

## **Grey wolf (*Canis lupus*) predation on livestock in the Prefecture of Trikala, central Greece**

**Kotsonas G. E., Mastora K. C. and Papakosta A. M.**

**Laboratory of Wildlife and Freshwater Fisheries, School of Forestry and Natural Environment, Aristotle University of Thessaloniki 54006, vkotsonas@hotmail.com**

### **Abstract**

The Grey wolf (*Canis lupus*) is the top predator in Greek ecosystems and the largest species of the Canidae family. The decline of wild ungulate populations has resulted in changing the wolf food habits, with livestock being its main food resource. In this study we analyzed wolf predation on livestock of Trikala Prefecture for the period 1999-2010. The total number of verified attacks recorded by HFIO (Hellenic Farmers Insurance Organization) and the Forest Service of Trikala is 2,561. The livestock is divided into 3 categories (goats, sheep and cattle) and the killed animals are 9,770. Most of the attacks occurred in areas with an altitude of 800 to 1,200 m. Autumn is the season with the largest number of attacks. Highest predation was recorded on sheep with 1,041 attacks. The presence of wolves in Greece is closely related to livestock animals and traditional farming. In order to estimate the effect of wolf predation on livestock a longitudinal monitoring is required as well as an analysis of all attacks at a national scale.

**Key words:** Grey wolf, *Canis lupus*, free ranging livestock, predation, wolf attack

### **Introduction**

The Grey wolf (*Canis lupus*) used to occur throughout North America, Europe and Asia, but its range is now significantly reduced, particularly in Europe (Delibes 1990). Despite years of persecution, the grey wolf still has one of the widest distributions among all mammals, occurring throughout the northern hemisphere, above 15 °N latitude (Alderton 1994).

Religious beliefs of various nations and specific farming practices were the main leading factors for the population decline and shrinkage of the species distribution. Currently, it is estimated that there are about 600 wolves in Greece (Legakis and Maragou 2009). The species continues to face several problems due to the complicated legal status. In the Red Book of Greece (Legakis and Maragou 2009) the Grey wolf is considered as a vulnerable (VU) species. Up to 1991 it was considered a game species, while in 1993 it was excluded from the list of pest species. Its presence in an area depends on food availability. The habitat may also influence the level of predation on domestic stock (Alderton 1994). Over the last decades, the distribution of the species in Greece follows the distribution of the free ranging livestock. This continuous interaction and the decline of wild

ungulate populations have resulted in changing the Grey wolf food habits, with livestock being its main food category (Papageorgiou et al. 1994, Pezzo et al. 2003, Magli et al. 2005). Garbage dumps and the remains of slaughterhouses are other alternative sources of food (Fritts et al. 2003, Mech and Peterson 2003, Peterson and Ciucci 2003, Legakis and Maragou 2009).

The aim of this study was to analyze the collected data related to the attacks of Grey wolf on livestock in the Prefecture of Trikala and to find out the conflicts between Grey wolf and human in order to understand the role and behavior of the species in Mediterranean ecosystems.

