

RABIES BULLETIN EUROPE

Volume 30

No 2

Quarter 2

2006

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www.druckerei-hk.de

ISSN 0257-8506

The Rabies Bulletin Europe is also available online: www.who-rabies-bulletin.org.

Acknowledgements

The Rabies Bulletin Europe is sponsored by the:

World Health Organization, Geneva
World Organisation for Animal Health (OIE), Paris

Gratefully acknowledged is the financial support of the WHO Collaborating Centre by the

Bundesministerium für Gesundheit und Soziale Sicherung and by the
Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz,
Germany

1. Editorial

Bat rabies is a very important aspect of rabies research in epidemiology, control and eradication. Two teenagers from Texas and Indiana (USA) died of rabies this year. The rabies virus (RABV) was presumably transmitted by bats. In Europe, where bats can be found infected with EBLV1 and EBLV2 only few human rabies cases associated with bat contacts are reported. Yet the importance of information and research on bat rabies can be seen in a recent event in Denmark. A young girl was bitten by a bat which was later destroyed but could not be tested. The girl was referred to the nearest paediatric medical service for management of the potential rabies exposure. Post-exposure prophylaxis (PEP) was started (human rabies immunoglobulin was administered and a course of rabies vaccination was begun). During the summer, the patient's parents had noticed several bats lying on the ground around the farm, unable to fly, but they had not previously reported this. Because the dead bat that bit the child had been crushed, it was not possible to test brain tissue for rabies virus. Nine dead bats were then collected from the farm and tested at the Danish Institute for Food and Veterinary Research. Of these 9 bats, 4 tested positive for a bat variant of rabies virus, European Bat Lyssavirus (EBLV). (Source: ProMED-mail) Such biting incidents with positive tested bats and adequate post exposure prophylaxis given to the people affected have also been reported from Germany.

Nonetheless, worldwide, one main public health threat is still terrestrial rabies and hereby mainly urban transmission cycles in developing countries. Many countries in Western and Central Europe have successfully eradicated sylvatic rabies by means of oral immunisation of foxes (OIF). With the enlargement of the European Union more and more countries are starting rabies eradication programmes. In this issue we present an article about the rabies situation in Romania, a country with very high numbers of rabies cases in the past. The article not only reflects the past and present situation of rabies in this country but also outlines the planned activities towards eradication.

As usual, we present the rabies situation in Europe in tables and maps. For more information, see also the online version of the Rabies Bulletin Europe at www.who-rabies-bulletin.org.

Conrad Freuling

3. Miscellaneous Articles

3.1 RABIES IN ROMANIA – PAST, PRESENT AND FUTURE

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Classical rabies is an infectious disease inevitably fatal to humans and warm blooded animals once symptoms develop. It is caused by genotype1 lyssaviruses of the genus rhabdovirus, order mononegavirales. Rabies occurs worldwide except for some regions where due to geographical isolation or implemented control measurements rabies has never been introduced or has been eradicated. For classical rabies different transmission cycles can be distinguished. Urban rabies is mainly transmitted by stray and feral dogs, whereas for sylvatic rabies in Europe the red fox (*Vulpes vulpes*)

and more recently the neozoon raccoon dog (*Nyctereutes procyonoides*) may also serve as reservoir species.

Romania used to be one of the countries with the highest number of rabies cases in animals in Europe. Between 1946 and 1956 the number of rabies cases reported was more than a thousand annually. However, it is not clear whether the diagnosis was based on clinical grounds or laboratory diagnosis. Urban rabies was predominant after World War II and before the arrival of the fox rabies epidemic. Dogs accounted for about 75 % of all rabies cases in

