

Contribution to the Knowledge on Distribution, Number and Habitat Preferences of Rare and Endangered Birds in Western Rhodopes Mts, Southern Bulgaria. Strigiformes and Piciformes

Peter Shurulinkov¹, Georgi Stoyanov², Emil Komitov³, Girgina Daskalova⁴, Andrey Ralev⁵

¹ National Museum of Natural History – Sofia, Bulgarian Academy of Sciences, 1000, Sofia, 1 Tsar Osvoboditel Blvd., Bulgaria; E-mail: p.shurulinkov@gmail.com

² Centre for Conservation and Support of the Wild Fauna Durrell, 23 Golyam Bratan Str, fl. 2, ap. 2, Sofia 1618, Bulgaria; E-mail: georgips@abv.bg

³ Regional Directorate of Forestry – Smolyan, 4700 Smolyan, 2 Purvi may str., Bulgaria; E-mail: ekomitov@abv.bg

⁴ Bulgarian Society for Protection of Birds, 8800, Sliven, 9 H. Dimitar str., Bulgaria; E-mail: girginand@gmail.com

⁵ Balkani Wildlife Society, Sofia, 67A T. Tserkovski str., Bulgaria; E-mail: aralev@balkani.org

Abstract: The article presents actual data on the status, distribution and habitats of some endangered species of owls and woodpeckers in the western part of Mt. Rhodopes, South Bulgaria. Both groups of birds were detected and attracted using imitations of their calls.

A total of 30 territories of Tengmalm's Owl (*Aegolius funereus*) and 37 territories of Pigmy Owl (*Glauucidium passerinum*) were found. Tengmalm's Owl was found in coniferous forests between 1202 and 1800 m a. s. l. Out of 25 localities with described habitat 13 were in mixed Spruce-Beech-Scots Pine forest. Pigmy Owl was found in coniferous and mixed forests between 1412 m and 1930 m, predominantly Spruce (58%) and Spruce-Scots Pine (28%). The population density of Pigmy Owl in optimal habitats in W Rhodopes was calculated to be 2.18 occupied territories/1000 ha.

Three-toed Woodpecker (*Picoides tridactylus*) was registered in 16 localities, all of them in predominantly Spruce forests, at altitudes between 1570 and 2100 m. The percent of dry trees in the species habitat was not less than 2% of the stand, usually between 4 and 40%, including many 'bark beetle' spots-groups of dry trees, attacked massively by bark beetles. The total population density of Three-toed Woodpecker in W Rhodopes was calculated to be 1.5 pairs/1000 ha of prime habitat, but it could reach locally up to 10.6 pairs/1000 ha ('Mantaritsa' reserve) and 8.2 pairs/1000 ha (Syutkia massif).

White-backed Woodpecker (*Dendrocopos leucotos lilfordi*) was registered in 19 localities. The total population density of the species was 3.4 pairs/1000 ha. It varied from 2.6 pairs/1000 ha at border parts of Zhulti dyal and Gorna Arda to 4.0 pairs/1000 ha for northern slopes of Batashka Mt. The species was detected mainly in Beech forests, aged 80-140 years, with many dying and dry trees and holes, between 1030 and 1579 m.

Grey-headed Woodpecker (*Picus canus*) and Black Woodpecker (*Dryocopus martius*) were widely distributed in various habitats in all studied parts of W Rhodopes.

Key words. forest owls, woodpeckers, Western Rhodopes, distribution, habitat, population density

Introduction

Bird fauna of Western Rhodopes Mts. has been object of a number of ornithological studies but nevertheless it is still insufficiently known. Especially the data on woodpeckers and owls are fragmentary and could not be a basis of any conclusions about their distribution, habitats, population density and number. The most

complete study of the birds in Bulgarian part of the massif was presented by PETROV *et al.* (2006). Data on the avifauna of concrete territories in frames of the massif was published for Dobrostan, Beglika nature reserve, Pamporovo resort, Trigrad-Yagodina region, Spruce forests in Chernatitsa and Bukova Mt. (DARAKCHIEV 1969; DONCHEV 1982; NANKINOV 1982, 1987A, 1993). Data on owls and woodpeckers are scarce. Evidence of the presence of Tengmalm's Owl in the Rhodopes are given by BOETTICHER (1927), NANKINOV (1982), NIKOLOV *et al.* (2001) and SHURULINKOV, STOYANOV (2006) but its distribution, number and habitat preferences there are not specified yet. Pigmy Owl was found in Bulgarian part of the massif by SHURULINKOV, STOYANOV (2006) and in Greek part by BAUER, BOHR (1987). Its population density and distribution was studied by SHURULINKOV *et al.* (2007), but since that article much more new data on this species was added. Three-toed Woodpecker was known from few localities in the Rhodopes, most of them reported in the first half of XX century (SPIRIDONOV 1985a). There is no concrete published data about the actual localities and population density of this species in Mt. Rhodopes. The other woodpeckers of conservation concern are either not sufficiently studied as regards to their distribution and habitat preferences.

The aim of the present study is to investigate the actual distribution, number and habitat of the owls and woodpeckers of conservation importance in Western Rhodopes Mts.

Material and Methods

Owls. Owls were provoked by imitation of their advertising call. The points for imitation were at a distance of not less than 750 m from the previous detected locality. Imitation sessions lasted at least 5 min for Pigmy Owl and 15 min for Tengmalm's Owl. A total of 12 Pigmy Owls transects (4.0-13.9 km long) were conducted both during the day and evening, covering approximately 9300 ha of appropriate habitat. Daytime transects for Pigmy Owl have shown good results for detecting the species (SHURULINKOV *et al.* 2007). Tengmalm's Owls were detected only at dusk, at dawn and during the night (but before 23.00 h) from selected imitation points, usually on the top of forested valleys.

The owl search was conducted in spring – April-May and in autumn – September-October.

All transects were made during favourable weather conditions – clear sky, calm and air temperature higher than 0 °C.

Woodpeckers

All transects for woodpeckers were combined with stop points for imitation of their calls and drilling. The stop points were at approximately 500-600 m from each other depending on the existing habitat along the route. The imitation session lasted no more than 5 min from each stop point. Imitation was produced by mp3 player. Calculations of the population density were made using a presumption that on each transect we had ability to detect the presence of the species in a stripe of 250 m from both sides of the route. In summer and autumn of 2006 a total of 8 transects were completed in habitats favourable for White-backed Woodpeckers. The transects had a total length of 59.3 km with 144 stop points for imitation. During the same year also 16 transects in predominantly Spruce and Spruce-Scots Pine forests – typical habitats for Three-toed Woodpecker were conducted, covering 119.1 km, with 319 imitation stop points. In May and September 2010 we conducted two more transects for Three-toed Woodpeckers in suitable habitats in Syutkia massif of W Rhodopes. Those transects had a total length of 14.7 km and included a total of 36 stop points for imitation.

Study area

The borders of the study area covered the territory of Bulgarian Western Rhodopes, including the whole Smolyan district and parts of Pazardzhik, Blagoevgrad and Plovdiv districts. In our study were also included some areas along the border with Greece which geographically belong to Eastern Rhodopes – as Gyumyurdzhinski Snezhnik massif. Out of the borders of the present study remained Besaparski ridges and the northern and western foothills of Mt. Rhodopes below 800 m.

The study area was divided into 9 major territorial units:

- 1) Batashka Mt. and Beglika (including Bozhenets and Snezhanka);
- 2) Dubrash-Dospat;
- 3) Devinska Mt.;
- 4) Trigrad-Yagodina;
- 5) Perelik-Mursalitsa (including also Gerzovitsa ridge);
- 6) Chernatitsa;
- 7) Dobrostan-Radyuva Mt.;
- 8) Prespa;
- 9) Zhulti dyal and Gorna Arda (including Gyumyurdzhinski Snezhnik).

