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Breeding avifauna of Opava Mountains and their foothills, Opole Silesia

Grzegorz Kopij

Breeding avifauna of Opava Mountains and their foothills, Opole Silesia. – Acta Mus. Siles. Sci. Natur., 68: 233-248, 2019.

Abstract: In 2010, an attempt was made to quantify bird species breeding in the Opava Mts. and their foothill (c. 135 km^2, including c. 40 km^2 [31%] of forests). The area is situated in the extreme south of Opole Silesia, SSW Poland. For most non-passerine species, total counts were made for the whole area (distribution of their breeding pairs is shown on maps), while for most passerine species, semi-quantitative studies were conducted. A total of 116 breeding and two probably breeding bird species were recorded. Changes in breeding avifauna of the area during the years 1880-2010 are also analysed based on literature search. A total of 134 breeding bird species were recorded over the 130 years. During the years 1990-2010, decreae in numbers has been evidenced for the following species: *Perdix perdix, Tetrastes bonasia, Tyto alba, Athene noctua, Corvus frugilegus,* and *Nycifraga caryocatactes*, In the same period, increase in numbers has been documented for species such as: *Accipiter gentilis, Falco tinnunculus, Columba oenas, Jynx torquilla, Dryocopus martius, Picus canus, Picus viridis, Motacilla cinerea, Luscinia megarhynchos, Phoenicurus phoenicurus, Saxicola rubicola, Locustella naevia, Locustella fluviatilis, Corvus corax and Corvus cornix*. Opava Mts. and its foothills constitute an imporant conservation area. Fifteen species listed in Annex I of the Bird Directive of the E.U. were recorded there, including a sizable population of *Ficedula albicollis*.

Key words: cenzuses, population trends, Sudeten Mts., Głuchołazy, Biskupia Kopa, ladscape parks.

Introduction

Opava Mts. are the only mountains in Opole Silesia, SSW Poland, and as such they have attracted attention of tourists as well as ecologists, conservationists, botanists and zoologists in the last few decades. First observations on birds of the Polish part of the Opava Mts. were made in the end of 19th and at the beginning of the 20th century (Thiemann 1887, Kollibay 1906, Pax 1925, Jitschin 1938). However, quantitative data from this period refer only to a few rare species, such as *Bonasia bonasia, Picus canus,* and *Cinclus cinclus.*

An attempt to estimate numbers of some rare species in Opava Mts. was undertaken again at the end of that century, when a general survey was conducted across the whole area of Silesia in 1978-1987 (Dyrcz *et al.* 1991). Among others, the following species were subject of this survey: *Accipiter gentilis, A. nisus, Falco tinnunculus, Columba oenas, Picus canus, Alcedo atthis, Cinclus cinclus, Motacilla cinerea, Saxicola torquata, Remiz pendulinus, Corvus corax*.

The entire breeding avifauna of the Opava Mts. was a subject of a thorough investigation in the 1990-92 (Kopij 1994), and 1995-96 (Hebda 2001). Breeding avifauna of the foothills was also under Kopij's (1999) survey conducted during the years 1989-1992. Although the numbers of breeding pairs of less common species (mainly non-passerines) were estimated quite precisely, for most common species (mostly passerines), only rough semi-quantitative data were presented.

The aim of this study was to estimate number of breeding pairs of all uncommon species, and to estimate relative abundance of the remaining common species, especially those breeding in forests. The study area has been extended further north to the Opava Mountains Lanscape Park, as to include also neighbouring lowlands. An attempt is also made here to determine population trends for some species during the last 130 years.

Study area

The study area comprises Polish part of the Opava Mountains and their foothills within boundaries as defined by Kondracki (1994), i.e. to Prudnik River in the north, and Biała Gluchołaska in the west. It excudes, therefore, the neighbouring areas of the same mountains in the Czech Republic (Kopij 2005, 2006, 2007a, 2007b) and the hilly areas west of Głuchłazy (Kopij 1996). The town Głuchołazy within its administrative boundaries is included in the study area, while the town Prudnik is excluded, except for its southern not built-up peripheries. Breeding avifauna of Prudnik town was, however, a subject of thorough investigation by Kopij (1995, 2013c).

The total surface of such defined study area is c. 135 km^2. It is administered by two districts: Nysa (with Głuchołazy caunty) in western part, and Prudnik (with Prudnik and Lubrza caunties) in eastern part. The study area includes, therefore, the whole Opava Mountains Landscape Park, with its buffer zone. It is a part of the larger Euroregion Praded/Pradziad/Alvater (Kopij 2017a).

Forests occupy c. 40 km^2 (c. 31% of the total surface area); in the western part: Chrobry. Mt. (c. 650 ha), Bishop's Mt. (with Silvery Mt., and Castel Mt.) – c. 1100 ha, and Olszak Mt. with Charbielin Forest – c. 750 ha; in the eastern part: Prudnicki Forest (c. 1000 ha) and Trzebina Forest (c. 500 ha). Bishop's Mt. is dominated by the spruce *Picea abies*, and Trzebnicki Forest by the oak *Quercus robur*, while other forest compelxes represent mixed forests (Dubiel 1993, Kopij 2013b).

The farmland dominates the foothills. Most of the area is covered with cultivated arable fields with wheat, rape and beat as main crops.

The following villages are located in western part (Nysa district): Konradów, Skowronków, Podlesie (with Gęstwina), Jarnołtówek and Pokrzywna; in the estern part: Moszczanka, Łąka Prudnicka, Wieszczyna, Dębowiec, Chocim, Trzebina, Dytmarów and Krzyżkowice.

There are small fish-ponds near Krzyżkowice, between Krzyżkowice and Dytmarów, west of Trzebina, and in Niemysłowice (together with gravel-pit); and water reserviors in Jarnołtówek, Pokrzywna, and in southern periphery of Prudnik. The main rivers are Biała Głuchołaska to the west and Prudnik to the north. Złoty Potok with Bystry Potok are the main tributaries of Prudnik, while Olszanka is the main tributary of Biała. All the rivers belong to the Nysa Kłodzka river basin.

Material and methods

Studies were carried out from 18 March to 20 July 2010. In total, 26 days were devoted to these studies, which were conducted on foot in forests and in river valleys, while on bicycle in open areas. Special attention was paid to uncommon species, determining in each case the breeding status of each encountered bird (according to atlasing citeria; eg. Sikora *et al.* 2007). Two records in the same site (separated by an interval of at least two weeks) of a bird showing breeding or/and territorial behaviour were interpreted as occupied territory (=breeding pair), as were also two simultanously singing males in an optimal breeding habitat (Bibby *et al.* 1993).

Based on literatute, four study periods were distinguished:

I: 1906–1938, based on Kollibay (1906), Pax (1925) and Jitschin (1938)

II: 1990-92, based on Kopij (1994)

III: 1995-96, based on Hebda (2001).

IV: 2010, based on this study and Kopij (2013a, 2014a, 2014b).

Quantitative studies on birds breeding in forests were conducted from 18 March to 14 July 2010 by mean of the line transec method (Bibby *et al.* 1992). A total of 16 days (86 hours and 50 min.) were devoted for counting (Table 1). Additional 10 days were devoted for study in farmlands and human settlements.

In total 26 days were spent in the field: March: 19, 20, 22, 23, 24; April: 4, 7, 8, 9, 24; May: 22, 24, 25, 26, 28, 29, 30; June: 17, 18, 19, 21, 22, 23; July: 10, 23, 25.

Table 1. Time expenditure for counting birds by means of the line transect method in forests.

	Góra Chrobrego	Kopa Biskupia	Olszak and Charbielin F.	Prudnicki Forest	Trzebina Forest
March	6h40'	6h30'	3h30'	6h20'	5h15'
April	2h55'	8h15'	8h20'	6h00'	
May	5h00'	8h30'		7h30'	5h20'
June			2h30'		4h05'
Total	14h35'	23h25'	14h20'	19h50'	14h40'

SYSTEMATIC LIST OF SPECIES

***Cygnus olor*.** On 17.06.2010, 1 adult with 5 pulli were observed in a water reservoir S of Prudnik. In the same year, another pair without nest was recorded in a fish-pond near Krzyżkowice.

***Anas platyrhynchos*.** Fairly common on rivers, canals, and fish-ponds. 23.06.2010 c. 60 non-breeding individuals were recorded in fish-ponds between Dytmarów and Krzyżkowice.

Tachybaptus ruficollis. On 04.04.2010, two males in a breeding display were observed in fish-ponds SW of Wieszczyna.

