

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

Twenty-fifth meeting of the Animals Committee  
Geneva (Switzerland), 18-22 July 2011

Review of Significant Trade in specimens of Appendix-II species

SPECIES SELECTED FOLLOWING COP13

1. This document has been prepared by the Secretariat.
2. At its 21st meeting (AC21, Geneva, May 2005), the Animals Committee agreed that, under the terms of paragraph b) of Resolution Conf 12.8 (Rev. CoP13), among others, a review of trade in *Mantella* spp. should be undertaken.
3. At its 22nd meeting (Lima, July 2006), the Animals Committee reviewed the available information in accordance with paragraph g) of Resolution Conf. 12.8 (Rev. CoP13) and agreed not to eliminate *Mantella* spp. from the review.
4. IUCN was engaged to compile information about the biology and management of and trade in *Mantella* spp. and to provide a preliminary categorization of these species, in compliance with paragraphs h) and i) of Resolution Conf. 12.8 (Rev. CoP13) (see document AC23 Doc. 8.4).
5. Having reviewed the information and preliminary categorization at its 23rd meeting (Geneva, April 2008), the Animals Committee decided to retain in the review four species from the genus *Mantella* (*M. crocea*, *M. expectata*, *M. milotympanum* and *M. viridis*, all endemic to Madagascar). The Committee asked Madagascar to provide additional data on the population estimates and on its non-detriment findings in order to be able to reconsider the status of these species at its 24th meeting.
6. At its 23rd meeting, the Animals Committee also adopted the following recommendations concerning two species from the genus *Mantella* for which it considered that the trade was 'of least concern' and that were therefore eliminated from review (see AC23 summary record):
  - For *Mantella aurantiaca*, Madagascar was asked to inform the Secretariat of any quota that may be set and the Secretariat was to keep the Animals Committee informed; and
  - For *Mantella bernhardi*, the Animals Committee may consider the species again should the quota be re-established.
7. At its 24th meeting (Geneva, April 2009), in the light of information received from Madagascar, the Animals Committee revised the preliminary categorization of species from the genus *Mantella* proposed by IUCN, and either eliminated the species from the review, or formulated recommendations to address problems related to the implementation of Article IV, paragraphs 2 (a) and 3.
8. The Committee decided to eliminate *Mantella milotympanum* from the review. With respect to *Mantella crocea*, *Mantella expectata* and *Mantella viridis*, the Committee made the following recommendations:
  - a) a zero quota should be established immediately;

- b) Madagascar should find the resources for a long-term standardized monitoring programme for the three species to be able to monitor the population trends in protected and unprotected areas and the effect of trade, should it be resumed. Reference to such standardized monitoring programme may be found in document AC24 Doc. 9.1 – p. 25, *Measuring and Monitoring Biological Diversity – Standard methods for Amphibians*;
  - c) on the basis of the information received and the results stemming from these programmes, such as population estimates and NDFs, precautionary quotas may be set in the future; and
  - d) adaptive management strategies should be implemented.
9. Regarding *Mantella aurantiaca*, at AC24, the Committee expressed concern that a quota of 2,500 specimens had been established noting that the species has been listed as Critically Endangered (CR) by IUCN, and recommended that these concerns be expressed in a letter from the Secretariat in which Madagascar would be asked to explain in more detail the basis for and method of the calculation of this quota (with a deadline of three months). This information should be submitted to the Committee for review and possible recommendations, including re-instatement into the Review of Significant Trade, through an expedited procedure.
  10. Regarding *Mantella bernhardi*, at AC24, the Committee took note of the quota of 650 specimens proposed by Madagascar. However, owing to the localized distribution, as well as the IUCN categorization Endangered, it recommended that these concerns be expressed in a letter from the Secretariat in which Madagascar would be asked to explain in more detail the basis for and method of calculation of this quota (with a deadline of three months for reply). This information should be submitted to the Committee for review and possible recommendation, including re-instatement into the Review of Significant Trade. In addition the Committee recommended that this species be included in a long-term standardized monitoring programme.
  11. On 7 August 2009, the Secretariat wrote to the Management Authority of Madagascar to convey the recommendations of the Animals Committee and asked it to provide the required information.
  12. The Management Authority of Madagascar responded on 3 November 2009 with information on *Mantella aurantiaca*, *Mantella bernhardi*, *Mantella crocea*, *Mantella expectata* and *Mantella viridis*. This information is provided in Annex to the present document.
  13. On 14 December 2010, the interim Chair of the Animals Committee requested a decision from the Committee by the postal procedure on the re-instatement of *Mantella aurantiaca* into the Review of Significant Trade. The Committee adopted this proposal on 1 March 2011.

