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AVIFAUNA OF 'BULGARKA' NATURE PARK (BULGARIA) WITH DISTRIBUTION, POPULATION SIZE AND BREEDING DENSITY DATA FOR THE SPECIES OF CONSERVATION IMPORTANCE

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Abstract

Study was completed in 2012 and 2013. A total of 163 bird species were registered during the field studies and on the basis of literature sources. 121 species are breeding and 42 are transitory migrants, wintering or wandering in the area. High number and population densities were registered for some endangered species as White-backed woodpecker – 35–40 breeding pairs, overall density – 0.24 pairs/100 ha, Red-breasted flycatcher – 80–110 pairs, density 1.1–5.5 pairs/100 ha and Semi-collared flycatcher – 150–300 pairs, density – 7.5–24.3 pairs/100 ha. Also significant populations of Corncrake, Grey-headed woodpecker and Black woodpecker were found. Breeding of Goosander and Woodcock is probable. In the old beech forests two dominant species were Robin and Common chaffinch, and subdominant were found to be Blackcap, Common chiffchaff, Song thrush and Semi-collared flycatcher.

Key words: breeding populations, Central Stara Planina Mts., forest birds, protected territory.

Introduction

Avifauna of 'Bulgarka' Nature Park (NP) in Central Stara Planina Mts., Central Bulgaria, has not been a subject of specific research until now and that mountain area remains poorly studied. That protected territory was created in 2002 to preserve the old beech-wood habitats on the northern slopes of Stara Planina Mts. above the towns of Gabrovo, Tryavna and Plachkovtsi. From the published sources there are data about the presence of 119 bird species on that territory and in its vicinity (the whole Shipchenska Mt. and Trevnenska Mt. – parts of Stara Planina Mts.)

but in almost all of the cases without given exact localities and without data about their general status, distribution, number, densities and preferred habitats. The only ornithological study that covers the current territory of 'Bulgarka' NP as well as much larger territories of Stara Planina Mts. was published 43 years ago (Donchev 1974). That study presented concrete observations of 21 bird species. Some older observations were cited even from the end of XIX century (Reiser 1894), giving concrete findings of five species. The studies of Dr. Stefan Donchev have been localized mainly in two parts of Shipchenska Mt. – at Yantra hut and at 'Buzludzha' hut.

The richest information about the birdlife of that region can be obtained from the national mapping of the breeding birds in Bulgaria (Iankov 2007). In that study are included data about the presence of 116 bird species breeding in the NP and its surroundings for the period 1990–2007. That information is presented on the basis of mapping of all 10×10 km UTM squares situated on the territory of the NP. Unfortunately these data are not confined to particular localities, dates, years, altitude or habitat. In the text of that atlas there are no any concrete data on the number, localization or breeding densities of the species mapped on that mountain territory. From these 116 species found, seven are included with possible breeding, 21 with probable breeding and 88 – with confirmed breeding status.

Undoubtedly there is lack of concrete data on bird status, distribution, number, habitats, etc. on the territory of 'Bulgarka' NP. The species checklist is also far from complete. Thus we conducted the presented here research in the frames of the works for establishment of Management Plan for 'Bulgarka' NP in 2012–2013. We hope that the information presented will be used for the proper management of the protected territory.

Study Area

The research covered the whole territory of 'Bulgarka' NP – 21,772 ha. Geographical coordinates of its central area above Potoka village – 42°45'33.9" N and 25°21'52.2" E. The area is covered predominantly by mature Beech (*Fagus moesiaca* Czeczott) and Common hornbeam (*Carpinus betulus* L.) forests, about half of them over 80 years old. Locally there are coniferous plantations, mainly of Spruce (*Picea abies* L.), Scots pine (*Pinus sylvestris* L.) and Fir (*Abies* ssp.). Forests cover more than 80 % of the territory. Mountain meadows cover the highest parts of the mountain but also some mesophilic meadows are situated in the foothills, often along the rivers and streams. The altitudinal belt of the studied territory was between 500 and 1510 m a.s.l. There is one artificial lake in the western part – 'Smirnenski' Dam situated at 530 m a.s.l., with a total water surface of 105.4 ha. It has predominantly steep shores thus it does not supply attractive habitats for feeding of waterfowl.

Material and Methods

Study on the avifauna of 'Bulgarka' NP was completed in 2012 and 2013 but some observations were added also from the periods 2009–2011 and 2014–2017. A total of 370 days were spent on field research. Thus all the territory was covered in all four seasons of the year.

For studying the populations' densi-

ties of passerine birds and woodpeckers and their species composition in the most typical beech forest habitat we used two line transects, with length of 3.14 km and 1.94 km, completed in the middle of every month. These transects were situated in the eastern parts of the NP, close to the road Plachkovtsi – Krustets, in mature (80–90 years old) beech forests with a presence of dispersed solitary Scots pine trees. The birds were counted visually or acoustically in two spatial belts – 0–25 m and over 25 m. For the breeding birds' composition and densities we used the data from May, June and July, 2012.

Additionally, we completed line transects in a considerable number of other NP territories mainly during the breeding period. All the main river valleys were included in the research. Transects for woodpeckers were made in the period March–May. They had length of 5–10 km and the birds were provoked to vocalize or attracted using mp3 players for imitations of their voice. Part of these transects were completed by car with regular stops for imitations at each 500–700 m.

The distribution of the diurnal birds of prey was studied from stationary points with good visibility. At least two hours in good weather conditions were spent on each observation point. The separate points were at a distance over 2 km from each other (Watson et al. 1989, Bibby et al. 1992). The observations were made in the period March–July using binoculars with magnification 10×50 or 8×30 and spotting scopes with magnification 30–60x. The species and number of all birds of prey were noted as well as age, sex, flight height and direction of each observed individual (if possible). Part of the stationary points were visited 2–4 times per year for collecting data from both breeding and migration periods.

For specific search for Corncrake (*Crex crex* L., 1758) we used acoustic provocation (imitation) of its mating calls in transects chosen in appropriate to its habitat – wet meadows in foothills, mostly along the river (stream) courses. Transects and the points for imitation were visited in the evening, during the night and in the morning, approximately between 19:00 and 8:00 when the highest vocal activity was expected. The search for that species was completed in the period 15 May – 30 June, in 2012 and 2013. Most transects were made by car and the imitation points were set at a distance of not less than 100 m between them. These transects were made in different locations, not repeated at a same location.

The taxonomy used for results presentation follows that accepted in the list of the birds recorded in Bulgaria (BUNARCO 2009).