***Podiceps cristatus*.** On 17.06.2010, a pair with 2 pulli was recorded in a water reservoir S of Prudnik.

Perdix perdix. In 1990-96, only few pairs were recorded (Kopij 1994, Hebda 2001); in 2010 not recorded at all.

***Coturnix coturnix*.** In 2010, 5 pairs were recorded (Fig. 1).

***Phasianus colchicus*.** Fairly common in farmlands.

***Tetrastes bonasia*.** According to Kollibay (1906), it nested near Jarnołtówek and Pokrzywna, where 4 pairs were recorded in an area of 500 ha forests in 1880. However, it was not recorded during the years 1945-1995 and in 2010 (Dyrcz *et al.* 1991, Kopij 1994, Hebda 2001). On 16.08.2001 one individual was observed on Biskupia Kopa (Kopij, Profus 2014).

***Ciconia nigra*.** In the years 1970-1995 one pair nested near Pokrzywna (Bednorz 1974, Kopij 1994, Hebda 2001, Kopij 2011), and during the years 1978-87, another one near Trzebina (Dyrcz *et al.* 1991). In 2010 not recorded.

***Ciconia ciconia*.** During the years 1978-87, 9 nests were occupied (Dyrcz *et al.* 1991, Kopij 1991). In the subsequent years the numers remained stable (Kopij 1991, 1992, 1994, 1999, 2003, 2017, Kopij *et al.* 2001). In 2010, 6 breedidng pairs: Moszczanka – 2 pairs (Moszczanka 98: 2009: HPm2; 2010: HE2; HPmx.); Trzebina (2010: HPo(x)); Skrzypiec (2010: HPo(x)), Dytmarów and Wierzbiec; seven other pairs nested without breeding success (Fig. 2).

Pernis apivorus. During the years 1978-87 nested near Pokrzywna (Dyrcz *et al.* 1991). In 1995, one probably breeding pair was recorded on Chrobry Mt. near Przylesie (Hebda 2001). In 2010 not recorded.

Circus aeruginosus. On 17.06.2010 one female was observed while hunting in a farmland between Wierzbiec and Moszczanka.

***Accipiter gentilis*.** According to Thiemann (1887) it nested ('spärlich') near Głuchołazy. During the years 1978-87 only one pair was recorded in Trzebina Forest (Dyrcz *et al.* 1991). In 2010 – 9 occupied territories, including 3 in Prudnik Forest (Fig. 3).

***Accipiter nisus*.** On 23.03.2010 and 4.4.2010 a hunting individual was observed in a dense young spruce-larch forest around a fish-pond near Wieszczyna (Fig. 4).

***Buteo buteo*.** In 2010, 32 occupied territories were mapped in the whole study area (Fig. 5).

Aquila pomarina. In 1997 one probably breeding pair was recorded in Charbielin Forest (Hebda 2001). In 2007, a nest with chicks was found near Osoblaha in the Czech Republic, close to the Czech/Polish border near Racławice Śląskie (Kondělka & Petro 2007). In 2010 not recorded.

***Falco tinnunculus*.** Recorded in Głuchołazy, where 3 pairs nested in 2010 (Kopij 2014b), and in Prudnik, where 4 pairs were recorded (Kopij 2013c) (Fig. 4). During the years 1978-87 four breeding sites were recorded (Dyrcz *et al.* 1991)

Falco subbuteo. In 1880 and 1881, breeding was recorded near Prudnik (Kutter & Kollibay 1882, 1883). During the years 1978-87 breeding pair was recorded near Głuchołazy (Dyrcz *et al*. 1991). In 2010 breeing pair was recorded in Wężowa Góra (363 m a.s.l.) in Trzebina Forest (Fig. 4).

***Grus grus*.** On 21.06.2010 one individual was passing along Złoty Potok near the water reservoir in Pokrzywna. In 2008, two breeding pairs were recorded around fish-ponds near Slezské Pavlovice in Czech Republic, just near the Polish/Czech border near Krzyżkowice (Kondělka & Petro 2008). Not recorded as breeding before 2008 (Kollibay 1906, Pax 1925, Dyrcz *et al*. 1991).

***Crex crex*.** Not recorded during the years 1978-87 (Dyrcz *et al*. 1991). In 2010, one singing male was heard on Złoty Potok near Pokrzywna.

Gallinula chloropus. In 1878, it was a common breeding species near Prudnik (Kutter &, Kollibay 1882). During the years 1989-1992, 2-3 pairs were recorded in a gravel-pit in Niemysłowice (Kopij 1999). In 2008-2010 2-4 pairs were recorded in a water reservior S of Prudnik; 1 pair in water reservoir above Jarnołtówek (21.06.2010: 1 ad. and 2 pulli); 1-2 pairs in fish-ponds between Krzyżkowice and Dytmarów; 1 pair in a fish-pond W of Trzebina.

***Fulica atra*.** In 1878, it was a common breeding species near Prudnika (Kutter & Kollibay 1882). For the years 1989-92 the species was erronously omitted in Kopij (1999); in those years 3-5 pairs nested in a gravel-pit in Niemysłowice, and 2 pairs in a water reservoir S of Prudnik. During the years 2008-2010, 4-5 pairs nested in fish-ponds in Niemysłowice, 2 pairs in the water reservoir S of Prudnik, and 1 pair in a fish-pond W of Trzebina.

***Charadrius dubius*.** Kutter and Kollibay (1882) recorded it as breeding near Prudnik. During the years 1978–1987 breeding sites were localised on the Prudnik River below Dytmarów and near Skrzypiec (Dyrcz *et al.* 1991). In 1989-1992 one pair was recorded in a sand-pit near Jasiona (Kopij 1999), where it nested also in 2010. Single breeding pairs were also recorded in 2010 on Prudnik River just above the Polish/Czech border, and near Dytmarów.

Vanellus vanellus. In 2010, 4 breeding pairs were recorded on the Prudnik River, and one pair in arable grounds NW of Wieszczyna (Fig. 1).

***Scolopax rusticola*.** According to Kutter and Kollibay (1882) and Kollibay (1906) it nested near Pokrzywna and Jarnołtówek. Not recorded during the years 1978-87 (Dyrcz *et al.* 1991). On 19.03.2010, it was observed in a suitable breeding habitat in Charbielin Forest, but probably it was there on passage.

***Chroicocephalus ridibundus*.** In 2010, two breeding pairs were recorded in a water reservoir S of Prudnik; and 2-3 breeding pairs in a fish-pond in Niemysłowice.

***Sterna hirundo*.** In 2010, possibly a breeding pair was recorded in a fish-pond between Dytmarów and Krzyżkowice.

***Columba livia f. domestica*.** As a breeding species recorded only in Prudnik (50-80 pairs; Kopij 2013b) and in Głuchołazy (30-50 par; Kopij 2014b).

***Columba oenas*.** During the years 1978-87 known only from one site near Pokrzywna (Dyrcz *et al.* 1991). In 2010, 4 sites with 9 calling males were mapped (Fig. 6). First arrival date: 19 March 2010 in Olszak Mt.

Columba palumbus. It comprises 0.5-1.5% of all breeding pairs in forests. In Prunik town, more than 100 pairs were recorded in 2010, including 58 pairs in a loose colony in the urban park (Kopij 2013b). In Głuchołazy – 3-6 pairs were recorded in 2010 (Kopij 2014b). First arrival date: 19 March 2010 in Niemysłowice Forest.

Streptopelia decaocto. Common in human settlements: Prudnik – 70-100 pairs (Kopij 2013); Głuchołazy – 51 pairs, including 12 pairs in the city centre (Kopij 2014b); Trzebina – 7, Krzyżkowice – 2 (Kopij 2014a); Konradów – 9, Jarnołtówek – 1 pair only (in the village center), Pokrzywna – 1 pair (near Chrobry Bldg.); Moszczanka-Łąka Pr. – 14 pairs. Not recorded in small villages: Wieszczyna, Dębowiec, Chocim, Podlesie and Gęstwina (Kopij 2014a, 2014b).

***Streptopelia turtur*.** In 2010, 38 pairs were recorded (Fig. 6).

***Cuculus canorus*.** In 2010, 23 male's territories were located (Fig. 7).

***Tyto alba*.** In 2010 – not recorded. In the past, it nested in Głuchołazy, Jarnołtówek, Łąka Prudnicka, and Trzebina (Kopij 1990).

***Athene noctua*.** During the years 1978–1992 single pairs nested in Łąka Prudnicka and Jasiona (Dyrcz *et al.* 1991, Kopij 1999).

***Strix aluco*.** Fairly common.

Bubo bubo. In 1995 recorded as breeding in Kopa Biskupia (Hebda 1997).

