

Supplementary Material 1: List of species included in the analysis, their respective ecology, and the number of specimens scanned per species (N).

Species	Ecology	Specimen number and origin collection	N	References
<i>Acrochordus granulatus</i>	Aquatic	0000.7200, MNHN; 0000.5196, MNHN; 0000.7201, MNHN; 0000.6155, MNHN; 1900.0356, MNHN; 1900.0357, MNHN	6	1–4
<i>Acrochordus javanicus</i>	Aquatic	0000.3294, MNHN; MS45, Anthony Herrel; MS52, Anthony Herrel; 0000.5370, MNHN; 0000.1145, MNHN	5	4–6
<i>Afronatrix anoscopus</i>	Aquatic	1921.0391, MNHN; 1916.0215A, MNHN; 1960.0139, MNHN; 1943.0079, MNHN; 1951.0008, MNHN	5	7,8
<i>Agkistrodon piscivorus</i>	Aquatic	0000.4252, MNHN; R3979, AMNH; R46913, AMNH; R50493, AMNH; R64620, AMNH	5	9–12
<i>Aipysurus fuscus</i>	Aquatic	R23488, MCZ; R23485, MCZ; R23483, MCZ; R23482, MCZ; R23481, MCZ	5	13
<i>Aipysurus laevis</i>	Aquatic	1990.4513, MNHN; 1990.4507, MNHN; 1990.4514, MNHN; 1990.4515, MNHN; 1999.6566, MNHN	5	13
<i>Atretium schistosum</i>	Aquatic	0000.3519, MNHN; 1946.0064, MNHN; 0000.7000, MNHN; 1999.8089, MNHN; 0000.7414, MNHN	5	14–16
<i>Bitia hydrooides</i>	Aquatic	229793, FMNH; 229795, FMNH; 198701, FMNH; 229791, FMNH; 211898, CAS; 211899, CAS; 211902, CAS	7	17–20
<i>Cantoria violacea</i>	Aquatic	206912, FMNH; 250116, FMNH; 250118, FMNH; 204970, CAS; 204971, CAS; 211909, CAS	7	17,21
<i>Cerberus rynchops</i>	Aquatic	1996.0258, MNHN; 1900.0417, MNHN; 1946.0078, MNHN; 1946.0078A, MNHN; 1946.0077, MNHN	5	17,21–23
<i>Cylindrophis ruffus</i>	Aquatic	0000.3280, MNHN; 2007.2452, MNHN; 0000.0440, MNHN; 0000.3281, MNHN; 0000.6362, MNHN	5	24,25
<i>Enhydris bocourtii</i>	Aquatic	1988.3768, MNHN; 1970.0556, MNHN; 1970.0558, MNHN; 1970.0559, MNHN; 1885.0333, MNHN	5	17,26
<i>Enhydris chinensis</i>	Aquatic	1911.0014, MNHN; 1911.0015, MNHN; 0000.8777, MNHN; 0000.8778, MNHN; 1906.0217, MNHN	5	17,21,27–29
<i>Enhydris enhydris</i>	Aquatic	0000.3749, MNHN; 0000.5567, MNHN; 1970.0544, MNHN; 1970.0550, MNHN; 0000.5528, MNHN	5	17,21,26,30,31
<i>Ephalophis greyae</i>	Aquatic	212348, FMNH; 212362, FMNH; 212351, FMNH; 212361, FMNH; 212367, FMNH	5	32,33

