

# Eradication programme for infection with RABV in Hungary

**1. Date of submission:** 12 December 2022.

**2. Name of the country:** Hungary

**3. The territorial scope with a description and delimitation of the geographical and administrative areas covered by the eradication programme and the names of the districts and regions if the programme covers more than one region:**

The rabies situation in Hungary has changed significantly, between 26 September 2022 and 24 November 2022, the National Reference Laboratory detected rabies in 3 foxes and 1 dog in Szabolcs-Szatmár-Bereg county, near the Ukrainian border. The foxes probably entered the country naturally as wildlife moved from Ukraine, with all cases occurring within about 10 km of the Ukrainian border. In areas close to Ukraine, the risk of epidemics is higher than usual as the war has prevented the veterinary authorities there from implementing the fox vaccination programme.

The objectives of the eradication programme is to improve the unfavourable epidemiological situation of rabies in Hungary, to prevent the reintroduction of the disease from neighbouring areas, to protect domestic livestock and to prevent human cases. Main measures of the programme are oral vaccination of wild carnivores, monitoring of effectiveness of oral vaccination and rabies surveillance in all species (domestic and wild animals) in the whole country. Rabies surveillance (examination of suspect cases and indicator animals) is in place in the whole territory of Hungary, monitoring of effectiveness of oral vaccination is conducted only in the vaccination area. The main target population of oral immunization programme is the red fox population, but in the southern parts of Hungary the number of golden jackals is continuously increasing, therefore golden jackals will be examined as well in the framework of the monitoring programme.

As of 21 April 2021 Hungary held a disease free status from infection with RABV (Hungary is listed in Part I of Annex III to the Commission Implementing Regulation (EU) 2021/620), meanwhile our rabies status has changed, currently the following counties are now free of the disease:

- Baranya County
- Bács-Kiskun County
- Békés County
- Borsod-Abaúj-Zemplén County
- Csongrád-Csanád County
- Fejér County
- Győr-Moson-Sopron County
- Hajdú-Bihar County
- Heves County
- Jász-Nagykun-Szolnok County
- Komárom-Esztergom County
- Nógrád County
- Pest County (including Budapest)
- Somogy County
- Tolna County
- Vas County

- Veszprém County
- Zala County

On 4 February 2022, the OIE (World Organisation for Animal Health) published on its website a declaration on rabies free status of Hungary, which has since been withdrawn.

#### **4. Description of the epidemiological situation for at least the last 5 years, including:**

**(a) the number of confirmed cases per listed species**

**(b) maps showing the distribution of confirmed cases referred to in (a) by year**

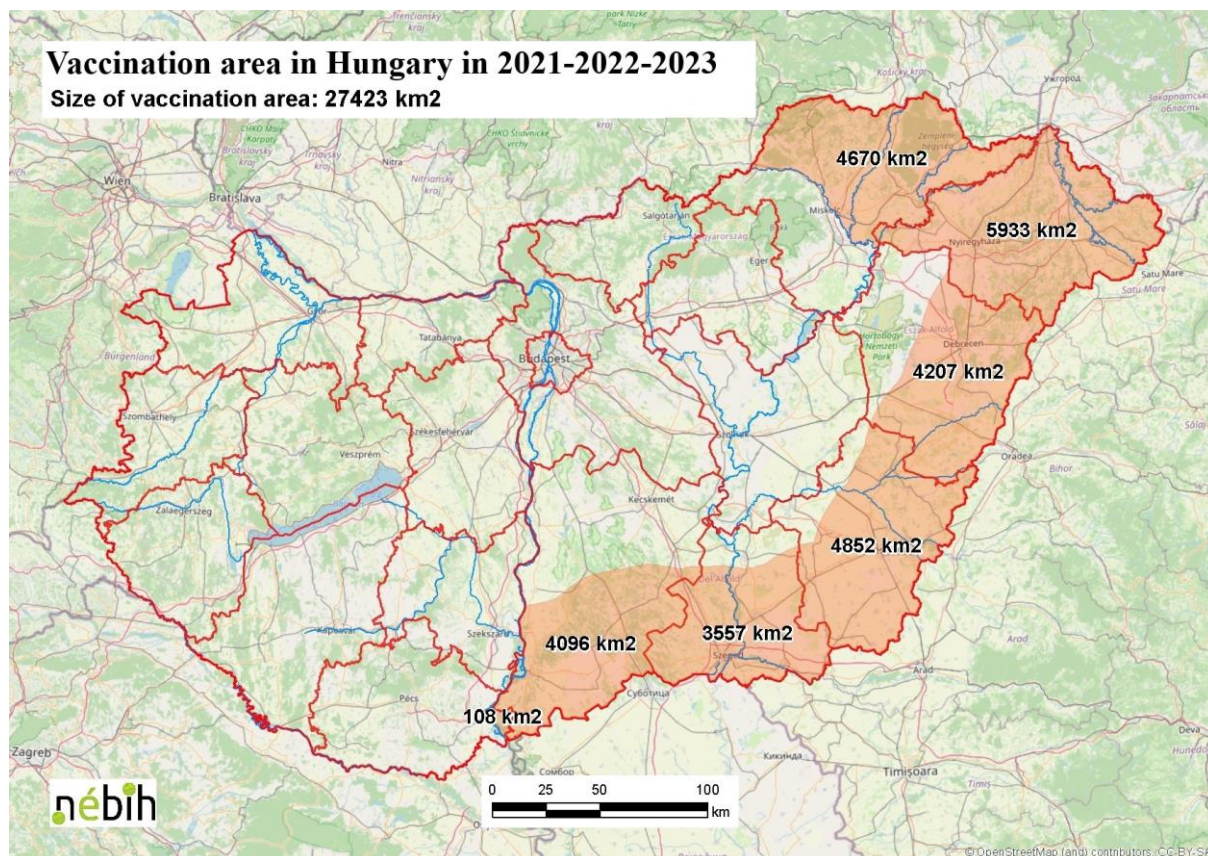
**(c) the disease control strategy and the results of the control measures**

Oral vaccination against rabies has been performed in different areas of Hungary since 1992, and then gradually extended to larger areas of the country. The long term objective of the oral vaccination programme was to eradicate (sylvatic) rabies from wild animals, mainly from red fox (*Vulpes vulpes*) populations in the whole territory of Hungary.

