Confirmed Report of the Aniqiao Torrent Frog, *Amolops aniqiaoensis* (Anura: Ranidae), from India, with Additional Distributional Records for Two Other Indian Species of *Amolops*

Bhaskar Saikia¹, Mostaque A. Laskar², Bikramjit Sinha¹, Manisha Debnath², Samrat Sengupta³, Hiramoni Das³, A. Shabnam⁴, Ilona Jacinta Kharkongor⁵, and K.P. Dinesh⁴

¹North Eastern Regional Centre, Zoological Survey of India, Shillong 793003, Meghalaya, India (bhaskar.saikia@zsi.gov.in)
²Department of Biotechnology, St. Anthony’s College, Shillong 793001, Meghalaya, India
³Department of Zoology, D.R. College, Golaghat 785621, Assam, India
⁴Zoological Survey of India, Western Regional Centre, Vidyanagar, Pune 411044, Maharashtra, India
⁵Zoological Survey of India, Arunachal Pradesh Regional Centre, Senki Valley, Itanagar 791113, Arunachal Pradesh, India

Abstract.—The torrent-dwelling frog genus *Amolops* is represented by 13 species in India, including type localities for 11 species. Based on recent field surveys and subsequent phylogenetic studies of specimens collected, we confirm the presence of *A. aniqiaoensis* Dong, Rao, and Lü 2005, which was described from Aniqiao, Xizang, China, in India. We also report a range extension of a recently described species, *A. adicola* Patel, Garg, Das, Stuart, and Biju 2021, with a further note on *A. indoburmanensis* Dever, Fuiten, Konu, and Wilkinson 2012.

Conservation and effective management for any amphibian taxon can be severely impeded by the lack of explicit information about its geographic distribution (S.N. Stuart et al. 2008), especially for range-restricted species with specialized habitat requirements. The torrent-dwelling frog genus *Amolops*, which is predominantly restricted to eastern and southeastern Asia and extending to the western Himalayas in India, has seen a burst of taxonomic descriptions that nearly doubled the total species count in the last decade (see Frost 2022). Of the 13 species of *Amolops* reported from India (Frost 2022), 11 species (*A. adicola* and *A. gerbillus* from Arunachal Pradesh; *A. assamensis* from Assam; *A. kobinaeansis* and *A. nidorbrellus* from Nagaland; *A. formosus* from Meghalaya; *A. chakrataensis* and *A. jaunsari* from Uttarakhand; and *A. himalayanus, A. monticola*, and *A. senchalesis* from West Bengal) were described based on type localities in the country (Günther 1876; Anderson 1871; Boulenger 1888; Annandale 1912; Chanda 1987; Ray 1992; Sengupta et al. 2008; Biju et al. 2010; Patel et al. 2021). Despite this rich diversity, our current knowledge of the distributional limits of these frogs in this region is relatively poor (Pawar et al. 2007).

In recent years, while studying the amphibian diversity of northeastern India (Fig. 1), we have collected representative torrent frogs in the genus *Amolops* that were subjected to molecular phylogenetic studies. This resulted in the confirmation of one new country record and a second distribution record of a recently described species.

---

**Fig. 1.** Map of northeastern India. Siyum, Upper Subansiri District, Arunachal Pradesh, the site where we collected *Amolops adicola* and *A. aniqiaoensis* is marked by the red dot, and Murlen Village, Champhai District, Mizoram, where we collected *A. indoburmanensis* is marked by the green dot.
Methods
We collected, preserved, and deposited five frogs (Amolops spp.) in the museum of the North Eastern Regional Centre, Zoological Survey of India, Shillong (ZSIS) (V/A/NERC/ZSI/1497, 1565A–B, 1707–8) (Table 1). Prior to fixation, we extracted and preserved liver tissues in 90% ethanol for molecular studies. We conducted genomic DNA extraction and polymerase chain reaction following the protocol of B. Saikia et al. (2021) and used the primers 16sar-L (5′CGCTCCTTATCAAAACAT3′) and 16sbr-H (5′CCGGTCTGAACCTGATCGT3′) of Palumbi et al. (2002) to amplify the 697 bp fragment of the mitochondrial 16S rRNA gene from genomic DNA extracts of the four amphibian samples. We outsourced Sanger sequencing. Using SeqTrace (Stucky 2012), we filtered and end-trimmed low-quality base calls from trace files of 16S rRNA gene sequence fragments, and checked the resultant sequence for corrections in MEGA XI software (Tamura et al. 2021). In addition, we downloaded 197 sequences of Amolops spp. available in GenBank and aligned them manually in MEGA XI using the MUSCLE algorithm (Edgar 2004). Sequence names (Appendix 1) follow Jiang et al. (2021) and Patel et al. (2021). We performed maximum-likelihood phylogenetic estimation in RAxML 2.0.0 (Stamatakis et al. 2007; Silvestro and Michalak 2012) under GTR+GAMMA+I model with 1,000 thorough bootstrap replicates. Outgroups followed Wu et al. (2020) and the final consensus tree was visualized by FigTree v1.4.0.

Results
The phylogenetic analysis revealed that our Amolops indoburmanensis sample (MN519705) from Murlen, Mizoram, India, and those reported in previous studies were genetically similar (Fig. 2). Also, our Amolops aniqiaoensis samples (MT636754 and MT636755) from Siyum, Arunachal Pradesh, India, were clustered with A. aniqiaoensis from earlier studies. Finally, our A. adicola sample (OK138593) from Siyum was genetically identical with the A. adicola sample reported by Patel et al. (2021).

Amolops adicola
Patel, Garg, Das, Stuart, and Biju 2021
(Fig. 3A).—Bikramjit Sinha collected two adult female Adi Cascade Frogs (A. adicola) (V/A/NERC/ZSI/1707, SVL 65.8 mm; V/A/NERC/ZSI/1708, SVL 67.7 mm) about 3 km from Siyum towards Talihka, Upper Subansiri District, Arunachal Pradesh, India (28.337°N, 94.031°E; elev. 563 m asl), on 24 September 2018. These frogs were collected after twilight from the bank of a fast-flowing second-order hill stream with large boulders (Fig. 3D) locally known as Row Stream. Mixed streamside vegetation is dominated by wild banana trees (Musa sp.), which are quite common in the area.

