

# Molecular-based rapid inventories of sympatric diversity: A comparison of DNA barcode clustering methods applied to geography-based vs. clade-based sampling of amphibians

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## Supplementary material

**Supplementary table 1.** GenBank accession numbers for the sequence from both the Panama and Malagasy datasets

Species	GenBank Accession Number COI	GenBank Accession Number 16S
<i>Mantidactylus brevipalmatus</i>	AY883995, AY883994	-
<i>Mantidactylus asper</i>	AY883993, AY883992	-
<i>Boophis microtympanum</i>	AY883991	-
<i>Boophis goudotii</i>	AY883990, AY883989	-
<i>Ptychadena mascareniensis</i>	AY883988, AY883987	-
<i>Mantidactylus ulcerosus</i>	AY883986	-
<i>Mantidactylus tschenki</i>	AY883985, AY883984	-
<i>Mantidactylus femoralis</i>	AY883983	-
<i>Boophis blommersae</i>	AY883982, AY883981	-
<i>Mantidactylus tornieri</i>	DQ116497, DQ116496	-
<i>Mantidactylus redimitus</i>	DQ116495, DQ116494	-
<i>Mantidactylus melanopleura</i>	DQ116493, DQ116492, DQ116491	-
<i>Mantidactylus liber</i>	DQ116490, DQ116489	-
<i>Mantidactylus domerguei</i>	DQ116488	-
<i>Mantidactylus depressiceps</i>	DQ116487	-
<i>Mantidactylus enki</i>	DQ116486, DQ116485	-
<i>Mantidactylus blommersae</i>	DQ116484, DQ116483, DQ116482, DQ116481, DQ116480, DQ116479, DQ116478, DQ116477	-
<i>Boophis tasymena</i>	DQ116476	-
<i>Boophis sibilans</i>	DQ116475	-
<i>Boophis septentrionalis</i>	DQ116474, DQ116473	-
<i>Boophis rappiodes</i>	DQ116472	-
<i>Boophis periegetes</i>	DQ116471	-
<i>Boophis mandraka</i>	DQ116470	-
<i>Boophis luteus</i>	DQ116469, DQ116468	-
<i>Boophis guibei</i>	DQ116467	-
<i>Boophis goudotii</i>	DQ116466	-
<i>Boophis erythrodactylus</i>	DQ116465	-

Supplementary table 1 (continued)

Species	GenBank Accession Number COI	GenBank Accession Number 16S
<i>Boophis doulioti</i>	DQ116464	-
<i>Boophis</i> aff. <i>sibilans</i>	DQ116463	-
<i>Aglyptodactylus madagascariensis</i>	DQ116462, DQ116461	-
<i>Allobates talamancae</i>	FJ766610, FJ766609.	FJ784370, FJ784428.
<i>Atelopus zeteki</i>	FJ766577, FJ766576, FJ766575, FJ766574, FJ766573, FJ766572.	FJ784541, FJ784543, FJ784545, FJ784551, FJ784553, FJ784581.
<i>Incilius coniferus</i>	FJ766768, FJ766767, FJ766766, FJ766765, FJ766764, FJ766732, FJ766762, FJ766761.	FJ784379, FJ784382, FJ784444, FJ784586, FJ784595, FJ784597, FJ784599, FJ784601.
<i>Rhaebo haematiticus</i>	FJ766818, FJ766817, FJ766816, FJ766815, FJ766814, FJ766813, FJ766812.	FJ784404, FJ784426, FJ784439, FJ784452, FJ784546, FJ784560, FJ784593.
<i>Rhinella marina</i>	FJ766819.	FJ784357.
<i>Caecilia volcani</i>	FJ766580.	FJ784371.
<i>Cochranella euknemos</i>	FJ766603, FJ766602, FJ766601, FJ766600.	FJ784396, FJ784443, FJ784458, FJ784459,
<i>Cochranella granulosa</i>	FJ766604.	FJ784455.
<i>Espadarana prosoblepon</i>	FJ766593, FJ766592, FJ766591, FJ766590, FJ766589.	FJ784362, FJ784363, FJ784419, FJ784604, FJ784605
<i>Hyalinobatrachium colymbiphllum</i>	FJ766709, FJ766708, FJ766716, FJ766715, FJ766713, FJ766712, FJ766711, FJ766710, FJ766714, FJ766717.	FJ784359, FJ784366, FJ784345, FJ784346, FJ784475, FJ784527, FJ784561, FJ784562, FJ784402, FJ784471.
<i>Hyalinobatrachium talamancae</i>	FJ766718.	FJ784480.
<i>Sachatamia ilex</i>	FJ766585, FJ766582, FJ766588, FJ766587, FJ766586, FJ766584, FJ766583, FJ766581.	FJ784582, FJ784588, FJ784403, FJ784574, FJ784580, FJ784583, FJ784584, FJ784591.
<i>Sachatamia albomaculata</i>	FJ766599, FJ766598, FJ766597, FJ766596, FJ766595, FJ766594.	FJ784392, FJ784441, FJ784449, FJ784468, FJ784474, FJ784550
<i>Teratohyla spinosa</i>	FJ766608, FJ766607, FJ766606, FJ766605.	FJ784330, FJ784348, FJ784361, FJ784479.
<i>Craugastor bransfordii</i>	FJ766631, FJ766630, FJ766629, FJ766628, FJ766627, FJ766626.	FJ784339, FJ784358, FJ784376, FJ784427, FJ784481, FJ784496.
<i>Craugastor</i> cf. <i>azueroensis</i>	FJ766637, FJ766636, FJ766675, FJ766674.	FJ784332, FJ784393, FJ784324, FJ784325.
<i>Craugastor crassidigitus</i>	FJ766643, FJ766641, FJ766644, FJ766639, FJ766642	FJ784327, FJ784329, FJ784322, FJ784407, FJ784328.
<i>Craugastor fitzingeri</i>	FJ766648, FJ766647, FJ766646, FJ766645.	FJ784337, FJ784344, FJ784356, FJ784555.
<i>Craugastor gollmeri</i>	FJ766656, FJ766655, FJ766654, FJ766653, FJ766652, FJ766651, FJ766650, FJ766649.	FJ784341, FJ784353, FJ784364, FJ784408, FJ784432, FJ784442, FJ784489, FJ784492.
<i>Craugastor megacephalus</i>	FJ766663, FJ766662, FJ766661, FJ766660.	FJ784323, FJ784335, FJ784347, FJ784378.

