

## Two New Species of *Leiopython* Hubrecht, 1879 (Pythonidae: Serpentes): Non-Compliance with the International Code of Zoological Nomenclature Leads to Unavailable Names in Zoological Nomenclature

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**ABSTRACT.**—The *International Code of Zoological Nomenclature* (ICZN; hereafter, the *Code*) governs not only the availability and application of scientific zoological names once they enter the realm of nomenclature but also what is to be considered published work for the purpose of zoological nomenclature. Article 8.1.1 of the *Code* clearly demands that to be considered published in the meaning of the *Code*, works “. . . must be issued for the purpose of providing a permanent public and scientific record.” This requirement is often unfulfilled with the publication of nomenclatural acts in hobbyist magazines and amateur literature. Nevertheless, some names published in such outlets are in use today although, under strict application of the *Code*, these names could be de facto nonexistent for the purpose of nomenclature and cannot be made available simply by subsequent usage (ICZN, 1999: Articles 11.5.2, 16.1). In this paper, I discuss the application of Article 8.1.1 to the nonscientific literature and, as a consequence, resolve a nomenclatural problem posed by two populations of snakes in the genus *Leiopython* Hubrecht, 1879 that have been recognized as valid species but that do not have valid names under the requirements of the *Code*.

Hubrecht (1879) introduced the genus *Leiopython* for a single species of White-Lipped Python from New Guinea, *Leiopython gracilis*, shortly after the description of *Liasis albertisii* (Northern White-lipped Python) by Peters and Doria in 1878. Boulenger (1893) synonymized Hubrecht’s species with *L. albertisii* and, therefore, the genus *Leiopython* became a synonym of *Liasis* Gray, 1842. This situation remained until Kluge (1993) resurrected *Leiopython*. Despite the ostensible monotypy of *Leiopython*, two separate lineages became recognized in the international pet trade, and for over 30 yr specimens were referred to as the northern and southern “races” of White-Lipped Pythons. Hoser (2000) attempted to formally separate these forms and introduced two new subspecies, one from Wau (Morobe Province, Papua New Guinea), called *L. albertisii bennettii* (Wau White-lipped Python), and the other from the remote St. Matthias Island group of the Bismarck Archipelago, called *L. albertisii barkeri* (Barker’s White-lipped Python). The proposal was not widely followed because subsequent workers were either unaware of this effort or because the descriptions presented were considered vague and controversial: the designated type material had not been examined but had been merely selected from specimens listed in the published literature (e.g., McDowell, 1975). Furthermore, the two subspecific names required emendation, with the subspecific name *barkeri* considered a nomen nudum (Wüster et al., 2001; Schleip, 2008). Regardless of this, it should be noted that a recent study by Reynolds et al. (2013) synonymizes the generic name *Leiopython* with *Bothrochilus* Fitzinger, 1843 because they were found to be sister taxa. However, the genetic data are inconclusive and, until further data are available and for the purpose of this work, I will retain the genus *Leiopython*.

Schleip (2008) eventually provided the genetic evidence for the separation of the northern and southern forms of *Leiopython* along with morphological evidence for the taxonomic validity of one of Hoser’s (2000) subspecies. While Schleip (2008) was able to solve the taxonomic problems created by Hoser (2000), the nomenclatural problems remain and need to be resolved.

Issues of unresolved nomenclature require careful attention to preserve the stability of taxon names used in broader applications of taxonomy. Confusing nomenclature may have

a negative impact on biodiversity estimates and conservation issues. Almost 12 yr after Hoser (2000) and 5 yr after Schleip (2008), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) still recognizes only *Leiopython albertisii* in its export quotas (Natusch and Lyons, 2012).

### *Leiopython meridionalis* sp. nov. (Fig. 1A, C)

Suggested English name: Southern White-lipped Python.

*Holotype*.—AMNH R-107150, an adult male from Wipim, Western Province, Papua New Guinea (PNG), 8.791°S 142.869°E, collected by F. Parker in August 1969.

