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Efforts to Combat Wild Animals Trafficking in Brazil

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1. Introduction

Wildlife trafficking, including the flora, fauna and their products and byproducts, is considered the third largest illegal activity in the world, after weapons and drugs trafficking. Considering only the wild animals trafficking in Brazil, it is estimated that about 38 million specimens are captured from nature annually and approximately four million of those are sold. Based on the data of animals seized and their prices, it is suggested that this Country deals with about two billion and five hundred million dollars a year [1].

The wildlife trafficking networks, like any other criminal network, have great flexibility and adaptability and join with other categories or activities (legal or illegal), such as drugs, weapons, alcohol, and precious stones. Their products are often sent from the same regions and have similar practices such as forgery, bribery of officials, tax evasion, fraudulent customs declarations, among many others [1].

In some cases, the criminals are infiltrated in public agencies to entice public officials and, in case of problems in the target Country, they can move with ease to other destination. Moreover, people involved can be easily replaced by others more efficient, reliable and qualified for the activity. This great power of mobility and changeability is one of the major problems to map the criminal networks and their local of action [2].

Although modern techniques has been used, around the world, to help the enforcement in the combat of illegal wildlife trade [3,4,5], the trafficking structure still presents features in common with the set of network information, because it requires equipment that enables the continuous exchange of information on routes, on the most quoted animals at the black market, on new forms of fraud and on corruption pathways. The new technologies are more and more used to increase the possibility of success on criminal operations, either through the use of cell phones, computers to defraud documentation, or internet sales, among others [2].

According to the report of the National Network to Combating Wild Animal Trafficking [1], there are four methods that encourage the illegal trade in wild animal: (a) animals for zoos and private collectors, (b) for scientific use/ biopiracy, (c) for pet shops and (d) for products and byproducts.

However, it is known that identifying the site of capture isn't an easy task, because the locals where the animals are confiscated usually differs from where they were captured. Furthermore, the capture and the sale of wild animals and their byproducts are not concentrated in one only place and do not always follow the same destiny: the movement is intense, with many destinations. After being captured, the animals commonly pass through small and medium traffickers who make the connection with Brazilian and international large dealers, however, the animals can also be sold by internet, pet shops and illegal fairs [2].

Although the trafficking consequences are numerous, it is possible to group them into three main branches: (a) Sanitary, since illegal animals are sold without any sanitary control and can transmit serious diseases, including unknown ones, onto domestic breeding and people [1,2,6]; (b) economic/social, as the trafficking moves incalculable amounts of financial resources without bringing income to the public coffers [1]; and (c) Ecological, since the capture from nature done without discretion accelerate the process of extinction of species, causes damage to ecological interactions and loss of the genetic heritage. Moreover, the trafficking can also bring ecological damage arising from the introduction of exotic specimens, that, although acquired as pets, are being abandoned by their owners in various natural areas [1].

Illegal wildlife trafficking is an extremely lucrative crime with serious consequences yet relatively low penalties and few prosecutions [3]. Besides all the complicating factors inherent to the trafficking, the researchers of this subject are facing yet the lack of organized and systematized data and information [2]. In addition, the studies on trafficking and its impacts on biota are also scarce [7], what makes the task of systematization even more complex.

Thus, through this work, we presented a national view of the control and combat actions towards the wild animals trafficking in Brazil through the existing information at the corporative systems managed by the Brazilian Institute of Environment and Renewable Natural Resources - IBAMA. As specific goals, we aimed to:

- Historically evaluate the gradual development of the Brazilian environmental enforcement related to fauna;
- Map the Brazilian States where there are greater efforts against wild animals trafficking, as well as the most confiscated species;
- Evaluate the major forms of admission and destination of the wild animals present at the Rehabilitation Centers;
- List the main perspectives and recommendations of actions to combat wild animals trafficking in Brazil.

2. The enforcement for conservation of wild animals in Brazil

For the preparation of this paper we used, primarily, historical information present in four information systems (Table 1), all managed by IBAMA. This information was compiled, systematized and analyzed together with literature data.

System	Name	Objective
SICAFI	Recording, Levying and Enforcement System	Responsible for recording data and information relating to environmental enforcement activities performed by IBAMA and partners institutions
SISPASS	Recording Passeriform Amateur Breeders System	Responsible for the control of the activity of Amateur and Commercial Passeriform ¹ Breeders
SISFAUNA	Fauna Management System	Responsible for the management of wild animals in captivity, including the emissions of permits, stock control, domestic trade, licenses issued and carried out transactions
SISCITES	System for the importation and exportation of specimens, biological stuff, native and exotic wildlife products and byproducts	Controls the importation and exportation of species listed in the CITES ² appendices

Table 1. Information systems related to wildlife and managed by IBAMA.

In Figure 1 we summarized data from the Wild Animals Rehabilitation Centers – CETAS, on all the confiscated wild animals placed there during eight years. The CETAS are responsible for receiving, identifying, marking, selecting, evaluating, recovering, rehabilitating and placing wild animals. Furthermore, they are important allies to the actions for the repression of trafficking because they provide relevant information about confiscated wild animals or from voluntary delivery.

