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

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Interpretation and implementation matters

General compliance and enforcement

Captive-bred and ranched specimens

GUIDANCE FOR INSPECTION OF CAPTIVE BREEDING AND RANCHING FACILITIES

The attached information document has been submitted by the Species Survival Network (SSN) * in relation to agenda item 14.

* *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.*

The following report analyzes data contained in the CITES Trade Database for trade in captive-bred, farmed, or ranched amphibians from 2012-2015. The database provided approximately 1,500 lines of data describing the trade of almost 200,000 captive-bred (C), farmed (F), confiscated (I), pre-convention (O), or ranched (R) amphibians for all purposes. This report includes data for live specimens, as well as bodies and parts and derivatives. The data was extracted by means of comparative tabulations of reported imports and exports. Latin American countries, particularly Panama and Nicaragua, were common exporters while North American and European countries, such as Canada, the United States, and the Netherlands, were common importers. Canada and the United States were heavily involved in both import and export for commercial purposes. Moreover, the United States was particularly active in importing for zoo purposes.

1. INTERNATIONAL AMPHIBIAN TRADE

1.1. TOP 5 IMPORTERS BY VOLUME 2012-2015

The country of export is the country that exported the shipment directly to the importing country, but not necessarily the country where the shipment originated. Countries reported a total of 171,810 amphibians imported for all purposes live or dead from 2012-2015, not including specimens known to be sourced from the wild (see Table 1). The top five importing countries accounted for approximately 72% of total trade over the four years.

- Imports to the United States declined steadily each year from 2012-2015.
- Although imports to Japan decreased slightly from 2012-2013, imports to Japan increased each year following 2013. Ultimately, Japan imported 764 more amphibians in 2014 than it did in 2013, and almost 500 more amphibians in 2015 than it did in 2014.
- Imports to Spain were infrequent, but voluminous. Spain imported only from Latin American countries; i.e., Nicaragua, Panama, and Peru. Between 2012 and 2013 Spain imported a total of 850 amphibians. However, that number increased to 4,650 between 2014-2015, that is nearly a 550% increase from the preceding two years.
- There was a 59% increase in imports to the Netherlands from 2012 to 2013: from 550 to 940 amphibians. Over the next two years the Netherlands imported 1,189 and 1,136 amphibians, respectively.
- France experienced an increase from 2013-2014 of about 180 imported amphibians.

Table 1. Top 5 Countries of Import 2012-2015

Rank	Country of Import	Reported Import (excluding known wild speciments)	Percent of Total Reported Import (N=171,810)	Quantity by Purpose	Percent by Purpose
1	United States	96,110	56.01%	127 B; 1 M; 2 P; 16,257 S; 79,723 T	0.13% B; 0.002% P; 16.91% S; 82.95% T
2	Japan	14,038	8.2%	1 M; 250 S; 13,787 T	0.007% M; 17.81% S; 98.21% T
3	Spain	5,500	3.2%	5,500 T	100% T
4	Netherlands	3,815	2.22%	15 M; 3,800 T	0.39% M; 99.61% T
5	France	3,732	2.17%	238 B; 3,444 T; 50 Z	6.38% B; 92.28% T; 1.34% Z

Purpose Legend
B: Breeding in captivity or artificial propagation
M: Medical
N: Reintroduction or introduction into the wild
P: Personal
S: Scientific
T: Commercial
Z: Zoo
XX: Purpose unreported

1.2. Top 5 Exporters by Volume 2012-2015

Exporting countries reported a total of 171,351 live or dead amphibians from 2012-2015. The top five exporting countries accounted for almost 95% of all reported exports.

- 94,488 *Agalychnis callidryas* exported from Nicaragua accounted for 55% of all exported amphibians.
- The top species exported from the second-leading exporter, Panama, was the Strawberry poison frog (*Oophaga pumilio)* (IUCN status - LC). In total, 17,646 non-wild *O. pumilio* were exported.
- The United States exported 2,826 non-wild *Ambystoma mexicanum*, accounting for 70% of total global exports.