<i>Erpeton tentaculatum</i>	Aquatic	1970.0564, MNHN; 1970.0568, MNHN; 0000.5458, MNHN; 0000.0924, MNHN; 0000.0924A, MNHN	5	17,34
<i>Erythrolamprus miliaris</i>	Aquatic	15426, FMNH; 15427, FMNH; 15432, FMNH; 15433, FMNH; 217389, FMNH	5	35
<i>Eunectes murinus</i>	Aquatic	0000.7190, MNHN; 1996.7897, MNHN; 1996.7898, MNHN; 1994.1539, MNHN; 1994.1538, MNHN	5	35
<i>Farancia erythrogramma</i>	Aquatic	1903.0325, MNHN; 0000.3397, MNHN; 1991.1666, MNHN; 0000.3396, MNHN; R128620, AMNH	5	36–38
<i>Fordonia leucobalia</i>	Aquatic	1974.1331, MNHN; 1885.0128, MNHN; 1892.0270, MNHN; 1885.0545, MNHN; 217450, FMNH; 218887, FMNH	6	17,21,31,3 9–41
<i>Gerarda prevostiana</i>	Aquatic	1946.0079, MNHN; 1946.0271, MNHN; 204972, CAS; 211971, CAS	4	17,21,41,4 2
<i>Grayia ornata</i>	Aquatic	1996.6644, MNHN; 1995.9679, MNHN; 1994.3383, MNHN; 1994.8079, MNHN; 1995.9672, MNHN	5	7
<i>Grayia smithii</i>	Aquatic	1998.0603, MNHN; 1995.3401, MNHN; 1996.6446, MNHN; 1994.3393, MNHN; 1995.3406, MNHN	5	43
<i>Grayia tholloni</i>	Aquatic	1996.6450, MNHN; 1996.6451, MNHN; 1988.2341, MNHN; 1988.2345, MNHN; 1994.8085, MNHN	5	7
<i>Helicops angulatus</i>	Aquatic	0000.3609, MNHN; 0000.1542, MNHN; 1997.2097, MNHN; 1997.2032, MNHN; 1997.2034, MNHN	5	35
<i>Helicops carinicaudus</i>	Aquatic	0000.5237, MNHN; 1887.0447, MNHN; 87097, CAS	3	44
<i>Homalopsis buccata</i>	Aquatic	1970.0516, MNHN; 1970.0518, MNHN; 1974.1333, MNHN; 1970.0517, MNHN; 1884.0123, MNHN	5	17,20,45–47
<i>Hydrelaps darwiniensis</i>	Aquatic	R86165, AMNH; R86166, AMNH; R86167, AMNH; R86169, AMNH; R86172, AMNH	5	48,49
<i>Hydrodynastes bicinctus</i>	Aquatic	1974.0854, MNHN; 1889.0398, MNHN; 1902.0271, MNHN; 0000.8665, MNHN; R88401, AMNH	5	35
<i>Hydrodynastes gigas</i>	Aquatic	1989.3093, MNHN; 0000.A301, MNHN; 0000.A302, MNHN; 1997.2121, MNHN; 1999.8322, MNHN; 1997.2347, MNHN	6	35
<i>Hydrophis ornata</i>	Aquatic	0000.0851, MNHN; 1977.0807, MNHN; R66586, AMNH; R66588, AMNH; R161770, AMNH	5	1
<i>Hydrophis platuna</i>	Aquatic	0000.5137, MNHN; 1922.0005, MNHN; 1922.0002, MNHN; 1994.0659, MNHN; 1893.0064, MNHN	5	1,50,51

