WHITE-TAILED EAGLE (AVES: ACCIPITERIFORMES) STATUS IN REPUBLIC OF MOLDOVA

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Abstract

White-tailed Eagle (*Haliaeetus albicilla*) is the biggest bird of prey from the Republic of Moldova which recorded a drastic decline until the 19th century. In 2001 it was mentioned only as probable breeding species in the 2nd edition of the Red Book of the Republic of Moldova. The threats of this species are unknown for our research area and the studies on White-tailed Eagle are more than 30years old. During 2012 - 2013 we have conducted a survey programme for the White-tailed Eagle in Western Republic of Moldova to search for breeding evidence or to identify suitable habitats. During our surveys we have discovered 4 breeding pairs in the riparian forests from the Prut River. All nests were recorded on poplar (*Populus sp*.) in areas with fish farms or big lakes. Three of them had two fledglings in 2013, which implies a good feeding area. In April 2013 we have recorded an adult bird with a territorial behaviour, near the Dniester River, but we couldn't find the nest.

This is the first White-tailed Eagle survey after 1981 from the Republic of Moldova. In the next years we plan to cover the entire territory of the country in order to record all the breeding pairs of this species or to identify the suitable habitats.

White-tailed Eagle is a protected species for the Republic of Moldova being listed in Annex 3 of law 439/1995 (Republic of Moldova) as endangered.

Keywords: White-tailed Eagle (*Haliaeetus albicilla*), Republic of Moldova, ecology, breeding, distribution

Introduction

The White-tailed Eagle (*Haliaeetus albicilla*) is one of the largest birds of prey from the Republic of Moldova and also from Europe. A drastic decrease of the world population lasted until the second half of the 20th century (Tucker and Heath 1994). In the last decades the population started to increase in some parts of its range mostly due to the abandonment of pesticides and the legal protection in most European countries (Helander and Stjernberg 2002). The population of the Danube River basin, where the Republic of Moldova population is situated, is increasing (Schneider - Jacoby et al. 2003). Now it is evaluated by IUCN as Least Concern (BirdLife International 2013), but it is protected by the Bird Directive (2009.147.EC) being listed in Annex I, by the Bern Convention being listed in Annex II - strictly protected species and by the Convention on Migratory Species.

In the Republic of Moldova the population started to decrease in the second half of the

20th century, mainly due to the increase of localities size and number, industry development, wetland drainage and to the large scale usage of the DDT (Averin, ed. Vol. I 1970). The last identified nest was in 1971 and since then there has been no data regarding the breeding pairs (Averin 1971, Uspenskii 1981, Red Book of the Republic of Moldova 2001, Munteanu 2010).

The characteristic breeding habitat of the White-tailed Eagle differs considerably along the species range. In Romania, the nests are built mainly in the crowns of tall, strong, mature trees which are close to wetland areas. The White-tailed Eagle can also breed on cliffs (Hauff 2001) but this is mainly specific for those which breed near big water bodies. In Croatia, more than 95% of the population breeds at altitudes lower than 140 m above sea level and are further than one km away from the nearest human settlement, regardless of the availability of forests (Radović and Mikuska 2008). On the other hand, in some areas in Poland some pairs show a decreasing degree of vulnerability to human influence, one pair nesting only some 400 m away from village buildings (Mizera & Szymkiewcz, 1991). For the Moldavian population which was recorded in the past, there is no data regarding the breeding habitat characteristics, except one nest from the south-eastern part of the country. This nest was occupied for 10 years, being located near the Dniester River, in a floodplain forest (Gania 1965). There is no available data regarding the anthropic pressure, but this threat was identified in other countries, like Croatia (Radović and Mikuska 2008) or north-western Tartumaa (Löhmus 2001). But the disturbance distance varies according to age and individual tolerance (Radović and Mikuska 2008).

The White-tailed Eagle is a poorly studied species for the Republic of Moldova especially in the last 40 years. The aim of this study is to assess the distribution of the White-tailed Eagle in the Republic of Moldova and to analyse the population status, breeding habitat selectivity and threats.

Main Text

Material and methods

The study area consists of the Republic of Moldova territory which is situated between the Prut and Dniester Rivers (33 843,5 km^2). The landscape is highly fragmented, represented by hilly areas and relatively low plains, with a general north - west to south - east slope. The highest levels are in north - west and central part of the country - 300 - 400 m asl., while in the southern part, the altitudes range is between 100 -200 m asl.

