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A molecular survey across Madagascar does not yield positive records of the amphibian chytrid fungus *Batrachochytrium dendrobatidis*

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Abstract. Madagascar harbors a rich and diverse amphibian fauna, with over 280 nominal species of native frogs, all of which are endemic to the island. Although many species are threatened predominantly by habitat destruction, so far this fauna has not experienced any enigmatic declines as amphibians have in other parts of the globe. The amphibian chytrid fungus *Batrachochytrium dendrobatidis* (*Bd*), associated with mass amphibian die offs in Europe, the Americas and Australia has so far not been detected in Madagascar, but surveys so far were based mainly on histological examination of frog samples, with molecular data from only a single site. Here, we present results from a molecular screening of altogether 300 frog specimens belonging to 53 species in 13 genera, from 12 sites throughout Madagascar spanning all of Madagascar's major bioclimatic regions and an array of different elevations from 20 to 2400 m above sea level. All samples were analyzed using a standard quantitative real time polymerase chain reaction (qPCR) assay and yielded only negative results, suggesting the widespread absence or very localized and low prevalence of the amphibian chytrid fungus across Madagascar during the sampling years 2006 and 2007.

Keywords. Madagascar, *Batrachochytrium dendrobatidis*, Amphibia, Anura, Mantellidae, Microhylidae, Hyperoliidae, Ptychadenidae, conservation.

Introduction

An increasingly important conservation issue for amphibians is the role of infectious diseases in population declines. One particular emerging infectious disease, chytridiomycosis, caused by the amphibian chytrid fungus, *Batrachochytrium dendrobatidis* (*Bd*), is frequently mentioned in the context of amphibian conservation (Woodhams et al., 2011; Garner et al., 2012). Truly remarkable among wildlife diseases is that *Bd* has been recorded in more than 350 amphibian species and has been identified as the cause of decline in at least 200 of these (Skerratt et al., 2007). Global surveillance of *Bd* is established by the *Bd* Global Mapping Project which through an online system (http://www.spatialepidemiology.net/*Bd*-maps/) provides a portal where presence/absence data can be updated in real time. According to a snapshot of these data in 2009, infection was found in 45 of 78 countries sampled on all continents hospitable to amphibians, with *Bd* detected in 50% of species (Fisher et al., 2009). As of October 2012, the online database contains positive *Bd* records from 52 out of 86 countries surveyed, and from 516 out of 1240 species surveyed (http://www.bd-maps.net, accessed on 6 October 2012). Although broadly distributed, the current known distribution of the *Bd* is not global, with some continents with continuous presence (Americas, Australia), patchy in parts of Africa and Europe, but with surprisingly low prevalence in Asia (Swei et al., 2011). The global distribution pattern of the disease is far from being clarified, resulting either from a lack of surveillance or absence data from disease surveys.

Chytridiomycosis has variable impacts on different species and populations, which makes it unpredictable and a high-risk disease to amphibian conservation. While some species are unaffected by *Bd* infection (Daszak et al., 2004; Woodhams et al., 2008) others experience a relatively slow population decline (Longo and Burrowes 2010), or rapid population decline with severe, high levels of infection (Lips et al., 2006;

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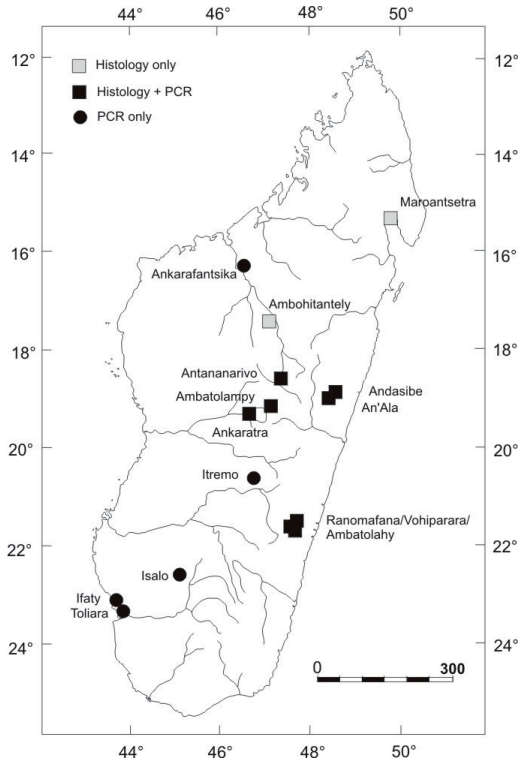

Figure 1. Map of Madagascar showing approximate location of sites that have been sampled for *Bd* screening. Histological data were published in Weldon et al. (2008); molecular data are those reported herein and in Crottini et al. (2011) for the locality Itremo. PCR refers to qPCR *Bd* assays.

Vredenburg et al., 2010). This variation in disease outcome has been attributed to the context-dependent nature of susceptibility to disease (Walker et al., 2010), although different isolates/lineages of *Bd* have been shown to have different virulence (Fisher et al., 2009), and a recent population genomic analyses of *Bd* identified a recombinant widespread hypervirulent lineage that seems to be the one causing declines worldwide (Farrer et al., 2011).