***Asio otus*.** Uncommon breeding resident.

***Apus apus*.** In 2010, 50-100 pairs nested in Prudnik (Kopij 2013); 34-50 pairs in Głuchołazy (Kopij 2014b); and 4 pairs in Podlesie (Kopij 2014b).

Alcedo atthis. In 1880, it was 'fairly common resident near Prudnik' (Kutter & Kollibay 1882). During the years 1978-87 one pair was nested on Prudnik near Dytmarów (Dyrcz *et al.* 1991), while in 2010 one pair was recorded on Prudnik near Niemysłowice.

***Coracias garrulus*.** In 1880, it was recorded as a breeding species near Prudnik (Kutter & Kollibay 1882). However, Kollibay (1906) already did not confirm it in the whole Prudnik Land, including Opava Mts.

***Upupa epops*.** 25 July 2010 calling male was heard in Konradów near Augusta Victoria's Monument (Kopij 2014b); and 8 April 2010 another male was heard in a farmland S of Moszczanka-Łąka Prudnicka. Not recorded during the years 1978-87 (Dyrcz *et al.* 2010).

***Jynx torquilla*.** In 2010, 6 breeding pairs were recorded (Fig. 8).

***Picus canus*.** According to Kollibay (1906), it nested near Głuchołazy. However, during the years 1978-87 it was not discovered in Opava Mts. at al (Dyrcz *et al.* 1991), being probably overlooked, as in 2010, 8 pairs were recorded (Fig. 9).

***Picus viridis*.** In 2010, 6 pairs were recorded (Fig. 9).

***Dryocopus martius*.** In 2010, 14 pairs were recorded (Fig. 9).

***Dendrocopos major*.** A dominant species in Bishop's Mt., Olszak Mt. and Charbielin Forest; subdominant elsewhere.

***Dendrocopos medius*.** In 2010, 11 pairs were recorded (Fig. 8)

***Dendrocopos minor*.** In 2010, 7 occupied territories were located (Fig. 8).

***Alauda arvensis*.** Common in famlands.

***Lulula arborea*.** 24.03.2010, a singing male was heard in Trzebina Forest near the Polish/Czech border.

***Hirundo rustica*.** Common in human settlements. In 2010 in Głuchołazy – 10-20 pairs (Kopij 2014b); at least each 20 pairs in the following villages: Konradów, Łąka Pr., Moszczanka, Trzebina; each few pairs in Jarnołtówek, Pokrzywna, Podlesie and Gęstwinia (Kopij 2014b).

***Delichon urbica*.** In 2010: Głuchołazy – 100-200 pairs (Kopij 2014b); Gęstwina on Oleśnica River – 73 nests (Kopij 2014b); Trzebina, – c. 30 nests; Jarnołtówek, 'Ziemowit' – c. 20 pairs. A few pairs nested in most other villages.

***Anthus trivialis*.** In Trzebina Forest it composed 2.4% of all breeding birds; 0.1-1.2% elsewhere.

Anthus campestris. In 2010, probably breeding in a sand-pit between Skrzypiec and Trzebina. In the same site, it was recorded also in 1978-1987 (Dyrcz *et al.* 1991).

Anthus pratensis. In 2010 not recorded. In 1990-92, single pairs were nested near Trzebina and Chocim (Kopij 1994).

***Motacilla flava*.** Fairly common in farmlands. In 2010, at leat 10 breeding pairs.

***Motacilla cinerea*.** During the years 1978-87: nested only at two sites: on Biała Głuchołaska near Głuchołazy and on Złoty Potok near Pokrzywna (Dyrcz *et al.* 1991). During the years 1995-1996: 12-13 pairs (Hebda 2001); 2000-2007: 22-23 pairs, including 7 pairs on Złoty Potok, 7 pairs on Biała Głuchołaska and 5 pairs on Bystry Potok (Czapulak *et al.* 2008). The numbers from 2000-2007 were probably overestimated (too staggered study period). In 2010, 17 pairs were recorded (Fig. 10).

***Motacilla alba*.** Fairly common, mosty in human settlements: Głuchołazy – 5-7 pairs (Kopij 2014b), Pokrzywna-Jarnołtówek – 3 pairs (Kopij 2014b), Łąka Prudnicka-Moszczanka – 2 pairs (Kopij 2014a).

***Cinculs cinclus*.** According to Kollibay (1906), it nested on Złoty Potok in Pokrzywna, and on Biała Głuchołaska in Głuchołazy. During the years 1978-87 also known only from this site (Dyrcz *et al.* 1991). In 2010 r. – 7 breeding pairs were recorded, including 4 pairs on Biała Głuchołaska, 2 pairs on Złoty Potok and one pair on Bystry Potok (Fig. 11).

***Troglodytes troglodytes*.** Common in forests.

***Prunella modularis*.** Fairly common in forests.

***Erithacus rubecula*.** Everywhere in forests a dominant species (in particular forests: 6.9-11.7%, x=8.1%).

***Luscinia megarhynchos*.** In 2010, 20 breeding pairs were recorded (Fig. 12). Not recorded in the vicinities of Głuchołazy, Jarnołtówek and Pokrzywna.

***Phoenicurus ochruros*.** It nested mainly in human settlements. In 2010: Prudnik – 20-40 pairs (Kopij 2013b); Głuchołazy – 27 pairs (Kopij 2014b), Trzebina – 8 pairs (Kopij 2014a), Pokrzywna-Jarnołtówek – 7 pairs, Konradów – 11 pairs, Podlesie-Gęstwina – 7 pairs (Kopij 2014b).

***Phoenicurus phoenicurus*.** In 2010, 26 breeding pairs were recorded, most of them nested near Pokrzywna and Jarnołtówek; in Głuchołazy – 2-4 pairs (Kopij 2014b); Prudnik – 5-7 pairs (Kopij 2013b); Podlesie – 3 pairs (Kopij 2014b) (Fig. 13).

***Saxicola rubetra*.** Fairly common in farmlands.

***Saxicola rubicola*.** In 2010, 18 breeding pairs were recorded (Fig. 14). In 1978-87 – not recorded at al (Dyrcz *et al.* 1991).

***Oenanthe oenanthe*.** During the years 1989–1993 one pair nested in a sand-pit S of Jasiona (Kopij 1999), where it nested also in 2010.

***Turdus merula*.** Subdominant (3.2%) species in all forests. Common also in human settlements: Prudnik – 30-50 pairs (Kopij 2013c); Głuchołazy – 20 pairs in April 2010 (Kopij 2014b); Konradów – 9 pairs (Kopij 2014b); Moszczanka – 6 pairs, Łąka Pr. – 5 pairs (Kopij 2014a).

***Turdus pilaris*.** Fairly common in farmlands. It nested also in Głuchołazy – 4-6 pairs (Kopij 2014b), Prudnik – 4-6 pairs (Kopij 2013c) and Konradów – 6 pairs (Kopij 2014b).

***Turdus philomelos*.** Subdominant in all forests (2.8%). Uncommon in human settlements: Prudnik – 4-6 pairs (Kopij 2013b); Głuchołzay – 2-3 pairs (Kopij 2014b); Pokrzywna-Jarnołtówek – 2 pairs (Kopij 2014b); Moszczanka – 4 pairs.

***Turdus viscivorus*.** In 2010, 36 breeding pairs were recorded (Fig. 15), and the whole population was estimated at 40-60 pairs. The proportion of *T. merula : T. philomelos : T. viscivorus* was 0.44 : 0.46 : 0.10 (n=423).

***Locustella naevia*.** Thiemann (1887) reported it as breeding near Głuchołazy. In 2010, 20 breeding pairs were recorded (Fig. 16).

***Locustella fluviatilis*.** In 2010, 11 breeding pairs were recorded (Fig. 16).

Locustela luscinioides. During the years 1978-1987, it was recorded in one breeding site on Prudnik near Dytmarów. Not recorded in 2010.

***Acrocephalus schoenobaenus*.** 28.04.2010 one singing male was heard in a marshland N of Krzyżkowice.

***Acrocephalus palustris*.** Common in farmlands and on forest edges.

***Acrocephalus scirpaceus*.** In 2010, it was recorded as breeding in reedbeds between Dytmarów and Krzyżkowice (2-3 pairs).

***Acrocephalus arundinaceus*.** In 2010, 5 pairs were recorded in a water reservior S of Prudnik, 4 pairs in Niemysłowice gravel pit, 3 pairs in a sand-pit between Trzebina and Skrzypiec, and 1 pair in a reedbed between Dytmarów and Krzyżkowice.

