

An Illustrated Key to the Genera of the Homalopsidae Bonaparte, 1845 (Reptilia: Squamata: Serpentes)

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Abstract

The Asian mud snakes (family Homalopsidae) are an unusual group of snakes that exhibit, among other characters, fragmentation of the head shields. Many genera and species have not been clearly illustrated. We provide a key to the homalopsid genera in conjunction with dorsal and lateral illustrations of the heads, ten of which have not been previously depicted.

Keywords: Homalopsidae; key; genera; illustrations

Introduction

The family Homalopsidae Bonaparte (1845) contains the Australasian mud snakes, most of which are rear-fanged. Throughout the late 20th Century, the standard reference for the homalopsids was the revision by Ko Ko Gyi, who recognized 10 genera and 34 species (Gyi, 1970). With the advent of Murphy and Voris and their numerous publications on homalopsids (Murphy 2007–2024, Murphy and Voris 2002–2021, see Murphy [2014] for a complete list to that date), the family now comprises 30 genera and 60 species (Murphy and Voris, 2014; Murphy, 2024).

Materials and Methods

Although the homalopsids form a diverse and important group, containing at least 60 species and being recognized as a distinct family for nearly 200 years, many of the taxa (both species and genera) have not yet been illustrated with line drawings of the head. Line drawings of the head of a snake are more informative than photographs for identification, as coloration and patterns, not to mention lighting and angles for photography, sometimes obscure the sutures of the head shields. We searched the literature for line drawings of all available homalopsid genera and found 11 genera lacking such images: *Calamophis*, *Dieurostus*, *Ferania*, *Gyiophis*, *Heurnia*, *Karnsophis*, *Kualatahan*, *Mintonophis*, *Miralia*, *Myanophis*, and *Phytolopsis*. To correct this deficit at the generic level,

SR made line drawings of the dorsal and lateral head views by tracing the sutures from photographs of these 11 genera. We then compiled the best images for each of the 30 genera to include in this paper in conjunction with an artificial key to the homalopsid genera for identification.

Results

Illustrations of species representing the 30 homalopsid genera include *Anoplohydrus* (Figure 1), *Bitia* (Figure 2), *Brachyorrhos* (Figure 3), *Calamophis* (Figure 4), *Cantorina* (Figure 5), *Cerberus* (Figure 6), *Dieurostus* (Figure 7), *Djokoiskandarus* (Figure 8), *Enhydris* (Figures 9 & 10), *Erpeton* (Figure 11), *Ferania* (Figures 12 & 13), *Fordonia* (Figure 14), *Gerarda* (Figure 15), *Gyiophis* (Figure 16), *Heurnia* (Figure 17), *Homalophis* (Figure 18), *Homalopsis* (Figures 19 & 20), *Hypsiscopus* (Figures 21 & 22), *Karnsophis* (Figure 23), *Kualatahan* (Figure 24), *Mintonophis* (Figure 25), *Miralia* (Figure 26), *Myanophis* (Figure 27), *Myron* (Figure 28), *Myrrhophis* (Figures 29 & 30), *Phytolopsis* (Figure 31), *Pseudoferania* (Figure 32), *Raclitia* (Figure 33), *Subsector* (Figure 34), and *Sumatranus* (Figure 35).

Keys to the identification of homalopsid genera and species are found in several sources (Gyi, 1970; Murphy, 2007; Murphy and Voris, 2014). The key below includes *Myanophis*, which is not included in any of the above-cited keys.

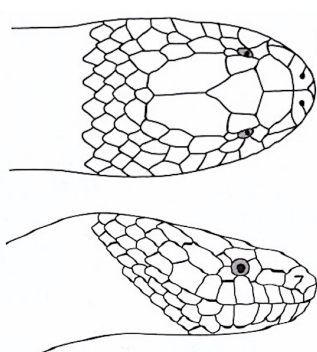


Figure 1. *Anoplohydrus aemulans*. Drawings from Werner (1909).

