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# Interspecific inguinal amplexus between *Leptophryne borbonica* (Tschudi, 1838) and the critically endangered *Leptophryne cruentata* (Tschudi, 1838) in Gunung Halimun Salak National Park, West Java, Indonesia

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Interspecific amplexus, in which an anuran clasps an individual of another species, has been reported in a range of frog taxa. A global database of misdirected amplexus documented 378 events worldwide, including 282 cases of interspecific amplexus involving different anuran species (Serrano et al., 2022). A global analysis of misdirected amplexus found that interspecific interactions were more frequent among closely related species than expected by chance and were also associated with greater overlap in microhabitat use (Soni et al., 2025). Such records include interactions among bufonids, including observations involving Asian toads (Shin et al., 2020). Despite these records, information on interspecific amplexus remains limited for many tropical anuran species.

The Critically Endangered *Leptophryne cruentata* (Tschudi, 1838), commonly known as the Bleeding Toad, is a bufonid endemic to Java (IUCN SSC Amphibian Specialist Group, 2019) and is the only amphibian currently listed as protected under Indonesian law (Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia, 2018; Hamidy, 2025; Tohir et al., 2025b). The species has been reported from Gunung Gede Pangrango National Park (GGPNP) and Gunung Halimun Salak National Park (GHSNP) (Kurniati, 2003, 2006; Kusrini et al., 2007, 2021; Noer et al., 2023; Tohir et al., 2025b). The species has also been documented in montane habitats associated with streams and waterfalls, and recent surveys in GGPNP recorded it at elevations between 1281 and 1892 m, with one additional record at 2089 m (Tohir et al., 2025a). Information on the reproductive behaviour of *L. cruentata* remains limited, although conspecific axillary amplexus has recently been documented in GGPNP (Alhadi et al., 2025).

The congeneric Hourglass Toad, *Leptophryne borbonica* (Tschudi, 1838), is also associated with humid stream habitats (Erfanda et al., 2019), and conspecific axillary amplexus has been documented in East Java (Septiadi et al., 2023). Both *L. cruentata* and *L. borbonica* have been recorded within GHSNP (Kusrini et al., 2021). Their occurrence in similar habitats creates the opportunity for interspecific encounters. Here, we report an observation of inguinal amplexus between these two congeneric species in Gunung Halimun Salak National Park, West Java, Indonesia.

On 21 July 2026 at 18:44 h, a pair of *Leptophryne* was encountered in amplexus near Cikeris Waterfall, within the management area of Resor Cikaniki, GHSNP, West Java, Indonesia, elevation 1523 m. The pair was found on a rock at the edge of a clear, shallow stream with a rocky and gravelly substrate. The surrounding conditions were humid, and no rain was occurring at the time of observation. Several individuals of both species were observed in the surrounding stream-associated habitat.

Based on the field identification, the lower individual was presumed to be a female *L. cruentata* and the upper individual was presumed to be a male *L. borbonica* (Fig. 1). These sex assignments are treated as presumptive rather than confirmed. The pair was observed for approximately 10 minutes and documented with photographs. During the observation, the individuals changed position after the area was illuminated with a headlamp. The pair was still in amplexus when the observers left the site. The available documentation does not establish whether calling, resistance, or egg deposition occurred; these behaviours were not recorded in the field notes. The presumed male *L. borbonica* clasped the presumed female *L. cruentata* with its

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forelimbs encircling the female's posterior trunk at the level of the hindlimb insertions (Fig. 1). This position, corresponding to the inguinal region, provides the anatomical basis for classifying the observed posture as inguinal amplexus.

This observation documents interspecific inguinal amplexus between *L. borbonica* and *L. cruentata*. Inguinal positioning has also been reported in other anuran interspecific amplexus, including observations involving *Bufo gargarizans* and *Lithobates catesbeianus* (Shin et al., 2020). The present record therefore adds a further example of an inguinal clasp during an interspecific interaction. It also contrasts with the axillary position reported for conspecific amplexus in both *Leptophryne* species (Alhadi et al., 2025; Septiadi et al., 2023).

The occurrence of the two species in stream-associated habitat is consistent with the broader observation that interspecific amplexus can involve closely related species that share microhabitats (Serrano et al., 2022; Soni et al., 2025). Imperfect mate discrimination has been proposed as one possible explanation for misdirected amplexus. However, the mechanism underlying the interaction reported here cannot be determined from a single observation, and it cannot be established whether the presumed male *L. borbonica* misidentified the presumed female *L. cruentata*.

To our knowledge, this represents the first published record of interspecific amplexus between *Leptophryne cruentata* and *Leptophryne borbonica*. The observation adds an unusual reproductive interaction to the natural history of *L. cruentata*, a Critically Endangered and nationally protected amphibian. Further observations at localities where both species occur are needed to determine whether such interactions are isolated events or occur repeatedly. However, the observed clasping posture alone does not provide evidence of successful mating, fertilisation, or reproductive output.



**Figure 1.** Interspecific inguinal amplexus between a presumed male *Leptophryne borbonica* (upper individual) and a presumed female *Leptophryne cruentata* (lower individual) near Cikeris Waterfall, Resor Cikaniki, Gunung Halimun Salak National Park, West Java, Indonesia. Photograph by Fawwaz Akbar.

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