As recommended by the Brazilian Environmental Policy and showed in Figure 1, the State supervision related to illegal wildlife, under the responsibility of the Environmental Military Police, has steadily increased in number and efficiency, thanks to ongoing efforts to decentralize responsibilities in the Country. Thus, IBAMA has been able to focus on major crimes, with significant results through the dissuasion of his actions. It is important to inform that in Brazil, the fines are applied per animal. So, due to that, Minas Gerais (which had the highest participation of environment military police) has the largest number of fines (Figure 2), but it doesn't reflect the absolute value. This happens because of the type of inspection that fights against the final receptors of wild animal traffic.

¹ IBAMA's Normative Instruction No 15/2010

² CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora (www.cites.org). The Brazilian CITES Management and Enforcement Authorities are represented by IBAMA.

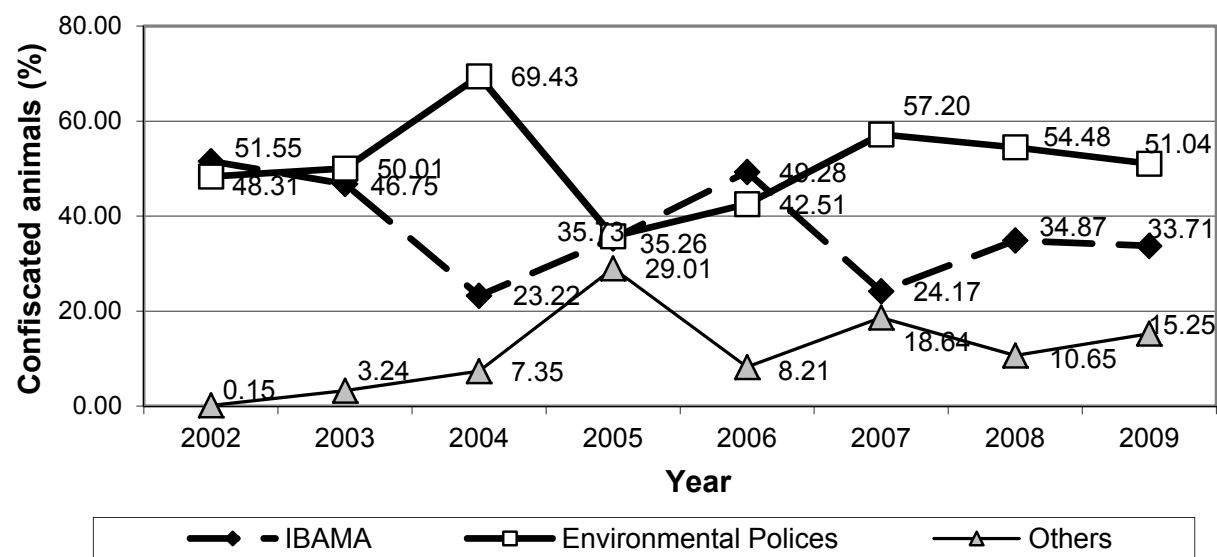


Figure 1. Number of confiscated wild animals received by CETAS

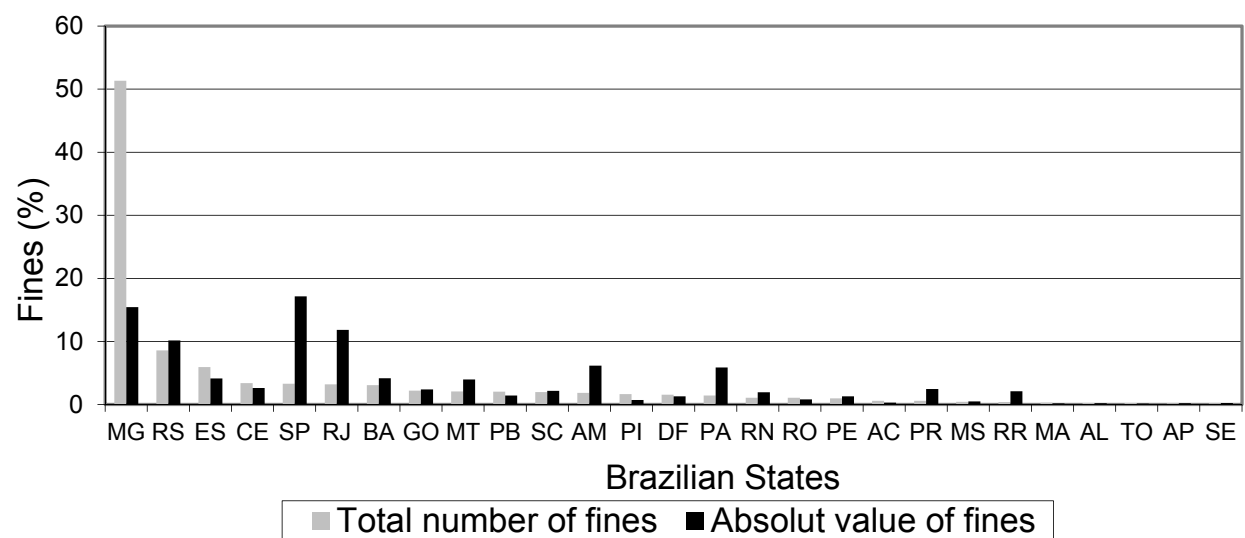


Figure 2. Percentage of Fauna fines per Brazilian State and their absolut value from 2005 to 2010.