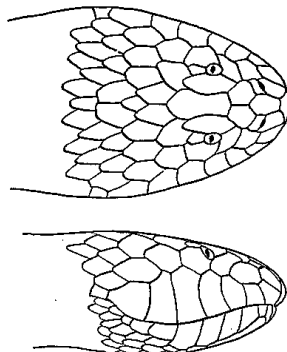


Figure 2. *Bitia hydroides*. Drawings (as *Hypistes hydrinus*) from Boulenger (1912).

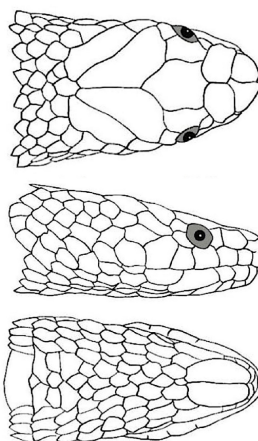


Figure 3. *Brachyorrhos pygmaeus*. Drawings by Nathalie Aall from Murphy and Voris (2020).

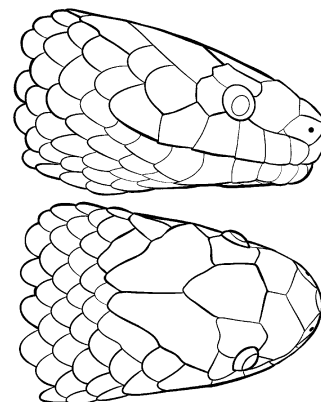


Figure 4. *Calamophis katesandersae*. Drawings by Stephanie Ruesch.

1. 4 Potter Park, Cambridge, MA 02138. Email: serpentes1@comcast.net

2. 21630 W. Montanoso Dr., Wittman, AZ 85361.

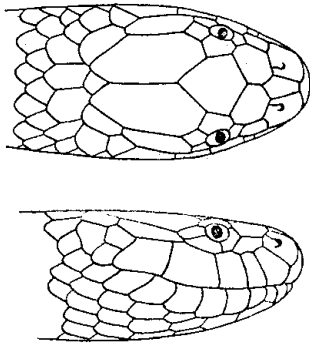


Figure 5. *Cantoria violacea*.
Drawings from Rooij (1917).

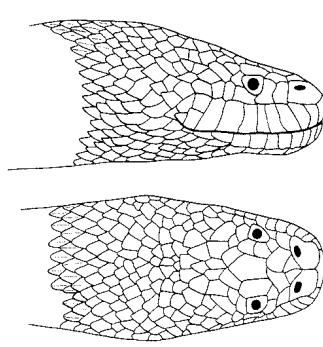


Figure 6. *Cerberus australis*.
Drawings from Storr et al. (1986).

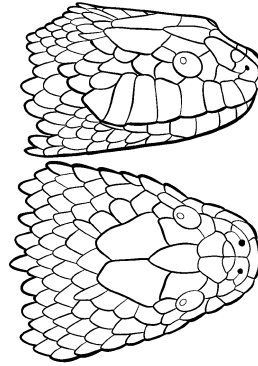


Figure 7. *Dieurostus dussumieri*. Drawings by
Stephanie Ruesch.

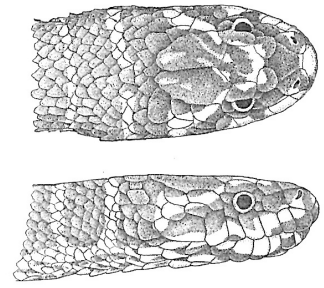


Figure 8. *Djokoiskandarus annulata*.
Drawings by Lisa Kanellos from
Murphy (2007).

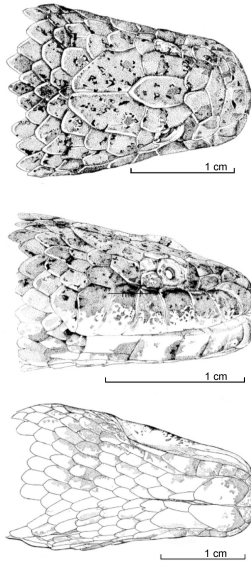


Figure 9. *Enhydris chanardi*.
Drawings by Sarah Drasner
from Murphy and Voris (2005).