Results

Totally 163 bird species were registered both in the field studies and literature sources. From these 121 species are breeding (possible, probable and confirmed breeders) (Table 1), and 42 transitory migrants, wintering or wandering in the area (Table 2). Confirmed breeding can be accepted for 105 species. The other 16 species are possible or probable breeders or they nest in neighboring territories to the NP and visit it during their regular search for food.

We present data about the status, distribution and ecological information for the rare and endangered (on national or international level) breeding or possibly breeding bird species.

Table 1. List of birds recorded during the breeding period.

English name	Latin name	Status
Black stork	*Ciconia nigra* L., 1758	B,M
White stork	*Ciconia ciconia* L., 1758	B*,M
Mallard	*Anas plathyrhynchos* L., 1758	B,S
Goosander	*Mergus merganser* L., 1758	(B),S
Honey buzzard	*Pernis apivorus* L., 1758	B,M
Northern goshawk	*Accipiter gentilis* L., 1758	B,S
Eurasian sparrowhawk	*Accipiter nisus* L., 1758	B,S
Common buzzard	*Buteo buteo* L., 1758	B,S
Long-legged buzzard	*Buteo rufinus* Cretzschmar, 1827	B*,S
Lesser spotted eagle	*Aquila pomarina* Brehm, 1831	(B),M
Golden eagle	*Aquila chrysaetos* L., 1758	B,S
Kestrel	*Falco tinnunculus* L., 1758	B,S
Hobby	*Falco subbuteo* L., 1758	B,M
Peregrine falcon	*Falco peregrinus* Tunstall, 1771	B*,S
Rock partridge	*Alectoris graeca* Meisner, 1804	(B),S
Grey partridge	*Perdix perdix* L., 1758	B,S
Quail	*Coturnix coturnix* L., 1758	B,M
Common pheasant	*Phasianus colchicus* L., 1758	B*,S
Corncrake	*Crex crex* L., 1758	B,M
Little ringed plover	*Charadrius dubius* Scopoli, 1786	B,M
Common sandpiper	*Actitis hypoleucos* L., 1758	B,M
Eurasian woodcock	*Scolopax rusticola* L., 1758	B,S
Feral pigeon	*Columba livia* f. *domestica* Gmelin, 1789	B*,S
Stock dove	*Columba oenas* L., 1758	(B),S
Wood pigeon	*Columba palumbus* L., 1758	B,S
Collared dove	*Streptopelia decaocto* Frivaldszky, 1838	B,S
Turtle dove	*Streptopelia turtur* L., 1758	B,M
Cuckoo	*Cuculus canorus* L., 1758	B,M
Scops owl	*Otus scops* L., 1758	B,M
Little owl	*Athene noctua* Scopoli, 1769	(B),S
Tawny owl	*Strix aluco* L., 1758	B,S
Long-eared owl	*Asio otus* L., 1758	B,S
Nightjar	*Caprimulgus europaeus* L., 1758	B,M
Common swift	*Apus apus* L., 1758	B,M
Pallid swift	*Apus pallidus* Shelley, 1870	B,M
Common kingfisher	*Alcedo atthis* L., 1758	B,S
Hoopoe	*Upupa epops* L., 1758	B,M
Wryneck	*Jynx torquilla* L., 1758	B,M
Grey-headed woodpecker	*Picus canus* Gmelin,1788	B,S
Green woodpecker	*Picus viridis* L., 1758	B,S
Black woodpecker	*Dryocopus martius* L., 1758	B,S
Great spotted woodpecker	*Dendrocopos major* L., 1758	B,S

English name	Latin name	Status
Syrian woodpecker	*Dendrocopos syriacus* Hemprich & Eherberg, 1833	B,S
Middle spotted woodpecker	*Dendrocopos medius* L., 1758	B,S
White-backed woodpecker	*Dendrocopos leucotos lilfordi* Sharpe et Desser 1871 **	B,S
Lesser spotted woodpecker	*Dendrocopos minor* L., 1758	B,S
Crested lark	*Galerida cristata* L., 1758	B,S
Woodlark	*Lullula arborea* L., 1758	B,M
Skylark	*Alauda arvensis* L., 1758	B,M
Rock martin	*Ptyonoprogne rupestris* Scopoli, 1769	B,M
Barn swallow	*Hirundo rustica* L., 1758	B,M
Red-rumped swallow	*Cecropis daurica* L., 1758	B,M
House martin	*Delichon urbicum* L., 1758	B,M
Tree pipit	*Anthus trivialis* L., 1758	B,M
Water pipit	*Anthus spinoletta* L., 1758	B,S
Yellow wagtail	*Motacilla flava* L., 1758	B,M
White wagtail	*Motacilla alba* L., 1758	B,M
Grey wagtail	*Motacilla cinerea* Tunstall, 1771	B,S
Dipper	*Cinclus cinclus* L., 1758	B,S
Eurasian wren	*Troglodytes troglodytes* L., 1758	B,S
Dunnock	*Prunella modularis* L., 1758	(B),S
Robin	*Erithacus rubecula* L., 1758	B,S
Nightingale	*Luscinia megarhynchos* Brehm, 1831	B,M
Common redstart	*Phoenicurus phoenicurus* L., 1758	B,M
Black redstart	*Phoenicurus ochrurus* Gmelin, 1789	B,M
Whinchat	*Saxicola rubetra* L., 1758	B,M
Stonechat	*Saxicola rubicola* L., 1766	B,M
Common wheatear	*Oenanthe oenanthe* L., 1758	B,M
Blackbird	*Turdus merula* L., 1758	B,S
Song thrush	*Turdus philomelos* Brehm,1831	B,M
Mistle thrush	*Turdus viscivorus* L., 1758	B,S
Ring ouzel	*Turdus torquatus* L., 1758	B,M
Marsh warbler	*Acrocephalus palustris* Bechstein, 1798	B*,M
Great reed warbler	*Acrocephalus arundinaceus* L., 1758	B*,M
Barred warbler	*Sylvia nisoria* Bechstein, 1792	B,M
Lesser whitethroat	*Sylvia curruca* L., 1758	B,M
Common whitethroat	*Sylvia communis* Latham, 1787	B,M
Blackcap	*Sylvia atricapilla* L., 1758	B,M
Garden warbler	*Sylvia borin* Boddaert, 1783	(B),M
Chiffchaff	*Phylloscopus collybita* Vieillot, 1817	B,M
Wood warbler	*Phylloscopus sibilatrix* Bechstein, 1793	B,M
Goldcrest	*Regulus regulus* L., 1758	B,S
Firecrest	*Regulus ignicapillus* Temminck, 1820	B,S
Semi-collared flycatcher	*Ficedula semitorquata* Homeyer, 1885	B,M
Red-breasted flycatcher	*Ficedula parva* Bechstein,1794	B,M