In Figure 2, the distinction among each Brazillian State on the combat against illegal actions related to wild animals is clear. The States of Rio Grande do Sul (RS), Minas Gerais (MG), Espírito Santo (ES), São Paulo (SP) and Rio de Janeiro (RJ) were the ones with the highest numbers of fines applied between 2005 and 2010. The last four are located in the southeastern region, where is the demand from the majority of animals from traffic. The States of Sergipe (SE) and Tocantins (TO) emerged with the lowest numbers. The States with the highest absolute values applied in fines were São Paulo (SP), Minas Gerais (MG), Rio de Janeiro (RJ), Rio Grande do Sul (RS), Amazonas (AM) and Pará (PA) (both last ones are located in the rainforrest region and represent one of the main sites where some taxon are captured), unlike the States of Maranhão (MA) and Tocantins (TO), which had the lowest absolute number.

We emphasize that the animals confiscated by Brazilian environmental agencies represent only a portion of the damage [8]. The task of estimating the amount of animals withdrawn from nature per year becomes even more difficult if we consider that the possession of a wild animal captured from nature in Brazil is a common practice, despite being prohibited by law. However, IBAMA's Department of Fish and Wildlife points out that the CETAS alone received in 2008 more than 60,000 animals and were destined more than 40,000 (Figure 4). We noticed, yet, that this number is still small. It happens because most of the animals confiscated in actions of inspection are released into the wild, due to the fact that they are still in savage condition.

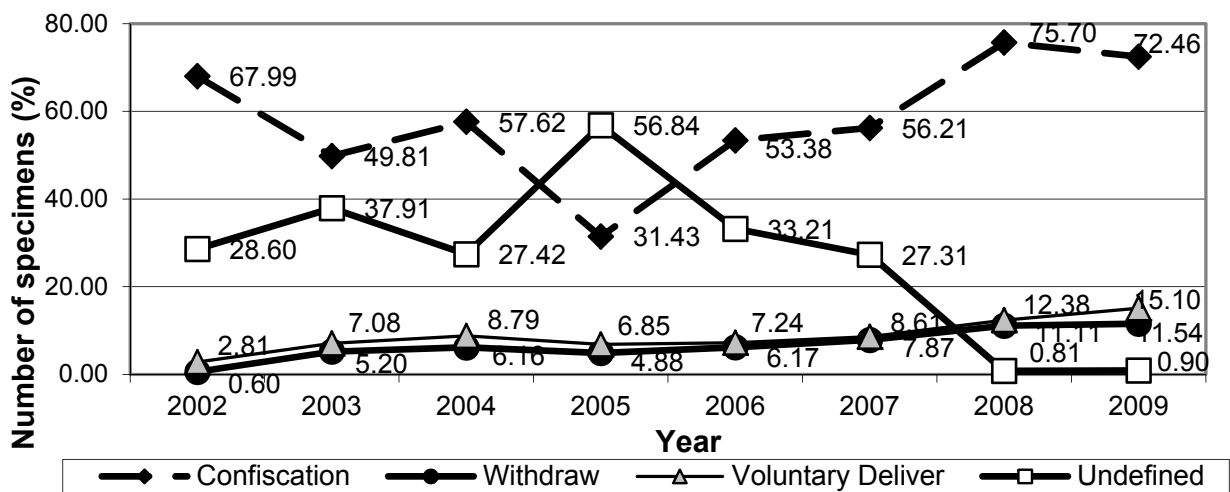


Figure 3. Number of wild animals received by CETAS and their different forms of admission.

