

## SUPPLEMENTARY DATA 1

### PHENOTYPIC DATA MATRIX

Inapplicable characters are shown with a hyphen (-); uncoded characters (missing data) are shown with a question mark (?). Character states enclosed between brackets represent variable conditions within a terminal (i.e., polymorphic scorings), whereas those enclosed in braces indicate uncertainty or ambiguity in the condition of a terminal taxon (among these states, but not among the remaining character states; see Pol and Apesteguía, 2005). The voucher number below each species corresponds to the terminal from the molecular dataset to which it was combined for the total evidence analysis. See appendix 4 for updated taxonomy of the vouchers.

*R. achalensis* (MACN 52406)

00000001{01}1012200000?111(01)0?0001200????????????????111?2501210--110011????  
?????????2112100021?

*R. achavali* (MNHN-Uy 9301)

222002???112110001??02100?00?00?0????????????????111024010111?1?001?011011110  
100????????????4

*R. acrolopha* (MAR 1426)

01(01)00101311212000121111200010120????????????????0000{14}{14}01110--0-0000?  
????????????????00?????

*R. acutirostris* (PD 132)

{01}1{01}0{01}????????????????1?0????????????????????111??11111??0-011????  
????????????????0001?

*R. alata* (QCAZ 11597)

{01}1100{01}????????????{01}??000????????????????????111?11(01)11111?1?0100  
????????????????000???

*R. amabilis* (QCAZ 68471)

0000000121011100000110-00?0001200????????????????111?14011011?1?0011?????????  
??????10???

*R. amboroensis* (NKA 5302)

{01}{01}{01}01????????????????0?0?0????????????????????0??301210--1?000?????  
????????????02?????

*R. arborescandens* (MHNC 14076)

{01}{01}{01}00{01}????????????????0?0?0????????????????????000?11012110?11000  
0????????????????1?????

*R. arenarum* (AR 305)

2220010132221100011112100?0000000?????????1?1????111145(01)10111011001001(01)  
01110021121121000114

*R. arequipensis* (KU 214792)

{01}{01}{01}00{01}0101011000001111000?0000100????????????????111?25012(01)11?  
11001?010011100??????????????7

*R. arunco* (KU 217369)

10000{01}01320211001011110001000110111110111101111111114401200--1100110100  
01100???????000114

*R. atacamensis* (KU 217352)

1110010122(12)2210010111110010001100????????????????11112411200--110000010011  
100???????200?1?

*R. azarai* (LGE 8710)

222002013222??1121{12}1120000000020????????????????111??50130101110?00011100  
10(01)???1001100001?

*R. beebei* (CBA 5732)

22200201{23}222?211212?12000?00?12?0????????????????111?55013?????0100011001  
10????000?1000???

*R. bergi* (MACN 46555)

222002013222??112121120000000120?11110100001001111144(01)120101110100?????  
????????????1000???

*R. bernardoii* (UNSJ 5046)

22200{01}013{12}22??1??1????00?00?12??????????????????111??40111??1000??0110  
00100???????????????

*R. casconi* (CFBH 22863)

121001??????????????????0?0????????????????????????111?45(01)1011??110010011011100  
??????100???

*R. castaneotica* (LSUMZ 17429)

110001112012020001000211100????????????????????????110?00(01)1101101?010000--011  
00??????002001?

*R. ceratophrys* (QCAZ 40240)

11{01}001??????????0??1?2?000????????????????????????111011110111?100000?????????  
????????00??1?

*R. cerradensis* (CHUNB 38671)

2220010132220000011112100?00?00?0?0????????????????????111125013111?11001101001111  
0???2112?00011?

*R. chavin* (MTD 43789)

1110000121120000011101010?00?02????????????????????111?4401210--110010??????????  
??????00??0?

*R. crucifer* (CFBH 24630)

2220020122221100011112000?0000101111101001110011111045(01)10111?1100000110  
11100101??????????4

*R. dapsilis* (QCAZ 43967)

0100001122121200011102102?0?????0000210010001101110010111???10000?????????  
????????????????