English name	Latin name	Status
Long-tailed tit	*Aegithalos caudatus* L., 1758	B,S
Marsh tit	*Poecile palustris* L., 1758	B,S
Willow tit	*Poecile montana* Baldenstein, 1827	B,S
Sombre tit	*Poecile lugubris* Temminck, 1820	B,S
Coal tit	*Periparus ater* L., 1758	B,S
Blue tit	*Cyanistes caeruleus* L., 1758	B,S
Great tit	*Parus major* L., 1758	B,S
Nuthatch	*Sitta europaea* L., 1758	B,S
Short-toed treecreeper	*Certhia brachydactyla* Brehm, 1831	B,S
Eurasian treecreeper	*Certhia familiaris* L., 1758	B,S
Golden oriole	*Oriolus oriolus* L., 1758	B,M
Red-backed shrike	*Lanius collurio* L., 1758	B,M
Lesser grey shrike	*Lanius minor* Gmelin, 1788	B,M
Jay	*Garrulus glandarius* L., 1758	B,S
Magpie	*Pica pica* L., 1758	B,S
Western jackdaw	*Corvus monedula* L., 1758	B*,S
Hooded crow	*Corvus cornix* L., 1758	B,S
Raven	*Corvus corax* L., 1758	B,S
Common starling	*Sturnus vulgaris* L., 1758	B,M
House sparrow	*Passer domesticus* L., 1758	B,S
Tree sparrow	*Passer montanus* L., 1758	B,S
Common chaffinch	*Fringilla coelebs* L.1758	B,S
European serin	*Serinus serinus* L., 1758	(B),S
Greenfinch	*Carduelis chloris* L., 1758	B,S
Goldfinch	*Carduelis carduelis* L., 1758	B,S
Linnet	*Carduelis cannabina* L., 1758	B,S
Bulfinch	*Pyrrhula pyrrhula* L., 1758	B,S
Hawfinch	*Coccothraustes coccothraustes* L., 1758	B,S
Common crossbill	*Loxia curvirostra* L., 1758	B,S
Siskin	*Carduelis spinus* L., 1758	(B),S
Yellowhammer	*Emberiza citrinella* L., 1758	B,S
Cirl bunting	*Emberiza cirlus* L., 1758	B,S
Rock bunting	*Emberiza cia* L., 1758	B,S
Ortolan bunting	*Emberiza hortulana* L., 1758	B,M
Black headed bunting	*Emberiza melanocephala* Scopoli, 1769	B,M
Corn bunting	*Emberiza calandra* L., 1758	B,M
In total: 121 species		

Legend: B – breeding species; (B) – probably breeding species; B* – species breeding in the vicinity of the Nature Park; M – migratory species; S – sedentary species.
Note: ** That subspecies is mentioned as it is well differentiated and can be easily detected during field study without need of capturing the birds.

Goosander (*Mergus merganser*)

A pair was observed on 7.04.2012 in 'Smirnenski' Dam. On 17.05.2012, only the female was spotted in the lake. It is typical for the species that the pairs separate after the hatching of the chicks. But probably the nesting here has not been successful as chicks were not observed at all in our next visits during the summer of 2012.

Table 2. List of birds recorded during migration and wintering; extinct species.

Species	Latin name	Status
Great cormorant	*Phalacrocorax carbo* L., 1758	M,W
Night heron	*Nycticorax nycticorax* L., 1758	M
Grey heron	*Ardea cinerea* L., 1758	M,W
Whooper swan	*Cygnus cygnus* L., 1758	M
Osprey	*Pandion haliaetos* L., 1758	M
Black kite	*Milvus migrans* Bodaert, 1783	M
Short-toed eagle	*Circaetus gallicus* Gmelin, 1788	M
Marsh harrier	*Circus aeruginosus* L., 1758	M
Hen harrier	*Circus cyaneus* L., 1758	M,W
Pallid harrier	*Circus macrourus* Gmelin, 1770	M
Montagu's harrier	*Circus pygargus* L., 1758	M
Levant sparrowhawk	*Accipiter brevipes* Severtzov, 1850	M
Griffon vulture	*Gyps fulvus* Hablizl, 1783	Wa
Spotted eagle	*Aquila clanga* Pallas, 1811	M
Booted eagle	*Hieraaetus pennatus* Gmelin, 1788	M
Chukar partridge	*Alectoris chukar* Gray, 1830	E
Hazel grouse	*Tetrastes bonasia* L., 1758	Wa
Capercaillie	*Tetrao urogallus* L., 1758	E
Moorhen	*Gallinula chloropus* L., 1758	M
Common crane	*Grus grus* L., 1758	M
Michahelli's gull	*Larus michahellis* Naumann, 1840	M,Wa
Eagle owl	*Bubo bubo* L., 1758	E
Alpine swift	*Tachymarptis melba* L., 1758	M
European bee-eater	*Merops apiaster* L., 1758	M
Roller	*Coracias garrulus* L., 1758	M
Balkan horned lark	*Eremophila alpestris balcanica* Reichenow, 1859**	Wa
Alpine accentor	*Prunella collaris* Scopoli, 1769	W,Wa
Meadow pipit	*Anthus pratensis* L., 1758	M
Fieldfare	*Turdus pilaris* L., 1758	M,W
Redwing	*Turdus iliacus* L., 1758	M,W
Thrush nightingale	*Luscinia luscinia* L., 1758	M
Willow warbler	*Phylloscopus trochilus* L., 1758	M
Waxwing	*Bombycilla garrulus* L., 1758	W
Grey flycatcher	*Muscicapa striata* Pallas, 1764	M
Collared flycatcher	*Ficedula albicollis* Temminck, 1815	M
Pied flycatcher	*Ficedula hypoleuca* Pallas, 1764	M

Species	Latin name	Status
Crested tit	*Lophophanes cristatus* L., 1758	E
Great grey shrike	*Lanius excubitor* L., 1758	W
Nutcracker	*Nucifraga caryocatactes* L., 1758	Wa
Alpine chough	*Pyrrhocorax graculus* L., 1758	E
Spanish sparrow	*Passer hispaniolensis* Temminck, 1820	M
Brambling	*Fringilla montifringilla* L., 1758	M,W
In total: 42 species		

Legend: M – transitory migrant; W – wintering species; Wa – wandering species, occurring sporadically; E – extinct species.
Note: ** That subspecies is mentioned as it is well differentiated and can be easily detected during field study without need of capturing the birds.

