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1. EDITORIAL

In this issue, we continue the applied orientation of the Miscellaneous Articles with two papers – one about rabies control in Finland and one about practical results of the modelling of rabies control.

The report from Finland demonstrates that freedom from rabies could only be achieved by means of long-term control and surveillance measures. Particular attention was paid to minimizing the risk of the disease being re-introduced.

The other article introduces the concept of an area index. The results presented in this paper suggest that rabies control can be achieved the faster the larger the area of oral vaccination is and, especially, the more continuously this area is treated. Although the outcome of this investigation is only valid for the regions studied, experiences from long years of rabies control generally confirm these recommendations. The success of rabies control by means of oral vaccination depends on long-term intervention in sufficiently large areas.

For the first time in many years, the Rabies Bulletin Europe contains data from all European countries. This is of great value for the rabies database of the Bulletin as well as for everybody working in the field of European rabies control, surveillance or research. Therefore, I would like to thank the representatives of the European countries for their rabies reports.

Carsten J. Pötzsch

3. MISCELLANEOUS ARTICLES

3.1 Documenting freedom from rabies and minimising the risk of rabies being re-introduced to Finland

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Sylvatic rabies outbreak in 1988-1989

Rabies reappeared in Finland in the spring of 1988 after a 29-year absence. Before 1959 all outbreaks had been dog-mediated. In early April 1988, one fox and one dog were diagnosed rabid west of the river Kymi, about 100 km west of the south-eastern national border. This time rabies occurred in sylvatic form. The major species involved was raccoon dog (*Nyctereutes procyonoides*) and not red fox (*Vulpes vulpes*). The first raccoon dogs had been observed in Finland in the 1930's, but a significant population was established during the 1970s and 1980s (Helle and Kauhala 1987). The calculated population density of the raccoon dog in the outbreak area was approximately 0.3 animal/km² in the spring and 1.0 animal/km² in the autumn. The population density of the red fox was about 0.15 and 0.3 animals/km², respectively.

During 1988 and 1989, 3015 animals from the whole country were examined for rabies. During the outbreak 66 animals were diagnosed rabid: 48 raccoon dogs, 12 foxes, 2 badgers, 2 cats, one dog and one young bull (Nyberg et al. 1992). No cases were recorded within 60 km of the national eastern border in spite of intensive sampling. Most probable hypothesis is that the infection was brought in by wolves migrating on the ice along the coast. Spread of rabies by land through an animal to animal chain from behind the south-eastern border seems unlikely. The third and least plausible hypothesis is that rabies could have entered Finland with raccoon dogs hiding in timber boxcars from the USSR.

The rabies virus was shown by monoclonal antibodies to be an arctic-type

strain and different from the one occurring in foxes in continental Europe (Nyberg et al. 1992, Kulonen & Boldina 1993). Arctic rabies has been reported from Estonia, the Leningrad area and Kola peninsula (Selimov et al. 1990).

Rabies control and re-establishing rabies free status

The importance of lakes and the Kymi river in preventing and directing the expansion of the epidemic was obvious also in Finland. The raccoon dog sleeps for a variable time during winter. This phenomenon might be of importance in the epidemiology of rabies, because the contact rate might fall to the level at which the disease disappears.

In the outbreak area, vaccination of dogs was compulsory and voluntary vaccination of cats, cattle and horses was recommended. In the country as a whole, vaccination of dogs used for hunting and those put on show became compulsory and voluntary vaccination of pet dogs and cats was strongly recommended.

In September 1988, a field trial was started on oral immunisation of raccoon dogs and foxes against rabies. Rabies baits containing capsules with SAD B19 vaccine strain were distributed over the outbreak area. Throughout the following winter raccoon dogs and foxes from the campaign area were examined serologically for antibodies against rabies. 72% of raccoon dogs and 66% of the foxes had antibody titres indicating immunity (Nyberg et al. 1992). In April 1989 a second bait distribution campaign was carried out and baits were distributed over an area, including the first campaign area and a wide buffer zone surrounding it. In

the fall of 1989 the estimated infection area was baited a third time. In June 1990 the part of it not baited in 1988 was baited a third time. A surveillance of vaccination area was continued. The last case was recorded in February 1989. The outbreak area in south-eastern Finland was estimated to cover 1700 km² and the bait vaccination area covered about 8000 km². The rabies baits were evenly distributed, 15/km² if spread on the ground by hunters and 20/km² if by air. Finland was declared free of rabies again in 1991.