Table 2. Top 5 Countries of Export 2012-2015

Rank	Country of Export	Reported Export	Percent of Total Reported Export (N=171,902)	Quantity by Purpose	Percent by Purpose
1	Nicaragua	99,701	58%	10,399 S; 89,302 T	10.43% S; 89.57% T
2	Panama	26,004	15.13%	17,858 T; 8,146 XX	68.67% T; 31.33% XX
3	United States	18,119	10.54%	1,500 N; 26 P; 3,327 S; 13,266 T	8.28% N; .14% P; 18.36% S; 73.22% T
4	Canada	13,527	7.87%	13,389 T; 138 Z	98.98% T; 1.02% Z
5	Netherlands	5,059	2.94%	5,043 T; 16 Z	99.68% T; .32% Z

1.3. Top 5 Routes by Volume Exported 2012-2015

The trade route from Nicaragua to the United States alone was responsible for 45% of the 171,351 reported exports from 2012-2015.

- *A. callidryas* and *O. pumolio* were the only species traded along this route.
- *O. pumilio* was the most common species exported from Panama to Belgium and the United States, followed by the Green poison frog (*Dendrobates auratus*).
- However, there were 7,000 more *A. callidryas* than *O. pumilio* shipped between the two countries. *Agalychnis callidryas* was the most common export by a wide margin from Nicaragua to Canada.
- The Canada-Netherlands trade route included the most diverse array of species, with *Ranitomeya fantastica* the most numerous species exported after *A. callidryas*.

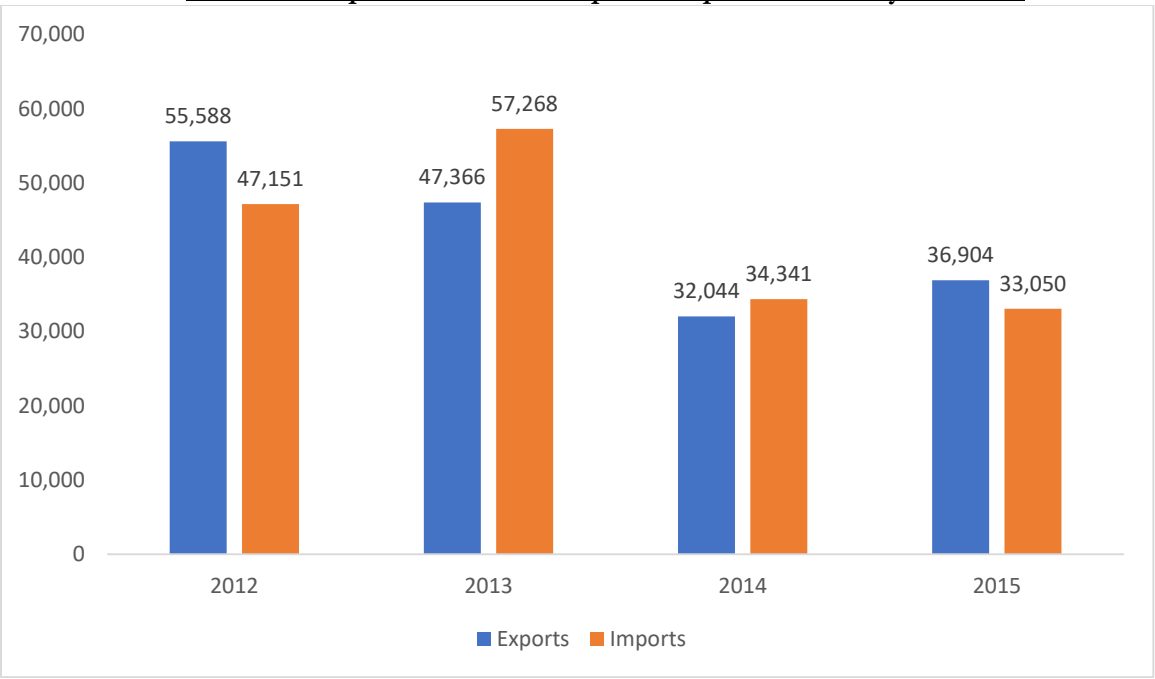
Table 3. Top 5 Routes by Volume Exported 2012-2015

