Annuaire de l'Université de Sofia "St. Kliment Ohridski"
Faculte de Biologie
2016, volume 101, livre 4, pp. 5-10
Youth Scientific Conference "Kliment's Days", Sofia 2015

# THE EUROPEAN RABBIT (*ORYCTOLAGUS CUNICULUS, LINNAEUS, 1758*) IN BULGARIA: PAST AND PRESENT

ALBENA VLASSEVA*, ATIDJE AHMED, PETER GENOV

*Institute of Biodiversity and Ecosystem Research - BAS, 2, U. Gagarin, Sofia, Bulgaria*
** Corresponding author: mirchevaa@yahoo.com*

**Keywords:** European rabbit, *Oryctolagus cuniculus*, introduction, game species

**Abstract:** The European rabbit (*Oryctolagus cuniculus*) is a widespread colonizer and is considered a pest outside its natural range (Spain, Portugal, and northwestern Africa-Morocco and Algeria), where the rabbit is a priority for conservation.

In Bulgaria, *O. cuniculus* was acclimatized successfully in the 60s of the last century on the St. Ivan Island near Sozopol, where the species can be found today. At the present, its number is between 350-500 individuals and it is not a hunted species due to limited distribution and low numbers. Bulgarian hunters are interested in introducing European rabbit in more places in the country and its inclusion in the game species list.

This paper presents chronologically the introduction of *O. cuniculus* in Bulgaria, the current status of the only surviving colony of the species, and also comment positive and negative aspects of the widespread introduction of the controversial species like the European rabbit in our country.

## INTRODUCTION

The European wild rabbit (*Oryctolagus cuniculus, Linnaeus, 1758*) is the only extant representative of a monospecific genus in the family Leporidae which probably originated in the Iberian Peninsula and survived the last glaciation in two refugia, one in southern Spain and the other in southern France and north-eastern Spain (Ferrand, 2008).

The current status of the wild rabbit has been described as "paradoxical" given that it is largely threatened within its native range, but extremely successful elsewhere as an introduced species and is present in most of Europe, North Africa, and parts of South America, Australia, New Zealand and hundreds of islands (Ferreira, 2012).

*O. coniculus* is a species having a special role in ecological relationships to

the system. On the Iberian Peninsula, rabbits conspicuously change plant species composition and vegetation structure through grazing and seed dispersal, which creates open areas and preserve plant species diversity. Moreover, rabbit latrines have a demonstrable effect on soil fertility and plant growth and provide new feeding resources for many invertebrate species. Rabbit burrows provide nest sites and shelter for vertebrates and invertebrates. In addition, rabbits serve as prey for a number of predators (Delibes-Mateos *et al*., 2008), (Fig. 1).

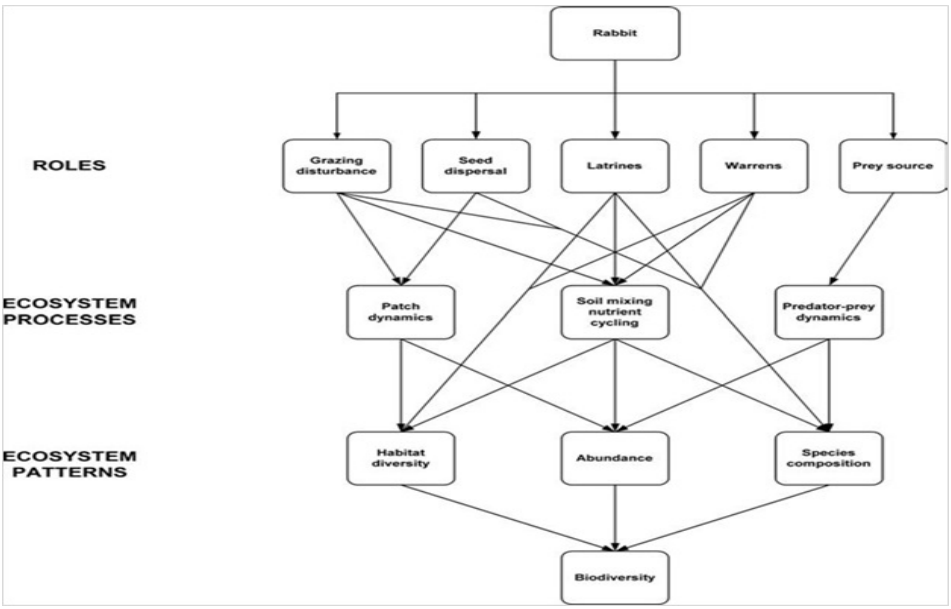


**Figure 1.** Role of the European rabbit on the structure and function of ecosystems of the Iberian Peninsula (Delibes-Mateos et al., 2008)