Between 2004-2006 the bait distribution has been extended over the whole country in the framework of a PHARE project. Since 2007 the eradication, control and monitoring programme is approved and co-financed by the European Commission. In 2007 the vaccination of the whole territory of the country was continued. From 2008, due to the favourable epidemiological situation, oral vaccination was maintained only in a 50 km wide zone along the state borders to neighbouring countries not officially free from rabies until spring 2013. Between 2005-2010 the number of the detected positive cases remained under ten cases. In 2010 10 rabies cases occurred in Hungary (plus 1 bat case). In 2011 and 2012 no rabies cases were diagnosed in domestic animals or wildlife (except 3 bats, EBLV-1). In September 2013 rabies was diagnosed in a red fox originating from Bács-Kiskun county, a territory that had not been vaccinated since 2008. In 2013, 24 cases were detected in 3,5 moths. An emergency ring vaccination was implemented in autumn 2013 in a semi-circle (taking advantage of river Tisza as a natural barrier) of 50 km radius around the first detected case. In 2014, 23 rabies cases were detected while vaccination area was extended to the north up to highway M3 (E71) and in this area a double baiting density was applied (40 baits/km<sup>2</sup>). The epidemic concerned 3 counties (Bács-Kiskun, Pest, Jász-Nagykun-Szolnok), and 47 cases were found in total, of which 4 in domestic animals and 43 in wild animals. After 3 consecutive vaccination campaigns in the infected area, no further cases were found. In 2015, vaccination area was further extended to the north and no rabies cases were diagnosed in domestic animals or wildlife. Only one bat (EBLV-1, Pest county) and one fox was found positive (Békés county, vaccine induced case, confirmed by the EURL as well.) In February 2016, one red fox was found positive in Borsod-Abaúj-Zemplén county. The virus was different from the viruses isolated from the 2013-2014 cases. During the 2016 spring campaign, vaccine baits were distributed in a double (40 baits/km<sup>2</sup>) density within a circle of 50 km radius around the location of the case. In March 2017, in the same area, a red fox showing neurological symptoms was found positive again. The strain was identical to the one isolated in 2016. Two weeks later, in a farm closely located to the finding place of the fox, rabies was confirmed in two goats (a female and a kid). In spring 2018, due to problems with the public procurement procedure, vaccination campaign could not be performed in the area of Hungary that was designated for vaccination in the plan submitted for 2018 (the European Commission has been notified about the problem in letter No. ÉlfF/268/2018 of 14 March 2018). However, taking into consideration the epidemiological risks, distribution of oral rabies vaccines has been performed within an apprx. 30 km radius area (2.240 km<sup>2</sup>) around Szerencs, the city in Borsod-Abaúj-Zemplén county, where rabies cases were confirmed in spring 2016 (1 fox) and spring 2017 (1 fox and 2 goats).

In autumn 2018, following a new tender procedure, an area of 41.970 km<sup>2</sup> has been vaccinated, which is 45% of the territory of Hungary. In 2019 and 2020, vaccination was continued in the same area as in 2018 (41.970 km<sup>2</sup>).

During the years 2018-2020, no classical rabies cases were detected in Hungary (only EBLV in bats: one case of only EBLV-1, Pest county, January 2018). For the sake of cost-effectiveness, and also considering the favourable epidemiological situation in the country as well as the risk of re-introduction from neighbouring territories, the vaccination area has been reduced in 2021, by only maintaining the vaccination in the counties along the south-eastern, eastern and north-eastern country border. For detailed information of the areas please see the following map:

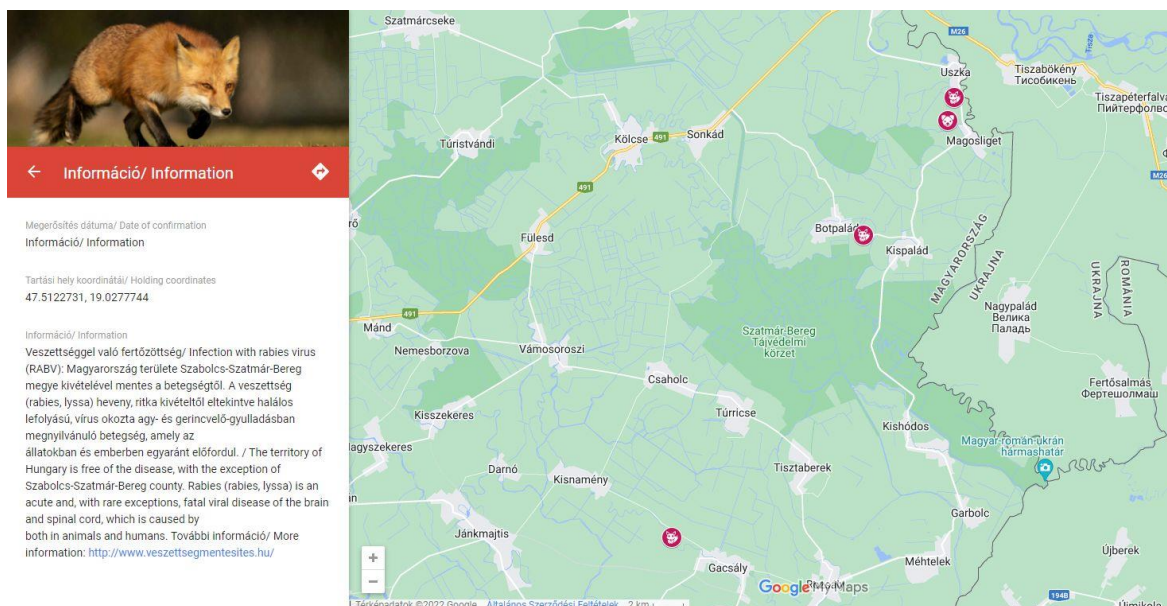
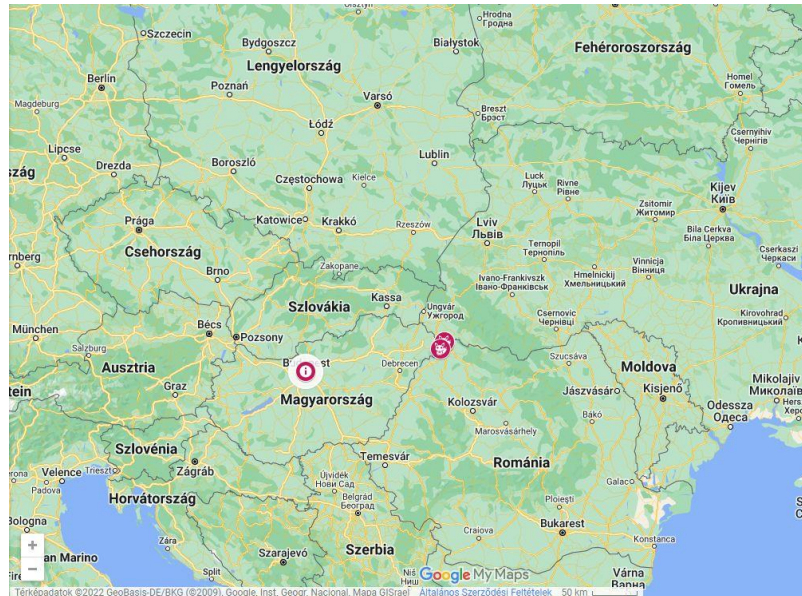


The rabies situation in Hungary has changed significantly in the meantime, between 26 September 2022 and 24 November 2022, the National Reference Laboratory detected rabies in 3 foxes and 1 dog in Szabolcs-Szatmár-Bereg county, near the Ukrainian border. The foxes probably entered the country naturally as wildlife moved from Ukraine, with all cases occurring within about 10 km of the Ukrainian border. In areas close to Ukraine, the risk of epidemics is higher than usual as the war has prevented the veterinary authorities there from implementing the fox vaccination programme.

In 2022, National Food Chain Safety Office has created a website on animal disease free health status, which provides a wealth of useful information on rabies and an interactive map of rabies outbreaks, which can be accessed directly from the link below:

<https://portal.nebih.gov.hu/kitoressek-es-mentessegek>

Please see the following maps indicating the area where the above 4 cases occurred (close to each other, 5-10 km apart):



## 5. Description of the disease control strategy of the eradication programme in accordance with Article 32 of Commission Delegated Regulation (EU) 2020/689:

(a) surveillance, indicating at least:

i. the animal population subject to surveillance:

The main target animal population of the oral vaccination campaigns is the red fox (*Vulpes vulpes*) population, but there are also increasing populations of golden jackals (*Canis aureus*) and a minor population of raccoon dogs (*Nyctereutes procyonoides*) present in Hungary. The raccoon dog population is not significant, but the golden jackal population is increasing in number and gradually spreading to the north. As the jackal is a competitor species of the red fox, it is expected that in some areas there will be more jackals than foxes. Moreover, although jackals are a susceptible species, very few data are available about their role in rabies epidemic and the effectiveness in OV

in this species. The target number of animals to be examined to control effectiveness of OV will be 4 foxes/100 km<sup>2</sup>/year in the vaccination area, but jackals will be also accepted as a proportion of the samples submitted by the hunters and tested for tetracycline and antibodies in the framework of monitoring of effectiveness of OV. It must be mentioned, that according to hunters, it is more difficult to hunt jackals than foxes.

The estimated size of the red fox population in Hungary is cca. 60 500 foxes (estimated in February each year, before reproductive season, without offspring, and officially published in summer each year). The distribution of the population is quite even in the country, with somewhat higher densities in the plain areas.

The estimated size of the golden jackal population of Hungary is cca. 15 300 jackals (estimated in February each year, before reproductive season, without offspring, and officially published in summer each year). The distribution of the species in the country is uneven. The species intruded into Hungary from the south, and currently the major part of the population lives in the south-western part of the country, but it is continuously spreading to the northern and eastern parts, where it can be observed in a lower number.

The target populations for passive surveillance are the populations of all animal species susceptible for rabies, and passive surveillance is in place not only in the vaccination area, but in the whole territory of Hungary. In the co-financed programme, targets are set only for the most commonly tested species, but of course all suspect animals and all animals causing human injury of any species will be tested.

Rabies control should not only be carried out in wild animals, but also in domestic animals. Regular vaccination of domestic carnivores against rabies is important to rid the country of the disease and to prevent human cases. The regular vaccination of dogs against rabies is required by law in Hungary (Decree No. 164/2008 (20.12.2008) of Ministry of Agriculture and Rural Development (MARD)), which obliges the keeper to have all dogs over three months of age vaccinated against rabies at his own expense by the veterinary service provider. A dog over three months of age must be vaccinated within 30 days and then vaccinated again within 6 months of the first vaccination. Thereafter, dogs must be vaccinated against rabies every year. Stray dogs must be contained and treated in the same way as unvaccinated dogs over 3 months old. Only authorised vaccines should be used for vaccination in accordance with the instructions for use.