Rank	Country of Export	Country of Import	Reported Export	Percent of Total Export	Purpose by Quantity	Purpose by Percent of Export
1	Nicaragua	United States	76,550	44.63%	66,151 T; 10,399 S	86.42% T; 13.58% S
2	Panama	Belgium	11,600	6.76%	7,600 T; 4,000 XX	65.52%; 34.48% XX
3	Panama	United States	9,150	5.33%	6,850 T; 2,300 XX	74.86% T; 25.14% XX
4	Nicaragua	Canada	6,800	3.96%	6,800 T	100% T
5	Canada	the Netherlands	3,969	2.31%	3,969 T	100% T

1.4. Gross Annual Exports and Imports Reported 2012-2015

The following figure illustrates gross exports and imports of amphibian from C, F, I, O, or R sources for all purposes from each year between 2012-2015. Although reported imports declined slightly from 2014-2015, the reported exports increased by nearly 5,000.

Figure 1. Gross Number of Exports and Imports of Captive-bred, Farmed, Confiscated, or Ranched Amphibians for All Purposes Reported Annually 2012-2015



1.5. Top 5 Species Exported 2012-2015

Countries reported trade in seventy-one amphibian species from 2012-2015. Some of the species traded, such as *A. callidryas*, are listed as Least Concern by IUCN,[1] while others, like *A. mexicanum*, are listed as Critically Endangered.[2]

[1] Solís, F., Ibáñez, R., Santos-Barrera, G., Jungfer, K., Renjifo, J. & Bolaños, F. 2008. *Agalychnis callidryas*. The IUCN Red List of Threatened Species 2008: e.T55290A11274916. http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T55290A11274916.en.

[2] Luis Zambrano, Paola Mosig Reidl, Jeanne McKay, Richard Griffiths, Brad Shaffer, Oscar Flores-Villela, Gabriela Parra-Olea, David Wake. 2010. *Ambystoma mexicanum*. The IUCN Red List of Threatened Species 2010: e.T1095A3229615. http://dx.doi.org/10.2305/IUCN.UK.2010-2.RLTS.T1095A3229615.en.

- *Nectophrynoides asperginis* is listed as "Extinct in the Wild",[3] yet its trade was fourth-highest of all amphibian species from 2012-2015.
- *A. callidryas* exports decreased from 2012-2013, then again from 2013-2014. However, the number of *A. callidryas* exported increased by nearly 9,000 from 2014-2015.
- About 90% of *A. callidryas* trade was for commercial purposes.
- Trade in *O. pumilio* (Least Concern) decreased from 2012-2013, but jumped by nearly 2,000 exports in 2014.
- For the most part, exports of *D. auratus* (Least Concern) were stable from 2012-2014, but exports rose by 1,000 from 2012-2013.

- Reported exports of *N. asperginis* decreased each year.
- Exports of *A. mexicanum* increased from 1,029 in 2012 to 1,044 in 2013. From 2013-2015 its trade receded marginally. Notwithstanding the dip in trade over the four years, *A. mexicanum* still outpaced the total trade of the sixth most-commonly traded species, *Dendrobates tinctorius* (Least Concern), by nearly 300 exports.

Table 4. Top 5 Captive-Bred, Farmed, or Ranched Amphibian Species Exported 2012-2015

Rank	Common name	Species	Total Reported Export	IUCN Red List	Source by Quantity	Source by Percent	Purpose by Quantity	Purpose by Percent
1	Red-eyed tree frog	*Agalychnis callidryas*	101,715	Least Concern	101,549 C; 158 F; 8 I	99.84% C; 0.16% F	10,605 S; 91,070 T; 40 Z	10.43% S; 89.53% T; 0.04% Z
2	Strawberry poison frog	*Oophaga pumilio*	24,726	Least Concern	24,710 C; 6 F; 10 I	99.94% C; 0.02% F; 0.04% I	18,600 T; 6,126 XX	75.22% T; 24.78% XX
3	Green poison frog	*Dendrobates auratus*	12,246	Least Concern	12,145 C; 101 F	99.18% C; 0.82% F	10,116 T; 110 Z; 2,020 XX	82.61% T; 0.9% Z; 16.5% XX
4	Kihansi spray toad	*Nectophrynoides asperginis*	7,000	Extinct in the Wild	2,000 C; 5,000 F	28.57% C; 71.43% F	1,500 N; 500 S; 5,000 Z	21.43% N; 7.14% S; 71.43% Z
5	Axolotl	*Ambystoma mexicanum*	3,823	Critically Endangered	3,993 C; 10 F	99.75% C; 0.25% F	8 P; 2,839 S; 956 T; 20 Z	.21% P; 74.26% S; 25.01% T; .52% Z

Source Legend
C: Bred in captivity
F: Born in captivity
I: Confiscated or seized specimens

[3] IUCN SSC Amphibian Specialist Group. 2015. *Nectophrynoides asperginis*. The IUCN Red List of Threatened Species 2015: e.T54837A16935685. http://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T54837A16935685.en.