Black stork (*Ciconia nigra*)

One pair supposedly nests in the area near the mouth of Panicharka River in 'Smirnenski' damlake. The Black storks probably nest on the rocks in Topleshki dol or on a tree in the surrounding forests. The species is observed also in the eastern parts of the NP, to the northeast of Krustets village, but we consider the probability of nesting there as small. The species is more common as a breeder along Yantra River below the town of Gabrovo (unpublished data).

Honey buzzard (*Pernis apivorus*)

A total of eight localities of separate pairs were found. In the western parts of the studied territory pairs were registered during the breeding period around 'Malusha' peak and the upper course of Levicharka River – close to its springs. Another pair was found in the forests to the south of rivers Levicharka and Panicharka confluence. Probably a bird from the same locality was seen on 23.05.2013 along Panicharka River. It was observed also between 'Partizanska pesen' hut and Osenikova polyana, on 21.05.2013. In the eastern parts of the NP pairs were seen above Gaydari village (18.06.2012), in 'Studen Kladenets' protected area and between 'Babata' peak and 'Gorelska chuka' peak (19.05.2013).

Northern goshawk (*Accipiter gentilis*)

Very rare as a breeding species. One pair was observed on 1.04.2013 close to Konarskoto village. An adult specimen was observed at 0.5 km to the west of 'Partizanska pesen' hut, on 02.05.2017.

Eurasian sparrowhawk (*Accipiter nisus*)

Not numerous breeding species. At least eight localities of the species were found during the breeding period. Possibly about 8–10 pairs nest is the deciduous and mixed forests. Observed on 14.05.2013 at Buzludzha, on 15.05.2013 hunting close to peak 'Golyam Bedek' and on 22.05.2013 between 'Uzana' hut and peak 'Ispolin'.

Golden eagle (*Aquila chrysaetos*)

Two pairs of the species were recorded in their hunting territories. The first area is in the upper course of Yantra River, 'Muhnatite skali' and 'Kurvina mogila'. That pair was observed flying with a juvenile eagle both in 2012 and 2013 years. The sec-

ond territory lies in Kozya River valley – Golden eagles were observed there on 18.05.2013. One adult bird seen in flight over Sokolski Monastery on 30.06.2012 probably originated from the same pair (Rosen Tzonev – pers. communication). Occupied nests of the species were not found. Possibly the Golden eagles nest at the southern rocky slopes of Shipchenska Mt. or on a tree in the old beech forests.

In the neighbouring to 'Bulgarka' NP forest enterprise 'Mazalat' one subadult Golden eagle was observed on 2.05.2017, at 1.4 km to the west of NP borders.

In the past the species was observed at Shipka pass during the breeding period (Baumgart 1971).

Peregrine falcon (*Falco peregrinus*)

The species was observed on 31.03.2013 in the central parts of NP. During April, 2012 the species has been recorded on a rocky slope in close vicinity to the place of our observation (Georgi Stoyanov – pers. communication).

Hobby (*Falco subbuteo*)

One pair was recorded in May, 2013 to the south of Brezhnitsite village close to the road for Krustets. The birds occupied a nest on an electric pylon, most probably built by a pair of Ravens breeding at a neighbouring one. The breeding was unsuccessful, without detected reason for its failure.

Hazel grouse (*Tetrastes bonasia*)

The species was not observed during the present study. In April, 2012 some feathers and excrements were found in a young beech forest to the north of 'Muhnatite skali' area. One individual was seen by Yulian Marinov in September, 2012 to the northeast of 'Golemia Vis' peak (1117 m a.s.l.) in a beech forest (pers. communication). In the same area tracks of a Hazel grouse were found on snow on 05.12.2012 and 03.02.2013. These facts proved that single specimens of the species enter the territory of the NP very rarely, mostly in its southern parts and supposedly more often out of the breeding period.

Corncrake (*Crex crex*)

Breeding species in wet and mesophilic meadows. Most of the localities are situated in the low parts of the studied territory (Fig. 1). The total number of the registered singing males was 20, grouped at 11 localities. In the western parts of the NP 9 males were recorded at 4 places – at Zeleno Durvo village, at 'Uzana' hut, in the lower course of Panicharka River and at meadows above Radetski village. In the central parts the species was encountered only at one locality with two singing males – to the north of Ezeroto village. In the eastern parts of the park nine males were recorded at six localities – at the villages Dragnevtsi, Prestoy, Radevtsi and Mruzetsite, to the south of Velchovtsi village and between Prestoy and Stanchov Khan villages.

Eurasian woodcock (*Scolopax rusticola*)

The species was found at three localities in beech and mixed forests bordering to mesophilic meadows. In each locality only single mating male was observed during the late evening hours – at peak 'Golemia Vis', on 31.03.2013, in a mixed beech-scots pine forest; at peak 'Chereshata', in the easternmost part of the studied ter-

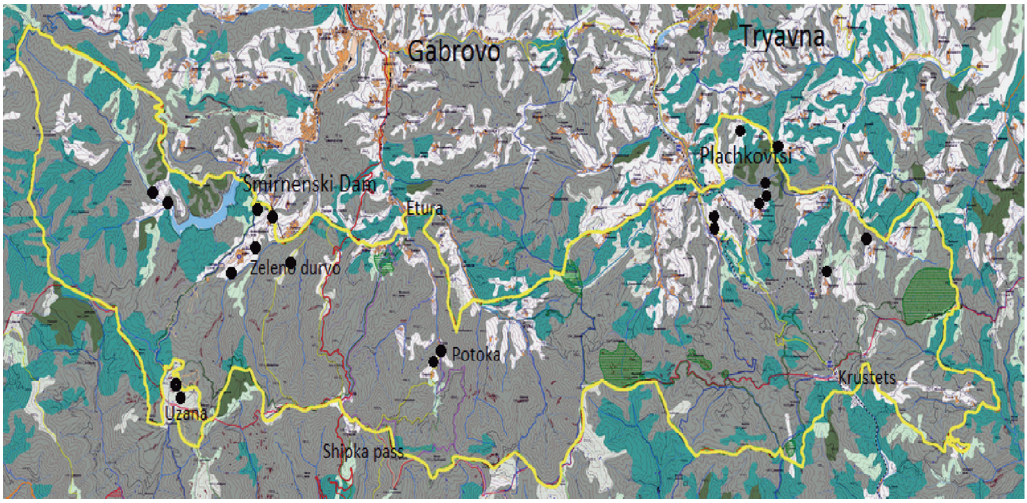

Fig. 1. Map of Corncrake (*Crex crex*) breeding localities (black spots).

ritory, on 01.04.2013 – over a beech forest mixed with some pine plantations and at 'Bulgarka' hut – flying over old beech forest. Out of the breeding season Woodcocks were seen in the basins of Sivyak and Byala rivers, in the area between 'Golemia Vis' and 'Bulgarka' hut, at 'Shipka' pass and in an area to the northwest of Radevtsi village.

