

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA



Seventeenth meeting of the Conference of the Parties
Johannesburg (South Africa), 24 September - 5 October 2016

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Inclusion of *Dyscophus guineti* and *D. insularis* in Appendix II in accordance in accordance with Article II, paragraph 2 (a) of the Convention and satisfying Criteria A in Annex 2a of Resolution Conf. 9.24 (Rev. CoP16).

B. Proponent

Madagascar*.

C. Supporting statement

1. Taxonomy

- 1.1 Class: Amphibia
- 1.2 Order: Anura
- 1.3 Family: Microhylidae
- 1.4 Genus, species or subspecies, including author and year: *Dyscophus guineti* (Grandidieri 1875)
and
Dyscophus insularis (Grandidieri 1872)
- 1.5 Scientific synonyms: *Dyscophus grandidieri*, *D. beloensis*, *Phrynocara quinquelineatum*, *Dyscophus quinquelineatus*, *Discophus insularis*, *Kalulaguineti*, *Dyscophus guineti*, *Pletctropus guineti*, *Discophus guineti*
- 1.6 Common names: English: Tomato Frog / False Tomato Frog
French: La grenouille tomate

2. Overview

The genus *Dyscophus* contains three species of large microhylids composing the subfamily Dyscophinae endemic to Madagascar. Two - *D. Antongillii* and *D. guineti* - are red-orange in coloration and commonly called tomato frogs because of their appearance. They are well-known and iconic amphibian species. Described by Alfred Grandidier in the 1870's, the three species of *Dyscophus* occupy different parts of the country with *D. Antongillii* occurring in a small section of the northeast, *D. guineti* along the remnant eastern rainforest corridor, and *D. Insularis* distributed broadly throughout the west. *D. antongillii* has been listed within CITES Appendix I since 1987 (a separate proposal to amend the species to CITES Appendix II has

* The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.

also been prepared this year), while the other two species currently have no CITES listing. *D. guineti* in particular is popular in the international pet trade and wild sourced frogs are exported in large numbers from the island for this purpose.

3. Species characteristics

3.1 Distribution

Both species are endemic to Madagascar. *D. insularis* has a wide distribution throughout the west of the island from Ambanja to south of Toliara, while *D. guineti* has a patchy record of known localities in the remnant central eastern rainforest around Fierenana, Andekaleka, and south eastern at Vevembe.

3.2 Habitat

D. insularis is found in savannahs and dry forests of the west. *D. guineti* inhabits humid rainforests in the east. Both species breed in seasonal water bodies.

3.3 Biological characteristics

Dyscophus are terrestrial ambush predators, spending most of the time relatively inactive in concealed locations such as leaf litter or among other objects on the ground. A glue-like viscous substance is secreted from skin when disturbed which acts as a mechanical defence inhibiting consumption by potential predators (König et al., 2013). They are known to breed explosively with the availability of water during the rainy season and at this time of the year (typically January-March) can be found at night in abundance at breeding sites. For *D. guineti* breeding sites involve ponds and pools in rainforest that fill as water levels rise in nearby streams (Glaw & Vences, 2007). Inhabiting the drier west, *D. insularis* breed in somewhat different environments within pools or depressions that fill with rain water in savannah and deciduous forests (Glos et al., 2008). Hundreds of eggs are laid in water following amplexus, and tadpoles of *D. guineti* may complete metamorphosis in as little as 30 days (Gili, 2008).

3.4 Morphological characteristics

Both species are rather large microhylids, with stout bodies and overall round structure. Adult *D. guineti* have a snout-to-vent length of 3.7 to 11.2 cm while *D. insularis* smaller and slightly more elongated in shape with a typical SVL of 4-5 cm. Males are usually smaller than females. *D. guineti* is orange-red in coloration with two lateral black stripes and varying degrees of red or orange speckled patterns dorsally. *D. insularis* tan or brown in coloration with darker stripes and blotches running down the dorsum.

3.5 Role of the species in its ecosystem

Few to no ecological studies have been carried out on the species. Presumably the terrestrial adults play an important role consuming arthropod prey. Larvae may likely be a food source for any number of aquatic organisms that share their temporary water bodies.

4. Status and trends

4.1 Habitat trends

Habitat of both species is at risk and receding and neither species is found in degraded areas (Glos, 2006; Nussbaum et al., 2008). The eastern rainforest where *D. guineti* occurs is under pressure from timber extraction, charcoal production, conversion of forest to agricultural areas, and potentially small-scale mining activities. The dry deciduous forest and savannah where *D. insularis* occurs is under similar pressure especially due to fires to clear land for agricultural activities.

4.2 Population size

Population size in the wild of both species is unknown. During the rainy season, *D. guineti* can be abundant at night at breeding ponds and at the sites it is known from it can be regularly encountered (Amphibia Web 2008; Glaw & Vences 2007).