***Hippolais icterina*.** Fairly common in human settlements, e.g. Prudnik – 2-5 pairs (Kopij 2013c); Głuchołazy – 2-5 pairs (Kopij 2014b), Konradów – 2 pairs (Kopij 2014b). Rare in forests.

***Sylvia curruca*.** Fairly common in human settlements: Prudnik – 7-12 pairs (Kopij 2013c); Głuchołazy – 7-10 pairs (Kopij 2014b); Trzebina – 5 pairs (Kopij 2014a). Rare in forests and farmlands.

***Sylvia communis*.** Common in farmlands; uncommon in forests.

***Sylvia borin*.** Fairly common in forests and farmlands.

***Sylvia atricapilla*.** Dominant in all forests (5.0-10.5%; *x*=8.4); common also in human settlemnts, e.g. in Prudnik – 10-15 pairs (Kopij 2013b); Głuchołazy – 4-6 pairs (Kopij 2014b); Trzebina – 13 pairs (Kopij 2014a). The proportion between *S. atricapilla* and remaining *Sylvia* species was 0.88 : 0.12 (n=335).

***Phylloscopus sibilatrix*.** In Trzebina Forest, it was recorded as subdominant (3.9%) and the most numerous *Phylloscopus* species; in other forests, it comprised less than 2%.

***Phylloscopus collybita*.** A dominant species (5.0-5.1%) in Chrobry's Mt. and Bishop's Mt.; subdominant elsewhere; Prudnik – 15-20 pairs (Kopij 2013c); Głuchołazy – 32 pairs (Kopij 2014b). First arrival date: 19 March 2010, Niemysłowice Forest. In forests the proportion: *P. collybita : P. sibilatrix : P. trochilus* was 0.71 : 0.21 : 0.08 (n=271).

***Phylloscopus trochilus*.** Fairly common in forests, human settlements and farmlands. In Olszak Mt. and Charbielin Forest – 2.1%; below 0.5% elsewhere. In Konradów – at least 6 pairs in 2010 (Kopij 2014b).

***Phylloscopus trochiloides*.** 25.05.1997 one singing male was recorded on Bystry Potok valley (Hebda 2001).

***Regulus regulus*.** Dominant species in Chrobry's and Bishop's Mts., where spruce predominates; sudominant elsewhere; but in Trzebina Forest (mostly oaks) only 0.8%.

***Regulus ignicapillus*.** Subdominant in Bishop's Mt. (2.4%); <1% in other forests. Single singing males were recorded in urban parks in Głuchołazy and Pokrzywna. The proportion between *R. regulus* and *R. ignicapillus* was 0.79 : 0.21 (n=256). Arrival date: 20 March 2010 in Głuchołazy.

Muscicapa striata. Subdominant in all forests (2.4%). In most villages: 1-2 pairs (Kopij 2014ab); Prudnik – 3-5 pairs (Kopij 2013c); Głuchołazy – 2-5 pairs (Kopij 2014b).

***Ficedula albicollis*.** During the years 1978-87 – not recorded at all (Dyrcz *et al.* 1991). In 2010, 19 breeding pairs were recorded (Fig. 17).

***Ficedula hypoleuca*.** In overall, it was much less numerous than the sibbling species. The proportion between *F. albicollis* and *F. hypolecuca* was 70.3 : 29.7 (n=37). In the western part of the study area *F. hypoleuca* was as numerous as *F. albicollis* (0.50 : 050; n=18),while in the eastern part the reverse was true (89.5 : 10.5; n=19).

***Ficedula parva*.** 25.05.2010 one singing male was heard in Bystry Potok valley in 'Cicha Dolina' nature reserve. During the years 1978-87 – not recorded (Dyrcz *et al.* 1991).

***Aegithalos caudatus*.** Uncommon, below 0.7% of all breeding birds in forests.

***Parus palustris*.** Fairly common.

***Parus montanus*.** Rare.

***Parus cristatus*.** Fairly common.

***Parus ater*.** Dominant and the most numerous of all tit species (*Paridae*) in Chrobry's and Bishop's Mts.; subdominant in other forests.

***Parus caeruleus*.** Subdominant in Olszak Mt., Charbielin Forest and Trzebina Forest; below 2% in other forests. In Moszczanka – 14 pairs in 2010 (Kopij 2014a).

***Parus major*.** A dominant species (4.4-9.6%; *x*=6.2) in all forests, except for Chrobry's Mt., where 4.4%. The percentage proportion among *P. major : P. ater : P. caeruleus : P. cristatus : P. palustris* was 45.0 : 33.7 : 13.2 : 5.2 : 3.0 (n=796). Common also in human settlements, eg. in Moszczanka – at least 23 pairs in 2010 (Kopij 2014a).

***Sitta europaea*.** A dominant species (4.3-9.6%; *x*=5.9) in all forests. In Prudnik – 7 pairs (Kopij 2013c); Głuchołazy – 6 pairs (Kopij 2014b). Not recorded in villages.

***Certhia familiaris*.** Recorded as subdominant in most forests (*x*=1.9%).

***Certhia brachydactyla*.** Uncommon. The proportion between *C. familiaris* and *C. brachydactyla* was 86.8 : 13.2 (n=121), in western part of the study area: 96.7 : 3.3 (n=61), in the eastern part: 76.7 : 23.3 (n=60).

***Remiz pendulinus*.** During the years 1978-87 – not recorded. In 2010, single breeding pairs were recorded in willows near the water reservoir above Jarnołtówek, and on Prudnik River near Prudnik (Fig. 18).

***Oriolus oriolus*.** In 2010, 38 pairs were recorded (Fig. 19).

***Lanius collurio*.** Fairly common in farmlands.

***Lanius excubitor*.** 28.04.2010 one individual was recorded on Prudnik River near Krzyżkowice; 17.06.2010 one individual was observed in a farmland S of Wierzbiec.

***Garrulus glandarius*.** Fairly common. In particular forest, it comprised 1-2% of all breeding birds.

***Nucifraga caryocatactes*.** For the first time recorded in Opava Mts. on 12.09.1887 near Pokrzywna (Kollibay 1906). In 1990-92 – 4-5 pairs (Kopij 1994), but in 2010 not recorded.

***Pica pica*.** Fairly common in human settlements: Prudnik – 3-10 pairs (Kopij 2013); Głuchołazy – 3-5 pairs (Kopij 2014b); Moszczanka-Łąka Prudnicka – 5 pairs (Kopij 2014a).

***Corvus monedula*.** In 2010, it was recorded in Prudnik (20-40 pairs; Kopij 2013c), Głuchołazy (20-40 pairs; Kopij 2014b), Dytmarów (5 pairs) and Skrzypiec (1 pair).

***Corvus frugilegus*.** In 2010, a colony with c. 358 nests was established in a park in Prudnik, and another small one (20 nests) near the railway station in this town (Kopij 2013c). A breeding colony with 28 occupied nests was also established in a small park in Skłodowska Str. in Głuchołazy (Kopij 2014b).

***Corvus cornix*.** In 2010, 13 breeding pairs were recorded, including 6 pairs on Prudnik River (Fig. 20).

***Corvus corax*.** In 2010, 13 breeding pairs were recorded (Fig. 20). During the years 1978-87 – not recorded at al (Dyrcz *et al.* 1991).

***Sturnus vulgaris*.** In most forests recorded as subdominant. Common also in human settlemnts.

***Passer domesticus*.** Breeding recorded only in human settlements: Głuchołazy – 70-150 pairs (Kopij 2014b), including 33 pairs in the town centre (12 ha); Konradów – 45, Podlesie – 12, Jarnołtówek – 19, Pokrzywna – 5, (Kopij 2014b); Trzebina >60 par, Moszczanka – 42, Łąka Prudnicka – 41; Dębina – 3 pairs (Kopij 2014a).

***Passer montanus*.** Fairy common in human settlements.

***Fringilla coelebs*.** The most common species in forests; strongly dominating over other species in all forests (10.1-17.2%; *x*=14.6%); Prudnik – 10-20 pairs (Kopij 2013c); Głuchołazy – 13 pairs (Kopij 2014b), Konradów – 17 pairs (Kopij 2014b), Trzebina – 5 pairs (Kopij 2014a).

***Serinus serinus*.** Common in human settlements, e.g.: Prudnik – 20-40 pairs (Kopij 2013c); Głuchołazy – 14 pairs (Kopij 2014b), Trzebina – 11 pairs (Kopij 2014a). Rare in forests.

