

# An update: Prevalence of rabies in animals between 2010 and 2017 in north-eastern Romania

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## Abstract:

In order to obtain an overview of the situation of rabies positive cases, but also to establish a true prevalence of the disease among domestic and wild animals, an epidemiological survey was conducted in the north east of the country, targeting the 8 counties of Moldova region, over a period of eight years, between 2010 and 2017. A total of 2306 brain samples coming from animals with suspicion of rabies were received at the laboratories, from which 851 (36,90 %) were represented by domestic animals and 1455 (63,10 %) by wild animals. Following the implementation of the referenced techniques in rabies diagnosis, out of 2306 tested samples, 492 (21,36%) were confirmed positive and 1814 negative (78,66%).

Out of 1455 samples coming from wild animals, 303 (20,82 %) were confirmed positive, with a total prevalence of 21,32 %, while in the case of domestic animals out of 851 samples, 189 were positive, with a total prevalence of 22,20 %.

**Keywords:** epidemiology, rabies, Romania

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## Introduction

Centuries old, rabies remains one of the most severe and lethal zoonosis that affects all homeothermic animals and humans, being produced by a virus belonging to the *Rhabdoviridae* Family, *Lyssavirus* Genus (ICTV, 2017).

During the last decades, rabies has been eradicated from the west and center Europe by using intensive programs which consisted in the distribution of vaccine baits targeting wild foxes and mass vaccinations of pets (Brochier *et al.*, 1995; Bugnon *et al.*, 2004; Matouch *et al.*, 2007), considered to be the only effective methods to eradicate the disease and brake the infectious cycle between animals and people.

The aim of the study was to obtain an overview of the situation of rabies positive cases, but also to establish a true prevalence of the disease among domestic and wild animals. In this respect, an

epidemiological survey was conducted in the north east of the country, targeting the 8 counties of Moldova region, over a period of eight years, between 2010 and 2017.

## Materials and methods

For better understand the distribution of positive rabies cases, data have been collected since 2010, prior to the implementation of the strategic program regarding the oral vaccination of foxes, first applied in our country in 2011. Thus, these data were obtained from each of the *Sanitary Veterinary and Food Safety Direction* and correlated with the official statements reported by the OIE. The counties included in the study were represented by Suceava, Botosani, Iasi, Piatra Neamt, Bacau, Vaslui, Galati and Vrancea (Figure 1).



**Figure 1.** Map of Romania with geographical origin of the 8 counties studied (original)

Between 2010 and 2017, a total of 2306 brain samples coming from animals with suspicion of rabies were received at the laboratories, from which 851 (36.90%) were represented by domestic animals and 1455 (63.10%) by wild animals. Out of 2306 samples, 153 came from Vrancea county, 87 from Galati county, 238 from Bacau county, 207 from Vaslui county, 130 from Piatra Neamt county, 632 from Iasi county, 625 from Suceava county and 234 from Botosani county.

Regarding domestic animals, most of the samples came from dogs (No=335), 243 from cattles, 172 from cats, 42 from sheeps, 33 from goats, 11 from horses, 9 from rabbits and 6 from pigs. In a higher proportion (63.10%), as expected, the samples were coming from wild animals, especially from the sylvatic reservoir of rabies, represented by the fox, with a total of 1391 brain samples. In a lower proportion, other 64 brain samples coming from other wild animals were received at the laboratory: ferrets (No=14), wild cats (No=10), wolves (No=9), roebucks (No=8), martens (No=5), badgers (No=5), deer's (No=5), weasel (No=1), squirrel (No=1), lama (No=1),

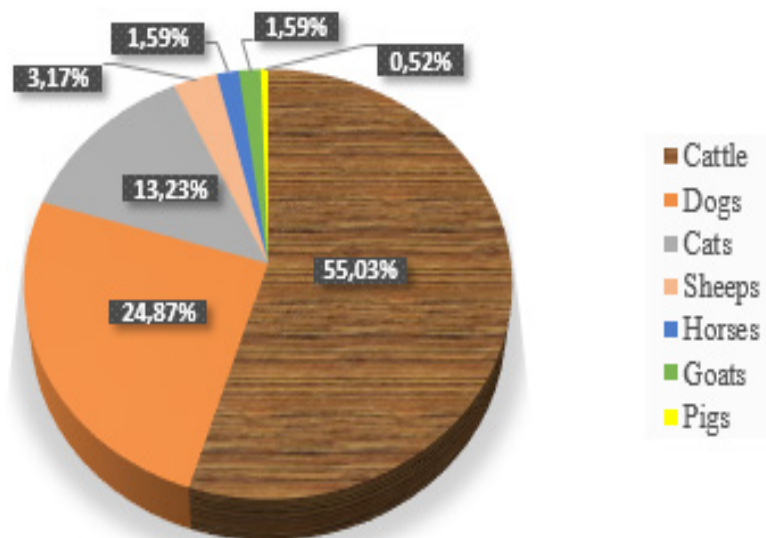
hamster (No=1), otter (No=1), lynx (No=1), rat (No=1) and wild boar (No=1).