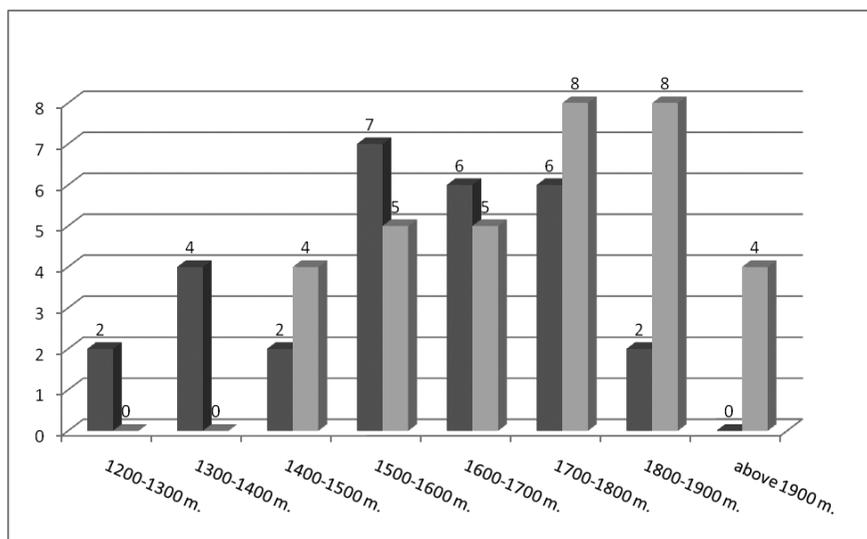


Fig. 1. Altitudinal distribution of the localities of Tengmalm's Owl (*Aegolius funereus*) (n=29) – dark grey bars and Pigmy Owl (*Glaucidium passerinum*) (n=34) – light grey bars, in W Rhodopes Mts.

Results and Discussion

Tengmalm's Owl (*Aegolius funereus* L., 1758)

Widely distributed but not numerous breeding species confined to the coniferous forest belt of the studied area. We recorded a total of 30 localities of the species in all studied units. In this number we included four localities already reported (NIKOLOV *et al.* 2001; SHURULINKOV, STOYANOV 2006). A total of 35 Tengmalm's Owls were registered. The distribution and number by regions are as follows (Fig. 2):

Batashka Mt. and Beglika. The species is quite common in many parts of that unit. Particularly this is true for the area to the south and southwest of the peak Malka Syutkya, where four localities of Tengmalm's Owls were found in September 2010. One bird was heard (smacking calls) on 21.09.2010 after 22.00 h to the east of 'Balinov chark'. The bird was imitated 15 min using mp3 player about 20.00-20.15 h but it did not respond. It started vocalization about 2 h afterwards. The locality is covered by Spruce forest, at 1593 m a. s. l. Two birds were attracted almost immediately after the beginning of our imitation session in 'Kazarmite' locality and produced many smacking calls in the evening on 22.09.2010. The birds were heard from a large mountain meadow on the edge of old, well preserved Spruce-Scots Pine forest, at 1776 m. In the evening of 23.09.2010 two more localities were added – one to the north of 'Gargaluka' area and another to the south of 'Krustovete' area. In both cases single

individuals were heard. The forests in those two localities were Spruce and Spruce-Scots Pine.

Two birds were heard on the eastern borders of 'Beglika' Nature Reserve (to the east of Malka Syutkia) on 11.10.2005 (SHURULINKOV, STOYANOV 2006).

Tengmalm's Owls live also in the southern parts of the unit – around Shiroka polyana dam. To the north of its shores one singing male was heard on 30.04.2006 in old Spruce forest. Another male was performing its mating song in the evening of 23.04.2009 at 1.3 km west of the lake. Third male was found singing on 15.05.2009 to the south of 'Sluncheva polyana' Protected Area, situated on the southern shore of the lake. These localities lie at an altitude of 1540 m. The species was heard in the autumn of 1998 also at 2 km to the north of Toshkov chark Reservoir (NIKOLOV *et al.* 2001).

In the north of the unit the species was found in Batashki Sneznik massif, in 'Borovo' State Game Station, to the northwest of peak Momin kladenets. There we heard smacking calls of one Tengmalm's Owl on 21.10.2010 in Spruce-Scots Pine forest at 1600 m.. Another locality was registered in the NW part of the unit at Samovoditsa hut, Bozhenets ridge, where one male was heard singing on 7. 05. 2007 from Beech-Spruce-Scots Pine forest at 1300 m. PETROV *et al.* (2006) found the species in 'Kupena' Nature Reserve. A total of 10 localities were found in that unit. As we have studied for the presence of Tengmalm's Owl approximately 20% of

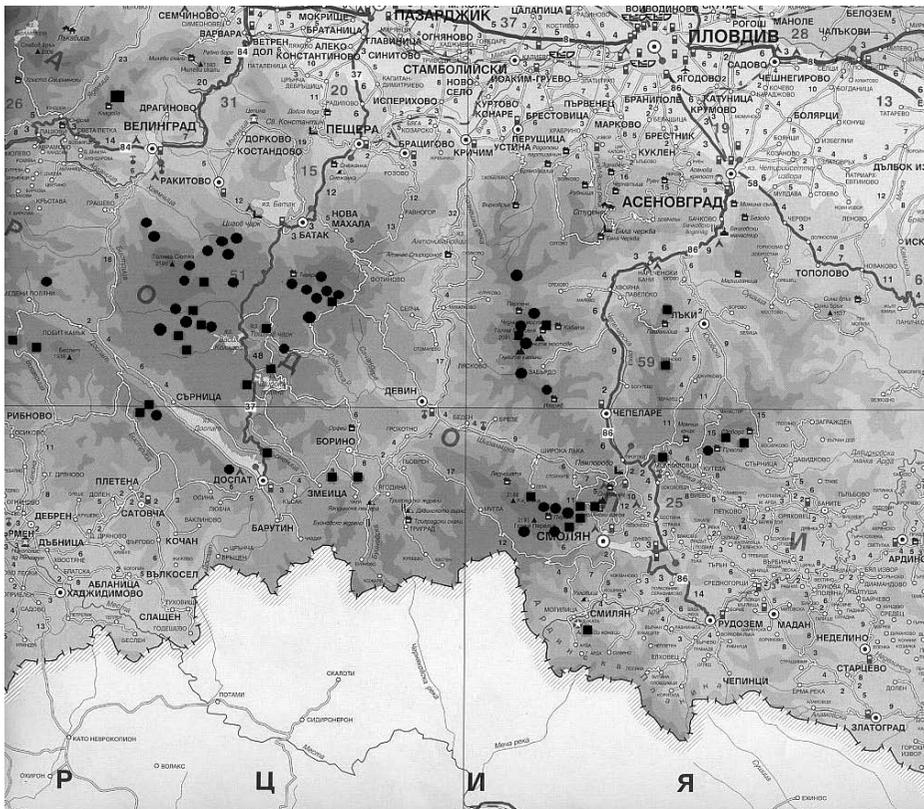


Fig. 2. Map of the distribution of Tengmalm's Owl (*Aegolius funereus*) (black squares) and Pigmy Owl (*Glaucidium passerinum*) (dark grey circles) in Mt. Rhodopes.

the territories covered by appropriate habitats of the species in frames of the unit we can suppose that the number of occupied territories of the species here should be about 55-60.

Dubrash-Dospat. In this territorial unit only small areas have been studied for the presence of the species (less than 15% of the existing appropriate habitats). Three males performing advertising calls were heard in close to Sveti Petar peak, to the southwest of Rancha on 1. 05. 2006. The forest is very old, Spruce and Scots Pine, at an altitude of 1644 m. Two localities (single birds) were heard after imitation between Kovachevitsa and 'Beslet' area on 3 and 4. 10. 2003. Again at 'Beslet' area one male was heard on 25.04.2007 in Scots Pine-Spruce forest. It is early to precise estimation of the number of the species in this unit but taking in account the surface of the existing very good habitats it could be expected to be between 30 and 50 occupied territories.