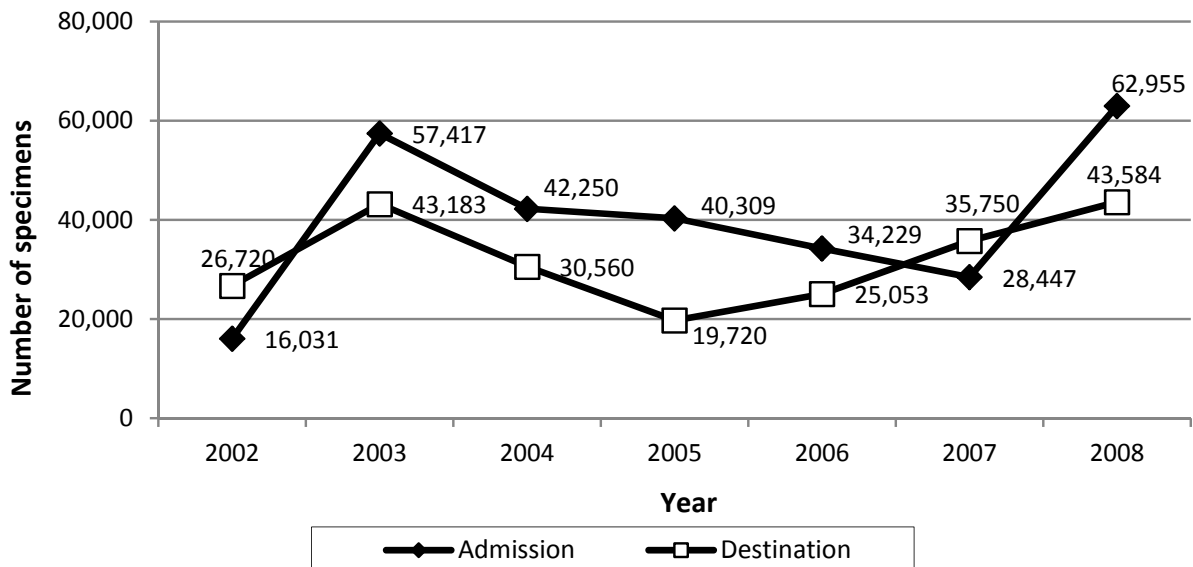


Figure 4. Relationship between admission and destination of specimens in CETAS between 2002 and 2008, in absolute numbers.

The Figure 5 and the Table 2 gather the destinations given to animals from CETAS, between 2002 and 2009. We observed that the releases, after the declining trend observed between 2004 and 2007, re-emerged as the main destination given to the confiscated animals in Brazil, reaching almost 23,000 specimens released into the wild in 2008. The placement in captivity, widely used in 2006 and 2007, has a lower incidence from 2008 on, with the publication of new normative instruments, which regulated the policy to native and exotic wild animals in captivity.

The number of deaths recorded in CETAS suffered variations over the sample period, but their values remained between 16 and 26 percent. The values of escapes/evasions remained constantly low if compared with the total number of destinations.

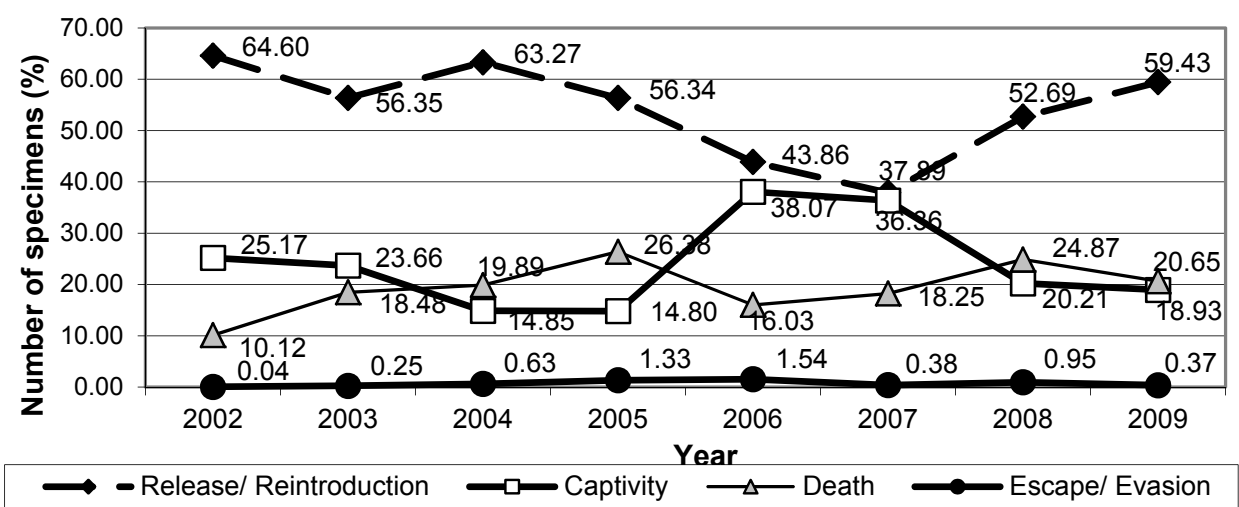


Figure 5. Destination of the animals from CETAS between 2002 and 2009.

Year	Admissions	Releases/ Reintroductions	Captivities	Deaths	Escapes/ Evasions
2002	16,031	17,260	6,725	2,705	12
2003	57,417	24,333	10,219	7,980	110
2004	42,250	19,336	4,538	6,078	191
2005	40,309	11,110	2,919	5,202	263
2006	34,229	10,988	9,537	4,015	386
2007	28,447	13,544	12,998	6,523	137
2008	62,955	22,965	8,809	10,839	413

Table 2. Number of specimens destined by CETAS between 2002 and 2008.



Figure 6. Released birds in Bahia (BA)

3. The species of confiscated animals

We found that the destination given to confiscated animals in Brazil is directly linked to the taxonomic class of animal (Figure 7). For Birds, the main form of destination was release into the wild (greater than 55%), followed by placement in captivity and death. Release into the wild was also the main destination given to reptiles (~ 60%) and mammals (~ 45%). We also noticed that reptiles obtained a lower death rate, while the exotics animals remained in captivity (~ 60%).

