



Correspondence

On WARSZEWICZ's trail again: a reply to SUÁREZ-MAYORGA (2022)

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More than 160 years have passed since a number of frogs collected by the renowned Polish botanist JÓZEF WARSZEWICZ were described by SCHMIDT (1857, 1858), yet herpetologists remain puzzled about the identity and origins of some of WARSZEWICZ's findings. Only very recently did KÖHLER et al. (2024) elucidate the status of one of them, *Gastrotheca splendens* (SCHMIDT, 1857), and were able to restrict its type locality to northwestern Peru. Another frog, *Hyla molitor* SCHMIDT, 1857, was identified as a senior synonym of the frog previously known as *Dendropsophus labialis* (PETERS, 1863) (JUNGFER 2017). Both species were reportedly collected “am Chiriqui-Flusse unweit Bocca del toro” (SCHMIDT 1857, 1858) [= along the Río Guarumo not far from Bocas del Toro, Panama (JUNGFER 2017)].

Several herpetologists examined the type material of *H. molitor* and redescribed it in more detail than SCHMIDT (1857, 1858) did. They concluded that the frogs could not have originated from the stated locality, nor from anywhere else in Central America (SAVAGE & HEYER 1969, DUELLMAN 1970). Later, JUNGFER (2017) compared directly the Vienna lectotype (at Naturhistorisches Museum Wien) of *Hyla molitor* (NMW 16494, Fig. 1a) with the Berlin holotype (at Zoologisches Museum Berlin) of *Hyla labialis* PETERS, 1863 (ZMB 4913, Fig. 1b) from the surroundings of Bogotá, Colombia, and concluded that the two were conspecific. Fresh material from Cundinamarca, Colombia, of frogs then well known as *Dendropsophus labialis* corroborated his view that a single species, *Dendropsophus molitor*, was involved. This demonstrated that *Hyla molitor* could not have originated from western Panama, but its provenance must have been the Andes around Bogotá. With this settled, JUNGFER (2017) was more concerned with proving that, in the absence of any itinerary, WARSZEWICZ had indeed visited the area. This was possible by consulting old

orchid gazettes. His task would have been easier had he been aware of a note by DUNN (1944) earlier, which explicitly referenced WARSZEWICZ's stay in Bogotá.

Recently, SUÁREZ-MAYORGA (2022) provided results of her inspection of anuran specimens housed at the Zoologische Staatssammlung Munich. Her primary interest lay in the type material collected between 1817 and 1820 by J. B. VON SPIX and C. F. P. VON MARTIUS (SPIX 1824), but she also came across a few other types originating from South America, among them “*Hyla wilsoniana* [sic! for *vilsoniana*] *krausi*” HELLMICH, 1940 (ZSM 102/1937). Her results are, at the very least, surprising.

SUÁREZ-MAYORGA (2022) states: “*Hyla wilsoniana krausi* HELLMICH, 1940 is an undisputed synonym of *Hyla labialis* PETERS, 1863, but neither the former nor the later [sic!] are synonyms of *Hyla molitor* SCHMIDT, 1857. Moreover, the specimens stated as the holotype and the lectotype of *Hyla labialis* are not conspecific despite PETERS' and SAVAGE's indications. This statement is based on the morphology of both taxa (rounded or nearly truncated snout, expanded digital disks, thickened arm, and enlarged tympanum in *Hyla molitor*), the localities in which *Hyla labialis* was collected and actually lives (as *Dendropsophus*: the high Andean forests and paramos of the Cordillera Oriental of Colombia, in the same places that are still occupied by another taxon described by PETERS, 1863, *Bolitoglossa adspersa*) and the expert taxonomic opinion that, based on morphology and distribution, *Hyla molitor* could be a member of *Dendropsophus* or *Smilisca* but never conspecific to this very particular high Andean *Dendropsophus*.”

Apart from the spelling error (“*wilsoniana*”), SUÁREZ-MAYORGA (2022) refers to a holotype and a lectotype of *Hyla labialis*. This is not possible. If there is a holotype (which is in fact the case), a lectotype would be invalid.

