



Range extension of *Amolops himalayanus* (Boulenger, 1888) (Anura, Ranidae), first record from China and first description of the juvenile of this species

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Abstract

Background

Amolops himalayanus (Boulenger, 1888) is a poorly-known species which was originally described from north-eastern India over a hundred years ago. Currently, *A. himalayanus* is known only from India and Nepal and there is no reliable re-description or photos of this species reported.

New information

We record *Amolops himalayanus* (Boulenger, 1888) from China for the first time, based on one specimen collected from Yadong County, Xizang Autonomous Region, China. Although the specimen from China is a juvenile, however, phylogenetically, it was clustered with the syntype of *A. himalayanus* and the specimens of this species from Nepal with strong support and the genetic distance between the specimen from China and the syntype of *A. himalayanus* was only 0.7% in 16S gene sequences. We provide a description of the juvenile specimen and, in addition, we provide reliable photos of this species in life for the first time.

Keywords

16S rRNA, distribution, morphology, Yadong County, Xizang Autonomous Region

Introduction

The genus *Amolops* Cope, 1865 is the most speciose genus in the family Ranidae (Frost 2025). This genus is widely distributed from Nepal, northern India, western and southern China to Malay Peninsula (Dever et al. 2012, Pham et al. 2019, Wu et al. 2020, Mahony et al. 2022, Tang et al. 2023, Li et al. 2024, Wu et al. 2024, Frost 2025). It currently includes 88 species, which can be subdivided into 10 species groups (Liu et al. 2025, Nguyen et al. 2025, Wu et al. 2025). In China, 60 species of *Amolops* have been recorded, 16 of which were found in Xizang Autonomous Region (Frost 2025, Huang et al. 2025, Liu et al. 2025).

Amolops himalayanus (Boulenger, 1888) is a poorly-known species which was originally described from Darjeeling India over a hundred years ago and was later recorded in Nepal and Bhutan (Nidup et al. 2016, Limbu et al. 2020). However, Mahony et al. (2022) reviewed the species of *Amolops* in Bhutan and removed *A. himalayanus* from Bhutan's amphibian checklist and confirmed that this species is present in Nepal. Currently, *A. himalayanus* is known only from north-eastern India and eastern Nepal (Frost 2025).

During our field survey in Xizang Autonomous Region, China, in 2017, a specimen of *Amolops* was collected from Yadong County. As this specimen is a juvenile, it cannot be accurately identified morphologically, we conducted molecular analysis for it and the result indicated that it is *A. himalayanus*. Therefore, we report the distribution of this species in China for the first time and provide a description of the specimen collected from China.

Materials and methods

The field survey was carried out during the implementation of the General Survey on Forest Harmful Organisms project in Xizang, China. The frog specimen was collected as the certificate of forest pest's natural enemy. After being photographed, the specimen was preserved in 75% ethanol and was deposited at Kunming Natural History Museum of Zoology, Kunming Institute of Zoology, Chinese Academy of Sciences (KIZ).

Measurements were taken with a digital caliper to the nearest 0.1 mm. The methodology of measurements followed Wu et al. (2024): SVL, snout-vent length, measured from the tip of the snout to the vent; HL, head length, measured from the tip of the snout to the angle of the jaw; HW, head width, measured at the widest point of the head; SL, snout length, measured from the tip of the snout to the anterior corner of the eye; INS, internasal space, measured between the nares; IOS, interorbital space, measured at the narrowest point between the eyelids; NED, nasal to eye distance, measured from the anterior corner of the eye to the centre of the nostril; UEW, upper eyelid width, measured at the maximal width of the upper eyelid; ED, eye diameter, measured between the anterior and posterior corners of the eye; TD, tympanum diameter, measured at the maximal diameter of the tympanum; LAHL, lower arm and hand length, measured from the elbow to the tip of the third finger; HND, hand length, measured from the proximal edge of the inner metacarpal tubercle to the tip of the third finger; LAD, lower arm diameter, measured at the maximal diameter of the lower arm; FEM, femoral length, measured from the cloaca to the knee; TIB, tibia length, measured from the knee to the heel; FTL, foot length, measured from the proximal end of the inner metatarsal tubercle to the tip of the fourth toe.