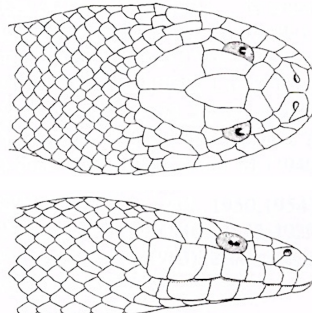


Figure 10. *Enhydris enhydris*.
Drawings from Schleich and Kästle
(2002).

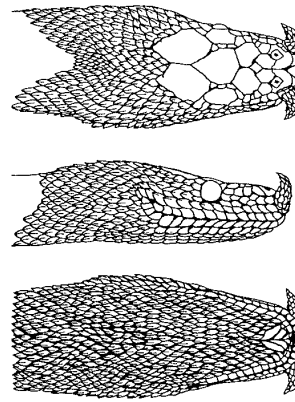


Figure 11. *Erpeton tentaculatum*.
Drawings from Nutaphand (2001).

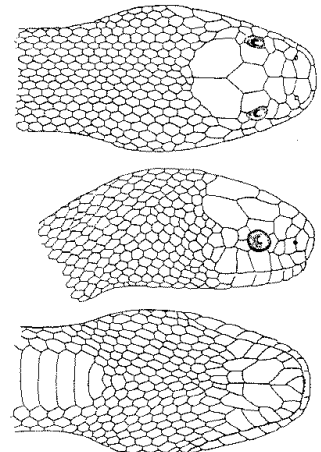


Figure 12. *Ferania sieboldii*.
Drawings from Schleich and Kästle
(2002).

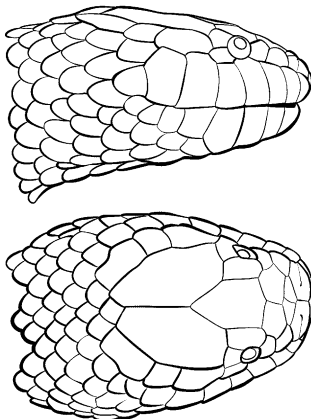


Figure 13. *Ferania sieboldii*.
Drawings by Stephanie Ruesch.

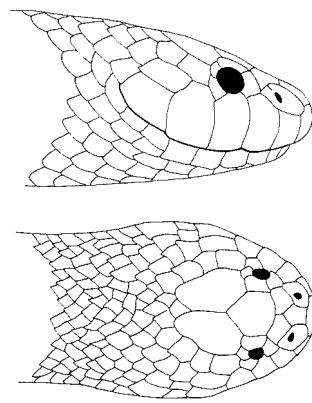


Figure 14. *Fordonia leucobalia*.
Drawings from Storr et al. (1986).

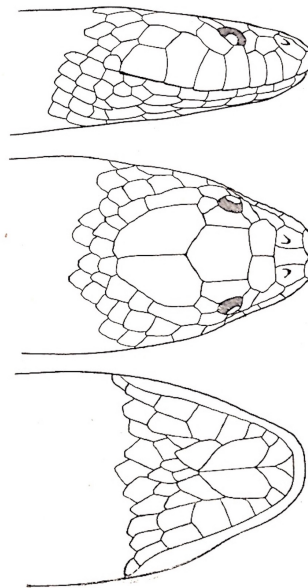


Figure 15. *Gerarda prevostiana*.
Drawings from Smith (1943).

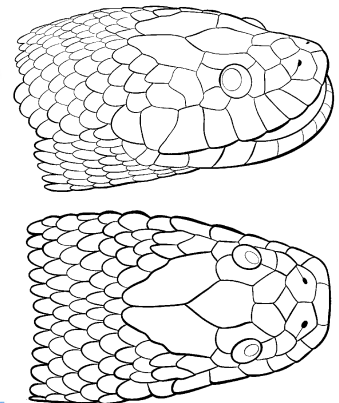


Figure 16. *Gyiophis maculosus*.
Drawings by Stephanie Ruesch.