The reference to “PETERS’ and SAVAGE’s indications” is unclear, as the only paper of PETERS cited by SUÁREZ-MAYORGA (2022) in the references (i.e., PETERS 1873) pertains exclusively to SPIX types. No reference by SAVAGE is provided. Her claim that the holotype and a non-existing lectotype are not conspecific is puzzling. Perhaps she meant the lectotype of *Hyla molitor* and the holotype of *Hyla labialis*. Regarding the “expanded digital discs” of (the lectotype of?) *Hyla molitor*, SAVAGE & HEYER (1969) described them as “Tiny finger and toe disks that are barely enlarged”. DUELLMAN (1970) refers to “small discs”, and JUNGFER (2017) noted “finger discs only slightly wider than finger”. A “thickened arm” is mentioned in none of the published descriptions, and we have not observed such character. The “enlarged” tympanum is described as small (SCHMIDT 1858), less than one-half of the diameter of the eye (DUELLMAN 1970), or slightly less than half the diameter of the eye (i.e., small) (JUNGFER 2017). Only the “rounded or nearly truncated snout” is partly agreed upon by SCHMIDT (1858) and JUNGFER (2017), who described it as rounded.

Obviously, the “expert taxonomic opinion” (not clear from the text whose opinion, so we presume hers; SUÁREZ-MAYORGA 2022) asserting that *molitor* and *labialis* are not

conspecific is based on four characters, three of which have been interpreted differently by herpetologists who inspected *H. molitor* types firsthand. Moreover, it is unclear how SUÁREZ-MAYORGA (2022) obtained morphological data of the lectotype of *Hyla molitor*, as the most detailed description, and the only one containing photographs of the lectotype (JUNGFER 2017), is neither mentioned nor cited, nor are earlier descriptions (SCHMIDT 1857, 1858, SAVAGE & HEYER 1969, DUELLMAN 1970, 2001). Although author names appear in the text, they are absent from the reference list, which is surprising, especially given the journal’s claim that articles undergo peer review (Brazilian Journal of Animal and Environmental Research 2025).

We also challenge SUÁREZ-MAYORGA’s (2022) claim that *molitor* “could be a member of *Dendropsophus* or *Smilisca*”. Regarding the latter genus, DUELLMAN (1970) stated that “Careful examination of the supposed syntype of *Hyla molitor* and study of SCHMIDT’s description by CHARLES F. WALKER, JAY M. SAVAGE, and me have resulted in our being unable to assign the name to any known population of Central American hylids”. We concur and note that all species of *Smilisca* are primarily Central American and none is endemic to South America. Among *Dendropsophus*, relatively few species occurring in South American countries visited by WARSZEWICZ (Colombia, Ecuador, Peru, Bolivia, Argentina, and Chile) reach a snout–vent length of 36.1 mm, the size of the *H. molitor* lectotype (JUNGFER 2017). Of some 105 recognized species in the genus (FROST 2024), only nine meet this criterion. These include three species in the *Dendropsophus marmoratus* group (groups according to ORRICO et al. 2021 and WHITCHER et al. 2025): *D. acreanus* (BOKERMANN, 1964), *D. marmoratus* (LAURENTI, 1768), and *D. melanargyreus* (COPE, 1887). All three of them exhibit strongly contrasting colouration ventrally on body and/or limbs (absent in *H. molitor*) and significantly more webbing on hands and feet. Three relatively large species in the *Dendropsophus leucophyllatus* group, *D. reticulatus* (JIMÉNEZ DE LA ESPADA, 1870), *D. saraya-cuensis* (SHREVE, 1935), and *D. triangulum* (GÜNTHER, 1869), all differ from *H. molitor* in having truncate snouts in lateral view (versus rounded) and much more webbing, especially on the hands. In one species of the *Dendropsophus columbianus* group, *D. norandinus* RIVERA-CORREA & GUTIÉRREZ-CÁRDENAS, 2012, the vomerine teeth are prominent and the odontophores separated medially (versus vomerine teeth small, odontophores almost in contact with each other in *H. molitor*). Two species of the *Dendropsophus molitor* group, *D. meridensis* (RIVERO, 1961) and *D. pelidnus* (DUELLMAN, 1989), have scattered small tubercles dorsally (versus smooth) and the feet are about two thirds webbed (versus one half). None of these species exhibits the ventral folds from the posterior part of the arm insertions towards the sternum as found in *H. molitor*.

While all of these *Dendropsophus* fail to match the lectotype of *Hyla molitor*, we still maintain that the latter shares all diagnostic characters with the frog formerly known as *Dendropsophus labialis*. In contrast, SUÁREZ-MAYORGA (2022) has provided no compelling evidence to disprove