<i>Hydrophis schistosa</i>	Aquatic	198586, FMNH; 202102, FMNH; 202103, FMNH; 199488, FMNH; 218842, FMNH	5	1,13
<i>Hydrophis spiralis</i>	Aquatic	0000.4260A, MNHN; 0000.4260, MNHN; 0000.3988, MNHN; 0000.7723, MNHN; R161772, AMNH	5	52
<i>Hydrophis stokesii</i>	Aquatic	212320, FMNH; 213063, FMNH; 16774, CAS	3	13
<i>Hydrops triangularis</i>	Aquatic	1973.0296, MNHN; 0000.3438, MNHN; 1978.2500, MNHN; 1986.0565, MNHN; 1989.3052, MNHN	5	35
<i>Laticauda colubrina</i>	Aquatic	0000.5180, MNHN; 0000.7702, MNHN; 0000.5881, MNHN; 0000.5766, MNHN; 0000.9053, MNHN	5	1,53–55
<i>Lycodonomorphus laevissimus</i>	Aquatic	R18223, AMNH; 156721, CAS	2	56
<i>Lycodonomorphus rufulus</i>	Aquatic	205893, FMNH; 205889, FMNH; 0000.3377, MNHN; 0000.1210, MNHN; 0000.0563, MNHN	5	57
<i>Micrurus lemniscatus</i>	Aquatic	1897.0006, MNHN; 1989.3151, MNHN; 0000.7658, MNHN; 1996.7849, MNHN; 0000.0201, MNHN	5	35
<i>Micrurus surinamensis</i>	Aquatic	1996.7874, MNHN; 1978.2312, MNHN; 0000.3926, MNHN; 1873, Antoine Fouquet; 1999.8313, MNHN	5	35
<i>Myron richardsonii</i>	Aquatic	R86236, AMNH; R111790, AMNH; R111792, AMNH; R111793, AMNH; 114105, CAS; 135489, CAS; 135491, CAS	7	13
<i>Naja annulata</i>	Aquatic	1967.0455, MNHN; 1899.0294, MNHN; 1892.0098, MNHN; 1967.0452, MNHN; 0000.8222, MNHN	5	7
<i>Natriciteres olivacea</i>	Aquatic	1896.0518, MNHN; 0000.6507A, MNHN; 1896.0520, MNHN; 0000.6508, MNHN; 1994.8215, MNHN	5	8,58,59
<i>Natrix tessellata</i>	Aquatic	2000.5145, MNHN; 1989.0698, MNHN; 0000.0641, MNHN; 1884.0155, MNHN; 0000.0642, MNHN	5	60,61
<i>Nerodia cyclopion</i>	Aquatic	0000.0121, MNHN; 0000.3482, MNHN; 1955.0058, MNHN; R159217, AMNH; R159218, AMNH	5	62,63
<i>Nerodia harteri</i>	Aquatic	R64408, AMNH; R72686, AMNH; R72690, AMNH; R85314, AMNH; R162252, AMNH	5	62,64–67
<i>Opisthotropis lateralis</i>	Aquatic	R172664, MCZ; R172665, MCZ; R175987, MCZ; R172654, MCZ; R172653, MCZ	5	68
<i>Psammodynastes pictus</i>	Aquatic	1891.0077, MNHN; 1891.0045, MNHN; 1891.0046, MNHN; 128402, FMNH; 148906, FMNH; 148926, FMNH	6	47

<i>Pseudoeryx plicatilis</i>	Aquatic	0000.3402, MNHN; 0000.3401, MNHN; 0000.3401A, MNHN; 1962.0423, MNHN; 1978.2550, MNHN	5	35,69
<i>Pseudoferasia polylepis</i>	Aquatic	R35067, MCZ; R140183, MCZ; R129135, MCZ; R141689, MCZ; 1937.0082, MNHN	5	17,70
<i>Regina grahami</i>	Aquatic	29565, FMNH; 30428, FMNH; 7791, FMNH; 17033, FMNH; 17609, FMNH	5	62,71
<i>Regina septemvittata</i>	Aquatic	3074, FMNH; 35881, FMNH; 3076, FMNH; 3077, FMNH; 35880, FMNH; 0000.3492, MNHN	6	72–74
<i>Regina alleni</i>	Aquatic	11047, FMNH; 22591, FMNH; 48360, FMNH; R159307, AMNH; R170180, AMNH	5	75–77
<i>Regina rigida</i>	Aquatic	0000.1101, MNHN; R159322, AMNH; R159323, AMNH; R160211, AMNH; R162319, AMNH	5	62,63,78
<i>Seminatrix pygaea</i>	Aquatic	53688, FMNH; 53693, FMNH; 53687, FMNH; 53691, FMNH; 95347, FMNH	5	79
<i>Sinonatrix annularis</i>	Aquatic	1902.0080, MNHN; 1989.0215, MNHN; 1989.0206, MNHN; 1999.9017, MNHN; 1999.9016, MNHN	5	80
<i>Sinonatrix percarinata</i>	Aquatic	1935.0449, MNHN; 1935.0449A, MNHN; 1812.0321, MNHN; 2007.2443, MNHN; 1812.0319, MNHN	5	80
<i>Thamnophis atratus</i>	Aquatic	R57421, AMNH; R162404, AMNH; R162405, AMNH; 212664, CAS; 212709, CAS; 212720, CAS; 220684, CAS	7	81–85
<i>Thamnophis couchii</i>	Aquatic	R57423, AMNH; R66544, AMNH; R108191, AMNH; R108192, AMNH; R108194, AMNH	5	81,86
<i>Thamnophis rufipunctatus</i>	Aquatic	R64376, AMNH; R64402, AMNH; R68286, AMNH; R85996, AMNH; R162440, AMNH	5	81,87–89
<i>Xenochrophis piscator</i>	Aquatic	1991.1628, MNHN; 0000.7323, MNHN; 1991.1627, MNHN; 1998.8543, MNHN; 1998.8553, MNHN; R34085, AMNH	6	28,90,91
<i>Achalinus rufescens</i>	Non-aquatic	1935.0439, MNHN; 1935.0441, MNHN; 1935.0051A, MNHN; 1935.0051B, MNHN; 1935.0440, MNHN	5	92
<i>Agkistrodon contortrix</i>	Non-aquatic	1996.2762, MNHN; 0000.0884, MNHN; 1973.0072, MNHN; 1973.0077, MNHN; 0000.1762, MNHN	5	93
<i>Boaedon lineatus</i>	Non-aquatic	1988.2109, MNHN; 1994.8159, MNHN; 1994.8131, MNHN; 1994.8134, MNHN; 1990.4591, MNHN	5	94
<i>Bungarus caeruleus</i>	Non-aquatic	0000.4259, MNHN; 2007.2454, MNHN; 1962.0237, MNHN; 1962.0238, MNHN; 0000.3952, MNHN	5	95