Although regular compulsory rabies vaccination of cats is not required by law, it is strongly recommended due to the lifestyle of the species. Cats get out of the garden, spend more time outdoors, are more likely to encounter wildlife, including foxes, and are more likely to be infected. In areas where rabies has been diagnosed, the district veterinarian may also order regular preventive vaccination against rabies of domestic cats and other carnivorous pets. In this case, the immunisation must be carried out in accordance with the rules on vaccination against rabies. Preventive vaccination against rabies of other domestic animals may be carried out by the veterinarian providing the service at the request and expense of the keeper.

## ii. sampling schemes and details on the collection of fallen stock; and

### iii. diagnostic methods:

#### *Active surveillance:*

The efficiency of oral vaccination shall be monitored by laboratory methods. According to the Hungarian national legislation the number of samples to be collected is four foxes per 100 km<sup>2</sup> in a year, in accordance with the WHO and EFSA recommendations. Accordingly, 2 foxes/50 km<sup>2</sup> (only from the vaccination area) shall be collected per campaign. Foxes are shot by licensed hunters who submit the whole body of the fox to the veterinary authority for laboratory testing. Hunters are legally obliged to submit the samples by an official decision issued by the competent county government office and payed 7000 HUF/ cca. 17 EUR (excl. VAT) for this activity. During the pre-campaign meetings organized in each county, the hunters responsible for shooting the foxes for monitoring of effectiveness of OV are called upon to shoot the suspect foxes and other suspect wild animals as well.

The target tables include jackals, because they indicate the number of animals to be tested, being either foxes or jackals. The number of animals to be tested in the vaccination area is 4 animals (fox or jackal)/100 km<sup>2</sup>/ year. Submitting golden jackals for testing is an option for hunters, however, each hunting organization is allowed to submit jackals only up to 50% of the sample number calculated by their territory (2 animals/100 km<sup>2</sup>/campaign). The number of golden jackals is increasing, but hunters report that golden jackals are more difficult to hunt than foxes and in some areas golden jackals are completely absent. For the above reasons, in order to monitor the effectiveness of the ORV, the target number of golden jackals to be tested set based on the number of golden jackals tested in the previous hunting year. However, on country level the number of jackals tested shall not exceed 25% of the total sample number.

The tests for monitoring the efficiency of the oral immunization of foxes are also carried out in the laboratories of the VDD, from foxes (and, as of 2016, golden jackals) shot within the vaccination area, with the following methods:

- transversal tooth section from jaw – test for the presence of tetracycline biomarker (test for bait uptake)
- serological test (ELISA) of blood samples – test for the presence of anti-rabies antibodies (this test is carried out only in Budapest. The regional labs forward the blood samples to the NRL),
- direct immunofluorescence test (fluorescent antibody test -FAT) of imprints of the brain – test for exclusion/confirmation of rabies – this test was routinely performed from foxes shot for monitoring purposes until summer 2021 (until the end of the 2021 spring sampling period. Experts of the European Commission discouraged to continue this activity (see letter of the Health and Digital Executive Agency of the European Commission on 28 September 2021). Since autumn 2021, foxes shot for monitoring purposes are not tested for rabies any more). However, we would like to point out that between 26 September 2022 and 24 November 2022, the National Reference Laboratory detected rabies in 3 foxes and 1 dog in Szabolcs-Szatmár-Bereg county, near the Ukrainian border. Of the above animals, 2 foxes were asymptomatic animals, which were shot within the framework of an epidemiological measure (herd control and monitoring programme), and in their case the rabies virus was detected only because we ordered FAT and (if necessary) PCR testing of foxes shot in Szabolcs-Szatmár-Bereg county within the framework of the enhanced epidemiological measures. Based on the practical experiences described above, we would like to continue the FAT and (if

necessary) PCR analysis of the active monitoring samples sent in from Szabolcs-Szatmár-Bereg county in 2023, but due to the withdrawal of EU funding in this direction, the realisation of this plan is highly doubtful.

*Passive surveillance:*

Rabies passive surveillance is conducted in the whole territory of Hungary. All species of domestic and wild animals are tested for rabies if they showed abnormal behaviour or neurological signs, or caused human injury before their death. Wild animals found dead are to be tested for rabies as well.

Routine diagnostics of rabies in all animal species is carried out in three laboratories of the Veterinary Diagnostic Directorate (VDD) of the National Food Chain Safety Office (NFCSO): a central laboratory in Budapest, which is the NRL for Rabies, and two regional laboratories in Debrecen and in Kaposvár.

Available diagnostic methods:

- FAT - direct immunofluorescence (fluorescent antibody test -FAT) of imprints of the brain with a monovalent anti-nucleocapside conjugate,
- real time RT-PCR (Wakeley et al., 2005)
- conventional PCR
- RTCIT - isolation of the virus in the neuroblastoma cells cultures, with N2A cells and Fujirebio monoclonal globulins (Fujirebio Diagnostics, Inc.)

FAT positive results are confirmed by:

- real time RT-PCR
- conventional PCR
- RTCIT
- Sequencing (Sanger et. al., 1977)

In case of human contamination, FAT negative samples are examined beside these above mentioned methods with:

- real time RT-PCR
- RTCIT

In every rabies positive case the virus will be sequenced but because this is only performed from positive cases, and due to the low number of positive cases in recent years, the number of such tests cannot be estimated in advance. Therefore no target will be set and no financial contribution is requested for sequencing.

**(b) where appropriate, vaccination, indicating at least:**

**i. vaccination of the animals kept within the framework of the eradication programme;**

**- the type of vaccine(s) to be used;**

**- target population:**

Regular vaccination of domestic carnivores against rabies is important to rid the country of the disease and to prevent human cases. The regular vaccination of dogs against rabies is required by law in Hungary (Decree No. 164/2008 (20.12.2008) of MARD), which obliges the keeper to have all dogs over three months of age vaccinated against rabies at his own expense by the veterinary service provider. A dog over three months of age must be vaccinated within 30 days and then vaccinated again within 6 months of the first vaccination. Thereafter, dogs must be vaccinated against rabies every year. Stray dogs should be treated in the same way as unvaccinated dogs over 3 months of age. Only authorised vaccines should be used for vaccination in accordance with the instructions for use.

