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Mitochondrial phylogeny and molecular-based species delimitation illuminate cryptic diversity in saw-scaled vipers (Viperidae: *Echis*)

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SUPPLEMENTARY METHODS

Phylogenetic Analyses

We used the standard model selection procedure implemented in IQTREE (Kalyaanamoorthy et al., 2017) selecting the model of sequence evolution with the lowest Bayesian information criterion score, and then used 1,000 ultrafast bootstraps to assess bootstrap support values (UFB; Hoang et al., 2018).

For the divergence dating analysis, the best fit substitution model was inferred using jModelTest2 (Darriba et al., 2012). Within BEAST we used a Yule speciation and a log normal relaxed clock prior. Two fossil calibrations were used, following Zaher et al., 2019. First, the Viperidae stem age was constrained with a 5% quantile minimum of 23.3 mya and a 95% upper quantile of 93.3 mya using a log normal prior (median of 31.2, and offset of 22.1), this corresponds to several fossil deposits from the early Miocene of present-day Europe (Szyndlar & Rage, 1999; 2002; Čerňanský et al., 2015; Zaher et al., 2019). Second, the root of Crotalinae was constrained with a log normal distribution with a median of 16.7 and an offset of 11.2, resulting in a minimum age (5% quantile) of 11.9 mya and a maximum (95% quantile) of 54.0, corresponding to a fossilized maxilla from mid-Miocene western Europe (Ivanov, 1999; Zaher et al., 2019). The Markov chain Monte Carlo was run for 60 million iterations, logging every 6,000th iteration. Effective sample sizes for all parameters were checked in Tracer v.17.2 (Rambaut et al., 2018) to ensure stationarity. Nodes on the final BEAST tree are supported by posterior probability support values (PP).

Delimitation Methods

The tree-based mPTP approach can accommodate different rates of coalescence among clades (Kapli et al., 2017). Such patterns can emerge because of uneven sampling intensity across a focal taxon's geographic distribution, or variation in genetic structure because of differences in effective population size, rates of coalescence within lineages, and/or life history differences (Blair & Bryson, 2017). We used this method with the non-ultrametric, maximum likelihood gene tree generated in IQTREE for which we removed outgroups using the R package *ape* (Paradis et al., 2004). The minimum branch length was calculated using the minbr_auto function in mPTP (minbr = 0.001012). We then delimited species across our ML tree using this minimum branch length as the input with all other parameters as default.

The bPTP is an updated method of the original PTP method that incorporates Bayesian support values. Greater support on a node indicates that all descendants from this node are more likely to be from the same species (Zhang et al., 2013). The original PTP method takes a rooted phylogenetic tree and models speciation events in terms of branch lengths within species compared to between species and uses the number of substitutions to estimate species limits. The same outgroup-pruned maximum-likelihood tree from above was uploaded to a web server and run with default parameters (Zhang 2015*a,* https://species.h-its.org/).

The General Mixed Yule Coalescent is a popular single-locus coalescent-based method for species delimitation that uses an ultrametric gene tree to model speciation events (Fujisawa & Barraclough, 2013). This method works under the assumption that distinct genetic clusters are separated from each other by longer internal branches along the phylogeny (Fujisawa & Barraclough, 2013). Branching events in the gene-tree between species are modelled assuming a constant speciation rate with no extinction (e.g., the Yule model) whereas branching events within species are modelled as a neutral coalescent process (Hudson, 1990). Branches are classified as either intra- or interspecific to maximize the likelihood of the GMYC model. Single and Multiple-threshold GMYC (sGMYC and mGMYC) delimitation analyses were processed using a web server (Zhang 2015*b*, https://species.h-its.org/gmyc/) using the time-calibrated gene tree estimated in BEAST with outgroups pruned using *ape* (Paradis et al., 2004; Table S1).