Total genomic DNA was extracted from liver tissue sample. A partial fragment of the mitochondrial 16S rRNA gene (16S) was amplified and sequenced using the primers 16Sar (5'-CGCCTGTTTAYCAAAAACAT-3') and 16Sbr (5'-CCGGTYTGAACTCAGAT CAYGT-3') (Hedges 1994). The experimental protocols of amplification and sequencing followed Wu et al. (2024). The sequence was assembled using SeqMan in Lasergene 7.1 (Burland 2000). The new sequences have been deposited in GenBank and other sequences used in this study were obtained from GenBank (Table 1).

Sequences were aligned using MAFFT 7 (Katoh and Standley 2013) with default parameters. The best substitution models for Bayesian Inference (GTR+F+I+G4) and Maximum Likelihood phylogenetic analysis (GTR+F+R4) were selected using the Akaike Information Criterion in ModelFinder (Kalyaanamoorthy et al. 2017). The technical computation methods for Bayesian Inference and Maximum Likelihood analysis and genetic divergences calculation were the same as those in Liu et al. (2024).

Table 1.

Samples used for the phylogenetic analyses in this study.

Species	Voucher	Locality	Accession
<i>Amolops adicola</i>	BNHS 6121	Upper Siang, Arunachal Pradesh, India	MZ229772
<i>Amolops afghanus</i>	KIZ 048431	Husa, Yunnan, China	MN953654
<i>Amolops ailao</i>	GXNU YU000004	Xiping, Yunnan, China	MN650754
<i>Amolops akhaorum</i>	FMNH 271355	Vieng Phou Kha, Luang Namtha, Laos	FJ417158
<i>Amolops albispinus</i>	SYS a003452	Shenzhen, Guangdong, China	MK263247
<i>Amolops aniqiaoensis</i>	KIZ 011136	Xizang, China	MN953658
<i>Amolops archotaphus</i>	CUMZ A 2000.62	Doi Inthanon, Chiang Mai, Thailand:	FJ417124
<i>Amolops attiguus</i>	NCSM 79166	Anh Son, Nghe An, Vietnam	OQ994729
<i>Amolops australis</i>	LSUHC 7673	Endau-Rompin, Peta, Malaysia	MF061745
<i>Amolops beibengensis</i>	KIZ 016397	Medog, Xizang, China	MN953662
<i>Amolops bellulus</i>	CAS 233986	Tengchong, Yunnan, China	FJ417126
<i>Amolops chankaya</i>	V/A/NERC/ZSI/1771	West Kameng, Arunachal Pradesh, India	ON025582
<i>Amolops chaochin</i>	CIB 116971	Chongzhou, Sichuan, China	MZ702027
<i>Amolops chayuenis</i>	SYS a007509	Baxoi, Xizang, China	MK573820
<i>Amolops chunganensis</i>	SYS a004212	Jinggangshan, Jiangxi, China	MK263263
<i>Amolops compotrix</i>	FMNH 256500	Nakai, Khammouan, Laos	FJ417141
<i>Amolops cremnobatus</i>	KIZ 011621	Puhu National Reserve, Thanhhoa, Vietnam	MN953672
<i>Amolops cucae</i>	AMNH 168729	Van Ban, Lao Cai, Vietnam	FJ417145
<i>Amolops daiyunensis</i>	KIZ 08991	Daiyunshan, Fujian, China	MN953675
<i>Amolops daorum</i>	ROM 38501	Lao Cai, Sa Pa, Vietnam	FJ417150
<i>Amolops deng</i>	KIZ 014116	Zayü, Xizang, China	MN953695
<i>Amolops formosus</i>	KIZ 012533	Gyirong, Xizang, China	MN953682
<i>Amolops gerbillus</i>	KIZ 014086	Medog, Xizang, China	MN953744
<i>Amolops gerutu</i>	RMB 21077	Gunung Tebu, Terengganu, Malaysia	MF061721
<i>Amolops granulosus</i>	SCUM 045823HX	Dayi, Sichuan, China	MN953680
<i>Amolops hainanensis</i>	SCUM 050243YJ	Wuzhishan, Hainan, China	MN953687
<i>Amolops himalayanus</i>	BMNH 1947.2.3.83	Darjeeling, West Bengal, India	SAMN28238802
<i>Amolops himalayanus</i>	KIZ 040227	Mabu, Ilam, Nepal	MN953713
<i>Amolops himalayanus</i>	KIZ 040228	Maimajhuwa, Ilam, Nepal	MN953714
<i>Amolops himalayanus</i>	SH 2789	Rakse village, Mechi, Nepal	MN953712
<i>Amolops himalayanus</i>	KIZ 2017002	Yadong, Xizang, China	PV241793
<i>Amolops hongkongensis</i>	ROM 29014	Hong Kong, China	MN953691
<i>Amolops huanglianshanensis</i>	KIZ 2023094	Lvchun, Yunnan, China	PQ202849

