CONTROL OF WILDLIFE RABIES: EUROPE

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ABSTRACT

In the present rabies epizootic in Central Europe, the chain of infection is maintained largely within fox (Vulpes vulpes) populations, with other species being involved only sporadically. With the failure of fox control campaigns in most parts of Europe, investigations into the possibility of immunizing foxes with live attenuated rabies virus administered by the oral route were initiated about 15 years ago. Chicken heads were chosen as baits. A "blister-package" designed to release vaccine (a clone of the SAD strain, grown in BHK-21 cells) into the oral cavity of a fox chewing the bait was developed. The first field trial was conducted in an Alpine valley in Switzerland in 1978, and an advancing epizootic wave was stopped by a barrier consisting of a population of about 60% immune foxes. The strategic application of oral vaccination in additional regions has freed 80% of the country from the zoonosis. In the Federal Republic of Germany, field trials were initiated in 1983. Switching to an automated bait manufacturing system in 1985 allowed an extension of the vaccination areas in Germany, and an export of baits to other European countries, including Italy, Austria, Belgium, France, and Luxembourg.

EPIDEMIOLOGY OF RABIES IN EUROPE

For unknown reasons, rabies disappeared from Central Europe around the turn of the century. Later, during World War II, a new fox rabies epizootic originated in Eastern Europe. Its wave front progressed slowly but continuously towards the west and southwest. The epidemic has been described and analyzed by numerous authors (see Blancou, this
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volume), its main features being as follows:

1. The first rabies cases registered in a newly invaded area are almost always foxes (1,2).

2. The front wave moves into new areas at a rate of approximately 25-60 km/year (1-6).

3. Rivers, lakes, and high mountains function as natural barriers. Rivers are usually crossed where bridges are available (7).

4. Very intensive fox control may result in areas of low fox density. Such areas may also stop the spread of rabies.

5. The case density in the front wave is very high. In areas with good surveillance, up to 2 rabid foxes per km² are recovered yearly (2).

6. Foxes constitute the majority (60-85%) of all diagnosed rabies cases.

7. In animals grouped according to the conditions under which they are collected (shot by hunters, road kills, found dead, killed because of abnormal behavior, etc.), the proportion of rabid ones is always higher in foxes than in similarly grouped categories of other species (2).

8. In an area of a few hundred km² the front wave of the epizootic lasts no more than 1-2 years, after which rabies may disappear for several years.

9. In situations where rabies, together with fox control, reduce fox populations below a certain level, rabies disappears not only in foxes, but also in all other terrestrial species. The same observation is made in areas from which rabies disappears as a consequence of oral fox immunization. Only bat rabies is independent of the occurrence of the disease in foxes.

10. Foxes and badgers (*Meles meles*), but no other species, are reduced in population density by the event of a rabies epizootic.

11. An area that becomes free from rabies may be reinvaded after a few years from adjacent infected regions. This is explained by a rapid recovery of fox populations during the rabies-free years (8). The same may occur in areas freed by fox vaccination due to the rapid population turnover bringing the herd immunity below the threshold needed.