In Bulgaria *O. cuniculus* is represented by only one colony that inhabits the St. Ivan Island, situated opposite to the town of Sozopol 1.5 km offshore. St. Ivan is the biggest Bulgarian island (30.04 ha), notified for protected area since 1993 with conservation purpose, habitat of protected and rare species of birds. The European rabbit was introduced for the first time probably in 1925. In 1930 an unsuccessful attempt was made to transfer rabbits near Ropotamo River (Boev, 1980). In 1940 Sokachev announces introduction of *O. coniculus* in Bulgaira unsuccessful due to lack of suitable soils. The same author expresses concern that the introduction of the European rabbit in our country may be dangerous, especially for agriculture (Sokachev, 1940). Dragoev (1978) is also not convinced of the advantages of the enrichment for native fauna with species such as the rabbit. Later in detailed articles Boev and Genov (1980, 1987, respectively), try to „cleanse“ the bad reputation of this lagomorphs. Since 1987 until now official information and detailed observations of the rabbit colony in Bulgaria are

lacking. The latest information we have is from foresters in the Burgas region and Hunting and fishing society „*Lebed*". Currently the island has 350-500 rabbits, many of them black or spotted due to inbreeding. *O. cuniculus* is the main prey of the numerous gulls (*Larus argentatus*) inhabiting the island.

## MATERIALS AND METHODS

Paper was based on the available publications about the European rabbit in Bulgaria. Most of them have been published in periodicals hunting magazines and newspapers and other in popular science magazines. Generally, information about *O. cunuculus* in our country is very scarce. In the fall of 2015 at our request a short survey of the number and condition of the rabbits on the St Ivan Island was organized. The island was visited by foresters and hunters, fishermen were interviewed, etc.

## DISCUSSION

Modern studies emphasize the role of the European rabbits as a keystone species in its native range. Perhaps the most obvious advantage is that it is prey to over 40 species of predators - raptors and other birds, mammals and reptiles (Ferreira, 2012). The enrichment of Bulgarian fauna with different prey species would reduce pressure on populations of other types of prey, including the brown hare, whose numbers in our country and throughout Europe are at a critical minimum (Zhelev, 2015, Smith et al. 2005). The predators of the rabbits and the hares are the same and their attacks are more efficient when the prey lives in colonies which are static (Orojan *et al.*, 2014) as the European rabbit colonies. Compared to *O. cuniculus*, which prefer to stay in the same land in colonies, *L. europaeus* is solitary and nomad (Orojan *et al.*, 2014). This is a plus for the brown hare because once the predators find a prey-rich location, they will keep on hunting there. On the other hand predators and hunters pursuing brown hare will be reduced in the presence of other prey species. One more interesting feature of the rabbit, even in areas where its numbers have decreased (Spain and Portugal), is that it remains one of the preferred hunted species, thanks to which the revenue from hunting amounted to millions of euros annually (Ferreira, 2012).

In Bulgaria there are many uncultivated lands that have historically been cultivated agriculture lands or pastures of numerous herds of livestock. Today they are weedy, unsuitable for habitation by most native animal species. The European rabbit is very suitable for introduction in these specific places (large areas of abandoned agricultural land), especially considering its strong influence on the habitats and other species through consumption of vegetation, seed dispersal and burrowing (Delibes-Mateos, 2008).

In addition to these remarkable qualities, the European rabbit caused concern

of many experts, because this species also may be agricultural pests, disease vectors, and a direct competitor to the indigenous to our country brown hares.

The European rabbit was introduced or re-introduced in Romania for hunting purposes in counties such as: Alba, Bacău, Botoşani, Braşov, Buzău, Covasna, Dolj, Iaşi, Ilfov, Maramureş, Mureş, Prahova, Sibiu, Timiş and Vîlcea. Many introductions dated a long time ago, some of them before 1900s. At present, it can be found only in two counties: for sure in Timiş (Timiş Meadow) and possible in Sibiu. In most of other counties where it was introduced the rabbit populations were extinct in the wild. The reasons for these extinctions are the nature of the soil, cold winters, predators and pathogens. Even in low number, the European rabbit is a species of hunting purpose and according to Romanian legislation, it can be hunted all year long for meat and fur. It is also a reservoir of wild genes, useful for the genetic improvement of the domestic rabbit. The invasive potential of *O. cuniculus* in Romania is quite low (Oroian, 2014). Given the high numbers of predators in Bulgaria, such a growth in the population of rabbits that they can become an agricultural pest is not expected.

Another fear, regarding the introduction of the European rabbit in our country is associated with its susceptibility to some diseases (myxomatosis, pseudotuberculosis, etc.). We should not ignore the fact that predators and pathogens are common to both species - brown hare and European rabbit. The difference consists in the fact that viruses, bacteria and protozoan parasites are spread more efficiently if the hosts' animals live in colonies. Several studies show that a reduction of brown hares from disease is much less than from predators and remodel habitats (Oroian, 2014).