CRITICAL ANALYSIS: *AGALYCHNIS CALLIDRYAS*, *DENDROBATES AURATUS*, *OOPHAGA PUMILIO*

Three species – *A. callidryas*, *D. auratus*, and *O. pumilio* – were analyzed more critically than the others. SC62 Doc.26 and SC66 Doc 41.1 identify these species as requiring close monitoring and careful consideration. We consider these three species as deserving further consideration at AC29 because the large numbers of these species being traded as bred in captivity does not match what is known about the requirements for breeding them, particularly in the countries of origin. If these specimens have actually been sourced from the wild, the numbers involved are high enough to pose a potential threat to the species' survival.

2.1. *AGALYCHNIS CALLIDRYAS*

In *A. callidryas*, the smaller male attaches himself to the female on the underside of a leaf when her eggs are mature. The male then inseminates the eggs as they emerge from the female. The female must then enter the water with the male still attached to her back, to keep her eggs moist and hydrated. *A. callidryas* is distinct from many other species in that it lays its eggs on the underside of leaves hanging over water, rather than directly in the water. This process may take over a day to complete. Reproduction is therefore a particularly strenuous activity for *A. callidryas*. The species is common in the pet trade[4] although wild populations are threatened by increasing habitat degradation[5].

- *A. callidryas* was identified in SC62 Doc. 26 (July, 2012) as cause for concern warranting further examination. AC29 Doc. 14.1also identified *Agalychnis callidryas* as a species of concern. Trade in this species has nonetheless rapidly increased in recent years.
- From 2012-2015, trade in *A. callidryas* was over 400% larger (over 77,000 more specimens) than that in the highly-traded *O. pumilio*.
- 100% of *A. callidryas* were from claimed captive-bred sources, and over 91,000 were exported for commercial or zoo purposes.[6]
- The source of specimens in trade is not claimed to be from the wild. Exports of wild *A. callidryas* from Nicaragua have been banned since 2005. Yet, Nicaragua has come extremely close to reaching its annual export quota of 30,000 specimens each year since 2010; and at least one conservation scientist has expressed concern that the country does not have breeding facilities capable of producing such high numbers of frogs of any species.[7]
- In 2010, 2011, and 2012, the United States imported 7,929, 20,206, and 23,732 captive-bred *A. callidryas*.
- Each year except 2014, exporters reported higher quantities of *A. callidryas* than importers (more than 5,000 fewer in 2014.
- Four shipments exceeded 10,000 specimens, all of which were exported from Nicaragua to the United States. These four shipments totalled to 73,164: 72% of the 101,715 total reported exports.

[4] http://animaldiversity.org/accounts/Agalychnis_callidryas/

[5] *See* Wilson, Larry David, and James R McCranie. "The Conservation Status of the Herpetofauna of Honduras." *Amphibian and Reptile Conservation* 3.1 (2004): 6–33. *PMC*. Web. 10 July 2017 (discussing the threat of environmental degradation to Central and South American herpetofauna); *see also* Díaz-Gallegos, J. R., Mas, J.-F. and Velázquez, A. (2010), Trends of tropical deforestation in Southeast Mexico. Singapore Journal of Tropical Geography, 31: 180–196. doi: 10.1111/j.1467-9493.2010.00396.x; Gourdji, Sharon; Läderach, Peter; Martinez Valle, Armando; Zelaya Martinez, Carlos; Lobell, David B.. 2014. Historical climate trends, deforestation, and maize and bean yields in Nicaragua. Agricultural and Forest Meteorology 200 (15): 270-281 (discussing the detrimental effects climate change and environmental degradation have on Nicaragua).

[6] Table 4.