Regarding habitats, the area is characterised mainly by highly fragmented agricultural fields, hilly deciduous forests, grassland and floodplain forests. The floodplain forests flanking the Prut and Dniester Rivers have medium age as well as old-growth trees.

During November 2012 - August 2013 we have conducted a counting programme in order to identify the breeding pairs of the White-tailed Eagle or characteristic habitats for this species. In order to be more efficient, we identified the forest areas adjacent to the Prut and Dniester Rivers using satellite imaging data correlated with field observation. Following this, in the months of November 2012 - February 2013 we have selected 6 squares of 2 km^2 each in forests along the Prut River and 4 squares of 2 km^2 each in Dniester River forests where we conducted transects in order to identify the nests of the White-tailed Eagle. The lack of foliage in the trees during the winter season offered the best conditions for spotting the nests. We covered the entire surface of the selected squares during the winter months. To identify the square limits and to mark the location of potential nests, we used Garmin Oregon 450t and Garmin GPSMap 62 GPS devices. For visual observations we used Nikon Monarch DCF 10 x 42 and Olympus 10 x 42 EXWP binoculars. After we identified potential nests of the White-tailed Eagle, we checked them in the breeding period, in order to confirm the breeding target species. For this, we used fixed observation points method. We took advantage of a high level area that gave us a good view over the potential nest. Using a Carl Zeiss Victory Diascope 65 T FL Fieldscope, we monitored the activity over the nest site. This method was also used to

identify the White-tailed Eagle activity in other areas where no potential nest was previously identified. This is a non-invasive method and we chose it because we did not have any data on the influence of human disturbance on White-tailed Eagle.

For each nest we took the GPS position and the data during the breeding period was recorded in a GIS database in order to calculate the habitat structure around the nest, the distance between the occupied nests or to the nearest locality or lake/fish farm.

To detect possible differences between the land use structure around the nests, we used Friedman's repeated-measures analysis of variance (F_r).

The GIS data was analysed in Quantum GIS, v.2.0.1. and the statistical calculation were conducted in R statistical software, v. 3.0.2.

Results and discussions

For more than 40 years, in the Republic of Moldova, there were no surveys conducted for the White-tailed Eagle and the population of this country was unknown. In all this period it was assumed that the breeding population of the White-tailed Eagle could be represented by 3 pairs (Uspenskii 1981), but there were no data regarding the possible nests location.

During our surveys, we checked 10 squares of 2 X 2 km which were selected on the Republic of Moldova main rivers, Prut and Dniester. We found 4 breeding pairs on Prut River and one possible breeding pair on Dniester River (Figure 1). All the nests were built on poplar (*Populus* sp.) even if near the tree where the nets was placed were other tree species, as willow (*Salix* sp.) or oak (*Qurecus robur*). The species is known to nest in strong mature trees such as pines (*Pinus sp.*), especially in northern regions like Poland (Mizera & Szymkiewcz, 1991), beech (*Fagus sp.*), oak (*Quercus sp.*). Closely to our region, in Serbia, ⅓ of nests are located in poplar trees (Hám and Tukanov 2014).

The first nest is located in the northern part of the Republic of Moldova, near Stânca-Costeşti Lake. The land use structure is represented mainly by arable land, followed by wetlands and water surfaces, pasture and herbaceous vegetation and forests (Table 1).