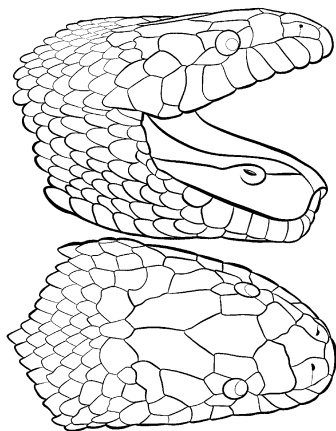


Figure 17. *Heurnia ventromaculata*. Drawings by Stephanie Ruesch.

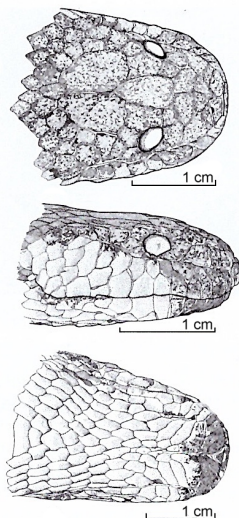


Figure 18. *Homalophis gyii*. Drawings by Sarah Drasner from Murphy (2007).

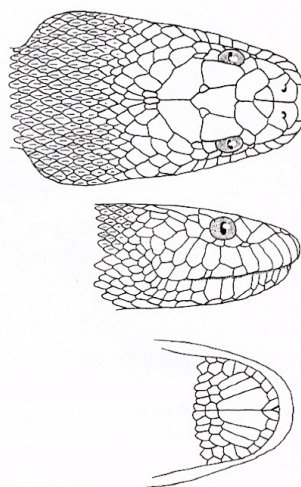


Figure 19. *Homalopsis buccata*. Drawings from Schleich and Kästle (2002).

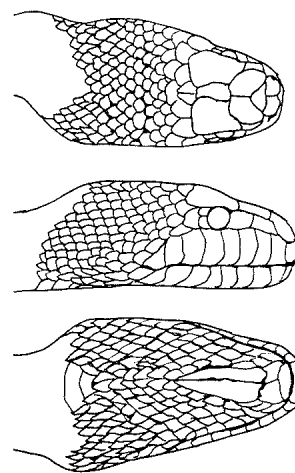


Figure 20. *Homalopsis mereljcoxi*. Drawings from Nutaphand (2001).

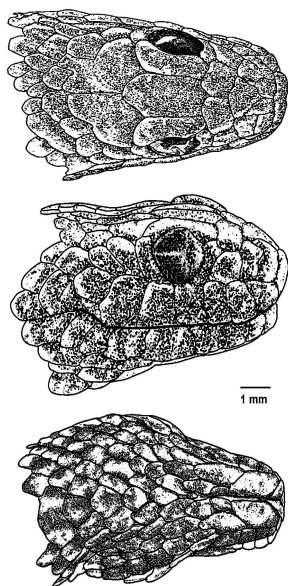


Figure 21. *Hypsiscopus indonesiensis*. Drawings from Hamidy et al. (2023).

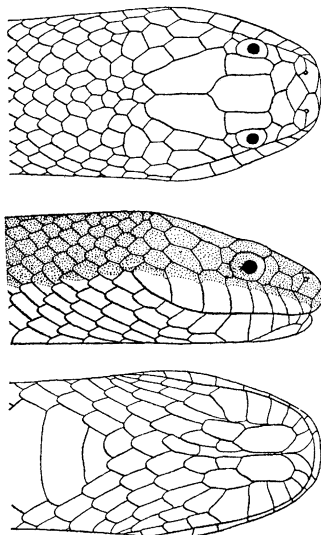


Figure 22. *Hypsiscopus plumbea*. Drawings from Maki (1931).

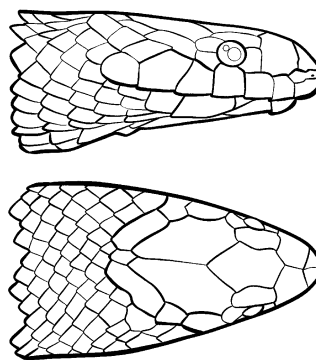


Figure 23. *Karnsophis siantaris*. Drawings by Stephanie Ruesch.

