Livestock grazing, openings and raptors conservation in the Dadia-Lefkimi-Soufli Forest National Park

Bakaloudis D.E.

in

Kyriazopoulos A.P. (ed.), López-Francos A. (ed.), Porqueddu C. (ed.), Sklavou P. (ed.). Ecosystem services and socio-economic benefits of Mediterranean grasslands

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 114

2016
pages 437-440

Livestock grazing, openings and raptors conservation in the Dadia-Lefkimi-Soufli Forest National Park

D.E. Bakaloudis[1,2]

[1] School of Forestry and Natural Environment, Lab. of Wildlife and Freshwater Fish, Aristotle University of Thessaloniki, PO Box 241, 541 24 Thessaloniki (Greece)
[2] Head of Management Body of Dadia-Lefkimi-Soufli Forest National Park, 684 00 Dadia (Greece)
e-mail: debakaloudis@for.auth.gr

Abstract. Livestock grazing regimes may influence indirectly wildlife populations and particularly species such as raptors that depend mainly on open areas for hunting their prey. In the Dadia-Lefkimi-Soufli forest National Park (DLS NP), which supports a valuable number of wildlife species and densities, including mammals, birds, reptiles and amphibians, socio-economic reasons as well as zoonoses have resulted in declining livestock numbers over the last six decades. Its consequence was evident in the gradual increase of forested areas and the decrease of openings. This canopy closure of the area through shrub and tree encroachment may influence raptor distribution and abundance within the DLS NP, but this should be studied in more detail.

Keywords. Grazing – Openings – Raptors – Management – Protected areas.

Pâturage du bétail, zones ouvertes et conservation des oiseaux de proie dans le parc national de la forêt de Lefkimi-Dadia Soufli

Résumé. *Les régimes de pâturage du bétail peuvent influencer indirectement les populations fauniques et en particulier des espèces telles que les oiseaux de proie qui dépendent principalement de zones ouvertes pour chasser leurs proies. Dans le parc national de la forêt de Dadia-Lefkimi-Soufli (DLS NP), qui prend en charge un nombre important d'espèces sauvages et de densités, y compris des mammifères, des oiseaux, des reptiles et des amphibiens, les raisons socio-économiques ainsi que les zoonoses ont entraîné la diminution du nombre d'animaux sur les six dernières décennies. Sa conséquence est évidente dans l'augmentation progressive des zones forestières et la diminution des zones ouvertes. Cette fermeture de la canopée de la zone par empiètement des arbustes et des arbres peut influer sur la répartition et l'abondance des oiseaux de proie dans le DLS NP, mais cela doit être étudié plus en détail.*

Mots-clés. *Pâturage – Zones ouvertes – Rapaces – Aires protégées – Gestion.*

I – Introduction

Habitat degradation and land use change are referred as the most important factors contributing for biodiversity loss worldwide as well as in the Mediterranean basin over the last decades (Cuttelod *et al*., 2008). Among direct drivers of land use changes, which alter the extent, pattern and quality of native vegetation, is the global increase in lands assigned to agriculture and grazing (Alkemade *et al*., 2013). Therefore, the type, timing and intensity of livestock grazing may influence wildlife populations in different ways (Kochert, 1989; Peterjohn, 2003; La Morgia *et al*., 2015), by modifying nesting substrate availability (Ammon and Stacey, 1997), by changing prey species abundance (Taylor, 1986; Torre *et al.,* 2007), and by influencing prey vulnerability (Bakaloudis, 2009). On the other hand, livestock grazing has been recognized as an easy and cheap management tool in natural habitats for maintaining open structure and suitable plant composition upon which a variety of wildlife species depend for their survival (du Toit *et al.,* 2010; Beemster and Vulink, 2013). In addition, grazing intensity may influence natural habitats, such as grasslands and/or shrublands, on different directions and thus change

vegetation composition and density, which may benefit or not some open land raptors, such as eagles, vultures and buzzards (Bakaloudis *et al*., 1998a,b; Sanchez-Zapata *et al*., 2003). The aim of this study was twofold: firstly to highlight temporal changes in both livestock numbers and human population in a protected area, and secondly to assess their consequences on raptors in the Dadia-Lefkimi-Soufli forest National Park.

II – Livestock grazing, openings and raptors

The Dadia-Lefkimi-Soufli forest National Park (hereafter DLS NP) is important for wildlife because it offers the only extensively wooded area along the Evros valley. However, due to long term human activities, including agriculture, logging, livestock grazing and small-scale wildfires, a mosaic of different habitat types has been created in the area.