***Carduelis chloris*.** Common in human settlements, e.g.: Moszczanka – 17 pairs, Łąka Prudnicka – 8 pairs (Kopij 2014a), Konradów – 14 pairs (Kopij 2014b). Rare in forests.

***Carduelis carduelis*.** Common in human settlements, e.g.: Moszczanka – 10 pairs, Łąka Prudnicka – 5 pairs (Kopij 2014a); Pokrzywna-Jarnołtówek – 9 pairs (Kopij 2014b). Common also in farmlands, but rare in forests.

***Carduelis spinus*.** Uncommon.

***Carduelis cannabina*.** Common in human settlements, e.g. in Moszczanka – 6 pairs, Łąka Pr. – 8 pairs (Kopij 2014a).

Loxia curvirostra. Fairly common in spruce forests, especially on Chrobry Mt.

Loxia leucoptera. In 1889, a young individual was recorded in Schönwald near Głuchołazy, and near Pokrzywna in 1892 and 1902 (Kollibay 1906).

Carpodacus erythrinus. On 29.06.1999 one singing male was heard near water reservoir on Złoty Potok in Jarnołtówk (Hebda 2001).

***Pyrrhula pyrrhula*.** Fairly common in spruce forests.

Coccothraustes coccothraustes. In most forests recorded as subdominant (1.9%).

***Emberiza citrinella*.** A dominant species in Olszak Mt. and Charbielin Forest (5.9%); subdominant elsewhere; in Chrobry Mt. – only 0.2%. Also fairly common in some villages, e.g. in Konradowa – 12 pairs, Moszczanka-Łąka Pr. – 6 pairs (Kopij 2014a); but not recorded in Jarnołtówek and Pokrzywna (Kopij 2014b);

***Emberiza hortulana*.** In 2010, 3 breeding sites were located: 3 singing males on a forest egdge SW of Krzyżkowice, one male S od Moszczanka on Szyniecki Potok, and one male between Wieszczyna and Pokrzywna along the Polish/Czech border (Fig. 19).

***Emberiza schoeniclus*.** Fairy common in farmlands; 10-20 pairs. In 2010, one pair nested in a rape cultivation near Trzebina, far from any water bodies.

***Miliaria calandra*.** Fairly common in farmlands. In 2010, more than 20 breeding pairs.

Discussion

General characteristic of the breeding avifauna

In 2010, a total of 116 breeding and two probably breeding bird species were recorded in Opava Mts (Table 2, Fig. 1-20). This comprises 62.5% of all breeding bird species recorded in Silesia during the years 1978-87 (based on Dyrcz *et al.* 1991) and 51.1% of all breeding bird species recorded in Poland during the years 1990-2004 (based on Sikora *et al.* 2007). In comparison with other mountains in Sudety (Dyrcz & Mikusek 1996; Mikusek 1996; Flousek & Gramsz 1999; Mikusek & Dyrcz 2003), this is quite a high number. However, it is important to point out, that in this study also the foothills were included as study area. This could increase the number of breeding species by some water birds. On the other hand the study period was restricted to one year only, and a few breeding species could passed undetected.

Out of 116 species recorded in 2010 in Opava Mts., Non-Passriformes comprised 33.9%, while Passeriformes – 66.1%. In the former group water birds (9 species), raptors (6 species) and woodpeckers (7 species) were the most representative groups. Among Passeriformes the most speciose were Turdidae (11 species), Fringillidae (10 species) and Paridae (8 species).

Few species breed in Opava Mts. in denities higher than in other parts of Opole Silesia. The group includes *Accipiter gentilis, Falco tinnunculus, Columba oenas, Motacilla cinerea, Cinclus cinclus, Saxicola rubicola, Turdus viscivorus, Regulus ignicapillus, Parus montanus* and *Loxia curvirostra*.

Changes in the breeding avifauna over the years 1880-2010

Over the last 130 years (1880-2010), a total of 134 bird species were recorded as breeding in Opava Mts., which comprises 70.7% of Silesian (based on Dyrcz *et al.* 1991) and 57.9% of Polish breeding avifauna (based on Sikora *et al.* 2007). For three species, *Circus aeruginosus, Phylloscopus trochiloides* and *Loxia leucoptera*, there is no direct proof of their breeding. They can be regarded as possible breeding in Opava Mts. *Cygnus olor, Chroicocephalus ridibundus, Sterna hirundo, Podiceps cristatus* and *Fulica atra* were found to breed only in the foothills, while *Aquila pomarina* and *Grus grus* nested extralimitary in the Czech Republic, close to the Polish/Czech border.

Before 1990, but after 1945, the following species were recorded as new for the breeding avifauna of Opava Mts.: *Streptopelia decaocto, Ciconia ciconia, Ciconia nigra, Corvus frugilegus, Locustella luscinioides* (based on Pax 1925, Dyrcz *et al.* 1991). The following species were recorded as breeding for the first time in Opava Mts. during the years 1990-97: *Bubu bubo, Corvus corax, Saxicola rubicola, Locustella fluviatilis, Ficedula albicollis, Acrocephalus schoenobaenus,* and *Emberiza hortulana* (Kopij 1994, Hebda 2001). In 2010, the following species were recorded as breeding in Opava Mts. for the first time: *Cygnus olor, Tachybaptus ruficollis, Podiceps cristatus, Chroicocephalus ridibunda,* and *Remiz pendulinus* (this study).

During the years 1990-2010, for the following species decrease in numbers has been evidenced: *Perdix perdix, Tetrastes bonasia, Tyto alba, Athene noctua, Corvus frugilegus,* and *Nycifraga caryocatactes*, In the same period, increase in numbers has been documented for species such as: *Accipiter gentilis, Falco tinnunculus, Columba oenas, Jynx torquilla, Dryocopus martius, Picus canus, Picus viridis, Motacilla cinerea, Luscinia megarhynchos, Phoenicurus phoenicurus, Saxicola rubicola, Locustella naevia, Locustella fluviatilis, Corvus corax and Corvus cornix*.

Protection of the avifauna

Several bird species recorded in Opava Mts. are listed in Annex 1 of the Bird Directive of E. U. (Directive 79/409/EWG from 2 April 1979): *Ciconia nigra, Ciconia ciconia, Pernis apivorus, Circus aeruginosus, Crex crex, Grus grus, Sterna hirundo, Alcedo atthis, Dryocopus martius, Picus canus, Dendrocopos medius, Ficedula albicollis, Lanius collurio, Lulula arborea. Emberiza hortulana.* Especially common are the woodpeckers and *Ficedula albicollis*.

The most serious threat for the breeding avifauna is the habitat (i.e. forest) destruction. In the last few decades a quick and large removal of old stands of trees, especially spruces, have been done in some places of the Chrobry Mt. and Prudnicki Forest. Affected species include woodpeckers, raptors, owls, *Ficedula albicollis,* and *Columba oenas*. The Prudnik River below the town of Prudnik and Złoty Potok below Jarnołtówek are badly polluted with the communal sewage and may pevent *Alcedo atthis, Charadrius dubius, Actitis hypoleucos Cinclus cinclus,* and *Motacilla cinerea* to breed there. Tourists and forest workers (felling trees in the breeding season) may negativelly affect the numbers of *Bonasia bonasia, Grus grus, Ciconia nigra, Accipiter gentilis* and *Aquila pomarina*.

Larger parts of the Opava Mts. are protected in the form of Landscape Park. There are also three reserves established within this Park (Kopij 2013a). Based on the distrribution maps of endangered, rare and protected species (Fig. 1-20), the following other areas are postulated to be protected in the form of nature reserve: the water reservoir and its surrounding on Złoty

Potok above Jarnołtówek; Bystry Potok Valley from its source to the confluence with Złoty Potok; and the tree stand on the Lipowiec Mt. in Trzebnica Forest. The whole Prudnicki Las and its surroundings (meadows) is postulated to be protected as so called nature-landscape complex.

Table 2. Changes in the status and numbers of birds breeding in Opava Mts. over the years 1906-2010.