Although regular compulsory rabies vaccination of cats is not required by law, it is strongly recommended due to the lifestyle of the species. Cats get out of the garden, spend more time outdoors, are more likely to encounter wildlife, including foxes, and are more likely to be infected. In areas where rabies has been diagnosed, the district veterinarian may also order regular preventive vaccination against rabies of domestic cats and other carnivorous pets. In this case, the immunisation must be carried out in accordance with the rules on vaccination against rabies. Preventive vaccination against rabies of other domestic animals may be carried out by the veterinarian providing the service at the request and expense of the keeper.

**ii. vaccination of wildlife:**

**- definition/demarcation of the vaccination area;**

**- frequency and expected dates of vaccination campaigns;**

**- the baits/baits to be used containing the vaccine;**

**- method of distribution of vaccine baits and intended density of vaccine baits;**

**- a description of the methods to be used to assess the correct distribution of vaccine baits;**

**- a description of the strategy for monitoring the effectiveness of vaccination of the serology and vaccine baits used in the field of the sampling systems (with details of the collection of dead animals) and diagnostic methods;**

**- a description of the measures taken to ensure that the quality of the vaccine baits is maintained prior to distribution, in particular as regards titration of vaccine baits and cold chain controls;**

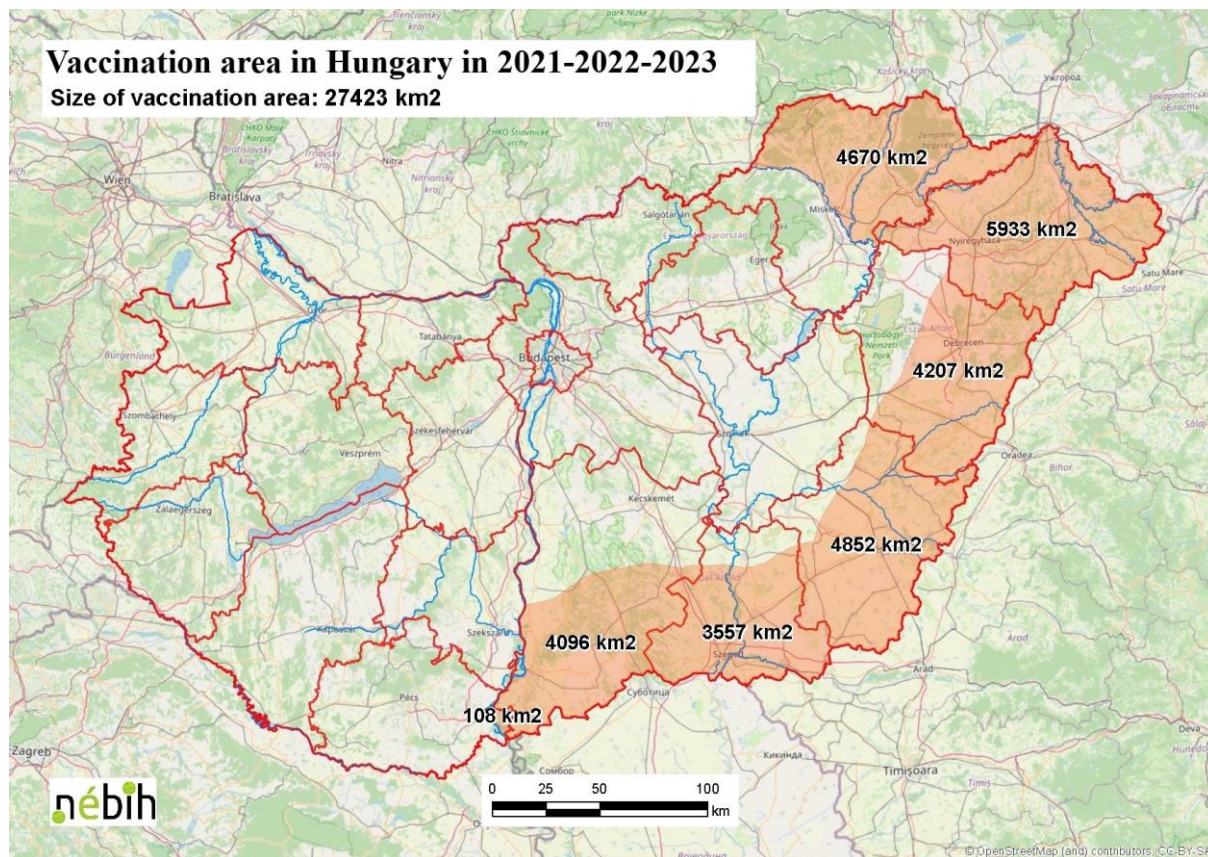
**- the vaccination of stray dogs with the type of vaccine(s) to be used and the target population:**

In 2021-2022, vaccination area was reduced, taking into consideration the favourable progress of rabies eradication in Croatia. The vaccination area in 2023 will be the same as in 2021-2022. Vaccination will be continued in the southern and eastern part of Hungary along the country borders with Serbia and Romania and Ukraine to avoid reintroduction of the disease from non-free countries (according to EFSA Scientific Opinion 4164/2015). Area of vaccination and monitoring of effectiveness of OV in 2023 covers 27.423 km<sup>2</sup> and involves 6 counties of Hungary: Bács-Kiskun, Békés, Borsod-Abaúj-Zemplén, Csongrád, Hajdú-Bihar, Szabolcs-Szatmár-Bereg (and also a small



area of Baranya county is included, which administratively belongs to Baranya, but geographically it is adjacent to the vaccinated part of Bács-Kiskun county).