*R. diptycha* (KU 289057)

22200(12)0132221(12)00011112100?0000000????????????????111145013(01)1101100100  
11011100200????1000?14

*R. dorbignyi* (MACN 43695)

221002????????11?????????0?0????????????????????11(01)1441130101110?0001110010(  
01)????????1000???

*R. fernandezae* (LGE 8718)

222002013222121121?11200000001200?11101101??011111(01)?441130101110?000111  
0010(01)???100110001??

*R. festae* (KU 217501)

02000{12}0021021200012111120?010121????????????????00003301110--0-0?00????????  
?????????00??0?

*R. gallardoi* (LGE 4546)

010001012121?000010101000?0001200????????????????1111(45)501110--1?0010????????  
????????????????

*R. gildae* (CFBH 11400)

121{01}01?????????????????0?0????????????????????????111?1111101??110100?????????  
????????????????

*R. granulosa* (CFBH 18706)

222001?????????????????0?0????????????????????????111155013011?1?010001110110021  
1????100???2

*R. henseli* (CFBH 20117)

12100(01)?????????????????0?0?????111101001110011111?2511011??110?10?????????  
?101?????????4

*R. hoogmoedi* (CFBH 13286)

111101?????????????????0?0?????000021001001010111?3{13}(01)11111?10010?00--0  
1100011?????0????5

*R. horribilis* (MAR 2057 NuG)

22200(12)013222110001?1?2100?00????????????????????1111(45)5013(01)11?11001001  
1011100???0???1000114

*R. humboldti* (AJC 3533)

222001013222?211111?12000?0001200????????????????111?55?13011?11010?0111?110?  
??????1000???

*R. icterica* (CFBH 27410)

22200101222211000101(01)2100?00?00?0????????????????111125(01)1311101100100100  
11101101????(01)00??4

*R. inca* (MNCN 44405)

{01}1{01}0?1?????????????????0?0????????????????????111?3?0110?????001?????????  
??????????????????

*R. inopina* (CHUNB 51110)

221001?????????????????0?0????????????????????111?451101?????????0?????????????  
???100???

*R. jimi* (CFBH 19523)

22200(12)???222110001??02100?00?00?011110110101111111125013111011001101101  
1100111?????0?????

*R. justinianoi* (MNCN-ADN 6065)

111002?????????????????0?0?????????????????????????0?330111?????0000?????????????  
???000?0?

*R. leptoscelis* (MUBI 5989)

2110?{12}?????????????????0?0?????????????????????111?3?0111?????000??????????  
???????????????

*R. lescurei* (5 MC)

{01}{01}{01}00{01}?????????????????0?0?????????????????????111?331111?????0100  
?????????????????0?????

*R. lilyrodriguezae* (MUSM 32205)

{01}{01}{01}0?0?????????????????0?00??0?????????????????111?3?(01)111?????000?  
?????????????????11?????

*R. limensis* (nv)

00000{01}0111{01}11100000111000?0000200?????????????????111124{01}1110--??00?1  
010-11100??????????????4

*R. lindae* (MAR 3432)

{01}1{01}00{01}?????????????????0?000120?????????????????1(01)(01)?33111111?0-1  
000?????????????????0?????

*R. macrorhina* (MHUA 8319)

{01}21002?121221200012001?20?000120?????????????????00001101111?0-(01)000????  
?????????????00?????



*R. magnussoni* (APL 20530)

{01}1{01}00{01}????????????????{12}?0????????????????????111?14(01)0-11?0110  
00000--01100??????00200??

*R. major* (MNCN-ADN 6232)

222001013222?21121211200000001200?10101????1????11114501301011101000111(01)  
0100???1001100001?

*R. manu* (MNCN 20672)

0110000{01}2122??00?110010201001021????????????????111?1101200--111000??????  
????????11?????

*R. cf. margaritifera* (KU 215146)

1221?1111222020001{01}1021010000120????????????????111011(01)111?????010?????  
????????????????