Species	Voucher	Locality	Accession
<i>Amolops indoburmanensis</i>	CAS 233204	Haka, Chin, Myanmar	MN953693
<i>Amolops iriodes</i>	AMNH 163926	Vi Xuyen, Ha Giang, Vietnam	FJ417152
<i>Amolops jinjiangensis</i>	SCUM 050434CHX	Deqing, Yunnan, China	MN953700
<i>Amolops kaulbacki</i>	SCUM 050402CHX	Pianma, Yunnan, China	MN953736
<i>Amolops kohimaensis</i>	WIIADA 751	Kohima, Nagaland, India	MZ229774
<i>Amolops kottelati</i>	NCSM 79617	Thaphabhat, Bolikhamxay, Laos	OQ994724
<i>Amolops larutensis</i>	KUHE 15488	Perak, Malaysia	AB211484
<i>Amolops lifanensis</i>	SYS a005374	Lixian, Sichuan, China	MK573809
<i>Amolops loloensis</i>	SCUM 045806HX	Xichang, Sichuan, China	MN953704
<i>Amolops mahabharatensis</i>	CDZMTU 0110	Chitwan, Bagmati, Nepal	MT124507
<i>Amolops mantzorum</i>	SCUM 045817HX	Wolong, Sichuan, China	MN953706
<i>Amolops marmoratus</i>	KIZ 013411	Huai Hea, Chiang Mai, Thailand	MN953708
<i>Amolops medogensis</i>	SYNU 04II6216	Medog, Xizang, China	MN953710
<i>Amolops mengdingensis</i>	KIZ 20160266	Mengding, Yunnan, China	MK501809
<i>Amolops minutus</i>	IEBR Amolops5142	Tam Duong, Lai Chau, Vietnam	PQ346023
<i>Amolops monticola</i>	WIIADA 544	Tarku, Sikkim, India	MZ229773
<i>Amolops nepalicus</i>	CDZMTU 0148	Lamatar, Taplejung, Nepal	MT124520
<i>Amolops nyingchiensis</i>	SYS a006679	Medog, Xizang, China	MK573814
<i>Amolops pallasitatus</i>	SYNU 1507034	Dinggye, Xizang, China	MK573816
<i>Amolops panhai</i>	FMNH 268355	Huay Yang, Prachuap Khiri Khan, Thailand	MN953720
<i>Amolops putaoensis</i>	GXNU W011	Putao, Kachin, Myanmar	MT901383
<i>Amolops ricketti</i>	HDSK 0043	Wuyishan, Fujian, China	MN953743
<i>Amolops sengae</i>	FMNH 258376	Kasi, Vientiane, Laos	OQ994715
<i>Amolops shihaitaoi</i>	GXNU YU000353	Hekou, Yunnan, China	OK754591
<i>Amolops shuichengicus</i>	SYS a004956	Shuicheng, Guizhou, China	MK604845
<i>Amolops siju</i>	D414	Siju, Meghalaya, India	OM174172
<i>Amolops sinensis</i>	SYS a007107	Yingde, Guangdong, China	MK263299
<i>Amolops spinapectoralis</i>	ROM 37375	Ngoc Linh, Kon Tum, Vietnam	MN953726
<i>Amolops tanfuiianae</i>	AMS R 171526	Con Cuong, Nghe An, Vietnam	OQ994640
<i>Amolops tawang</i>	VIA/NERC/ZSI/1772	Tawang, Arunachal Pradesh, India	ON025581
<i>Amolops teochew</i>	SYS a008705	Chaozhou, Guangdong, China	MZ447970
<i>Amolops terraorchis</i>	Amolops_331	Arunachal Pradesh, India	MW794278
<i>Amolops torrentis</i>	SCUM 050253YJ	Hainan, China	EF453744
<i>Amolops tuanjiensis</i>	GXNU YU 110003	Gengma, Yunnan, China	MN832772
<i>Amolops tuberodepressus</i>	SCUM 050433CHX	Jingdong, Yunnan, China	MN953729
<i>Amolops viridimaculatus</i>	KIZ 048487	Tengchong, Yunnan, China	MN953731