Minimising the risk of rabies being re-introduced

The unprotected area on the Russian side poses a risk for rabies spreading from that area into Finland, taking also into account the unfavourable rabies situation in Baltic countries (Sihvonen 2001). Finland tries to minimise the risk of rabies being re-introduced. To combat this risk a 20 km cordon sanitaire along the south-eastern border has been spread with vaccine baits once a year (in September) since the beginning of 90s (Figure 1). The size of the vaccination area is 4000 km². The baits are distributed by fix wing aircraft on agricultural area and forests 18-20 baits/km². Raccoon dogs and foxes are regularly examined serologically for antibodies against rabies to monitor the efficacy of bait vaccination. The results of these studies have been in line with earlier studies reported by Nyberg et al. (1992).

Raccoon dog and fox population reduction is an important part of prevention of an epidemic in wildlife. The populations of raccoon dogs and foxes in Finland are controlled by hunting.

Continuous surveillance and epidemiological screening is necessary to detect any new outbreaks of rabies at an early stage. During 2001 21 domestic animals and 685 wildlife animals (mostly raccoon dogs and foxes) were examined for rabies virus.

Dog-mediated rabies prevention is best accomplished by control of imported dogs and cats. Imported dogs and cats must be properly vaccinated.

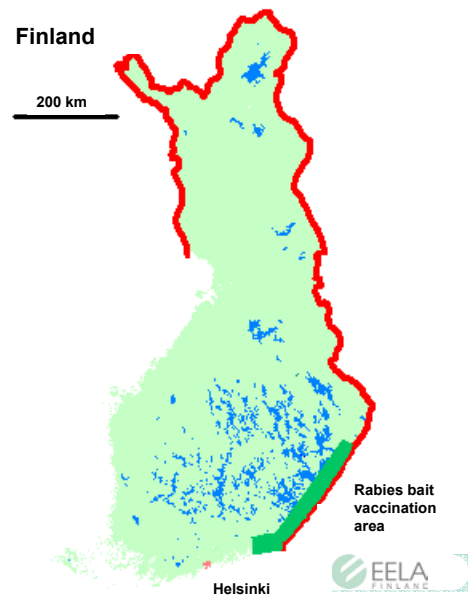


Figure 1: Area of oral rabies vaccination in Finland at the border to Russia

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3.2 Comparing European strategies for oral vaccination of foxes against rabies using an area index

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In Europe, oral vaccination of foxes has been successfully applied to combat rabies. Since the first field trial in 1978 large parts of western Europe could be freed from rabies with this modern and powerful method of disease control. However, within the last 23 years often diverse spatial and temporal strategies were applied within national oral vaccination programmes (OVP). Next to other parameters, these strategies differed with respect to the selection and to the size of vaccination areas during the course of successive vaccination campaigns. While in some countries vaccination areas were adapted to the rabies situation at time of vaccination (patch work) others used consistent large scale or overlapping vaccination schemes. Also concepts considering natural barriers were followed. By and by, it seemed that these spatial strategies resulted in differences concerning the time needed for eradicating rabies. Therefore, we were interested in the correlation between a particular vaccination strategy applied in a given area and the resulting duration of rabies eradication.

To answer this question, a retrospective epidemiological study was conducted including 4 European countries. Based on the specific national OVP, 28 study areas from Belgium (1), Germany (15), Italy (3) and Switzerland (9) were compared

comprising the years 1978 to 2000. The study areas were either based on administrative units (Germany, Italy, Belgium) or on natural barriers (Switzerland). Independent of the rabies situation, the observation period was defined as the time interval from the 1st vaccination campaign conducted in the study area up to either the eradication of rabies or up to the year 2000. Rabies was assumed to be eradicated if the disease was not recorded within a two year surveillance period after the last confirmed rabies case in the study area.

To quantify the observed spatial and temporal differences in vaccination strategies we approached the problem by introducing an area index (AI). This index is calculated for each region under investigation. Variables required to calculate the AI are (Fig. 1):

1. the area of the whole region concerned by the ORV programme (vA_{max}),
2. the size of the areas successively vaccinated during campaigns at time t (vA_t , vA_{t-1})
3. the size of the overlapping of vaccinated areas successively from campaign to campaign (Φ_i).

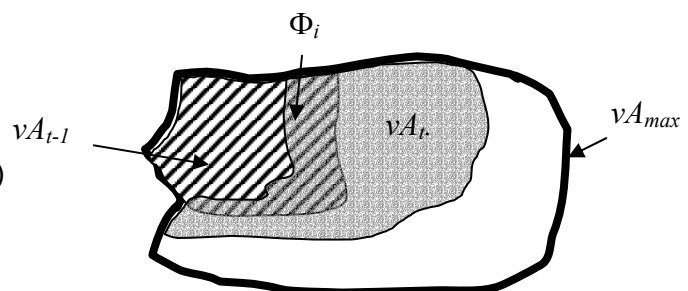


Figure 1: Concept of the area index (AI)

The AI equation is given by

$$\overline{AI} = \frac{1}{n} \sum_t^n \frac{vA_t}{vA_{\max}} \frac{\Phi_t}{vA_{t-1}}$$

The AI's are calculated for each campaign and the AI is the mean of all AI's. Then, the AI is a measurement of the proportion of areas repeatedly vaccinated within a region during the observation period. The AI ranges from 0 to 1. A region in which the total area has been vaccinated since the beginning of the programme would be characterized with an AI close or equal to 1. An AI equal to 0 would indicate that no overlapping of successive vaccinated areas has ever been done. An AI close to 0 would indicate that such overlapping was limited and/or that the proportions of the vaccinated areas over the size of the whole region were systematically small.

