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THE GREY SQUIRREL IN ITALY: RISKS OF EXPANSION AND RELATED THREATS TO THE SURVIVAL OF THE RED SQUIRREL IN EUROPE

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ABSTRACT: The American grey squirrel, imported to Italy in 1948, represents a threat to the indigenous red squirrel, and an eradication of the alien species has been asked by several national and international organizations. In 1997, the National Wildlife Institute started an experimental eradication in the Racconigi Park (northwest Italy), aimed to evaluate the reliability and efficiency of humane removal techniques, through live-trapping, anaesthesia, and subsequent euthanasia of squirrels. The program, supported by most NGOs, was strongly opposed by radical animal right groups, who took the author and the director of the National Wildlife Institute to court, causing a halt of any activity. The species has expanded since then, and an eradication is no longer considered feasible. A colonization of the entire Alps in the middle term and of a large part of Europe in the long term is predicted, potentially threatening the survival of the red squirrel in the continent.

KEY WORDS: invasive, extinction, red squirrel, competition, conservation, biological invasion

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INTRODUCTION

The red squirrel (*Sciurus vulgaris* Linnaeus, 1758), the only indigenous squirrel of Europe, is threatened for the fragmentation of woodland habitats (Celada et al. 1994) and for the competition with the American grey squirrel (*Sciurus carolinensis* Gmelin, 1788). This alien species, present in Great Britain for over a century, was introduced in 1948 to Piedmont (northwest Italy), in Genova in 1966, and in the Ticino valley in 1994. All data gathered in Great Britain (Gurnell and Pepper 1993; Kenward 1983; Skelcher 1997) and in Italy (Wauters et al. 1997) confirm that in areas colonized by the grey squirrel, the native red squirrel becomes rapidly extinct. In Piedmont, the grey squirrel had been confined until 1970 to the Stupinigi Park, in the suburbs of Turin, where the red squirrel was also present. The last observation of a red squirrel in the Park was recorded during the winter of 1979-80. In 1990 the grey squirrel's range had largely increased, and in the same area the red squirrel had disappeared from Stupinigi and from most of the woodland fragments of the northern, western, and central parts of the grey squirrel's range; red squirrels had reduced of 54% their range in the area, and were still present only along some rivers in the outermost southern and eastern parts of the grey squirrel's range (Wauters et al. 1997). Between 1991 and 1997, the extinction rate of the red squirrel was very rapid, with a decrease of 55% of the species' range in the area. Between 1996 and 1997, the grey squirrel expanded significantly (Figure 1); in 1997 the red squirrel was still present only in two locations—Racconigi Park, where a dramatic decrease was observed, and the small Borgo Cornalese park, where the grey squirrel arrived only in 1996 (Wauters et al. 1997).

The mechanisms of the replacement are not yet fully understood, but seem to be based on an indirect competition for resources (Wauters and Gurnell 1999).

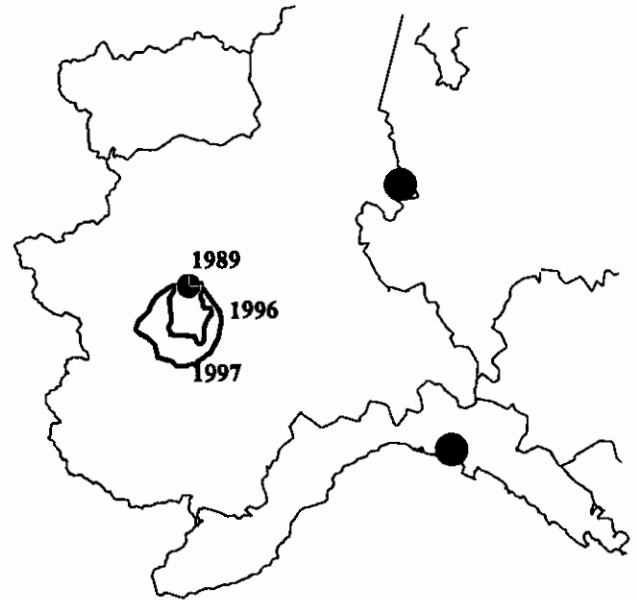


Figure 1. Distribution of the grey squirrel in 1997, in 1996 (Wauters et al. 1997), and in 1989 (Bertolino).