Supplementary table 1 (continued)

Species	GenBank Accession Number COI	GenBank Accession Number 16S
	FJ766659, FJ766658, FJ766657.	FJ784431, FJ784456, FJ784472.
<i>Craugastor noblei</i>	FJ766665, FJ766664, FJ766666.	FJ784513, FJ784523, FJ784367.
<i>Craugastor punctariolus</i>	FJ766673, FJ766672, FJ766671, FJ766670, FJ766669, FJ766668, FJ766667.	FJ784333, FJ784411, FJ784417, FJ784418, FJ784448, FJ784483, FJ784488.
<i>Craugastor aff. longirostris</i>	FJ766681, FJ766680, FJ766679, FJ766678, FJ766677, FJ766676.	FJ784343, FJ784349, FJ784518, FJ784524, FJ784537, FJ784556
<i>Craugastor tabasarae</i>	FJ766684, FJ766683, FJ766682.	FJ784342, FJ784512, FJ784515.
<i>Craugastor talamancae</i>	FJ766696, FJ766695, FJ766694, FJ766693, FJ766692, FJ766691, FJ766690, FJ766689, FJ766688, FJ766687, FJ766686, FJ766685.	FJ784462, FJ784506, FJ784510, FJ784511, FJ784517, FJ784521, FJ784530, FJ784533, FJ784536, FJ784542, J784549, FJ784572.
<i>Colostethus panamansis</i>	FJ766619, FJ766618, FJ766617, FJ766616, FJ766615, FJ766614, FJ766613, FJ766612, FJ766611.	FJ784447, FJ784504, FJ784505, FJ784507, FJ784508, FJ784509, FJ784516, FJ784526, FJ784529
<i>Colostethus pratti</i>	FJ766623, FJ766622, FJ766621, FJ766620, FJ766625, FJ766624	FJ784429, FJ784438, FJ784464, FJ784494, FJ784350, FJ784351.
<i>Dendrobates auratus</i>	FJ766698, FJ766697.	FJ784317, FJ784319.
<i>Oophaga vicentei</i>	DQ502869.	DQ502167.
<i>Phyllobates lugubris</i>	FJ766769.	FJ784587.
<i>Ranitomeya minuta</i>	DQ502870.	DQ502168.
<i>Silverstoneia flotator</i>	FJ766822, FJ766821, FJ766820.	FJ784352, FJ784400, FJ784450.
<i>Silverstoneia nubicola A</i>	FJ766831, FJ766824, FJ766823.	FJ784420, FJ784563, FJ784564.
<i>Silverstoneia nubicola B</i>	FJ766833, FJ766832, FJ766830, FJ766829, FJ766828, FJ766827, FJ766826, FJ766825.	FJ784383, FJ784401, FJ784446, FJ784465, FJ784514, FJ784532, FJ784534, FJ784544.
<i>Diasporus aff. quidditus</i>	FJ766810, FJ766809.	FJ784369, FJ784390.
<i>Gastrotheca cornuta</i>	FJ766706, FJ766705, FJ766704.	FJ784373, FJ784477, FJ784528.
<i>Hemiphractus fasciatus</i>	FJ766707.	FJ784476.
<i>Agalychnis callidryas</i>	FJ766570, FJ766568, FJ766567, FJ766566.	FJ784436, FJ784592, FJ784603, FJ784608.
<i>Cruziohyla calcarifer A</i>	FJ766571.	FJ784368.
<i>Cruziohyla calcarifer B</i>	FJ766565, FJ766564.	FJ784374, FJ784495.
<i>Ecnomiohyla miliaria</i>	FJ766699.	FJ784360.
<i>Hylomantis lemur</i>	FJ766721, FJ766720, FJ766719.	FJ784355, FJ784440, FJ784445
<i>Hyloscirtus colymba</i>	FJ766731, FJ766730, FJ766729, FJ766728, FJ766727, FJ766726,	FJ784381, FJ784500, FJ784540, FJ784554, FJ784566, FJ784571,

Supplementary table 1 (continued)