ABGD is a distance-based delimitation method that is computationally efficient, even with large datasets (Puillandre et al., 2012b). It seeks to quantify where a DNA barcode gap lies within sequence data that distinguishes between intraspecific and interspecific variation (Puillandre et al., 2012b). This method plots the number of groups delimited across the prior intraspecific distance, revealing two partitions. ABGD delimitation was processed through a web server (Brouillet 2023, https://bioinfo.mnhn.fr/abi/public/abgd/abgdweb.html) using default parameters, following methods outlined in previous studies (Bragança et al., 2021; Ortiz et al., 2023; Solovyeva et al., 2023). We used results for both the initial (iABGD) and recursive (rABGD) partitions for comparison in this study. We took both partitions at the median prior maximal distance of P = $7.74e^{-03}$, a DNA barcode gap distance of 0.076 and a JC69 minimum slope of 1.5.

ASAP employs hierarchical clustering, successively merging sequences into groups. Each merge, labelled a partition, contains a consecutively decreasing number of sequences responding to how many partitions have occurred. Each partition is characterised by two metrics: the probability of each group being a single species, and the width of the barcode gap between the new and previous partition (Puillandre et al., 2021). These two numbers are combined in a single ASAP-score that is used to rank the partitions, where the smaller score is considered better. ASAP improves upon the ABGD series in two ways: 1) it does not need a defined prior for maximal genetic intraspecific divergence (*P*) reliant on known biological data, and 2) it includes a scoring system based on an ad hoc score computed from both the barcode gap width and probabilities of panmixia (Puillandre et al., 2021). We analysed our sequences using a web server with default parameters using the JC69 substitution model and split probability of 0.01. We selected a subset with an ASAP-score of 9.50, which averaged the relative ranking of *P* (rank 10; P = .54) and the rank of relative gap width metrics (rank 9; W = $6.60e^{-5}$). The threshold distance for our results at this score was 0.02 (Puillandre et al., 2021, https://bioinfo.mnhn.fr/abi/public/asap/).

Data Generation:

The PCR cycle was run as follows: initial denaturation for 3 min at 95°C, 35 cycles of denaturation for 20s at 95°C, annealing for 20s at 50°C and extension for 5 min at 60°C and repeated for 40 cycles. PCR products were visualised on a 1% agarose gel stained with ethidium bromide to ensure the intended fragment size was amplified and only a single band was present. PCR products were then purified using Exonuclease I (Exo) and Shrimp Alkaline Phosphatase (SAP). A 20% dilution of ExoSAP and Millipore water was mixed prior to adding 2.0 or 4.0 µL allotments to the PCR products. Higher quality PCR products received 4.0 µL allotments, and weaker products received 2.0 µL so as not to further dilute the product. The samples underwent another cycle in the thermocycler, incubating at 37°C for 30 minutes, followed by a period of 15 minutes at 80°C.