<i>Diadophis punctatus</i>	Non-aquatic	0000.8593, MNHN; 1894.0061, MNHN; 1894.0062, MNHN; 0000.3379, MNHN; 0000.3379A, MNHN	5	96
<i>Echiopsis curta</i>	Non-aquatic	0000.0951, MNHN; 0000.7675, MNHN	2	97
<i>Epicrates cenchria</i>	Non-aquatic	1955.0037, MNHN; 1991.1492, MNHN; 0000.3335, MNHN; 1973.1196, MNHN; 0000.3291, MNHN	5	98
<i>Erythrolamprus aesculapii</i>	Non-aquatic	1978.2515, MNHN; 1978.2516, MNHN; 1887.0391, MNHN; 0000.3686, MNHN; 1980.1115, MNHN	5	99
<i>Micrurus corallinus</i>	Non-aquatic	1883.0260, MNHN; 1962.0468, MNHN; 1962.0469, MNHN; 0000.7653, MNHN; 0000.3909, MNHN	5	100
<i>Naja haje</i>	Non-aquatic	1999.8836, MNHN; 1990.4629, MNHN; 1990.4660, MNHN; 1988.2485, MNHN; 1988.2486, MNHN; 1988.3931, MNHN	6	101,102
<i>Philodryas nattereri</i>	Non-aquatic	1908.0245, MNHN; 1967.0136, MNHN; 1967.0133, MNHN; 1967.0134, MNHN; 0000.3744, MNHN	5	103
<i>Prosymna meleagris</i>	Non-aquatic	0000.8807, MNHN; 1916.0176, MNHN; 1962.0007, MNHN; 1977.0380, MNHN; 1908.0062, MNHN	5	104
<i>Psammophis sibilans</i>	Non-aquatic	1921.0471, MNHN; 1921.0470, MNHN; 1905.0215, MNHN; 1891.0184, MNHN; 1902.0014, MNHN	5	105
<i>Pseudaspis cana</i>	Non-aquatic	1912.0494, MNHN; 0000.3529, MNHN; 0000.8592, MNHN; 1896.0391, MNHN; 2007.2457, MNHN	5	106,107
<i>Pseudechis porphyriacus</i>	Non-aquatic	0000.7672, MNHN; 0000.7673, MNHN; 0000.7674, MNHN; 0000.3945, MNHN; 2007.2453, MNHN	5	108
<i>Pseudonaja textilis</i>	Non-aquatic	1900.0521, MNHN; 1900.0522, MNHN; 0000.1027, MNHN; 2007.2479, MNHN; 0000.1303, MNHN	5	109
<i>Sibynophis collaris</i>	Non-aquatic	1919.0144, MNHN; 1919.0145, MNHN; 1946.0285, MNHN; 1928.0055, MNHN; 1928.0053, MNHN	5	110,111
<i>Storeria dekayi</i>	Non-aquatic	0000.3439, MNHN; 1994.0077, MNHN; 1994.0765, MNHN; 0000.1326, MNHN; 0000.1023, MNHN	5	112
<i>Tachymenis peruviana</i>	Non-aquatic	0000.3907, MNHN; 1961.0575, MNHN; 1961.0576, MNHN; 1905.0350, MNHN; 1996.2732, MNHN	5	113
<i>Thamnophis scalaris</i>	Non-aquatic	1975.0190, MNHN; 1901.0305, MNHN; 1894.0081, MNHN; 1901.0306, MNHN; R88724, AMNH	5	114
<i>Uropeltis ceylanicus</i>	Non-aquatic	1895.0099, MNHN; 1895.0100, MNHN; 1848.0265, MNHN; 1848.0266, MNHN; 1897.0258, MNHN	5	115