The island of Madagascar is one of the regions that is regarded *Bd* negative following disease surveillance at various sites (Weldon et al., 2008, Crottini et al., 2011). Madagascar harbors a rich amphibian fauna of currently about 285 nominal species (AmphibiaWeb, 2012) and around 150 undescribed species (Vieites et al., 2009). Paradoxically, despite this large amount of undescribed diversity, Madagascar‘s amphibians are comparatively well studied. All but one introduced species are endemic to Madagascar and, as many other animal and plant species of the island, a high proportion is microendemic to small ranges (Vences et al., 2009). The highest species diversity occurs in the eastern rainforests, with indications of a latitudinal and altitudinal mid-domain effect (Colwell & Lees, 2000), and for some groups, the highest degree of local endemism is centred in the northern and southern mountain massifs characterized by a high elevational heterogeneity on a small spatial scale (Wollenberg et al., 2008). Several of Madagascar‘s amphibians are bright-coloured and spectacular animals and have the potential to attract ecotourists and thus to sustainably valorize Madagascar‘s natural resources (Wollenberg et al., 2011).

Given the overall high proportion of endemic species coupled with high rates of deforestation, Madagascar has been identified as one of the most important global hotspots for biodiversity conservation (Myers et al., 2000). Its amphibian fauna, however, has not yet experienced dramatic declines. Of 238 species assessed, 66 were identified as threatened according to categories of the International Union for Conservation of Nature (IUCN 2001): 6 Critically Endangered, 31 Endangered, and 29 Vulnerable (Andreone et al., 2005, 2008b). Threats were mainly caused by habitat destruction and partly by excessive collection of specimens for the pet trade, but in general, all species maintained healthy and dense populations. In fact, all nominal species of Malagasy amphibians have been confirmed in the wild during the last 10-12 years, and most of them during the last 6 years, with the exception of some rare local endemisms in remote areas, such as *Madecassophryne truebae* in the Anosy mountains. Furthermore, in many rainforest sites of Madagascar, not only is species diversity high, with sometimes over 100 species per site (Glaw & Vences, 2007; Vieites et al., 2009), but the density of individuals is also remarkably high (Andreone et al., 2008a). This suggests the presence of a pre-decline fauna which may be yet untouched by recent events of emergent disease outbreak, and encourages implementation of a proactive amphibian conservation policy (Andreone 2008; Andreone et al., 2008a). The likely event of *Bd* introduction into Madagascar and subsequent potential for epizootic dieoffs of this unique and megadiverse amphibian community has led to claims for implementing a high degree of biosecurity (Andreone et al., 2008a; Weldon and du Preez, 2008). Consequently a national *Bd* monitoring plan was developed in 2011 for the island to enable early detection of infection (Weldon et al., in review).

Table 1. Localities sampled using the qPCR Bd assay in Madagascar.

Locality	Latitude (decimal)	Longitude (decimal)	Elevation (a.s.l.)	Year	Species sampled	Specimens sampled
Ambatolampy	-21.2439	47.42	1650	2006	2	21
An'Ala	-19.4333	48.2167	800	2006	13	27
Andasibe	-18.9333	48.4167	920	2006	14	25
Ankarafantsika	-16.19107	47.10499	100-170	2007	8	49
Ankaratra	-19.32833	47.26167	2000-2400	2006	8	41
Antananarivo	-18.9167	47.5167	1290	2006	2	4
Ifaty	-23.15	43.6167	20	2007	1	1
Isalo	-22.4212	45.2745	ca. 750	2007	10	39
Ranomafana (Ambatolahy)	-21.2439	47.4262	915	2007	11	24
Ranomafana (Vohiparara)	-21.25833	47.40278	ca. 1000	2006	6	14
Ranomafana (several sites)	-21.26165	47.45952	619	2006	11	23
Toliara	-23.35	43.6667	20	2007	3	32

Chytrid screening in Madagascar is so far largely based on histology (Weldon et al., 2008), with the exception of one PCR-based assay of samples from a single highland locality (Crottini et al., 2011). Based on samples collected in 2006 and 2007 our study provides comprehensive molecular screening using a *Bd* PCR assay on 300 specimens collected at 12 sites covering all of Madagascar‘s main biomes.

Materials and Methods

Frog specimens were collected by hand, mostly at night, and placed in separate, clean plastic bags in order to minimize the risk of potential disease transmission. Between surveys at different locations, all footwear and equipment were thoroughly cleaned and air dried. Dissecting instruments used for sampling amphibians were wiped clean and alcohol flamed between animals. We examined all frogs for any clinical symptoms associated with chytridiomycosis, i.e., abnormal body posture, excessive sloughing of skin, and loss of righting reflex. Frogs were euthanized with chlorobutanol and sampled for the presence of *Bd*, and subsequently fixed in 95% ethanol and preserved in 70% ethanol. Skin swab samples were taken in the field using a standardized protocol (Hyatt et al., 2007). Synthetic sterile swabs with wooden applicator and fine cotton tip were used (Copan Diagnostics Inc.) and each individual was swabbed with 30 strokes, five times on each hindfoot on the toe webbing, five times on each thigh, and five times each side of the ventral abdomen (Hyatt et al., 2007). Swabs were stored dried in 1.5 ml tubes until processed in the lab. Collected amphibian specimens were labeled with field numbers of Miguel Vences (ZCMV) or David Vieites (DRV) and deposited in the permanent herpetological collections of the Université d’Antananarivo, Département de Biologie Animale, Madagascar, and the Zoologische Staatssammlung München, Germany.