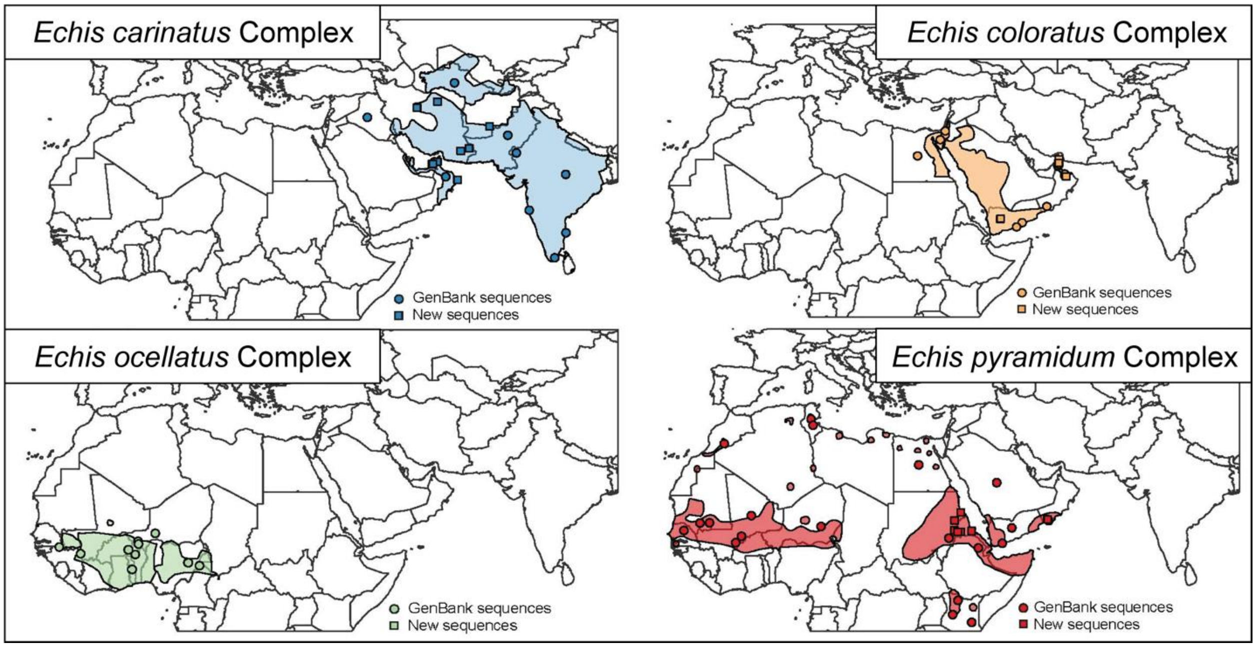

Figure S1. Range maps generated using the combined IUCN Red List data for currently recognised species within each of the four *Echis* species complexes. Cytochrome b sequences generated in this study and those accessioned to GenBank were included.

Table S1. Catalog number, species, and locality information of all *Echis* vouchers and outgroup taxa used in this study. Our study contributes new Cytochrome b sequences from tissues provided by the California Academy of Sciences (CAS), Berkeley Museum of Vertebrate Zoology (MVZ), and the Smithsonian Museum of National History (USNM).

Catalog Number	**Species I.D.**	**Latitude**	**Longitude**	**Locality**	**Source**
AJ275702.1	*Echis multisquamatus*	39.04949025	59.23451637	Turkmenistan	Lenk et al., 2001
AJ275706.1	*Echis carinatus*	29.96759353	69.28572012	Pakistan	Lenk et al., 2001
AJ275707.1	*Echis pyramidum*	15.80158565	47.18612185	Yemen	Lenk et al., 2001
AJ275708.1	*Echis coloratus*	26.63079272	29.71402139	Wadi Rishrash, Egypt	Lenk et al., 2001
AJ275709.1	*Echis pyramidum*	26.63079272	29.71402139	Egypt	Lenk et al., 2001
AJ275710.1	*Echis ocellatus*	17.9017278	-1.747131677	Mali	Lenk et al., 2001
CAS228727	*Echis carinatus*	34.7665	52.174667	49 km E of guard station at entrance to Kavir National Park, Semnan Province, Iran	This study
CAS228783	*Echis carinatus*	34.76669829	52.17464524	Touran Protected Area, Majerad Spring, Semnan Province, Iran	This study
CAS250868	*Echis carinatus*	24.9573	54.9885	Jabel Ali, UAE	This study
CAS250874	*Echis carinatus*	25.3725	56.0323	4.77 km N. of Manama, Fujairah, UAE	This study
CAS250911	*Echis omanensis*	25.387	56.2649	9 km E. of Zubara, Wadi Wurayah, Fujairah, UAE	This study
CAS250924	*Echis omanensis*	26.0502	56.3508	9.5 km S.E. of Khasab, Musandam Government, Oman	This study
CAS251019	*Echis carinatus*	22.2561	59.8098	3.9 mi N. of Al Khabah, Ash Sharqiyah North Government, Oman	This study
CAS251087	*Echis khosatzkii*	17.2427	53.8902	34.9 km N W. of Salalah, Wadi Uyun, Dhofar Government, Oman	This study
CAS251090	*Echis coloratus*	25.387	56.2649	26.5 km E. of Thumrait, Dhofar Government, Oman	This study
CAS251146	*Echis omanensis*	23.0002	57.6705	9.8 km N. of Birkat Al-Mawz, Wadi Muaiden, Ad Dakhiliyah Government, Oman	This study