Bodies robust; heads almost as long as wide; snouts rounded and longer than diameter of the eyes; nostrils slightly closer to the snouts than to the eyes; interorbital distance almost equal to the length of the upper eyelids, but less than internarial distance; tongues large and cordate shaped; vomerine teeth present; tympana distinct and round, separated from the eyes by a distance equal to the diameter of the tympana; fingers free, tips ending in discs bearing circummarginal grooves; subarticular tubercles prominent; relative finger lengths I<II<IV<III; tibiae longer than femur and more than half of SVL; toes fully webbed and ending in discs with circummarginal grooves; inner metatarsal tubercles elongated, outers absent; tibiotarsal articulations reaching beyond the snout; dorsolateral folds present; skin smooth. The preserved specimens are grayish-brown dorsally, creamy white ventrally; sides of heads are darker but additional markings are not evident in the preserved specimens.

Our specimens generally agreed with the original description of the species (Patel et al. 2021), although the heads of our specimens were almost as long as wide, whereas Patel et al. (2021) described A. adicola as having a head longer than wide.

This report from the Upper Subansiri District of Arunachal Pradesh is only the second report of this species and it extends the range of the species about 85 km south-west from the type locality near Mossing in Upper Siang District of Arunachal Pradesh and the maximum elevational distribution from 515 m (Patel et al. 2021) to 563 m.

Amolops aniqiaoensis
Dong, Rao, and Lü 2005
(Fig. 3B).—Bikramjit Sinha also collected two adult male Aniqiao Torrent Frogs (A. aniqiaoensis) (V/A/NERC/ZSI/1565A, SVL 49.5 mm; V/A/NERC/ZSI/1565B, SVL 51.4 mm) at the same locality as the female A. adicola mentioned above (Fig. 3D).

Bodies slender; heads as wide as long; snouts blunt; nostrils nearer the eyes than to the snouts; tongues bifid; a pair of vomerine teeth present between the choanae; interorbital distance greater than the length of the upper eyelids; tympana distinct and round, separated from the eyes by a distance equal to the diameter of the tympana; fingers free, tips ending in discs bearing circummarginal grooves; subarticular tubercles prominent; prepollicles enlarged; relative finger lengths I<II<IV<III; tibiae longer than femur and more than half of SVL; toes fully webbed, ending in discs with circummarginal grooves; inner metatarsal tubercles elongated, outers absent; tibiotarsal articulations reaching beyond the snout; dorsolateral folds present; posterior regions (including the hindlimbs) with numerous scattered spinules characteristic of this species; venter smooth. Dorsa with small scattered dark markings; venters creamy white with a few darker spots; limbs with irregular markings (not banded). Both males have a pair of gular pouches at the posterior end of the mandibles.

This report from Upper Subansiri District of Arunachal Pradesh, the first confirmed report of this species from India and the first record other than the type locality at Aniqiao,
Table 1. Morphometric data (as in Dinesh et al. 2022) of the specimens of torrent frogs (*Amolops* spp.) used in this study. Abbreviations: SVL = snout-to-vent length; HW = head width at the angle of the jaws; HL = head length (rear of the mandible to tip of the snout); IN = internarial distance; NE = nostril-to-eye distance; NS = distance from nostril to tip of snout; MN = distance from the rear of the mandible to the center of the nostril; MFE = distance from the rear of the mandible to the anterior-most orbital border; MBE = distance from the rear of the mandible to the posterior-most orbital border; SL = snout length (tip of the snout to the anterior-most orbital border); EL = eye length (the horizontal distance between the bony orbital borders of the eye); IUE = inter upper-eyelid width (shortest distance between the upper eyelids); UEW = maximum upper-eyelid width; IFE = distance between anterior corners of the eyes; IBE = distance between the posterior corners of the eyes; TYD = tympanum diameter; TE = tympanum to posterior corner of eye distance; FLL = forelimb length (elbow to the base of the outer palmar tubercle); HAL = hand length (base of the outer palmar tubercle to the tip of the third finger); FL1 = first finger length (tip of finger to proximal palmar tubercle); FL2 = second finger length (tip of finger to proximal palmar tubercle); TFL = third-finger length (tip of finger to proximal palmar tubercle); AGL = axilla to groin distance; WBS = body width behind the shoulders; WFG = body width anterior to the groin; ShL/FL = thigh length; TiL = tibia length; Tal = tarsus length; FOL = foot length (base of the inner metatarsal tubercle to the tip of the fourth toe); ITL = inner toe length; IMT = length of the inner metatarsal tubercle.

| Character | *A. adicola* ZSI/1707 | *A. adicola* ZSI/1708 | *A. aniqiaensis* ZSI/1565A | *A. aniqiaensis* ZSI/1565B | *A. indoburmanensis* ZSI/1497 |
|-----------|------------------------|------------------------|-----------------------------|-----------------------------|-----------------------------|
| SEX       | F                      | F                      | M                           | M                           | F                           |
| SVL       | 65.8                   | 67.7                   | 49.5                        | 51.4                        | 94.7                        |
| HW        | 21.3                   | 22.0                   | 16.1                        | 17.0                        | 33.1                        |
| HL        | 20.9                   | 21.8                   | 16.1                        | 17.0                        | 29.7                        |
| IN        | 6.8                    | 7.5                    | 5.6                         | 6.1                         | 11.1                        |
| NE        | 4.2                    | 4.6                    | 3.3                         | 3.3                         | 6.7                         |
| NS        | 4.1                    | 4.4                    | 3.8                         | 4.0                         | 6.1                         |
| MN        | 17.5                   | 17.6                   | 12.6                        | 13.3                        | 24.4                        |
| MFE       | 12.6                   | 12.9                   | 9.7                         | 10.6                        | 17.5                        |
| MBE       | 6.9                    | 7.3                    | 5.1                         | 5.8                         | 9.9                         |
| SL        | 8.6                    | 9.7                    | 7.5                         | 7.7                         | 13.4                        |
| EL        | 7.4                    | 7.6                    | 6.3                         | 6.3                         | 11.7                        |
| IUE       | 5.7                    | 5.7                    | 4.4                         | 5.0                         | 8.2                         |
| UEW       | 5.5                    | 5.6                    | 4.4                         | 5.0                         | 8.8                         |
| IFE       | 11.7                   | 12.1                   | 9.2                         | 9.7                         | 17.9                        |
| IBE       | 17.3                   | 17.5                   | 13.8                        | 14.9                        | 26.5                        |
| TYD       | 3.0                    | 3.1                    | 2.7                         | 2.7                         | 3.1                         |
| TE        | 3.0                    | 3.1                    | 2.3                         | 2.2                         | 4.6                         |
| FLL       | 16.1                   | 16.1                   | 13.3                        | 13.3                        | 18.9                        |
| HAL       | 21.5                   | 21.5                   | 17.1                        | 17.2                        | 26.7                        |
| FL1       | 13.1                   | 13.2                   | 11.0                        | 11.1                        | 15.5                        |
| FL2       | 15.4                   | 15.6                   | 12.1                        | 12.0                        | 17.0                        |
| TFL       | 21.5                   | 21.5                   | 17.1                        | 17.2                        | 25.6                        |
| AGL       | 32.4                   | 32.4                   | 22.2                        | 22.3                        | 39.9                        |
| WBS       | 22.2                   | 25.2                   | 14.8                        | 14.8                        | 33.7                        |
| WFG       | 13.0                   | 13.0                   | 9.1                         | 9.2                         | 18.4                        |
| ShL/FL    | 40.3                   | 40.3                   | 30.6                        | 30.7                        | 52.3                        |
| TiL       | 45.7                   | 46.5                   | 33.9                        | 33.9                        | 56.1                        |
| Tal       | 21.9                   | 22.1                   | 16.2                        | 16.3                        | 25.1                        |
| FOL       | 39.6                   | 39.6                   | 29.9                        | 30.2                        | 48.6                        |
| FTL       | 22.9                   | 22.7                   | 17.9                        | 18.0                        | 26.1                        |
| ITL       | 10.2                   | 10.9                   | 7.8                         | 7.7                         | 12.3                        |
| IMT       | 3.5                    | 3.5                    | 2.5                         | 2.6                         | 6.8                         |
China, extends the range of the species about 155 km aerial distance to the southwest and the lower elevational distribution from 1,066 m (Dong et al. 2005) to 563 m asl.