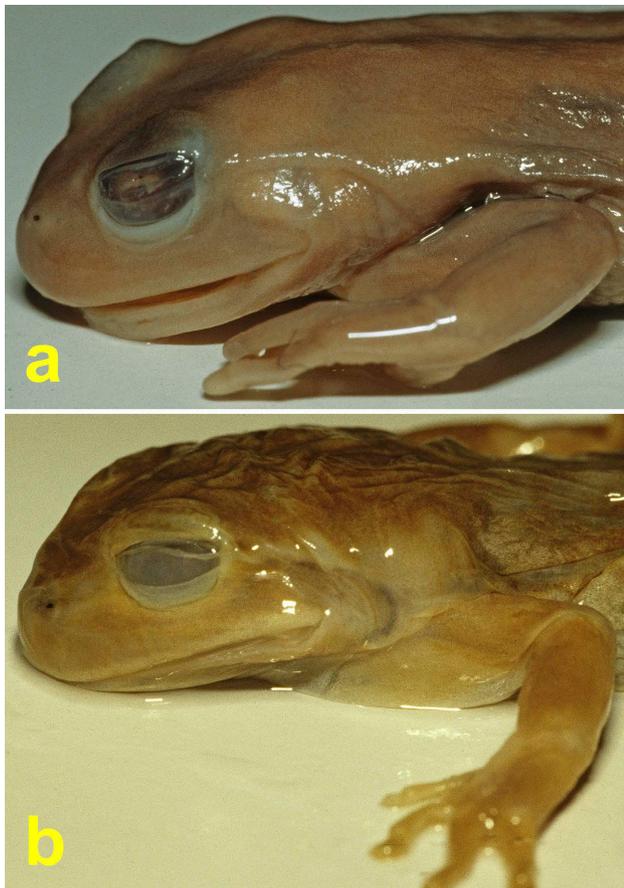


Figure 1. Lateral views of the heads of (a) the lectotype of *Hyla molitor* PETERS, 1863 (NMW 16494), and (b) the holotype of *Hyla labialis* SCHMIDT, 1857 (ZMB 4913). Not to scale.

their conspecificity. Consequently, we keep considering both taxa, *H. molitor* and *H. labialis*, synonymous as proposed by JUNGFER (2017).

In his synonymy list of *D. molitor*, JUNGFER (2017) considered it superfluous to reiterate the taxa that had already been synonymized with *Hyla labialis*, an opinion not shared by FROST (2024). To remedy this, the synonyms are therefore listed here in an expanded form.

***Dendropsophus molitor* (SCHMIDT, 1857)**

Hyla molitor SCHMIDT, 1857

Hyla molitor marmorata SCHMIDT, 1857. Holotype not seen by us. Synonymy with *Hyla molitor* deduced from SAVAGE & HEYER (1969) who stated that “The Cracow syntypes of *H. molitor* and *H. molitor marmoratus* are indistinguishable from one another...” and the fact that *D. molitor* exhibits a wide variety of colour morphs (Fig. 2).

Hyla labialis PETERS, 1863. Synonymy by JUNGFER (2017) as *Dendropsophus molitor*.

Hyla creolica WERNER, 1899. Synonymy with *Hyla wilsoniana* by BOULENGER (1900).

Hyla servalina WERNER, 1899. Synonymy with *Hyla labialis* by DUNN (1944).

Hyla wilsoniana COPE, 1899. Synonymy with *Hyla labialis* by DUNN (1944).

Hyla gularis WERNER, 1916. Synonymy with *Hyla labialis* by DUNN (1944).

Hyla wilsoniana krausi HELLMICH, 1940. Subspecific distinctiveness (as *Hyla labialis krausi*) rejected by DUELLMAN (1989).

Hyla molitor – SAVAGE & HEYER 1969, who designated NMW16494 as lectotype. FROST (2024) erroneously reported one of the two specimens in the Krakow Museum (KM 1010/1341) as lectotype.

Dendropsophus luddeckei GUARNIZO, ESCALLÓN, CANNATELLA & AMÉZQUITA, 2012. Synonymy with *Dendropsophus molitor* by ARIAS-CÁRDENAS et al. (2023).

A remark on the etymology of *molitor*: The specific name *molitor* is Latin and means miller (German: Müller). It does not, however, refer to any surname, though widespread as it is, but to the greyish blue dorsal colouration that the types had then, “which would be called Millers’ Blue [Müllerblau] in everyday life” (SCHMIDT 1858). In fact, in those days, millers were attired in clothes of that colour, but neither the clothes nor the expression are in use any longer, and neither is the colouration left in the lectotype.

Many frogs with green dorsal colouration turn bluish in preservative. SCHMIDT (1858), describing all his three specimens (the lectotype and two paralectotypes), stated that the dorsal surfaces exhibited a uniform greyish blue, more intensive on the back, fading on the extremities and flanks, an indication that all dorsal surfaces had been green in life, a feature relatively uncommon in *Dendropsophus* (but present, e.g., in the closely related *D. meridensis* and *D. pelidnus*).



Figure 2. Individuals of *Dendropsophus molitor* at one small pond near Villa de Leyva, Boyacá, Colombia, exemplifying the colour polymorphism of the species.

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