CAS260298	*Echis pyramidum*	17.06253	36.44122	W.S.W. of Hamashkoraib, Kassala State, Sudan	This study
CAS260307	*Echis pyramidum*	15.40009	36.40952	6 km S. of Kassala Town, Kassala State, Sudan	This study
CAS260372	*Echis pyramidum*	18.47424	37.60496	74 km S. of Suakin, Red Sea State, Sudan	This study
CAS261511	*Echis pyramidum*	15.25078	39.64993	3.2 km E. of Foro Village, Northern Red Sea Region, Eritrea	This study
CAS262521	*Echis pyramidum*	15.11425	37.57866	Ministry of Agriculture Tree Nursery, Barentu, Gash Barka Region, Eritrea	This study
CAS262549	*Echis pyramidum*	15.12725	37.03989	5.5 km E. of Barentu, Gash Barka Region, Eritrea	This study
CAS262618	*Echis pyramidum*	15.25273	39.64706	2.6 km S.E. of Foro Town, Northern Red Sea Region, Eritrea	This study
EU642583.1	*Echis khosatzkii*				Arnold et al., 2009
EU642584.1	*Echis khosatzkii*	17.25528241	53.89541451	NW. of Ayun pools, Dhofar, Oman	Arnold et al., 2009
EU642585.1	*Echis leucogaster*	16.65947356	-9.605795305	Ayoûn el'Atrous, Mauritania	Arnold et al., 2009
EU642586.1	*Echis leucogaster*	16.65947356	-9.605795305	Ayoûn el'Atrous Mauritania	Arnold et al., 2009
EU642587.1	*Echis omanensis*	23.04119106	57.46546954	N. of Tanuf, Oman	Arnold et al., 2009
EU642588.1	*Echis omanensis*	23.07293007	57.6082164	Wadi Bani Habib, Oman	Arnold et al., 2009
EU642589.1	*Echis omanensis*	23.07293007	57.6082164	Wadi Bani Habib, Oman	Arnold et al., 2009
EU642590.1	*Echis omanensis*	23.1861202	57.3724178	Jebel Akhdar, Oman	Arnold et al., 2009
EU642591.1	*Echis carinatus*	22.79401146	57.59056976	Manah, Oman	Arnold et al., 2009
EU642592.1	*Echis ocellatus*	15.019889	5.261472	10 km N. of Tapoua, Niger	Arnold et al., 2009
EU852294.1	*Echis ocellatus*	9.322330763	13.39211824	Garoua, Cameroon	Barlow et al., 2009
EU852295.1	*Echis carinatus*	25.3543386	55.41976578	Al Wasit, Sharjah, UAE	Barlow et al., 2009
EU852296.1	*Echis pyramidum*	0.862151297	36.08166713	Baringo, Kenya	Barlow et al., 2009
EU852297.1	*Echis coloratus*	30.34153725	34.91870142	Negev, Nahal Paran, Israel	Barlow et al., 2009
GQ359418.1	*Echis ocellatus*	9.322330763	13.39211824	Garoua, Cameroon	Pook et al., 2009
GQ359419.1	*Echis ocellatus*	13.50941718	2.125207924	Niamey, Niger	Pook et al., 2009
GQ359420.1	*Echis ocellatus*	9.820302528	11.31203432	Kaltungo, Nigeria	Pook et al., 2009
GQ359421.1	*Echis ocellatus*	8.666571645	1.013633042	Baringo, Kenya	Pook et al., 2009
GQ359422.1	*Echis ocellatus*	8.666571645	1.013633042	Togo	Pook et al., 2009