All the samples were tested using the referenced techniques in rabies diagnosis, recommended by both WHO and OIE, namely *Direct Fluorescent Antibody Test* and *Mouse Inoculation Test*, as described in OIE, Terrestrial Manual, 2018.

### Results and discussions

Following the implementation of the referenced techniques in rabies diagnosis in the related laboratories, out of 2306 tested samples coming from both domestic and wild animals during the study period, 492 samples (21.36%) were confirmed positive and 1814 negative (78.66%).

*Situation of rabies cases in domestic animals.* As concerning domestic animals, 189 positive samples out of 851 were diagnosed, from which 104 (55.03%) were reported in cattle, 47 (24.87%) in dogs, 25 (13.23%) in cats, 6 (3.17%) in sheep's, 3 in horses (1.59%), 3 in goats (1.59%) and one (0.52%) in pigs, resulting a prevalence of 22.20% (Figure 2).



**Figure 2.** The positive cases of rabies recorded in domestic animals during 2010-2017 in Moldova counties

**Table 1.** The total number of samples tested during 2010-2017 and the results obtained at the confirmation diagnosis for the 8 counties studied

Species	BT		SV		IS		NT		VS		BC		GL		VN		Total	
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Cow	19	17	38	20	20	16	8	21	8	31	7	21	4	0	0	13	104	139
Dog	7	22	4	37	14	81	4	25	5	30	2	49	8	13	3	31	47	288
Cat	1	1	1	15	11	64	0	6	6	11	3	23	1	17	2	10	25	147
Sheep	0	3	2	5	0	7	0	9	4	4	0	7	0	0	0	1	6	36
Horse	0	1	0	2	3	1	0	0	0	1	0	0	0	1	0	2	3	8
Goat	0	1	2	1	0	1	0	5	0	3	0	9	1	0	0	10	3	30
Pig	0	0	0	1	1	1	0	0	0	2	0	1	0	0	0	0	1	5
Rabbit	0	0	0	0	0	0	0	8	0	0	0	1	0	0	0	0	0	9
<b>Total</b>	<b>27</b>	<b>45</b>	<b>47</b>	<b>81</b>	<b>49</b>	<b>171</b>	<b>12</b>	<b>74</b>	<b>23</b>	<b>82</b>	<b>12</b>	<b>111</b>	<b>14</b>	<b>31</b>	<b>5</b>	<b>67</b>	<b>189</b>	<b>662</b>

Most cases of rabies in cattle confirmed during these years were recorded in Suceava county with a total of 38 cases, followed by Iasi with 20 cases, Botosani with 19 cases, Neamt and Vaslui counties with 8 cases each, Galati county with 4 cases and zero cases for Vrancea county.

The second most affected species was represented by the dogs with a total of 47 cases. Most of those were confirmed in Iasi with 11 cases, followed by Galati with 8 cases, 7 cases in Botosani, 5 cases in Vaslui, 4 cases in Suceava and Neamt respectively, at the opposite side being the counties of Vrancea and Vaslui with 3 and 2 cases, respectively.

Also, one of the species most affected were the cats with 25 cases, 11 of them being reported in Iasi county, 6 in Vaslui, 3 in Bacau and 2 in Vrancea. In Botosani, Suceava and Galati counties only 1 case per each were reported.

Of those least affected species were the sheeps. Only 6 positive cases were reported, of which 4 in Vaslui and 2 in Suceava. Few cases were reported also in horses with a total of 3 cases, all diagnosed in Iasi county. In goats, 3 cases were confirmed, 2 in Suceava and one in Galati and one case in a pig in Iasi county.

The most affected counties by rabies among domestic animals were represented by Iasi and

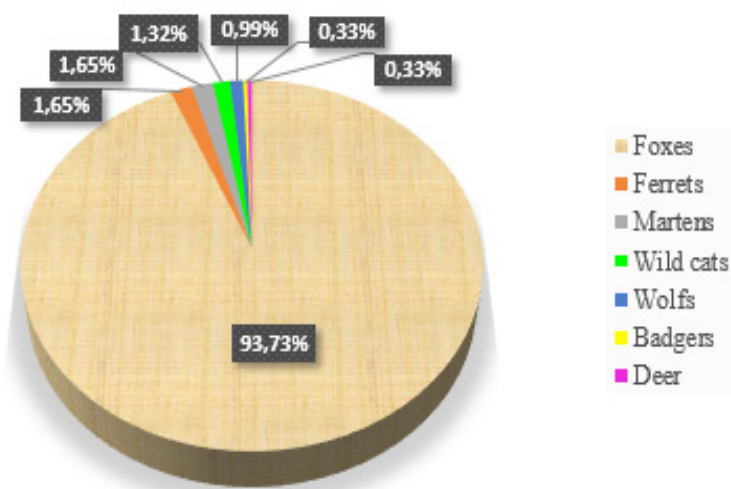


Figure 3. The positive cases of rabies recorded in wild animals during 2010-2017 in Moldova counties