Stock dove (*Columba oenas*)

The species was observed only once during the field studies – on 18.06.2012 in the area 'Moravata', in the basin of Kozya River. Several times the species was seen also during the autumn period – from September to November, probably autumn migrants. The species is on the edge of extinction as a breeder in 'Bulgarka' NP as well as many other parts of Bulgaria.

White-backed woodpecker (Lilford's) (*Dendrocopos leucotos lilfordi*)

Widely distributed species but only in old forest stands (Fig. 2). It prefers old beech forests, in deep river (stream) basins. A total of 34 pairs were found. The highest number was registered in the basins of Plachkovska and Panicharka rivers. In the western parts of the NP 14 territories were found, in central – 4 and in the eastern parts – 16 territories. Probably the total number is 35–40 pairs. At every 420 ha forest territory lives one pair White-backed woodpecker and the total density is 0.24 pairs/100 ha. Taking into account that the average size of the territory of White-backed woodpecker pair is 100–150 ha (Spiridonov and Virrkala 1997) it means that about 1/3 of the potential habitat in NP is occupied by the species. The altitude of the localities varied between 560 and 1232 m a.s.l., on average – 881 m a.s.l. (n=34). They were situated mostly on northern, northeastern and northwestern slopes where the oldest forest in the studied area grows (see Table 3).

Middle spotted woodpecker (*Dendrocopos medius*)

Rare breeding species, found in low number. It was recorded in low altitude forests

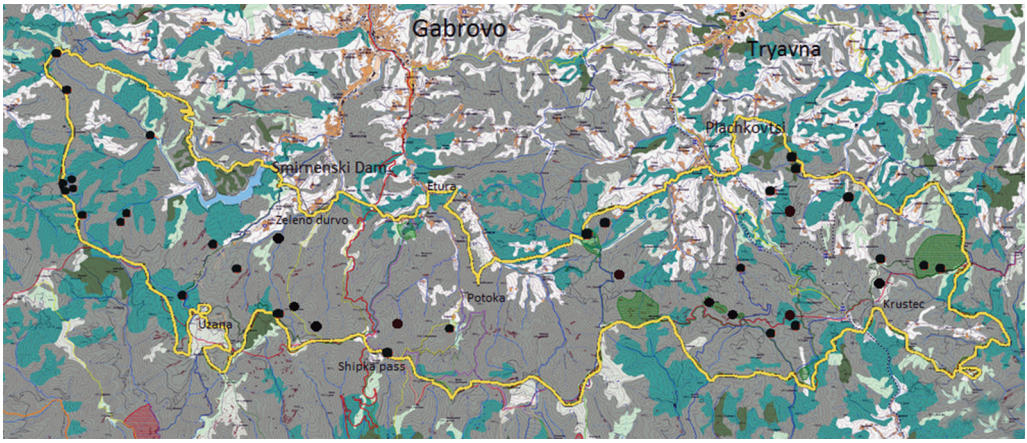

Fig. 2. Map of the recorded breeding localities (black spots) of White-backed woodpecker (*Dendrocopos leucotos lilfordi*).

Table 3. Slope exposure of White-backed woodpecker (*Dendrocopos leucotos lilfordi*) localities.

Exposure	Number of cases	Share, %
Northeastern	9	33,3
Northern	5	18,5
Northwestern	4	14,8
Eastern	4	14,8
Southern	1	3,7
Southwestern	1	3,7
Southeastern	1	3,7
Flat area	2	7,4
Total	27	100

with significant presence of oak, hornbeam and wild cherry. During the breeding period only seven localities were found – in Panicharka River basin, in an area to the east of 'Bulgarka' hut, between 'Hlebna' hut and 'Uzana' hut (22.05.2013), at Radevtsi village, between Potoka village and peak 'Buzludhza', in 'Studen kladenets' protected area and close to 'Smirnenski' damlake. In autumn (15.11.2012) the species was registered also above Gaydari village. The number of the Middle spotted woodpecker's pairs in the NP probably is not more than 10–15 pairs.

Grey-headed woodpecker (*Picus canus*)

Widely distributed and well-presented species. A total of 23 pairs were located. According to river basins they were found as follows: Plachkovska River – 6 pairs, Panicharka and Borushtitsa Rivers – 4, Levicharka River – 3, Stanchovhanska River – 2, Borushtenska River – 2, Zelenishka River – 2, Yantra River – 1, Kozya River – 1, Gabrishtitsa River – 1, others – 1. The total number of the species should be estimated at 30–35 breeding pairs.

Black woodpecker (*Dryocopus martius*)

The species is distributed everywhere on the studied territory except in the youngest forest stands (<50 years of age). Practically all territories offering appropriate habitat are occupied by the species. The number can be estimated at around 50 pairs, on average one pair at each 340 ha forest habitat. It lives in all forest habitats, mostly in beech and mixed forests, but in all cases it needs a presence of old, thick trees in the stand.

Red-breasted flycatcher (*Ficedula parva*)

Rare species, distributed sparsely and unevenly in the oldest (over 80 years) beech and beech-hornbeam forests (Fig. 3). The total number of the registered occupied territories was 24. The overall number of the species in the studied area can be determined at 80–110 pairs taking in account that in large areas of beech habitat the species does not nest at all. The population density is about four times lower compared to the Semi-collared flycatcher and varies between the different parts of the NP from 1.1 to 5.5 pairs/100 ha, on average – 3.2 pairs/100 ha. The highest density of the species was recorded in the valleys of the rivers Panicharka, Zelenishka and Belilshka. The localities lied at altitudinal belt 604 – 1208 m a.s.l., on average 879 m a.s.l. (*n*=21).