All frogs were tested for *Bd* using a standard quantitative real time PCR (Boyle et al., 2004; Hyatt et al., 2007) assay (*Bd* qPCR assay). DNA from swabs was extracted using PrepMan ultra sample preparation reagent (Applied Biosystems, Foster City, CA), and each sample was run in duplicate. Negative controls and positive controls (*Bd* standards) were included on each test plate. All standards were obtained from the Australian Animal Health Laboratory (courtesy of A. Hyatt).

Results and Discussion

We analyzed samples of 300 frog specimens from 12 sites throughout Madagascar (Table 1), including four additional sites (Ankarafantsika, Ifaty, Isalo, Toliara) that had not been included in the histological chytrid screening by Weldon et al. (2008). Together with the localities of Weldon et al. (2008), a total of 14 sites have so far been tested. We found no indication of *Bd* infection.

The frogs studied herein belong to 53 species in 13 genera (Table 2), representing about 10-15% of the ca. 400 species and candidate species of amphibians currently known from Madagascar (e.g., Vieites et al., 2009). he localities studied (Fig. 1) cover all of Madagascar‘s major bioclimatic regions as defined by Schatz (2000): Arid (Ankarafantsika, Isalo), Subarid (Ifaty, Toliara), Humid (An‘Ala, Andasibe, Ranomafana, Ambohitantely, Maroantsetra), and Montane (Ankaratra). The sites also span a wide elevational

Table 2. Summary of genera of Malagasy frogs sampled using the qPCR *Bd* assay. Note that in some cases, undescribed candidate species (Vieites et al., 2009) might be subsumed under the species name, especially in cases where a reliable species identification is not possible without DNA barcoding. This regards especially the genus *Mantidactylus* (candidate species similar to *M. betsileanus, M. femoralis, M. lugubris,* and *M. ulcerosus*). Note that two juvenile frogs could not be identified to genus level and therefore are not listed in this table.

Genus	Species sampled	Total specimens sampled	Infected
Hyperoliidae			
Heterixalus	*H. alboguttatus, H. betsileo, H. luteostriatus, H. punctatus, H. tricolor*	42	0 %
Mantellidae			
Aglyptodactylus	*A. madagascariensis*	1	0 %
Blommersia	*B. blommersae, B. wittei*	14	0 %
Boophis	*B. albilabris, B. andohahela, B. bottae, B. doulioti, B. goudoti, B. luteus, B. madagascariensis, B. mandraka, B. marojezensis, B. microtympanum, B. obscurus, B. occidentalis, B. picturatus, B. pyrrhus, B. reticulatus, B. rufioculis, B. sibilans, B. tephraeomystax, B. williamsi*	94	0 %
Gephyromantis	*G. boulengeri, G. tschenki*	4	0 %
Guibemantis	*G.* sp. aff. *albolineatus, G. liber, G. tornieri*	10	0 %
Laliostoma	*L. labrosum*	18	0 %
Mantella	*M. baroni, M. betsileo*	4	0 %
Mantidactylus	*M. alutus, M. betsileanus, M. biporus, M. brevipalmatus, M. curtus, M. femoralis, M. grandidieri, M. lugubris, M. majori, M. melanopleura, M. ulcerosus*	56	0 %
Microhylidae			
Paradoxophyla	*P. palmata*	1	0 %
Plethodontohyla	*P. inguinalis, P. notosticta, P. tuberata*	8	0 %
Scaphiophryne	*S. calcarata, S. marmorata*	2	0 %
Ptychadenidae			
Ptychadena	*P. mascareniensis*	44	0 %
Total		**298**	**0%**

range, fully representative of Madagascar‘s lowlands and mountains, from near sea level (Ifaty, Maroantsetra, Toliara) over low-elevation rainforest around 600-800 m (Ranomafana, An‘Ala) to higher elevation rainforest at 900-1200 m (Andasibe, Vohiparara, Ambohitantely) to montane grassland and heathland at 2000-2400 m (Ankaratra). Furthermore, our sampling includes the four national parks with highest tourist incidence (Analamazoatra-Mantadia near Andasibe, Ankarafantsika, Isalo, and Ranomafana) plus some samples from the capital Antananarivo, which would be among the most likely sites for accidental disease introductions by the live aquatic trade (e.g. contaminated water of aquatic plants and ornamental fish).

Our results support previous studies (Weldon et al., 2008; Crottini et al., 2011) who did not detect the amphibian chytrid fungus in Madagascar. At least for the period of our sampling (2006-2007) this provides baseline data to state that *Bd* was absent or occurred at only very low prevalences across most of Madagascar‘s territory, including diverse biomes and elevations. No thorough experimental evidence for the susceptibility of Malagasy frogs to *Bd* has been published so far, but anecdotal experiences of chytridiomycosis exist for

specimens in captivity (e.g., Oevermann et al., 2005; Une et al., 2008). Our own observations on terrarium-bred frogs (*Mantidactylus betsileanus*) exposed accidentally to *Bd* (S. Hauswaldt and M. Vences, unpublished observation in 2011) and preliminary experiments carried out in South Africa with various species of Malagasy frogs (L. Raharivololoniaina and C. Weldon, unpublished) suggest that at least some mantellid species are highly susceptible and under certain conditions can die within a few days after exposure.