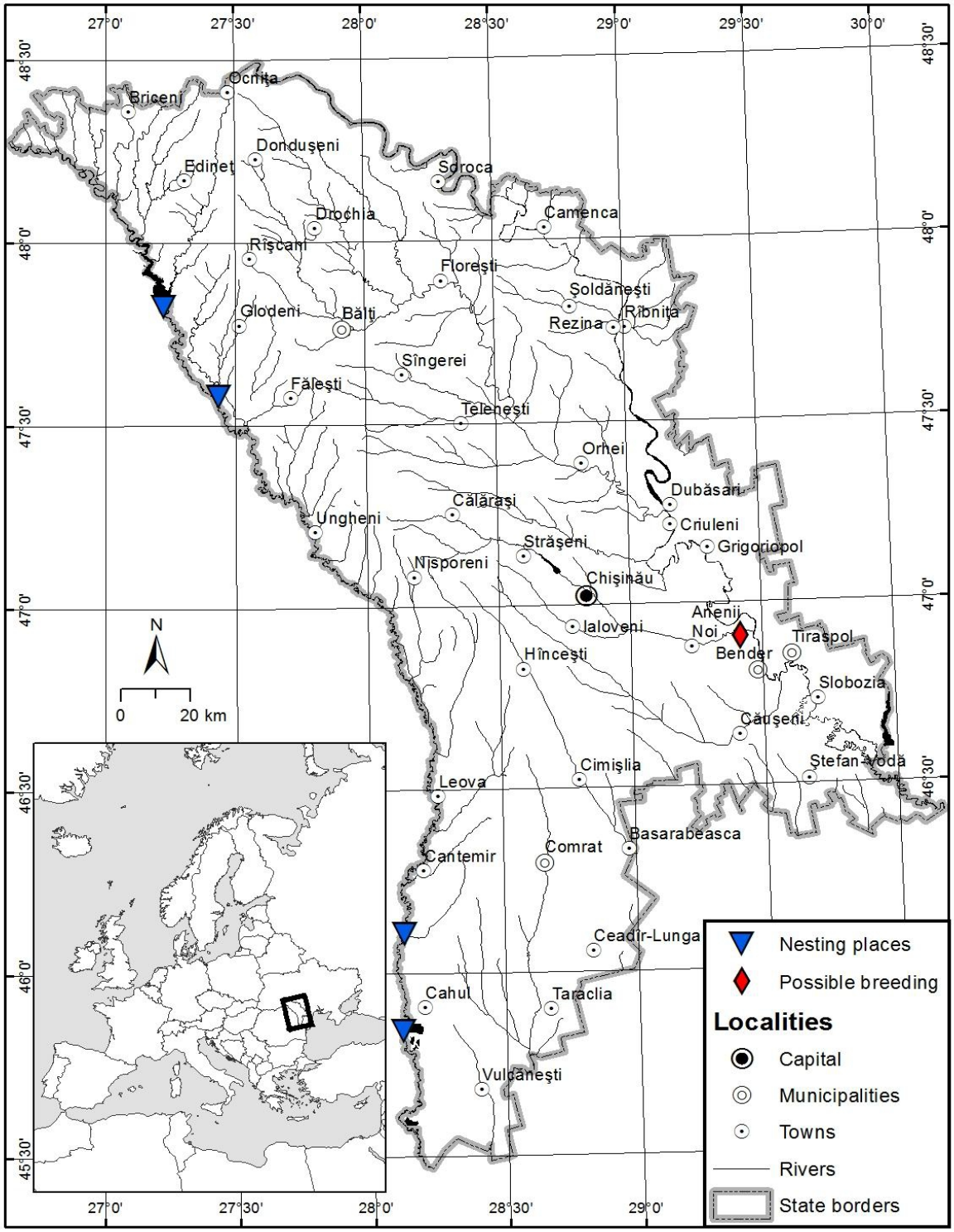
The second nest is located in a National Scientific Protected Area (Pădurea Domnească forest). This is the only nest which is in a protected area. The land use structure is represented mainly by forest, arable land and pasture and herbaceous vegetation (Table 1). For this nest, wetlands and water surfaces have a low representation of only 4.2 % and is represented mainly by oxbow lakes.

The third nest is located close to Cîrja - Maţa - Rădeanu Romanian fish farms. The land use structure is represented mainly by arable land, wetlands and water surfaces, pasture and herbaceous vegetation and forest (Table 1).

The fourth nest is located near Manta fish farm and Manta Lake. The land use structure is represented mainly by arable land, wetlands and water surfaces, pasture and herbaceous vegetation and forest (Table 1).

Table 1. The land use composition near the White-tailed Eagle nest, with a buffer area of 5 km from the nest location. The values are in percentages.

land use name	Stânca-Costeşti nest	Domnească Forest nest	Cîrja - Maţa - Rădeanu nest	Manta nest
wetlands and water surfaces	17.15	4.20	17.80	28.32
localities and industrial areas	8.23	9.07	2.58	2.23
arable land	37.89	35.13	57.38	34.18
pasture and herbaceous vegetation	14.65	12.18	10.79	21.32
forests	13.72	37.12	7.77	9.94
fruit tree plantations	0.76	0.47	0.40	2.11
vineyards	0.94	1.50	3.29	1.89
other land use	6.67	0.32	0.00	0.00



surveys. Data was processed in Quantum GIS, v.2.0.1.