There was a large variation of the AI (from 0.18 to 1) indicating a large variety of strategy in the studied countries (Belgium: 0.56; Switzerland: 0.20-0.98; Germany: 0.13-1; Italy: 0.60-0.92). There was no significant difference in the mean AI between rabies free and regions still infected at that time. However, when rabies-free regions were divided into two groups by size (above and below 6,000 km²), in both groups the time from the beginning of ORV to eradication of rabies given with the number of campaigns is negatively correlated with the AI. In regions showing a high AI (0.8 - 1), rabies was eradicated within 3-6 campaigns for small regions (<6,000 km²), and 12-15 campaigns for large regions (>6,000 km²). In contrast, regions with a low AI (0.2 - 0.6) required 5-16, and 27-29 vaccination campaigns, respectively (Fig. 2).

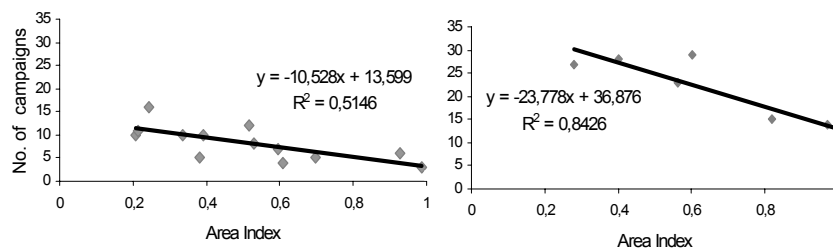


Figure 2: Linear regression of AI vs. the number of vaccination campaigns in rabies-free regions.

The validity of the AI approach is confirmed when considering regions still infected with rabies. It was observed that 3 regions in Germany (all larger than 6.000 km²), which developed a strategy characterised with low AI (lower than 0.6), were still rabies infected after 30 to 34 campaigns. In these regions, the vaccination plan did not follow a systematic approach, contrary to the one that had been followed in the eastern part of the same country where the whole region was covered by vaccination during successive campaigns (high AI). In conclusion, these studies illustrate that an AI can explain the variation encountered in dissimilar OVP strategies, i.e. the differences in times taken to eradicate rabies. In order to improve the efficiency of oral rabies vaccination systems in general it

is necessary to guarantee a high AI to eradicate rabies in due course. However, the AI cannot take into account the question of re-infection across the border of neighbouring regions. Logically, any correlation between the AI and the number of campaigns required for rabies elimination can only be observed as long as until such re-infection can be ruled out.

In conclusion, the AI can be used to summarize spatial and temporal characteristics of strategies of OVP. From the results obtained there is evidence that in general, strategies with a high AI are more effective than strategies characterized by a low AI. Therefore, variations in success of OVP can be explained by the use of the AI.