#### Actions required by the Animals Committee

14. In order to comply with paragraph n) of Resolution Conf. 12.8 (Rev. CoP13), the Committee is requested to establish deadlines for the recommendations in paragraph 8 of the present document.
15. Concerning *Mantella bernhardi*, in line with paragraph b) of Resolution Conf. 12.8 (Rev. CoP13), the Committee is invited to decide whether this is a species of priority concern to be selected for review.

## REVIEW OF SIGNIFICANT TRADE IN SPECIMENS OF APPENDIX-II SPECIES

### *Mantella crocea*

This species has a highly localized geographical distribution and many colour variants, which may lead to great confusion if it were harvested (Bora *et al.*, 2008 [1]). No further data are currently available. We do not have any comments on the zero quota.

### *Mantella expectata*

- New data are available on the species's distribution (Mercurio *et al.*, 2008 [2]) and phylogeography (Crottini *et al.*, 2008[3]).
- A population monitoring study is currently underway inside and outside Isalo National Park (from 19 October to December 2009). The team directed by Franco Andreone (ASG Co-Chair – Madagascar) is in charge of the study.
- The current IUCN status of the population is Critically Endangered (CR). However, according to Andreone *et al.*, 2008 [4], the IUCN status needs to be updated. Based on recent data, Andreone *et al.* propose that *M. expectata* should be classified as Endangered (EN).

We request that the cautious quota of 250 specimens be maintained.

### *Mantella viridis*

This species has a highly localized distribution and only occurs within a 5-km radius between Antongombato and Montagne des Français [5]. Yet, new areas of distribution have recently been discovered (Mercurio and Andreone, 2008 [6]). Considering the improvement in the species's abundance, Andreone *et al.* (2008) [4] propose that it should no longer be classified as Endangered. However, ecological monitoring studies must be carried out.

We request that the cautious quota of 250 specimens be maintained.

### *Mantella aurantiaca*

Trade in *M. aurantiaca* has been suspended for about 10 years because the species only occurs at Torotorofotsy marsh and is not found in any protected areas. However, several studies have been carried out since and new data on the species's abundance and distribution are available, including those obtained by Rabemananjara *et al.*, 2008 [7] and Bora *et al.* (2008) [1]. The former authors estimated a density between 836 and 1,317 individuals per hectare at the localities of Andranomandry and Torotorofotsy.

The species occurs in four areas that include several localities outside Protected Areas and New Protected Areas (NPA), namely Mangabe. The largest population occurs in the future NPA.

A conservation plan to improve the management of the species is currently underway with the participation of all Malagasy stakeholders.

The cautious quota of 2,500 specimens was set at an *ad hoc* meeting organized by the Scientific Authority in December 2008. Density data published by Rabemananjara *et al.*, 2008 (d= 836; d= 1,267 and d=1,317) were

used to set the quota. Applying the quota allocation formula (Annex 1) to the minimum density, the quota of 2,500 specimens was the result of the following equation:

$$Q = N/S(fnxfa)np = 836 \times (0.25+0.25+1) \times (0.25+0.25) \times 4 = 2,508 \text{ (rounded off to 2,500)}$$

Where:

- Minimum density: 836
- Natural parameters: **fn=d+t+r**
  - d = 0.25, since the species is regionally restricted
  - t = 0.25, since its range is classified as b
  - r = 1, since the species is r-selected
- Anthropogenic parameters: **fa = h+c**
  - h = 0.25, since the habitat is relatively intact
  - c = 0.25, since the effect of the harvest is medium
- Number of harvest sites proposed: np = 4 (two sites in Torotorofotsy, Andranomandry and Andranomena)

The quota suspension for *M. aurantiaca* was adopted in 2004 after an effective Scientific Authority was established in Madagascar, on the basis of an ongoing study of trade (Rabemananjara *et al.*, 2008). Before the quota was suspended, the species was confused with *M. milotympanum* in exports prior to 2002. The export figures recorded in 2002 and 2003 that correspond to *M. aurantiaca* were 4,780 and 2,681 respectively (Rabemananjara *et al.*, 2008). Despite these export volumes, the species did not appear to suffer any declines in the localities visited (Behra *et al.* recorded 14 to 238 individuals/ha in 1995, compared to 836 to 1,267 individuals/ha recorded by Rabemananjara *et al.* between 2004 and 2007). The harvest ban has already had the desired effect on population densities. This justifies authorizing harvests with a cautious quota of 2,500 specimens in localities outside Protected Areas and measures to control the harvest system by designating sites and harvest quotas for each site.

Bora *et al.*, 2008 [1] published data on the distribution of *M. aurantiaca*. According to the findings of a recent study, currently under review for publication, *M. aurantiaca* is known to occur in 27 localities. These localities are distributed according to the following tenure scheme: 17 in the Category-VI New Protected Areas with temporary protection status since October 2008, five in privately-owned areas (a mining company), three in the Ramsar site and two in open-access areas. The harvest sites proposed for the 2,500 specimens are among the open-access areas and those in the New Protected Area buffer zones.

Considering this information, preparing a strategy and an action plan for the species was one of the main decisions made at the two discussion meetings held on 25 September 2009 and 21 October 2009. We are also considering a review of the IUCN status of the species.

#### *Mantella bernhardi*

No quotas were set for this species before 2005. A zero quota has been in place since 2005.

According to [7], density ranges from 600 to 4,480 individuals/ha.

Despite the high number of localities surveyed by Rabemananjara *et al.*, 2005 [8], Vieites *et al.*, 2006 [9] discovered that the Manombo population is a separate species. Thus, the number of harvest sites must be limited to the north of Manombo and a cautious quota of 650 specimens should be set.

**COMMENT:**

With the aim of reducing the intrinsic and extrinsic threats to Malagasy amphibians in the future and preventing the loss of species, a training and captive-breeding project involving non-endangered species and the various ecological guilds will be implemented next year by EAZA (European Association of Zoos and Aquaria) and ASG (Amphibian Specialist Group), in partnership with the Scientific Authority of Madagascar.

## ANNEX 1

The method used to calculate the quotas is the same method used by the Scientific Authorities to set quotas in previous years, using the following formula:

FORMULAS	Criteria		Coefficient
<p><b>1) Known density</b></p> <p><math>Q = N/S(fnxfa)np</math></p> <p>Q = quota</p> <p>fn = d+t+r (natural parameters)</p> <p>fa = h+c (anthropogenic parameters)</p> <p>d = distribution</p> <p>t = range (IUCN)</p> <p>r = mode of reproduction</p> <p>h = habitat</p> <p>c = harvest</p> <p>N = population size</p> <p>S = surface</p> <p>np = number of sites proposed</p>	habitat	degraded	1
		secondary	0.25
		primary	0.1
	harvest	high	0.1
		medium	0.25
		low	1
	reproduction	r-selected	1
		k-selected	0.25
	range	a	0.1
		b	0.25
		c	1
	<p><b>2) Unknown density</b></p> <p><math>Q = S(fnxfa)C</math></p> <p>C = constant 0.01</p> <p>S = extent of occurrence</p> <p>The other parameters are the same as above</p>		
distribution		RL	0.1
		RR	0.25
		LF	0.5
		L	1