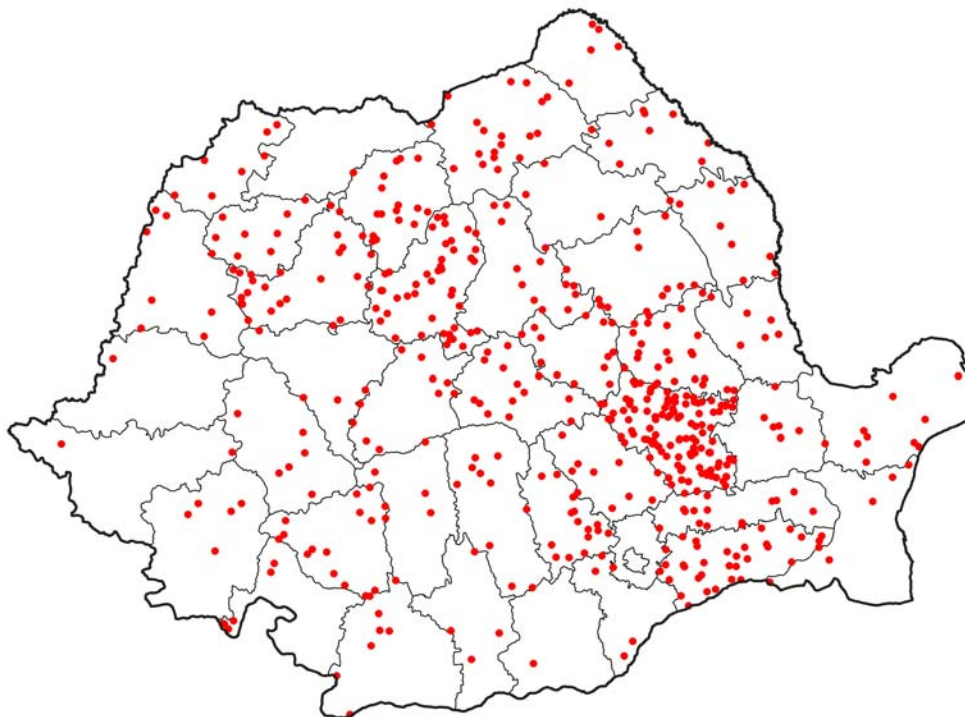


Figure1. Distribution of rabies cases in Romania in 2005 (530 cases)

1946. Control measurements were implemented in 1942, 1944 and in 1951 with the veterinary law No 71/1951. Following this law preventive vaccinations of a considerable number of domestic animals, e.g. dogs reduced the rabies incidence considerably and were capable of eradicating rabies in some regions. Despite these successes rabies remained endemic in 6 regions comprising the lower Carpathian area. From the mid of the sixties fox rabies cases increased rapidly indicating that as in other European countries a fox rabies epidemic encompassed Romania. Although there is no data available for the time before 1977 when reporting to the RBE started it can be assumed that rabies had been established in wildlife. Wolves played an important role in the transmission of rabies to humans; between 1951 and 1966 113 persons were bitten by rabid wolves.

Since 1999 a monitoring programme for rabies has been in place for both domestic and wild animals. In areas with high rabies incidences field trials for oral immunisation of foxes using Lysvulpen were initiated. Furthermore, all domestic species were vaccinated within these areas. As shown in figure 2, wildlife rabies is mostly fox dependent. The number of rabies cases diagnosed may differ according to the number of animals tested, indicating a need for improved surveillance following WHO and EU recommendations. Rabies in Romanian wildlife is very interesting in therefore as that Romania has a rich diversity in wild fauna. This is reflected in rabies cases diagnosed in brown bears, lynxes, wolves and otters. In 2004 a rabid brown bear killed two people and some more where injured, all injured receiving appropriated post exposure prophylaxis. The racoon dog which is

