

CRISTINA GARCÍA-HERNÁNDEZ, BENJAMÍN GONZÁLEZ DÍAZ, JESÚS RUIZ-FERNÁNDEZ

Departamento de Geografía. Universidad de Oviedo

*Evolution of the damage caused by the Iberian wolf
(Canis lupus signatus) to the Asturian livestock,
between 1997 and 2016*

The social conflict originated by wolf predation in Asturias results from the existence of opposed positions fluctuating from conservationism to repudiation of the species. For the resolution of the conflict, a key factor derived from the interaction between wolf and human societies must be faced: livestock depredation by wolves. The present study, based on the statistical analysis of the damages registered by the regional Administration, aims to examine the evolution of wolf damage to the livestock of Asturias during the period between 1997 and 2016. Specifically, damage to livestock (considering all types of affected animals) was studied, as well as those damages caused to each of the main cattle herds: cows, sheep, goats, horses and Asturcón horses: a variant of the previous one whose losses, due to the peculiarities of the breed, have been documented in a segregated manner with respect to the equine, which has allowed a specific analysis.

In order to address this study, two main techniques have been applied. On the one hand, the statistical treatment of data on wolf damage (number of domestic animals killed or injured by the wolf, and the place and date of the event) provided by the regional Administration of the Principality of Asturias. These data cover the period between 1997 and 2016 (20 years). On the other hand, the elaboration of thematic cartography with parish base that shows the evolution of the damages during the two decades in which the Asturian Administration recorded those data for the economic compensations of wolf damages.

Chiefly, the results show a significant increase in the

number of animals affected by wolf predation in the period 1997-2016, with horses and sheep being the most severely damaged animals. Secondly, results show as well the existence of an intra-annual pattern according to which the damage is accentuated in the spring, especially during the month of May. From the territorial point of view, there is a clear progression of the damage to the north from the Southern mountainous areas of the region, where the species has always been present. Nowadays, the damages are being documented even in coastal areas, reaching highly populated territories.

Both the number of denunciations and the number of affected domestic animals have experienced a significant increase throughout the studied period. This increase has been more noticeable in the stages 2007-2010 and 2011-2014. In general, both the number of animals affected and the number of parishes in which the damages are documented have also increased obviously since 1997, and the increase of documented damage by parish has been evident for both average and extreme numbers.

Moreover, damage follows an intra-annual pattern according to which they usually increase during the spring, reaching their maximum, often, in the month of May. On the other hand, documented damage frequently remains high during the summer season, and is progressively reduced throughout the autumn. Damage is usually reduced to the minimum in the winter season. This performance clearly reflects the seasonal cycles derived from extensive and semi-extensive livestock management, while certain changes affecting the very life cycles of the wolf itself, as well as the multiple circumstances that affect its

chances of predation (weather changes, wildlife epidemics), could have some incidence in this regard.

In the Iberian Peninsula the wolves have proved to be highly adaptable predators, changing their diet depending on the existing resources in the territory, varying between diets composed mainly of cattle and those in which wild animals predominate. In this sense, the reproductive and life cycles of the animals that are part of the diet of the wolf (whether it is wild fauna or domestic animals), can also influence these intra-annual patterns because wolves tend to predate on weak animals (which, often, are the youngest, so their predation increases in the season of births). Finally, the life cycle of the Iberian wolf itself, whose births generally occur in the month of May, could also influence the intra-annual patterns of damage by altering the hunting habits and the nutritional needs of the animals.

The most affected animals are the horses and, especially, the sheep. In the first case, the higher frequency with which the livestock is managed in an extensive or semi-extensive manner influences the occurrence of damage as, generally, equine cattle is always managed extensively. Notwithstanding, in the second case the tendency of the wolf to select animals of reduced size and weight, can be added to the first factor. Indeed, the preference for the predation of sheep is common, not only in Northern Spain but also in other geographical areas. The number of cows affected is lower than in the rest of the livestock, with the exception of the Asturcón typology. However, due to the high costs of the compensation associated with the loss of cattle, the socioeconomic impact of damages on cattle is very high.

Results show, as well, a similar evolution followed by damages: a successive and alternate increase and decrease in damage inserted in a long-term upward trend. This applies to all types of animals but the Asturcón horse, and this evolution could be related to the cycles that affect to wolf population (with an alternate territorial expansion increase and decline of the wolf, equally inserted in a general trend of territorial expansion). Specifically, the observed decreases in damages can often be related to the implementation of systematic population controls, as can be seen, for example, from the analysis of damages derived of wolf predation in the Sierra de Ibéu and in the Sierra del Cuera areas (Eastern sector of Asturias) during the consecutive five-year period 2002-2006 and 2007-2011.