The DLS NP is located in the central part of Evros Province in north-eastern Greece and covers approximately 427 km^2. Its elevation ranges between 20 and 700 m above sea level, and it is criss-crossed with steep valleys. Most of the area is forested, but agricultural land and shrublands are also occurring. The DLS NP has been established in 2003, but has been designated as a protected area since 1980. This year two cores were established as strictly protected areas for birds of prey, and they cover 75 km^2. The position of the DLS NP, lying at the junction of three continents, as well as the varied geology, the variety of climatic conditions, the diverse structure and vegetation composition and the low human disturbance appoint the area a complicated ecosystem supporting a valuable number of wildlife species and densities, including at least 12 amphibians, 27 reptiles, 46 mammals and more than 173 birds. In particular, it supports one of the richest diurnal raptorial fauna in Europe (Poirazidis *et al*., 2011). In total, 31 species are present out of the 38 that occur in Europe, and most of them are considered to be of specific conservation concern, as they are endangered or vulnerable in Europe. Most of these raptorial birds are using the forest for nesting and open areas for foraging and hunting their prey (Bakaloudis *et al*., 1998a; 1998b) (Table 1).

Table 1. Different succession stages of forests used by raptors

Species	Common name	Edge, openings	regeneration	Forest stages thicket	pole	mature
Falco tinnunculus	kestrel					
Buteo buteo	buzzard					
Milvus migrans	black kite					
Circaetus gallicus	snake eagle					
Aquila chrysaetos	golden eagle					
Aegypius monachus	black vulture					
Accipiter gentilis	goshawk					

Dark grey indicates ideal nesting habitat, bright grey indicates ideal foraging habitats and white indicates unsuitable habitats.

Grazing occurs inside the DLS NP in nomadic flocks. Numbers of livestock have declined during the sixties due to socio-economic changes in the region, although numbers have stabilized at low levels over the last few decades (Fig. 1). In particular, most of the livestock has been killed due to zoonoses during a two-year period (2014 and 2015), and now only a few flocks remain in the DLS NP.

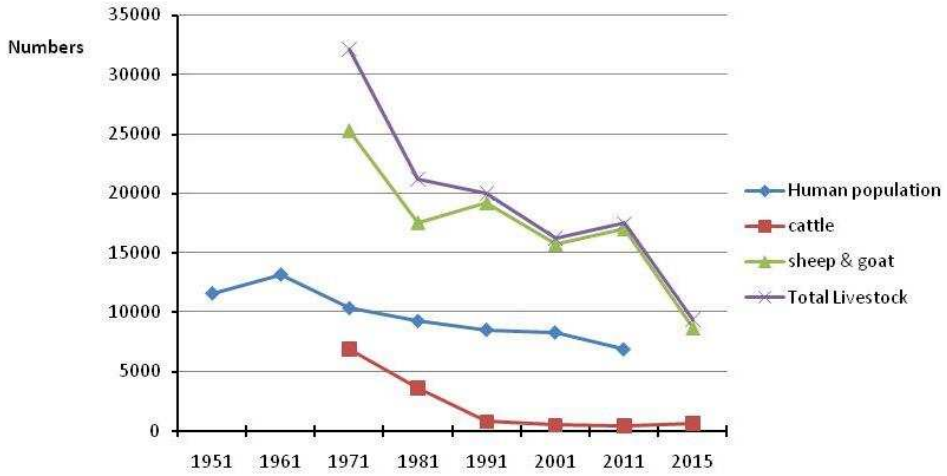

Fig. 1. Numbers of livestock and human population of seven villages in DLS NP in different years.

Similarly, a long-term population declining trend has occurred in villages and towns of DLS NP (Fig. 1). As a result the demand for woods from DLS NP which is used as fuel in the surrounding villages was reduced.

Although grazing by goats and sheep has been noted to have a degrading and/or devastating influence on Mediterranean ecosystems (Dafis, 1991), in the DLS NP had an opposite, positive effect on wildlife through by maintaining an open vegetation structure and by creating a patchwork of different habitat types (Bakaloudis *et al*., 1998b). Following the decline in both livestock numbers and human population, many openings have regenerated with Calabrian pines (*Pinus brutia*), and open shrublands and partially forested areas have experienced a progressive canopy closure. According to Triantakonstantis *et al*. (2006), in DLS NP the forested area (areas covered by >40% by trees) increased steadily from 46% (1945), to 54% (1973) and to 72% (2001). On the other hand, the openings (areas covered by <40% by trees), as a result of their gradual encroachment by trees and shrubs, decreased in numbers and area from 35%, to 25% and to 9% for the time periods 1945, 1973 and 2001, respectively. Agricultural land remained more or less stable, between 18%, 20% and 16% for the above time periods respectively. Those trends are followed both in the buffer zone and the two cores. These changes may have resulted in a greater abundance of small raptors that are able to utilize closed canopy habitats (i.e. goshawk *Accipter gentilis*, sparrowhawk *A. nisus*) over large raptors that require open areas for hunting (i.e. snake eagle *Circaetus gallicus*, golden eagle *Aquila chrysaetos* etc.) (Bakaloudis *et al*., 1998b). However, more research is needed to clarify the association of raptor species and densities with grazing regimes and vegetation structure.