Species	GenBank Accession Number COI	GenBank Accession Number 16S
<i>Hyloscirtus palmeri</i>	FJ766725, FJ766724, FJ766723, FJ766722. FJ766738, FJ766737, FJ766736, FJ766735, FJ766734, FJ766733, FJ766732.	FJ784575, FJ784576, FJ784585, FJ784607. FJ784457, FJ784493, FJ784503, FJ784568, FJ784573, FJ784577, FJ784596.
<i>Hypsiboas rufitelus</i>	FJ766740, FJ766739.	FJ784372, FJ784486.
<i>Smilisca phaeota</i>	FJ766835, FJ766834.	FJ784413, FJ784433.
<i>Smilisca sila</i>	FJ766837, FJ766836, FJ766838.	FJ784578, FJ784579, FJ784320.
<i>Engystomops pustulosus</i>	FJ766703, FJ766702, FJ766701, FJ766700.	FJ784414, FJ784415, FJ784434, FJ784435
<i>Leptodactylus fragilis</i>	FJ766745, FJ766744, FJ766743, FJ766742, FJ766741.	FJ784331, FJ784416, FJ784437, FJ784453, FJ784497.
<i>Leptodactylus insularum</i>	FJ766746.	FJ784467.
<i>Leptodactylus poecilochilus</i>	FJ766747.	FJ784321.
<i>Leptodactylus savagei</i>	FJ766748.	FJ784394.
<i>Elachistocleis ovalis</i>	FJ766754, FJ766753.	FJ784469, FJ784470.
<i>Nelsonophryne aterrima</i>	FJ766759, FJ766758, FJ766757, FJ766756, FJ766755.	FJ784519, FJ784547, FJ784567, FJ784569, FJ784570.
<i>Bolitoglossa colonnea</i>	FJ766578.	FJ784318.
<i>Bolitoglossa schizodactyla</i>	FJ766579.	FJ784482.
<i>Oedipina parvipes</i>	FJ766760.	FJ784316.
<i>Lithobates warszewitschii</i>	FJ766752, FJ766751, FJ766750.	FJ784454, FJ784552, FJ784558.
<i>Lithobates</i> aff. <i>warszewitschii</i>	FJ766749.	FJ784384.
<i>Pristimantis caryophyllaceus</i> A	FJ766771, FJ766770, FJ766774, FJ766773.	FJ784397, FJ784589, FJ784421, FJ784422.
<i>Pristimantis caryophyllaceus</i> B	FJ766775.	FJ784491.
<i>Pristimantis caryophyllaceus</i> C	FJ766776, FJ766772.	FJ784473, FJ784375.
<i>Pristimantis cerasinus</i>	FJ766786, FJ766785.	FJ784387, FJ784391
<i>Pristimantis cruentus</i>	FJ766787, FJ766784, FJ766783, FJ766782, FJ766781, FJ766780, FJ766779, FJ766778, FJ766777.	FJ784380, FJ784502, FJ784520, FJ784525, FJ784531, FJ784535, FJ784538, FJ784548, FJ784557.
<i>Pristimantis gaigeae</i>	FJ766792, FJ766791, FJ766790, FJ766789, FJ766788.	FJ784385, FJ784412, FJ784461, FJ784487, FJ784490.
<i>Pristimantis museosus</i>	FJ766798, FJ766795, FJ766793	FJ784340, FJ784430, FJ784559.
<i>Pristimantis</i> aff. <i>museosus</i>	FJ766796, FJ766799, FJ766797.	FJ784409, FJ784334, FJ784354.
<i>Pristimantis pardalis</i>	FJ766804, FJ766803, FJ766802, FJ766801, FJ766800.	FJ784336, FJ784365, FJ784386, FJ784406, FJ784590.
<i>Pristimantis ridens</i> A	FJ766808, FJ766807.	FJ784388, FJ784389.
<i>Pristimantis ridens</i> B	FJ766806, FJ766805.	FJ784398, FJ784399.
<i>Strabomantis bufoniformis</i>	FJ766635, FJ766634, FJ766633, FJ766632.	FJ784410, FJ784451, FJ784522, FJ784565.

**Supplementary table 2.** Museum numbers, GenBank accession numbers and species names of samples from the Panama dataset that were not used in the SAP analysis because the program crashed when these sequences were included

Museum number of specimens not used in SAP analysis	GenBank Accession number for COI sequence	GenBank Accession number for 16S sequence	Species according to Crawford et al., 2010
USNM 572195	FJ766593	FJ784362	<i>Espadarana prosoblepon</i>
USNM 572158	FJ766603	FJ784396	<i>Cochranella euknemos</i>
USNM 572086	FJ766767	FJ784382	<i>Incilius coniferus</i>
USNM 572166	FJ766604	FJ784455	<i>Cochranella granulosa</i>
USNM 572134	FJ766718	FJ784480	<i>Hyalinobatrachium talamancae</i>
USNM 572092	FJ766765	FJ784586	<i>Incilius coniferus</i>
No voucher	FJ766732	FJ784597	<i>Incilius coniferus</i>
USNM 572169	FJ766608	FJ784330	<i>Teratohyla spinosa</i>
USNM 572170	FJ766607	FJ784348	<i>Teratohyla spinosa</i>
MVUP 1806	FJ766606	FJ784361	<i>Teratohyla spinosa</i>
USNM 572618	FJ766731	FJ784381	<i>Hyloscirtus colymba</i>