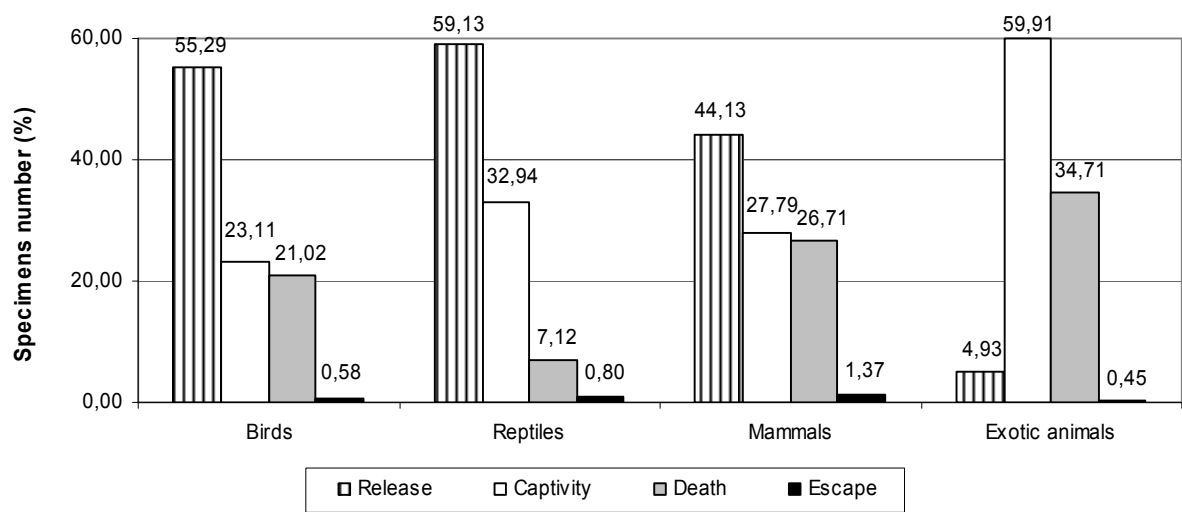


Figure 7. Destination of the animals from CETAS between 2002 and 2009, by taxonomic group.

The Table 3 presents the amount of admission and destination of animals from CETAS. Birds represented 81% of admitted specimens and 82% of released ones, between 2002 and 2009. The Birds was also the group that obtained the largest number of deaths registered (86%). In Australia and Asia, Reptilia was most targeted group of taxa for illegal trade, being also the most seized [4, 9].

Group	Entrance	Release	Captivity	Death	Escape
Birds	250,206	108,622	45,395	41,294	1,135
Reptiles	34,835	17,198	9,581	2,072	233
Mammals	17,936	7,233	4,554	4,377	225
Exotics	4,577	44	535	310	4

Table 3. Amount of specimens that entered and left the CETAS between 2002 and 2009.

We listed, in the Table 4, the 30 species most confiscated by IBAMA and accredited institutions between 2005 and 2009, according to SICAFI. The class Aves was the most representative (80%), followed by Reptilia (16.67%). The most significant families were Emberizidae (30%), Thraupidae (13.33%) and Podocnemididae (10%). The most commonly confiscated species was *Sicalis flaveola* (Saffron Finch), followed by *Saltator similis* (Green-winged Saltator) and *Sporophila caerulescens* (Double-collared Seedeater), (Figure 8).

Classif	Type	Class	Family	Specie ³	Common name
1º	Wild animal	Aves	Emberizidae	<i>Sicalis flaveola</i> (Linnaeus, 1766)	Saffron Finch
2º	Wild animal	Aves	Thraupidae	<i>Saltator similis</i> d'Orbigny & Lafresnaye, 1837	Green-winged Saltator
3º	Wild animal	Aves	Emberizidae	<i>Sporophila caerulescens</i> (Vieillot, 1823)	Double-collared Seedeater
4º	Wild animal	Aves	Cardinalidae	<i>Cyanoloxia brissonii</i> (Lichtenstein, 1823)	Ultramarine Grosbeak
5º	Wild animal	Aves	Emberizidae	<i>Sporophila angolensis</i> (Linnaeus, 1766)	Chestnut-bellied Seed-Finch
6º	Wild animal	Reptilia	Podocnemididae	<i>Podocnemis expansa</i> Schweigger, 1812	Giant South American River Turtle
7º	Wild animal	Aves	Icteridae	<i>Gnorimopsar chopi</i> (Vieillot, 1819)	Chopi Blackbird
8º	Domestic	Aves	Phasianidae	<i>Gallus gallus</i>	Domestic

³ Nomenclature according to the updated lists CBRO, 2011 (www.cbro.org.br) and SBH, 2011 (<http://www.sbherpetologia.org.br>)