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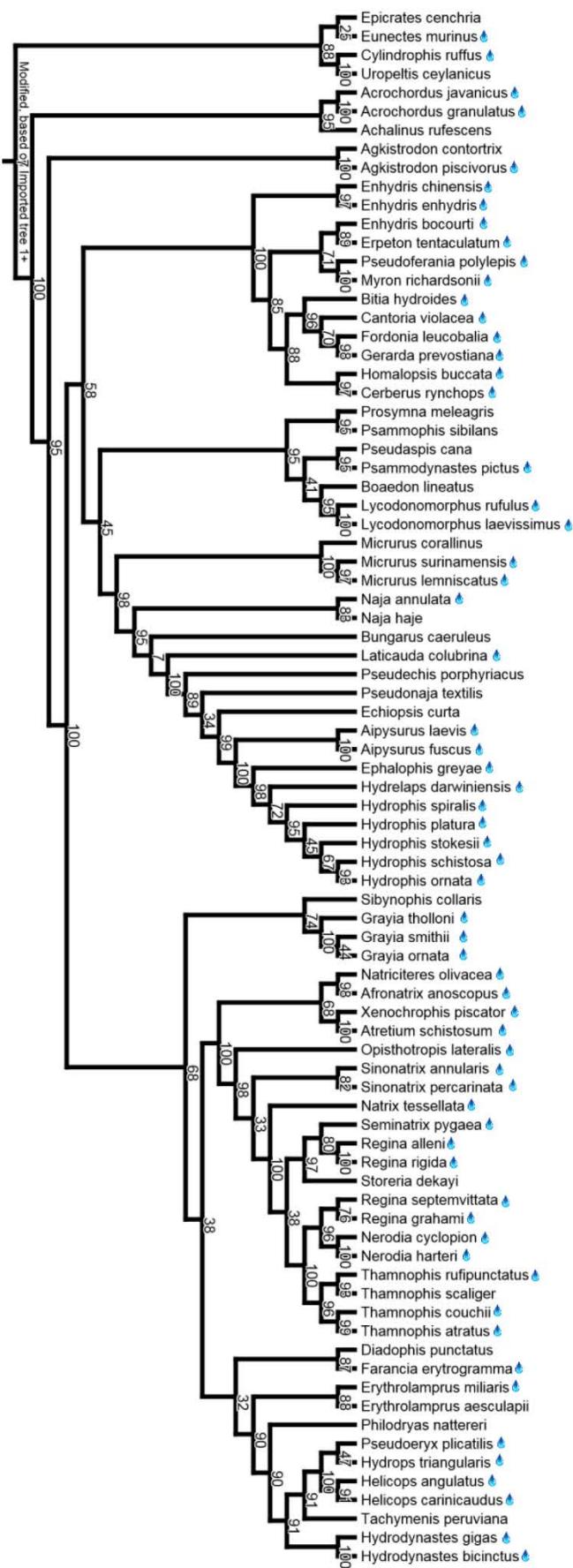
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**Supplementary Material 2: Phylogeny of the selected species based on Pyron et al. 2013
(blue tear drop = 'aquatic' species).**



Supplementary Material 3: List of anatomical landmarks and curves used for the template.