**Amolops indoburmanensis** Dever, Fuiten, Konu, and Wilkinson 2012 (Fig. 3C).—Ilona Jacinta Kharkongor and Bhaskar Saikia collected an adult female Indoburman Torrent Frog (*A. indoburmanensis*) (V/A/NERC/ZSI/1497, SVL 94.7 mm) in Murlen Village on the fringe of Murlen National Park, Champhai, Mizoram, India (23.6622°N, 93.2861°E; elev. 1,401 m asl), on 31 January 2019.

Body stocky; head broad and flat with a distinct canthus rostralis; nostrils closer to the snout tip than to the eyes; vomerine teeth present; tongue notched medially; tympana small, round, and distinct; forearms stocky; fingers free, fingertips ending in disks with circummarginal grooves; finger lengths I<II<IV<III; inner and outer metacarpal tubercles large and flat; hindlimbs long and stocky; tibiotarsal articulation crosses snout; toes fully webbed and with disks with circummarginal grooves (but disk size smaller than those on fingers); inner metatarsal tubercles elongated and flat, outer absent; dorsum smooth, venter slightly granular. Dorsal coloration greenish-brown with scattered dark spots, ventral coloration dirty off-white.

The frog was found under a boulder in a dry streambed near a banana plantation on the outskirts of Murlen Village. The female was gravid, suggesting that this species breeds before the onset of the monsoon.

---

**Fig. 2.** Maximum-likelihood tree for species of *Amolops* based on 560 bp of mt 16s rRNA.
Discussion

Jiang et al. (2021) assigned the 14 known species of *Amolops* known to occur in India, including *A. aniqiaoensis* (reported herein), to three morphological species groups: the *A. marmoratus* group (*A. assamensis*, *A. gerbillus*, *A. indoburmanensis*, *A. jaunsari*, *A. senchalensis*), *A. monticola* group (*A. adicola*, *A. aniqiaoensis*, *A. chakratensis*, *A. kohimanensis*, *A. monticola*), and *A. viridimaculatus* group (*A. formosus*, *A. bimalayanus*, *A. nidorbellus*, *A. viridimaculatus*). The distribution of species in the *A. monticola* group is known with certainty (Patel et al. 2021), whereas the distribution of species in the *A. marmoratus* group is uncertain. Although Lalronunga et al. (2020) provided a credible report of *A. indoburmanensis* in India from Aizawl and Lunglei Districts of Mizoram, and we herein document the presence of the species from the adjacent District of Champhai. Previous reports of *A. marmoratus sensu stricto* from India (Ahmed et al. 2009; Mathew and Sen 2010) were considered doubtful by Dever et al. (2012). Also, after the resurrection of *A. nepalicus* (Khatiwada et al. 2020; Wang et al. 2020), which had been considered a junior synonym of *A. marmoratus*, Frost (2022) conditionally recognized *A. senchalensis*, which Dubois (2000) had placed in the synonymy of *A. marmoratus*. Ao et al. (2003) reported the occurrence of *A. viridimaculatus sensu stricto* at Dzuna, Nagaland, India, which is more than 400 km west of the type locality in Tengchong, Yunnan, southeastern China. U. Saikia and Das (2017) also reported the occurrence of *A. viridimaculatus* from Tawang District, Arunachal Pradesh, India, which is another 300 km west of Nagaland. U. Saikia and Das (2017) compared their observation with previous reports from the state (Pawar and Birand 2001; Athreya 2006) and noted that these frogs were “dorsally greenish in colouration with large roundish brown spots,” whereas *A. viridimaculatus sensu stricto* has a brownish dorsum with roundish green spots (Fei et al. 2012; Khatiwada et al. 2020). However, none of these three reports from Arunachal Pradesh confirm that these frogs were *A. viridimaculatus sensu stricto*; instead, they probably represent one or more undescribed lineages in the *A. viridimaculatus* group.

Estimation of species diversity in cryptic groups is difficult without the use of integrative taxonomic tools. B.L.
Stuart et al. (2006) remarked that amphibian diversity remains grossly underestimated due to the erroneous assumption that samples of the same genus collected in sympatry are conspecific. In India, sympatric species of *Amolops* are known from the Darjeeling Hills of West Bengal (*A. himalayanus*, *A. monticola*, *A. senchalenensis*) and from Chakrata, Dehra Dun Hills in Uttarakhand (*A. chakrataensis* and *A. jaunsari*). Interestingly, syntopy in Indian species of *Amolops*, although rare, has been documented. Biju et al. (2010) described two syntopic *Amolops* species (*A. kohimaensis* and *A. nidorbellus*) from Nagaland, Dinesh and Radhakrishnan (2019) reported the syntopic occurrence of *A. assamensis* and *A. himalayanus* at Namdapha, Arunachal Pradesh, and we herein report syntopy of *A. adicola* and *A. anigiaoaensis* at Siyum, Arunachal Pradesh.

**Acknowledgements**

We thank various state forest departments for collecting permits: Arunachal Pradesh letter No. CWL/G/13(95)/2011-12/Pt./1048-49, 22 June 2015, and Mizoram letter No. A.33011/4/2017-CWLW/Vol.III/192, 16 July 2018. We also thank the Director, Zoological Survey of India, Kolkata; the Officer-in-Charge, ZSIS; and the Officer-in-Charge, ZSI, WRC, Pune; for access to facilities and support. We conducted molecular studies in the DBT-BIF of St. Anthony’s College, Shillong, Meghalaya, India.