Semi-collared flycatcher (*Ficedula semitorquata*)

The species is widely distributed and locally abundant in beech and beech-hornbeam forests over 65–75 years. It was recorded in all parts of the NP where such habitats exist. In total 85 occupied territories were mapped (Fig. 4) and the expected number for the whole studied territory can be estimated at 150–300 pairs. The biggest part of the localities were situated in the basins of rivers Kozya, Plachkovska, Stanchovhanska, Panicharka and Levicharka. In these five basins were situated about 66 % of all found localities of the species. The breeding density varied between 7.5 and 24.3 pairs/100 ha of optimal habitat, on average 13.5 pairs/100 ha (Fig. 5). Highest density was calculated for 'Studen Kladenets' protected area were logging is prohibited and in the basins of Panicharka and Kozya river. High density of the species was found also in the beech forests to the west of 'Bulgarka' hut. The altitudes of the localities varied between 549 and 1260 m a.s.l., on average 991 m a.s.l. (*n*=80). The forest stand age varied between 65 and 130 years, on average 92.7 years (*n*=24). The percent of the standing dead trees in the stands around the localities varied between 1 and 17.5 %, on average 7.5 % (*n*=20).

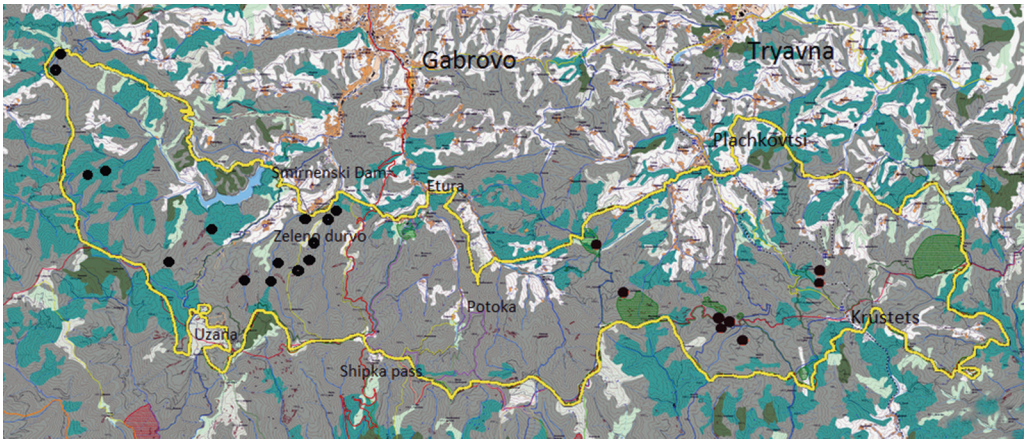

Fig. 3. Map of Red-breasted flycatcher (*Ficedula parva*) breeding localities (black spots).

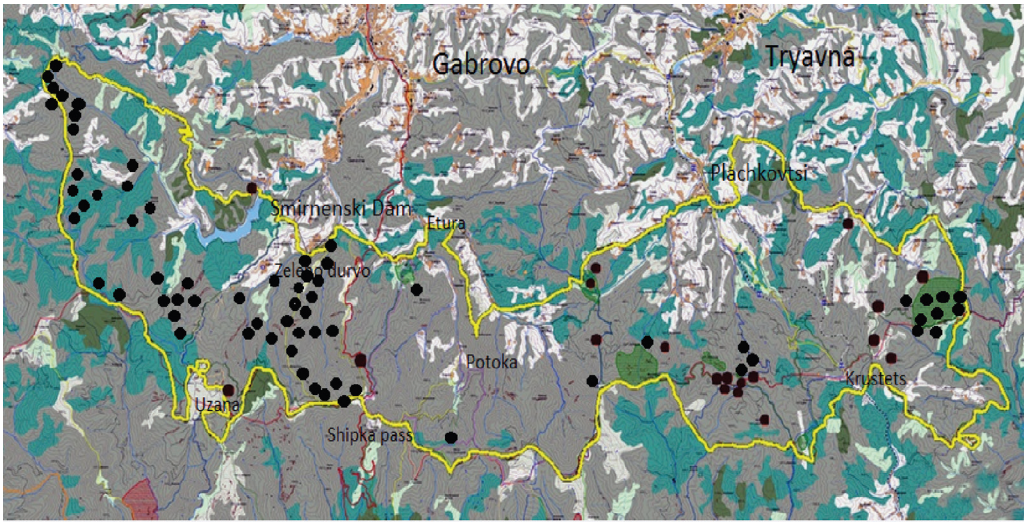

Fig. 4. Map of Semi-collared flycatcher (*Ficedula semitorquata*) breeding localities (black spots).

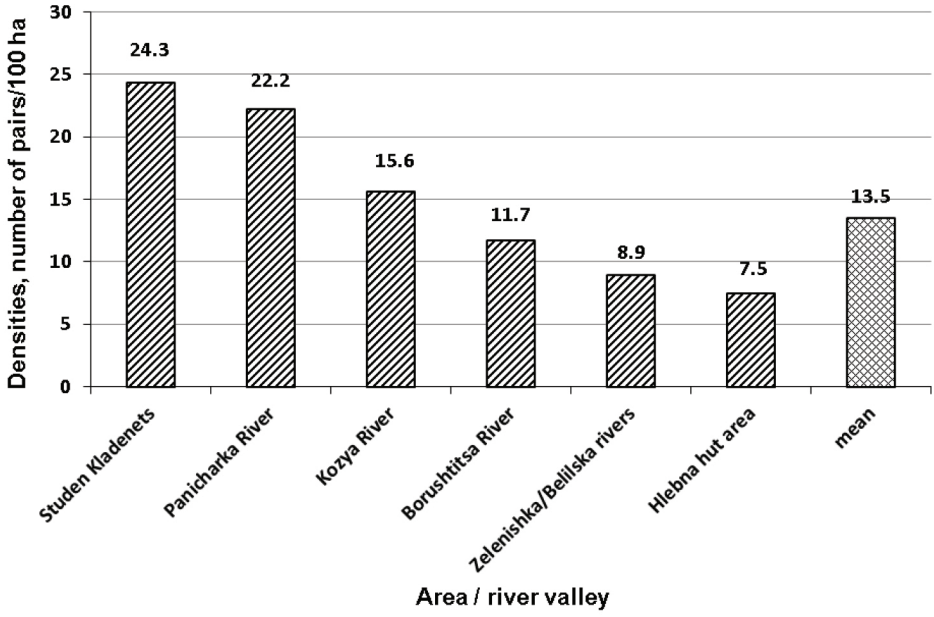

Fig. 5. Breeding densities of Semi-collared flycatcher (*Ficedula semitorquata*) in different parts of NP 'Bulgarka' (number of pairs/100 ha).

Breeding densities of common bird species

Overall densities of the breeding birds calculated along two transects in mature beech forests with presence of Scots pine trees are presented in Figure 6. Two dominant species with highest values of their population density were Robin and Com-

mon chaffinch. As subdominants can be considered Blackcap, Common chiffchaff, Song thrush and Semi-collared flycatcher. Some species characteristic for coniferous forests were also recorded – Goldcrest, Coal tit and Firecrest.