GQ359423.1	*Echis ocellatus*	8.666571645	1.013633042	Togo	Pook et al., 2009
GQ359424.1	*Echis ocellatus*	8.666571645	1.013633042	Togo	Pook et al., 2009
GQ359425.1	*Echis ocellatus*	8.666571645	1.013633042	Togo	Pook et al., 2009
GQ359426.1	*Echis ocellatus*	8.666571645	1.013633042	Togo	Pook et al., 2009
GQ359427.1	*Echis ocellatus*	11.37819129	-8.388732186	Niakoni, Mali	Pook et al., 2009
GQ359428.1	*Echis ocellatus*	9.322330763	13.39211824	Garoua, Cameroon	Pook et al., 2009
GQ359429.1	*Echis ocellatus*	9.322330763	13.39211824	Garoua, Cameroon	Pook et al., 2009
GQ359430.1	*Echis ocellatus*	11.24831242	1.597655606	Pendjari National Park, Benin	Pook et al., 2009
GQ359431.1	*Echis ocellatus*	13.04226954	2.208825896	Between Niamey and Tapoa, Niger	Pook et al., 2009
GQ359432.1	*Echis ocellatus*	12.06015685	0.366207065	Fada-N'Gourma, Burkina Faso	Pook et al., 2009
GQ359433.1	*Echis carinatus*	13.09696837	80.2515655	Chennai, Tamil Nadu, India	Pook et al., 2009
GQ359434.1	*Echis carinatus*	26.91826777	70.90417053	Jaisalmer, Rajasthan, India	Pook et al., 2009
GQ359435.1	*Echis carinatus*	8.767782899	78.13468321	Tuticorin, Tamil Nadu, India	Pook et al., 2009
GQ359436.1	*Echis carinatus*	25.35806158	55.42594559	Sharjah, UAE	Pook et al., 2009
GQ359437.1	*Echis carinatus*	25.35806158	55.42594559	Sharjah, UAE	Pook et al., 2009
GQ359438.1	*Echis carinatus*	29.96759353	69.28572012	Pakistan	Pook et al., 2009
GQ359439.1	*Echis carinatus*	16.99196456	73.31169141	Ratnagiri, Maharashtra, India	Pook et al., 2009
GQ359440.1	*Echis carinatus*	29.96759353	69.28572012	Pakistan	Pook et al., 2009
GQ359441.1	*Echis carinatus*	29.96759353	69.28572012	Pakistan	Pook et al., 2009
GQ359442.1	*Echis pyramidum*	26.63079272	29.71402139	Egypt	Pook et al., 2009
GQ359443.1	*Echis pyramidum*	26.63079272	29.71402139	Egypt	Pook et al., 2009
GQ359444.1	*Echis pyramidum*	14.02546933	35.36788013	Gedaref, Sudan	Pook et al., 2009
GQ359445.1	*Echis pyramidum*	0.862151297	36.08166713	Baringo, Kenya	Pook et al., 2009
GQ359446.1	*Echis pyramidum*	0.862151297	36.08166713	Baringo, Kenya	Pook et al., 2009
GQ359447.1	*Echis pyramidum*	3.321119581	37.07351551	North Horr, Kenya	Pook et al., 2009
GQ359448.1	*Echis* cf	12.33532674	40.91280869	Galili, Afar triangle, Ethiopia	Pook et al., 2009
GQ359449.1	*Echis khosatzkii*	17.02340245	54.10521105	Near Salalah, Oman	Pook et al., 2009
GQ359450.1	*Echis khosatzkii*	17.02340245	54.10521105	Near Salalah, Oman	Pook et al., 2009
GQ359451.1	*Echis khosatzkii*	17.02340245	54.10521105	Near Salalah, Oman	Pook et al., 2009
GQ359452.1	*Echis leucogaster*	14.34902777	-3.609727694	Bandiagara, Mali	Pook et al., 2009
GQ359453.1	*Echis leucogaster*	16.04260376	11.34624448	Massif de Termit, Niger	Pook et al., 2009
GQ359454.1	*Echis leucogaster*	14.34902777	-3.609727694	Bandiagara, Mali	Pook et al., 2009