*R. cf. margaritifera* (QCAZ 42269)

122111????22120001??0101??10?02?1??  
??????????

*R. marina* (VUB 1965)

22200(12)0132221100011112100100?00?0????????????????111?{45}501311?0110010011  
01110(01)??001?1000?14

*R. martyi* (156 MC)

{01}22102????????????????2?1????????????????????111?{13}{13}(01)111????0100  
????????????????0?????

*R. merianae* (CFBH 16641)

222002013212021111210200?00????????????????????111?5501301?11?0100011101100  
???????100001?

*R. mirandaribeiroi* (CFBH 10254)

22200{01}01{23}222?211212?12000?00?12?0111001000010011111?551130???1?010?01  
1101110???????100????

*R. multiverrucosa* (MHNC 11455)

{01}1100{01}0121220000011101010?00?02?1????????????????11114401210--110000??  
???????????????1???0?

*R. nesiotis* (CBD 13953)

{01}{01}{01}0?{01}?????????????????0?0????????????????????111?3?0120????000?  
????????????????11???0?

*R. nicefori* (MHUA 4793)

{01}2{01}002???1????????????????0?010????????????????????00002201111?0-1000?????  
????????????0???0?

*R. ocellata* (ZUFG 8519)

1111{01}1112212120001100200{01}?0?????010001001000110111011111111?11010???  
?????????????1?0001?

*R. ornata* (CFBH 18815)

22100{12}01222212000101120001000020????????????????111045110111011001001101  
11001012112(01)000014

*R. paraguas* (TG 1480)

{01}{01}100{01}?????????????????0?00??1?01000000000010100?3301210-?1?1000?  
?????????????10??0?

*R. paraguayensis* (UFMT 1876)

{01}1{01}1{01}1????????????????{12}?0????????????????????111043(01)11111?100  
100?????????????000???

*R. poeppigii* (MHNC 6863)

22{12}00{12}01(23)2221200011112100?00?00?0????????????????1111250131110110?10  
?????????????????000??4

*R. proboscidea* (CTGA-UFAM 5602)

{01}1{01}?0{01}?????????????????1?0????????????????????111??000-0?????00?000--  
01100?????????0000014



*R. scitula* (IIBP 849)

111{01}{01}{01}?????????????????1?0?????????????????????111?44(01)1(01)111?100  
100010001100?????????10000??

*R. sclerocephala* (MHNLS 7495)

{01}22102?????????????????{12}?0?????????????????????111?1101111??1?0000??????  
??????????00????1?

*R. s. papillosa* (MACN 49782)

{01}{01}{01}00{01}?????????????????0?0??????11010110101101111114501200--1000  
110??0111??????????00021?

*R. s. spinulosa* (MACN 49701)

1{01}{01}00{01}0111011100001110?00?00?02?0111101101011011111????12?????????  
?0100111012112112100021?

*R. s. spinulosa* (nv)

1{01}{01}00{01}0101011100001110-00?00?02?0?????????????????11112511200--110010  
010011101???????????????

*R. s. trifolium* (nv)

??00?????????????????0?0?????????????????????111?451121???110?1?010011100???  
???????????

*R. stanlaili* (MNCN-ADN 6274)

{01}1{01}10{01}????????????????1?0????????????????????111?11(01)1110--1?0100?  
????????????????(01)0??0?

*R. sternosignata* (nv)

111?0111221202010121121001000020????????????????111?3301211(01)0110001??????  
??????????????0?

*R. tacana* (NKA 7187)

{01}{01}{01}00{01}????????????????0?0????????????????????111?3301211??1?000  
0??????????????111000?

*R. tenrec* (MAR 3584)

{01}1{01}001????????????????0?0????????????????????000?1101110--0-0??0??????  
??????????????0?

*R. vellardi* (KU 211765)

2000000111011100000110-10?0000101????????????????11112401210--110011??????????  
??????????????

