



Human-large Carnivores Conflict: The Case of Confident Brown Bears (*Ursus Arctos L.*) in Italy

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Opinion

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Introduction

In human-dominated landscapes, an effective coexistence is necessary to ensure long-term viable and sustainable conditions for large carnivores and humans, respectively. Considering the important ecological role played today by large carnivores such as wolves, bears and lynxes we cannot ignore to evaluate present and future scenarios concerning the strategies to encourage the coexistence with humans [1,2]. The conservation of the brown bear constitutes an objective of primary importance in the context of conservation strategies of the fauna for biological, ecological and cultural reasons. The conflicts generated by the presence of large carnivores are mainly supported by the negative effects on anthropic activities such as agriculture and animal husbandry. In the last decades there has been a global increase in the number attacks [3]. They are the results of different factors mainly referred to the growth of both bears and human populations worldwide, that has led to increased habitat overlap. In this context the increasing presence of confident bears was linked to the growing number of people engaged in recreational activities in bear areas, which likely enhances the probability of encounters [4]. The problem of confident bears in Italy is increasing and often causes conflicts between animal rights activists, farmers and authorities. In Italy the Framework Law on Protected Natural Areas (L. 394/91) includes, among the main objectives, the mitigation of conflicts by providing compensation for the damage caused by wildlife to anthropic activities. The presence of the brown bear (*Ursus arctos L.*) in Italy is limited to three fragments of its range: the Central Alps, especially the province of Trento where a repopulation program was planned between 1999 and 2002 with wild individuals coming from Slovenia. At present this population is constituted by 100 heads cub included [5]. In the Eastern Alps, especially in the Friuli Venezia Giulia Region there has been a spontaneous

recolonization by individuals from Slovenia [6,7]. A limited nucleus of individuals lives in the Central Apennines mainly in the Abruzzo, Lazio and Molise National Park. In this region the brown bear represents a zoological entity of considerable value, where it is present with a unique subspecies of brown bear (*Ursus Arctos L.*) and is named *Ursus arctos Marsicanus* [8]. In 2014 this population was estimated between 46 and 69 heads, but it is increasing in the last years [9]. In Italy the Life ARCTOS project (2010-2014) gave the possibility to codify, connect and coordinate the set of activities of territorial organizations finalized to the safeguard of the Marsican brown bear. The protocol on the management of confident/problematic bears lead to establish different parameters linked to the knowledge of the phenomenon, the monitoring through telemetry, the qualification to use the weapon for dissuasion and, finally the communication. In the following years the Life ARCTOS project continued and a communication strategy was planned involving all the economic and social stakeholders (Major, farmers, beekeepers, breeders, tourist operators, hunters, park rangers, forestry agents). In the case of problematic/confident bears in the alpine province of Trento a special project finalized to provide an estimate of the number of problematic individuals that may appear in the coming years was planned: the Interregional Action Plan for the Conservation of the brown bear in the Central eastern Alps (*Piano d'Azione interregionale per la Conservazione dell'Orso Bruno sulle Alpi Centro-Orientali - PACOBACE*). In this region the individuals who are responsible for conflicts with humans represents a small part of the total. In 2019 the problematic bears were in total 19, divided in different categories: 6 harmful and 15 dangerous bears, these last divided into 11 confident bears and 4 bears that attacked people. More recent findings suggest that over the next 5 years, the number of bears that could exhibit problematic behavior ranges between 5 and 15 individuals (in the worst scenario). The

problematic bears are linked to the environmental characteristics, the increase of anthropic activities, the specificities of the population and individuals and inadequate human behavior [10]. In this complex situation, the role of preventive actions appears evident. These include the installation of “anti-bear” waste bins, fences to defend beekeeping, agricultural and livestock activities accompanied by dissemination of information activities on the most correct behaviors to adopt. The international bibliography available demonstrates that a proactive management finalized to prevent the onset of problematic behaviors mainly referred to the confident bears *versus* humans represents a much more effective strategy than a reactive management (dissuasion or removal of individuals) and can avoid the emergence of management critical issues by limiting social conflicts. In this context it arises the priority of strengthening efforts aimed at preventing the onset of potentially dangerous behaviors and the occurrence of risk conditions in particular by reducing the probability of food conditioning and of approaching inhabited centers and other human structures through the implementation of specific actions. It is fundamental the role of communication actions and a careful monitoring of the population identifying risk situations in order to guarantee effective interventions in critical situations and correct information for the population. The problematic nature levels of the possible behaviors of a bear are: capture with release for the purpose of movement and/or radio tagging; capture by permanent captivity; culling. The proactive effort carried out to date it also takes a look at the future, trying to frame the onset of new conflict situations in the light of the demographic evolution of the population. The most energetic management measure is the removal. This action, which up to now has mostly resulted in permanent captivity is considered unsustainable for several reasons: long-term maintenance costs for bears and structures, critical issues in terms of animal welfare; the impossibility of releasing animals that are now accustomed to humans back into nature. It is clear, therefore, that in the presence of a bear for which every prevention and dissuasion action has proven ineffective, culling could become a necessary and inevitable option. In any case, it will be a decision based on the objective reconstruction of the facts and the individual history of the problematic bear. A deeper understanding of the behavior of bold bears represents a first and key step towards gaining the necessary knowledge to be able to quickly identify such individuals and, thus, to choose the most effective management actions. Although similar patterns in attacks exist across the distribution range of brown bears, specific local contexts might prove to be crucial in explaining particularly high or low attack numbers. Additional studies at a local scale, especially in those countries where information is still scarce, will help to identify the factors related to local situations which will provide wildlife managers with specific information on how

effectively deal with this issue. To this aim, strong connection and collaboration between researchers, managers and education tools such as mass media and schools should be established to promote correct and scientific-based information about bears among the large public. The result of inappropriate and risk-enhancing human behaviors (e.g. moving alone and being silent in bear country), walking an unleashed dog, or chasing a wounded bear while hunting could be reduced by improving public education and awareness of the issue. For example, when in bear country, announcing one’s presence can help to avoid sudden encounters and unleashed dogs should be strongly avoided. The cases of the brown bears (*Ursus Arctos l.*) of the Italian Alps and of the Marsican brown bears (*Ursus Arctos Marsicanus*) of Italian Central Apennines reveal considerable approach differences. They refer to different awareness policies focused to contain the conflict between bears and human activities such as beekeeping and breeding, especially domestic breeding of small animals. There has been a considerable reduction of mortality caused by road investments, which is prevented above all with the diffusion of tools to reduce speed on the roads with the installation of anti-crossing bollards and with the maintenance of underpasses that allow wildlife to safely cross busy roads. Hives, chicken coops and farms must be made safe or adequately protected for example with electrified fences. This means to limit the poaching phenomena and the possibilities of do-it-yourself justice and mortality due to anthropic causes. The objective is to ensure that everyone - beekeepers, farmers, passing motorists, school pupils, tourists, residents - knows what to do when they find themselves in an area inhabited or potentially visited by the animals. In the case of the Marsican bears there have been an important activity of communication and awareness-raising with many communication projects that valorized the presence of the bear: it has become a symbol of the area, a tourist attraction. There are also rules of conduct for tourists finalized to contain the possibilities to meet the bears and, consequently, the risk of conflicts or the increase of confident bears that could become aggressive in certain situations. In fact, when the attacks occurred, half of the people were engaged in leisure activities and the main scenario was an encounter with a female with cubs. Understanding global patterns of bear attacks can help to reduce dangerous encounters and, consequently, it is crucial to inform wildlife managers and the public about appropriate measures to reduce this kind of conflicts in bear country.

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