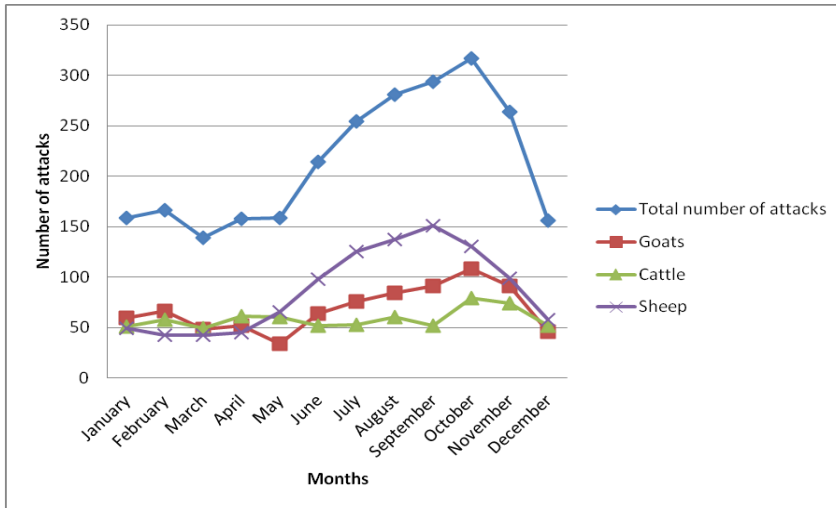
### **Materials and methods**

Data on Grey wolf attacks on livestock were collected from 1999 to 2010, in the Prefecture of Trikala in Thessaly, central Greece. In terms of topography the study area is mountainous (66%), semi mountainous (14%) and of the plain type (20%). The area is mainly covered by forests (30%), rangelands (42%) and cultivated land (20%). The climate is continental, with severe cold in winter and extremely hot summer. The average annual temperature in the lowlands is 16-17 °C and lower on the mountain areas. According to the official data of the Hellenic Statistical Authority for 2008, the main livestock categories consist of 93,593 goats, 213,925 sheep and 28,540 cattle. Data on attacks by Grey wolf were obtained by HFIO and the Forest Service of Trikala for 1999-2010. We examined the seasonal and altitudinal distribution of attacks, in relation to livestock age classes as well as the number of livestock losses per attack.

### **Results and Discussion**

#### **Seasonal and altitudinal distribution of attacks**

The number of attacks presents a seasonal variation (Fig. 1). During the winter period (November-April) approximately 50 attacks per month and per livestock category occur.

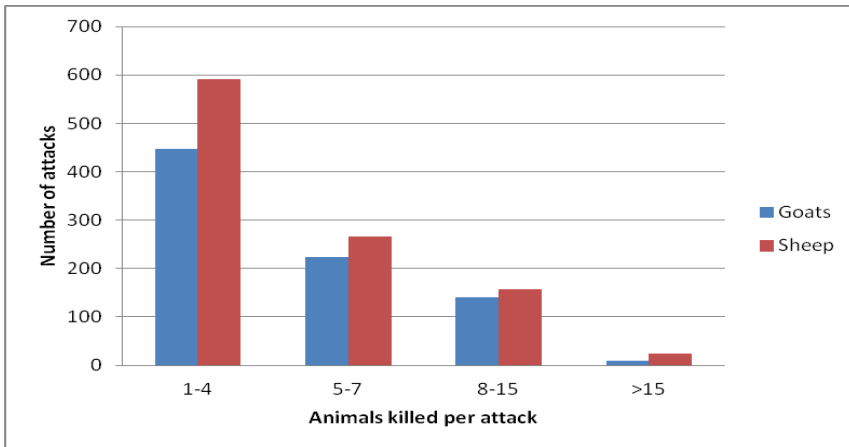


**Figure 1.** Seasonal distribution of Grey wolf attacks in the Prefecture of Trikala (average for 1999-2010)

The maximum number of attacks appeared during September and October. This period coincides with the post-weaning season where wolves raise their pups (Iliopoulos et al. 2009). From May to October sheep and goat flocks move from lowland to upland pastures (Papanastasis 2009) so prey availability is higher. An altitudinal analysis shows that the majority of attacks (1,046) took place in the mountainous areas (800-1,200 m) followed by the plain, the semi-mountainous and the high mountainous zones with 955, 478 and 82 attacks respectively. Villages in the plain zones that suffered higher predation are located on the foot of high mountains thus facilitating Grey wolf packs to approach them.