*Diagnosis*.—A detailed description and diagnosis of this species was presented by Schleip (2008:656–658 under the heading “*Leiopython hoserae*” [Southern White-lipped Python]). *Leiopython meridionalis* sp. nov. is separated from *L. albertisii* Peters and Doria, 1878, *Leiopython biakensis* (Biak White-lipped Python) Schleip, 2008, and *Leiopython fredparkeri* (Fred Parker’s White-lipped Python) Schleip, 2008 by larger average size in hatchlings and adults along with a generally darker, greyish-black color with white or off-white flanks compared with the yellowish coloration seen in *L. albertisii*. It can further be distinguished in having only one pair of parietal scales that form a characteristic pattern, by a lower number of dorsal midbody scale rows, and by the absence of the whitish spot behind the eye. Additionally, mitochondrial DNA analysis (see Schleip, 2008) supports the distinction of *L. meridionalis* from *L. albertisii*, with a genetic distance of up to 9.3% (for details see Schleip, 2008). It can be separated from *Leiopython montanus* sp. nov. (see below) in having a lower number of loreals, prefrontals, and dorsal midbody scale rows.

*Etymology*.—The specific name *meridionalis* derives from the Latin for ‘southern,’ in reference to the fact that this species was often referred to as the southern form of White-Lipped Pythons.

### *Leiopython montanus* sp. nov. (Fig. 1B, D)

Suggested English name: Wau White-lipped Python

*Holotype*.—BPBM 5452 F, a juvenile female specimen from the Bishop Museum Field Station near Wau, Morobe Province,