The diverse climatic conditions present in Madagascar are suitable for the amphibian chytrid fungus. The first potential distribution model of *Bd* including Madagascar (Ron, 2005) shows that the fundamental niche of *Bd*, based on bioclimatic variables, is present all across the island from north to south in the east coast and mountain ranges, with some areas of high suitability in central areas of the island, but being not suitable most of the western side of Madagascar. A more elaborate host-pathogen model (Rödder et al., 2009; for Asia, see also Swei et al., 2011) obtained a largely similar potential *Bd* distribution area. This risk model was specifically evaluated in the context of Malagasy frog diversity, stressing a high potential of invasion and strong overlap with amphibian diversity and species of conservation priority (Lötters et al., 2011). Land-use changes and possible chytridiomicosis outbreaks in Madagascar are likely the main threats for Malagasy frogs (Andreone et al., 2008a; Hof et al., 2011).

Our results support calls for continuous monitoring and especially of proactive measures to prevent the introduction of *Bd* to Madagascar (Andreone et al., 2008b; Weldon and du Preez, 2008; Lötters et al., 2011). One possible pathway of introduction of *Bd* is non air-dried gear of tourists who previously travelled in other countries, especially in Africa. Notably *Bd* has been documented to be widespread at high prevalence and infection intensities on adjacent mainland Africa (e.g., Kielgast et al., 2010). Interviews with ecotourists visiting Madagascar‘s national parks have revealed that most tourists would not be scared off by being exposed to information about the biosecurity measures in order to avoid the spread of this wildlife disease (which is harmless for humans) (Wollenberg et al., 2010). We strongly suggest that tourists entering the country and travelling among amphibian-rich sites within Madagascar should be educated about how to prevent the spread of this deadly amphibian pathogen, for instance via appropriate flyers and posters, and information to travel books and websites.

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Appendix 1. Detailed list of specimens sampled using the qPCR *Bd* assay in Madagascar, including localities and field number of voucher specimen.

Locality	Voucher specimen	Sample number	Year of collection	Family	Genus	Species
Ambatolahy Forest	ZCMV 5826	N/A	2007	Mantellidae	*Boophis*	*andohahela*
Ambatolahy Forest	ZCMV 5822	N/A	2007	Mantellidae	*Boophis*	*luteus*
Ambatolahy Forest	ZCMV 5823	N/A	2007	Mantellidae	*Boophis*	*luteus*
Ambatolahy Forest	ZCMV 5827	N/A	2007	Mantellidae	*Boophis*	*madagascariensis*
Ambatolahy Forest	ZCMV 5828	N/A	2007	Mantellidae	*Boophis*	*madagascariensis*
Ambatolahy Forest	ZCMV 5824	N/A	2007	Mantellidae	*Boophis*	*mandraka*
Ambatolahy Forest	ZCMV 5825	N/A	2007	Mantellidae	*Boophis*	*mandraka*
Ambatolahy Forest	ZCMV 5813	N/A	2007	Mantellidae	*Boophis*	*reticulatus*
Ambatolahy Forest	ZCMV 5814	N/A	2007	Mantellidae	*Boophis*	*reticulatus*
Ambatolahy Forest	ZCMV 5815	N/A	2007	Mantellidae	*Boophis*	*reticulatus*
Ambatolahy Forest	ZCMV 5816	N/A	2007	Mantellidae	*Boophis*	*reticulatus*
Ambatolahy Forest	ZCMV 5817	N/A	2007	Mantellidae	*Boophis*	*reticulatus*
Ambatolahy Forest	ZCMV 5818	N/A	2007	Mantellidae	*Boophis*	*sibilans*
Ambatolahy Forest	ZCMV 5819	N/A	2007	Mantellidae	*Boophis*	*sibilans*
Ambatolahy Forest	ZCMV 5820	N/A	2007	Mantellidae	*Boophis*	*sibilans*
Ambatolahy Forest	ZCMV 5821	N/A	2007	Mantellidae	*Boophis*	*sibilans*
Ambatolahy Forest	ZCMV 5811	N/A	2007	Mantellidae	*Gephyromantis*	*tschenki*
Ambatolahy Forest	ZCMV 5806	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Ambatolahy Forest	ZCMV 5807	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Ambatolahy Forest	ZCMV 5808	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Ambatolahy Forest	ZCMV 5809	N/A	2007	Mantellidae	*Mantidactylus*	*lugubris*