Devinska Mt. Advertising calls of one male Tengmalm's Owl were heard in the westernmost part of the unit, close to the eastern shores of Dospat dam, on 23.04.2009. The forest was Spruce-Scots Pine, at 1503 m, on south-western slope.

The species has been reported from 'Kastrakli' Reserve, where a young bird was observed in May, 1974 (NANKINOV 1982). We expect that 5 to 8 pairs of Tengmalm's Owl live in Devinska Mt.

Trigrad-Yagodina. One male was singing on 24.04.2009 to the south of the road between Dospat and Borino, in the area between Zmeitsa and the valley of river Magareshki dol. The locality lies in Spruce forest at north exposure at 1305 m. Another male was heard singing on 26.04.2009 between Borino and Chala village, close to Dyavolski most. The bird was singing from Spruce-Scots Pine forest, at 1200 m, which is the lowest location of the species in the Western Rhodopes found by us. It is early for proper estimation of the number of Tengmalm's Owl's territories in that unit but it could be in the frames of 10-30 pairs as far as the forest habitats along Bulgarian-Greek border are well-preserved yet and very suitable for the species.

Perelik-Mursalitsa. Three singing males were heard between Prevala and Perelik hut in the late evening of 16.04.2006. Two of the localities were recorded in old Spruce forests at 1638 and 1690 m respectively. The third was in Scots Pine-Spruce

forest at higher altitude of 1760 m. In the same area two birds were heard singing also in April, 2009 (SVETOSLAV VELKOV – pers. comm.). On 27.10.2007 one Tengmalm's Owl attacked the observer after imitation of Pigmy Owl's mating song to the east of Lednitsata hut (KRASSIMIR HRISTOV – pers. comm.). One bird was heard in the NE parts of Perelik also on 9. 10. 2009. From the southern slopes of Perelik massif the species was reported for the upper valley of Elenska River, where it was heard in autumn of 2008 (SPIRIDONOV *et al.* 2008). We can estimate that at least 20-25 pairs of Tengmalm's Owls live in Perelik-Mursalitsa unit. Considerable parts of SW Perelik and NW Mursalitsa, as well as Gerzovitza area covered by prime habitats for Tengmalm's Owl are still unexplored for the presence of that species.

Chernatitsa. One male was heard singing on 24.04.1999 to the south-east of Golyam Persenk peak, at 1850 m (NIKOLOV *et al.* 2001). Two males were heard singing close to Skalni mostove hut, in April, 2007. KOSTADINOVA, GRAMATIKOV (2007) supposed breeding of 15-20 pairs of Tengmalm's Owls in this unit of W Rhodopes on the basis of data given by the respondent Kostadin Vulchev.

Dobrostan-Radyuva Mt. One male was heard singing for a short about midday after imitation of Pigmy owl call on 4.03.2007 between Yugovo and Pashaliitsa hut. The locality lies in Scots Pine forest with some Spruce, on 1480 m. Also singing male was registered on 16.04.2007 above Dryanovo village, in Spruce forest at 1500 m. We suppose that at least 7-11 breeding pairs live in that unit.

Prespa. We heard 'smacking call' of one bird close to Angelova Kaba hut on 3.10.2007. The forest was old, Spruce, at 1644 m. One bird was heard by us also in autumn of 2000 in the area between Prespa hut and summit Prespa (NIKOLOV *et al.* 2001). In the western part of the unit the species was found above Momchilovtsi, where one male was heard to sing on 14.04.2007. We suppose that between 8 and 12 pairs live in Prespa massif.

Zhulti dyal and Gorna Arda. Only one locality was found in that territorial unit – above Smilyan village, where one individual was heard on 2.11.2003 in Spruce-Scots Pine forest at 1200 m.

Overall for the whole studied area we can estimate a population of 150-215 pairs of Tengmalm's Owls on the basis of the estimations made separately for each territorial unit. According to PETROV *et*

al. (2006) only 8-11 pairs nest in the mountain (together with Greek parts) which is considerably underestimated population number. KOSTADINOVA, GRAMATIKOV (2007) give a total number of 42-67 pairs for Tengmalm's Owl in the four IBA's in W Rhodopes together. For sure the number estimated for IBA 'Western Rhodopes' – 25 to 35 pairs are underestimated.

Habitat of Tengmalm's Owl in W Rhodopes was divided mainly between two close coniferous forest types – Spruce and Scots Pine-Spruce (in different combinations). Out of 25 localities, 13 were in Scots Pine-Spruce forests (52%) and 11 were in pure Spruce forests (44.0%). Only one locality (Samovoditsa) was in mixed Spruce-Beech-Scots Pine forest. The species was found in Kupena Reserve in mixed Beech-Austrian Pine-Spruce forest (PETROV *et al.* 2006). The species was found only in mature and old forests (normally >80 years old), rich in dry and dying trees.

Many localities lie close to wet mountain meadows (pastures), predominantly on northern slopes. The species was often observed to fly over such meadows during moon nights. The altitudes of the localities varied between 1200 and 1800 m, on average 1561 m (n=29) (Fig.1).

Pigmy Owl (*Glaucidium passerinum* L., 1758)

The distribution and population density of that species in W Rhodopes was described in an earlier work, including a total of 19 localities (SHURULINKOV *et al.* 2007). Here we present all new data gathered after 2007 and we make general conclusions about the presence of the species by territorial units and about its habitat preferences. The species is resident for the coniferous zone of W Rhodopes distributed widely in five of the territorial units – Batashka Mt. and Beglika, Dubrash-Dospat, Perelik-Mursalitsa, Chernatitsa and Prespa (Fig. 2). The total number of the occupied territories found (including data from SHURULINKOV *et al.* 2007) is 37. Out of these, 12 were recorded during the spring period and 25 – during autumn. The distribution and number by regions were as follows:

Batashka Mt. and Beglika. The significant part of the recordings of the species were made in this unit, especially in Batashka Mt. and Syutkia, on the territory of State Forest Enterprises Rakitovo, Batak, Borovo and Beglika. A total of 7 localities were found

in autumn of 2006 in 'Mantaritsa' Nature Reserve and Batashki Snezhnik Protected Area and one male was heard in spring of 2007 to the east of Toshkov chark dam (SHURULINKOV *et al.* 2007). We proved the presence of the species also on the massif of Syutkia, on the slopes of Golyama Syutkia and Malka Syutkia peaks, out of protected territories. Two singing males were heard to the northwest of Golyama Syutkia peak 28.10.2009 evening in old Spruce-Beech -Fir forest. On the eastern slopes of the peak we detected another singing male during midday of 24.04.2010, in Spruce-Scots Pine forest, at 1900 m. To the south of this place, at Muhov peak we heard also Pigmy Owl male during daytime in Spruce forest with many dry and dying trees, at 1705 m. Close to the owl territory there was a small clear cutting of about 6 ha. Around Malka Syutkia we recorded Pigmy Owls at two places – in Kazarmite area – on 22.09.2010 evening and between Kazarmite and Chernovruh settlement on 23.09.2010, during daytime, in pure Scots Pine forest, at 1580 m. The forest was not more than 60 years but close to Spruce forest of similar age.

We also found Pigmy Owl close to the northwestern shores of Golyam Beglik dam, singing on 21.09.010 evening from Spruce forest (1570 m).

In 'Borovo' Game Station we detected further four Pigmy Owl territories in October, 2010, all of them in old Spruce-Scots Pine and Spruce forests. Two of them were close to the east of Gashnia River flow, between the peaks Momin kladenets and Lup, one was in the area 'Golyamata surpa', close to a road and one was to the east of Lup peak. Three of these records were made during daytime.

In the westernmost parts of the unit Pigmy Owl was found close to the east from Medeni polyani village (SHURULINKOV *et al.* 2007).

In Batashka Mt and Beglika territorial unit we found a total of 20 territories occupied by Pigmy Owls since our first finding of the species here in Gazinchevtsi site in October, 2005 (SHURULINKOV, STOYANOV 2006). The species was reported for Beglika area also by SPIRIDONOV *et al.* (2011, in press). We can estimate that the total number of the Pigmy Owls in this unit should be in frames of 60-70 pairs.