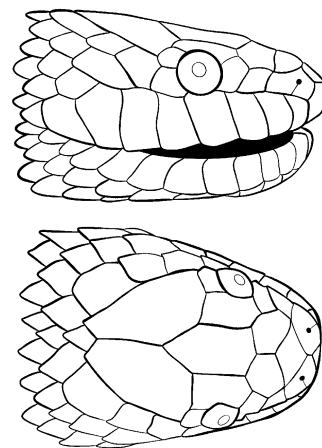


Figure 24. *Kualatahan pahangensis*. Drawings by Stephanie Ruesch.

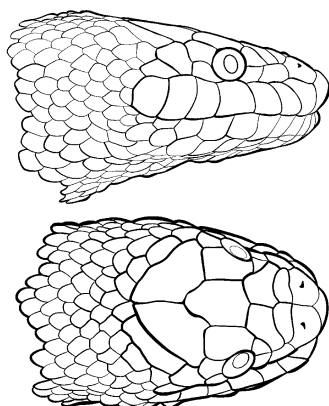


Figure 25. *Mintonophis pakistanicus*. Drawings by Stephanie Ruesch.

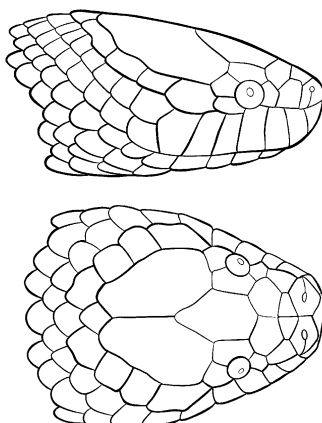


Figure 26. *Miralia alternans*. Drawings by Stephanie Ruesch.

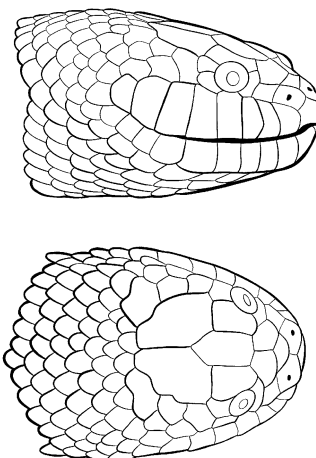


Figure 27. *Myanophis thanlyinensis*. Drawings by Stephanie Ruesch.

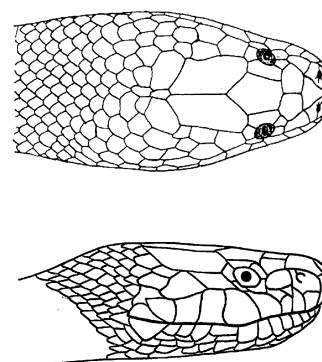


Figure 28. *Myron richardsonii*. Upper drawing from Rooij (1917). Lower drawing from Storr et al. (1986).

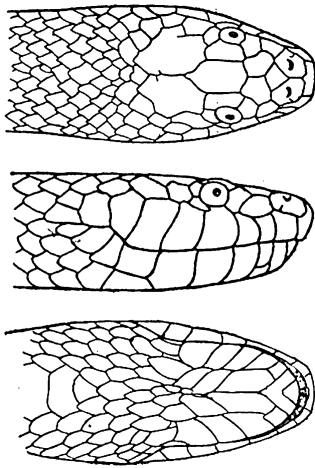


Figure 29. *Myrrophis bennettii*. Drawings from Stejneger (1907).

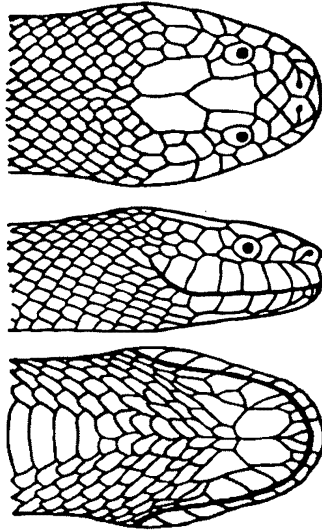


Figure 30. *Myrrophis chinensis*. Drawings from Shen et al. (2014).