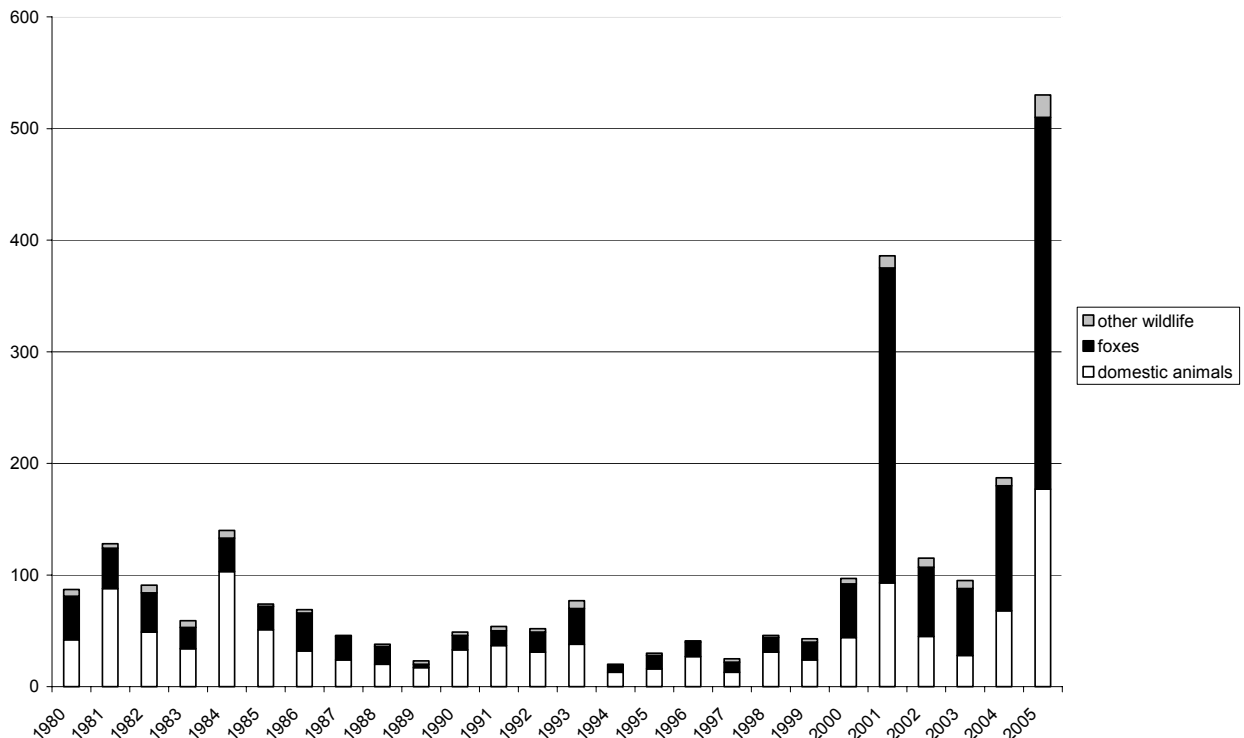


Figure 2. Number of confirmed rabies cases in animals, 1980-2005

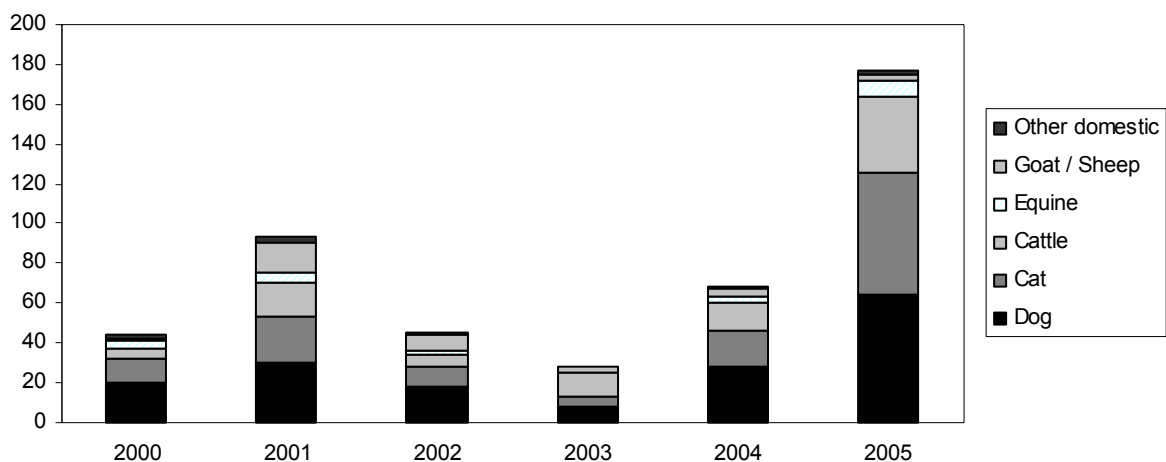


Figure 3. Number of confirmed rabies cases in domestic animals, 2000-2005

probably capable of establishing a rabies transmission cycle has so far been diagnosed rabid only rarely in the north western districts. As shown in figure 3 the number of domestic animals diagnosed rabid have increased from 2002 to 2005. Most cases are in pets, i.e. dogs and cats and might indicate insufficient vaccination coverage. Hence, the close relationship to these animals causes a high number of possible virus transmissions and therefore many pre and post exposure prophylactic treatments in humans with severe impacts on public health funding.

Currently, ongoing phylogenetic analysis of a few rabies virus isolates from across Romania suggest that at least 3 different rabies virus variants are circulating among wildlife in specific areas with genetic relationship to virus strains isolated in central Balkan region, and Hungary. Further analysis are planned to gain more information.

In Europe, oral rabies vaccination of foxes (ORV) has been successfully applied to combat rabies. For many years the Community has contributed financially towards campaigns for ORV in a number of Member States affected by epidemics

of wildlife rabies. As a result, large parts of Western and Central Europe could be freed from terrestrial rabies with this modern and powerful method of disease control. So far, next to Switzerland (1998) several MS such as Finland (1991), the Netherlands (1991), Italy (1997), France (2000), Belgium (2001), Luxembourg (2001) and the Czech Republic (2004) have been declared as being officially free of rabies. During the last two decades considerable progress in rabies elimination has also been achieved in many middle and eastern European countries.

Inspired by these successes, in 2006, Romania has drawn up a country-wide program for the control and eradication of rabies for a period of 10 years. In accordance with EU regulations this planned program is submitted to the Commission to benefit from co-financing of the Community. The main objectives are as follows:

1. Enhanced surveillance of rabies in fox population
2. Control of rabies in fox population and finally
3. Eradication of rabies in Romania