**Literature Cited**

Ahmed, M.F., A. Das, and S.K. Dutta. 2009. *Amphibians and Reptiles of Northeast India: A Photographic Guide*. Aaranyak, Guwahati, India.

Ao, J.M., S. Bordoloi, and A. Ohler. 2003. Amphibian fauna of Nagaland with nineteen new records from the state including five new records for India. *Zoo Print Journal* 18: 1117–1125.

Anderson, J. 1871. A list of the reptilian accession to the Indian Museum, Calcutta from 1865 to 1870, with a description of some new species. *Journal of the Asiatic Society of Bengal* 40: 12–39.

Annandale, N. 1912. Zoological results of the Abor Expedition (Batrachia). *Journal of the Asiatic Society of Bengal* 40: 12–39.

Ashrey, R. 2006. *Eaglenest Biodiversity Project (2003–2006): Conservation Resources for Eaglenest Wildlife Sanctuary*. Kazir Trust, Pune, India.

Boulenger, G.A. 1888. Descriptions of two new Indian species of *Rana*. *Annals and Magazine of Natural History*, Series 6, 2: 506–508.

Biju, S.D., S. Mahony, and R.G. Kamei. 2010. Description of two new species (*Amolops*) from Chakrata, Dehra Dun Hills in Uttarakhand (*A. chakrataensis* and *A. jaunsari*). Interestingly, syntopy in Indian species of *Amolops*, although rare, has been documented. Biju et al. (2010) described two syntopic *Amolops* species (*A. kohimaensis* and *A. nidorbellus*) from Nagaland, Dinesh and Radhakrishnan (2019) reported the syntopic occurrence of *A. assamensis* and *A. himalayanus* at Namdapha, Arunachal Pradesh, and we herein report syntopy of *A. adicola* and *A. anigiaoaensis* at Siyum, Arunachal Pradesh.

Dinesh, K.P. and C. Radhakrishnan. 2019. *Amphibia, pp. 65–82. In: Fauna of Namdapha Tiger Reserve, Arunachal Pradesh*. Conservation Area Series, 65. Zoological Survey of India, Kolkata, India.

Dinesh, K.P., B.H. Channakeshavarurthy, P. Deepak, A. Shabnam, A.K. Ghosh, and K. Deuti. 2022. Discovery of a new species of *Esphysicus* (Anura: Dicroglossidae) from the western coastal plains of peninsular India. *Zootaxa* 5100: 419–434. https://doi.org/10.11646/zootaxa.5100.3.6.

Dong, B.-J., D.-Q. Rao, and S.-Q. Liu. 2005. *Amolops anigiaoaensis*, p. 251. In: S.-Q. Zhao, D.-Q. Rao, S.-Q. Liu, and B.-J. Dong. *Herpetological surveys of Xizang autonomous region 2*. Medog. Sichuan *Journal of Zoology* 24: 250–253 (in Chinese).

Dubois, A. 2000. Synonyms and related lists in zoology: general proposals, with examples in herpetology. *Dumerila* 4: 33–98.

Edgar, R.C. 2004. *MUSCLE: multiple sequence alignment with high accuracy and high throughput*. *Nucleic Acids Research* 32: 1792–1797. https://doi.org/10.1093/nar/gkh340.

Fei, L., C.-Y. Ye, and J.-F. Jiang. 2012. *Colored Atlas of Chinese Amphibians and Their Distribution*. Sichuan Publishing House of Science & Technology, Sichuan, China.

Frost, D.R. 2022. *Amphibian Species of the World: An Online Reference*, Version 6.1. American Museum of Natural History, New York, New York, USA. https://doi.org/10.5531/db.vr.0001. <https://amphibiansoftheworld.amnh.org/index.php>.

Grosjean, S., A. Ohler, Y. Chuaenyknern, C. Cruda, and A. Hassanin. 2015. Improving biodiversity assessment of anuran amphibians using DNA barcoding of tadpoles. *Case studies from Southeast Asia*. Amfliërer: l’estimation de la biodiversité des amphibiens anoures à l’aide du barcode ADN. *L’exemple du Sud-Est asiatique*. *Comptes Rendus Biologies* 338: 351–361. https://doi.org/10.1016/j.crvi.2015.03.015.

Günther, A.C.L.G. 1876. Third report on collections of Indian reptiles obtained by the British Museum. *Proceedings of the Zoological Society of London* 1875: 567–577.

Jiang, K., J.-L. Z.-T. Ren, Z.-T. Lu, D. Wang, Z. Wang, K. Lv, J.-W. Wu, and J.-T. Li. 2021. *Taxonomic revision of Amolops changanensis* (Pope, 1929) (Amphibia: Anura) and description of a new species from southwestern China, with discussion on *Amolops monticola* group and assignment of species groups of the genus *Amolops*. *Zoological Research* 42: 574–591. https://doi.org/10.1016/j.zooreso.2021.03.002.

Khatiwada, J.R., G.-C. Shu, B. Wang, T. Zhao, F. Xie, and J.-P. Jiang. 2020. Description of a new species of *Amolops* Cope, 1865 (Amphibia: Ranidae) from Nepal and nomenclatural validation of *Amolops nepalicus* Yang, 1991. *Asian Herpetological Research* 11: 71–95. https://doi.org/10.16373/j.cnki.ahr.190052.

Lalronunga S., Vanramliana, C. Lalrinchhana, Vanlalhrima, V. Sailo, Lalnunhlua, L. Sailo, I. Zosangliana, K. Lalmanguaiha, and E. Lalhmimgaiha. 2020. DNA barcoding reveals a new country record for three species of frogs (Amphibia: Anura) from India. *Science Vision* 20: 106–117. https://doi.org/10.34933/sci.2020.03.02.

Lyu, Z.T., J. Wu, J. Wang, Y.H. Sung, Z.Y. Liu, Z.C. Zeng, Y. Wang, Y.Y. Li, and Y.Y. Wang. 2018. A new species of *Amolops* (Anura: Ranidae) from southwestern Guangdong, China. *Zootaxa* 4418: 562–576. https://doi.org/10.224937/j.vz.2018.03.01.008.

Lyu, Z.T., L.S. Huang, J. Wang, Y.Q. Li, L.H. Chen, S. Qi, and Y.Y. Wang. 2019. Description of two cryptic species of the *Amolops ricketti* group (Anura, Ranidae) from southeastern China. *ZooKeys* 812: 133. https://doi.org/10.3897/zookeys.812.29956.

Mathew, R. and N. Sen. 2010. *Pictorial Guide to the Amphibians of North East India*. Zoological Survey of India, Kolkata, India.