Regarding a competition between *L. europaeus* and *O. coniculus* the studies in some regions of Hungary have shown that local abundance of the brown hare was not significantly limited by the exploitation of similar food resources by the European rabbit (Katona *et al.*, 2005); In Tuscany both populations of lagomorph showed a great habitat overlap, but European rabbits seem to live at shorter distance from permanent cover (hedgerows and woods) and seem to prefer uncultivated fields and permanent crops that offer more protection from avian predators. Brown hares seem to prefer more open habitats (arable crops). This means less selectivity of hares than rabbits. The differences found in habitat use probably have enabled the two species to coexist for many decades and may be used to manage these species (Santillia, 2015). The results of Narce *et al.* (2012) indicate that a suitable habitat has a higher diversity, a medium number of patches and a small proportion of shrubs. All of this we may be used to diagnose the landscape prior to any management action to enhance rabbit populations and conversely is helpful as a tool of integrated control in the cases of local population increase with agricultural damages.

## CONCLUSIONS

This short review of the literature shows that we must be particularly cautious to the reintroduction of the species, which is a pest in areas outside its natural distribution. Although in our country such a mass increase of the rabbit densities are not expected, mostly because of the high density of the predators. It is necessary to stop the spread of rabbits with unknown origin (Lo Valvo, 2014) and for introduction should be used only animals taken from the places of native range and with high enough density. The places of rabbit introduction should also be continuously monitored and timely measures should be taken in case of probable destruction damage to crops, diseases, etc. We need the right policies for the conservation and management of rabbit populations not only for hunting purposes, because it appears that hunting and predators are not the the most effective control strategies of the European rabbit.

**Acknowledgements:** We would like to thank the foresters in the Burgas region and Hunting and fishing society „Lebed“ and especially to Neven Karavasilev for his desire to help us with material or information on the status of wild animals along Southern Black Sea coast.

## REFERENCES

1. Boev N. 1980. What about another hare? *Hunting and fishing*, 10: 24-28
2. Delibes-Mateos, M., Simon, J. F., Villafuerte, R., Ferreras, P. 2008. Feeding responses of the red fox (*Vulpes vulpes*) to different wild rabbit (*Oryctolagus cuniculus*) densities: a regional approach. *Eur. J. Wildl. Res.*, 54: 71–78 DOI 10.1007/s10344-007-0111-5
3. Dragoev P. 1978. European rabbit (*Oristolagus cuniculus* L.) In: Enrichment of hunting fauna in Bulgaria, Zemizdat, Sofia, pp 55-56
4. Ferrand, N. 2008 Inferring the evolutionary history of the European rabbit (*Oryctolagus cuniculus*) from molecular markers. In: Alves PC, Ferrand N, Hackländer K (eds) Lagomorph biology: evolution, ecology, and conservation. Springer, Berlin, pp 47–63
5. Ferreira, C. 2012. European rabbit research in the Iberian Peninsula: state of the art. *Eur. J. Wildl. Res.*, 58: 885–895
6. Genov, P. 1987. The rabbit. *Fishing*, 8: 28-29
7. Katona, K., Biro, Z., Hahn, I., Kertesz, M., Altbacker, V. 2004. Competition between European hare and European rabbit in a lowland area, Hungary: a long-term ecological study in the period of rabbit extinction. *Folia Zool.*, 53: 255–268
8. Lo Valvo, M., La Scala, A., Scalisi, M. 2014. Biometric characterisation and taxonomic considerations of european rabbit *Oryctolagus cuniculus* (Linnaeus 1758) in Sicily (Italy). *World Rabbit Sci.* 2014, 22: 207-214

9. Narce, M., Meloni, R., Beroud, T., Pléney, A., Ricci, J. C. 2012. Landscape ecology and wild rabbit (*Oryctolagus cuniculus*) habitat modeling in the Mediterranean region. *Animal Biodiversity and Conservation*, 35.2: 277–283
10. Oroian, I.G., Covrig, I., Todoran, C.F., Botha, M., Blaga, B.C., Petrescu-Mag, I.V. 2014. Distribution of the European rabbit (*Oryctolagus cuniculus*) in Romania. *Rabbit Gen*., 2014, 4 (1):60-63. http://www.rg.bioflux.com.ro/docs/2014.60-63.pdf
11. Santillia, F., Bagliaccab, M., Pacib, G. 2015. Density and habitat use of sympatric Brown hares and European rabbits in a Mediterranean farmland area of Tuscany (Central Italy). *Ethology Ecology & Evolution*, 27(2): 233-243, DOI:10.1080/03949 370.2013.870607
12. Smith, R.K., Jennings, N.V., Harris, S. 2005. A quantitative analysis of the abundance and demography of European hares *Lepus europaeus* in relation to habitat type, intensity of agriculture and climate. *Mammal Review* 35: 1–24.
13. Sokachev I. 1940. Final unfortunate comparison between the German and Bulgarian hunting. Hunter 4: 30-33
14. Zhelev Ch. 2015. Status and influence of some environmental factors on stocks of brown hare (Lepus europaeus Pallas, 1778) in lowland habitats in the country. Dissertation, Sofia, 209 pp