Classif	Type	Class	Family	Specie ³	Common name
	animal			(Linnaeus, 1758)	Chicken
9º	Wild animal	Aves	Thraupidae	<i>Paroaria dominicana</i> (Linnaeus, 1758)	Red-cowled Cardinal
10º	Wild animal	Aves	Emberizidae	<i>Sporophila lineola</i> (Linnaeus, 1758)	Lined Seedeater
11º	Wild animal	Reptilia	Podocnemididae	<i>Podocnemis sextuberculata</i> Cornalia, 1849	Six-tubercled Amazon River Turtle
12º	Wild animal	Aves	Emberizidae	<i>Zonotrichia capensis</i> (Statius Muller, 1776)	Rufous-collared Sparrow
13º	Wild animal	Aves	Emberizidae	<i>Sporophila nigricollis</i> (Vieillot, 1823)	Yellow-bellied Seedeater
14º	Wild animal	Aves	Emberizidae	<i>Sporophila collaris</i> (Boddaert, 1783)	Rusty-collared Seedeater
15º	Wild animal	Aves	Psittacidae	<i>Amazona aestiva</i> (Linnaeus, 1758)	Blue-fronted Parrot
16º	Wild animal	Reptilia	Alligatoridae	<i>Caiman crocodilus</i> (Linnaeus, 1758 [originally Lacerta])	Common Caiman
17º	Wild animal	Aves	Turdidae	<i>Turdus rufiventris</i> Vieillot, 1818	Rufous-bellied Thrush
18º	Wild animal	Aves	Thraupidae	<i>Paroaria</i> sp. Bonaparte, 1832	Cardinal
19º	Wild animal	Aves	---	Not specified	Bird
20º	Wild animal	Aves	Columbidae	<i>Zenaida auriculata</i> (Des Murs, 1847)	Eared Dove
21º	Wild animal	Aves	Emberizidae	<i>Sporophila albogularis</i> (Spix, 1825)	White-throated Seedeater
22º	Domestic animal	Mammalia	Bovidae	<i>Bos taurus</i> Linnaeus, 1758	Domestic Cattle
23º	Wild animal	Aves	Psittacidae	Many species	Parrot
24º	Wild animal	Aves	Fringillidae	<i>Sporagra magellanica</i> (Vieillot, 1805)	Hooded Siskin
25º	Wild animal	Reptilia	Podocnemididae	<i>Podocnemis unifilis</i> (Troschel, 1848)	Yellow-spotted Amazon River Turtle
26º	Wild	Aves	Icteridae	<i>Icterus jamacaii</i>	Campo Troupial

Classif	Type	Class	Family	Specie ³	Common name
	animal			(Gmelin, 1788)	
27 ^o	Wild animal	Aves	Emberizidae	<i>Sporophila maximiliani</i> (Cabanis, 1851)	Great-billed Seed-Finch
28 ^o	Wild animal	Reptilia	Testudinidae	<i>Chelonoidis</i> sp. Fitzgerald, 1835	Tortoise
29 ^o	Wild animal	Aves	Turdidae	<i>Turdus</i> sp. Linnaeus, 1758	Thrush
30 ^o	Wild animal	Aves	Thraupidae	<i>Lanio cucullatus</i> (Statius Muller, 1776)	Red-crested Finch

Table 4. Most confiscated species by IBAMA and partner institutions between 2005 and 2009.