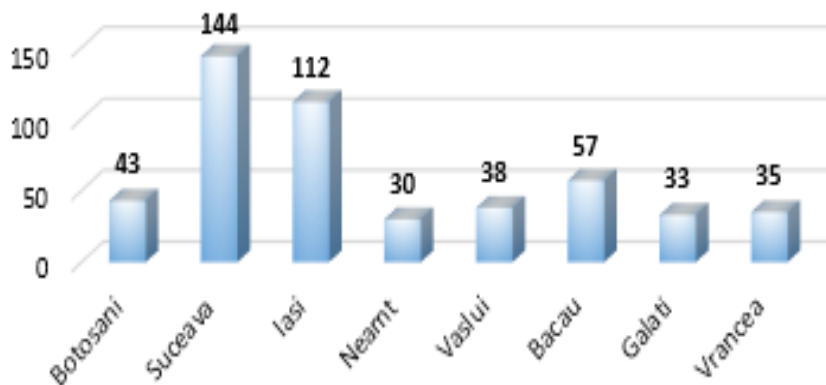


Figure 4. Total number of positive rabies cases recorded in Moldova counties between 2010-2017

Suceava with 49 respectively 47 cases, followed by Botosani with 27 cases, Vaslui with 23 cases, and at the opposite pole, Galati with 14 cases, Bacau and Neamt with 12 cases each and 5 cases for Vrancea (Table 1).

*Situation of rabies cases in wild animals.* Regarding the wild animals, 303 positive samples out of 1455 were found, with the highest percentage of positive cases in foxes. Thus, 284 positive cases (93.73%) were reported in foxes, 5 (1.65%) in martens, 5 (1.65%) in ferrets, 4 (1.32%) in wild cats, 3 (0.99%) in wolves and one case in badger (0.33%), respectively in roebuck (0.33%), with a total prevalence of 21.32% (Figure 3).

As concerning the positive cases in foxes, most of them were reported in Suceava and Iasi county with 93, respectively 60 cases, followed by Bacau

county with 40 cases and Vrancea county with 25 cases. The fewest cases in foxes were registered in Neamt and Galati counties with 18 cases each, followed by Botosani and Vaslui counties with 15 cases each.

Five positive cases were registered also in martens, from which 3 in Suceava and 2 in Bacau counties and another 5 cases in ferrets, 3 of them in Iasi and 2 in Vrancea counties.

The wild cats were also affected by rabies, with a total of 4 cases reported in Vrancea, Galati, Bacau and Neamt counties. Rabies were also confirmed in wolves, were 3 cases were diagnosed in Vrancea and Bacau counties. The least affected were the badger and the roebuck with one case confirmed in Suceava, respectively in Bacau counties.

To summarize, of all the positive cases recorded in both domestic and wild animals, the main affected county was Suceava with 144 cases, followed by Iasi with 112 cases, Bacau with 57 cases, Botosani with 43 cases, Vaslui with 38 cases, at the opposite pole being the counties of Vrancea, Galati and Neamt with 35, 33 and 30 cases, respectively (Figure 4).

Since 2011, our country dispose of a national program regarding the surveillance, control and eradication of rabies in foxes, approved for a period of 10 years, a program that involves a bi-annual distribution of the baits in the habitat of these animals (Government Decision No. 55/2008). Although Romania has been one of the most affected rabies countries at European level over the past decades (Rabies Bulletin Europe, 2018; WAHIS, 2018), with the implementation of this program, the number of positive cases of rabies among animals have declined significantly.

### Conclusions

Out of 1455 wild animals samples received at the related laboratory during the 8 years study, 303 (20.82 %) were confirmed positive, with a total prevalence of 21.32 %. As expected, the foxes were the most affected species with 284 (93.73%) cases. The highest number of rabies cases in wild animals were reported in Suceava county summing 93 cases.

Out of 851 domestic animals samples received at the laboratory with rabies suspicion, 189 (22.20 %) were confirmed positive, with a total prevalence of 22.20 %. The cattles were the most affected domestic species with 103 cases, most of

them being confirmed in Iasi county, area with a total of 48 cases.

The massive vaccination of the foxes and pets has led to the eradication of rabies in Western Europe over the last decades, being the only effective ways to eliminate the disease and break the infectious cycle between animals and humans.

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