GREY SQUIRREL ERADICATION CAMPAIGN IN ITALY

In recent years, the risk of extinction of the red squirrels deriving from the grey squirrel's presence in Italy was underlined by several national and international organizations (IUCN, UK Forestry Commission, WWF, People's Trust for Endangered Trust, etc.). Also, in respect to the international obligations of Italy (Bern Convention, Rio Convention), the National Wildlife Institute (Istituto Nazionale per la Fauna Selvatica) informed all competent authorities (Ministers and local administrations) of the risks related to the grey squirrel presence in Piedmont, and on the need and urgency to plan an eradication of the species.

More recently, a sanitary risk related to the presence of the grey squirrel was highlighted by British experts; the species is, in fact, suspected to be a source of *parapoxvirus*, that is a potential threat not only to wildlife, but also to livestock and humans (Sainsbury et al. 1997).

In 1996, a monitoring of the species' range through hair-tubes was started, and an experimental eradication campaign was proposed by the National Wildlife Institute in cooperation with the University of Turin; the program was aimed to: 1) evaluate the feasibility of an eradication; 2) define humane control methods; 3) assess the presence of the *parapoxvirus*; and 4) produce an eradication plan.

PUBLIC OPINION

The program was discussed with the main NGOs, with animal rights groups, and with the local political parties. Comments by the NGOs were considered, and in this respect it was decided to test the possibility of anaesthetizing squirrels with alothane (that reduces stress in rodents) before euthanizing them. The experimental eradication was officially presented to all the parties in April 1997, and started in May 1997.

EXPERIMENTAL ERADICATION

The experimental eradication was carried out in the Racconigi park, a 150 ha fenced park, closed to the public. In the park, a total population of about 350 grey squirrels was previously estimated through a mark-recapture study (Bertolino and Wauters in prep.). One hundred fifty multiple live catch traps were used; traps were baited with corn, covered with black plastic sheets, and checked every morning. Captured animals were introduced in a sealed box, treated with alothane, and monitored by a veterinarian to detect stress indicators and time needed for unconsciousness. After euthanasia, a blood sample was collected and autoptic analyses were carried out in order to test for *parapoxvirus* and other pathologies.

The tested method resulted very effective; 188 animals (>50% of the estimated population) were trapped in about ten days of activity. The adopted procedure of euthanasia significantly reduced animals' stress; squirrels reached unconsciousness in less than a minute, and could be euthanized on the field, with very limited manipulation. The early stop of the program did not allow estimation of the effort needed to remove the total population (Figure 2).

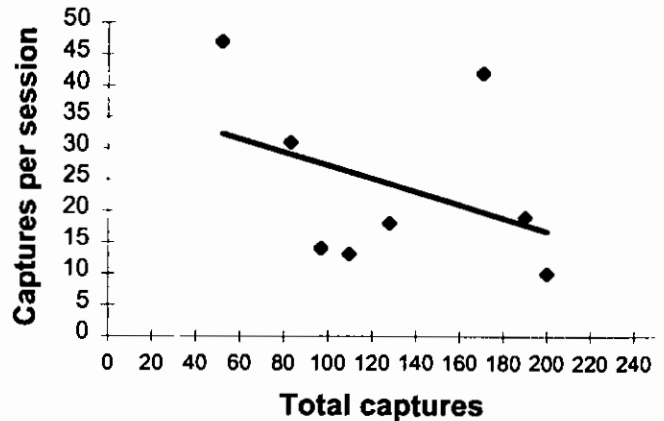


Figure 2. Results of the experimental eradication in the Racconigi park ($R^2 = 0.16$).

LEGAL ASPECTS

In order to oppose the program, in June 1997, three radical animal right groups took the author, as coordinator of the project, and the director of the National Wildlife Institute to court under the charges of illegal hunting, damage to state property, and cruelty to animals. The experimental eradication was thus halted. During the trial, the animal right groups were backed by Giorgio Celli, a popular wildlife TV presenter and entomologist at the University of Bologna, who was elected at the European Parliament for the green party.

The charge of illegal hunting was based on the consideration that the National Wildlife Institute does not need any authorization to carry on research (the NWI is competent for authorizing all research on wildlife in Italy), but cannot directly realize pest control programs. So, in the trial it was debated whether an experimental eradication involving 200 animals could be considered research or, on the contrary, pest control. The charge of damage to state property was based on the principle that for the Italian legal framework wildlife belongs to the state, and all species are thus protected. The charge of cruelty to animals was related to the euthanasia of two lactating females.