Ambatolahy Forest	ZCMV 5810	N/A	2007	Mantellidae	*Mantidactylus*	*majori*
Ambatolahy Forest	ZCMV 5812	N/A	2007	Mantellidae	*Mantidactylus*	*melanopleura*
Ranomafana (Ambatolahy?)	ZCMV 5829	N/A	2007	Mantellidae	*Mantidactylus*	*majori*
Ambatolampy	ZCMV 2702	A8	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2703	A9	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2704	A10	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2705	B1	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2706	B2	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2707	B3	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2708	B4	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2709	B5	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2710	B6	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2711	B7	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2712	B8	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2713	B9	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2714	B10	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2715	C1	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ambatolampy	ZCMV 2720	A1	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ambatolampy	ZCMV 2721	A2	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ambatolampy	ZCMV 2722	A3	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ambatolampy	ZCMV 2723	A4	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ambatolampy	ZCMV 2724	A5	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ambatolampy	ZCMV 2725	A6	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ambatolampy	ZCMV 2726	A7	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
An'Ala	ZCMV 2474	N/A	2006		*?*	*?*
An'Ala	no voucher taken	AC060208A	2006	Mantellidae	*Boophis*	*goudoti*
An'Ala	no voucher taken	AC060208A	2006	Mantellidae	*Boophis*	*goudoti*
An'Ala	no voucher taken	AC060208AA	2006	Mantellidae	*Boophis*	*marojezensis*
An'Ala	no voucher taken	AC060208AB	2006	Mantellidae	*Boophis*	*marojezensis*
An'Ala	no voucher taken	AC060208AA	2006	Mantellidae	*Boophis*	*marojezensis*
An'Ala	no voucher taken	AC060208AB	2006	Mantellidae	*Boophis*	*marojezensis*
An'Ala	no voucher taken	AC060208AD	2006	Mantellidae	*Boophis*	*picturatus*
An'Ala	no voucher taken	AC060208AE	2006	Mantellidae	*Boophis*	*picturatus*
An'Ala	no voucher taken	AC060208AD	2006	Mantellidae	*Boophis*	*picturatus*
An'Ala	no voucher taken	AC060208AE	2006	Mantellidae	*Boophis*	*picturatus*
An'Ala	no voucher taken	AC060208AF	2006	Mantellidae	*Boophis*	*pyrrhus*
An'Ala	no voucher taken	AC060208AG	2006	Mantellidae	*Boophis*	*pyrrhus*
An'Ala	no voucher taken	AC060208AF	2006	Mantellidae	*Boophis*	*pyrrhus*
An'Ala	no voucher taken	AC060208AG	2006	Mantellidae	*Boophis*	*pyrrhus*
An'Ala	ZCMV 1454	AC060208L4	2006	Mantellidae	*Boophis*	*rufioculis*
An'Ala	no voucher taken	AC060208AH	2006	Mantellidae	*Guibemantis*	*liber*
An'Ala	no voucher taken	AC060208AH	2006	Mantellidae	*Guibemantis*	*liber*
An'Ala	no voucher taken	AC060208AI	2006	Mantellidae	*Mantidactylus*	*biporus*
An'Ala	no voucher taken	AC060208AI	2006	Mantellidae	*Mantidactylus*	*biporus*
An'Ala	no voucher taken	AC060208AC	2006	Mantellidae	*Mantidactylus*	*grandidieri*
An'Ala	no voucher taken	AC060208AC	2006	Mantellidae	*Mantidactylus*	*grandidieri*
An'Ala	ZCMV 1410	AC060208G1	2006	Mantellidae	*Mantidactylus*	*melanopleura*
An'Ala	ZCMV 1455	AC060209W	2006	Microhylidae	*Plethodontohyla*	*notosticta*
An'Ala	no voucher taken	AC060210A	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
An'Ala	no voucher taken	AC060210A	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
An'Ala	ZCMV 1409	AC060208F1	2006	Mantellidae	*Spinomantis*	*aglavei*
Andasibe Forest Reserve	ZCMV 2343	AC060207O	2006	Mantellidae	*Aglyptodactylus*	*madagascariensis*
Andasibe Forest Reserve	ZCMV 2331	AC060207Q	2006	Mantellidae	*Boophis*	*albilabris*
Andasibe Forest Reserve	ZCMV 2334	AC060207P	2006	Mantellidae	*Boophis*	*goudoti*
Andasibe	ZCMV 5794	N/A	2007	Mantellidae	*Boophis*	*luteus*

