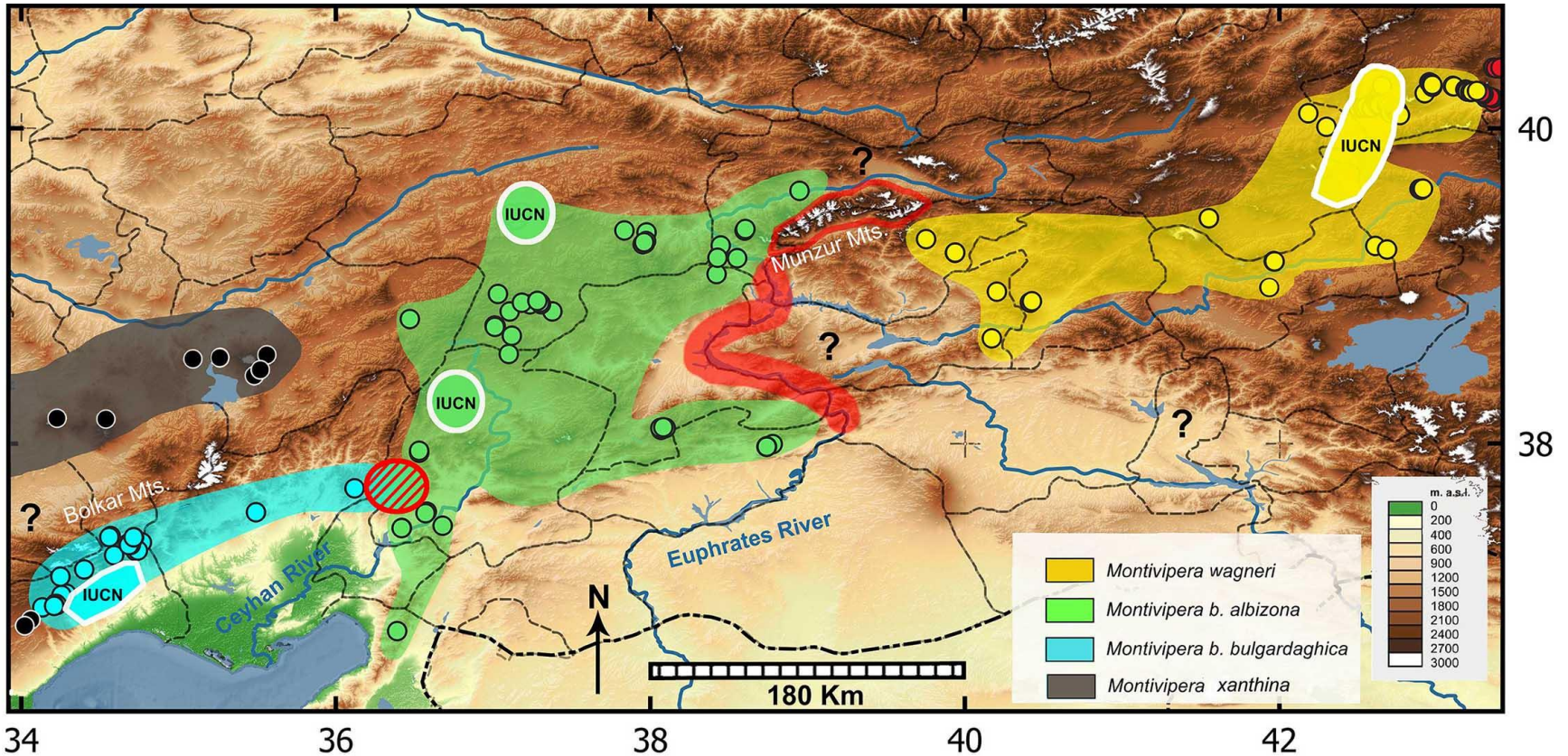


FIGURE 11—from primary article-enlarged. Updated distribution of mountain vipers in south-central to north-eastern Anatolia with known localities as colored circles on top of same color shaded areas representing their interpolated ranges: dark grey (*Montivipera xanthina*), light blue (*M. b. bulgardaghica*), green (*M. b. albizona*), yellow (*M. wagneri*). For the latter three taxa, the smaller, white-bordered, and color-saturated polygons represent the approximate and much smaller distribution maps as depicted in the respective files of the IUCN Red List of Threatened Species (IUCN. 2020. *op. cit.*). The red transparent band over the Euphrates River leads north to a red-bordered area encircling the Munzur-Mercan Mountains. They indicate the prominent landscape feature separating most proximate populations between *M. b. albizona* and *M. wagneri* or may represent even their potential contact zone. Similarly, the red-hatched circle near the Ceyhan River reflects a potential contact or transition zone between the subspecies of *M. b. bulgardaghica* and *M. b. albizona*. However, substantial further sampling is required to confirm or adjust these potential contact/transition zones. Question marks indicate areas where additional *Montivipera* populations are expected but require confirmation.

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