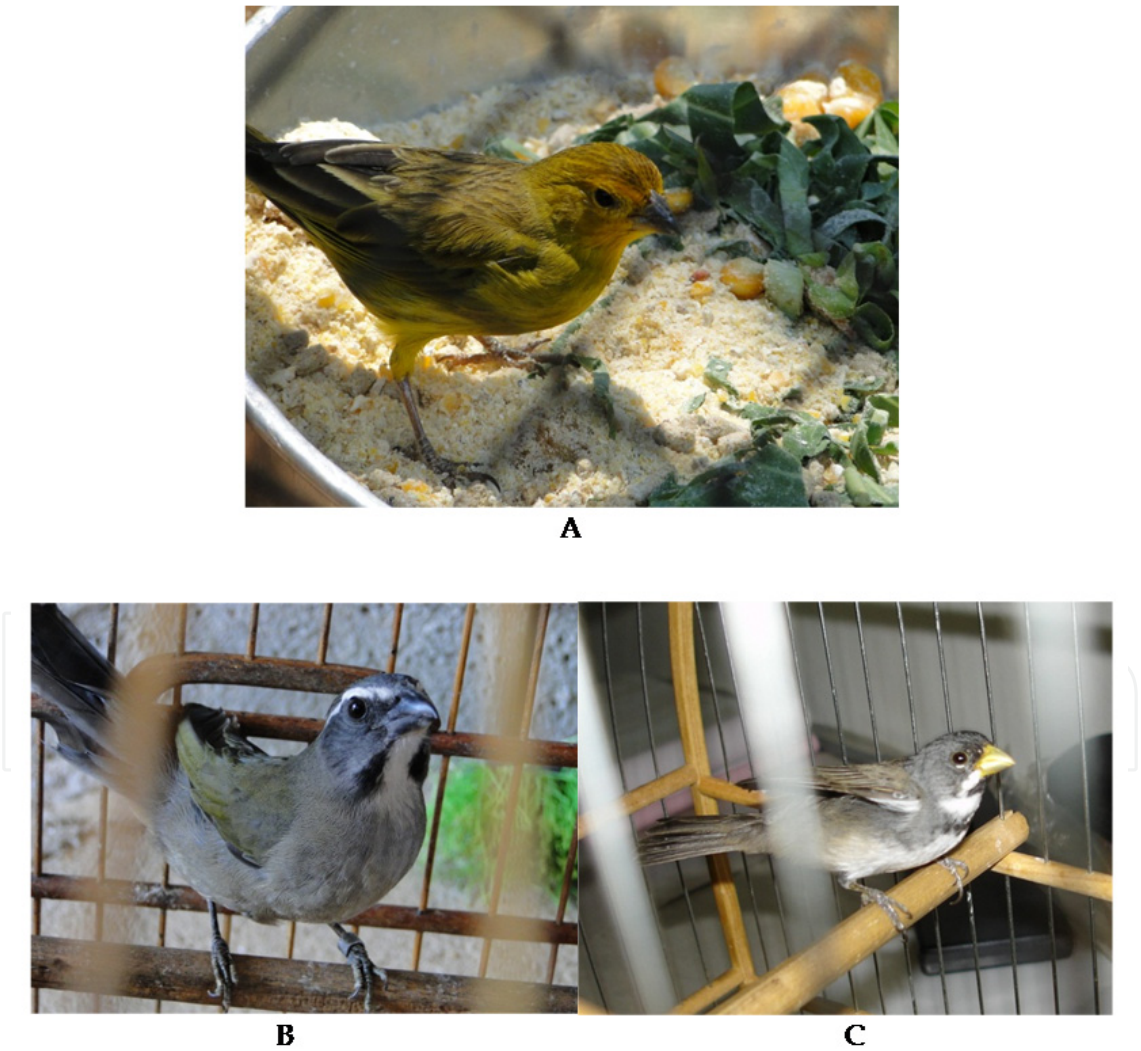


Figure 8. The three most confiscated species by environmental enforcement in Brasil: A. *Sicalis flaveola* (Saffron Finch), B. *Saltator similis* (Green-winged Saltator) and C. *Sporophila caerulea* (Double-collared Seedeater).

According to studies conducted by [8] in south Brazil, the most commonly confiscated species by enforcement, between 1998 and 2000, was the Cardinal (*Paroaria coronata*), followed by the Saffron Finch (*Sicalis flaveola*). And the Emberizidae family presented the largest number of seized specimens, compelling evidence that the great interests of the illegal trade are the songbirds.

The Emberizidae family also excelled in seizures conducted in southeastern and northeastern Brazil [7,10,11]. According to the authors, that fact can be explained, preliminarily, because that family has many species and specimens, for being abundant in the Neotropics, for having easy occurrence in the sampled region, for the high quality of its singing, due to its low market value and for being easy to maintain. Generally, the birds most wanted for trafficking are the songbirds or those able to become pets, conferring them high values of trade [8].

Some species listed in Table 4 are exclusively Amazonian, as the Giant South American river turtle, Six-tubercled Amazon River turtle and Yellow-spotted Amazon River Turtle, all very popular in regional cuisine and found in nature in large populations. The domestic chicken (*Gallus gallus*) and domestic cattle (*Bos taurus*) obtained national prominence in seizures, because the first is often used in arenas, being the target of actions against animal abuse, and the second is the subject of crime in embargoed areas due to deforestation, mainly in the Amazon region.

We also observed an intrinsic relationship between the passerines authorized breeding and the wild animals trafficking: the five species more seized are also the taxa of greatest interest for commercial and amateur breeders of passerines (Table 5). All other passerines listed in Table 4 are species authorized for commercial and amateur activity.

Classif.	Species ⁴	Common name	Total of breeders	Total of specimens
1º	<i>Saltator similis</i> d'Orbigny & Lafresnaye, 1837	Green-winged Saltator	133.699	528.621
2º	<i>Sporophila angolensis</i> (Linnaeus, 1766)	Chestnut-bellied Seed-Finch	89.083	535.195
3º	<i>Sporophila caerulea</i> (Vieillot, 1823)	Double-collared Seedeater	86.666	279.888
4º	<i>Sicalis flaveola</i> (Linnaeus, 1766)	Saffron Finch	83.281	444.160
5º	<i>Cyanoloxia brissonii</i> (Lichtenstein, 1823)	Ultramarine Grosbeak	46.364	108.703
6º	<i>Sporagra magellanica</i> (Vieillot, 1805)	Hooded Siskin	28.709	83.885
7º	<i>Turdus rufiventris</i> Vieillot, 1818	Rufous-bellied Thrush	27.250	57.960
8º	<i>Saltator maximus</i> (Statius Muller, 1776)	Buff-throated Saltator	19.129	53.203

⁴ Nomenclature according to the updated lists CBRO, 2011 (www.cbpro.org.br)