**Supplementary table 3.** Species assignment results obtained with the FuzzyID method for the Panama dataset

	Query			FMF value
	Number	Species	Species assigned	
Singleton with indication of bad assignment	AJC 1938	<i>Ranitomeya minuta</i>	<i>Oophaga vicentei</i>	0
	KRL 0118	<i>Leptodactylus poecilochilus</i>	<i>Leptodactylus fragilis</i>	0
	KRL 0758	<i>Ecnomiohyla miliaria</i>	<i>Oophaga vicentei</i>	0
	KRL 0797	<i>Caecilia volcani</i>	<i>Oophaga vicentei</i>	0
	KRL 0838	<i>Leptodactylus pentadactylus</i>	<i>Leptodactylus bolivianus</i>	0
	KRL 1162	<i>Hemiphractus fasciatus</i>	<i>Oophaga vicentei</i>	0
	KRL 1210	<i>Pristimantis caryophyllaceus B</i>	<i>Pristimantis caryophyllaceus C</i>	0
	KRL 1735	<i>Phyllobates lugubris</i>	<i>Oophaga vicentei</i>	0
	KRL 0744	<i>Rhinella marina</i>	<i>Incilius coniferus</i>	0.01
	KRL 1011	<i>Cochranella granulosa</i>	<i>Cochranella euknemos</i>	0.09
Singletons assigned with intermediate probabilities	GB KRL 0789	<i>Oophaga vicentei</i>	<i>Dendrobates auratus</i>	0.13
	KRL 0781	<i>Agalychnis calcarifer A</i>	<i>Agalychnis calcarifer</i>	0.43
	KRL 0823	<i>Lithobates warszewitschii</i>	<i>Lithobates warszewitschii</i>	0.45
	KRL 1179	<i>Bolitoglossa schizodactyla</i>	<i>Bolitoglossa colonnea</i>	0.57
Successful assignment with threshold >0.90	CH 6526	<i>Bolitoglossa colonnea</i>	<i>Bolitoglossa schizodactyla</i>	0.6
	KRL 0129	<i>Craugastor crassidigitus</i>	<i>Craugastor crassidigitus</i>	0.94
	KRL 0734	<i>Silverstoneia flotator</i>	<i>Silverstoneia flotator</i>	0.98
	KRL 0915	<i>Engystomops pustulosus</i>	<i>Engystomops pustulosus</i>	0.99
	AJC 1999	<i>Dendrobates auratus</i>	<i>Dendrobates auratus</i>	1
	CH 6605	<i>Dendrobates auratus</i>	<i>Dendrobates auratus</i>	1
	FROG 1000	<i>Smilisca sila</i>	<i>Smilisca sila</i>	1
	KRL 0630	<i>Craugastor aff. azueroensis</i>	<i>Craugastor aff. azueroensis</i>	1
	KRL 0664	<i>Craugastor crassidigitus</i>	<i>Craugastor crassidigitus</i>	1
	KRL 0665	<i>Craugastor crassidigitus</i>	<i>Craugastor crassidigitus</i>	1
	KRL 0675	<i>Craugastor crassidigitus</i>	<i>Craugastor crassidigitus</i>	1
	KRL 0677	<i>Cochranella spinosa</i>	<i>Cochranella spinosa</i>	1
	KRL 0678	<i>Leptodactylus fragilis</i>	<i>Leptodactylus fragilis</i>	1
	KRL 0680	<i>Craugastor aff. azueroensis</i>	<i>Craugastor aff. azueroensis</i>	1
	KRL 0682	<i>Craugastor punctariolus</i>	<i>Craugastor punctariolus</i>	1
	KRL 0683	<i>Pristimantis museosus A</i>	<i>Pristimantis museosus A</i>	1
	KRL 0690	<i>Pristimantis pardalis</i>	<i>Pristimantis pardalis</i>	1
	KRL 0693	<i>Craugastor fitzingeri</i>	<i>Craugastor fitzingeri</i>	1
	KRL 0696	<i>Craugastor bransfordii</i>	<i>Craugastor bransfordii</i>	1
	KRL 0701	<i>Craugastor gollmeri</i>	<i>Craugastor gollmeri</i>	1
	KRL 0706	<i>Craugastor tabasarae</i>	<i>Craugastor tabasarae</i>	1
	KRL 0708	<i>Craugastor sp. nov.</i>	<i>Craugastor sp. nov.</i>	1
	KRL 0726	<i>Hyalinobatrachium colymbiphyllum</i>	<i>Hyalinobatrachium colymbiphyllum</i>	1
	KRL 0727	<i>Hyalinobatrachium colymbiphyllum</i>	<i>Hyalinobatrachium colymbiphyllum</i>	1
	KRL 0728	<i>Craugastor megacephalus</i>	<i>Craugastor megacephalus</i>	1
	KRL 0730	<i>Craugastor sp. nov.</i>	<i>Craugastor sp. nov.</i>	1
	KRL 0732	<i>Colostethus pratti</i>	<i>Colostethus pratti</i>	1
	KRL 0737	<i>Craugastor gollmeri</i>	<i>Craugastor gollmeri</i>	1
	KRL 0739	<i>Pristimantis museosus A</i>	<i>Pristimantis museosus A</i>	1
	KRL 0742	<i>Hylomantis lemur</i>	<i>Hylomantis lemur</i>	1
KRL 0743	<i>Craugastor fitzingeri</i>	<i>Craugastor fitzingeri</i>	1	
KRL 0751	<i>Craugastor bransfordii</i>	<i>Craugastor bransfordii</i>	1	

Supplementary table 3 (continued)