4.2 Rabies cases per country, 2nd quarter 2003 (continued)

01.04.03 -30.06.03

Location	Domestic animals										Wildlife										bat	Human cases	total					
	dog	cat	cattle	equine	goat	sheep	pig	stray dog	other	subtotal	fox	raccoon dog	raccoon	wolf	badger	marten	other mustelides	other carnivores	wild boar	roe deer				red deer	fallow deer	other	subtotal	
ESTONIA																												
Harjumaa	0	1	0	0	0	0	0	0	0	0	1	11	8	0	0	0	0	0	0	0	0	0	0	0	19	0	0	20
Ida-Virumaa	1	0	1	0	0	0	0	0	0	0	2	5	8	0	0	0	0	0	0	0	0	0	0	0	13	0	0	15
Järvmmaa	1	0	1	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	5	
Jõgevamaa	1	0	0	0	0	0	0	0	0	0	1	3	7	0	0	0	0	0	0	0	0	0	0	10	0	0	11	
Läänemaa	0	0	0	0	0	0	0	0	0	0	0	7	4	0	0	0	0	0	0	0	0	0	0	11	0	0	11	
Lääne-Virumaa	1	1	0	0	0	0	0	0	0	0	2	14	10	0	0	0	0	0	0	0	0	0	0	25	0	0	27	
Pärnumaa	1	1	0	0	0	0	0	0	0	0	2	8	12	0	0	0	0	0	0	0	0	0	0	20	0	0	22	
Põlvamaa	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	0	0	0	0	0	0	0	0	7	0	0	7	
Raplamaa	0	1	0	0	0	0	0	0	0	0	1	7	11	0	0	0	0	0	0	0	0	0	0	18	0	0	19	
Tartumaa	0	0	0	0	0	0	0	0	0	0	0	11	5	0	0	0	0	0	0	0	0	0	0	17	0	0	17	
Valgamaa	0	2	0	0	0	0	0	0	0	0	2	6	3	0	0	0	0	0	0	0	0	0	0	9	0	0	11	
Viljandimaa	0	0	1	0	0	0	0	0	0	0	1	8	5	0	0	0	0	0	0	0	0	0	0	14	0	0	15	
Võrumaa	0	0	0	0	0	0	0	0	0	0	0	6	4	0	0	0	0	0	0	0	0	0	0	10	0	0	10	
TOTAL	5	6	3	0	0	0	0	0	0	0	14	91	82	0	0	0	0	0	0	0	0	0	0	176	0	0	190	
PERCENT	2.6%	3.2%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.4%	47.9%	43.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	92.6%	0.0%	0.0%	100%	
HUNGARY																												
Baranya	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Békés	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Csongrád	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Hajdú-Bihar	0	1	1	0	0	0	0	0	0	0	3	8	0	0	0	0	0	0	0	0	0	0	0	8	0	0	11	
Jász-Nagykun-Szolnok	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	
Pest	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	
Szabolcs-Szatmár-Bereg	0	1	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4	
Vas	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
Veszprém	0	1	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4	
TOTAL	1	6	1	0	0	0	0	0	0	0	9	21	0	0	0	0	0	0	0	0	0	0	0	21	0	0	30	
PERCENT	3.3%	20.0%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	30.0%	70.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	70%	0.0%	0.0%	100%	
FINLAND																												
Finland	*	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
PERCENT	0.0%	0.0%	0.0%	100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0%	0.0%	0.0%	100%	

* 1 imported case

4.2 Rabies cases per country, 2nd quarter 2003 (continued)

01.04.03 -30.06.03

Location	Domestic animals										Wildlife										bat	Human cases	total					
	dog	cat	cattle	equine	goat	sheep	pig	stray dog	other	subtotal	fox	raccoon dog	raccoon	wolf	badger	marten	other mustelides	other carnivores	wild boar	roe deer				red deer	fallow deer	other	subtotal	
L A T V I A																												
Aizkraukle	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
Aluksne	2	2	1	0	0	0	0	0	0	5	8	4	0	0	1	0	0	0	0	0	0	0	0	0	13	0	0	18
Balvi	2	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	5
Bauska	1	0	0	0	0	0	0	0	0	1	3	5	0	0	0	1	1	0	0	0	0	0	0	0	10	0	0	11
Cesis	7	4	0	0	0	0	0	0	0	11	10	9	0	0	3	0	0	0	0	0	0	0	0	0	22	0	0	33
Daugavpils	1	0	0	0	0	0	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4
Dobele	2	0	0	0	0	0	0	0	0	2	2	6	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	10
Gulbene	0	0	0	0	0	0	0	0	0	0	9	2	0	0	2	0	0	0	0	0	0	0	0	0	13	0	0	13
Jelgava	3	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	5	
Krāslava	2	1	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
Kuldīga	0	0	0	0	0	0	0	0	0	0	3	6	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9
Liepājas	0	0	0	0	0	0	0	0	0	0	7	7	0	0	2	0	0	0	0	0	0	0	0	0	17	0	0	17
Limbaži	0	1	0	0	0	0	0	0	0	1	4	2	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	10
Ludza	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
Madona	1	2	0	0	0	0	0	0	0	3	11	4	0	0	1	0	0	0	0	0	0	0	0	0	16	0	0	19
Ogre	1	0	0	0	0	0	0	0	0	1	2	3	0	0	1	0	0	0	0	0	0	0	0	0	6	0	0	7
Preiļi	2	0	0	0	0	0	0	0	0	2	7	1	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	11
Rēzekne	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
Rīga	4	2	0	0	0	0	0	0	0	6	10	5	0	0	1	1	0	0	0	0	0	0	0	0	18	0	0	24
Saldus	1	0	0	0	0	0	0	0	0	1	1	5	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	8
Talsi	0	0	0	0	0	0	0	0	0	0	5	2	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7
Tukums	0	2	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	6
Valka	0	3	0	0	0	0	0	0	0	3	14	4	0	0	0	0	1	0	0	0	0	0	0	0	20	0	0	23
Valkriera	0	0	0	0	0	0	0	0	0	0	8	2	0	0	0	0	0	1	0	0	0	0	0	0	11	0	0	11
Ventspils	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
TOTAL	29	17	1	0	0	0	0	0	0	47	121	74	0	0	11	2	9	1	0	0	2	0	0	220	0	0	267	
PER CENT	10.9%	6.4%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.6%	45.3%	27.7%	0.0%	0.0%	4.1%	0.7%	3.4%	0.4%	0.0%	0.0%	0.7%	0.0%	0.0%	82%	0.0%	0.0%	100%	
A U S T R I A																												
Oberpullendorf	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
PER CENT	0.0%	0.0%	0.0%	100%	0.0%	0.0%	0.0%	0.0%	0.0%	100%	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0%	0.0%	0.0%	100%	