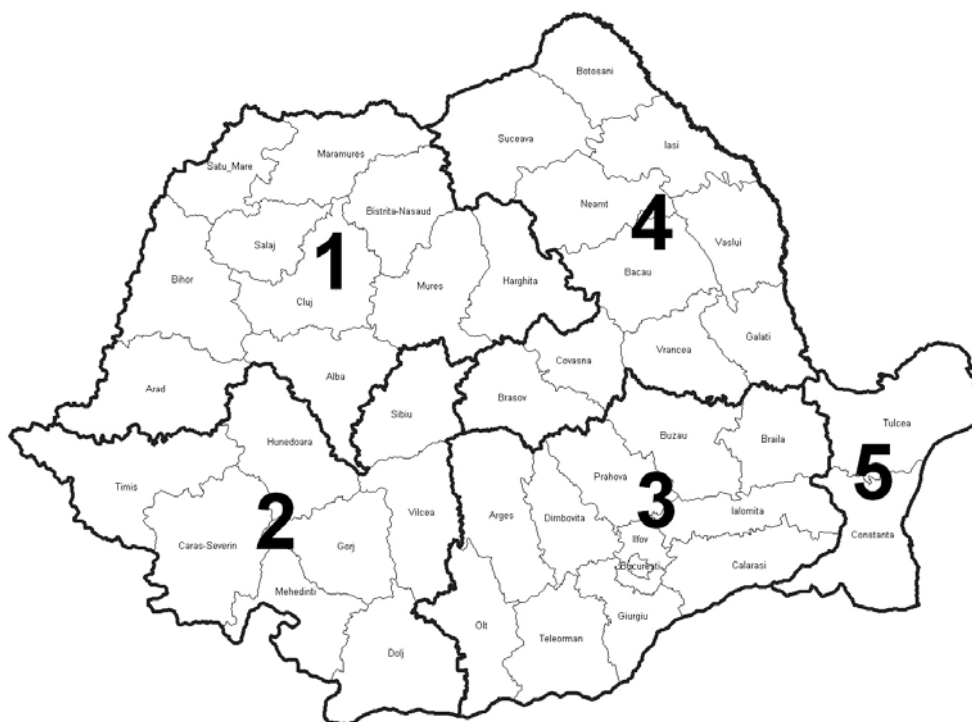


Figure 4. Regions in Romania according to ORV program

In order to fulfill the objective it is planned to orally vaccinate the entire fox population by 2016. Permanent surveillance of wildlife rabies and monitoring of the application of vaccination plans will be used to evaluate the effectiveness of ORF and improve and document the progress. For this purpose data collection, data analysis and IT-processing will be established. The implementation of the program will be carried out by the Sanitary Veterinary Services in collaboration with the services of the Ministry of Agriculture, Food and Rural Development based on a strategy under the co-ordination of the National Sanitary Veterinary and Food Safety Authority (NSVFSA). It will take into account the current epidemiological situation of rabies densities within the fox population as the main vector of rabies in various topographical areas.

According to natural borders Romania was divided into 4 major areas and a special one, Danube

Delta (figure No 4). The first vaccination campaign will be conducted in 2007. Considering ongoing oral vaccination programs in neighbouring countries Romania intends to start ORV in the northwestern part of the country comprising 10 counties covering an area of 50000 km² at the border with Hungary (See figure No 4, area nr. 1). In Hungary oral immunization of foxes against rabies started in 1992 and from 2004 ORV covered the whole territory of the country. This strategy has advantages for both countries as Romania will benefit from established long-term herd immunity among foxes in Hungarian vaccination areas. On the other hand, possible re-infection of areas in Hungary from adjacent Romanian areas will be significantly reduced.

Such vaccination campaigns in a given region are planned for the next two years. Afterwards vaccination areas will be extended to the east, covering step by step the whole territory of the country until 2016.

Depending on the success of ORV in areas freed from rabies vaccination will be stopped by and by.

Nevertheless, in accordance with the Report of the Scientific Committee on Animal Health and Animal Welfare, EC 2002, to protect a rabies-free or freed area from a neighbouring infected area, an immunological barrier (a buffer zone, 50 km deep) along the borders with infected areas will be established.

Romania will first use the classic pattern of two "single vaccination" campaigns per year, carried out in spring and autumn. Oral vaccination of foxes in spring will be carried out in May- June in order to increase the efficient access of fox cubs to bait. The vaccination will be repeated in autumn, September-October, when baits will be distributed in the same territory. This biannual distribution frequency has been used in all European programs of oral vaccination and it resulted in the elimination of rabies.

Aerial distribution of vaccine baits will be the preferred method of choice either using fixed-wing aircraft or helicopter. In urban and suburban areas complementary hand distribution of vaccine baits will be conducted. Regarding the recommendations of the Scientific Committee for Animal Health and Welfare adopted on the 23rd of October 2002, the number of baits/km² delivered with the planes will be 20, with a distance between the flight lines of 1000 m and the number of baits delivered by hand will be of 25/km².

Follow-up investigations in vaccination areas will be coordinated at the National Reference Laboratory for Diagnosis and focused on rabies surveillance (diagnosis), bait uptake (tetracycline marking), serological testing of foxes on rabies specific antibody, and characterization of isolated strains by PCR or monoclonal antibodies.

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