Query			FMF value
Number	Species	Species assigned	
KRL 0761	<i>Centrolene prosoblepon</i>	<i>Centrolene prosoblepon</i>	1
KRL 0764	<i>Craugastor gollmeri</i>	<i>Craugastor gollmeri</i>	1
KRL 0765	<i>Pristimantis pardalis</i>	<i>Pristimantis pardalis</i>	1
KRL 0769	<i>Hyalinobatrachium colymbiophyllum</i>	<i>Hyalinobatrachium colymbiophyllum</i>	1
KRL 0780	<i>Craugastor noblei</i>	<i>Craugastor noblei</i>	1
KRL 0782	<i>Diasporus</i> aff. <i>diastema</i>	<i>Diasporus</i> aff. <i>diastema</i>	1
KRL 0796	<i>Colosthetus</i> aff. <i>pratti</i>	<i>Colosthetus</i> aff. <i>pratti</i>	1
KRL 0798	<i>Hypsiboas rufitelus</i>	<i>Hypsiboas rufitelus</i>	1
KRL 0799	<i>Gastrotheca cornuta</i>	<i>Gastrotheca cornuta</i>	1
KRL 0801	<i>Pristimantis caryophyllaceus</i> C	<i>Pristimantis caryophyllaceus</i> C	1
KRL 0802	<i>Craugastor bransfordii</i>	<i>Craugastor bransfordii</i>	1
KRL 0805	<i>Craugastor megacephalus</i>	<i>Craugastor megacephalus</i>	1
KRL 0809	<i>Incilius coniferus</i>	<i>Incilius coniferus</i>	1
KRL 0812	<i>Hyloscirtus colymba</i>	<i>Hyloscirtus colymba</i>	1
KRL 0820	<i>Incilius coniferus</i>	<i>Incilius coniferus</i>	1
KRL 0822	<i>Silverstoneia nubicola</i>	<i>Silverstoneia nubicola</i>	1
KRL 0828	<i>Pristimantis cruentus</i> A	<i>Pristimantis cruentus</i> A	1
KRL 0830	<i>Pristimantis ridens</i> B	<i>Pristimantis ridens</i> B	1
KRL 0831	<i>Diasporus</i> aff. <i>diastema</i>	<i>Diasporus</i> aff. <i>diastema</i>	1
KRL 0832	<i>Pristimantis cruentus</i> A	<i>Pristimantis cruentus</i> A	1
KRL 0835	<i>Craugastor</i> aff. <i>azueroensis</i>	<i>Craugastor</i> aff. <i>azueroensis</i>	1
KRL 0845	<i>Pristimantis ridens</i> A	<i>Pristimantis ridens</i> A	1
KRL 0846	<i>Pristimantis ridens</i> A	<i>Pristimantis ridens</i> A	1
KRL 0847	<i>Silverstoneia flotator</i>	<i>Silverstoneia flotator</i>	1
KRL 0848	<i>Silverstoneia nubicola</i>	<i>Silverstoneia nubicola</i>	1
KRL 0852	<i>Hyalinobatrachium colymbiophyllum</i>	<i>Hyalinobatrachium colymbiophyllum</i>	1
KRL 0857	<i>Pristimantis pardalis</i>	<i>Pristimantis pardalis</i>	1
KRL 0858	<i>Craugastor crassidigitus</i>	<i>Craugastor crassidigitus</i>	1
KRL 0860	<i>Craugastor gollmeri</i>	<i>Craugastor gollmeri</i>	1
KRL 0861	<i>Pristimantis museosus</i> A	<i>Pristimantis museosus</i> A	1
KRL 0862	<i>Strabomantis bufoniformis</i>	<i>Strabomantis bufoniformis</i>	1
KRL 0863	<i>Craugastor punctariolus</i>	<i>Craugastor punctariolus</i>	1
KRL 0864	<i>Pristimantis gaigei</i>	<i>Pristimantis gaigei</i>	1
KRL 0865	<i>Smilisca phaeota</i>	<i>Smilisca phaeota</i>	1
KRL 0868	<i>Engystomops pustulosus</i>	<i>Engystomops pustulosus</i>	1
KRL 0869	<i>Leptodactylus fragilis</i>	<i>Leptodactylus fragilis</i>	1
KRL 0870	<i>Craugastor punctariolus</i>	<i>Craugastor punctariolus</i>	1
KRL 0872	<i>Craugastor punctariolus</i>	<i>Craugastor punctariolus</i>	1
KRL 0875	<i>Centrolene prosoblepon</i>	<i>Centrolene prosoblepon</i>	1
KRL 0897	<i>Silverstoneia nubicola</i> A	<i>Silverstoneia nubicola</i> A	1
KRL 0898	<i>Pristimantis caryophyllaceus</i> A	<i>Pristimantis caryophyllaceus</i> A	1
KRL 0903	<i>Rhaebo haematiticus</i>	<i>Rhaebo haematiticus</i>	1
KRL 0904	<i>Craugastor bransfordii</i>	<i>Craugastor bransfordii</i>	1
KRL 0905	<i>Colosthetus</i> aff. <i>pratti</i>	<i>Colosthetus</i> aff. <i>pratti</i>	1
KRL 0906	<i>Colostethus pratti</i>	<i>Colostethus pratti</i>	1
KRL 0909	<i>Pristimantis museosus</i>	<i>Pristimantis museosus</i>	1

Supplementary table 3 (continued)

Query				FMF value
Number	Species	Species assigned		
KRL 0911	<i>Craugastor megacephalus</i>	<i>Craugastor megacephalus</i>		1
KRL 0912	<i>Craugastor gollmeri</i>	<i>Craugastor gollmeri</i>		1
KRL 0914	<i>Smilisca phaeota</i>	<i>Smilisca phaeota</i>		1
KRL 0916	<i>Engystomops pustulosus</i>	<i>Engystomops pustulosus</i>		1
KRL 0917	<i>Agalychnis callidryas</i>	<i>Agalychnis callidryas</i>		1
KRL 0918	<i>Leptodactylus fragilis</i>	<i>Leptodactylus fragilis</i>		1
KRL 0919	<i>Colostethus pratti</i>	<i>Colostethus pratti</i>		1
KRL 0926	<i>Rhaebo haematiticus</i>	<i>Rhaebo haematiticus</i>		1
KRL 0928	<i>Hylomantis lemur</i>	<i>Hylomantis lemur</i>		1
KRL 0929	<i>Cochranella albomaculata</i>	<i>Cochranella albomaculata</i>		1
KRL 0930	<i>Craugastor gollmeri</i>	<i>Craugastor gollmeri</i>		1
KRL 0937	<i>Cochranella euknemos</i>	<i>Cochranella euknemos</i>		1
KRL 0939	<i>Incilius coniferus</i>	<i>Incilius coniferus</i>		1
KRL 0940	<i>Hylomantis lemur</i>	<i>Hylomantis lemur</i>		1
KRL 0945	<i>Silverstoneia nubicola</i>	<i>Silverstoneia nubicola</i>		1
KRL 0958	<i>Silverstoneia flotator</i>	<i>Silverstoneia flotator</i>		1
KRL 0962	<i>Strabomantis bufoniformis</i>	<i>Strabomantis bufoniformis</i>		1
KRL 0971	<i>Leptodactylus fragilis</i>	<i>Leptodactylus fragilis</i>		1
KRL 1008	<i>Lithobates warszewitschii</i>	<i>Lithobates warszewitschii</i>		1
KRL 1038	<i>Hyloscirtus palmeri</i>	<i>Hyloscirtus palmeri</i>		1
KRL 1054	<i>Cochranella euknemos</i>	<i>Cochranella euknemos</i>		1
KRL 1055	<i>Cochranella euknemos</i>	<i>Cochranella euknemos</i>		1
KRL 1079	<i>Pristimantis gaigei</i>	<i>Pristimantis gaigei</i>		1
KRL 1087	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1094	<i>Colostethus pratti</i>	<i>Colostethus pratti</i>		1
KRL 1095	<i>Silverstoneia nubicola</i>	<i>Silverstoneia nubicola</i>		1
KRL 1135	<i>Cochranella albomaculata</i>	<i>Cochranella albomaculata</i>		1
KRL 1136	<i>Nelsonophyne aterrima</i> A	<i>Nelsonophyne aterrima</i> A		1
KRL 1137	<i>Nelsonophyne aterrima</i> A	<i>Nelsonophyne aterrima</i> A		1
KRL 1140	<i>Hyalinobatrachium colymbiophyllum</i>	<i>Hyalinobatrachium colymbiophyllum</i>		1
KRL 1144	<i>Craugastor megacephalus</i>	<i>Craugastor megacephalus</i>		1
KRL 1151	<i>Pristimantis caryophyllaceus</i> C	<i>Pristimantis caryophyllaceus</i> C		1
KRL 1158	<i>Cochranella albomaculata</i>	<i>Cochranella albomaculata</i>		1
KRL 1159	<i>Hyalinobatrachium colymbiophyllum</i>	<i>Hyalinobatrachium colymbiophyllum</i>		1
KRL 1163	<i>Gastrotheca cornuta</i>	<i>Gastrotheca cornuta</i>		1
KRL 1177	<i>Craugastor bransfordii</i>	<i>Craugastor bransfordii</i>		1
KRL 1180	<i>Craugastor punctariolus</i>	<i>Craugastor punctariolus</i>		1
KRL 1191	<i>Hypsiboas rufitelus</i>	<i>Hypsiboas rufitelus</i>		1
KRL 1196	<i>Pristimantis gaigei</i>	<i>Pristimantis gaigei</i>		1
KRL 1198	<i>Craugastor punctariolus</i>	<i>Craugastor punctariolus</i>		1
KRL 1200	<i>Craugastor gollmeri</i>	<i>Craugastor gollmeri</i>		1
KRL 1202	<i>Pristimantis gaigei</i>	<i>Pristimantis gaigei</i>		1
KRL 1214	<i>Craugastor gollmeri</i>	<i>Craugastor gollmeri</i>		1
KRL 1216	<i>Hyloscirtus palmeri</i>	<i>Hyloscirtus palmeri</i>		1
KRL 1217	<i>Colostethus pratti</i>	<i>Colostethus pratti</i>		1
KRL 1218	<i>Agalychnis calcarifer</i>	<i>Agalychnis calcarifer</i>		1



