Rabies situation in Slovenia and experience in OVF gained over the past decades

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- Rabies in Slovenia – history
- Eradication of rabies
- Rabies in Slovenia - current situation
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Rabies in Slovenia - history

Urban (dog – mediated) rabies

- Compulsory vaccination of dogs
- 1950 - last human case of rabies
- 1954 - last case of dog-mediated rabies

Uncomplete data due to the II. World War

MINISTRY OF AGRICULTURE, FORESTRY AND FOOD
VETERINARY ADMINISTRATION OF THE REPUBLIC OF SLOVENIA
Rabies in Slovenia - history

Dog-mediated rabies (1945 - 1956)

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog</td>
<td>87.07%</td>
</tr>
<tr>
<td>Cat</td>
<td>2.52%</td>
</tr>
<tr>
<td>Fox</td>
<td>0.32%</td>
</tr>
<tr>
<td>Horse</td>
<td>5.99%</td>
</tr>
<tr>
<td>Cattle</td>
<td>0.95%</td>
</tr>
<tr>
<td>Swine</td>
<td>2.21%</td>
</tr>
<tr>
<td>Small ruminants</td>
<td>0.95%</td>
</tr>
</tbody>
</table>
### Rabies in Slovenia - history

**peak of urban rabies in 1946 and 1947**

- **Implementation of compulsory vaccination of dogs (UL LRS 13/47)**

**additional measures implemented (control of stray dogs)**

- **dog-mediated rabies eradicated in 1954**

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#### Table 1

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>1946</td>
<td>Peak of urban rabies</td>
</tr>
<tr>
<td>1947</td>
<td>Implementation of compulsory vaccination of dogs (UL LRS 13/47)</td>
</tr>
<tr>
<td>1954</td>
<td>Dog-mediated rabies eradicated</td>
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</tbody>
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**MINISTRY OF AGRICULTURE, FORESTRY AND FOOD**

**VETERINARY ADMINISTRATION OF THE REPUBLIC OF SLOVENIA**
Rabies in Slovenia - history

Sylvatic (wildlife - mediated) rabies

- first rabid animal (red fox) was detected in 1973 in the north-eastern part of the country
- it was spread through the territory of Prekmurje, but it has never crossed the river Mura
- the second wave reached our country in 1979 from Austria
- from there it has been spread throughout the territory of Slovenia and remained till nowadays
Rabies in Slovenia - history
Rabies eradication

- Program of oral vaccination of foxes since 1988
  - due to the inconvenient epidemiological situation
  - on the basis of good experiences in other countries
- Pilot project on the area of 540 km² - Kranj, Tržič, Škofja Loka, Radovljica and Jesenice
- Start of manual distribution – 1 and 2 October 1988
- Very important role of hunters
- Multi annual program of vaccination was prepared with Italy and Austria
Rabies eradication

Vaccination area - pilot project in 1988
Rabies eradication

OVF – manual distribution of baits

- multi-annual program of OVF – 1989 to 1992 (three years)
  - 1989 – 1991 in cooperation with Italy
  - 1991 to 1992 in cooperation with Austria

- Control of OVF
  - Control of transport and storage of baits
  - Control of distribution
  - Control of bait up-take (in the field – 4th, 8th and 14th day)
  - Testing of shot foxes
Rabies eradication
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Rabies eradication
Rabies eradication

APRIL 92
Rabies eradication

Območje polaganja vab - 1993 - 1994

AUTUMN 93
Rabies eradication
Rabies eradication
Rabies eradication

Območje polaganja vab - jesen 1994

AUTUMN 94
Rabies eradication

OVF – manual distribution of baits

- the whole territory was covered three times
- strategy of pushing rabies towards east failed
- 1,067 positives in 1988 \(\Rightarrow\) 1,089 positives in 1995
Rabies eradication

OVF – aircraft distribution of baits

- 1995 – the beginning of aircraft distribution of baits
- The whole territory has been covered twice a year
- 600,000 – 700,000 baits have been laid
- 20 – 26 baits per km²
Rabies eradication

OVF – aircraft distribution of baits

- a special system was developed
- for support and control Navigation software FIC
  - guiding and shooting of flying routes
  - system of calculation and signalisation of bait dropping
  - taking into account
    - ground speed
    - wind
  - to get the optimal bait density
- sensing of baits in tube and marking of location where bait was dropped
- mapping
- FIC enables self control (support pilot and operator)
Rabies situation - current

- the results of the new strategy were very encouraging
- the number of cases decreased from 1.089 in 1995 to only 2 – 3 in recent years
- all cases were near the south-eastern border
Rabies situation - current

Rabies 1980 - 2008

- First oral vaccination campaign
- Aircraft distribution of baits
Rabies situation - current

Rabies by species 1980 - 2008

- Fox: 94.94%
- Badger: 1.41%
- Roe deer: 2.82%
- Other: 0.82%
Rabies situation - current
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Rabies situation - current
Problems, experiences

1. Change of bait distribution
   in 1995 – from manual to aircraft distribution
Problems, experiences

2. No long-term planning

- annual programme
- tenders just for one year
- in case that something went wrong – revision of tenders requested – oral vaccination campaign not performed

- 2007
  - Submission of multiannual programme 2008-2012
  - Contract agreement for 6 years
Problems, experiences