GQ359455.1	*Echis leucogaster*	15.34333709	-14.40752262	Between Kidira and St Louis, Senegal	Pook et al., 2009
GQ359456.1	*Echis leucogaster*	34.49597565	9.476466641	Bou Hedma, Tunisia	Pook et al., 2009
GQ359457.1	*Echis leucogaster*	30.26569972	-6.844525529	Morocco	Pook et al., 2009
GQ359458.1	*Echis leucogaster*	30.26569972	-6.844525529	Allougoum, Morocco	Pook et al., 2009
GQ359459.1	*Echis leucogaster*	33.448533	9.827805	Matmata, Tunisia	Pook et al., 2009
GQ359460.1	*Echis leucogaster*	16.62615642	-11.40565419	Kiffa, Mauritania	Pook et al., 2009
GQ359461.1	*Echis coloratus*	31.03150469	34.9346711	Isreal	Pook et al., 2009
GQ359462.1	*Echis coloratus*	31.03150469	34.9346711	Isreal	Pook et al., 2009
GQ359463.1	*Echis coloratus*	29.50037267	34.00051491	Sinai, Egypt	Pook et al., 2009
GQ359464.1	*Echis coloratus*	29.50037267	34.00051491	Sinai, Egypt	Pook et al., 2009
GQ359465.1	*Echis coloratus*	17.65315148	54.03027958	Thumrait, Oman	Pook et al., 2009
GQ359466.1	*Echis omanensis*	24.80664653	56.1249647	Hatta, UAE	Pook et al., 2009
GQ359467.1	*Echis omanensis*	25.13026479	56.32517582	Fujairah, UAE	Pook et al., 2009
GQ359468.1	*Echis omanensis*	25.13026479	56.32517582	Fujairah, UAE	Pook et al., 2009
GQ359469.1	*Echis omanensis*	25.59446008	56.26094241	Dibba, UAE	Pook et al., 2009
GQ359470.1	*Echis omanensis*	25.13026479	56.32517582	Fujairah, UAE	Pook et al., 2009
GQ359471.1	*Echis omanensis*	25.13026479	56.32517582	Fujairah, UAE	Pook et al., 2009
GQ359472.1	*Echis omanensis*	23.40038332	57.44414593	Ar Rustaq, Oman	Pook et al., 2009
GQ359473.1	*Echis omanensis*	23.40038332	57.44414593	Ar Rustaq, Oman	Pook et al., 2009
GQ359474.1	*Echis omanensis*	23.40038332	57.44414593	Ar Rustaq, Oman	Pook et al., 2009
GQ359475.1	*Echis pyramidum*	-0.453095462	39.64669684	Garissa, Kenya	Pook et al., 2009
GQ359476.1	*Echis jogeri*	12.53874187	-12.31068516	Bandafassi, Senegal	Pook et al., 2009
GQ359477.1	*Echis coloratus*	14.77446441	49.38099134	Ghoyal Ba-Wazir, Yemen	Pook et al., 2009
GQ359478.1	*Echis coloratus*	14.0249872	48.34528373	Bir Ali, Yemen	Pook et al., 2009
GQ359479.1	*Echis borkini*	13.13529916	45.38803239	Zinjubar, Yemen	Pook et al., 2009
GQ359480.1	*Echis borkini*	13.13529916	45.38803239	Zinjubar, Yemen	Pook et al., 2009
GQ359481.1	*Echis borkini*	13.13529916	45.38803239	Zinjubar, Yemen	Pook et al., 2009
GQ359482.1	*Echis ocellatus*	12.53874187	-12.31068516	Togo	Pook et al., 2009
GQ359483.1	*Echis jogeri*	12.53874187	-12.31068516	Bandafassi, Senegal	Pook et al., 2009
GQ359484.1	*Echis leucogaster*	13.233333	-4.7	Séoulasso, Mali	Pook et al., 2009
GQ359485.1	*Echis borkini*	23.570354	44.35672368	Saudi Arabia	Pook et al., 2009
GQ359486.1	*Echis borkini*	23.570354	44.35672368	Saudi Arabia	Pook et al., 2009