III – Conclusions

The gradual decline of livestock grazing numbers as well as the changing style of life of local people and the changing of livestock regimes from extensive and pastoral to intensive farming has caused an increase in forested area and a dramatic reduction of open areas, such as small openings and forest gaps in the DLS NP over the last six decades. The closure of the area through shrub and tree encroachment and its consequences on different wildlife species and particularly on raptors has to be studied more in-depth. Reverting to a more open landscape both in buffer zone and protected cores across DLS NP is not realistic in short-term. However, effective long-term management practices, including timber harvesting in conjunction with

proper livestock grazing, may lead to an appropriate ratio of forest-open area. This would be based on the conservation goal of the area, and will require more research on what kind of practices is needed to benefit the greatest diversity (multiple-species management) of wildlife in the area while to help single species with high conservation concern.

References

Alkemade R., Reid R.S, Berg M. van den, Leeuw de J. and Jeuken M., 2013. Assessing the impacts of livestock production on biodiversity in rangeland ecosystems. In: *Proceedings of the National Academy of Sciences of the United States of America*, 110(52), p. 20900-20905.

Ammon E.M. and Stacey P.B., 1997. Avian nest success in relation to past grazing regimes in a montane riparian system. In: *Condor* 99, p. 7-13.

Bakaloudis D.E., 2009. Implications for conservation of foraging sites selected by Short-toed Eagles (*Circaetus gallicus*) in Greece. In: *Ornis Fennica*, 86, p. 89-96.

Bakaloudis D.E., Vlachos C. and Holloway G.J., 1998a. Habitat use by short-toed eagles *Circaetus gallicus* and their reptilian prey during the breeding season in Dadia Forest (north-eastern Greece). In: *Journal of Applied Ecology*, 35, p. 821-828.

Bakaloudis D., Vlachos C., Nastis A. and Holloway G.J. 1998b. Distribution of raptors and reptiles in different habitat types in Dadia-Lefkimi-Soufli Forest Complex, N.E. Greece. In Waterhouse, A and McEwan, E. (eds.). In: *Landscapes, Livestock and Livelihoods in European Less Favoured Areas*. Ayr: SAC Auchincruive, p. 63-67.

Beemster N. and Vulink T.J., 2013. The long-term influence of grazing by livestock on common vole and raptors in man-made wetlands in the Netherlands. In: *Lutra*, 56, p. 5-21.

Cuttelod A., Garcia N., Abdul Malak A., Temple H. and Katariya V., 2008. The Mediterranean: a biodiversity hotspot under threat. In: Vié J.-C., Hilton-Taylor C. and Stuart S.N. (eds). *The 2008 review of the IUCN Red List of threatened species*. IUCN Gland, Switzerland.

Dafis S., 1991. *Forest Ecology*. Giahoudis-Giapoulis Publishers, Thessaloniki.

du Toit J.T., Kock R. and Deutsch J.C., 2010. *Wild rangelands: conserving wildlife while maintaining livestock in semi-arid ecosystems.* Wiley-Blackwell, Chichester, UK.

Kochert M.N., 1989. Responses of raptors to livestock grazing in the western United States. In Pendleton B.G. (ed.). *Proceedings of The Western Raptor Management Symposium and Workshop*. Washington, D.C.: National Wildlife Federation, p. 194-203.

La Morgia V., Balbo C., Memoli S. and Isaia M., 2015. Rodents in grassland habitats: does livestock grazing matter? A comparison of two Alpine sites with different grazing histories. In: *Zoosystema*, 37, p. 571-580.

Peterjohn B.G., 2003. Agricultural landscapes: can they support healthy bird populations as well as farm products? In: *Auk*, 120, 14-19.

Poirazidis K., Schindler S., Kakalis E., Ruiz C, Bakaloudis D.E., Scandolara C., Eastham C., Hristov H. and Catsadorakis G., 2011. Population estimates for the diverse raptor assemblage of Dadia National Park, Greece. In: *Ardeola*, 58, p. 3-17.

Sanchez-Zapata J.A., Carrete M., Gravilov A., Sklyarenko S., Ceballos O., Donazar J.A. and Hiraldo F., 2003. Land use changes and raptor conservation in steppe habitats of Eastern Kazakhstan. In: *Biological Conservation*, 111, p. 71-77.

Taylor D.M., 1986. Effects of cattle grazing on passerine birds nesting in riparian habitat. In: *Journal of Range Management*, 39, p. 254-257.

Torre I., Diaz M., Martinez-Padilla J., Bonal R., Vinuela J. and Fargallo J.A., 2007. Cattle grazing, raptor abundance and small mammal communities in Mediterranean grasslands. In: *Basic and Applied Ecology*, 8, p. 565-575.

Triantakonstantis D.P., Kollias V.J. and Kalivas D.P., 2006. Forest re-growth since 1945 in the Dadia forest nature reserve in northern Greece. In: *New Forests*, 32, p. 51-69.