4.3 Population structure

Age structure has been studied in *Dyscophus guineti* with their lifespan ranging from 3-7 years and sexual maturity reached between years 2 and 4 (Tessa et al., 2011).

4.4 Population trends

No information is available on population trends. Likely to be stable at sites where habitat still exists, but declining at sites where habitat is receding.

4.5 Geographic trends

The *D. guineti* population around Fierenana is the one targeted most heavily by collectors.

5. Threats

The main threat to both species is habitat loss. This is especially notable for *D. guineti* which does not seem to occur in secondary or degraded forest (Glaw & Vences 2007). Timber extraction and logging, slash and burn agriculture, charcoal production, clearance of forest for livestock grazing, and expanding settlements are all causing rapid habitat loss.

The recent detection of the pathogenic amphibian chytrid fungus *Bd* and ranavirus in Madagascar are also of concern since *Dyscophus* species have been shown to be susceptible to this pathogen in captivity (Oevermann et al., 2005), however to date amphibian population declines and mortality have not been observed due to disease in situ (Bletz et al., 2015)

Regarding the threat presented by collection for the international pet trade, it is not clear whether current unregulated levels of harvesting wild frogs are sustainable or not. *D. guineti* in particular is targeted heavily, which has been said to be a result of the closely related and similarly coloured *D. antongilii* being listed under CITES Appendix I (Andreone et al., 2006). Further research is needed to clarify the threat of over-harvesting.

6. Utilization and trade

6.1 National utilization

D. guineti is sometimes collected and used for display at private zoological parks in Madagascar.

6.2 Legal trade

All trades in both species are legal. They are traded live for use in the international pet trade.

The export database of Madagascar on the trade of the *Dyscophus guineti* and *D. insularis* from 2012 to 2015 is shown in the table 1 below

Table 1

Country Year/	Canada	England	Spain	France	Hong Kong	Hungary	Japan	Switzerland	Taiwan	Tcheque Republic	Thailand	The Netherlands	USA	Total
<i>Dyscophus guineti</i>														
2012													40	40
2013							82	20					50	152
2014	20						70				50		130	270
2015	90	100	50	30	50	80	530			60	20	100	1280	2390
<i>Dyscophus insularis</i>														
2012														
2013							22						90	112
2014									50				100	150
2015					50		70			100	20	50	430	720

The US import information from 2012 to 2014 is presented by the table 2 below:

Table 2

Species/Year	2012	2013	2014
<i>Dyscophus guineti</i>	810	446	663
<i>Dyscophus insularis</i>	274	444	460

The export data (table 1) shows that the interest on the number and of the Countries for these species increased very sharply in 2015.

The US import data (table 2) is higher than the export data which means that retailers and captive breeders are among the traders out of Madagascar.

6.3 Parts and derivatives in trade

Whole live frogs for the international pet trade.

Persevered specimens and tissues samples for research.

6.4 Illegal trade

Dyscophus guineti has been found within confiscated smuggled shipments of Malagasy wildlife, despite being legal to trade.

6.5 Actual or potential trade impacts

It is not clear whether trade in the species is sustainable or not. The high levels of *Dyscophus guineti* in the trade may be impacting wild populations.

The last three years, the trades of the two species rise to be very sharply in 2015.

As we have not yet any ecological data and population data to estimate whether the trade is harmful or not for the species, the regulation is one of the options to have sustainable exploitation of both species.

Both species are in large distribution and the data records show to us the origin of each species traded, so, any survey of the trade is easier to the Malagasy Authorities in the future, if the species is accepted to be included into appendix II.

7. Legal instruments

7.1 National

According to the decree 2006-400 about categorisation of the species, they are classified as category I and Class II which means both species are protected but the capture and collect need authorisation from "Organe de Gestion CITES Madagascar" after scientific advice from "Autorité scientifique Madagascar."

7.2 International

No IUCN and EDGE protection and no CITES management.

8. Species management

8.1 Management measures

There are no species-based management measures currently in place.

8.2 Population monitoring

There are no population monitoring programs being carried out for either species.

8.3 Control measures

8.3.1 International

There are no control measures on the international level for either species.

8.3.2 Domestic

Permits are required from the Ministère de l'Environnement, de l'Ecologie, de la Mer et des Forêts to collect wildlife for commercial purposes.

8.4 Captive breeding and artificial propagation

Dyscophus guineti has been bred in captivity on numerous occasions at zoological institutions and is occasionally bred for commercial purposes by private breeders (Li Vigni, 2013). It is unclear whether *D. insularis* has been bred in captivity, since reported captive breeding events for this species may also refer to *D. guineti* that were incorrectly sold under the name *D. insularis*.

8.5 Habitat conservation

Dyscophus guineti is not found in any reliably protected area, however, some populations are within the Ankeniheny-Zahamena Forest Corridor which is a new protected area, though in practice this forest continues to be under heavy use. *D. insularis* occurs in Isalo National Park and Kirindy, among other protected areas. Most of both species habitat is under serious threat and is being heavily used, despite legal protection.