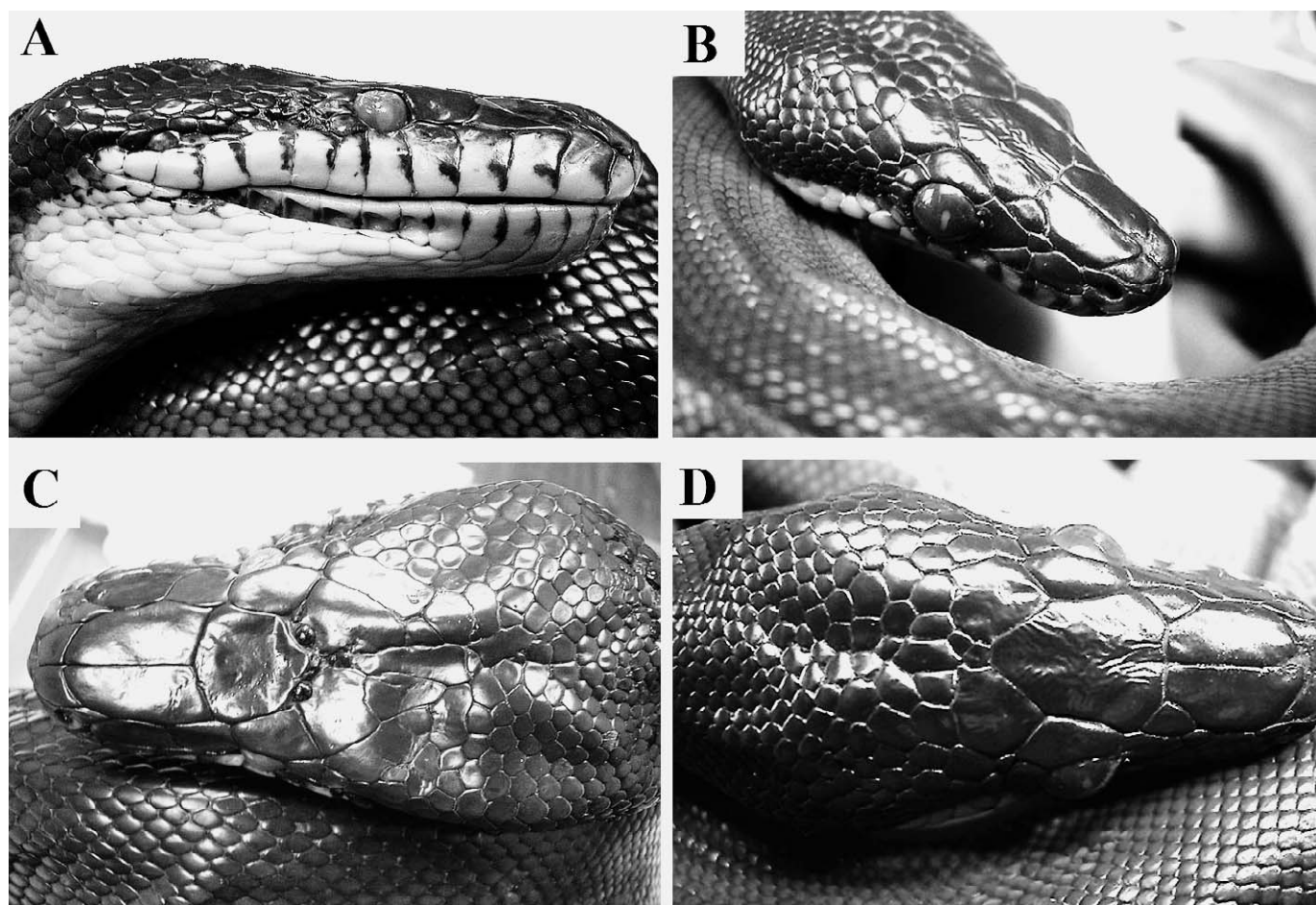


FIG. 1. Lateral (A) and dorsal (C) view of the head of the holotype of *Leiopython meridionalis* sp. nov. Dorsolateral (B) and dorsal (D) view of the head of the holotype of *Leiopython montanus* sp. nov. Modified from Schleip (2008:fig. 6).

PNG, elevation approximately 1,250 m, 7.341°S 146.705°E, collected by A. C. Ziegler on 13 June 1967.

**Diagnosis.**—A detailed diagnosis and description can be found in Schleip (2008:658–659 under the heading “*Leiopython bennettorum*” (Wau White-lipped Python). *Leiopython montanus* sp. nov. can be distinguished easily from all other members of the genus *Leiopython* by a higher loreal scale count and by a second pair of small lateral prefrontals. Furthermore, higher average midbody scale row and postocular scale counts separate this species from *L. meridionalis*, *Leiopython huonensis* (Huon White-lipped Python), *L. fredparkeri*, and *L. albertisii*.

**Etymology.**—The specific name *montanus* derives from the Latin adjective for ‘living on a hill,’ in reference to the topography near the town of Wau.

#### DISCUSSION

**Publishing According to the Code.**—To be considered available for the purpose of zoological nomenclature, a taxon name must have been published in accordance with the *Code*. The *Code* not only governs the availability and application of such names once they have entered the realm of nomenclature but also provides a series of mandatory requirements against which the publication of works that include nomenclatural acts can be judged. If a work is published in line with these requirements, then the taxon names contained therein will be deemed published and available for the purpose of nomenclature. If it is not, then the proposed

taxon names have no standing of any kind in nomenclature; they are nonexistent for nomenclatural purposes.

**Publishing for the Permanent Scientific Record.**—Although the wording of the *Code* generally leaves space for interpretation, Article 8.1.1 is very precise and specific (Knapp and Wright, 2010:85) in its demand that works considered published, “must be issued for the purpose of providing a public and permanent scientific record” (Art. 8.1.1; ICZN, 1999). In terms of creating a permanent scientific record, periodicals such as herpetoculture magazines and scientific journals are generally issued by a publisher and, therefore, the process of issuing the publication is normally beyond an author’s responsibility. On the other hand, it is clearly an author’s responsibility, prior to submission of a manuscript, to consider carefully the aim and scope of the outlet so that their work has proper context and reaches the appropriate audience. Given the fundamental difference in the target audience, aim, and scope between hobbyist magazines and scientific journals, it is reasonable to assume that authors who submit manuscripts to the former consciously decide to address a nonscientific audience and, hence, cannot expect to provide a permanent scientific record. This interpretation of the publishing side of nomenclature and taxonomy is anchored in the spirit of the *Code*, according to which “Authors, editors, and publishers have a responsibility to ensure that works containing new names, nomenclatural acts, or information likely to affect nomenclature are self-evidently published within the meaning of the *Code*” (Recommendation 8D; ICZN, 1999).