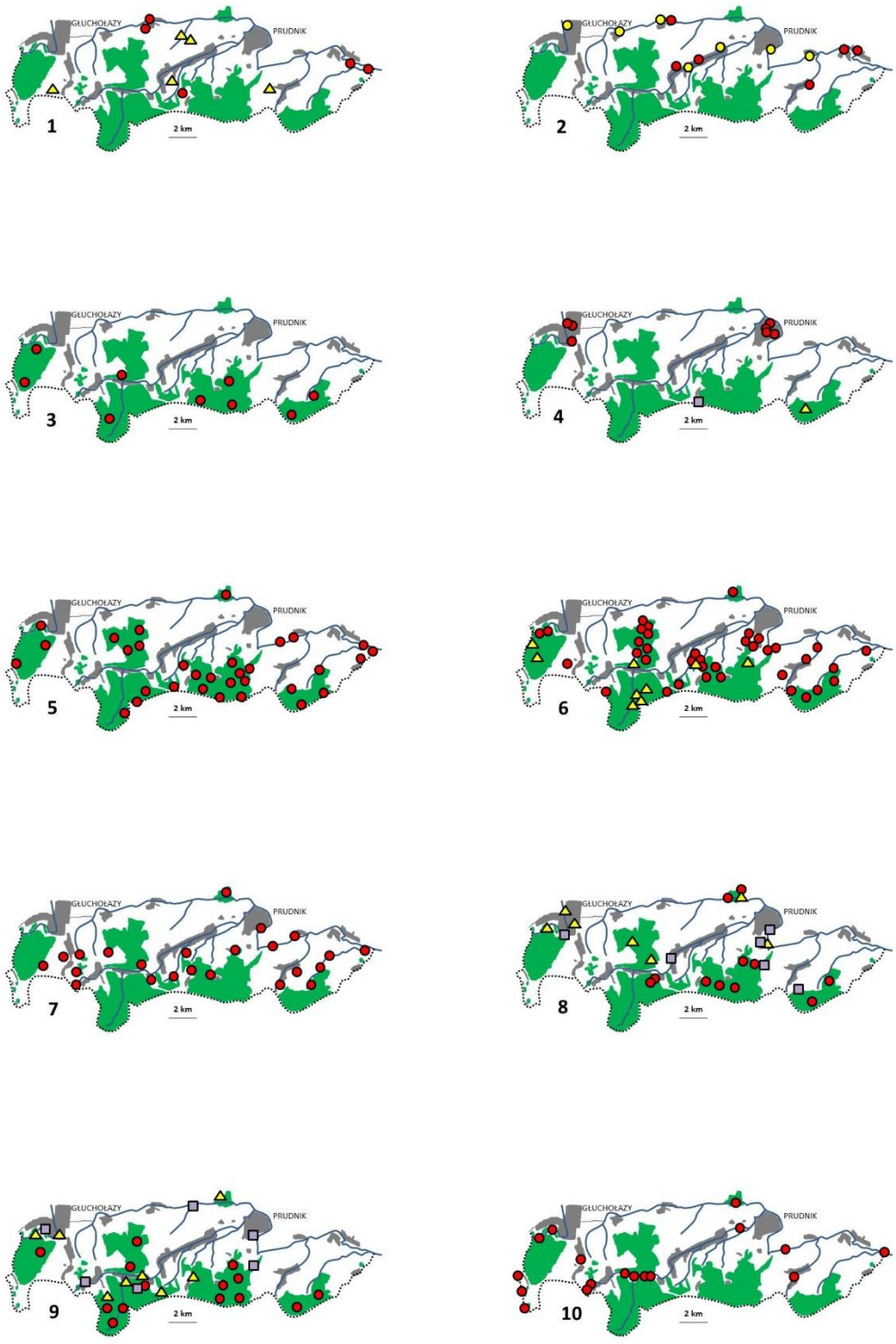
Species	1906-38	1990-92	1995-96	2010	Trend
Cygnus olor	-	-	-	1	
Anas platyrhynchos	*	*	-	*	
Perdix perdix	*	3	3	-	
Coturnix coturnix	*	-	8-11	5	↑
Phasianus colchicus	*	*	-	*	
Tachybaptus ruficollis	-	-	1	1	
Podiceps cristatus	-	-	-	1	
Ciconia nigra	-	1	1	-	
Ciconia ciconia	-	5-6	12	6	↑↓
Pernis apivorus	?	-	1?	-	
Circus aeruginosus	-	-	-	1?	
Accipiter gentilis	*	5	4-5	9	↑
Accipiter nisus	*	-	1	1?	
Buteo buteo	*	25	46-50	32	
Aquila pomarina	-	-	1?	(1)	
Falco tinnunculus	*	3	7	7	↔
Falco subbuteo	-	-	1?	1	
Crex crex	*	1-2	3	1	↔
Gallinula chloropus	?	-	-	5-8	
Fulica atra	?	-	-	7-8	
Grus grus	-	-	-	(1-2)	↑
Charadrius dubius	?	-	3-5	1	↓
Vanellus vanellus	?	6-8	3	5	↓
Scolopax rusticola	*	2?	1?	1?	
Chroicocephalus ridibundus	-	-	-	4-5	
Sterna hirundo	-	-	-	1?	
Columba livia f. domestica	-	?	*	30-50	
Columba oenas	*	2	2	9	↑
Columba palumbus	*	*	*	*	
Streptopelia decaocto	-	>46	*	>70	
Streptopelia turtur	*	*	*	37	
Cuculus canorus	*	6	17	23	↑
Tyto alba	?	2	1	-	
Athene noctua	*?	1?	1	-	
Bubo bubo	-	-	1	?	
Asio otus	*	?	2	*	
Strix aluco	*	*	16	*	
Apus apus	*?	40	*	38-54	↔
Alcedo atthis	*	-	2	1	
Coracias garrulus	*	-	-	-	
Upupa epops	?	-	1?	2	
Jynx torquilla	*	-	1	6	↑
Picus canus	1	1	6	8	↑
Picus viridis	*	1	1-2	6	↑
Dryocopus martius	*	c.10	12	14	↑
Dendrocopos major	*	*	*	*	
Dendrocopos medius	*?	4	12	11	↑
Dendrocopos minor	*?	7	9-12	7	
Alauda arvensis	*	*	*	*	
Hirundo rustica	*	*	*	>120	

Delichon urbica	*	400	*	250-350	↔
Anthus trivialis	*?	*	*	*	
Anthus pratensis	*	2	-	-	
Anthus campestris	?	-	-	1	
Motacilla flava	*	-	1	>10	↑
Motacilla cinerea	*	3-5	12-13	17	↑
Motacilla alba	*	25-30	*	*	
Cinclus cinclus	2-3	4	8	7	↑
Troglodytes troglodytes	*	*	*	*	
Prunella modularis	*?	*	*	*	
Erithacus rubecula	*	*	*	*	
Luscinia megarhynchos	*	8	2	20	↑
Phoenicurus ochruros	*	*	*	>60	
Phoenicurus phoenicurus	*	4	10	26	↑
Saxicola rubetra	*?	>6	21-24	*	
Saxicola rubicola	-	7	8	18	↑
Oenanthe oenanthe	?	-	-	1	
Turdus merula	*	*	*	*	
Turdus pilaris	*	*	*	*	
Turdus philomelos	*	*	*	*	
Turdus viscivorus	*	15	32-35	36	
Locustella naevia	*	2	8	20	↑
Locustella fluviatilis	-	2	7	11	↑
Acrocephalus schoenobaenus	-	-	-	1	
Acrocephalus palustris	*?	*	*	*	
Acrocephalus scirpaceus	*?	-	-	2-3	
Acrocephalus arundinaceus	*?	-	-	13	↑
Hippolais icterina	*	*	*	*	
Sylvia nisoria	*?	*	1	-	
Sylvia curruca	*	*	*	*	
Sylvia communis	*	*	*	*	
Sylvia borin	*	*	*	*	
Sylvia atricapilla	*	*	*	*	
Phylloscopus sibilatrix	*	*	*	*	
Phylloscopus collybita	*	*	*	*	
Phylloscopus trochilus	*	*	*	*	
Phylloscopus trochiloides	-	-	1?	-	
Regulus regulus	*	*	*	*	
Regulus ignicapillus	?	*	*	*	
Muscicapa striata	*	*	*	*	
Ficedula albicollis	-	*	45	19	↓?
Ficedula hypoleuca	*	*	*	*	
Ficedula parva	*?	-	5-6	-	
Aegithalos caudatus	*	*	*	1	
Parus palustris	*	*	*	*	
Parus montanus	*	*	*	*	
Parus cristatus	*	*	*	*	
Parus ater	*	*	*	*	
Parus caeruleus	*	*	*	*	
Parus major	*	*	*	*	
Sitta europaea	*	*	*	*	
Certhia familiaris	*	*	*	*	
Certhia brachydactyla	?	*	*	*	
Remiz pendulinus	-	-	-	2	↑
Oriolus oriolus	*	7-9	24	38	↑
Lanius collurio	*	*	33-37	*	
Lanius excubitor	?	2	1	2	
Nucifraga cayocatactes	*	4-5	1-2	-	↓
Garrulus glandarius	*	*	*	-	
Pica pica	*	14	*	*	