Supplementary table 3 (continued)

Query				FMF value
Number	Species	Species assigned		
KRL 1244	<i>Craugastor bransfordii</i>	<i>Craugastor bransfordii</i>		1
KRL 1290	<i>Leptodactylus fragilis</i>	<i>Leptodactylus fragilis</i>		1
KRL 1329	<i>Hyloscirtus colymba</i>	<i>Hyloscirtus colymba</i>		1
KRL 1333	<i>Pristimantis cruentus</i>	<i>Pristimantis cruentus</i>		1
KRL 1339	<i>Colostethus panamensis</i>	<i>Colostethus panamensis</i>		1
KRL 1342	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1344	<i>Colostethus panamensis</i>	<i>Colostethus panamensis</i>		1
KRL 1359	<i>Colostethus panamensis</i>	<i>Colostethus panamensis</i>		1
KRL 1360	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1363	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1373	<i>Craugastor tabasarae</i>	<i>Craugastor tabasarae</i>		1
KRL 1381	<i>Craugastor noblei</i>	<i>Craugastor noblei</i>		1
KRL 1385	<i>Silverstoneia nubicola</i>	<i>Silverstoneia nubicola</i>		1
KRL 1387	<i>Craugastor tabasarae</i>	<i>Craugastor tabasarae</i>		1
KRL 1390	<i>Colostethus panamensis</i>	<i>Colostethus panamensis</i>		1
KRL 1394	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1400	<i>Nelsonophyne aterrima</i>	<i>Nelsonophyne aterrima</i>		1
KRL 1407	<i>Pristimantis cruentus</i>	<i>Pristimantis cruentus</i>		1
KRL 1412	<i>Strabomantis bufoniformis</i>	<i>Strabomantis bufoniformis</i>		1
KRL 1417	<i>Craugastor</i> sp. nov.	<i>Craugastor</i> sp. nov.		1
KRL 1420	<i>Pristimantis cruentus</i>	<i>Pristimantis cruentus</i>		1
KRL 1421	<i>Colostethus panamensis</i>	<i>Colostethus panamensis</i>		1
KRL 1424	<i>Hyalinobatrachium colymbiphylum</i>	<i>Hyalinobatrachium colymbiphylum</i>		1
KRL 1429	<i>Gastrotheca cornuta</i>	<i>Gastrotheca cornuta</i>		1
KRL 1433	<i>Colostethus panamensis</i>	<i>Colostethus panamensis</i>		1
KRL 1454	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1455	<i>Pristimantis cruentus</i>	<i>Pristimantis cruentus</i>		1
KRL 1457	<i>Silverstoneia nubicola</i>	<i>Silverstoneia nubicola</i>		1
KRL 1458	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1460	<i>Silverstoneia nubicola</i>	<i>Silverstoneia nubicola</i>		1
KRL 1462	<i>Pristimantis cruentus</i>	<i>Pristimantis cruentus</i>		1
KRL 1463	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1474	<i>Pristimantis cruentus</i>	<i>Pristimantis cruentus</i>		1
KRL 1518	<i>Hyloscirtus colymba</i>	<i>Hyloscirtus colymba</i>		1
KRL 1519	<i>Atelopus zeteki</i>	<i>Atelopus zeteki</i>		1
KRL 1520	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1523	<i>Silverstoneia nubicola</i>	<i>Silverstoneia nubicola</i>		1
KRL 1525	<i>Atelopus zeteki</i>	<i>Atelopus zeteki</i>		1
KRL 1526	<i>Rhaebo haematiticus</i>	<i>Rhaebo haematiticus</i>		1
KRL 1528	<i>Pristimantis cruentus</i>	<i>Pristimantis cruentus</i>		1
KRL 1529	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>		1
KRL 1530	<i>Cochranella albomaculata</i>	<i>Cochranella albomaculata</i>		1
KRL 1539	<i>Atelopus zeteki</i>	<i>Atelopus zeteki</i>		1
KRL 1540	<i>Lithobates warszewitschii</i>	<i>Lithobates warszewitschii</i>		1
KRL 1542	<i>Atelopus zeteki</i>	<i>Atelopus zeteki</i>		1
KRL 1544	<i>Hyloscirtus colymba</i>	<i>Hyloscirtus colymba</i>		1