Dubrash-Dospat. Only two localities of Pigmy Owls were recorded. One male was singing in early afternoon of 25.04.2009 in old Spruce-Scots Pine forest to the west of the southern part of Dospat dam. Another locality was reported from Sveti Petar peak

area, on 1.05.2006 (SHURULINKOV *et al.* 2007).

Two are the possible reasons for the scarcity of data on Pigmy Owl from Dubrash area. First it is one of the less studied units. Another reason could be the composition of forest types in that unit with prevailing Scots Pine compared to predominantly Spruce forests of Batashka Mt-Beglika, Chernatitsa, Perelik and Prespa.

It is not possible yet to make more or less acceptable estimation of the number of Pigmy Owls in this large unit, but we believe that the number should be much lower compared to the neighbouring Batashka Mt-Beglika unit, dominated by Spruce forests.

Perelik-Mursalitsa. A total of five localities were found both on the northern and southern slopes of Perelik massif. Three of them were found in daytime on 10.04.2010 along the Panorama road on the northern slopes of Perelik – all of them in mature Spruce forest. One male was heard singing in the evening of 9.04.2010 close to the northern borders of 'Soskovcheto' Nature Reserve in very old Spruce forest. Close to this place, in the upper stream of Elenska River, the species was found in 2008 (SPIRIDONOV *et al.* 2008). The only locality in southwestern parts of Perelik massif was found on 22.09.2006 at Musayata peak (SHURULINKOV *et al.* 2007). The total number of Pigmy Owls in Perelik-Mursalitsa could be expected to be between 15 and 20 pairs.

Chernatitsa. Pigmy Owl was found in seven localities in October, 2006, all of them along the central highest ridge of the unit. For further details – see SHURULINKOV *et al.* 2007. On the ancient roman road at Persenk the species was heard also on 1.05.2006 (K. VULCHEV – pers.comm.). All localities here lie in old Spruce forests, except Modur peak where the species was found in mixed Spruce-Scots Pine forest.

In the southernmost parts of the unit the Pigmy Owl was reported for Pamporovo resort area (PACENOVSKY, SHURULINKOV 2006). We estimate that about 25 to 30 pairs of Pigmy Owls could live in Chernatitsa unit.

Prespa. Only one locality was found in old Spruce forests to the west of Prespa hut. In that area Pigmy Owls were heard at least three times in autumn 2005 and spring 2006 (SHURULINKOV *et al.* 2007) and again on 4.10.2007.

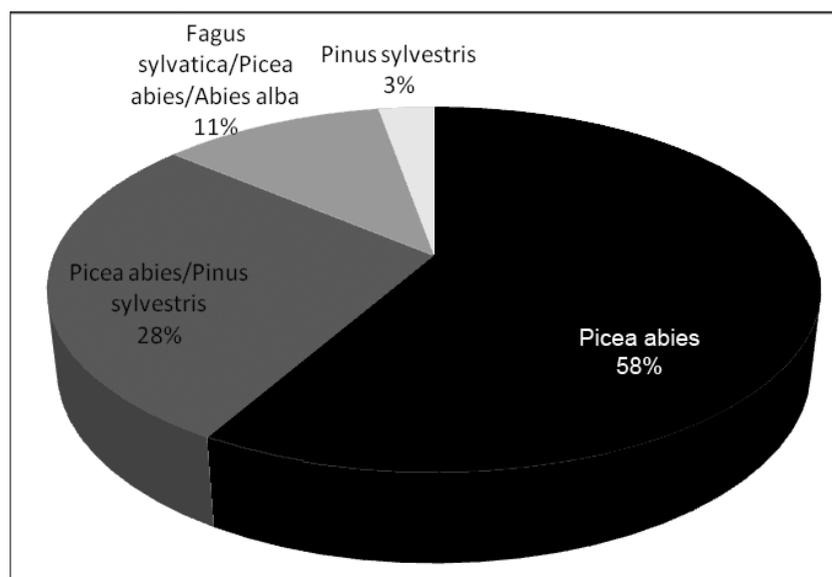


Fig. 3. Forest habitats preferred by the Pigmy Owl (*Glaucidium passerinum*) in W Rhodopes (n=37).

Habitat preferences of Pigmy Owl in W Rhodopes are shown in Fig. 3. The species prefers old Spruce and Spruce-Scots Pine forests and much more rarely – mixed ones. In one occasion it was detected in pure Scots Pine forest, although in vicinity of Spruce forest. The altitudes of the localities varied between 1412 m and 1930 m, on average 1712 m (n=34) (Fig. 1). This average value showed that in the Rhodopes Pigmy Owl prefers significantly higher altitudes compared to Tengmalm's Owl (average altitude 1561 m). Pigmy Owl shows much more tolerance to the level of forestry activities compared to Tengmalm's Owl. It was found in few cases in much younger forests, between 50 and 80 years. Additionally, in part of the localities the forest have been a subject of cuttings with intensity of up to 10% during the last ten years but not during the last two. These facts allowed the survival of the species in larger unprotected forests where sustainable forestry was practised.

The population density of the species in optimal habitats in W Rhodopes was calculated to be 2.18 occupied territories/1000 ha (SHURULINKOV *et al.* 2007). In Mt. Rila (W Bulgaria) the density is 3.9 territories/1000 ha and in West Slovakian Carpathians – 9.5 -10.4 territories/1000 ha (PACENOVSKY, SHURULINKOV 2008). Our new data gave further support for the estimation of species number at 150-170 territories for Bulgarian parts of W Rhodopes (SHURULINKOV *et al.* 2007).

Three-toed Woodpecker (*Picoides tridactylus alpinus* BREHM, 1831)

Very rare species, threatened with extinction in W Rhodopes. Solitary pairs are dispersed almost entirely in protected territories where logging is prohibited or on inaccessible slopes close to some forested highest peaks. Only in NW parts of the Rhodopes much higher number of localities were recorded (Fig. 6). A total of 16 localities were found, 10 of them during the transect search (Table 1). All localities were in old Spruce forests (80-120 years), in four cases with low to moderate presence of Scots Pine (5-40%). In all localities the percent of the dry trees was not less than 2% of the stand, usually 4-40%, including many groups of dry trees, attacked massively by bark beetles. Localities lied at altitudes varying between 1570 and 2100 m, on average 1833 m (n=13).

Other our records included: southern part of 'Mantaritsa' Reserve -12.08.1996 -1 female and a pair in old Spruce forest; two localities in Prespa Massif – below Prespa hut, in Spruce forest at 1750 m, 1.04.2000, and in 'Sedlovinata' area between Prespa hut and Prespa peak – in Spruce forest at 1800 m. In both cases single birds were seen; 'Bukovi luki' area, in Perelik massif – 11.05. 2004 – 1 ind.; Persenk peak – in Spruce forest, at 2050-2100 m (K. VULCHEV – pers. comm.); above Shiroka polyana dam, the area 'Partizanski lager' – 1 ind. on 15.05.2009 in old Spruce forest with many fallen and dry trees, without forestry activities, at 1600 m.

The localities of Three-toed Woodpecker were spread among the following territorial units: in

Table 1. Results of transect search for Three-toed Woodpeckers in W Rhodopes.