We detected several municipalities in which the damage can be considered extreme from the statistical point of view. A municipality is considered to be atypical or

extreme in the cow/bovine category if there are at least 342 affected animals; 961 in equine; 1431 in sheep; 683 in goats; 156 in Asturcón. The municipalities detected as atypical for the set of all the animals are Belmonte de Miranda (5048 denounces and 5,346 killed or injured animals), Teverga (3553 denounces and 4673 animals) and Ponga (1697 denounces and 4601 animals). Belmonte de Miranda is the municipality in which the total damages can be considered more extreme, especially in the horse/equine category, in which it records the highest number of specimens, but also in cows (second position).

In like manner, it has been determined that a parish is extreme in terms of the number of killed or injured animals if it reached, at least, 105 in sheep, 80 in horses, 65 in cows, 55 in goats and 35 in Asturcón horses. The parish of Agüera, in the municipality of Belmonte de Miranda, stands out in the horse/equine category (1304 killed or injured horses), far from the second parish, Villayón, in the same municipality (966 horses). On the other hand, Casomera, in the municipality of Aller, stands out in the cow category (803 cows), and Taranés, in Ponga, in the sheep/ovine category (1524 sheep). In the case of the Asturcón horses, Polavieja, in the municipality Navia, stands out with 303 killed or injured animals. The most outstanding difference in this regard is in the goat/caprine category, as the parish of Villanueva in Teverga (1639 injured or killed goats) triples in the number of affected goats to the second one, which is the parish of Valledor de San Salvador in the municipality of Allande (510 goats). Villanueva had 71 times more affected goats than 75% of the parishes that reported damages affecting goats.

With respect to Asturcón horses, the feature observed in the damage trend (which, unlike the rest, has been increasing continuously since the year 2009) could respond to the increase in the breeding of this type of livestock which, moreover, has recently become more numerous as now it includes more genetic types of horses as belonging to the breed. Finally, we must consider the fact that the management of Asturcón horses also adheres to extensive and semi-extensive methods of management, similar to those already discussed in the case of the rest of horses.

In addition to the quantifiable damages from the number of casualties for each of the livestock typologies (dead or injured animals), there are other impacts (indirect impacts) whose estimate is far more complicated, although they are equally important. These indirect damages are related, for example, to the possible alteration of dairy production after suffering wolf attacks (as a conse-

quence, for instance, of the reduction in milk production or the triggering of abortions because of the stress), both in the case of livestock managed in extensive and semi-extensive regime and, especially, of sheep and goats. Despite the undeniable difficulty in quantifying and demonstrating this type of damage, some Spanish regions such as Castilla - La Mancha and the Basque Country have been granting compensation in this sense for a few years.

In this sense, we must remember that in a great part of the best Asturian cheeses (especially those belonging to controlled or protected designations of origin in which all stages of the manufacturing process occur in a region), the raw material is cow, sheep or goat milk (and often all three) that is obtained by means of these traditional practices. Therefore, one of the future lines of research in relation to the impact of wolf predation on livestock could be precisely to determine its effect on certain agricultural goods. These kinds of products (for example, the traditional cheeses of Asturias among which stands out the blue cheeses produced in the Eastern sector of the region, such as the Cabrales and the Gamonéu) are generally known as products of high natural value or high ecological value, and they are highly dependent on sheep or goats for their productions. This is the reason why wolf's predation affects more this type of productions that, usually, are managed in a more traditional way and with extensive grazing systems.

Moreover, we must consider the presence of an undetermined percentage of cattle heads affected and not recorded in the regional Administration reports of damages, as they have never been denounced. Especially among the species of livestock managed in semi-extensive regime (sheep and goats, and namely the latter). This underreporting of damage implies, in our opinion, an important conflicting element that must be addressed in the future by the regional Administration. It is necessary to quantify and analyse their causes, that could be related with the smaller economic compensation in comparison with the one that compensates for the loss in other animals (as horses and cows), the time and effort required to certify the damages, and the difficulties to find the bodies of the dead animals (due to the orography in which the herds of goats and sheep graze), among others.

Finally, in a limited number of cases farmers could be developing inadequate practices in relation to claiming wolf predation damages. Despite involving a small group of farmers, this issue, could be causing considerable damage in terms of economic impact constituting, in addition, a highly damaging factor for the public image of the livestock sector, the most damaged by the predation of the wolf. The analysis of this unresolved problem is, therefore, one of the pending issues in relation to the management the damage caused by the Iberian wolf to the Asturian livestock.