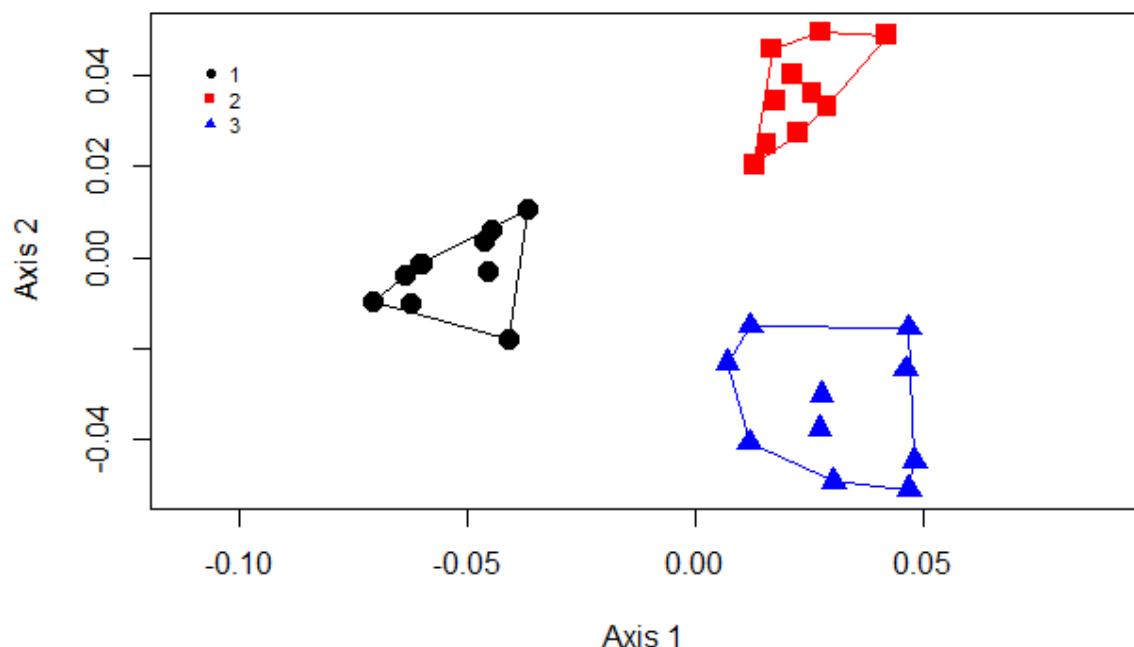
Anatomical landmarks:

1. Middle of the left nostril
2. Middle of the right nostril
3. Extreme point of the rostrum
4. Extreme point of the left part of the jaw
5. Extreme point of the right part of the jaw
6. Left commissure
7. Right commissure
8. Extremity of the mental scale
9. Most dorsal point of the left eye
10. Most dorsal point of the right eye

Curves:

- Curve 1: left eye
- Curve 2: right eye
- Curve 3: from landmark 6 to landmark 8 along mouth
- Curve 4: from landmark 7 to landmark 8 along mouth
- Curve 5: from landmark 4 to landmark 5 along dorsal part of the head
- Curve 6: from landmark 4 to landmark 5 along ventral part of the head

Supplementary Material 4: Assessment of the error in landmark positioning using a principal component analysis. Landmarks were placed ten times on three different specimens of the same species. The principal component plot shows that variation due to the placement of the landmarks is lower than variation among individuals.



Supplementary Material 5: Scatter plot of the principal components two and nine showing that species that capture elusive aquatic prey (black squares) differ from those that do not (grey circles). Axes two and nine respectively account for 13.7 and 1.5% of the head shape variance.