For detailed information of the areas please see the following map:



Oral vaccination is performed two times a year: in spring (preferably first half of April) and in autumn (preferably first half of October). One campaign is performed in approximately 10-14 days (in case of favourable weather conditions).

Bait density to be achieved is 20 baits/km<sup>2</sup> in the vaccination area. Distribution of vaccine baits is not carried out in the urban areas (town, villages, etc.), in the areas of water (lakes, rivers, etc.), areas of public roads (roads, highways, etc.) and railways. The number of baits to be distributed per campaign is cca 550.000 doses.

In 2023 Rabadrop vaccine (MA holder: Bioveta) will be used.

Vaccines will be distributed with the use of airplanes, but in some specific areas manual distribution is performed as well.

#### *Aerial distribution:*

Aerial distribution is the main method for distribution. The target bait density is 20 baits/km<sup>2</sup> (gross). Distribution of vaccine baits will be performed with fixed-wing airplanes (since 2003 different types of CESNA airplanes are used). Distance between flying lines is usually 1000 m, the flying speed is between 100 and 120 km/h. In each new campaign flying lines are rotated by appr. 90 degree compared to the lines of the previous campaign. The distributor companies and the personnel of the airplanes are instructed not to drop baits in densely inhabited areas and water bodies.

All airplanes are equipped with GPS systems to record the flight routes and the dropping of baits. The aerial distribution is planned with mapping software and controlled using GPS. Flying lines and points of bait dropping are digitally recorded and stored.

GPS is used for flying navigation and following the planned flight routes. On each airplane the vaccine dropping machine is controlled by a computer connected with GPS. Flying lines and the dropping places of each vaccine bait are recorded by a computer (connected with the GPS system). The flight routes are also recorded by an independent system and the data are sent automatically to the central competent authority (CCA). The contractor for distribution reports on a daily basis via telephone to CCA, and also sends the GPS data of the given day during the vaccination campaign. The CCA checks at the end of each day of the campaign with the contractor which flight lines have been completed and how many baits have been distributed on the given flight lines. During the vaccination campaign CCA is able to control the distribution work on a daily basis.

#### *Manual distribution:*

Manual distribution is only supplementary. (Less than 1% of all the baits are distributed manually.) Manual distribution is applied in some specified areas where flying is prohibited or where a more precise distribution of baits is needed (i.e. oil and power plants /Algyó/ and railway transfer zones /Záhony/). Manual distribution is carried out by qualified wildlife biologists. The bait density is 20 baits/km<sup>2</sup>. The number of baits to be used for manual distribution per campaign is less than 2000 doses per campaign. Manual distribution is recorded GPS as well (tracks only).

#### *Control of vaccine distribution:*

GPS is used for flying navigation and for to define the exact places of dropping each vaccine. On each airplane the vaccine dropping machine is controlled by a computer connected with GPS. Flight routes and the places of each dropped vaccines are recorded by a computer (connected with the GPS system). During the vaccination campaigns the competent authority controls the implementation of the distribution work on a daily basis. There is an independent flight route recording system in place which sends the flight data automatically to the authority. At the end of each day of the campaign, the contractor for distribution reports on the progress of work via telephone to the CA. The CA checks on the map (flight plan) which flight routes have been completed on the given day and how many baits have been distributed on the given flight lines. Additionally, at the end of each day the GPS data of the flight routes and bait release, recorded by the computer of the airplane, is sent electronically to the CA and the quality of the work is checked by the CA using mapping software (QGIS). GPS data are merged and analyzed during and after the campaign, and after the end of each campaign a meeting takes place where the contractor has to explain all the visible gaps. If there are too many unaccounted number of gaps the contractor has to pay liquidated damages.

#### *Controls on the maintenance of the cold chain:*

The winner of the public procurement contract responsible for the supply of the oral vaccines delivers the vaccines to the appointed cold storage facility. At arrival the shipment is examined by the central and local competent authority, by the winner of the public procurement contract responsible for the distribution of the vaccines and by the personnel of the cold storage facility. The company owning the cold storage is responsible for the proper storage (including temperature) of the vaccines. Vaccine storage at the cold store is checked by the local competent authority before transportation to the airfields. The contractor responsible for the distribution of the vaccines is responsible for maintaining the cold chain of the vaccines during transport to the airport with

appropriate vehicles. The cold storage of vaccines at the airport is regularly checked (and the findings are recorded) by the local competent authority. The central competent authority supervises the above by checking the vaccine storage at the airports.

*Titration of all vaccine batches before distribution:*

Each batch of oral vaccine will be sampled by the competent authority before distribution. The samples will be tested for quality in a competent laboratory.

*Bait uptake data:*

2013/2014 hunting year: 71% (age determination was only introduced in late 2013)

2014/2015 hunting year: 69,48% (59,50% in juveniles, 93,04% in adults)

2015/2016 hunting year: 74,58% (65,76% in juveniles, 89,96% in adults)

2016/2017 hunting year: 72,50% (62,20% in juveniles, 91,57% in adults) (similar results in jackals)

2017/2018 hunting year: 77,81% (69,16% in juveniles, 95,51% in adults) (similar results in jackals)

2018/2019 hunting year: 76,73% (71,21% in juveniles, 92,31% in adults) (similar results in jackals)

2019/2020 hunting year: 71,47% (64,45% in juveniles, 93,83% in adults) (similar results in jackals)

2020/2021 hunting year: 85,48% (81,16% in juveniles, 95,65% in adults) (similar results in jackals)

2021/2022 hunting year: 82.95% (79.81% in juveniles, 92.94 in adults) (similar results in jackals)

*Seroconversion data:*

2013/2014 hunting year: 24,77% (age determination was only introduced in late 2013)

2014/2015 hunting year: 35,16% (29,94% in juveniles, 47,43% in adults)

2015/2016 hunting year: 44,15% (39,50% in juveniles, 52,22% in adults)

2016/2017 hunting year: 50,59% (45,72% in juveniles, 59,95% in adults) (similar results in jackals)

2017/2018 hunting year: 41,32% (35,44% in juveniles, 53,94% in adults) (similar results in jackals)

2018/2019 hunting year: 37,66% (37,25% in juveniles, 38,71% in adults) (similar results in jackals)

2019/2020 hunting year: 24,63% (18,90% in juveniles, 41,03% in adults) (similar results in jackals)

2020/2021 hunting year: 31,91% (27,85% in juveniles, 41,42% in adults) (similar results in jackals)

2021/2022 hunting year: 28.97% (25.19% in juveniles, 40.31% in adults) (similar results in jackals)

*Obstacles of the programme:*

Unfavourable weather conditions can cause delay in the aerial distribution of vaccines but in such case the CA will be informed by the contractor about the delay. The safety of flight personnel is always considered as a priority.