3. Occurrence of rabies in limited areas

- due to the vicinity of international airport baits were not distributed in this area
- in the area double flights were used
- revaccination (the second flight) in 2 – 3 weeks
Problems, experiences

4. Increase of rabies in 2000

- Number of cases increased again - 115 cases
Problems, experiences

- **Two reasons:**
  - Lack of money
  - Infection pressure from neighbouring country
Problems, experiences

- actions taken
  - strategy of bait distribution was adopted to the new conditions
  - decision between parallel flight in a flight distance of 500 m or “cross flight”
  - on the grounds of the study of surface structure, altitude model – relief “cross flight” strategy was enforced
  - NW part of Slovenia excluded from vaccination area
Problems, experiences

- encouraging results in 2002 and following years
Problems, experiences

5. PHARE Project – 2003, 2004

- additional baits
  - Additional 200,000 baits
  - Emergency stock

- evaluation of the programme and recommendations
  - Monitoring of OVF
    - Before campaigns
      - Rabies incidence
      - Bait titration when delivered by the producer
Problems, experiences

- **evaluation of the programme**
  - Monitoring of OVF
    - During campaign
      - Follow-up of the aerial distribution
      - Bait titration “out of the plane”
    - After campaign
      - Tetracycline control: a bait is eaten
      - Serological control: a fox is protected
      - Age determination to monitor cub population
      - Rabies incidence
Problems, experiences

- **evaluation of the programme**
  - Monitoring of OVF
    - late spring vaccination (end of May, June)
    - “cross-flight” strategy equal (at least) to 500 m flight line distance

20 baits/km²
Single flight
1000 m between lines

30 baits/km²
Crossing flight
1000 m between lines
Flight time x2, more baits, all foxes vaccinated
Problems, experiences


- **Increase of rabies near Croatian border**
  - due to the huge infection pressure in Croatia
  - until November – 48 cases near the border with Croatia

- **Outbreak near Italian border**
  - on 5 November a case detected near the border with Italy
  - outside the vaccination area
  - Italy notified rabies outbreaks in neighbouring region in the middle October
Problems, experiences
Problems, experiences

- Outbreaks in the vaccination area (near Croatia)
  - Evaluation of 2007 programme
    - Number of tested animals: 2,075
    - Number of tested foxes: 1,884 (1,660 out of hunting bag, 224 indicator animals)
    - Number of positives: 3 positive
    - Determination of isolates: “field” virus
Problems, experiences

- Evaluation of 2007 program
  - Control of vaccination:
    - determination of biomarker TTC – 70 %
    - detection of antibodies in blood samples – 62 %
  - Control of baits:
    - determination of virus titre in vaccine baits
Problems, experiences

- actions taken due to the outbreaks in the area along Croatian border
  - Buffer zone to Croatian border of 40 km around outbreaks (existing vaccination zone is sufficient)
  - A zone with intensified surveillance - 20km beyond the buffer zone, in the non vaccinated area – enlarged to the whole non-vaccinated territory of Slovenia
  - Raising disease awareness (instructions, communication to hunters, practitioners, citizens,…)
  - Communication to Veterinary Authorities of neighbouring countries
Problems, experiences
Problems, experiences

- Outbreak outside the vaccination area (near Italy)
  - Evaluation of 2008 (30. 11.) programme
    - Number of tested animals
      - 2,265
    - Number of tested foxes
      - 2,004 foxes
    - Number of positives
      - 45 foxes, 2 badgers, 1 horse, 1 dog (unvacc.)
    - Determination of isolates
      - “field” virus
Problems, experiences

- **Evaluation of 2008 programme**
  - **Control of vaccination:**
    - determination of biomarker TTC – 72 %
    - detection of antibodies in blood samples – 56,25 %
  - **Control of baits:**
    - determination of virus titre in vaccine baits
Problems, experiences

- Evaluation of rabies situation in neighbouring countries in 2007 and 2008
  - Austria, Hungary – no problems
  - Italy – no problems? until October 2008
  - Croatia – immense infection pressure
Problems, experiences

- actions taken due to the outbreak outside the vaccination area (near Italian border)
  - Italy and Slovenia requested a mobilisation of EU experts
  - meeting of experts, EC, Italy, Austria and Slovenia (Croatia invited)
Problems, experiences

- outcomes of the meeting
  - emergency vaccination in Slovenia
    - area of 40 km radius around the positive case in Kanal
    - minimum area to be vaccinated 3.500 km²
    - 105,000 baits needed
    - 50,000 baits – emergency stock
    - baiting density not less than 20 baits per km²
Problems, experiences

- outcomes of the meeting
  - intensified surveillance in some areas
    - especially in the bordering region with Croatia
  - modified vaccination area for future OVF
    - whole territory of Slovenia
  - regular meetings planned with Italy and Austria
Problems, experiences

- due to budget constrains emergency vaccination will not be implemented in 2008 as recommended
- no EU funds available for emergency vaccination in 2008
- in 2009 vaccination will be performed on the whole territory of Slovenia
Conclusions

- rabies in wildlife can be suppressed and eradicated by oral vaccination of foxes
- the main problem is to secure a budget for a long term programme, including possible emergencies
- in order to achieve eradication of rabies OV programmes should be implemented for several years and in cooperation with neighbouring countries
Thank you!