Matsui, M., T. Shimada, W.Z. Liu, M. Maryati, W. Khonsue, and N. Orlov. 2006. Phylogenetic relationships of Oriental torrent frogs in the genus *Amolops* and its allies (Amphibia, Anura, Ranidae). *Molecular Phylogenetics and Evolution* 38: 659–666. https://doi.org/10.1016/j.ympev.2005.11.019.

Orlov, N., R. Murphy, W. Liu, A. Ngo, and A. Lathrop. 2006. The phylogenetic relationships of the Chinese and Vietnamese waterfall frogs of the genus *Amolops*. *Amphibia-Reptilia* 27: 81–92.

Palumbi, S.R., P.A. Martin, L.S. Romano, O.W. McMillan, L. Stice, and G. Grabowski. 2002. *The Simple Fool’s Guide to PCR Ver. 2.0*. Special Publications Department of Zoology, University of Hawaii, Honolulu, Hawaii, USA.

Patel, N.G., S. Garg, A. Das, B.L. Stuart, and S.D. Biju. 2021. Phylogenetic position of the poorly known montane cascade frog *Amolops monticola* (Ranidae)
Appendix 1. GenBank accession numbers for mt 16S rRNA sequences used in the maximum-likelihood phylogenetic analysis of torrent frogs (Amolops spp.) (Wu et al. 2020; Jiang et al. 2021; Patel et al. 2021). Sequences from this study are in bold type.