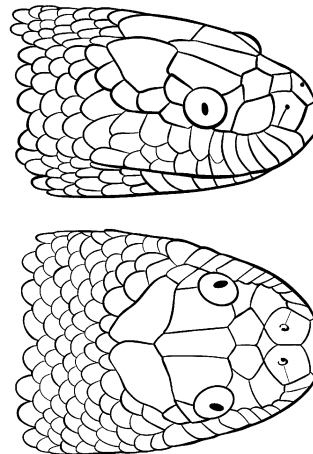


Figure 31. *Phytolopsis punctata*. Drawings by Stephanie Ruesch.

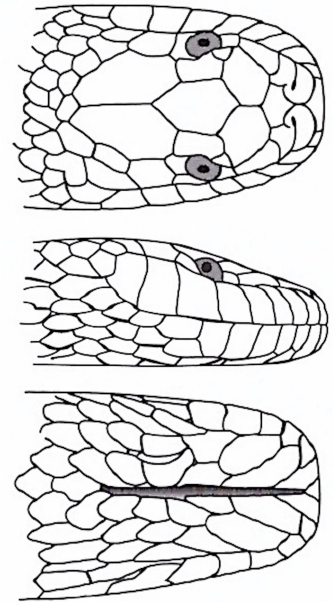


Figure 32. *Pseudoferania polylepis*. Drawings from Murphy (2007).

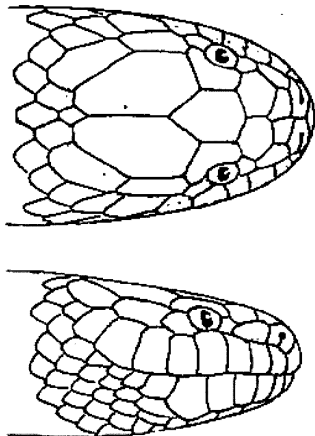


Figure 33. *Raclitia indica*. Drawings from Boulenger (1896).

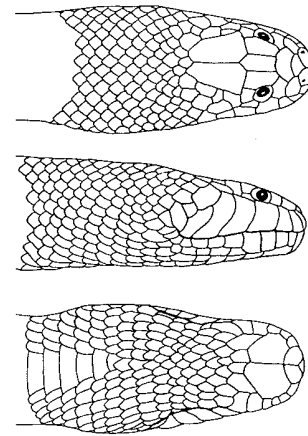


Figure 34. *Subessor bocourti*. Drawings from Nutaphand (2001).

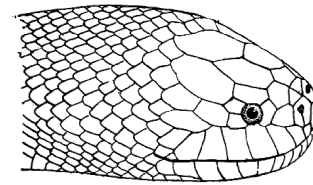


Figure 35. *Sumatranus albomaculatus*. Drawing from Rooij (1917).

Artificial key to the homalopsid genera

- 1a. Internasal(s) absent, fused with prefrontals, oviparous-----
-----*Anoplohydrus*
- 1b. One or more internasals, ovoviviparous-----2
- 2a. Maxillary dentition aglyphous, lacking enlarged fangs and a diastema-----3
- 2b. Maxillary dentition opisthoglyphous with fangs and a diastema-----5
- 3a. One postocular, one loreal, internasal single, nasal entire, two supralabials enter orbit, posterior scale row reduction present-----*Calamophis*
- 3b. Two postoculars, loreal normally absent, internasals usually paired, nasal normally divided, usually one supralabial enters orbit, no posterior scale row reduction-----4

- 4a. Rostral visible dorsally, lower jaw not countersunk, tail rounded-----*Brachyorrhos*
- 4b. Rostral not visible dorsally, lower jaw countersunk, tail compressed laterally-----*Karnsophis*
- 5a. Costal scales of body lanceolate with acuminate tips-----
-----*Kualatahan*
- 5b. Costal scales not lanceolate, apices rounded-----6
- 6a. Costal scales strongly or weakly keeled, if only in cloacal region-----7
- 6b. Costal scales entirely smooth-----11
- 7a. A pair of rostral appendages or tentacles on snout, loreals 12–15, anterior temporals 3–4, ventrals bicarinate-----*Erpeton*
- 7b. Lacking rostral appendages or tentacles on snout, loreals 0–1, anterior temporals 1–2-----8