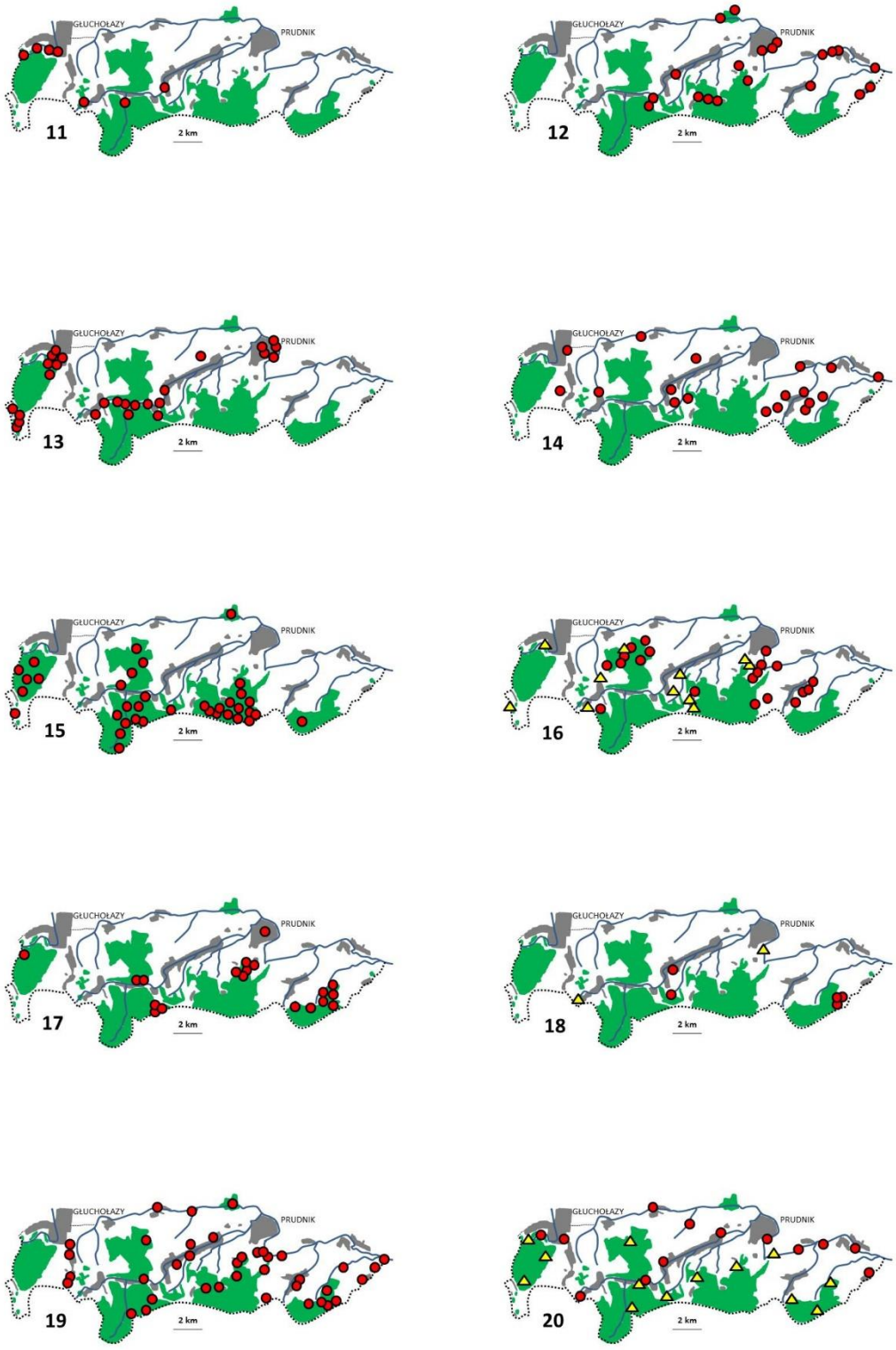
Corvus monedula	*	30-33	*	26-46	
Corvus frugilegus	-	100	*	28	↓
Corvus cornix	*	8	9	13	↑
Corvus corax	-	2	9	13	↑
Sturnus vulgaris	*	*	*	*	
Passer domesticus	*	*	*	*	
Passer montanus	*	*	*	*	
Fringilla coelebs	*	*	*	*	
Serinus serninus	*	60	*	*	
Carduleis chloris	*	*	*	*	
Carduelis carduelis	*	*	*	*	
Carduelis spinus	?	8-9	*	*	
Carduelis cannabina	*	*	*	*	
Loxia curvirostra	*	*	>2	>10	↑
Loxia leucoptera	*?	-	-	-	
Carpodacus erythrinus	?	-	1?	-	
Pyrrhula pyrrhula	?	*	10-11	*	
Coccothraustes coccothraustes	*	*	*	*	
Emberiza citrinella	*	*	*	*	
Emberiza hortulana	-	4	7	5	↔
Emberiza schoeniclus	?	1	1	10-20	↑
Miliaria calandra	-	1	4-5	>20	↑

Based on literatute, four study periods were distinguished:
I: 1906–1938 based on Kollibay (1906), Pax (1925) and Jitschin (1938)
II: 1990-92 based on Kopij (1994)
III: 1995-96 basedon Hebda (2000)
III: 2010 based on this study and Kopij (2014).
Trend (during the years 1990–2010): ↑ – increase, ↓ – decrease, ↔ – stable, - – no recorded Please note, in 2010, foothills were also included in the study area.

Explanatory notes for Figs 1-20: **Fig. 1**. *Cotunrix coturnix* (yellow triangles) and *Vanellus vanellus* (red dots) breeding pairs in Opava Mts. in 2010; **Fig. 2**. *Ciconia ciconia* nests (red dots: nests with fledglings, yellow dots: occupied nests without fledglings) in Opava Mts. in 2010; **Fig. 3**. *Accipiter gentilis* breeding pairs in Opava Mts. in 2010; **Fig. 4**. Distribution of *Accipiter nisus* (purple square), *Falco tinnunculus* (red dots) and *Falco subbuteo* (yellow triangle) breeding pairs in Opava Mts. in 2010; **Fig. 5**. *Buteo buteo* breeding pairs in Opava Mts. in 2010; **Fig. 6**. Distribution of *Streptopelia turtur* (red dots) and *Columba oenas* (yellow triangles) breeding pairs in Opava Mts. in 2010; **Fig. 7**. *Cuculus canorus* males in Opava Mts. in 2010; **Fig. 8**. *Dendrocopos medius* (red dotes), *Dendrocopos minor* (yellow triangles) and *Jynx torquilla* (purple squares) breeding pairs in Opava Mts. in 2010; **Fig. 9**. *Dryocopus martius* (red dots), *Picus canus* (yellow squares) and *Picus viridis* (purple squares) breeding pairs in Opava Mts. in 2010; **Fig. 10**. Distribution of *Motacilla cinerea* breeding pairs in Opava Mts. in 2010; **Fig. 11**. *Cinclus cinclus* breeding pairs in Opava Mts. in 2010; **Fig. 12**. *Luscinia megarhynchos* breeding pairs in Opava Mts. in 2010; **Fig. 13**. *Phoenicurus phoenicurus* breeding pairs in Opava Mts. in 2010; **Fig. 14**. *Saxicola rubicola* breeding pairs in Opava Mts. in 2010; **Fig. 15**. *Turdus viscivorus* breeding pairs in Opava Mts. in 2010; **Fig. 16**. *Locustella naevia* (red dots) and *Locustella fluviatilis* (yellow triangles) breeding pairs in Opava Mts. in 2010; **Fig. 17**. *Ficedula albicollis* breeding pairs in Opava Mts. in 2010; **Fig. 18**. *Remiz pendulinus* (yellow triangles) and *Emberiza hortulana* (red dotes) breeding pairs in Opava Mts. in 2010; **Fig. 19**. *Oriolus oriolus* breeding pairs in Opava Mts. in 2010; **Fig. 20**. *Corvus cornix* (red dotes) and *Corvus corax* (yellow triangles) breeding pairs in Opava Mts. in 2010.



Figs 1-10: Map of distribution of birds in Opava Mts and their foothills, Opole Silesia. For explanatory notes see page 243.



Figs 11-20: Map of distribution of birds in Opava Mts and their foothills, Opole Silesia. For explanatory notes see page 243.