Figure 1. The distribution of the White-tailed Eagle in the Republic of Moldova recorded during the 2012 - 2013

Comparing the land use structure between the nests we cannot find a statistical significant difference (F_r = 0.80, p = 0.85). An optimal habitat for the White-tailed Eagle population should have a high percent of water surface (Krone et al. 2013), though nests can be found at a distance up to 10 km from the hunting territory (Glutz at al. 1971). For these nests, water is an important habitat but the surface is not the key element. Considering that

White-tailed Eagle inhabits river valleys, this land use structure is normal for our country and the lakes and fish farms are rich in fish stock.

All four nests are in the border protected area where access requires special permission, fact which keep the human disturbance at a very low level. This area is strictly monitored because it is the border with the European Union and the river banks are very sparsely populated because this is where the western border of the U.S.S.R. was.

The minimum distance between two nests was 29.4 km and the greatest distance was 172 km. This distance is quite large, but it could be explained by the habitat availability. Being a raptor with a large percent of its diet being represented by fish, the White-tailed Eagle will select those areas with water surfaces and especially with fish farms which are rich in fish stock.

Comparing the two main river valleys from the Republic of Moldova, there are big differences regarding the land use and human density (Table 2). Near the Dniester River there are larger surfaces with artificial habitats (76.49 %) than the Prut River (67.6 %). Also, the number of inhabitants is much higher near the Dniester River (767245, 2004) than Prut River (213800, 2004). Another important difference, is the access to forests and near the river, the Dniester being only a short distance away from the border with Ukraine. Because of this, the Dniester has a higher disturbance level, with many localities on the river bank. However, an adult bird was observed near Sălaş fish farm, close to the Dniester River. This individual behaved as a breeding one but we could not find the nest.

Table 2. The land use on Prut River valley and Dniester River valley with a buffer of 5 km from the river.

land use name	Prut River (%)	Dniester River (%)
wetlands and water surfaces	5.3	4.16
localities and industrial areas	9.96	13.12
arable land	51.30	54.94
pasture and herbaceous vegetation	14.55	7.20
forests	11.04	11.40
fruit tree plantations	1.71	5.23
vineyards	4.63	3.20
other land use	1.51	0.75

Four pairs of White-tailed Eagle for the Republic of Moldova is a small population but if we consider the absence of breeding evidence for more than 40 years, this data is highly important for the bird population. Also, the new breeding pairs of the White-tailed Eagle is an indicator for habitat recovering on the Prut River. The White-tailed Eagle population decreased in all the species range during the second half of the 20th century (Tucker and Heath 1994). In Romania, the neighbouring country, the White-tailed Eagle population decreased from 92 pairs in 1986 until 15 - 18 pairs in 2000 (Cramp and Simmons 1980). But in the last years the White-tailed Eagle population from Romania started to increase. In Ukraine the White-tailed Eagle breeding population started to increase after 1970 when there were only 20 -30 pairs (Brauner 1984) until 1991 when there were recorded 41 - 45 pairs and in 2009 were recorded 100 - 120 pairs (Akimov 2009).

For the next years we will select other 2 X 2 km squares to be investigated in order to have complete data on this species. Being a large bird of prey, its population status could represent a very important indicator for ecosystem stability and function.

Conclusion

During 2012 - 2013 we investigated 10 squares of 2 x 2 km in order to identify the White-tailed Eagle breeding pairs or characteristic habitats. After this surveys 4 breeding pairs came up and another one which is recorded as possible breeding. This is the first data on species breeding after 40 years.

All 4 breeding pairs of the White-tailed Eagle are located near Prut River in the border protected area. There is no difference between the land use structures around the nests. The

nests are close to water bodies, habitats suited for its feeding habits.
Prut River is sparsely populated and the natural habitats from this area are protected by the border territory which require a special permission for access. This important factors may lead the nesting of White-tailed Eagle in the flood plain forests from this area.

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