[7] Joseph R. Mendelson III, PhD, noted in a 2014 personal communication, that Nicaragua likely does not have sufficient breeding facilities for such high numbers of frogs. Mendelson is the Director of Research at Zoo Atlanta and an adjunct associate professor at the Georgia Institute of Technology School of Biology.

Table 5. Top 5 Largest *Agalychnis callidryas* Export Shipments

Rank	Year	Country of Import	Country of Export	Importer Quantity	Exporter Quantity
1	2012	United States	Nicaragua	23,730	26,802
2	2013	United States	Nicaragua	17,290	20,356
3	2015	United States	Nicaragua	14,935	15,607
4	2014	United States	Nicaragua	16,100	10,399
5	2015	Canada	Nicaragua	--	3,450

Table 6. *Agalychnis callidryas* Top 5 Trade Routes 2012-2015

Together the top five trade routes by volume represent 85% of total exports.

Rank	Country of Export	Country of Import	Reported Export	Percentage of Total Export
1	Nicaragua	United States	73,164	71.93%
2	Nicaragua	Canada	6,700	6.59%
3	Nicaragua	Spain	3,050	3.0%
4	Nicaragua	Hong Kong	2,100	2.06%
5	Nicaragua	Japan	2,093	2.06%

2.2. *DENDROBATES AURATUS*

D. auratus reproduce during the rainy season and females can lay up to six eggs in the water at a time. After about two weeks, the eggs hatch and the male carries the tadpoles on his back to another body of water. The tadpoles are on their own once released by the male, and reach adulthood in about another six weeks.[8] The Panamanian blue morph of *D. auratus* is believed to be threatened with extinction.[9]

- With a total of 12,246 specimens exported, *D. auratus* was behind only *Agalychnis callidryas* and *Oophaga pumilio* in total exports over all four years.[10]
- Panama and Canada together accounted for nearly 90%, and the top five exporting countries together for 98.11%, of all *D. auratus* exports.[11]
- Over two-thirds of all *D. auratus* exports occurred along the top five trade routes: Panama-Belgium, Panama-United States, Canada-Netherlands, Panama-Japan, and Canada-United States.[12]
- Although internet advertisements from Panama describe captive-bred *Dendrobates auratus* as "farmed", doubts have been expressed that specimens of *Dendrobates auratus* specimens exported from Panama originate from a non-wild source.[13] This concern was raised in AC27 Doc. 17 Annex 1. It may be scientifically and economically impracticable for this species to be captive-bred within the country at such high commercial volumes.[14]
- Although *D. auratus* has been categorized by IUCN as Least Concern, the loss of suitable wooded habitat and the frequency of the frogs' presence in the international pet market, especially if the animals are indeed being sourced from the wild, create concern for future population numbers.[15]

[8] http://www.rosamondgiffordzoo.org/assets/uploads/animals/pdf/GreenBlackPoisonDartFrog.pdf
[9] http://www.iucnredlist.org/details/55174/0
[10] Table 4.
[11] Table 7.
[12] Table 8.
[13] A 2014 personal communication with Mendelson revealed that he "did not know of any breeding facility which is capable of producing this many adult frogs of any species."
[14] Mendelson also stated that, after visiting a Panamanian breeding facility, "In the breeding facility I only found adult specimens; no tadpoles – which does not make sense for a business. If they were farmed, there should have been juveniles and tadpoles in that operation."
[15] Solís, F., Ibáñez, R., Jaramillo, C., Chaves, G., Savage, J., Köhler, G., Jungfer, K., Bolívar, W. & Bolaños, F. 2008. *Dendrobates auratus*. The IUCN Red List of Threatened Species 2008: e.T55174A11250892. http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T55174A11250892.en.

- SC62 Doc 26 identifies the species as warranting further examination. The CITES Secretariat pointed out in SC 66 Doc 41.1 that *D. auratus* is difficult to breed species in captivity because of its complex reproductive mechanisms, including the male's responsibility of transporting hatchlings to water bodies after birth.[16] The species was identified for further review at SC66.