Transect	Territorial unit	Date	Length	Number of stop points	Habitat (type of forest, age, years)	Number of birds	Weather
Shiroka polyana damlake – Dzenevra –Pchelaritsa	Batashka Mt-Beglika	29. 04. 2006	9.3 km	30	Spruce, Scots Pine 60-110	0	Sunny, Calm
Shiroka polyana dam – Malka Dhzenevra – ‘Dupkata’ Reserve	Batashka Mt-Beglika	30. 04. 2006	10 km	30	Spruce, Scots Pine 60-110	0	Sunny, calm
Rancha – Sveti Petar peak – Chukurska River	Dubrash-Dospat	1. 05. 2006	5.4 km	15	Spruce, 80-150	0	Sunny, calm
Perelik hut – ‘Soskovcheto’ Reserve – Sredoka	Perelik-Mursalitsa	19. 07. 2006	6.6 km	20	Spruce, Scots Pine, 80-150	1 m	Sunny, calm
Komita- Battluboz-Golyam Beglik dam- ‘Chatuma’[Batashka Mt-Beglika	21. 07. 2006	5.5 km.	15	Spruce, Scots Pine, 60-100	1 f	Sunny, calm
‘Konski dol’ Reserve – Groba – ‘Tumnata gora’ reserve	Dubrash-Dospat	22. 07. 2006	6.7 km.	20	Spruce, 80-140 Beech-Fir,100-150	0	Sunny, calm
Chavdaritsa – Malinov peak – Isekya	Trigrad –Yagodina	23. 07. 2006	8.0 km	25	Spruce, Scots Pine, 70-120	0	Sunny, calm
Mugla – Kedika peak	Trigrad-Yagodina	21. 09. 2006	5.4 km	7	Spruce, Spruce-Scots Pine 70-90	0	Sunny, calm
Cherna river springs-Musayata peak –Golyama river – Mugla	Perelik-Mursalitsa	22. 09. 2006	4.0 km	10	Spruce, 80-120	0	Sunny, calm
Kosharite – Sredni peak – upper stream of Muglenska River	Trigrad-Yagodina	23. 09. 2006	6.9 km	20	Spruce, 80-120	0	Sunny, calm
Pashino burdo-Reserve ‘Mantaritsa’ reserve – Batak dam	Batashka Mt-Beglika	25-26. 09. 2006	7.8 km	30	Spruce, Spruce-Scots Pine Beech-Fir , 100-150	2 (2 territories)	Sunny, calm
Teheran area – Batashki Snezhnik peak- eastern border of ‘Batashki Snezhnik’ protected area	Batashka Mt-Beglika	14-16. 10. 2006	8.6 km	30	Spruce, Spruce-Beech and Beech-Fir	0	Sunny, calm
Shiroka luka – Kukuvitisa – Izgrev hut	Chernatitsa	19. 10. 2006	7.3 km	7	Spruce, 50-80, many cuttings	0	Sunny, calm
Sveti Spas (over Zornitsa) – Izgrev hut-Chernogor – Sveti Iliia	Chernatitsa	20. 10. 2006	6.3 km	20	Spruce, Spruce-Scots Pine, 50-80	0	Sunny, calm
Hut Izgrev- – Persenk Hut	Chernatitsa	21. 10. 2006	13.9 km.	30	Spruce, 80-130	0	Partly cloudy, Light rain

Table 1. Continued.

Transect	Territorial unit	Date	Length	Number of stop points	Habitat (type of forest, age, years)	Number of birds	Weather
Hut Persenk – .Modur peak – Orehovo	Chernatitsa	22. 10. 2006	7.4 km	10	Spruce, Spruce-Scots Pine and Scots Pine, 60-130	0	Sunny, calm
Golyama Sytkia peak area	Batashka Mt. Beglika	7. 05. 2010	8.7 km	26	Spruce, 80-120 many dry trees	5 ad. (3 territories)	Partly cloudy, light rain shortly
Malka Syutkia peak area	Batashka Mt-Beglika	22.09. 2010	6.0 km	10	Spruce, 80-120, many dry trees	6 (5 ad, 1 juvenile, 3 territories)	Sunny, calm
			133.8 km	355		10 territories	

Batashka Mt./Beglika – 11, in Perelik-Mursalitsa – 2, in Prespa-2 and in Chernatitsa – 1.

Population density of Three-toed Woodpecker was calculated for 'Mantaritsa' Reserve- 10.6 pairs/1000 ha of prime habitat, and for Syutkia massif – 8.2 pairs/1000 ha (combined for Golyama Syutkia and Malka Syutkia). But these high densities occur only in small territories of unused old forests – protected territories or around forested highest peaks where many dry trees could be found. The total density for all completed transects was 1.5 pairs/1000 ha of prime habitat of the species. For comparison the population densities obtained in other populations of Three-toed Woodpecker are as follows: in Quebec, Canada – 10 pairs/1000 ha; (IMBEAU, DESROCHERS 2002), in Germany – 9-10 pairs/1000 ha (PEHACHEK, OLEIRE- OLTMANS 2004), in Austria- 4.0 pairs/1000 ha (CRAMP 1985) and in Finland – 0.2 to 6.9 pairs/1000 ha. (PAKKALA *et al.* 2002). It should be noted that in W Rhodopes the species is absent in many suitable forests supplying optimal habitat and especially in all visited managed natural forests of any age. Thus it is very hard to predict the species breeding number but we can suppose that about 45-65 pairs of Three-toed Woodpeckers are left in W Rhodopes. In this number are included 25-30 pairs in Batashka Mt – Beglika area, 9-12 pairs in Perelik –Mursalitsa, 4-6 pairs in Chernatitsa, 3-4 pairs in Prespa, and 5-10 pairs in the other territorial units. PETROV *et al.* (2006) estimated 15-20 pairs for the whole W Rhodopes (including the Greek part).

Black Woodpecker (*Dryocopus martius* L., 1758)

The species is widely distributed and common in all studied areas of W Rhodopes, with at least 73 localities found, of which 44 detected during the breeding period (Fig. 7). It prefers various types of forests but in all cases at an age of not less than 70-80 years. It could breed sometimes in forests with lower average age only if there are many old dying trees dispersed in the stand. The preferred habitat types are presented on Fig. 4. A total of 71% of the localities were found in stands with participation of Spruce. Most of the localities are between 1500 and 1900 m, more rarely between 900 and 1500 and above 1900 m and up to 2075 m (on average 1544 m, n=54, Fig. 5). The species was found in 65 UTM squares in W Rhodopes by IANKOV (2007) with estimated population of 375-425 pairs for the whole mountain massif (PETROV *et al.* 2006).

Grey Headed Woodpecker (*Picus canus* GMELIN, 1788)

Rare species, sparsely distributed in all territorial units. Found at 36 localities, 30 of them during the breeding period. Solitary birds or pairs were detected in Prespa (4 localities), Devinska Mt (3), Julti dyal and Gyumyurdzhinski Sneznik (5), Chepino and Syutkia (3), Beglika and Batashka Mt (7), Dubrash-Dospat area (5), Chernatitsa (7), Dobrostan-Radyuva Mt. (1) and Gerzovitsa-Perelik area (1) (Fig. 6).

The species lives in diverse forest habitats but prefers stands with participation of Beech (in

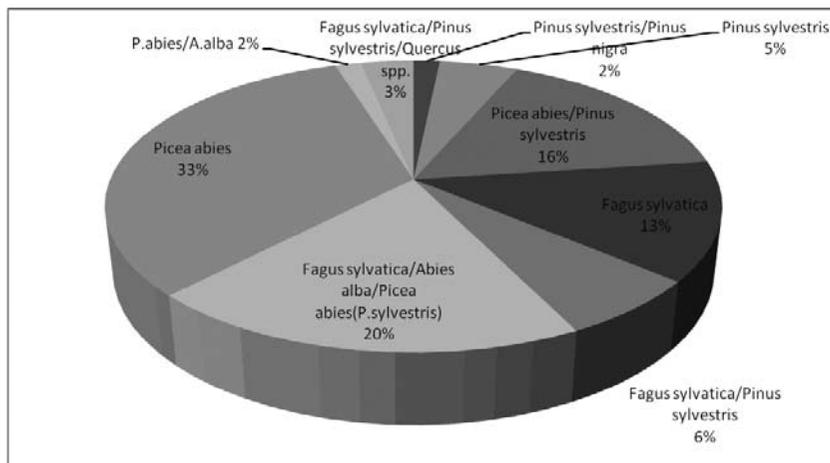


Fig. 4. Forest habitats preferred by Black Woodpecker (*Dryocopus martius*) in W Rhodopes (n=59).