#### **Livestock losses and age class selection**

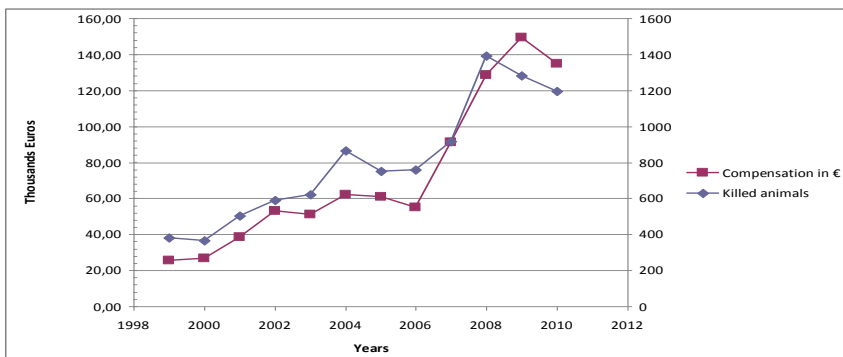
In the majority of attacks on sheep and goats, losses of less than 4 individuals per attack are observed. Surplus killing is frequent but severe losses (more than 15 individuals per attack) are recorded only in 34 attacks (Fig. 2). During attacks on cattle, wolves killed one individual at a time, while more individuals per attack were killed on only 62 cases. Highest predation was recorded in adults for each livestock category. Losses of lambs and kids were recorded on a small scale, because synchronized births keep them absent from pastures during the high predation period (May-October) (Iliopoulos et al. 2009).



**Figure 2.** Livestock losses per attack in the Prefecture of Trikala (average for 1999-2010)

### Financial losses

During the last years wolves caused significant livestock losses in the study area and high compensations were given to farmers. Today HFIO compensates 100% of the damage caused by wild animals. From 1999 to 2010 the government spent 876,500 € for livestock losses in the Prefecture of Trikala (Fig. 3).



**Figure 3.** Annual livestock losses and compensations in the Prefecture of Trikala (average for 1999-2010)

### Conclusions

- Most of the attacks occurred during summer and autumn and in high altitude pastures.

- Adult livestock suffered higher predation.
- The cost of compensations in a national scale seems to be high.
- The longitudinal monitoring of damages to livestock is vital for the conservation and management of the species (Boitani 2000).

### Acknowledgments

We are grateful to Mr Dimitris Kanteres, from the Hellenic Farmers Insurance Organization (HFIO), who provided us with all data used in this paper and valuable information.

### References

- Alderton D. 1994.** Foxes, wolves and wild dogs of the world. Litho Link Limited, Welshpool, Powys, Wales.
- Boitani L. 2000.** Action plan for the conservation of wolves in Europe (*Canis lupus*). Nature and Environment, No 113. Council of Europe Publishing, Strasbourg: 1-84.
- Delibes M., ed. 1990.** Status and conservation needs of the wolf (*Canis lupus*) in the Council of Europe member states. Nature and Environment Series no. 47. Council of Europe, Strasbourg. 46 pp.
- Fritts S. H., R. O. Stephenson, R. D. Hayes and L. Boitani 2003.** Wolves and humans. [In: Wolves: behavior, ecology and conservation. D. L. Mech and L. Boitani, eds]. The University of Chicago Press, Chicago and London: 289-316.
- Iliopoulos Y., S. Sgardelis, V. Koutis and D. Savaris. 2009.** Wolf depredation on livestock in Central Greece. *Acta Theriologica*, 54: 11-22.
- Legakis A. and P. Maragou. 2009.** The Red Data Book of Threatened Animals of Greece. Hellenic Zoological Society, Athens. 528 pp. (In Greek)
- Magli D., D. Youlatos and Y. Iliopoulos 2005.** Winter food habits of wolves in central Greece. *Journal of Biological Research*, 4: 217-220.
- Mech D. L. and R. O. Peterson 2003.** Wolf-Prey Relations. [In: Wolves: behavior, ecology and conservation. D. L. Mech and L. Boitani, eds]. The University of Chicago Press, Chicago and London: 131-160.
- Papageorgiou N., C. Vlachos, A. Sfougaris and E. Tsachalidis 1994.** Status and diet of wolves in Greece. *Acta Theriologica*, 39: 411-416
- Papanastasis V. 2009.** Rangeland development. Giahoudis Press. Thessaloniki. 157 pp. (In Greek)
- Peterson R. O. and P. Ciucci 2003.** The Wolf as a Carnivore. [In: Wolves: behavior, ecology and conservation. D. L. Mech and L. Boitani, eds]. The University of Chicago Press, Chicago and London: 104-130.
- Pezzo F., L. Parigi and R. Fico. 2003.** Food habits on wolves in central Italy based on stomach and intestine analyses. *Acta Theriologica* 48: 265-270.