One may argue that since the advent of the binomial system of nomenclature, and even since the establishment of the first edition of the *Code* in 1961, a considerable number of names in zoology have been published in what might be called the 'grey literature,' and many of these are fully accepted, have been validated, and are being used by the scientific community. While this may be the case for names published in outlets with an acceptable quality standard and a long history, it is doubtful that scientific merit should be extended to a newly established and therefore unknown herpetoculture magazine. It is in situations like these that the *Code* is unable to insure that taxon names are properly vetted and thus assigned scientific merit (Kaiser, 2013). It is one of the general recommendations of the *Code* that works containing nomenclatural acts should be published in outlets that have "a wide circulation, and which zoologists would not regard as unlikely to contain new names in the taxonomic field concerned" (Appendix B.8, General Recommendations; ICZN, 1999); alas, this Appendix to the *Code* is not mandatory.

*Science and Nomenclature.*—The scientific record builds the foundation of our scientific knowledge and requires works to meet certain standards in scientific quality and rigor to ensure sufficient detail for others to reproduce the research (Carraway, 2009; Kaiser et al., 2013). Hence, the accuracy and reproducibility of research are two of the major pillars in science whereas inaccurate or error-prone works compromise the integrity of the scientific record. Scientists and publishers of scientific literature, therefore, carry a responsibility and make great efforts to uphold the integrity of this process (e.g., Hoppeler et al., 2008; Carraway, 2009). Regardless of the requirements of Article 8.1.1 of the *Code*, nomenclature is not a scientific discipline, and works that contain nomenclatural acts (i.e., establishing new taxon names) should not automatically be eligible for the scientific record (Dayrat, 2005; Kaiser, 2013).

*The Problem with Hoser (2000).*—The herpetoculture magazine *Ophidia Review* was announced in 2000 as a "new magazine dedicated to snake keeping," to be published by the British company Mantella Publishing (Mantella Publishing, 2000); its specified audience was snake keepers and not scientists working in snake taxonomy. This distinction is clear from the layout and style of the magazine along with the advertisements therein (C-View Media, 2000). The first and only published issue consists of 36 pages with three articles and advertisements. Two articles were herpetocultural in nature, dealing with the care and maintenance of viperid snakes, and the third (Hoser, 2000) proposed new names for some Australian pythonid snakes. This latter work does not meet generally accepted standards for scientific writing (Wüster et al., 2001), and the publication *Ophidia Review* does not comply with Article 8.1.1 of the *Code*. Therefore, I contend that the article published by Hoser (2000) was not "published for the permanent scientific record" (emphasis added), and that several names coined by Hoser (2000) are nonexistent for the purpose of zoological nomenclature.

Hoser's efforts in taxonomy are considered "taxonomic vandalism" (Pyron et al., 2013) and their use has been formally abandoned by scientists (Kaiser, 2013; Kaiser et al., 2013). Therefore, most of the names coined by Hoser (2000) are not recognized or used by either professional herpetologists or herpetoculturists. However, a few names have come into use because subsequent authors of bona fide scientific publications (e.g., Schleip, 2008; Schleip and O'Shea, 2010; Natusch and Lyons, 2012) assumed Hoser taxon names to be nomenclaturally available. However, these authors did not analyze the original

descriptions with reference to the *Code*. Although I erroneously used Hoser's *Leiopython* names myself (Schleip, 2008), and provided a detailed description of the groups, their names remained unpublished for the purpose of nomenclature because I did not explicitly denote them as 'new,' a requirement of Article 16.1 (ICZN, 1999). This has led to the undesirable situation that authors use nomenclaturally nonexistent names while there are no nomenclaturally available names for these organisms. Another example of this is the use of *Broghammerus* Hoser, 2004 by Rawlings et al. (2008) for a group of pythons that only received the name *Malayopython* in 2013 (Reynolds et al., 2013). To return the taxonomy of the genus *Leiopython* to nomenclatural stability, it became necessary to propose new names for the two above-named taxa. All taxon names coined by Hoser (2000) are nomenclaturally nonexistent, and the fate of groups carrying such names requires scientific attention. For example, in the case of the New Guinea Carpet Python, whose name was given as "*Morelia harrisoni*" by Hoser (2000), it remains unclear if this is a valid taxon because morphological and genetic data have yet to be examined properly.