| Accession no. | Species                          | Locality                       | References               |
|---------------|---------------------------------|--------------------------------|--------------------------|
| MW794278.1    | Amolops spp                     | India: Sessa Wildlife Sanctuary Arunachal Pradesh | Unpublished              |
| MW794279.1    | Amolops spp                     | India: Sessa Wildlife Sanctuary Arunachal Pradesh | Unpublished              |
| MW794280.1    | Amolops spp                     | India: Sessa Wildlife Sanctuary Arunachal Pradesh | Unpublished              |
| MW794281.1    | Amolops spp                     | India: Sessa Wildlife Sanctuary Arunachal Pradesh | Unpublished              |
| MW794282.1    | Amolops spp                     | India: Sessa Wildlife Sanctuary Arunachal Pradesh | Unpublished              |
| MT124518.1    | A. formosus                      | Nepal: Kimathanka, Sankhuwasabha | Katiwada et al. 2020    |
| MN953750.1    | A. sp. 7                        | Nepal: Mabu, Ilam              | Wu et al. 2020; Patel et al. 2021 |
| MT124519.1    | A. formosus                      | Nepal: Lamatar, Taplejung      | Katiwada et al. 2020    |
| MT124517.1    | A. formosus                      | Nepal: Kimathanka, Sankhuwasabha | Katiwada et al. 2020    |
| OK138592.1    | A. gerbillus                     | India: Kamle, Arunachal Pradesh | Unpublished              |
| MN953746.1    | A. yarlungzangbo                 | China: Medog, Tibet           | Wu et al. 2020          |
| MN953747.1    | A. yarlungzangbo                 | China: Medog, Tibet           | Wu et al. 2020          |
| MN953744.1    | A. yarlungzangbo                 | China: Medog, Tibet           | Wu et al. 2020          |
| MN953745.1    | A. yarlungzangbo                 | China: Medog, Tibet           | Wu et al. 2020          |
| MT124512.1    | A. mahabharatensis              | Nepal: Pokhara, Kaski District, Nepal | Katiwada et al. 2020   |
| MT124511.1    | A. mahabharatensis              | Nepal: Pokhara, Kaski District, Nepal | Katiwada et al. 2020   |
| MT124513.1    | A. mahabharatensis              | Nepal: Barahakhetra, Sunsari District | Katiwada et al. 2020   |
| MT124507.1    | A. mahabharatensis              | Nepal: Hatibang, Chitwan District | Katiwada et al. 2020   |
| MT124509.1    | A. mahabharatensis              | Nepal: Hatibang, Chitwan District | Katiwada et al. 2020   |
| MT124514.1    | A. mahabharatensis              | Nepal: Barahakhetra, Sunsari District | Katiwada et al. 2020   |
| MT124508.1    | A. mahabharatensis              | Nepal: Hatibang, Chitwan District | Katiwada et al. 2020   |
| MT124510.1    | A. mahabharatensis              | Nepal: Hatibang, Chitwan District | Katiwada et al. 2020   |
| MT124516.1    | A. mahabharatensis              | Nepal: Latinnath, Darchula District | Katiwada et al. 2020   |
| MT124515.1    | A. mahabharatensis              | Nepal: Latinnath, Darchula District | Katiwada et al. 2020   |
| Accession no. | Species          | Locality                             | References                      |
|--------------|------------------|--------------------------------------|---------------------------------|
| MN953722.1   | A. nyingchiensis | Myanmar: Pakchan Reserve Forest, Kawkhong, Tanintharyi | Wu et al. 2020                  |
| JF794451.1   | A. nyingchiensis | Myanmar: Tanintharyi                 | Dever et al. 2012; Kariwada et al. 2020 |
| AB211488.1   | A. bellulus      | Thailand: Phetchaburi                | Matsui et al. 2006; Kariwada et al. 2020 |
| MN953720.1   | A. marmoratus    | Thailand: Huay Yang National Park, Prachuap Khiri Khan | Wu et al. 2020                  |
| MN953721.1   | A. nyingchiensis | Thailand: Ngoa Falls National Park, Ranong | Wu et al. 2020                  |
| MN953708.1   | A. marmoratus    | Thailand: Hua Hea, Chiang Mai         | Wu et al. 2020                  |
| MN953709.1   | A. marmoratus    | Thailand: Wachiraratn Falls, Amphoe Chom Thong, Chiangmai | Wu et al. 2020                  |
| JF794453.1   | A. marmoratus    | Myanmar: Mon                         | Dever et al. 2012; Kariwada et al. 2020 |
| JF794454.1   | A. marmoratus    | Myanmar: Mon                         | Dever et al. 2012; Kariwada et al. 2020 |
| MN953694.1   | A. stoborurumans | Myanmar: Upper Bee Hoe Village, Mindat, Chin | Wu et al. 2020                  |
| MN953692.1   | A. stoborurumans | Myanmar: Baw Village, Chin           | Wu et al. 2020                  |
| MN519705.1   | A. stoborurumans | India: Mizoram, Murlen National Park | This study                      |
| MN953693.1   | A. stoborurumans | Myanmar: Haka Township, Chin         | Wu et al. 2020                  |
| JF794460.1   | A. stoborurumans | Myanmar: Rakhine                     | Dever et al. 2012; Kariwada et al. 2020 |
| JF794431.1   | A. afghanus      | Myanmar: Kachin                      | Dever et al. 2012; Kariwada et al. 2020 |
| MN953773.1   | A. afghanus      | Myanmar: Indawgyi Lake Wildlife Sanctuary, Kachin | Wu et al. 2020                  |
| MN953774.1   | A. afghanus      | Myanmar: Myitkyina                   | Wu et al. 2020                  |
| MN953654.1   | A. afghanus      | China: Hua, Yunnan                   | Wu et al. 2020                  |
| FJ417145.1   | A. vuicai        | Vietnam: Van Ban, Lao Cai            | B.L. Stuart et al. 2010; Wu et al. 2020 |
| FJ417144.1   | A. vuicai        | Vietnam: Van Ban, Lao Cai            | B.L. Stuart et al. 2010; Wu et al. 2020 |
| FJ417129.1   | A. wenshansi     | China: Jinxiu, Guangxi                | B.L. Stuart et al. 2010; Wu et al. 2020 |
| MN953725.1   | A. wenshansi     | China: Xichou, Yunnan                | Yuan et al. 2018; Wu et al. 2020  |
| MN953724.1   | A. wenshansi     | China: Xichou, Yunnan                | Yuan et al. 2018; Wu et al. 2020  |
| FJ417142.1   | A. compotrix     | Vietnam: Dak Glei, Kon Tum           | Stuart et al. 2010; Wu et al. 2020 |
| FJ417141.1   | A. compotrix     | Laos: Nakai                          | B.L. Stuart et al. 2010; Wu et al. 2020 |
| MN953739.1   | A. vitreus       | Laos: Phongaly, Phou Dendin National Biodiversity Conservation Area | Wu et al. 2020                  |
| FJ417164.1   | A. vitreus       | Laos: Phongaly, Phongsay             | B.L. Stuart et al. 2010; Wu et al. 2020 |
| MN953678.1   | A. daorum 1      | China: Jingdong, Yunnan              | Wu et al. 2020                  |
| MN953679.1   | A. daorum 1      | China: Jingdong, Yunnan              | Wu et al. 2020                  |
| MN953661.1   | A. archotaphus   | Thailand: Doi Inthanon, Chiang Mai   | Wu et al. 2020                  |
| MN953660.1   | A. archotaphus   | Thailand: Doi Inthanon, Chiang Mai   | Wu et al. 2020                  |
| MN953659.1   | A. archotaphus   | Thailand: Amphoe Chom Thong, Chiang Mai | Wu et al. 2020                  |
| FJ417158.1   | A. akbarum       | Laos: Vieng Phou Kha, Luang Namtha   | B.L. Stuart et al. 2010; Wu et al. 2020 |
| FJ417159.1   | A. akbarum       | Laos: Vieng Phou Kha, Luang Namtha   | B.L. Stuart et al. 2010; Wu et al. 2020 |
| MK501808.1   | A. mengdingensis | China: Mengding, Yunnan              | Yu et al. 2019                   |
| MK501809.1   | A. mengdingensis | China: Mengding, Yunnan              | Yu et al. 2019                   |
| MK501810.1   | A. mengdingensis | China: Mengding, Yunnan              | Yu et al. 2019                   |
| FJ417147.2   | A. daorum 2      | Laos: Vieng Tong, Huaphahn           | B.L. Stuart et al. 2010; Wu et al. 2020 |
| FJ417148.2   | A. daorum 2      | Laos: Vieng Tong, Huaphahn           | B.L. Stuart et al. 2010; Wu et al. 2020 |
| FJ417153.2   | A. rioides       | Vietnam: Vi Xuyen, Ha Giang          | B.L. Stuart et al. 2010; Wu et al. 2020 |
| FJ417152.2   | A. rioides       | Vietnam: Vi Xuyen, Ha Giang          | B.L. Stuart et al. 2010; Wu et al. 2020 |
| FJ417151.2   | A. mengungeneesi | Vietnam: Sa Pa, Lao Cai              | B.L. Stuart et al. 2010; Patel et al. 2021 |
| KR827703.1   | A. mengungeneesi | Vietnam: Sa Pa, Lao Cai              | Grosjean et al. 2015; Patel et al. 2021 |
| KR827704.1   | A. mengungeneesi | Vietnam: Sa Pa, Lao Cai              | Grosjean et al. 2015; Patel et al. 2021 |
| MZ229774.1   | A. kohimaeus     | India: Nagalap                        | Patel et al. 2021                |
| MN953657.1   | A. amianigenus   | China: Medog, Tibet                  | Wu et al. 2020                   |
| MZ229772.1   | A. adicola       | India: Arunachal Pradesh             | Patel et al. 2021                |
| OK138593.1   | A. adicola       | India: Arunachal Pradesh, Upper Subansiri | This study                      |
| MZ229773.1   | A. montivola     | India: South Sikkim                  | Patel et al. 2021                |
| MT636794.1   | A. amianigenus   | India: Arunachal Pradesh, Upper Subansiri | This Study                      |
| MT636795.1   | A. amianigenus   | India: Arunachal Pradesh, Upper Subansiri | This Study                      |
| MN953658.1   | A. amianigenus   | China: Tibet                         | Wu et al. 2020                   |
| MN953655.1   | A. amianigenus   | China: Medog, Tibet                  | Wu et al. 2020                   |
| MN953656.1   | A. amianigenus   | China: Medog, Tibet                  | Wu et al. 2020                   |
| FJ417127.2   | A. bellulus      | China: Teng, Chong Co., Yunnan       | B.L. Stuart et al. 2010; Wu et al. 2020 |
| MN953664.1   | A. bellulus      | China: Teng, Chong Co., Yunnan       | Wu et al. 2020                   |
| MN953665.1   | A. bellulus      | China: Teng, Chong Co., Yunnan       | Wu et al. 2020                   |
| MN953719.1   | A. myingchensius | China: Mainling, Tibet               | Wu et al. 2020                   |
| MN953717.1   | A. myingchensius | China: Mainling, Tibet               | Wu et al. 2020                   |
| MN953718.1   | A. myingchensius | China: Medog                          | Wu et al. 2020                   |