Species	Voucher	Locality	Accession
<i>Amolops vitreus</i>	FMNH 258187	Phongsaly, Phongsaly, Laos	FJ417164
<i>Amolops wangyali</i>	SCZM 2019.07.18.1	Bodidrang Chhu, Trashigang, Bhutan	ON462441
<i>Amolops wangyufani</i>	KIZ 014067	Zayü, Xizang, China	MN953740
<i>Amolops wenshanensis</i>	KIZ 021425	Xichou, Yunnan, China	MN953724
<i>Amolops wuyiensis</i>	HDSK 0042	Wuyishan, Fujian, China	MN953742
<i>Amolops xinduiqiao</i>	KIZ 041127	Kangding, Sichuan, China	MN953764
<i>Amolops yangi</i>	KIZ 050788	Fugong, Yunnan, China	PP097200
<i>Amolops yatseni</i>	SYS a006807	Zhongshan, Guangdong, China	MK263290
<i>Amolops yunkaiensis</i>	SYS a003979	Yangchun, Guangdong, China	MK263253
<i>Odorrana jingdongensis</i>	KIZ 46977	Jingdong, Yunnan, China	MN953755

Taxon treatment

Amolops himalayanus (Boulenger, 1888)

Material

- a. scientificName: *Amolops himalayanus*; country: China; stateProvince: Xizang; locality: Pangda Village, Xiayadong Township, Yadong County, Rikaze City; verbatimElevation: 1860 m; verbatimCoordinates: 27°15'13"N 89°1'16"E; eventRemarks: collected by Hengying Wang on 27 July 2017; individualCount: 1; lifeStage: juvenile; catalogNumber: KIZ 2017002; basisOfRecord: preserved specimen; occurrenceID: 43DC4C6E-ED61-558F-8083-2CF830E39168

Description of the specimen from China

Morphological measurements of the specimen (Fig. 1) are provided in Table 2. SVL 22.9 mm; head moderate long (HL/SVL 0.38), slightly longer than wide (HL/HW 1.08); snout moderate long (SL/SVL 0.16), projecting beyond lower jaw; canthus rostralis distinct; loreal region slightly concave; distance from nostril to snout tip slightly smaller than distance from eye to nostril; internarial distance slightly greater than interorbital distance (INS/IOS 1.07); upper eyelid width almost equal to interorbital distance (UEW/IOS 1.05); pupil oval, horizontal; tympanum distinct, small (TD/ED 0.27); tympanum to eye distance greater than tympanum diameter; pineal spot present, indistinct.

Fore-limb relatively long; relative length of fingers III > IV > II > I; tips of outer three fingers expanded into discs, circummarginal grooves present on tips of outer three fingers, absent on first finger; webbing between fingers absent; subarticular tubercles distinct, oval, formula 1, 1, 2, 2; supernumerary tubercles absent; metacarpal tubercles indistinct.

Table 2.

Measurements (in mm) of the specimen of *Amolops himalayanus* from China (for abbreviations, see Material and Methods).

	KIZ 2017002		KIZ 2017002
SVL	22.9	ED	3.7
HL	8.6	TD	1.0
HW	8.0	LAHL	12.6
SL	3.7	HND	8.2
INS	3.2	LAD	1.7
IOS	3.0	FEM	12.4
NED	2.0	TIB	12.8
UEW	2.1	FTL	11.4

Figure 1. [doi](#)

The specimen of *Amolops himalayanus* from China in preservative. **A** Dorsal view; **B** ventral view.

Hind-limb moderate long; tibia almost equal to femoral length (TIB/FEM 1.03); relative length of toes IV > V > III > II > I; all toe tips expanded into discs with circummarginal grooves; webbing between toes deeply incurved; subarticular tubercles distinct, oval, formula 1, 1, 2, 3, 2; supernumerary tubercles absent; inner metatarsal tubercle elongated; outer metatarsal tubercle absent.