Supplementary table 3 (continued)

	Query		Species assigned	FMF value
	Number	Species		
	KRL 1549	<i>Craugastor sp. nov.</i>	<i>Craugastor sp. nov.</i>	1
	KRL 1550	<i>Pristimantis cruentus</i>	<i>Pristimantis cruentus</i>	1
	KRL 1553	<i>Lithobates warszewitschii</i>	<i>Lithobates warszewitschii</i>	1
	KRL 1554	<i>Pristimantis museosus</i>	<i>Pristimantis museosus</i>	1
	KRL 1555	<i>Rhaebo haematiticus</i>	<i>Rhaebo haematiticus</i>	1
	KRL 1556	<i>Hyalinobatrachium colymbiophyllum</i>	<i>Hyalinobatrachium colymbiophyllum</i>	1
	KRL 1557	<i>Hyalinobatrachium colymbiophyllum</i>	<i>Hyalinobatrachium colymbiophyllum</i>	1
	KRL 1561	<i>Silverstoneia nubicola</i> A	<i>Silverstoneia nubicola</i> A	1
	KRL 1562	<i>Strabomantis bufoniformis</i>	<i>Strabomantis bufoniformis</i>	1
	KRL 1565	<i>Hyloscirtus colymba</i>	<i>Hyloscirtus colymba</i>	1
	KRL 1590	<i>Nelsonophyne aterrima</i>	<i>Nelsonophyne aterrima</i>	1
	KRL 1597	<i>Nelsonophyne aterrima</i>	<i>Nelsonophyne aterrima</i>	1
	KRL 1598	<i>Nelsonophyne aterrima</i>	<i>Nelsonophyne aterrima</i>	1
	KRL 1624	<i>Craugastor talamancae</i>	<i>Craugastor talamancae</i>	1
	KRL 1626	<i>Hyloscirtus palmeri</i>	<i>Hyloscirtus palmeri</i>	1
	KRL 1630	<i>Hyloscirtus colymba</i>	<i>Hyloscirtus colymba</i>	1
	KRL 1631	<i>Hyloscirtus colymba</i>	<i>Hyloscirtus colymba</i>	1
	KRL 1641	<i>Smilisca sila</i>	<i>Smilisca sila</i>	1
	KRL 1642	<i>Smilisca sila</i>	<i>Smilisca sila</i>	1
	KRL 1701	<i>Centrolene ilex</i>	<i>Centrolene ilex</i>	1
	KRL 1711	<i>Atelopus zeteki</i>	<i>Atelopus zeteki</i>	1
	KRL 1712	<i>Centrolene ilex</i>	<i>Centrolene ilex</i>	1
	KRL 1714	<i>Centrolene ilex</i>	<i>Centrolene ilex</i>	1
	KRL 1720	<i>Centrolene ilex</i>	<i>Centrolene ilex</i>	1
	KRL 1723	<i>Hyloscirtus colymba</i>	<i>Hyloscirtus colymba</i>	1
	KRL 1728	<i>Incilius coniferus</i>	<i>Incilius coniferus</i>	1
	KRL 1736	<i>Centrolene ilex</i>	<i>Centrolene ilex</i>	1
	KRL 1744	<i>Pristimantis caryophyllaceus</i> A	<i>Pristimantis caryophyllaceus</i> A	1
	KRL 1745	<i>Pristimantis pardalis</i>	<i>Pristimantis pardalis</i>	1
	TOE 10	<i>Centrolene ilex</i>	<i>Centrolene ilex</i>	1
	TOE 11	<i>Agalychnis callidryas</i>	<i>Agalychnis callidryas</i>	1
	TOE 140	<i>Incilius coniferus</i>	<i>Incilius coniferus</i>	1
	TOE 141 a	<i>Incilius coniferus</i>	<i>Incilius coniferus</i>	1
	TOE 144	<i>Incilius coniferus</i>	<i>Incilius coniferus</i>	1
	TOE 151	<i>Incilius coniferus</i>	<i>Incilius coniferus</i>	1
	TOE 2	<i>Agalychnis callidryas</i>	<i>Agalychnis callidryas</i>	1
	TOE 2253	<i>Centrolene prosoblepon</i>	<i>Centrolene prosoblepon</i>	1
	TOE 2301	<i>Centrolene prosoblepon</i>	<i>Centrolene prosoblepon</i>	1
	TOE 3	<i>Hyloscirtus colymba</i>	<i>Hyloscirtus colymba</i>	1
	TOE 4	<i>Agalychnis callidryas</i>	<i>Agalychnis callidryas</i>	1

The table includes field collection number and *a priori* species name for query sequences and the species name assigned along with the FMF value of each assignment. Specimens were considered as assigned to a species with a FMF threshold of >0.90