4.2 Rabies cases per country, 2nd quarter 2003 (continued)

01.04.03 -30.06.03

Location	Domestic animals											Wildlife											bat	Human cases	total				
	dog	cat	cattle	equine	goat	sheep	pig	stray dog	other	subtotal	fox	raccoon dog	raccoon	wolf	badger	marten	other mustelides	other carnivores	wild boar	roe deer	red deer	fallow deer				other	subtotal		
ROMANIA																													
Alba	1	0	1	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4	
Arges	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Bistrita-Nesaud	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Braila	1	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Calarasi	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Cluj	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Covasna	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Gorj	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
Hunedoara	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	
Mures	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	
Salaj	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	
Satu Mare	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
Sibiu	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Suceava	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
Timis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1		
TOTAL	3	1	2	0	0	0	0	0	0	6	24	0	0	1	0	0	0	0	0	0	0	0	0	3	28	0	0	34	
PERCENT	8.8%	2.9%	5.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.6%	70.6%	0.0%	0.0%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.8%	82%	0.0%	0.0%	100%	
POLAND																													
Dolnoslaskie	0	1	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4	
Kujawsko-Pomorskie	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	
Lubelskie	1	3	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	9	
Malopolskie	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
Podkarpackie	0	1	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	
Podlaskie	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	
Pomorskie	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	
Slaskie	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	
Swietokrzyskie	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Warmińsko-Mazurskie	1	1	1	0	0	0	0	0	0	3	7	8	0	0	0	0	0	0	0	1	0	0	0	0	16	0	0	19	
Wielkopolskie	1	2	0	0	0	0	0	0	0	3	16	1	0	1	0	0	0	0	0	0	0	0	0	0	18	1	0	22	
Zachodniopomorskie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
TOTAL	3	8	1	0	0	0	0	0	0	12	42	10	0	1	2	0	0	0	0	1	0	0	0	0	56	2	0	70	
PERCENT	4.3%	11.4%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.1%	60.0%	14.3%	0.0%	1.4%	2.9%	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	80%	2.9%	0.0%	100%	
NETHERLANDS																													
Gelderland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
Utrecht	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	
PERCENT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0%	100%	0.0%	100%	