Dorsal and lateral surfaces of head and body smooth; dorsal surface of fore-limb smooth, dorsal surface of hind-limb with many small tubercles; supratympanic fold

present; discontinuous glandular dorsolateral fold from rear of eye to near vent; ventral surface smooth.

Colouration in life

Dorsal surface of the head and body green, some small black spots on dorsum; dorsal surface of limbs yellowish-green with some brown crossbars; lateral surface of head light green, a black stripe below canthus rostralis from snout tip across eyes to supratympanic fold; upper lip light yellowish-green with irregular brown spots; lateral surface of body light green, a large brown spot just behind supratympanic fold on each side; ventral surface of head light yellow, lower lip yellowish-brown; ventral surface of light greenish-yellow; ventral surface of limbs yellowish-brown (Fig. 2).



Figure 2. [doi](#)

The specimen of *Amolops himalayanus* from China in life. **A** Dorsal view; **B** ventral view; **C** left view; **D** right view.

Ecological notes

This specimen was found at night in the shrubland near a river on a leaf of an herbaceous plant (Fig. 3). Other amphibian species found in sympatry include *Nanorana blanfordii* (Boulenger, 1882), *N. liebigii* (Günther, 1860), *Raorchestes yadongensis* Zhang, Shu, Liu, Dong & Guo, 2022 and *Xenophrys pangdaensis* Shu, Li, Wu, Liu, He, Li, Zhang & Guo, 2023.

Recommended common name

We suggest 喜山湍蛙 (Pinyin: xǐ shān tuān wā) as the Chinese name of this species.



Figure 3. [doi](#)

Habitat of the specimen of *Amolops himalayanus* collected in China.

Analysis

Bayesian Inference and Maximum Likelihood analysis obtained similar results. The sequence of the specimen from Yadong, Xizang, China, clustered with the sequences of the syntype (BMNH1947.2.3.83) and other specimens of *Amolops himalayanus* from Nepal with strong support (Fig. 4). The genetic distance (uncorrected p-distance) between the sequence of the specimen from Yadong and the sequence of the syntype (BMNH1947.2.3.83) of *A. himalayanus* was only 0.7% and the genetic distances (uncorrected p-distance) between the sequence of the specimen from Yadong and the sequences of the specimens of *A. himalayanus* from Nepal ranged from 0.8% to 0.9% (Table 3).

Table 3.

Uncorrected pairwise genetic distances (%) between specimens of *Amolops himalayanus*, based on 16S sequences.

	1	2	3	4
1 BMNH 1947.2.3.83 (Syntype, India)				
2 SH 2789 (Nepal)	0			
3 KIZ 040227 (Nepal)	0	0		
4 KIZ 040228 (Nepal)	0.2	0.2	0.2	
5 KIZ 2017002 (China)	0.7	0.8	0.8	0.9