Table 7. Top 5 *Dendrobates auratus* Exporting Countries by Volume 2012-2015

Rank	Country of Export	Reported Export	Percent of Total Export
1	Panama	8,358	68.25%
2	Canada	2,583	21.09%
3	the Netherlands	487	3.98%
4	United States	483	3.94%
5	Germany	103	.85%

Table 8. Top 5 *Dendrobates auratus* Trade Routes by Export 2012-2015

Rank	Country of Export	Country of Import	Reported Export	Percent of Total Export
1	Panama	Belgium	3,750	30.62%
2	Panama	United States	2,200	17.97%
3	Canada	the Netherlands	951	7.77%
4	Panama	Japan	750	6.12%
5	Canada	United States	602	4.92%

2.3. *OOPHAGA PUMILIO*

The breeding season for *O. pumilio* can last up to ten months, but breeding will be successful only under favorable moist conditions. *O. pumilio* reaches sexual maturity at about ten months, and females generally give birth to three to five offspring. Both males and females will mate with different partners in each breeding season, and males will compete with other males for larger territory during this time to increase their likelihood of mating. After ten to fourteen days the eggs will develop into tadpoles under the male's care, at which point the female will take over. It will take forty-three to fifty-two days for the tadpoles to become adults. In addition to the pet trade, , *O. pumilio* are also taken because their alkaloid poison may have medical value despite a lack of any major breakthroughs in medical research involving this species.[17]

- *O. pumilio* was exported as live or dead specimens in greater numbers than for any other amphibian except *A. callidryas* every year both from 2012-2015.
- Of the 24,726 *O. pumilio* exported between 2012-2015, about 71% came from Panama and 21% from Nicaragua.[18]
- The top five exporters amounted to a monopoly in the *O. pumilio* trade, accounting for 99% of overall exports.[19]
- 60% of trade involved Panama exporting *O. pumilio* to either Belgium or the United States.[20]
- Panama was the exporter in four out of the five most common trade routes: Panama-Belgium, Panama-United States, Nicaragua-United States, Panama-Japan, Panama-Germany.[21]

[16] SC 66 Doc 41.1 went on to explain on page 9 that "it would . . . be easy for the [Panamanian] facility to be used to export wild-taken specimens as captive-bred. The Secretariat sent TRAFFIC's report to the Panamanian MA for comment, but has received no response." Available here: https://cites.org/sites/default/files/eng/com/sc/66/E-SC66-41-01x.pdf.
[17] http://animaldiversity.org/accounts/Oophaga_pumilio/#6b74b8042c9336076992aa116e20284a
[18] Table 4; table 9.
[19] Table 9.
[20] Table 10.
[21] *Id.*

- *O. pumilio* exports were more than double those of the the next most-commonly traded species and, like *D. auratus*, it appears unlikely that the species can be commercially bred in such high volumes.[22] AC27 Doc. 17 indicated that the same trade practices that threaten *D. auratus*, including misleading advertisements and a lack of breeding facilities, also threaten *O. pumilio*.
- AC29 Doc. 14.1 identified *O. pumilio* (listed as *D. pumilio*) as a species of concern. Despite being considered "common" by the IUCN in Costa Rica, Nicaragua, and Panama; unsustainable collection and habitat loss may lead to an increase in fragmentation and risk to remaining populations[23].

Table 9. Top 5 *Oophaga pumilio* Exporting Countries by Volume 2012-2015

Rank	Country of Export	Reported Export	Percent of Total Export (N=24,726)
1	Panama	17,646	71.37%
2	Nicaragua	5,213	21.08%
3	United States	847	3.43%
4	Netherlands	548	2.22%
5	Costa Rica	295	1.19%

Table 10. Top 5 *Oophaga pumilio* Trade Routes by Export 2012-2015

Rank	Country of Export	Country of Import	Reported Export	Percent of Total Export
1	Panama	Belgium	7,850	31.75%
2	Panama	United States	6,950	28.11%
3	Nicaragua	United States	3,386	13.69%
4	Panama	Japan	1,018	17.81%
5	Panama	Germany	850	3.44%

[22] Mendelson extended his concerns about breeding facilities for *D. auratus*, as noted in footnote 14 and accompanying text, to those for *O. pumilio*.

[23] IUCN SSC Amphibian Specialist Group. 2015. *Oophaga pumilio*. The IUCN Red List of Threatened Species 2015: e.T55196A3025630. http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T55196A3025630.en.