Locality	Voucher specimen	Sample number	Year of collection	Family	Genus	Species
Andasibe Forest Reserve	ZCMV 2322	AC060207C1	2006	Mantellidae	*Boophis*	*madagascariensis*
Andasibe Forest Reserve	ZCMV 2335	AC060207J1	2006	Mantellidae	*Boophis*	*madagascariensis*
Andasibe	ZCMV 2306	AC060206C1	2006	Mantellidae	*Boophis*	*pyrrhus*
Andasibe Forest Reserve	ZCMV 2341	AC060207M1	2006	Mantellidae	*Boophis*	*pyrrhus*
Andasibe Forest Reserve	ZCMV 2309	AC060207A1	2006	Mantellidae	*Gephyromantis*	*boulengeri*
Andasibe Forest Reserve	ZCMV 2310	AC060207A2	2006	Mantellidae	*Gephyromantis*	*boulengeri*
Andasibe Forest Reserve	ZCMV 2311	AC060207A3	2006	Mantellidae	*Gephyromantis*	*boulengeri*
Andasibe Forest Reserve	ZCMV 2312	AC060207B1	2006	Mantellidae	*Guibemantis*	*cf. albolineatus*
Andasibe Forest Reserve	ZCMV 2313	AC060207B2	2006	Mantellidae	*Guibemantis*	*cf. albolineatus*
Andasibe Forest Reserve	ZCMV 2314	AC060207B3	2006	Mantellidae	*Guibemantis*	*cf. albolineatus*
Andasibe Forest Reserve	ZCMV 2357	AC060207N	2006	Mantellidae	*Guibemantis*	*liber*
Andasibe	ZCMV 5792	N/A	2007	Mantellidae	*Guibemantis*	*tornieri*
Andasibe Forest Reserve	ZCMV 2325	AC060207D1	2006	Hyperolidae	*Heterixalus*	*punctatus*
Andasibe	ZCMV 2303	AC060206B1	2006	Mantellidae	*Mantidactylus*	*betsileanus*
Andasibe	ZCMV 2304	AC060206B2	2006	Mantellidae	*Mantidactylus*	*betsileanus*
Andasibe	ZCMV 2305	AC060206B3	2006	Mantellidae	*Mantidactylus*	*betsileanus*
Andasibe Forest Reserve	ZCMV 2326	AC060207G1	2006	Mantellidae	*Mantidactylus*	*cf. betsileanus*
Andasibe Forest Reserve	ZCMV 2327	AC060207G2	2006	Mantellidae	*Mantidactylus*	*cf. betsileanus*
Andasibe	ZCMV 2301	AC060206A1	2006	Mantellidae	*Mantidactylus*	*femoralis*
Andasibe	ZCMV 2302	AC060206A2	2006	Mantellidae	*Mantidactylus*	*femoralis*
Andasibe	ZCMV 5793	N/A	2007	Microhylidae	*Scaphiophryne*	*marmorata*
Ankarafantsika	ZCMV 5601	N/A	2007		*?*	
Ankarafantsika	ZCMV 5620	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Ankarafantsika	ZCMV 5625	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Ankarafantsika	ZCMV 5626	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Ankarafantsika	ZCMV 5641	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Ankarafantsika	ZCMV 5642	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Ankarafantsika	ZCMV 5643	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Ankarafantsika	ZCMV 5644	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Ankarafantsika	ZCMV 5607	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5608	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5609	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5610	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5611	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5612	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5613	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5647	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5648	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5649	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5650	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5651	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Ankarafantsika	ZCMV 5621	N/A	2007	Mantellidae	*Boophis*	*sp*
Ankarafantsika	ZCMV 5614	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5615	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5616	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5627	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5628	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5630	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5633	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5634	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5635	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5636	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5637	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5638	N/A	2007	Hyperoliidae	*Heterixalus*	*luteostriatus*
Ankarafantsika	ZCMV 5603	N/A	2007	Hyperoliidae	*Heterixalus*	*sp.*
Ankarafantsika	ZCMV 5629	N/A	2007	Hyperoliidae	*Heterixalus*	*tricolor*
Ankarafantsika	ZCMV 5631	N/A	2007	Hyperoliidae	*Heterixalus*	*tricolor*
Ankarafantsika	ZCMV 5632	N/A	2007	Hyperoliidae	*Heterixalus*	*tricolor*
Ankarafantsika	ZCMV 5639	N/A	2007	Hyperoliidae	*Heterixalus*	*tricolor*
Ankarafantsika	ZCMV 5640	N/A	2007	Hyperoliidae	*Heterixalus*	*tricolor*
Ankarafantsika	ZCMV 5617	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Ankarafantsika	ZCMV 5618	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Ankarafantsika	ZCMV 5619	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Ankarafantsika	ZCMV 5624	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Ankarafantsika	ZCMV 5646	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Ankarafantsika	ZCMV 5604	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*
Ankarafantsika	ZCMV 5605	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ankarafantsika	ZCMV 5606	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ankarafantsika	ZCMV 5645	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ankarafantsika	ZCMV 5602	N/A	2007	Microhylidae	*Scaphiophryne*	*calcarata*
Ankaratra	ZCMV 2527	N/A	2006	Mantellidae	*Boophis*	*goudoti*
Ankaratra	ZCMV 2541	N/A	2006	Mantellidae	*Boophis*	*goudoti*
Ankaratra	ZCMV 2741	N/A	2006	Mantellidae	*Boophis*	*goudoti*
Ankaratra	ZCMV 2538	N/A	2006	Mantellidae	*Boophis*	*microtympanum*
Ankaratra	ZCMV 2542	N/A	2006	Mantellidae	*Boophis*	*microtympanum*
Ankaratra	ZCMV 2742	N/A	2006	Mantellidae	*Boophis*	*microtympanum*