4.2 Rabies cases per country, 2nd quarter 2003 (continued)

01.04.03 -30.06.03

Location	Domestic animals										Wildlife										bat	Human cases	total				
	dog	cat	cattle	equine	goat sheep	pig	stray dog	other	subtotal	fox	raccoon dog	raccoon	wolf	badger	marten	other mustelides	other carnivores	wild boar	roe deer	red deer				fallow deer	other	subtotal	
LITHUANIA																											
Alytus	2	1	1	0	0	0	5	0	9	13	15	0	0	1	4	4	0	0	0	0	0	0	0	37	0	0	46
Kaunas	4	6	3	0	0	0	0	0	13	3	6	0	0	0	2	0	0	0	0	0	0	0	0	11	0	0	24
Klaipeda	3	1	1	0	0	0	1	0	6	22	9	0	0	2	2	0	1	0	0	0	0	0	0	36	0	0	42
Marjampole	1	0	0	0	0	0	0	0	1	11	10	0	0	0	1	0	0	0	0	0	0	0	0	23	0	0	24
Panevezys	4	3	1	1	0	0	0	0	9	11	6	0	0	0	5	2	1	0	0	0	0	0	0	25	0	0	34
Šiauliai	3	7	3	0	1	0	0	0	14	12	9	0	0	0	6	0	0	0	0	0	0	0	0	27	0	0	41
Taurage	1	7	2	1	0	0	0	0	11	8	4	0	0	2	0	0	0	0	0	0	0	0	0	14	0	0	25
Telšiai	1	1	2	0	0	0	0	0	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	8
Utena	0	0	0	0	0	0	0	0	4	18	14	0	0	1	5	1	0	0	0	0	0	1	0	40	0	0	40
Vilnius	3	0	1	0	0	0	1	0	5	16	7	0	0	0	0	2	0	0	0	0	0	0	0	25	0	0	30
TOTAL	22	26	14	2	1	0	7	0	72	117	81	0	0	4	27	10	2	0	0	0	0	1	242	0	0	314	
PER CENT	7.0%	8.3%	4.5%	0.6%	0.3%	0.0%	2.2%	0.0%	22.9%	37.3%	25.8%	0.0%	0.0%	1.3%	8.6%	3.2%	0.6%	0.0%	0.0%	0.0%	0.3%	77%	0.0%	0.0%	100%		
UKRAINE																											
Cherkasskaja o.	4	6	2	0	0	0	0	0	12	9	1	0	0	0	0	1	0	0	0	0	0	0	0	11	0	0	23
Chernigovskaja o.	18	17	14	3	0	0	0	0	52	37	0	0	0	0	2	1	0	0	0	0	0	0	0	41	0	0	93
Chernovitskaja o.	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	2
Dnepropetrovskaja o.	1	2	1	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	6
Doneckskaja o.	3	1	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	5
Ivano-Frankovskaja	0	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Khar'kovskaja o.	9	8	2	0	0	0	0	0	19	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	22
Kher'son'skaja o.	2	2	3	0	1	0	0	0	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	11
Khmelnitskaja o.	12	6	4	0	0	0	0	0	22	25	0	0	0	1	1	0	0	0	0	0	0	0	0	27	0	0	49
Kievskaja o.	3	4	0	0	0	0	0	0	7	8	1	0	0	0	1	0	0	0	0	0	0	0	0	10	0	0	17
Kirovogradskaja o.	1	7	1	0	2	0	0	0	11	7	0	0	0	1	0	0	0	0	0	0	0	0	0	8	0	0	19
Krym	0	0	1	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4
Luganskaja o.	9	5	2	0	0	0	0	0	16	7	0	0	1	0	1	0	0	0	0	0	0	0	0	10	0	0	26
L'ovskaja o.	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5
Nikolajevskaja o.	1	2	0	0	0	0	0	0	3	9	0	0	0	0	0	1	0	0	0	0	0	0	0	10	0	0	13
Odesskaja o.	5	5	6	0	0	0	0	0	16	5	0	0	0	0	1	0	0	0	0	0	0	0	1	7	0	0	23
Poltavskaja o.	19	11	12	0	1	0	0	0	43	11	0	0	0	0	0	0	0	0	0	0	0	0	0	11	1	0	55
Rovenskaja o.	0	1	0	0	0	0	0	0	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	8
Sumskaja o.	6	18	9	0	0	0	0	0	33	6	0	0	0	0	0	1	0	0	0	0	0	0	0	7	0	0	40
Vinnitskaja o.	0	8	0	0	0	0	0	0	8	1	0	0	0	0	2	0	0	0	0	0	0	0	0	3	0	0	11
Volynskaja o.	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0	0	4
Zakarpatskaja o.	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Zaporozhskaja o.	0	1	3	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5
Zhitomirskaja o.	4	4	2	0	0	0	0	0	10	42	0	0	1	1	2	0	0	0	0	0	0	0	0	46	0	0	56
TOTAL	98	109	63	3	4	0	0	0	277	195	2	1	2	4	10	6	0	0	1	0	0	1	222	1	0	500	
PER CENT	19.6%	21.8%	12.6%	0.6%	0.8%	0.0%	0.0%	0.0%	55.4%	39.0%	0.4%	0.2%	0.4%	0.8%	2.0%	1.2%	0.0%	0.0%	0.2%	0.0%	0.2%	0.0%	44%	0.2%	0.0%	100%	