RL: restricted localized distribution

RR: restricted regional distribution

LF: large fragmented distribution

L: large continuous distribution

## ANNEX 2

Species	Localities	Period	Population size N (Schnabel)	Population size with 95% c. i.	Study plot surface	"Density" /ha
<i>Mantella aurantiaca</i>	Andranomandry	21-23 Jan 2004	86	64 - 126	750m <sup>2</sup>	1267
	Torotorofotsy	20-25 Feb 2004	75	63 - 95	600m <sup>2</sup>	1317
<i>Mantella baroni</i>	Torotorofotsy	21-22 Jan 2007	201	167 - 251	2500m <sup>2</sup>	836
	Fanjavala	15-17 Jan 2004	108	81 - 161	2000m <sup>2</sup>	605
	Ampasimpotsy (Aatoetra)	5-7 Dec 2003	92	78 - 112	1089m <sup>2</sup>	872
<i>Mantella bernhardi</i>	Kidonavo	21-29 Jan 2004	49	37 - 72	600m <sup>2</sup>	900
	Mangevo, inside Ranomafina National Park	11-12 Dec 2003	41	32 - 59	750m <sup>2</sup>	600
<i>Mantella betsileo</i>	Mangevo, outside Ranomafina National Park	11-12 Dec 2003	316	254 - 420	750m <sup>2</sup>	4480
	Tolongoina	16-19 Dec 2003	73	57 - 101	750m <sup>2</sup>	1053
	Manombo	1-3 Feb 2004	88	60 - 163	480m <sup>2</sup>	2333
	Ankadirato	10-12 Sep 2003	253	207 - 325	400m <sup>2</sup>	6650
<i>Mantella crocea</i>	Kirindy	27-29 Nov 2003	208	182 - 244	625m <sup>2</sup>	3392
	Ankasy Marovoy	7-8 Feb 2004	35	27 - 49	200m <sup>2</sup>	1900
<i>Mantella laevigata</i>	Mirojejy	20-21 Dec 2003	189	134 - 319	250m <sup>2</sup>	9040
		19-21 Mar 2004	154	97 - 378	250m <sup>2</sup>	9480
<i>Mantella madagascariensis</i>	Fanjavala	15-17 Jan 2004	186	132 - 314	2000m <sup>2</sup>	1115
	Sahamarolambo (near Fierenana)	18-22 Feb 2003	283*	—	6000 m <sup>2</sup>	470*
		11-13 Aug 2003	62	46 - 93	625m <sup>2</sup>	1120
		30 Jan - 1 Feb 2004	217	181 - 272	625m <sup>2</sup>	3616
	4-6 Apr 2004	86	69 - 111	625m <sup>2</sup>	1440	
<i>Mantella puichra</i>	An'Ala	9-11 Jan 2004	98	82 - 124	400m <sup>2</sup>	2575
	Andranomantsina	30 Aug - 1 Sep 2003	467	407 - 548	50m <sup>2</sup>	95400
26-28 Nov 2003		430	314 - 683	50m <sup>2</sup>	99600	
30 Aug - 1 Sep 2003		100	81 - 131	50m <sup>2</sup>	21200	
<i>Mantella viridis</i>	Andohatany	26-28 Nov 2003	75	49 - 157	50m <sup>2</sup>	20800

Tab. I. Summary of population size estimates carried out on *Mantella* populations using mark-recapture methods. The definitive densities were calculated based on population sizes averaged from the Schnabel estimator with 95% confidence interval. The population size of *M. milotympanum*, here reproduced from Vieites et al. (2005) (with asterisk) was calculated as average of Petersen (1896) estimates. Note the population "densities" calculated in the last column refer only to densities of the specimens at the study plots, and are merely reported to emphasize these frogs can occur in very dense breeding aggregations in very small areas, but these data should in no case be extrapolated to larger areas.