Classif.	Species ⁴	Common name	Total of breeders	Total of specimens
9 ^o	<i>Sporophila maximiliani</i> (Cabanis, 1851)	Great-billed Seed-Finch	18.142	123.832
10 ^o	<i>Zonotrichia capensis</i> (Statius Muller, 1776)	Rufous-collared Sparrow	16.466	32.677
11 ^o	<i>Sporophila lineola</i> (Linnaeus, 1758)	Lined Seedeater	13.868	25.317
12 ^o	<i>Gnorimopsar chopi</i> (Vieillot, 1819)	Chopi Blackbird	12.540	21.716
13 ^o	<i>Cyanoloxia cyanoides</i> (Lafresnaye, 1847)	Blue-black Grosbeak	11.435	23.435
14 ^o	<i>Paroaria coronata</i> (Miller, 1776)	Red-crested Cardinal	11.310	33.110
15 ^o	<i>Sporophila frontalis</i> (Verreaux, 1869)	Buffy-fronted Seedeater	9.301	22.073
16 ^o	<i>Sporophila nigricollis</i> (Vieillot, 1823)	Yellow-bellied Seedeater	9.264	22.135
17 ^o	<i>Molothrus oryzivorus</i> (Gmelin, 1788)	Giant Cowbird	8.878	18.858
18 ^o	<i>Lanio cucullatus</i> (Statius Muller, 1776)	Red-crested Finch	6.922	13.635
19 ^o	<i>Saltator fuliginosus</i> (Daudin, 1800)	Black-throated Grosbeak	6.756	14.533
20 ^o	<i>Paroaria dominicana</i> (Linnaeus, 1758)	Red-cowled Cardinal	6.123	11.675

Table 5. Species of greatest interest to the passerine breeders in Brazil.

For [1], one of the ways to reduce the pressure on the populations for trafficking would be the encouragement of captive breeding programs to meet commercial demand. However, this strategy can be of great concern, since those animals cannot achieve the low prices offered by the trafficking [7].

4. The trafficking routes

In Figure 9 we grouped the main trafficking routes of wild animals in Brazil, including major airports, trade and source areas. We observed that, in general, the Brazilian fauna has been removed from the North, Northeast and Midwest of the Country and it is being sent to the Southeast, South and other regions of Northeast, by land or river, fuelling the national trade. In relation to the international illegal trade, we emphasize cities located in border regions in the North, Midwest and South of Brazil, as well as in ports and airports located in the Northern, Northeastern, Southern and Southeastern Brazilian regions.

For [1], beyond the States of Para (PA) and Amazonas (AM), which had national prominence in the amount of fines, other Amazonian frontiers must be of particular concern,

Specialists point the absence of alternative income for people who use the trafficking as a means of livelihood. The report elaborated by the Brazilian National Congress in 2001 [12] recommends that the Union, States and Municipalities, in an articulated manner, must develop and implement programs to generate alternative income for poor communities involved in the illegal trade of wild animals.

However, the impact of trafficking in society needs to be further studied and its actors mapped. The capture of animals in nature is part of the culture and popular tradition, being one of the main livelihoods of the poor in some regions of Brazil [10]. However, in [11] found that in many regions people are using the illegal trade of animals only as an additional source of income. Thus, mechanism for control of wildlife use and trade should be formulated that take into consideration the special ethnic conditions of each region [13].

In global scale, it is recommended a multi-pronged approach including community-scale education and empowering local people to value wildlife, coordinated international regulation, and a greater allocation of national resources to on-the-ground enforcement for effective control of trafficking and illegal trade [9]. In Brazil, we noticed that the actions against illicit related to wildlife, although increasingly more organized and efficient, still require specific structural measures, among which we may highlight:

- Improving the number and the practice of IBAMA's agents and of Environmental Military Policeman through public competition and specific and continuous training;
- Increase the volume of public resources towards the activities of control and environmental monitoring;
- Increasing the incentive for the creation, implementation and maintenance of CETAS (Wild Animals Rehabilitation Centers);
- Reviewing the penal types of Law number 9.605/1998 due to provide harsher penalties for those who engage in wild animals trafficking such as large-scale commercial activity or international and interstate trafficking;
- Increasing responsibilities and sharing information among different agencies responsible for controlling and monitoring, through formal terms and shared systems;
- Maintaining permanent negotiation between the federal government and neighboring countries through bilateral agreements, so that policies or environmental standards more flexible than the Brazilian ones are not used to support the illegal activities;
- Increasing the control over the sale of wild animals by internet and their exit to abroad through joint action among different government agencies such as IBAMA, the Federal Revenue Secretariat, Ministry of Health, Federal Police, etc.;
- Promoting Specific Environmental Education Campaigns aimed at minimizing the wild animals trafficking, as well as joint efforts among the various ministries involved, including the ones of Transport, Environment, Health and Tourism.

Lastly, we hope that this paper provides important and necessary subsidies for the decision-making to combat the animal trafficking in Brazil and abroad, helping the effective protection and conservation of the nature.

5. Conclusion

We conclude that the Minas Gerais State was the largest contributor to the large volume of specimens seized in Brazil in the analyzed term, being *Sicalis flaveola* (Saffron Finch), *Saltator similis* (Green-winged Saltator) and *Sporophila caerulescens* (Double-collared Seedeater) the species most confiscated by environmental enforcement.

Furthermore, we noticed that releasing into the wild was the most common destination for mammals, birds and reptiles seized. The Wild Animals Rehabilitation Centers are essential support structures for the environmental enforcement actions related to fauna in Brazil.

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