*R. veraguensis* (USNM 346048)

1110010110120100112002010?0000201????????????????1?01330110?????000?211111001  
???????100???

*R. veredas* (CHUNB 44609)

22100{01}???222110001??02100?00?00?0?????????????????11115501{03}111?1?0010????  
?????????????00????

*R. yanachaga* (MHNC 7119)

{01}1100{01}0111220100111?01020?0?????????????????????111?34012011?111001????  
?????????????11??0?

*R. yunga* (MUSM 31096)

121{01}{01}1?????????????????0?0?????????????????????000?1101010--1?0000010001  
100???????100001?

*Rhinella* sp. (QCAZ 53142)

{01}{01}{01}00{01}?????????????????0?0?????????????????????110?001111???1000??  
?????????????????????

*Amazophrynella minuta*

000000?1{01}???????(01)2?????101000??1??11101000??01??00001100-00--0-000001000  
1001???????0013?1?

*Anaxyrus boreas*

12(12)00201{23}2(12)21100000?11000?0000200?????????????????111(01)4401001111100  
000110111000010?1??000011

*Anaxyrus americanus*

10000{01}01{01}1012100000110-0010000200????????????????111122011011?11001001  
{01}001100????????000110

*Anaxyrus woodhousii*

1220010132121100000?10000?00002?0?11001100?1(01)00?110(01)?3110011110000001  
10?110????????000???

*Ansonia longidigita*

{01}{01}{01}00{01}?????????????????0?0????????????????????1110{24}{24}00-011  
0100000221001000???????100??0?

*Bufo bufo*

0{01}100{01}01{01}0011000000110-1010000201????????????????11105501000--110000  
0100011000?0?1121000213

*Duttaphrynus melanostictus*

22200{01}01{23}1021100010?11000?0000201????????????????111152010010011000001  
00?11000?1????100001?

*Incilius alvarius*

22000{01}01{23}2221100011?11000?0000200????????????????11112201001001?001000  
?-11100????????000(01)1?



*Incilius coniferus*

22200{12}11{23}1221200010101000?00?12?0????????????????11104401111(01)0110000  
01{01}011100???????110011?

*Incilius valliceps*

22200201{23}222010001111100010000200????????????????111(01)4411111101?0000010  
101100???????1000112

*Melanophryniscus stelzneri*

0000000(01){23}00201002(01)2?00-1010000201?11?0?001?101??00010000-0110100100  
01000100100011200002?1?

*Nannophryne variegata*

00000000{01}0002100101000-00100012011(01)1?011011(01)010-00012211110--100000  
0110?1100???????1000?14

*Peltophryne lemur*

222?02?????????????????0?0?????111(01)010010100101110?401101(01)011001?01100  
1100???????1004?1?

*Peltophryne empusa*

12{12}00(12)01{23}222?101211?11000?0001200????????????????111?5501101?01?0010  
0????1100???????000?1?

*Phrynoidis juxtaspera*

01{01}00{01}01{01}222010001111100010000201????????????111044010011?11001  
02100?1010??????(01)000?1?

*Rentapia hosii*

00000001{01}0221100011(01)1101010000001????????????1110140110100100010{12  
}100?11000?0?????100??6

*Rhaebo guttatus*

01100101{01}1221100011?11000?0000100111101111?1000?11102201311(01)0??001?21  
0001101???????1000???

*Schismaderma carens*

00000{01}00{01}0002200000100-10?00?10?1?11101????????11111400-11101?001?010  
011000???1?1?00001?

*Sclerophrys mauritanica*

11100{01}?121211????11????0?000?0?0????????????1111{45}{45}010?1001?00100  
111?110????????00??5

*Sclerophrys regularis*

{01}{01}{01}00{01}0131221100002?01000?00?12?111110110101001111114(01)10111  
01100100100?110?101????(01)000?1?

*Vandijkophrynus robinsoni*

{01}{01}{01}00{01}?????????????????0?0?????????????????????111?2201001??11001

0010001110?????1??0002??