## REFERENCES

- [1] Bora P., Dolch R., Jenkins R., Jovanovic O., Rabemananjara F. C. E., Randrianirina J., Rafanomezantsoa J., Raharivololoniaina L., Ramilijaona O., Raminosoa N., Randrianelona R., Raselimanana A., Razafimahatratra B., Razafindrabe T. & Vences M. 2008. Geographical distribution of three species of Malagasy poison frogs of high conservation priority: *Mantella aurantiaca*, *M. crocea* and *M. milotympanum*. *Herpetology notes* 1: 39-48
- [2] Mercurio V., Aprea G., Crottini A., Mattioli F., Randrianirina J. E., Razafindrabe T. J. & Andreone F. 2008. The amphibians of Isalo massif, southern-central Madagascar: high frog diversity in an apparently hostile dry habitat. In *Monografie del Museo Regionale di Scienze Naturali di Torino*, XLV. Pp 143-196.
- [3] Crottini, et al., 2008. Into the canyons: the phylogeography of the Malagasy frogs *Mantella expectata* and *Scaphiophryne gottlebei* in the arid Isalo Massif, and its significance for conservation (Amphibia: Mantellidae and Microhylidae). *Organisms Diversity & Evolution*, 8 (5): 368-377.
- [4] Andreone, F., Cox, N., A., Glaw, F., Köhler, J., Rabibisoa, N. H. C., Randriamahazo, H., Randrianasolo, H., Raxworthy, C. J., Stuart, S. N., Vallan, D. & Vences, M. 2008. Update of the Global Amphibian Assessment for Madagascar in light of species discoveries, nomenclature changes, and new field information. In: Andreone F. (ed), *A Conservation Strategy for the Amphibians of Madagascar*. Monografie, 45. Museo Regionale di Scienze Naturali, Torino. Pp 419-436.
- [5] Glaw F. & Vences M. 2008. A fieldguide of amphibians and reptiles of Madagascar. Third edition.
- [6] Mercurio, V. & Andreone, F. 2008. New distribution data of the green mantella, *Mantella viridis*, from northern Madagascar (Anura, Mantellidae). *Herpetology notes* 1: 3-7.
- [7] Rabemananjara F. C. E., Bora P., Razafindrabe T. J., Randriamitso E., Ramilijaona R. O., Raminosoa R. N., Rakotondravony D., Vieites D. R., Vences M. 2008. Rapid assessment of population sizes in ten species of Malagasy Poison frogs, genus *Mantella*. In *Monografie del Museo Regionale di Scienze Naturali di Torino*, XLV. Pp 253-264.
- [8] Rabemananjara F.C.E., Bora, P., Cadle J. E., Andreone F., Rajeriarison E., Talata P., Glaw F., Vences M. & Vieites D. R., 2005. New records, potential distribution and conservation of *Mantella bernhardi*, an endangered frog species from south-eastern Madagascar. *Oryx* 39 (3), July 2005. pp. 339-342.
- [9] Vieites D. R., Chiari Y., Vences M., Andreone F., Rabemananjara F., Bora P., Nieto-Román S. & Meyer A., 2006 - Mitochondrial evidence for distinct phylogeographic units in the endangered Malagasy poison frog *Mantella bernhardi*. *Molecular Ecology* 15, 1617-1625.
- [10] Rabemananjara F.C.E., Rasoamampionona Raminosoa N., Ramilijaona Ravoahangimalala O., Rakotondravony D., Andreone F., Bora P., Carpenter A.I., Glaw F., Razafindrabe T., Vallan D., Vieites D. R. & Vences M. (2008). Malagasy poison frogs in the pet trade: a survey of levels of exploitation of species in the genus *Mantella*. In: Andreone F. (ed), *A Conservation Strategy for the Amphibians of Madagascar*. Monografie, 45. Museo Regionale di Scienze Naturali, Torino. Pp 277-300.