During the spring and autumn 2022 campaigns, the airborne baiting were made more difficult by the fact that in the airspace closure area on the Hungarian-Ukrainian border, the air traffic controllers repeatedly asked the aircraft carrying out the baiting to leave their routes for safety reasons, although we had previously agreed with the Hungarian Defence Forces. Nevertheless, the ejection plan was implemented, albeit with several interruptions.

### *Stray dogs:*

Stray dogs must be contained and treated in the same way as unvaccinated dogs over 3 months old. Only authorised vaccines should be used for vaccination in accordance with the instructions for use.

### **(c) the disease control measures to be applied in case of a confirmed case:**

Between 26 September 2022 and 24 November 2022, the National Reference Laboratory detected rabies in 3 foxes and 1 dog in Szabolcs-Szatmár-Bereg county, near the Ukrainian border. These were the first cases since 2017, when the last rabid animal was identified in Hungary. The cases have been reported on ADIS within 24 hours.

The cases were located within the regular fox oral vaccination (ORV) area. Nevertheless, as a precautionary measure, after the first case (at the end of September 2022) an emergency ORV has been ordered in the affected four surrounding game management units along the Hungarian border with Ukraine. This emergency vaccination was carried out together with the regular autumn ORV campaign and is scheduled to this area on 3-8 October 2022, which means a double dose of vaccine was dropped on this territory.

In addition to the above, our authority ordered and in the future will order the following measures:

- the normal rabies surveillance system was strengthened in the affected and surrounding game management units, which means that all killed foxes (both shot and trapped) should be sampled for laboratory tests for 6 months,
- increased hunting or other means of depopulation of foxes,
- enhanced passive surveillance in the whole territory of Szabolcs-Szatmár-Bereg county – all dead bodies of foxes and other wild animals must be sampled and sent for laboratory diagnostic test,
- dogs must not be let outside the premises for 90 days, and compulsory vaccination of domestic cats and other carnivorous pets against rabies with immediate effect.

Similarly to the above, in the upcoming years of the programme, in case of detecting a positive case in a non-vaccinated area, an emergency ring vaccination (ERV) is intended to be carried out in an area of at least 50 km radius around the place of the diagnosed case. At the case of emergency ring vaccination, the following measures must be taken:

- if the whole 50 km radius circle is outside the vaccinated area: double spreading on 7850 km<sup>2</sup>;
- if the whole 50 km radius circle is within the vaccinated area: immunisation of the basic area and additional single spreading on the defined 7850 km<sup>2</sup> area;
- if part of the 50 km radius circle is within the basic area and part is within the unimmunised area: additional single spreading and double spreading over a defined area;
- if the area of the 50 km radius circle includes Budapest: manual spreading in the Budapest area, double spreading in the rest of the circle.

**(d) public information campaigns to be implemented:**

In order to maintain or increase the current number of animals (suspect animals showing neurological symptoms, indicator found dead or in contact with humans) tested in the frame of passive surveillance, an awareness campaign has been started by the central authority in 2016. The aim of this campaign is to provide information about the disease to the public, and to support the notification of the suspicion of rabies. A homepage has been developed, leaflets were printed, and a TV spot produced and distributed, advertisements were published via online media, road panels, posters, citylights etc. and also an educational video mini-series about rabies was produced. The planned awareness campaign will continue to play a key role in the prevention of human cases and the protection of the Hungarian domestic animal population.

For 2023, we plan to continue the awareness campaign as follows:

*Key messages:*

1. Notification of rabies suspicion to the local or central veterinary service. The main aim of the campaign is to maintain a good passive surveillance by encouraging reporting of rabies suspect animals and rabies indicator animals (especially wild carnivores) found dead.
2. Prevention of human cases. Information is given about the importance of medical care in case of animal bites.
3. Call the attention of pet owners to have their dogs and cats vaccinated against rabies (in case of dogs, this is also obligatory in Hungary). The importance of vaccinating dogs and cats, and thus preventing the transmission of the disease to humans is explained.

*Tools in 2023:*

1. distribution of leaflets (eg. events, in schools, city halls, tourist attractions, zoo, national parks, pets' clinic, hunter's shop etc.) by post in the risk areas (cost of distribution by post)
2. road panels, posters and citylights – to be placed mainly in the risk areas (cost of production, cost of exhibition)
3. online, printed and radio advertisements (cost of production and publication)
4. homepage dedicated for rabies ([www.veszettsegmentesites.hu](http://www.veszettsegmentesites.hu)) – already in operation
5. social media platforms (Facebook, Instagram) - sharing news, information and guidance material on the platform of National Food Chain Safety Office
6. educational video mini-series about rabies – already produced and published (homepage, YouTube)
7. National Food Chain Safety Hotline (general hotline, not specifically for rabies) – already in operation
8. meetings with hunters in the area of oral vaccination

**(e) measures to be implemented to reduce contact with infected animals:**

Our authority will order the following measures:

- increased hunting or other means of depopulation of foxes,
- enhanced passive surveillance in the whole territory of the infected county,
- all dead bodies of foxes and other wild animals must be sampled and sent for laboratory diagnostic test,
- dogs must not be let outside the premises for 90 days, and compulsory vaccination of domestic cats and other carnivorous pets against rabies with immediate effect.