KX233705.1	*Echis carinatus*	33.07212229	42.81835328	Al-Basra province, Iraq	Rhadi et al., 2016
KX233706.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233707.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233708.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233709.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233710.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233711.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233712.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233713.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233714.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233715.1	*Echis carinatus*	33.07212229	42.81835328	Al-Basra province, Iraq	Rhadi et al., 2016
KX233716.1	*Echis carinatus*	33.07212229	42.81835328	Al-Basra province, Iraq	Rhadi et al., 2016
KX233717.1	*Echis carinatus*	33.07212229	42.81835328	Al-Basra province, Iraq	Rhadi et al., 2016
KX233718.1	*Echis carinatus*	33.07212229	42.81835328	Al-Basra province, Iraq	Rhadi et al., 2016
KX233719.1	*Echis carinatus*	33.07212229	42.81835328	Al-Basra province, Iraq	Rhadi et al., 2016
KX233720.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233721.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
KX233722.1	*Echis carinatus*	33.07212229	42.81835328	ThiQar province, Iraq	Rhadi et al., 2016
MG995811.1	*Echis carinatus*	23.20867894	80.1895061	India	Vaishnavi et al.
MG995822.1	*Echis carinatus*	23.20867894	80.1895061	India	Vaishnavi et al.
MH646094.1	*Echis carinatus*				Fathinia et al., 2018
MVZ234501	*Echis carinatus*	27.691969	61.992605	50 km N.W. Saravan, Iran	This study
MVZ234502	*Echis carinatus*	27.25316667	60.409	6 km N. of Bampur, Iran	This study
MVZ236627	*Echis carinatus*	15.4438333	45.311	Bilqish Hotel, Ma'rib Governorate, Yemen	This study
MVZ241422	*Echis carinatus*	24.99508969	55.14486625	19 km E. Dubai at Jebel Ali, UAE	This study
MVZ246024	*Echis carinatus*	35.7894722	56.0431389	Majerad Spring, Touran Protected Area, Iran	This study
MVZ246025	*Echis carinatus*	34.7665	52.1746667	within 2 km of the Caravansarie, 49 km E of the guard station at the entrance of Kavir National Park, Iran	This study

USNM581926	*Echis carinatus*	31.5011	65.8453	Kandahar Airfield, Kandahar, Afghanistan	This study
AF471076.1	*Daboia russelii*				Lawson et al 2005
AY612014.1	*Causus lichtensteinii*				Nagy et al. 2005
CLP2232	*Azemiops fea*				Myers et al. 2022
JX114154.1	*Bitis arietans*				Barlow et al. 2013
KC316113.1	*Vipera ursinii*				Zinenko et al. 2015
KX019027.1	*Trimeresurus stejnegeri*				Guo et al. 2016
KX168746.1	*Montivipera latifii*				Stümpel et al. 2016
KX835656.1	*Crotalus molossus*				Myers et al. 2017
KX835710.1	*Crotalus scutulatus*				Myers et al. 2017
MH646096.1	*Eristicophis macmahoni*				Fathinia et al. 2018
MH646198.1	*Pseudocerastes urarachnoides*				Fathinia et al. 2018
MT513238.1	*Achalinus zugorum*				Miller et al. 2020
MW791593.1	*Cerastes vipera*				Tejero-Cicuéndez et al. 2022
OQ054328.1	*Pareas baiseensis*				Gong et al. 2023

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