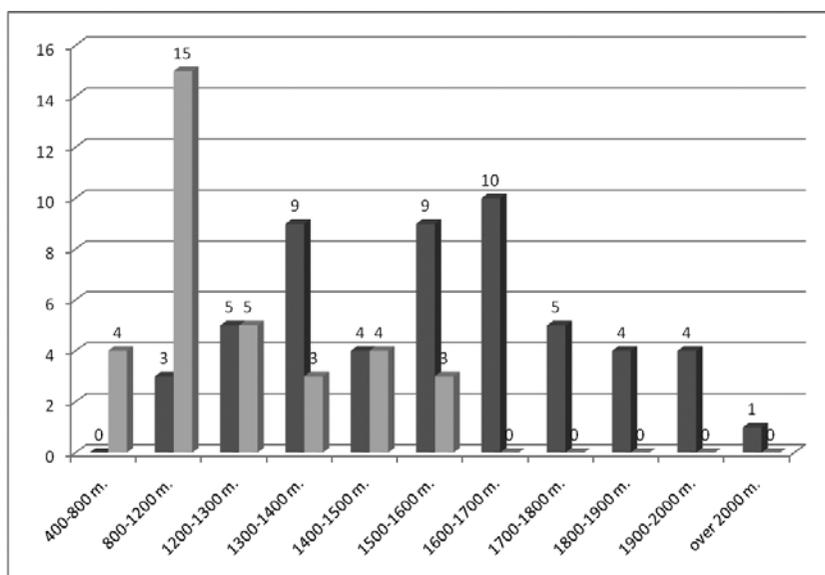


Fig. 5. Altitudinal distribution of the localities of Black Woodpecker (*Dryocopus martius*) (n=54) – dark grey bars and Grey Woodpecker (*Picus canus*) (n=34) – light grey bars, in W Rhodopes.

53% of the localities) and Scots Pine (in 47% of all localities) (Fig. 8). Most of the localities were in old forests with many dying or dry trees. The altitudes of the localities ranged from 450 to 1535 m (on average 1185 m, n=34, Fig. 5).

The species was reported only in 15 UTM squares in W Rhodopes by IANKOV (2007) with estimated population of 60-70 pairs for the whole mountain massif including the Greek territory (PETROV *et al.* 2006). Taking into account the high variety of the habitats used by the species and the number of recorded localities we consider that the population of the species in W Rhodopes could reach 160-200 breeding pairs.

White-backed Woodpecker (*Dendrocopos leucotos lilfordi* SHARPE & DRESSER, 1871)

Rare and endangered species in W Rhodopes, preferring mostly Beech and mixed Beech-coniferous forests in the northern and northwestern parts of the massif (Fig. 7). A total of 19 localities were found. The results obtained during the transects are presented in Table 2. Additionally we detected the following localities:

Batashka Mt-Beglika unit – above Samovoditsa hut, 7.05.2007, in mixed forest;

Dubrash-Dospat unit – at Chifte chark, ‘Beslet’ – in Beech-Scots Pine forest, at 1300 m (26.04.2007). One locality in pure old Scots Pine forest was found above Ribnovo village (R. TSONEV – pers.comm.); Chernatitsa unit – above Kosovo village, in Beech-Oak forest, 80 years old, at 1030 m (24.03.2011); Dobrostan-Radyuva Mt.

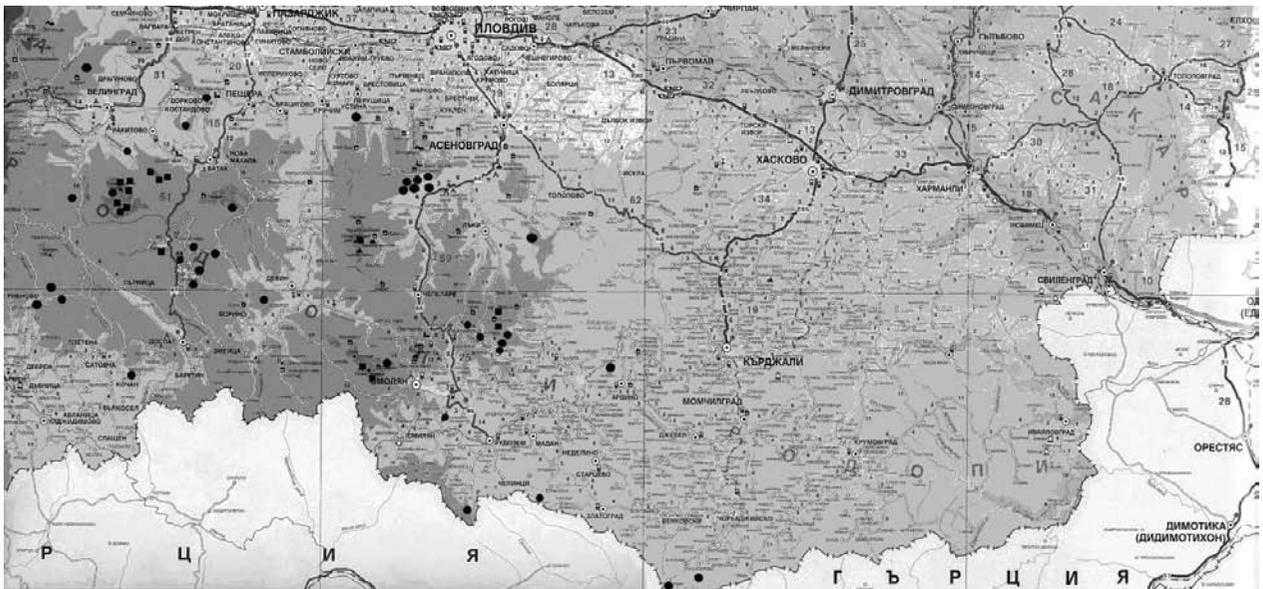


Fig. 6. Map of the distribution of Grey headed Woodpecker (*Picus canus*) (dark grey circles) and Three-toed Woodpecker (*Picoides tridactylus*) (black squares) in Mt. Rhodopes.

unit – at Karazhov kamuk – in 120 years Beech forest, between Martsiganitsa hut and Bezovo hut – in mixed forest, at 1300 m. (18.04.2007); at Dryanovo village, in Beech-Scots Pine forest at 1250 m (25.05.2006); at Narechenski bani (K. VULCHEV – pers.comm.); Zhulti dyal-Gorna Arda unit – the species was found on 13.04.2007 in Gyumyurdzhinski Snezhnik, at two places – above Gorno Kupinovo and Chakalarovo, in old Beech forests. It should be noted that in the same area we

conducted transects number 2 and 3 on 11 and 12 July 2006 and we did not record the species, most probably because of the very windy weather.

The total population density of the White-backed Woodpecker in W Rhodopes calculated for all the conducted transects was 3.4 pairs/1000 ha. It varies from 2.6 pairs/1000 ha at the border parts of Zhulti dyal and Gorna Arda (Tsigansko gradishte, Murzyan, Erma reka) to 4.0 pairs/1000 ha for the northern slopes of Batashka Mt. In other parts of