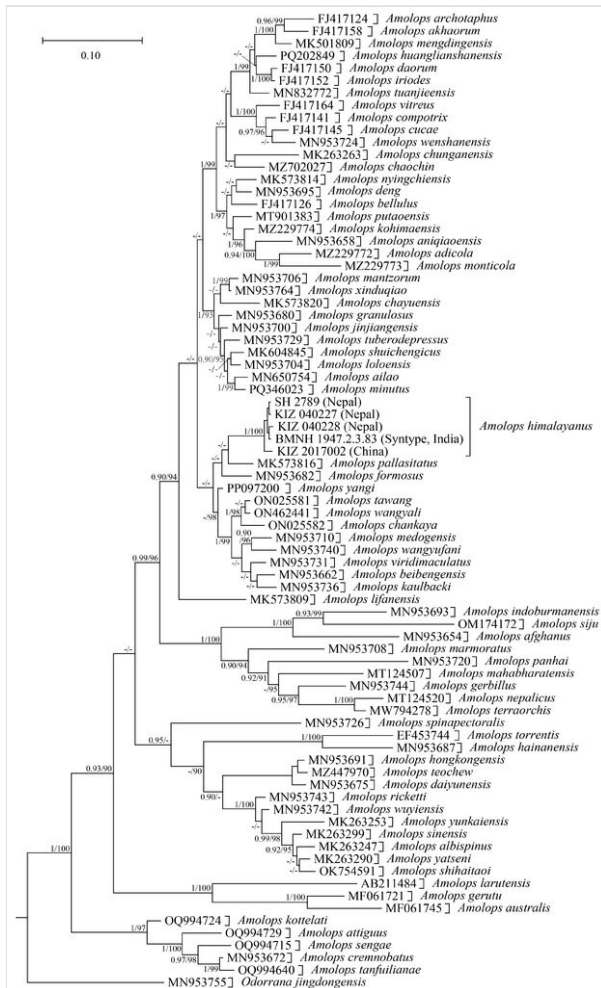


Figure 4. [doi](#)
 Bayesian phylogenetic tree based on 16S sequences. The numbers after and behind the “/” indicate the Bayesian posterior probabilities and Maximum Likelihood ultrafast bootstrap values (> 0.90/90), respectively.

Discussion

In some species of *Amolops*, especially in the *A. viridimaculatus* group, the body colouration of juveniles usually differs significantly from that of adults (Mahony et al. 2022). Therefore, the juvenile specimen we collected from Xizang cannot be accurately identified by morphology. However, phylogenetic analysis strongly supported that this specimen belongs to *A. himalayanus*, with a genetic distance of only 0.7% between it and the syntype (BMNH1947.2.3.83) of *A. himalayanus* in 16S gene sequences. Thus, we confirmed that *A. himalayanus* is distributed in China.

Amolops himalayanus has rarely been reported since it was described more than a hundred years ago. Previously, this species was recorded in Nepal and Bhutan and the photos in life and breeding ecology of this species have been reported (Nidup et al. 2016, Limbu et al. 2020). Subsequently, Mahony et al. (2022) pointed out that the species previously recorded as *A. himalayanus* in Bhutan actually belonged to *Amolops wangyali* Mahony, Nidup, Streicher, Teeling & Kamei, 2022 and removed *A. himalayanus* from Bhutan's herpetofauna. In addition, Mahony et al. (2022) confirmed the distribution of *A. himalayanus* in Nepal based on genetic data, but did not provide any morphological data or photos of *A. himalayanus*. Although there are some photos of alleged *A. himalayanus* available on the website iNaturalist (<https://www.inaturalist.org/>), even some of them having been taken from the type locality of *A. himalayanus*, they have not undergone strict identification. Therefore, so far, no reliable photos of *A. himalayanus* in life have been formally reported. Herein, we record *A. himalayanus* from China and provide photos of this species in life for the first time, based on a genetically confirmed specimen, even though it is a juvenile.

Previously, *Amolops himalayanus* was confirmed to be distributed in Darjeeling, India, as well as in Ilam and Mechi, Nepal. This study recorded for the first time the distribution of this species in China and the new collection site extended the distribution range of this species to the northeast by approximately 80 km (Fig. 5). Unfortunately, we only collected one specimen of this species and it is a juvenile. Future field surveys in this area should be strengthened to understand the population status of this species in China.

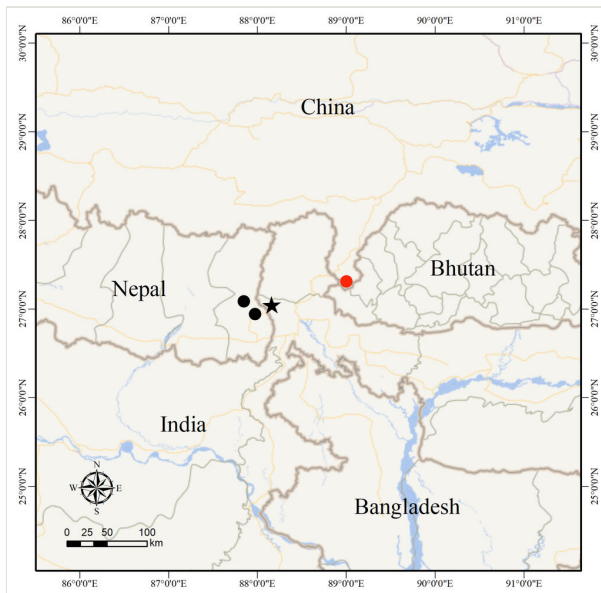


Figure 5. [doi](#)

Map showing the type locality of *Amolops himalayanus* in Darjeeling, India (black star), the confirmed distributions in Ilam and Mechi, Nepal (black dots) and the new collection site from Yadong, Xizang, China (red dot).

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