Locality	Voucher specimen	Sample number	Year of collection	Family	Genus	Species
Ankaratra	DRV 2755	N/A	2006	Mantellidae	*Boophis*	*microtympanum*
Ankaratra	DRV 2755	N/A	2006	Mantellidae	*Boophis*	*microtympanum*
Ankaratra	DRV 5290	N/A	2006	Mantellidae	*Boophis*	*microtympanum*
Ankaratra	DRV 5290	N/A	2006	Mantellidae	*Boophis*	*microtympanum*
Ankaratra	DRV 5291	N/A	2006	Mantellidae	*Boophis*	*microtympanum*
Ankaratra	DRV 5291	N/A	2006	Mantellidae	*Boophis*	*microtympanum*
Ankaratra	DRV 5275	N/A	2006	Mantellidae	*Boophis*	*williamsi*
Ankaratra	DRV 5275	N/A	2006	Mantellidae	*Boophis*	*williamsi*
Ankaratra	DRV 5276	N/A	2006	Mantellidae	*Boophis*	*williamsi*
Ankaratra	DRV 5276	N/A	2006	Mantellidae	*Boophis*	*williamsi*
Ankaratra	DRV 5277	N/A	2006	Mantellidae	*Boophis*	*williamsi*
Ankaratra	DRV 5277	N/A	2006	Mantellidae	*Boophis*	*williamsi*
Ankaratra	ZCMV 2539	N/A	2006	Mantellidae	*Mantidactylus*	*alutus*
Ankaratra	DRV 2753	N/A	2006	Mantellidae	*Mantidactylus*	*alutus*
Ankaratra	DRV 2753	N/A	2006	Mantellidae	*Mantidactylus*	*alutus*
Ankaratra	DRV 2754	N/A	2006	Mantellidae	*Mantidactylus*	*alutus*
Ankaratra	DRV 2754	N/A	2006	Mantellidae	*Mantidactylus*	*alutus*
Ankaratra	ZCMV 2539	N/A	2006	Mantellidae	*Mantidactylus*	*brevipalmatus*
Ankaratra	ZCMV 2540	N/A	2006	Mantellidae	*Mantidactylus*	*brevipalmatus*
Ankaratra	ZCMV 2739	N/A	2006	Mantellidae	*Mantidactylus*	*brevipalmatus*
Ankaratra	ZCMV 2740	N/A	2006	Mantellidae	*Mantidactylus*	*brevipalmatus*
Ankaratra	ZCMV 2522	N/A	2006	Mantellidae	*Mantidactylus*	*curtus*
Ankaratra	ZCMV 2537	N/A	2006	Mantellidae	*Mantidactylus*	*curtus*
Ankaratra	DRV 2748	N/A	2006	Mantellidae	*Mantidactylus*	*curtus*
Ankaratra	DRV 2748	N/A	2006	Mantellidae	*Mantidactylus*	*curtus*
Ankaratra	DRV 2749	N/A	2006	Mantellidae	*Mantidactylus*	*curtus*
Ankaratra	DRV 2749	N/A	2006	Mantellidae	*Mantidactylus*	*curtus*
Ankaratra	DRV 2751	N/A	2006	Microhylidae	*Plethodontohyla*	*tuberata*
Ankaratra	DRV 2751	N/A	2006	Microhylidae	*Plethodontohyla*	*tuberata*
Ankaratra	DRV 2752	N/A	2006	Microhylidae	*Plethodontohyla*	*tuberata*
Ankaratra	DRV 2752	N/A	2006	Microhylidae	*Plethodontohyla*	*tuberata*
Ankaratra	DRV 2756	N/A	2006	Microhylidae	*Plethodontohyla*	*tuberata*
Ankaratra	DRV 2756	N/A	2006	Microhylidae	*Plethodontohyla*	*tuberata*
Ankaratra	DRV 2750	N/A	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ankaratra	DRV 2750	N/A	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Antananarivo, Tzimbazaza Zoo	ZCMV 2763	N/A	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Antananarivo, Tzimbazaza Zoo	ZCMV 2764	N/A	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Antananarivo, Tzimbazaza Zoo	ZCMV 2786	N/A	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Antananarivo, Tzimbazaza Zoo	ZCMV 2787	N/A	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ifaty Beach	ZCMV 5721	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Isalo	ZCMV 5800	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Isalo	ZCMV 5801	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Isalo	ZCMV 5802	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Isalo	ZCMV 5803	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Isalo	ZCMV 5804	N/A	2007	Mantellidae	*Blommersia*	*wittei*
Isalo	ZCMV 5752	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Isalo	ZCMV 5764	N/A	2007	Mantellidae	*Boophis*	*luteus*
Isalo	ZCMV 5767	N/A	2007	Mantellidae	*Boophis*	*luteus*
Isalo	ZCMV 5748	N/A	2007	Mantellidae	*Boophis*	*obscurus*
Isalo	ZCMV 5750	N/A	2007	Mantellidae	*Boophis*	*obscurus*
Isalo	ZCMV 5759	N/A	2007	Mantellidae	*Boophis*	*obscurus*
Isalo	ZCMV 5774	N/A	2007	Mantellidae	*Boophis*	*obscurus*
Isalo	ZCMV 5781	N/A	2007	Mantellidae	*Boophis*	*obscurus*
Isalo	ZCMV 5751	N/A	2007	Mantellidae	*Boophis*	*occidentalis*
Isalo	ZCMV 5754	N/A	2007	Mantellidae	*Boophis*	*occidentalis*
Isalo	ZCMV 5755	N/A	2007	Mantellidae	*Boophis*	*occidentalis*
Isalo	ZCMV 5760	N/A	2007	Mantellidae	*Boophis*	*occidentalis*
Isalo	ZCMV 5769	N/A	2007	Mantellidae	*Boophis*	*occidentalis*
Isalo	ZCMV 5768	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Isalo	ZCMV 5771	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Isalo	ZCMV 5799	N/A	2007	Mantellidae	*Mantella*	*betsileo*
Isalo	ZCMV 5757	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Isalo	ZCMV 5761	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Isalo	ZCMV 5762	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Isalo	ZCMV 5773	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Isalo	ZCMV 5777	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Isalo	ZCMV 5778	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Isalo	ZCMV 5779	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Isalo	ZCMV 5780	N/A	2007	Mantellidae	*Mantidactylus*	*femoralis*
Isalo	ZCMV 5749	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*
Isalo	ZCMV 5753	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*
Isalo	ZCMV 5756	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*
Isalo	ZCMV 5758	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*
Isalo	ZCMV 5763	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*
Isalo	ZCMV 5766	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*
Isalo	ZCMV 5772	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*