4.2 Rabies cases per country, 2nd quarter 2003 (continued)

01.04.03 -30.06.03

Location	Domestic animals										Wildlife										bat	Human cases	total					
	dog	cat	cattle	equine	goat	sheep	pig	stray dog	other	subtotal	fox	raccoon dog	raccoon	wolf	badger	marten	other mustelides	other carnivores	wild boar	roe deer				red deer	fallow deer	other	subtotal	
R U S S I A																												
Astrahanskaja obl.	1	7	7	0	2	1	0	2	20	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	3	0	0	23
Belgorodskaja obl.	6	2	2	0	0	0	1	0	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	22
Brianskaja obl.	9	1	0	0	0	0	1	0	11	29	1	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	41
Cuvasckaja resp.	0	0	1	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	5
Dagestan resp.	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Kabardino-Balkarskaja resp.	0	0	1	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Kaliningradskaja obl.	7	4	3	0	0	0	0	0	14	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	15
Kalmykija resp.	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Kaluzskaja obl.	7	4	1	0	0	0	0	0	12	31	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	47
Krasnodarskij kr.	2	4	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Kurskaja obl.	10	12	8	0	0	0	0	8	38	13	0	0	0	0	0	1	0	0	0	0	0	0	0	0	14	0	0	52
Lipeckaja obl.	5	3	3	0	0	0	0	0	11	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4
Marij El' resp.	1	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	5
Mordovija resp.	0	1	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	31
Moskovskaja obl.	1	2	0	0	0	0	0	0	3	23	5	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	65
Nizegorodskaja obl.	5	0	3	0	0	0	0	0	17	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	22
Orlovskaja obl.	5	4	8	0	0	0	0	0	17	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	89
Penzenskaja obl.	14	2	3	0	0	0	0	0	19	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	20
Pskovskaja obl.	6	4	0	0	0	0	0	1	11	15	1	0	0	1	0	0	0	0	0	0	0	0	0	0	17	0	0	34
Rjazanskaja obl.	9	2	6	0	0	0	0	0	17	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	0	31
Rostovskaja obl.	14	6	5	0	1	0	0	0	26	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	23	0	0	65
Saratovskaja obl.	20	3	16	1	1	0	0	0	42	20	0	0	0	0	1	0	0	1	0	0	0	0	0	0	23	0	0	23
Severn. Osetija-Alanija resp.	10	1	9	0	0	3	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
Smolenskaja obl.	2	0	0	0	0	0	0	0	2	17	4	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0	23
Stavropolskij kr.	0	2	1	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
Tambovskaja obl.	11	1	2	0	0	0	0	0	14	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	33
Tul'skaja obl.	5	2	2	0	0	0	0	0	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	16
Tverskaja obl.	3	1	1	0	0	0	0	0	5	14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	24
Uljanovskaja obl.	1	1	5	0	0	0	0	0	7	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	11
Vladimirskaia obl.	3	1	0	0	0	0	0	0	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	10
Volgogradskaja obl.	4	0	13	0	2	0	0	0	19	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	23
Voronezskaja obl.	19	11	8	0	0	0	0	1	39	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	48
TOTAL	181	80	110	1	6	6	14	2	400	390	19	0	4	3	1	5	3	0	0	0	0	0	0	0	425	0	0	825
PERCENT	21.9%	9.7%	13.3%	0.1%	0.7%	0.7%	1.7%	0.2%	48.5%	47.3%	2.3%	0.0%	0.5%	0.4%	0.1%	0.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	52%	0.0%	0.0%	100%

4.3 TREND TABLES

4.3.1 Comparison of the reporting quarter (II /2003) with the previous quarter (I /2003)

NAME	Total			Wildlife			Domestic animals			Bats			Human		
	II 2003 (no.)	I 2003 (no.)	Difference	II 2003 (no.)	I 2003 (no.)	Difference	II 2003 (no.)	I 2003 (no.)	Difference	II 2003 (no.)	I 2003 (no.)	Difference	II 2003 (no.)	I 2003 (no.)	Difference
ALBANIA	0	2	-2	0	2	-2	0	0	0	0	0	0	0	0	0
AUSTRIA	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0
BELARUS	325	380	-55	233	290	-57	92	90	2	0	0	0	0	0	0
BELGIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BOSNIA /HERCEGOVINA	16	31	-15	14	26	-12	2	5	-3	0	0	0	0	0	0
BULGARIA	4	6	-2	2	5	-3	2	1	1	0	0	0	0	0	0
CROATIA	105	254	-149	97	245	-148	8	9	-1	0	0	0	0	0	0
CYPRUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZECH REPUBLIC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DENMARK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTONIA	190	238	-48	176	213	-37	14	25	-11	0	0	0	0	0	0
FED.REP. OF YUGOSL	67	77	-10	49	64	-15	18	13	5	0	0	0	0	0	0
FINLAND	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0
FRANCE	0	1	-1	0	0	0	0	0	0	0	1	-1	0	0	0
GERMANY	6	8	-2	2	8	-6	0	0	0	4	0	4	0	0	0
GREECE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HUNGARY	30	64	-34	21	47	-26	9	17	-8	0	0	0	0	0	0
ICELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IRELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ITALY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LATVIA	267	221	46	220	198	22	47	23	24	0	0	0	0	0	0
LITHUANIA	314	235	79	242	190	52	72	45	27	0	0	0	0	0	0
LUXEMBOURG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MACEDONIA **	0	**		0			0			0			0		
MOLDOVA	6	9	-3	3	5	-2	3	4	-1	0	0	0	0	0	0
NETHERLANDS	3	1	2	0	0	0	0	0	0	3	1	2	0	0	0
NORWAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POLAND	70	167	-97	56	149	-93	12	18	-6	2	0	2	0	0	0
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROMANIA	34	13	21	28	9	19	6	4	2	0	0	0	0	0	0
RUSSIAN FEDERATION	825	1130	-305	425	622	-197	400	508	-108	0	0	0	0	0	0
SLOVAK REPUBLIC	71	130	-59	62	110	-48	9	20	-11	0	0	0	0	0	0
SLOVENIA	0	2	-2	0	2	-2	0	0	0	0	0	0	0	0	0
SPAIN	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0
SWEDEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SWITZERLAND/LIECHTEN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TURKEY	50	40	10	8	6	2	42	34	8	0	0	0	0	0	0
UKRAINE	500	621	-121	222	322	-100	277	297	-20	1	0	1	0	2	-2
UNITED KINGDOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2886	3630	-744	1860	2513	-653	1016	1113	-97	10	2	8	0	2	-2