Conservation status of the recorded bird species

Avifauna of 'Bulgarka' NP includes high number of species of conservation concern. From a total of 164 bird species 146 (89 %) are protected by law on national level, 46 species (28 %) are included in Red Data Book Bulgaria (Golemansky et al. 2015), 44 species (26.8 %) are listed in Annex I of the European Bird Directive, 153 species (93.3 %) are included in Bern Convention, 46 species (28 %) are included in Bonn Convention for the protection of migratory species of animals, 30 species (18.3 %) are listed in CITES Convention regulating the trade with endangered species of flora and fauna and three species (1.8 %) are globally threatened, listed in categories above 'Least Concern' of IUCN Red Data List (Pallid harrier, Spotted eagle, Rock partridge).

Discussion

Among the faunistic findings we can mention the record of a pair of Goosanders possibly breeding in 'Smirnenski' damlake. Its shores offer good habitat for breeding of the species – old forests and some small rocks. The only known breeding locality of that species in Bulgaria until now is in 'Kurdzhali' damlake, Eastern Rhodopes where they were found with nestlings annually since 2011 (Borislav Borisov and Ivailo Angelov – pers. com-

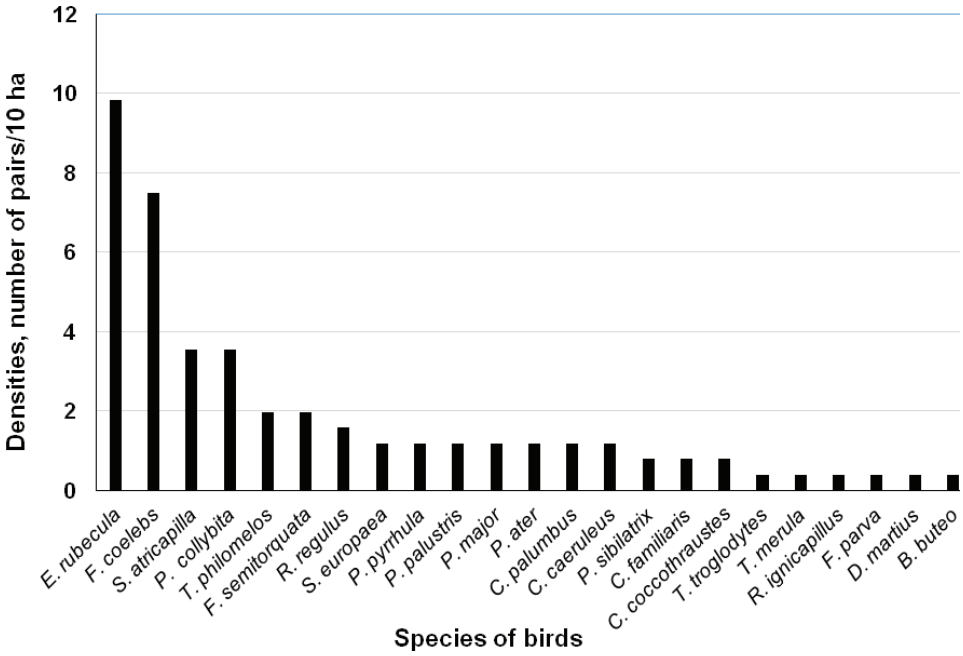

Fig. 6. Densities of breeding birds in mature beech forest with some Scots pine trees in the eastern part of 'Bulgarka' Nature Park (number of pairs/10 ha).

munication). During the last decades the species showed significant progress of its breeding population on the Balkans and in Southeastern Europe, especially on the territory of Serbia, Greece and FYR of Macedonia (Marinkovic et al. 2008, Catsadorakis et al. 2016). In FYR of Macedonia and Greece Goosanders breed in Prespa and Ohrid lakes where the population of 18–29 pairs was found and it showed a positive trend in number (Catsadorakis et al. 2016). In Serbia it was found to nest in a number of large artificial lakes and big rivers (Marinkovic et al. 2008; Drazenko Rajkovic, Milan Ruzic and Dimitrije Radisic, Bird Protection and Study Society of Serbia – pers. communication), mostly in the western parts of the country. It can be supposed that soon Goosanders will colonize other places on Bulgarian territory especially the large artificial lakes in the Rhodopes as 'Dospat, 'Krichim', 'Vucha', 'Batak', 'Golyam Beglik', 'Shiroka Polyana', 'Borovitsa', 'Studen Kladenets' and 'Ivailovgrad'.

In the past Hazel grouse has been widely distributed and quite often observed in Central Stara Planina Mts. It was seen in the mountain forests along the upper Yantra River basin (Reiser 1894). In the second half of 20th century it was appointed as quite rare sedentary bird in Central and Eastern Stara Planina Mts. and it was recorded in an old beech forest above Enina village, Kazanluk municipality – to the south of the present borders of 'Bulgarka' NP (Donchev 1974). Nowadays the presence of the species is confirmed in 'Tsarichina' nature reserve (situated in 'Central Balkan' National Park) and some neighbouring forests close to it (Stoyan Hristov and Rosen Tzonev – pers. communication). In the Atlas of the breeding birds of Bulgaria it is stated that Hazel grouse still lives in Stara Planina Mts. from 'Chuprene' nature reserve to the west to Kotlenska Mt. to the east, including one 10×10 km UTM square in 'Bulgarka' NP with probable breeding (Gerasimov et al. 2007). Probably the rare records in 'Bulgarka' NP represent birds from the population of 'Central Balkan' National Park. During their seasonal movements they most probably leave their breeding territories and reach lower parts of the mountains in eastwards direction. In our opinion there is no vital, self-sustainable population of Hazel grouse in 'Bulgarka' NP.

Woodcock is already extinct from the most of the territory of Bulgaria and its national population was recently estimated at not more than 30–100 or 200–400 breeding 'pairs'/territorial males (Nikolov et al. 2007, Shurulinkov et al. 2015b). In Central Stara Planina Mts. it was observed on 11.06.1963 in an oak-hornbeam forest over the town of Klisura (Donchev 1974). Female Woodcocks with well-developed eggs in ovarium were shot at Kesarevo village, Veliko Turnovo district in spring 1937 – at 40 km northeast from the present borders of 'Bulgarka' NP (Dumanov 1937). The localities found during the present work showed that despite Woodcock is rare, it still nests in these parts of Stara Planina Mts. Because of the early dates of these observations we cannot fully exclude the possibility that part of these displaying males or all of them were spring migrants. Usually the Woodcock starts its display flights in most of its Southern European breeding localities during the last decade of March and the first half of April (Cramp 1983). Thus we consider the breeding of the species in the studied territory as very probable.