8a. Nasals not in contact, separated by internasal, ventrals not bicarinate-----	<i>Myron</i>	19a. Midbody scale rows 27–33-----	20
8b. Nasals in contact along midline-----	9	19b. Midbody scale rows 19–23-----	21
9a. Cloacal shield entire, costals smooth with keels in cloacal region, 1–2 supralabials entering orbit, all supralabials undivided-----	<i>Pseudoferania</i>	20a. Subcaudals < 60, relative tail length < 21% TL, anterior scale rows 29–30-----	<i>Ferania</i>
9b. Cloacal shield divided, costals strongly keeled, supralabials separated from orbit by suboculars, some supralabials divided horizontally-----	10	20b. Subcaudals > 70, relative tail length > 21% TL, Anterior scale rows 31–33-----	<i>Mintonophis</i>
10a. Parietal shields fragmented, midbody scale rows 22–29-----		21a. Midbody scale rows 19–20, internasals paired-----	22
-----	<i>Cerberus</i>	21b. Midbody scale rows 21–25, internasal single-----	23
10b. Parietal shields entire, midbody scale rows 33–49-----		22a. Postoculars usually 2, supralabials usually 7 with 2 entering orbit, inhabits Greater Sunda islands-----	<i>Miralia</i>
-----	<i>Homalopsis</i>	22b. Postocular 1, 1 supralabials usually 8 with 1 entering orbit, inhabits Malay Peninsula-----	<i>Raclitia</i>
11a. Nasals not in contact along midline-----	12	23a. Ventrals < 130, inhabits Burma-----	<i>Myanophis</i>
11a. Nasals in contact on midline-----	18	23b. Ventrals > 130, inhabits China-----	<i>Myrophis</i>
12b. Ventrals keeled, cloacal shield longer than wide-----	<i>Bitia</i>	24a. Supralabials 11–17, all horizontally fragmented posterior to orbit-----	25
12b. Ventrals not keeled, cloacal shield broader than long-----	13	24b. Supralabials 7–9, only posteriormost supralabials horizontally divided-----	26
13a. Ventrals > 240, subocular(s) present, no supralabials entering orbit, posterior temporal 1-----	<i>Cantoria</i>	25a. Suboculars present, 2 or 3 internasals, pupil of eye circular-----	<i>Homalophis</i>
13b. Ventrals < 185, lacking subocular(s), 1 supralabial entering orbit, posterior temporals 2-----	14	25b. Lacking suboculars, single internasal, pupil of eye vertically elliptical-----	<i>Phytolopsis</i>
14a. Loreal absent, all supralabials undivided, supralabials 5-----		26a. Nasal suture contacting loreal-----	<i>Dieurostus</i>
-----	<i>Fordonia</i>	26b. Nasal suture contacting first supralabial-----	27
14b. Loreal present, some supralabials horizontally divided----	15	27a. Pupil of eye circular-----	<i>Sumatranus</i>
15a. Midbody scale rows 19–23-----	16	27b. Pupil of eye vertically elliptical-----	28
15b. Midbody scale rows 25–27-----	17	28a. Internasal not contacting loreal-----	<i>Hypsiscopus</i>
16a. Anterior, midbody and posterior scale rows 17–19 / 17–18 / 13–15, ventrals < 160, subcaudals < 38, nasal entire, preocular 1, 4–5 infralabials contact anterior genials-----	<i>Gerarda</i>	28b. Internasal(s) contacting loreal-----	29
16b. Anterior, midbody and posterior scale rows 21 / 19–23 / 17, ventrals > 165, subcaudals > 39, nasal semidivided, preoculars 2, 3 infralabials contact anterior genials-----	<i>Djokoiskandarus</i>	29a. Midbody scale rows 19–25-----	<i>Enhydris</i>
17a. Midbody scale rows 25, ventrals < 155, infralabials 10, nasal semidivided-----	<i>Gyiophis</i>	29b. Midbody scale rows 27–29-----	<i>Subsessor</i>
17b. Midbody scale rows 27, ventrals > 160, infralabials 14, nasal divided-----	<i>Heurnia</i>		
18a. Some supralabials horizontally divided-----	19		
18b. No supralabials horizontally divided-----	24		

Acknowledgments

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