**Supplementary table 4.** Species assignment results obtained with the FuzzyID method applied to the Malagasy dataset

	Query			FMF value
	Number	Species	Species assigned	
Singleton with indication of a bad assignment	voucher 2002-546	<i>Mantidactylus ulcerosus</i>	<i>Ptychadena mascareniensis</i>	0
	voucher 2002-1416	<i>Mantidactylus femoralis</i>	<i>Boophis goudotii</i>	0
	voucher FGMV 2002.479	<i>Boophis rappiodes</i>	<i>Boophis erythrodactylus</i>	0
	voucher ZCMV 347	<i>Boophis periegetes</i>	<i>Boophis goudotii</i>	0
	voucher 2002-54	<i>Boophis microtyimpanum</i>	<i>Boophis goudotii</i>	0
	voucher FGMV 2001A33	<i>Boophis mandraka</i>	<i>Boophis goudotii</i>	0
	voucher FGMV 2000A9 *	<i>Boophis guibei</i>	<i>Mantidactylus liber</i>	0
	voucher FGZC 92 *	<i>Boophis doulioti</i>	<i>Aglyptodactylus madagascariensis</i>	0
	voucher ZCMV 207	<i>Boophis tasymena</i>	<i>Boophis erythrodactylus</i>	0.03
	voucher FGMV 2001.1273	<i>Boophis sibilans</i>	<i>Boophis aff. sibilans</i>	0.04
	voucher FGMV 2001A4	<i>Boophis erythrodactylus</i>	<i>Boophis tasymena</i>	0.05
	MV-2005 voucher ZCMV 595	<i>Boophis aff. sibilans</i>	<i>Boophis sibilans</i>	0.11
	voucher ZCMV 63	<i>Mantidactylus depressiceps</i>	<i>Mantidactylus tornieri</i>	0.66
	voucher ZCMV 266	<i>Mantidactylus domerguei</i>	<i>Mantidactylus blommersae</i>	0.12
Non-singletons with uncertain assignment	voucher 2002-42	<i>Mantidactylus brevipalmatus</i>	<i>Boophis goudotii</i>	0
	voucher 2002-39	<i>Mantidactylus brevipalmatus</i>	<i>Boophis goudotii</i>	0
	voucher 2002-208	<i>Mantidactylus asper</i>	<i>Boophis goudotii</i>	0
	voucher 2002-10	<i>Mantidactylus asper</i>	<i>Boophis goudotii</i>	0
	voucher 2002-925	<i>Boophis blommersae</i>	<i>Boophis goudotii</i>	0
	voucher ZCMV 61	<i>Mantidactylus tornieri</i>	<i>Mantidactylus tornieri</i>	0.07
	voucher 2002-45	<i>Boophis goudotii</i>	<i>Mantidactylus femoralis</i>	0.28
	voucher ZCMV 780	<i>Mantidactylus tornieri</i>	<i>Mantidactylus tornieri</i>	0.29
	voucher FGMV 2001A24	<i>Boophis luteus</i>	<i>Boophis luteus</i>	0.39
	voucher ZCMV 351	<i>Boophis luteus</i>	<i>Boophis luteus</i>	0.43
	voucher ZCMV 180	<i>Mantidactylus liber</i>	<i>Mantidactylus liber</i>	0.44
	voucher ZCMV 786	<i>Mantidactylus liber</i>	<i>Mantidactylus liber</i>	0.45
	voucher FGZC 2716	<i>Boophis septentrionalis</i>	<i>Boophis septentrionalis</i>	0.5
	voucher FGZC 444	<i>Boophis septentrionalis</i>	<i>Boophis septentrionalis</i>	0.57
	voucher ZCMV 769	<i>Boophis goudotii</i>	<i>Boophis periegetes</i>	0.69
	voucher FGZC 184	<i>Mantidactylus melanopleura</i>	<i>Mantidactylus melanopleura</i>	0.83
	voucher 2002-136	<i>Ptychadena mascareniensis</i>	<i>Ptychadena mascareniensis</i>	0.84
	voucher FGMV 2001.1157	<i>Mantidactylus redimitus</i>	<i>Mantidactylus redimitus</i>	0.84
	voucher 2002-88	<i>Ptychadena mascareniensis</i>	<i>Ptychadena mascareniensis</i>	0.85
	voucher ZCMV 72	<i>Mantidactylus redimitus</i>	<i>Mantidactylus redimitus</i>	0.85
Successful assignment with threshold 0.90	voucher 2002-494	<i>Mantidactylus tschenki</i>	<i>Mantidactylus tschenki</i>	0.92
	voucher 2002-201	<i>Mantidactylus tschenki</i>	<i>Mantidactylus tschenki</i>	0.92
	voucher 2001-E52	<i>Boophis blommersae</i>	<i>Mantidactylus tschenki</i>	0.94
	voucher 2002-47	<i>Boophis goudotii</i>	<i>Boophis microtyimpanum</i>	0.95
	voucher ZCMV 771	<i>Aglyptodactylus madagascariensis</i>	<i>Aglyptodactylus madagascariensis</i>	1
	voucher ZCMV 772	<i>Aglyptodactylus madagascariensis</i>	<i>Aglyptodactylus madagascariensis</i>	1
	voucher ZCMV 670	<i>Mantidactylus blommersae</i>	<i>Mantidactylus blommersae</i>	1
	voucher ZCMV 669	<i>Mantidactylus blommersae</i>	<i>Mantidactylus blommersae</i>	1
	voucher ZCMV 30	<i>Mantidactylus blommersae</i>	<i>Mantidactylus blommersae</i>	1
	voucher ZCMV 31	<i>Mantidactylus blommersae</i>	<i>Mantidactylus blommersae</i>	1
	voucher FGMV 2001.1098	<i>Mantidactylus blommersae</i>	<i>Mantidactylus blommersae</i>	1
voucher FGMV 2001.1097	<i>Mantidactylus blommersae</i>	<i>Mantidactylus blommersae</i>	1	

**Supplementary table 4** (continued)

Query		Species assigned	FMF value
Number	Species		
voucher FGMV 2001.1099	<i>Mantidactylus blommersae</i>	<i>Mantidactylus blommersae</i>	1
voucher FGMV 2001.1096	<i>Mantidactylus blommersae</i>	<i>Mantidactylus blommersae</i>	1
voucher ZCMV 526	<i>Mantidactylus melanopleura</i>	<i>Mantidactylus melanopleura</i>	1
voucher FGMV 2001.1276	<i>Mantidactylus melanopleura</i>	<i>Mantidactylus melanopleura</i>	1
voucher ZCMV 34	<i>Mantidactylus enki</i>	<i>Mantidactylus enki</i>	1
voucher ZCMV 33	<i>Mantidactylus enki</i>	<i>Mantidactylus enki</i>	1

The table includes collection number and *a priori* species name for query sequences and the species name assigned along with the FMF value of each assignment. Specimens were considered as assigned to a species with a FMF threshold of >0.90