In the middle of 20th century Stock dove has been comparatively common in the old oak and beech forest in the whole Central Stara Planina Mts. (Donchev

1974). But as regards the data gathered in the present study it has decreased drastically. This trend is valid for almost all the territory of Bulgaria (Spiridonov 2015).

White-backed woodpecker showed quite a high number and density in the studied territory. That population is naturally tied and it is a part of the well-known core population of the species in 'Central Balkan' National Park. In that core area about 100–150 breeding pairs were found in 28,808 ha of old beech forests (Anonymous 2018), which corresponds to an average density of 3.47–5.2 pairs/1000 ha. In 'Bulgarka' NP the density calculated for the White-backed woodpecker was lower – 2.38 pairs/1000 ha, which can be explained with the lower average age of the forests and much more active forestry activities. Further to the east, in different parts of Eastern Stara Planina Mts., the species is even scarcer and with much lower density despite the presence of optimal habitats (Girgina Daskalova and Peter Shurulinkov – unpublished data). Higher population densities of the White-backed woodpecker were calculated in mixed forests in the Carpathians – 30 pairs/1000 ha (Balaz and Balazova 2012), in Lithuania – 12 pairs/1000 ha (Brazaitis and Pėtelis 2010), in Strandzha Mt., SE-Bulgaria – 7.92 pairs/1000 ha (Shurulinkov et al. 2015a), in Poland, Białowieża forest – 5 pairs/1000 ha (Pugacewicz 2011), in Western Pyrenees – 3.8 pairs/1000 ha (Fernandez and Azkona 1996).

In the past White-backed woodpeckers have been registered at Shipka pass (Jordans 1940), on the nowadays territory of 'Bulgarka' NP.

The breeding density and number of the Semi-collared flycatcher in 'Bulgarka' NP is comparatively high – on average 13.5 pairs/100 ha, similar to the reported for the easternmost parts of Stara Planina Mts. – Eminska Mt. – 12 pairs/100 ha (Georgiev and Iankov 2009). Higher densities were recorded in the Bulgarian part of Belasitsa Mt. – 48.6 pairs/100 ha and in Kozyak Mt. in Southern Serbia – 37.5 pairs/100 ha (Nikolov et al. 2011, Ružić et al. 2011), but these two results were based on much smaller studied territories consisting mainly core zones with optimal habitat for the species.

Breeding density of Red-breasted flycatcher in 'Bulgarka' NP (on average 3.2 pairs/100 ha) also can be evaluated as moderate to high. In Germany its average population density was calculated to be 2.8 pairs/100 ha (Flade 1997) and in Russia it varied between 0.8 and 2.5 pairs/100 ha (Taylor 2006). In Poland, Białowieża primaveral forest, the species average population density is much higher – 12 pairs/100 ha (Tomiałojć et al. 1984).

From the species list of the birds formerly recorded in the studied area, six species were not registered during the present study and in our opinion can be accepted as extinct as breeders or as species with regular occurrence there. These are Griffon vulture, Capercaillie, Eagle owl, Crested tit, Chukar partridge and Alpine chough. Griffon vulture was successfully reintroduced during the last ten years in Vrachanska Mt. (part of Western Stara planiana Mts.) and in Kotlenska Mt. (in Eastern Stara Planina Mts.). It is very likely that birds from these newly established colonies pass over 'Bulgarka' NP during their wanderings between the different feeding places for vultures in Stara Planina Mts. Eagle owl was not recorded during the present study but due to its secretive activity and habitat it cannot be excluded that the species still lives in that area. Furthermore Eagle owl showed

stable or increasing numbers in many parts of Bulgaria during the last 20 years (Peter Shurulinkov and Girgina Daskalova – unpublished data).

The closest to our study territory breeding localities of Alpine chough are in the high altitude rocky areas of 'Central Balkan' National Park (Stoyanov 2015). It is quite possible that separate birds or small flocks of that species can fly to the mountain meadows of 'Bulgarka' NP for feeding, especially out of their nesting period.

The three species showing highest population density in the present study were Robin, Common chaffinch and Blackcap. Similarly these three species were the most numerous dominants in beech-spruce and beech natural forests at Šutovska dolina, Mala Fatra Mts., Slovakia and Babia gora Mt. (Carpathians) in Poland but in much different ratios and densities (Kies 1991, Kornan and Adamik 2014). The Common chaffinch density in Slovak and Polish study is the highest – on average 13.9 pairs/10 ha and 22.1 pairs/10 ha respectively, which is much higher than in the present study (7.5 pairs/10 ha). Robin showed population density of 5.1 pairs/10 ha in Mala Fatra Mts. and 13.3 pairs/10 ha in Babia gora Mts. In 'Bulgarka' NP beech forests Robin was the most numerous species with a density of 9.8 pairs/10 ha. In all three compared forest bird communities Blackcap was on third place by population density showing very similar values of about 4 pairs/10 ha. Densities of two most common flycatchers in 'Bulgarka' NP and Mala Fatra Mts. were also quite similar – 2.0 pairs/10 ha for Semi-collared flycatcher in Bulgaria and 2.62 pairs/10 ha for the Collared flycatcher (*Ficedula albicollis*) in Slovakia.

Conclusions

'Bulgarka' NP has diverse avifauna including many species of high conservation importance. The high bird diversity (163 species) and conservation value of 'Bulgarka' NP can be highlighted when we compare the number of recorded bird species with other similar by territory and habitats protected territories or mountain areas in Bulgaria and SE-Europe – 'Mt. Tara' National Park, Western Serbia – 135 species (Jankovic et al. 2014), 'Mt. Shar' National Park, FYR of Macedonia – 130 species (Melovski et al. 2010), 'Rila Monastery' Nature Park, SW-Bulgaria – 122 species (Anonym. 2004), Bulgarian part of Osogovo Mt. – 111 species (Iankov et al. 2007), Vasilyovska Mt. – 108 species (Nikolov 2007).

Significant populations of Corncrake, Black woodpecker, Grey-headed woodpecker, White-backed woodpecker, Red-breasted flycatcher and Semi-collared flycatcher occur in the nature park. The most important habitat for most of these birds are the old beech forests. Their preservation and sustainable management is very important for ensuring a long-term stability in their population numbers and conservation status.

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