

A reward strategy for hunters to pursue the control programs of red fox (*Vulpes vulpes* Linnaeus, 1758)

Adriani, S.¹, Bonanni, M.², Primi, R.¹, Amici, A.¹

¹Università della Tuscia, Dipartimento di Produzioni Animali, Via C. De Lellis, snc, 07100 Viterbo, Italy

²Via F. Martinelli 34, Roma, Italy, bonanni_m@libero.it

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Abstract

A novel strategy for pest control is described in the present study. Together with the implementation of the normal control program of antagonists of hunting species a “reward strategy” aimed at involvement of hunters was implemented to enhance the containing effects on red fox (*Vulpes vulpes* L.). Exploiting the concept “more foxes killed - more game for restocking”, the territorial hunting areas of Rieti Province (Central Italy), developed two methods to stimulate the killing of foxes by hunters during the hunting season. Five years of application showed good results in terms of foxes killed, with an increased number of foxes killed in the first year of the application of one of the methods implemented.

Keywords: carnivore, pest control, Rieti province, *Vulpes vulpes*, wildlife management

Introduction

The European red fox (*Vulpes vulpes* Linnaeus, 1758) is a wild carnivore which diet includes a wide variety of food resources (Hartova-Nentvichova et al., 2010) depending on its broad geographic range and covering any point along the specialist – generalist continuum (Panzacchi, 2008). Several studies point out the evidence that foxes have negative impacts on a very broad range of wild vertebrates, but also poultry and livestock, and that these impacts are mediated directly by predation and by other direct and indirect processes (competition, transmission of diseases, etc.) (Saunders et al., 2010). In vulnerable ecosystems the predator-prey imbalance can lead to excessive loss of biodiversity and to the local extinction of species of particular conservation concern (Wallach et al., 2009). The common perception of hunters that the red fox excessively preys on hunting species has meant that this carnivore was always considered a pest (Boitani and Vinditti, 1987). It is well known, in fact, that predation by foxes affect partridge (*Perdix perdix*), hare (*Lepus* spp.), rabbit (*Oryctolagus cuniculus*) (Knauer et al., 2010) and pheasant (*Phasianus colchicus*) populations (Draycott et al., 2008). In order to reduce predation on game species, hunters put in place a strong pressure to achieve control programs of fox population (Toso and Giovannini, 1991; Toso and Genovese, 2003). However, the results of studies on the effects of fox control on population dynamics of prey species, were ambiguous (Salek et al., 2010; Reynolds et al., 2010; Knauer et al. 2010; Panek, 2009). In Italy the red fox is a hunting species, but since it is not a coveted prey, the normal practice of hunting does not contribute to its containment. As a result many institutions have begun autonomous control activity. To encourage the removal of this predator, control plans include a “reward strategy” to compensate hunters with “valuable” wild game (hare, pheasant, grey partridge) in proportion to the number of foxes removed. This study was designed to ascertain the quantitative aspects of containment regularly conducted by the Territorial Hunting Areas (ATCs) in the province of Rieti (Central Italy) in the period 2005-2010.

Materials and methods

The province of Rieti is divided into two ATCs, identified as ATCRI1 and ATCRI2. Each has developed a plan to control the fox, with different rewarding strategies. To stimulate the killing of foxes by hunters the ATCRI1 plan provides the reward of one hare for every three foxes culled. The ATCRI2 plan, instead, provides a scoring system (1 fox = 25 points), with two distinct reward combinations: 1) per hunter resident in the province of Rieti, 2) re-stocking. The first included: 100 bonus points = 1 year insurance policy for hunting (value € 85.00), 75 points = 1 card access to ATCRI2 in the next hunting season, 75 points = 1 free permit for the use of training dog areas. The second provides: 1 hare = 50 points, 1 pheasant = 10 points, 1 grey partridge = 5 points. Although differently articulated both projects are based on the concept of the exchange of killed fox in wild game animals for restocking. Furthermore, since the aim of the ATCs was only to test the procedures in terms of acceptance by hunters and other

stakeholders (farmers, common citizens, etc.), in this paper parameters of fox population and prey species were not investigated.

Results

The following table (Table 1) shows, in detail, the data of containment activities conducted in the ATCRI1 and ATCRI2 in the 2005-2010 period.

Tab. 1 Foxes killed in each ATC in the period 2005-2010

ATC	2005/06	2006/07	2007/08	2008/09	2009/10	Total
RI1	262	245	346	421	652	1,926
RI2	282	348	298	180	510	1,618
Total	544	593	644	601	1,162	3,544

During the five years examined 3,544 foxes were killed (1,926 and 1,618 in the ATCRI1 and ATCRI2 respectively). The province of Rieti covers about 2,750 km², the average culling intensity was 1.3 foxes/km².

Discussion

The sustainable management of natural resources together with the guarantee for their preservation relies on the continued participation of the people living in the area (Swanson and Barbier, 1992). Reward strategies that consider many aspects of the workplace in order to both attract and keep high quality people doing the right things may be expected for conservation and protection aims. In this case the local administrators responsible for wildlife management suggested the application of a rewarding system to the control of a carnivore pest, with good results in terms of foxes killed. It is not known whether the increase of the annual levy from 544 foxes in 2005/2006 to 1,162 in 2009 /2010, is due to an optimization strategies, a broader commitment of operators to capture or, more simply, the increasing attractiveness of the reward. This was independent of criteria of proper wildlife management. It is hoped that the recent activation of a monitoring plan for the species throughout the province and the simultaneous indication of the target density can help to control activities of the fox, and, simultaneously, to assess the results.

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