Wildlife: excluding bats

II /2003 (no.), I /2003 (no.): number of cases

Difference: no. of cases in II /2003 minus cases in I /2003

** no data

4.3.2 Comparison of the reporting quarter (II /2003) with the same quarter of the previous year (II /2002)

NAME	Total			Wildlife			Domestic animals			Bats			Human		
	II 2003 (no.)	II 2002 (no.)	Difference	II 2003 (no.)	II 2002 (no.)	Difference	II 2003 (no.)	II 2002 (no.)	Difference	II 2003 (no.)	II 2002 (no.)	Difference	II 2003 (no.)	II 2002 (no.)	Difference
ALBANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AUSTRIA	1	4	-3	0	4	-4	1	0	1	0	0	0	0	0	0
BELARUS	325	146	179	233	102	131	92	44	48	0	0	0	0	0	0
BELGIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BOSNIA /HERCEGOVINA *	16	2*	14	14	1	13	2	1	1	0	0	0	0	0	0
BULGARIA	4	3	1	2	3	-1	2	0	2	0	0	0	0	0	0
CROATIA	105	70	35	97	61	36	8	9	-1	0	0	0	0	0	0
CYPRUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZECH REPUBLIC	0	2	-2	0	2	-2	0	0	0	0	0	0	0	0	0
DENMARK	0	2	-2	0	0	0	0	1	-1	0	1	-1	0	0	0
ESTONIA	190	79	111	176	66	110	14	13	1	0	0	0	0	0	0
FED.REP. OF YUGOSL	67	24	43	49	19	30	18	5	13	0	0	0	0	0	0
FINLAND	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0
FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	6	6	0	2	4	-2	0	0	0	4	2	2	0	0	0
GREECE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HUNGARY	30	29	1	21	23	-2	9	6	3	0	0	0	0	0	0
ICELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IRELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ITALY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LATVIA	267	81	186	220	73	147	47	8	39	0	0	0	0	0	0
LITHUANIA	314	163	151	242	123	119	72	40	32	0	0	0	0	0	0
LUXEMBOURG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MACEDONIA **	0	**		0			0			0			0		
MOLDOVA	6	4	2	3	3	0	3	1	2	0	0	0	0	0	0
NETHERLANDS	3	0	3	0	0	0	0	0	0	3	0	3	0	0	0
NORWAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POLAND	70	248	-178	56	226	-170	12	22	-10	2	0	2	0	0	0
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROMANIA	34	19	15	28	10	18	6	9	-3	0	0	0	0	0	0
RUSSIAN FEDERATION	825	623	202	425	175	250	400	446	-46	0	1	-1	0	1	-1
SLOVAK REPUBLIC	71	13	58	62	10	52	9	3	6	0	0	0	0	0	0
SLOVENIA	0	2	-2	0	2	-2	0	0	0	0	0	0	0	0	0
SPAIN	1	2	-1	0	0	0	1	1	0	0	1	-1	0	0	0
SWEDEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SWITZERLAND + LIEC.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TURKEY	50	87	-37	8	12	-4	42	75	-33	0	0	0	0	0	0
UKRAINE	500	235	265	222	72	150	277	163	114	1	0	1	0	0	0
UNITED KINGDOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2886	1844	1042	1860	991	869	1016	847	169	10	5	5	0	1	-1

Wildlife: excluding bats

II 2003 (no.)/ II 2002 (no.): number of cases

Difference: no. of cases in II /2003 minus cases in II /2002

* not complete

** no data

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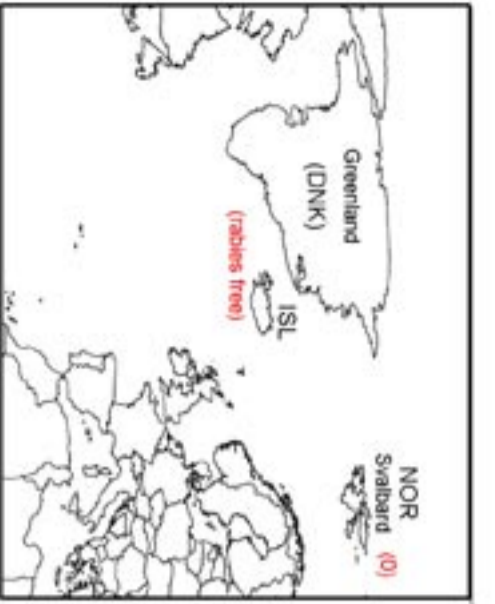
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**RABIES CASES EUROPE
2 nd QUARTER 2003
2886 CASES REPORTED**

10 BAT RABIES CASES INCLUDED