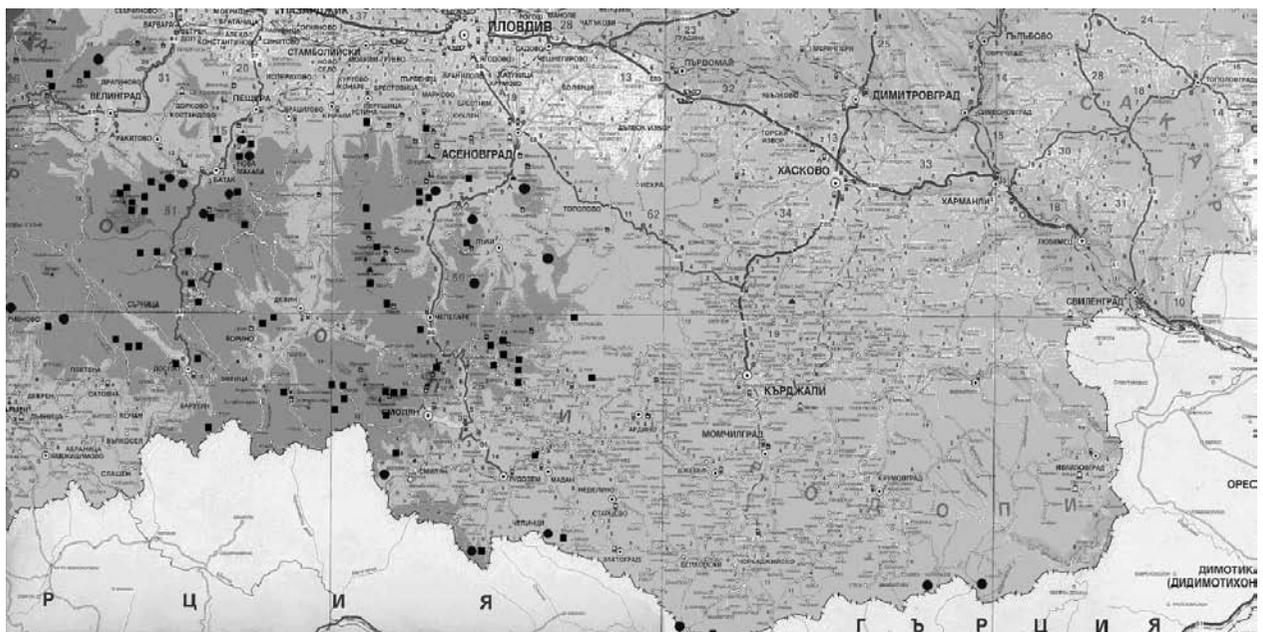


Fig. 7. Map of the distribution of Black Woodpecker (*Dryocopus martius*) (black squares) and White-backed Woodpecker (*Dendrocopos leucotos lilfordi*) (dark grey circles) in Mt. Rhodopes.

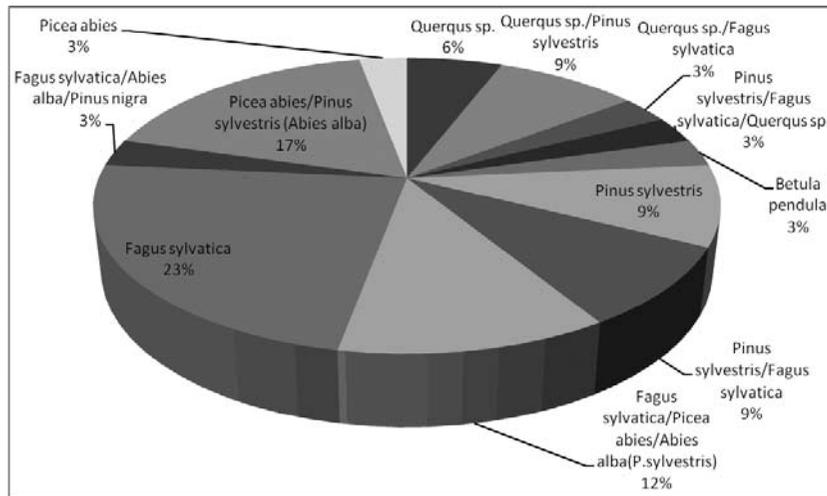


Fig. 8. Forest habitats preferred by Grey-headed Woodpecker (*Picus canus*) in W Rhodopes (n=34).

Table 2. Results of transect search for White-backed Woodpeckers (*Dendrocopos leucotos lilfordi*) in W Rhodopes.

Transect	Date	Length	Number of imitation stop pints	Habitat (forest type, Age, years)	Number of birds	Weather
Erma reka-Gergova polyana (Tenkovitsa)-Murzyan	27. 06. 2006	7.4 km	20	Beech, 60-120	F	Sunny, calm
2. G. Kupinovo peak Tri kladentsi – Tekyia Cham (Gyumurdzhinski Snezhnik)	11. 07. 2006	5.0 km	15	Beech, 60-120, mixed with areas covered by young forest	0	Sunny, strong north-eastern wind
3. Shumnatitsa (zastava)-peak Kermen –Chakalarovo	12. 07. 2006	7.6 km	22	Beech, 60-140, mixed with areas covered by young forest	0	Sunny, strong north-eastern wind
4. Koritata – Temni dol – Tsigansko gradishte – Papratovitsa peak	18.07. 2006	9.4 km	30	Beech, 60-120, with intensive cuttings in the western parts of the route	1 female	Sunny, calm
5. ‘Mantaritsa’ Reserve (northern slopes) – ‘Batak’ dam	26.09. 2006	5.6 km	10	Old Beech-Spruce, Beech-Fir and Beech-Fir-Spruce	(1 m, 1 f) 2 territories	Sunny, calm
6.settlement “Teheran“ – Batashki Snezhnik	14-15.10. 2006	4.0 km	7	Old Beech-Spruce and Beech-Fir	1 m	Sunny, calm
7.Batashki Snezhnik(east) – Nova mahala	16.10.2006	5.7 km	10	Beech and Beech-Fir-Spruce intensive cuttings	1 m	Cloudy, light rain, calm
8. To the north of Nova mahala – Kupena Reserve (south) – Pirin peak	17.10. 2006	7.8 km	20	Beech and Beech-Scots Pine	2 territories (2 birds)	Sunny, calm
9. Kupena Reserve	18.10. 2006	6.8 km.	10	Beech, with some cuttings	0	Sunny ,calm
Total		59.3 km	144		8 territories	

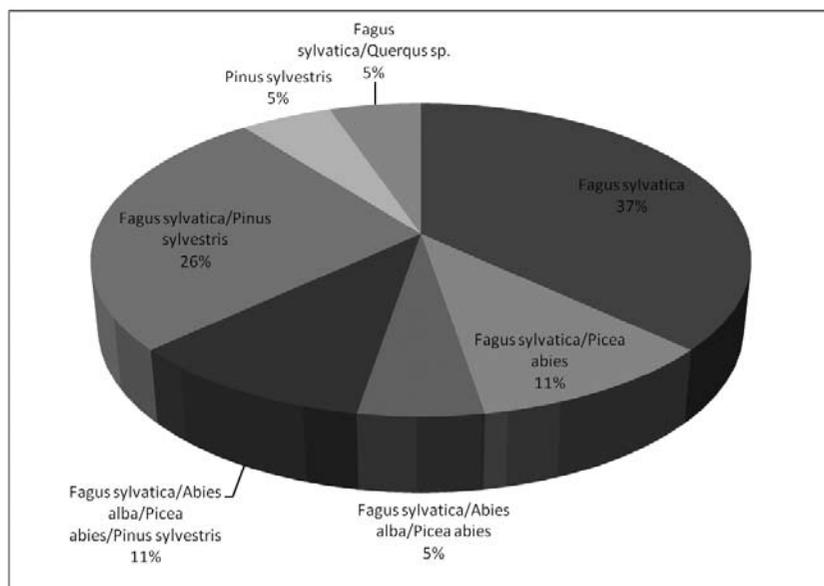


Fig. 9. Preferred forest habitats of White-backed Woodpecker (*Dendrocopos leucotos lilfordi*) in W Rhodopes (n=19).

the species distribution the following population densities were recorded: in Spain (Western Pyrenees, *D.l.lilfordi*) – 1.8- 4.9 pairs/1000 ha (GARMENDIA *et al.* 2006); in Austria (Steiermark) – 7.0-20.0 pairs/1000 ha (CRAMP 1985); in Poland (Bialoweza) – 6.0 pairs/1000 ha (WESOŁOWSKI 1995). In Bulgaria the average density was calculated at 2 pairs/1000 ha of habitat (SPIRIDONOV *et al.* 2011, in press).