**(f) where appropriate, measures coordinated with other Member States or third countries:**

Our cooperation with Ukraine on oral vaccination in a buffer zone in Ukraine won't be continued in 2023, because certain third countries can directly apply for the EU funding of rabies eradication as from 2023 therefore vaccination of the Ukrainian buffer zone should no longer be included in the Hungarian co-financed programme. Notwithstanding the above, all positive cases of rabies at the border will be immediately reported to the Ukrainian and Romanian authorities.

**6. Description of the organisation, supervision and role of the parties involved in the eradication programme, including at least the following:**

**(a) the authorities responsible for the coordination and supervision of the implementation of the programme;**

**(b) the roles of all stakeholders involved:**

**1. National authorities**

**1.1. National Food Chain Safety Office (NFCSO)**

1.1.a. National Food Chain Safety Office, Animal Health and Animal Welfare Directorate, Department of Epidemiology:

- Determines the date and territorial expansion of the immunization.
- Keeps contact with the counties, the different national authorities (hunting authority, public health authority, disaster management), with the Ministries of other countries and with the EU Institutes.
- Controls the implementation of the programme
- Coordinates (and supervises) the implementation procedures carried out by the different Directorates of the NFCSO.

1.1.b. National Food Chain Safety Office, Laboratory Directorate, Control Laboratory of Veterinary Medicinal Products:

- Responsible for registration and quality control of vaccines.
- Responsible for organisation of public procurements related to the eradication programme.
- Responsible for supervision of implementation of vaccine distribution.
- The national coordinator of the implementation of the programme is appointed from this Directorate.

#### 1.1.c. National Food Chain Safety Office, Veterinary Diagnostics Directorate (3 laboratories):

- Responsible for transport of the samples from the collecting places to the labs.
- Responsible for carrying out laboratory tests.
- Responsible for laboratory data collection.
- The central laboratory in Budapest is the National Reference Laboratory for rabies (NRL).

FAT and tetracycline detection is also carried out in the two regional laboratories in Debrecen and in Kaposvár, while serology (ELISA) is only performed in Budapest (the regional labs forward the blood samples).

### **1.2. County Government Offices**

#### 1.2.a. Government Office of each vaccinated County, Department responsible for Food Chain Safety and Animal Health:

- Orders restriction on movements of dogs and prohibits of grazing during the vaccination campaigns in accordance with national legislation
- Official veterinarians supervise the cold storage of vaccines and the work implemented at the airfields.
- Determines for each hunting association the number of foxes should be shot in the sampling period following each vaccination campaign.
- Organizes the collection of fox samples from the hunters.
- Imposes penalties on hunting associations not fulfilling the required number of fox samples.

#### 1.2.b. Government Office of each vaccinated County, Department responsible for Agriculture Directorate, Hunting and Fishing:

- Informs the hunters about their duties.
- Contributes in determination for each hunting association the number of foxes should be shot in a year (based on the size of the area).

### **1.3. Ministry of Agriculture**

#### 1.3.a. Food Chain Control Department, Animal Health Division:

- Responsible for Hungarian legislation on animal health issues (e.g.: on rabies.)

#### 1.3.b. Natural Resources Department, Hunting, Fishing and Management of Water Supplies Division:

- Responsible for Hungarian legislation on hunting.
- Coordinates and supervises the implementation procedures carried out by the hunting authority.

### **2. Business companies:**

- To produce vaccine baits.
- To distribute vaccine baits. (organising the vaccination campaign: holding informative meetings for the stakeholders before each campaign in each vaccinated county, handing over information materials to the hunters and for the inhabitants, handing over sampling equipments to the hunters, paying to the hunting associations for delivering of fox samples)

### **3. Hunting associations:**

- Responsible to inform the inhabitants via distribution of information materials (posters, leaflets) received from the contracted business company and posted on the hunting area and at local governments of the hunting area.
- To shoot and deliver fox samples to the animal health authority.

**7. The estimated duration of the eradication programme: 1 year**

**8. Interim objectives of the eradication programme, including at least the following:**

**(a) the expected annual reduction in the number of outbreaks;**

**(b) expected number of confirmed outbreaks in areas with outbreaks in the previous year;**

**(c) the expected rate of seroconversion in the animal populations under surveillance;**

**(d) the expected rate of vaccination coverage in animals of the target species:**

In year 2023, it is expected not to have any more indigenous rabies cases in domestic animals. However, the possibility of sporadic cases introduced from adjacent infected areas can not be excluded, but with an appropriate level of population immunity introduced cases are not expected to cause an epidemic. By eliminating rabies we would minimize the risk of the transmission to humans. Furthermore the overall human and animal health level both of Hungary and its neighbouring countries would improve. If sylvatic rabies will be eradicated in the country, the risk of transmission of the virus to domestic animals and through them, or directly, to humans, can be minimized. Therefore oral vaccination of wild carnivores contributes to human health status of the country. It is rather a matter of general human safety, than a matter of economics, unlike in case of some other co-financed eradication programmes (eg. the eradication of some cattle disease may promote trade of live animals or animal products and thus contribute to national economics etc., but this is not the case with rabies). However, to avoid unnecessary expenses, the programme is planned in such way that it will be implemented only in the areas where this is reasonable, and the vaccination area will be (hopefully) gradually reduced as the rabies situation in the region improves.

a) the expected annual reduction in the number of outbreaks: decrease to zero;

(b) expected number of confirmed outbreaks in areas with outbreaks in the previous year: zero;

(c) the expected rate of seroconversion in the animal populations under surveillance: please refer to point 5/b/ii.;

(d) the expected rate of vaccination coverage in animals of the target species: please refer to point 5/b/ii..