(continued)
| Accession no. | Species | Locality | References |
|--------------|---------|----------|------------|
| MN953716.1   | *A. myingiensis* | China: Mainling, Tibet | Wu et al. 2020 |
| MN953715.1   | *A. myingiensis* | China: Mainling, Tibet | Wu et al. 2020 |
| MN953699.1   | *A. deng* | China: Medog, Tibet | Wu et al. 2020 |
| MN953698.1   | *A. deng* | China: Zayü, Tibet | Wu et al. 2020 |
| MN953697.1   | *A. deng* | China: Zayü, Tibet | Wu et al. 2020 |
| MN953695.1   | *A. deng* | China: Zayü, Tibet | Wu et al. 2020 |
| MN953696.1   | *A. deng* | China: Zayü, Tibet | Wu et al. 2020 |
| MN953668.1   | *A. chaochin* | China: Sichuan, Anxian | Wu et al. 2020; Jiang et al. 2021 |
| MN953669.1   | *A. chaochin* | China: Sichuan, Anxian | Wu et al. 2020; Jiang et al. 2021 |
| MN953667.1   | *A. chunganensis* | China: Chengkou, Chongqing | Wu et al. 2020 |
| MN953670.1   | *A. chunganensis* | China: Medog, Tibet | Wu et al. 2020 |
| MN953662.1   | *A. beibengensis* | China: Medog, Tibet | Wu et al. 2020 |
| MN953663.1   | *A. behengensis* | China: Medog, Tibet | Wu et al. 2020 |
| MN953733.1   | *A. viridimaculatus* | China: Pianma, Yunnan | Wu et al. 2020 |
| MN953734.1   | *A. viridimaculatus* | China: Pingbian, Yunnan | Wu et al. 2020 |
| MN953735.1   | *A. viridimaculatus* | China: Tengchong, Yunnan | Wu et al. 2020 |
| MN953731.1   | *A. viridimaculatus* | China: Tengchong, Yunnan | Wu et al. 2020 |
| MN953732.1   | *A. viridimaculatus* | China: Tengchong, Yunnan | Wu et al. 2020 |
| MN953738.1   | *A. viridimaculatus* | China: Gongsan, Yunnan | Wu et al. 2020 |
| MN953740.1   | *A. wanglingensis* | China: Pianma, Yunnan | Wu et al. 2020 |
| MN953741.1   | *A. wanglingensis* | China: Tengchong, Yunnan | Wu et al. 2020 |
| MN953680.1   | *A. granulosus* | China: Anxian, Sichuan | Wu et al. 2020 |
| MN953681.1   | *A. granulosus* | China: Chuxiong, Yunnan | Wu et al. 2020 |
| MG991904.1   | *A. tuberodepressus* | China: Yunnan | Khatiwada et al. 2020 |
| EF453743.1   | *A. lobensis* | China: Xichang, Sichuan | Cai et al. 2007; Wu et al. 2020 |
| MN953757.1   | *A. lobensis* | China: Xichang, Sichuan | Wu et al. 2020 |
| MN953705.1   | *A. lobensis* | China: Xichang, Sichuan | Wu et al. 2020 |
| MN953704.1   | *A. lobensis* | China: Xichang, Sichuan | Wu et al. 2020 |
| MN953748.1   | *A. behengensis* | China: Sichuan | Matsui et al. 2006; Khatiwada et al. 2020 |
| MN953756.1   | *A. lobensis* | China: Xichang, Sichuan | Wu et al. 2020 |
| EF453741.1   | *A. jinjiangensis* | China: Deqing, Yunnan | Cai et al. 2007; Wu et al. 2020 |
| MN953701.1   | *A. jinjiangensis* | China: Chuxiong, Yunnan | Wu et al. 2020 |
| MN953700.1   | *A. jinjiangensis* | China: Deqing, Yunnan | Wu et al. 2020 |
| MK604866.1   | *A. shuichengicus* | China: Shuicheng County, Guizhou | Lyu et al. 2019 |
| MK604845.1   | *A. shuichengicus* | China: Shuicheng County, Guizhou | Lyu et al. 2019 |
| MN953730.1   | *A. tuberodepressus* | China: Jingdong, Yunnan | Wu et al. 2020 |
| MN953729.1   | *A. tuberodepressus* | China: Jingdong, Yunnan | Wu et al. 2020 |
| MN953705.1   | *A. xinduqiao* | China: Kangding, Sichuan | Wu et al. 2020 |
| EF453742.1   | *A. mantzorum* | China | Unpublished |
| AB211479.1   | *A. mantzorum* | China: Sichuan | Matsui et al. 2006; Khatiwada et al. 2020 |
| MN953706.1   | *A. mantzorum* | China: Wolong, Sichuan | Wu et al. 2020 |
| MN953707.1   | *A. mantzorum* | China: Daizi, Sichuan | Wu et al. 2020 |
| MN953704.1   | *A. xinduqiao* | China: Kangding, Sichuan | Wu et al. 2020 |
| MK604877.1   | *A. chayuensis* | China | Khatiwada et al. 2020 |
| MN953667.1   | *A. chayuensis* | China: Baxoi, Tibet | Wu et al. 2020 |
| MN953666.1   | *A. chayuensis* | China: Baxoi, Tibet | Wu et al. 2020 |
| MN953685.1   | *A. gyirongensis* | China: Gyirong, Tibet | Wu et al. 2020 |