The trial ended last December 1999; the judge ruled the two officers guilty of illegal hunting and cruelty to animals, and sentenced a fine of about \$1,500 and 20 days jail, commuted to a further \$750. The two officers were discharged for damage to a state property, also because an officer of the Ministry of Environment witnessed that the experimental eradication was aimed to protect the state property represented by the red squirrel, coherently with several international conventions adopted by Italy. The sentence was appealed, but it may take years to hear the review.

HUMAN DIMENSION

The case was reported by several media, including televisions and the main newspapers, with very different perspectives. The use of anaesthetic was presented as "chamber gas" and described as a "Nazi method." Also, the political level was involved, as the animal right groups asked the Italian premier to suspend the two officers and to close the National Wildlife Institute, that depends directly by the Prime Minister's cabinet.

RISKS OF EXPANSION

In a report produced by the National Wildlife Institute for the Ministry of Environment (Genovesi and Bertolino 2000), the status of the grey squirrel was analyzed, and the possible management alternatives were discussed. In 1997, the range of the alien species was still restricted to the agricultural plain of Turin, characterized by a spotted distribution of woods, located in a limited number of estates and villas. Grey squirrels were recorded at seven or more kilometers from the continuous woods of the Alps and of the Barolo hills.

Since then, as a consequence of the suspension of the eradication campaign, the species has significantly expanded. The distribution monitoring, carried out by transects of hair-tubes and species identification by microscopy (Bertolino in prep.), revealed that the species has arrived to the edge of the Alps, the hilly area of Turin and the Eastern part of the region. A model developed by Lurz et al. (1999) predicts an exponential increase of the number on grey squirrels and of the populations of the species in the next ten years. The risk of a future expansion to the entire Alps, including France and Switzerland in the medium term, is confirmed by the homogeneous and continuous broad leaf woodlands covering most of the Alps (Figure 3). The model developed by Lurz et al. (1999) predicts that the colonization of the Alps will occur within year 2007.

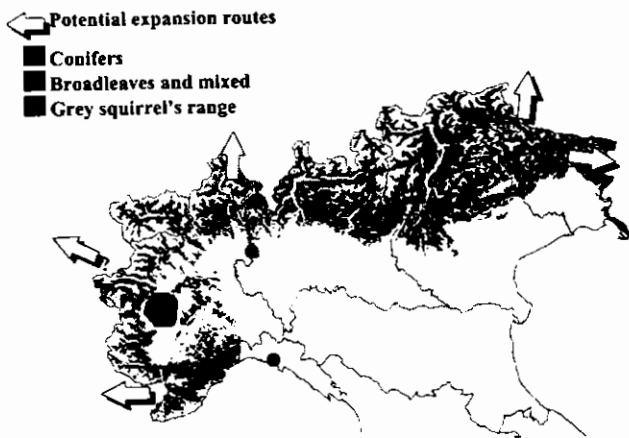


Figure 3. Grey squirrel distribution in 1999 to 2000, and potential expansion routes to the Alpine region, and to neighboring countries.

FUTURE ACTIONS

On the basis of the above results, an eradication of the grey squirrel from Italy is considered not feasible anymore. The report presented to the Ministry of Environment provides a strategy aimed to preserve, in the long term, viable populations of red squirrels, and to postpone, as much as possible, the expansion of the grey squirrel. For these aims, the strategy requires the definition of key areas for the conservation of the red squirrel and for the expansion of the grey squirrel, where local eradications or control of grey squirrels are recommended. Reintroduction of red squirrels in areas where the species disappeared, after successful removal of grey squirrels, is also suggested.

CONCLUSIONS

The opposition to the eradication of the grey squirrel in Italy, represents an example of the growing conflicts between radical animal right movements and conservation, and may result in dramatic consequences at a continental scale. Although human dimension aspects were carefully addressed in the program, and despite the support of the main national NGOs, the opposition caused the failure of the eradication campaign. Several reasons contributed to this failure: the general underestimation of the public of the threats posed by alien species; a growing sensitivity of the public to animal rights, determining an opposition to any action requiring destruction of animals (especially when they are cute); a legal framework that does not consider, in many countries, the problems caused by aliens species. Referring to the latter aspect, it is important to promote the implementation at an international level of legal and management instruments, as rapid alert mechanisms, task forces for the eradication of newly established populations, the prohibition of the import and commerce of species threatening biodiversity.

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