*The Trouble with Article 8.1.1.*—The strict application of article 8.1.1 presented here may not meet with everyone's approval. Critics may argue, for example, that the border between suitable and unsuitable media for the publication of nomenclatural works and acts is blurred and that there are plenty of names published in the nonscientific literature that are perfectly fine. However, under the strict application of the criteria of the *Code* (Articles 8, 9; ICZN, 1999), perhaps none of those names coined this century should be considered available for the purpose of nomenclature. It is incomprehensible why, for instance, the principle of priority (Article 23; ICZN, 1999) must always be applied strictly while other mandatory rules may be applied more freely. The strict application of the *Code* in regard to nonscientific literature is also compulsory because it has a stabilizing effect on nomenclature. Nowadays, determining whether or not works are to be considered published in the meaning of the *Code* is a simple and clear-cut 'yes' or 'no' decision on the question of if they were deliberately "... issued for the purpose of providing a public and permanent scientific record" as required by the *Code* (Art. 8.1.1; ICZN, 1999). This requirement implies that work itself should qualify for that purpose. Likewise, an author of a science fiction novel could claim to provide a scientific record. In other words, would the public expect that a publication contains scientific material relevant to taxonomy and nomenclature and that such a publication provides an appropriate vehicle for that information to be entered into the permanent scientific record? If this question cannot be answered unequivocally with 'yes,' or the purpose is not self-evidently clear from the outlet (Recommendation 8D; ICZN, 1999), then the work must be regarded as unpublished for the purpose of zoological nomenclature. This is also true for other works in nonscientific literature (see Kullander, 2011).

*Another Case Resolved.*—Recently, a discussion arose regarding the status of the generic name *Broghammerus* Hoser, 2004 and whether it was published validly under the *Code* (Kaiser et al., 2013; Reynolds et al., 2013). This taxon name was originally published by a small local Australian reptile club called the "Victorian Association of Amateur Herpetologists" (VAAH) in a magazine-like newsletter called "*The Crocodilian*." The newsletter was sent out only to the club's members, and nonmembers were unable to obtain hard copies from the club's website (VAAH, 2004). Print runs were only slightly higher than the number of club members, which counted approximately 50 at the time the information was published. Other than internal club news, the

issue contained advertisements from local retail shops (e.g., hotels, computers, reptiles) and reptile-related newspaper clippings, along with four articles about regional herpetocultural topics. Mixed into this was an article by Hoser dealing with the taxonomy of pythonid snakes, which was published in two parts in separate issues (Hoser, 2003, 2004). Hobby magazines and club newsletters such as *Ophidia Review* and *The Crocodilian* are not issued for the purpose of providing a permanent scientific record (Art. 8.1.1; ICZN 1999). Additionally, *The Crocodilian* was not published to provide a public record, and the status of the works therein must be considered the same as that of doctoral theses and conference abstract volumes that are issued for a small circle of people directly involved with the process. Such works are not recognized as published for the purpose of zoological nomenclature (Article 9.9; ICZN, 1999). Nonetheless, Rawlings et al. (2008) were urged by the reviewers and journal editors to use this name as a possible senior synonym, although without denoting it as 'new' (Articles 11.5.2, 16.1; ICZN, 1999). Reynolds et al. (2013) finally resolved the issue by publishing the name *Malayopython* to replace the de facto nonexisting generic name *Broghammerus*.

*The Issue of Stability.*—The equally strict application of all rules of the *Code* avoids uncertainty as to the existence and availability of scientific names in the future yet does not restrict taxonomic freedom. In the cases of *Leiopython* and *Malayopython* mentioned above, it is now possible to connect these names with a transparent scientific process and reliable evidence, something that was not possible with the nonscientific works of Hoser (2000, 2003, 2004). For the purpose of zoological nomenclature, it is irrelevant that the taxon names published in nonscientific outlets were indexed by the *Zoological Record* or subsequently registered in the newly created *ZooBank*, or even whether hard copies of the original works were submitted to and stored in public libraries. As general advice, authors who would like to publish works containing nomenclatural acts should be fully aware of the aim and scope of the outlet they wish to publish in and, in case of doubt, should contact the publisher or editorial board before submitting a manuscript. Deviation from this kind of due diligence fosters the appearance of deliberate circumvention of rigorous scientific process.

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