(continued)
| Accession no. | Species | Locality | References |
|--------------|---------|----------|------------|
| MN953683.1   | A. gyirongensis | China: Gyirong, Tibet | Wu et al. 2020 |
| MN953684.1   | A. gyirongensis | China: Gyirong, Tibet | Wu et al. 2020 |
| MN953686.1   | A. gyirongensis | China: Gyirong, Tibet | Wu et al. 2020 |
| MN953682.1   | A. gyirongensis | China: Gyirong, Tibet | Wu et al. 2020 |
| MT124524.1   | A. nepalicus | Nepal: Dobhan, Sankhuwasabha | Khattiwada et al. 2020 |
| MT124524.1   | A. nepalicus | Nepal: Dobhan, Sankhuwasabha | Khattiwada et al. 2020 |
| MT124522.1   | A. nepalicus | Nepal: Dobhan, Sankhuwasabha | Khattiwada et al. 2020 |
| MT124523.1   | A. nepalicus | Nepal: Dobhan, Sankhuwasabha | Khattiwada et al. 2020 |
| AR211481.1   | A. lifanensis | China: Sichuan | Matsui et al. 2006; Khatiwada et al. 2020 |
| MN953702.1   | A. lifanensis | China: Maoxian, Sichuan | Wu et al. 2020 |
| MN953703.1   | A. lifanensis | China: Maoxian, Sichuan | Wu et al. 2020 |
| AR211482.1   | A. lifanensis | China: Sichuan | Matsui et al. 2006; Khatiwada et al. 2020 |
| MN953690.1   | A. hongkongensis | China: Hong Kong | Wu et al. 2020 |
| KXS07317.1   | A. hongkongensis | China: Hong Kong | Sung et al. 2016; Khatiwada et al. 2020 |
| MN953691.1   | A. hongkongensis | China: Hong Kong | Wu et al. 2020 |
| MN953689.1   | A. hongkongensis | China: Hong Kong | Wu et al. 2020 |
| KXS07306.1   | A. dayunensis | China: Mt. Daiyu, Fujian | Sung et al. 2016; Khatiwada et al. 2020 |
| MN953676.1   | A. dayunensis | China: Dayunshan, Fujian | Wu et al. 2020 |
| MN953675.1   | A. dayunensis | China: Dayunshan, Fujian | Wu et al. 2020 |
| MN953677.1   | A. dayunensis | China: Dayunshan, Fujian | Wu et al. 2020 |
| MK263277.1   | A. punkhanensis | China: Ehuaizhang Nature Reserve, Guangdong | Lyu et al. 2018, 2019 |
| MK263271.1   | A. punkhanensis | China: Yunkaishan Nature Reserve, Guangdong | Lyu et al. 2018, 2019 |
| MN953673.1   | A. sinensis | China: Gongcheng, Guangxi | Wu et al. 2020 |
| MK263262.1   | A. sinensis | China: Guangdong | Lyu et al. 2019; Khatiwada et al. 2020 |
| MN953775.1   | A. sinensis | China: Guidong, Hunan | Wu et al. 2020 |
| MN953748.1   | A. sinensis | China: Mao er Shan, Guangxi | Wu et al. 2020 |
| MN953749.1   | A. sinensis | China: Mao er Shan, Guangxi | Wu et al. 2020 |
| KXS07312.1   | A. yunkaiensis | China: Yunkaishan | Sung et al. 2016; Khatiwada et al. 2020 |
| MK263248.1   | A. alboptinus | China: Mt. Wutong, Guangdong | Sung et al. 2016; Lyu et al. 2019 |
| MK263249.1   | A. alboptinus | China: Mt. Wutong, Guangdong | Sung et al. 2016; Lyu et al. 2019 |
| MK263290.1   | A. yatteni | China: Zhongshan City, Guangdong | Lyu et al. 2019 |
| MK263250.1   | A. yatteni | China: Shanghe Huan Island, Guangdong | Lyu et al. 2019 |
| MN953723.1   | A. yatteni | Vietnam: Sa Pa, Lao Cai | Wu et al. 2020 |
| MN953758.1   | A. yatteni | China: Jingp, Guangxi | Wu et al. 2020 |
| DQ204486.1   | A. richetti | China: Shanghang, Fujian | Orlov et al. 2006; Khatiwada et al. 2020 |
| MN953743.1   | A. richetti | China: Wuyishan, Fujian | Wu et al. 2020 |
| MN953759.1   | A. richetti | China: Shicheng, Jiangxi | Wu et al. 2020 |
| MN953760.1   | A. wuyiensis | China: Wencheng, Zhejiang | Wu et al. 2020 |
| MN953761.1   | A. wuyiensis | China: Wuyi, Zhejiang | Wu et al. 2020 |
| MN953742.1   | A. wuyiensis | China: Wuyishan, Fujian | Wu et al. 2020 |
| KXS07304.1   | A. wuyiensis | China: Fujian | Sung et al. 2016; Khatiwada et al. 2020 |
| MN953727.1   | A. spinospectoralis | Vietnam: Kon Ka Kinh, Gia Lai | Wu et al. 2020 |
| MN953770.1   | A. spinospectoralis | Vietnam: Tram Lap, Gia Lai | Wu et al. 2020 |
| MN953726.1   | A. spinospectoralis | Vietnam: Ngoc Linh vicinity, Kon Tum | Wu et al. 2020 |
| MN953771.1   | A. spinospectoralis | Vietnam: Central Highland, Ngoc Linh, Kon Tum | Wu et al. 2020 |
| AF206456.1   | A. spinospectoralis | Vietnam: Gia Lai | Chen et al. 2005; Khatiwada et al. 2020 |
| MN953768.1   | A. spinospectoralis | Vietnam: Bana resort, Da Nang | Wu et al. 2020 |
| MN953769.1   | A. spinospectoralis | Vietnam: Phong Dien Nature Reserve, Phong Dien, Thua Thien Hue | Wu et al. 2020 |
| MN953772.1   | A. spinospectoralis | Vietnam: Phong Dien Nature Reserve, Phong Dien, Thua Thien Hue | Wu et al. 2020 |
| MN953728.1   | A. torrentis | China: Diao Luo Shan forest Park, Lingshui, Hainan | Wu et al. 2020 |
| EF553744.1   | A. torrentis | China: Hainan | Wu et al. 2020; unpublished |
| MN953687.1   | A. hainanensis | China: Wuzhihun, Hainan | Wu et al. 2020 |
| MN953688.1   | A. hainanensis | China: Wuzhihun, Hainan | Wu et al. 2020 |
| KXS07520.1   | A. hainanensis | China: Hainan | Sung et al. 2016; Khatiwada et al. 2020 |
| MF061741.1   | A. larutensis | Malaysia: Gunung Babu, Perak | Unpublished |
| MF061749.1   | A. larutensis | Malaysia: Bukit Larut, Perak | Unpublished |
| MF061745.1   | A. australis | Malaysia: Endau-Rompin, Johor (Peta) | Unpublished |
| MF061721.1   | A. geratus | Malaysia: Gunung Tebu, Terengganu | Unpublished |
| MN953674.1   | A. crenohubbata | Thailand: Doi Phukta, Chom Poo Phukta Nature Trail, Nan | Wu et al. 2020 |
| DQ204477.1   | A. crenohubbata | Vietnam: Khe Moi | Orlov et al. 2006; Khatiwada et al. 2020 |

(continued)
| Accession no. | Species                  | Locality                                      | References                  |
|--------------|--------------------------|-----------------------------------------------|-----------------------------|
| FJ417143.1   | A. cremnobatus           | Laos: Kasi, Vientiane                        | B.L. Stuart et al. 2010; Wu et al. 2020 |
| MN953673.1   | A. cremnobatus           | Vietnam: Puhu National Reserve, Thanh Hoa     | Wu et al. 2020              |
| MN953672.1   | A. cremnobatus           | Vietnam: Puhu National Reserve, Thanh Hoa     | Wu et al. 2020              |
| MN953751.1   | Babina bainanensis       | China: Lingshui, Diao Luo Shan Forest Park, Hainan | Wu et al. 2020              |
| MN953752.1   | Huia cavitempanum        | Malaysia: Marak Parak, S. Tahobang, Kota Marudu, Sabah | Wu et al. 2020              |
| MN953755.1   | Odorrana jingdongensis   | China: Jingdong, Yunnan                      | Wu et al. 2020              |
| MN953753.1   | Rana jiemuensis          | China: Jiemu, Hunan                          | Wu et al. 2020              |