The species was detected mainly in Beech forests, aged 80-140 years, with many dying and dry trees and holes. Different types of old mixed forests are also occupied by the species (Fig. 9) but in all but one cases – with participation of Beech. The species has clear preference to deep valleys of streams where usually the thickest and oldest Beech, Fir and Spruce trees grow. Most of the localities were on northern, northeastern or northwestern exposure. Altitudes varied between 1030 and 1579 m, on average 1288 m (n=18).

On the basis on the obtained population density and the territories of the existing habitats we estimate the total number of White-backed Woodpecker in W Rhodopes at 150-170 breeding pairs. In that estimation we take in account that large suitable areas covered by Beech and Beech-Fir forest were not covered by our study, especially in the ridges Bozhenets, Snezhanka and Dobrostan. According to PETROV *et al.* (2006) the breeding number of

the species in Bulgarian and Greek parts of the W Rhodopes could be put at 115-150 pairs. The later authors found also the species in Mantaritsa Reserve, Dabrash ridge and Bulgarian-Greek border territory along Arda River. The species was found in the past close to Batak (specimen in the collection of NMNH-Sofia from 1936) and in Chernatitsa, inhabiting also Spruce forests there (DARAKCHIEV 1969, NANKINOV 1993). Despite the intensive studies in coniferous belt of Chernatitsa the species was not observed there by us. It has been observed also at Dobrostan ridge (SPIRIDONOV 1985). Thus all old localities of the species in W Rhodopes were confirmed by us except these in the Spruce forests of Chernatitsa.

Acknowledgements: We are grateful to our friends and colleagues who gave us valuable data for the present article or helped during the field work: Kostadin Vulchev, Krassimir Hristov, Hristo Dinkov, Nayden Chakarov, Kipriela Kelorska, Maria Russeva, Silvia Dyulgerova, Tsvetan Zlatanov, Boris Nikolov, Vessela Elenkova, Petar Dzhisov, Dimitar Avtanski, Brecht Verhelst, Rumen Komitov, Rossen Tsonev and Svetoslav Velkov. We are grateful also to the directors and the foresters of the following forest departments who helped us kindly during the field work: Slaveyno, Mugla, Dospat, Rakitovo, Smolyan, Smilian, Beglika, Dikchan, Izvora, Shiroka polyana, Shiroka luka, Stoykite, Yakoruda, Trigrad and Devin.

This study was partially funded by two projects of UNDP-Rhodopi programme for investigation of Woodpeckers and Hazel Grouse in Mt. Rhodopes and a project for investigation of the birds of Batashka Mt. conducted by Bulgarian Biodiversity Foundation.

References

- BAUER W., H. BOHR 1987. Unser Kenntnis der sudlichen Arealgrenzen einiger Vogelarten in den griechischen Rhodopen. – *Vogelwelt*, **108**: 1-13.
- BOETTICHER H. 1927. Kurze Uebersicht uber die Raubvogel und Eulen Bulgariens. – *Verh. Orn. Ges. Bayern*, **17**: 535-549.
- CRAMP S. (Ed.) 1985. The Birds of the Western Palearctic. Vol. IV. Terns to Woodpeckers. Oxford University Press.
- DARAKCHIEV A. 1969. Survey on the ornithofauna of Chernatitsa part in Rhodopes Mts with some biological and ecological notes. High Pedagogical Institute ‘P. Hilendarski’ – Plovdiv, Dep. Zoology (PhD Thesis). (In Bulgarian).
- DONCHEV S. 1982. The birds of ‘Vasil Kolarov’ Reserve and its vicinity (Western Rhodopes). – *Ekologia*, **10**: 35-44. (In Bulgarian).
- GARMENDIA A., S. CARCAMO, O. SCHWENDNER 2006. Forest management for conservation of Black Woodpecker, *Dryocopus martius* and White backed Woodpecker *Dendrocopos leucotos* populations in Quinto Real (Spanish Western Pyrenees). – *Biodiversity and Conservation*, **1** (2): 339-355.
- IANKOV P. (Ed.) 2007. Atlas of the breeding birds in Bulgaria. BSPB Conservation series. Book 10. Sofia.
- IMBEAU L., A. DESROCHERS 2002. Area sensitivity and edge avoidance: the case of the Three-toed Woodpecker (*Picoides tridactylus*) in a managed forest. – *Forest Ecology and Management*, **164**: 249-256.
- NANKINOV D. 1982. Ecological review on Kastrakli reserve and Trigradsko-Yagodinski Region of Rhodopes mountain. – *Ecology*, **10**: 22-34 (In Bulgarian).
- NANKINOV D. 1987a. Species composition of the breeding avifauna of the mountain resort ‘Vasil Kolarov’ in Western Rhodopes. – *Acta zoologica bulgarica*, **35**: 65-77.
- NANKINOV D. 1993. Distribution and ecological preferences of the White-backed Woodpecker (*Dendrocopos leucotos*) in Bulgaria. – In: National scientific conference of Forest management, 52-63.
- NIKOLOV B., I. HRISTOV, P. SHURULINKOV, I. NIKOLOV, A. ROGUEV, A. DUTSOV, R. STANCHEV 2001. New data on some poorly studied forest owl species (*Strix uralensis*, *Glaucidium passerinum*, *Aegolius funereus*) in Bulgaria. – *Forest Science*, **38** (1/2): 75-86. (In Bulgarian).
- PACENOVSKY S., P. SHURULINKOV 2008. Latest data on distribution of the Pigmy Owl (*Glaucidium passerinum*) in Bulgaria and Slovakia including population density comparison. – *Slovak Raptor Journal*, **2**: 91-106.
- PAKKALA T., I. HANSK, E. TOMPPO 2002. Spatial ecology of the three-toed woodpecker in managed forest landscapes. – *Silva Fennica*, **36** (1): 279–288.
- PETROV T., D. DEMERDZHIEV, G. POPGEORGIEV, L. PROFIROV, K. VELEV, K. DIMITROVA, D. PLACHIYSKI 2006. Birds of the Western Rhodopes (Bulgaria and Greece). – In: BERON P. (Ed.): Biodiversity of Bulgaria. 3. Biodiversity of Western Rhodopes (Bulgaria and Greece). Pensoft&Nat. Mus. Natur. Hist., Sofia.
- PECHACEK P., W. D’OLEIRE-OLTMANN 2004. Habitat use of the Three-toed Woodpecker in central Europe during the breeding period. – *Biol. conserv.*, **116**: 333-341.
- SHURULINKOV P., G. STOYANOV 2006. Some new findings of Pigmy Owl *Glaucidium passerinum* and Tengmalm’s Owl *Aegolius funereus* in Western and Southern Bulgaria. – *Acrocephalus*, **27** (128-129): 65-68.
- SHURULINKOV P., A. RALEV, G. DASKALOVA, N. CHAKAROV 2007. Distribution, numbers and habitat of Pigmy Owl, *Glaucidium passerinum* in Rhodopes Mts (S Bulgaria). – *Acrocephalus*, **28** (135): 159-163.
- SPIRIDONOV J. 1985. White-backed Woodpecker (*Dendrocopos leucotos lilfordi*). Red data book of PR of Bulgaria, 2, Animals. 126-127. (In Bulgarian).
- SPIRIDONOV J. 1985a. Three toed Woodpecker. (*Picoides tridactylus*). Red data book of PR Bulgaria. 2, Animals. 127-128. (In Bulgarian).
- SPIRIDONOV J., N. SPASSOV, V. IVANOV 2008. New localities of three relict bird species in Rhodopes Mts. – *Historia Naturalis Bulgarica*, **19**: 181-182.
- SPIRIDONOV J., D. GEORGIEV, TS. ZLATANOV 2011. White-backed Woodpecker (*Dendrocopos leucotos*) – In: Red Data Book of Bulgaria. Animals. (In print).
- WESOŁOWSKI T. 1995. Ecology and behaviour of White-backed Woodpecker (*Dendrocopos leucotos*) in a primaeval temperate forest (Białowiezha National Park, Poland). – *Die Vogelwarte*, **38**: 61-75.

Received: 09.08.2011
Accepted: 24.10.2011