Locality	Voucher specimen	Sample number	Year of collection	Family	Genus	Species
Isalo	ZCMV 5775	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*
Isalo	ZCMV 5776	N/A	2007	Mantellidae	*Mantidactylus*	*ulcerosus*
Isalo	ZCMV 5765	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ranomafana (rice field near hotel)	ZCMV 3114	N/A	2006	Mantellidae	*Blommersia*	*blommersae*
Ranomafana (rice field near hotel)	ZCMV 3115	N/A	2006	Mantellidae	*Blommersia*	*blommersae*
Ranomafana (Thermal station, village pond)	ZCMV 3117	N/A	2006	Mantellidae	*Boophis*	*bottae*
Ranomafana (Thermal station, village pond)	ZCMV 3119	N/A	2006	Mantellidae	*Boophis*	*bottae*
Ranomafana (rice field near hotel)	ZCMV 3107	N/A	2006	Mantellidae	*Boophis*	*madagascariensis*
Ranomafana	ZCMV 5805	N/A	2007	Mantellidae	*Boophis*	*tephraeomystax*
Ranomafana (rice field near hotel)	ZCMV 3104	N/A	2006	Mantellidae	*Boophis*	*tephraeomystax*
Ranomafana (rice field near hotel)	ZCMV 3105	N/A	2006	Mantellidae	*Boophis*	*tephraeomystax*
Ranomafana (rice field near hotel)	ZCMV 3106	N/A	2006	Mantellidae	*Boophis*	*tephraeomystax*
Ranomafana	ZCMV 5790	N/A	2007	Mantellidae	*Guibemantis*	*tornieri*
Ranomafana (rice field near hotel)	ZCMV 3110	N/A	2006	Hyperoliidae	*Heterixalus*	*alboguttatus*
Ranomafana (rice field near hotel)	ZCMV 3111	N/A	2006	Hyperoliidae	*Heterixalus*	*alboguttatus*
Ranomafana (rice field near hotel)	ZCMV 3112	N/A	2006	Hyperoliidae	*Heterixalus*	*alboguttatus*
Ranomafana (rice field near hotel)	ZCMV 3108	N/A	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ranomafana (rice field near hotel)	ZCMV 3109	N/A	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ranomafana (rice field near hotel)	ZCMV 3116	N/A	2006	Hyperoliidae	*Heterixalus*	*betsileo*
Ranomafana	ZCMV 5795	N/A	2007	Mantellidae	*Mantidactylus*	*betsileanus*
Ranomafana (rice field near hotel)	ZCMV 3113	N/A	2006	Mantellidae	*Mantidactylus*	*betsileanus*
Ranomafana (Thermal station, village pond)	ZCMV 3118	N/A	2006	Mantellidae	*Mantidactylus*	*lugubris*
Ranomafana	ZCMV 5796	N/A	2007	Microhylidae	*Paradoxophyla*	*palmata*
Ranomafana (rice field near hotel)	ZCMV 3101	N/A	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ranomafana (rice field near hotel)	ZCMV 3102	N/A	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ranomafana (rice field near hotel)	ZCMV 3103	N/A	2006	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5732	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Toliara	ZCMV 5733	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Toliara	ZCMV 5734	N/A	2007	Mantellidae	*Boophis*	*doulioti*
Toliara	ZCMV 5735	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	ZCMV 5736	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	ZCMV 5737	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	ZCMV 5738	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	ZCMV 5739	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	ZCMV 5740	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	ZCMV 5742	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	ZCMV 5743	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	ZCMV 5744	N/A	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	no voucher taken	CW 019/07	2007	Mantellidae	*Laliostoma*	*labrosum*
Toliara	ZCMV 5722	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5723	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5724	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5725	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5726	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5727	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5728	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5729	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5730	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5731	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5745	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5746	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	ZCMV 5747	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	no voucher taken	CW 013/07	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	no voucher taken	CW 014/07	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	no voucher taken	CW 015/07	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	no voucher taken	CW 016/07	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	no voucher taken	CW 017/07	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Toliara	no voucher taken	CW 018/07	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Ranomafana (Vohiparara, first bridge)	ZCMV 3187	N/A	2006	Mantellidae	*Boophis*	*luteus*
Ranomafana (Vohiparara, first bridge)	ZCMV 3188	N/A	2006	Mantellidae	*Boophis*	*luteus*
Vohiparara	ZCMV 5797	N/A	2007	Mantellidae	*Guibemantis*	*tornieri*
Vohiparara	ZCMV 5798	N/A	2007	Mantellidae	*Guibemantis*	*tornieri*
Vohiparara	ZCMV 5782	N/A	2007	Mantellidae	*Mantella*	*baroni*
Vohiparara	ZCMV 5783	N/A	2007	Mantellidae	*Mantella*	*baroni*
Vohiparara	ZCMV 5789	N/A	2007	Mantellidae	*Mantella*	*baroni*
Vohiparara	ZCMV 5791	N/A	2007	Mantellidae	*Mantidactylus*	*betsileanus*
Ranomafana (Vohiparara, first bridge)	ZCMV 3186	N/A	2006	Microhylidae	*Plethodontohyla*	*inguinalis*
Vohiparara	ZCMV 5784	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Vohiparara	ZCMV 5785	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Vohiparara	ZCMV 5786	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Vohiparara	ZCMV 5787	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*
Vohiparara	ZCMV 5788	N/A	2007	Ptychadenidae	*Ptychadena*	*mascareniensis*