8.6 Safeguards

There are no safeguards to assure the survival of either species, although currently it is thought that the wild populations of both species are large enough so that neither is in immediate danger of extinction (Nussbaum et al., 2008).

9. Information on similar species

Dyscophus antongilii is similar to *D. guineti* in appearance but brighter red and with less distinct or sometimes no black lateral stripes. The phylogenetic relationship between these two species has been unclear and it has been put forth that they are synonyms for different colour morphs of one single species, but recent genetic analysis has shown that they are in fact distinct species (Orozco-Terwengel et al., 2013).

In 1987 *D. antongilii* was listed as CITES Appendix I and it has been suggested that this caused a surge in trade of *D. guineti* within the international pet trade (Andreone et al., 2006).

10. Consultations

ASG Madagascar, Scientific Authorities CITES Madagascar

11. Additional remarks

A separate proposal to down-list *D. antongilii* to CITES Appendix II has also been prepared. Along with this proposal to list the other two *Dyscophus* species, this would place all species in the genus under CITES Appendix II.

12. References

Andreone, F., Mercurio, V., and F. Mattioli. 2006. Between environmental degradation and international pet trade: conservation strategies for the threatened amphibians of Madagascar. *Natura* 95(2): 81-96.

- AmphibiaWeb: Information on amphibian biology and conservation. 2015. Berkely, California: AmphibiaWeb. <<http://amphibiaweb.org/>> Accessed 16 Nov 2015.
- Bletz, M.C., Rosa, G., Andreone, F., Courtois, E.A., Schmeller, D.S., Rabibisoa, N.H.C., Rabemananjara, F.C.E., Raharivoloniaina, L., Vences, M., Weldon, C., Edmonds, D., Raxworthy, C.J., Harris, R.N., Fisher, M.C. and A. Crottini. 2015. Widespread presence of the pathogenic fungus *Batrachochytrium dendrobatidis* in wild amphibian communities in Madagascar. *Scientific Reports*, 5: 8633.
- Gili, C. 2008. Conservation activities on Malagasy amphibians at Acquario di Genova. In: Andreone, F. (ed.) *A Conservation Strategy for the Amphibians of Madagascar*. Monografie XLV. Museo Regionale di Scienze Naturali, Torino, Italy: 309-320.
- Glaw, F. and M. Vences. 2007. *A field guide to the amphibians and reptiles of Madagascar*. 3rd Ed. Vences and Glaw Verlag, Köln.
- Glaw, F. and M. Vences. 2008. *Dyscophus insularis*. The IUCN Red List of Threatened Species 2008: <<http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T57806A11684505.en>> Accessed 13 November 2015.
- Glos, J. 2006. Amphibian communities of the dry forest of Western Madagascar: Taxonomy, ecology and conservation. Unpublished dissertation. Bayerischen Julius-Maximilians-Universität Würzburg.
- Glos, J., Volahy, A. T., Bourou, R., Straka, J., Young, R., and J. Durbin. 2008. Amphibian conservation in central Menabe. In: Andreone, F. (ed.) *A Conservation Strategy for the Amphibians of Madagascar*. Monografie XLV. Museo Regionale di Scienze Naturali, Torino, Italy: 107-124.
- König, E., Wesse, C., Murphy, A. C., Zhou, M., Wang, L., Chen, T., Shaw, C., and O. R. P. Bininda-Emonds. 2013. Molecular cloning of the trypsin inhibitor from the skin secretion of the Madagascan Tomato Frog, *Dyscophus guineti* (Microhylidae), and insights into its potential defensive role. *Organisms Diversity & Evolution* 13: 453-461.
- Li Vigni, F. 2013. Les grenouilles du genre *Dyscophus*. *Reptilia* 53: 46-49.
- Nussbaum, R., Vences, M. and J. Cadle, 2008. *Dyscophus guineti*. The IUCN Red List of Threatened Species 2008: <<http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T57805A11684170.en>> Accessed 17 November 2015.
- Oevermann, A., Schildger, B., Feldman, S., and N. Robert. 2005. Chytridiomykose bei Tomatenfröschen (*Dyscophus antongilii*) in der Schweiz. *Tierärztl. Umschau*. 60: 211-217.
- Orozco-Terewengel, P., Andreone, F., Louis, E. and M. Vences. 2013. Mitochondrial introgressive hybridization following a demographic expansion in the tomato frogs of Madagascar, genus *Dyscophus*. *Molecular Ecology* 22: 6074-6090.
- Tessa, G., Guarina, F. M., Randrianirina, J. E. and F. Andreone. 2011. Age structure in the false tomato frog *Dyscophus guineti* from eastern Madagascar compared to the closely related *D. antongilii* (Anura, Microhylidae). *African Journal of Herpetology* 60(1): 84-88.