Table 3: Results of counting breeding birds by mean of line transect method in larger forests in Opava Mountains and foothills in 2010. Dominant species are indicated with bold case. Nt – total number of breeding pairs recorded in all three counts, N_{max} – maximal number of breeding pairs recorded in whatever of the three counts conducted.

Species↓	Chrobry's Mt.				Bishop's Mt.				Olszak and Charbielin F.				Prudnik F.				Trzebina Forest				Total			
Surface→	c. 650 ha				c. 1100 ha				c. 750 ha				c. 1000 ha				c. 500 ha				c. 4000 ha			
	Nt	%	N_{max}	%	Nt	%	N_{max}	%	Nt	%	N_{max}	%	Nt	%	N_{max}	%	Nt	%	N_{max}	%	Nt	%	N_{max}	%
Accipiter gentilis	0	0	0	0	0	0	0	0	1	0,1	1	0,2	2	0,1	2	0,2	1	0,1	1	0,2	4	0,07	4	0,12
Accipiter nisus	0	0	0	0	0	0	0	0	0	0	0	0	1	0,1	1	0,1	0	0	0	0	1	0,02	1	0,03
Aegithalos caudatus	3	0,4	2	0	5	0,4	3	0,4	6	0,7	4	0,7	5	0,3	3	0,3	3	0,3	3	0,5	22	0,41	15	0,45
Anas platyrhynchos	4	0,5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0,07	3	0,09
Anthus trivilais	1	0,1	1	0	1	0,1	1	0,1	9	1,1	7	1,2	4	0,3	4	0,5	15	1,7	15	2,4	30	0,56	28	0,85
Buteo buteo	4	0,5	4	1	5	0,4	3	0,4	8	0,9	3	0,5	18	1,2	7	0,8	10	1,1	6	1	45	0,83	23	0,7
Carduelis carduelis	0	0	0	0	2	0,1	1	0,1	2	0,2	2	0,4	3	0,2	3	0,3	1	0,1	1	0,2	8	0,15	7	0,21
Carduelis chloris	6	0,7	5	1	10	0,7	5	0,7	8	0,9	4	0,7	7	0,5	7	0,8	1	0,1	1	0,2	32	0,59	22	0,67
Carduelis spinus	0	0	0	0	1	0,1	1	0,1	0	0	0	0	0	0	0	0	0	0	0	0	1	0,02	1	0,03
Ccuculus canorus	0	0	0	0	5	0,4	4	0,5	4	0,5	4	0,7	10	0,7	10	1,2	5	0,6	5	0,8	24	0,44	23	0,7
Certhia brachydactyla	1	0,1	1	0	0	0	0	0	1	0,1	1	0,2	9	0,6	4	0,5	5	0,6	3	0,5	16	0,3	9	0,27
Certhia familiaris	19	2,3	12	2	29	2,2	14	1,8	11	1,3	6	1,1	32	2,1	19	2,2	14	1,6	7	1,1	105	1,95	58	1,76
Cinclus cinclus	1	0,1	1	0	2	0,1	1	0,1	0	0	0	0	0	0	0	0	0	0	0	0	3	0,06	2	0,06
Coccothraustes cocc.	18	2,2	9	2	32	2,4	21	2,8	13	1,5	11	2	16	1,1	7	0,8	16	1,8	13	2,1	95	1,76	61	1,85
Columba oena	3	0,4	3	1	4	0,3	4	0,5	1	0,1	1	0,2	2	0,1	2	0,2	0	0	0	0	10	0,19	10	0,3
Columba pamumbus	9	1,1	5	1	19	1,4	9	1,2	13	1,5	7	1,2	20	1,3	8	0,9	5	0,6	3	0,5	66	1,22	32	0,97
Corvus corax	4	0,5	2	0	3	0,2	3	0,4	3	0,4	1	0,2	7	0,5	5	0,6	7	0,8	4	0,6	24	0,44	15	0,45
Corvus cornix	1	0,1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,02	1	0,03
Dendrocopos major	**45**	**5,4**	22	4	43	3,2	16	2,1	**45**	**5,3**	19	3,4	**87**	**5,8**	32	3,7	**45**	**5,1**	24	3,9	265	4,91	113	3,43
Dendrocopos medius	0	0	0	0	0	0	0	0	0	0	0	0	4	0,3	2	0,2	1	0,1	1	0,2	5	0,09	3	0,09
Dendrocopos minor	0	0	0	0	1	0,1	1	0,1	2	0,2	1	0,2	0	0	0	0	0	0	0	0	3	0,06	2	0,06
Dryocopus martius	1	0,1	1	0	6	0,4	3	0,4	3	0,4	1	0,2	10	0,7	6	0,7	3	0,3	2	0,3	23	0,43	13	0,39
Emberiza citrinella	1	0,1	1	0	29	2,2	21	2,8	**70**	**8,2**	**33**	**5,9**	38	2,5	20	2,3	37	4,2	22	3,6	175	3,24	97	2,94
Emberiza hortulana	0	0	0	0	0	0	0	0	0	0	0	0	1	0,1	1	0,1	4	0,5	4	0,6	5	0,09	5	0,15
Erithacus rubecula	**65**	**7,8**	**41**	**8**	**114**	**8,5**	**57**	**7,5**	**83**	**9,7**	**66**	**12**	**100**	**6,7**	**59**	**6,9**	**58**	**6,6**	**43**	**6,9**	**420**	**7,78**	**266**	**8,06**
Falco subbuteo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,1	1	0,2	1	0,02	1	0,03
Ficedula albicollis	1	0,1	1	0	6	0,4	6	0,8	2	0,2	2	0,4	8	0,5	8	0,9	9	1	9	1,5	26	0,48	26	0,79
Ficedula hypoleuca	0	0	0	0	9	0,7	9	1,2	0	0	0	0	1	0,1	1	0,1	1	0,1	1	0,2	11	0,2	11	0,33
Ficedula parva	0	0	0	0	1	0,1	1	0,1	0	0	0	0	0	0	0	0	0	0	0	0	1	0,02	1	0,03
Fringilla coelebs	**135**	**16**	**65**	**13**	**320**	**24**	**130**	**17**	**86**	**10**	**57**	**10**	**273**	**18**	**131**	**15**	**197**	**22**	**100**	**16**	**1011**	**18,7**	**483**	**14,64**
Garrulus glandarius	13	1,6	10	2	15	1,1	8	1,1	19	2,2	7	1,2	23	1,5	10	1,2	15	1,7	15	2,4	85	1,58	50	1,52
Hipolais icterina	0	0	0	0	0	0	0	0	0	0	0	0	3	0,2	3	0,3	0	0	0	0	3	0,06	3	0,09
Jynx torquilla	0	0	0	0	0	0	0	0	0	0	0	0	1	0,1	1	0,1	0	0	0	0	1	0,02	1	0,03
Lanius collurio	0	0	0	0	0	0	0	0	1	0,1	1	0,2	1	0,1	1	0,1	2	0,2	2	0,3	4	0,07	4	0,12
Locustella fluviatils	1	0,1	1	0	2	0,1	2	0,3	1	0,1	1	0,2	4	0,3	4	0,5	0	0	0	0	8	0,15	8	0,24
Locustella naevia	0	0	0	0	6	0,4	6	0,8	3	0,4	3	0,5	1	0,1	1	0,1	1	0,1	1	0,2	11	0,2	11	0,33
Loxia curvirostra	12	1,4	7	1	13	1	7	0,9	2	0,2	2	0,4	10	0,7	5	0,6	4	0,5	3	0,5	41	0,76	24	0,73
Lulula arborea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,1	1	0,2	1	0,02	1	0,03
Motacilla cinerea	1	0,1	1	0	1	0,1	1	0,1	1	0,1	1	0,2	0	0	0	0	0	0	0	0	3	0,06	3	0,09
Muscicapa striata	11	1,3	11	2	19	1,4	19	2,5	9	1,1	9	1,6	26	1,7	26	3	15	1,7	15	2,4	80	1,48	80	2,42
Oriolus oriolus	0	0	0	0	0	0	0	0	1	0,1	1	0,2	9	0,6	9	1	5	0,6	5	0,8	15	0,28	15	0,45
Parus ater	**65**	**7,8**	**34**	**7**	**94**	**7**	**60**	**7,9**	17	2	11	2	66	4,4	31	3,6	26	2,9	21	3,4	**268**	**4,97**	157	4,76
Parus caeruleus	8	1	4	1	14	1	7	0,9	30	3,5	23	4,1	24	1,6	14	1,6	29	3,3	17	2,7	105	1,95	65	1,97
Parus cristatus	10	1,2	8	2	9	0,7	5	0,7	4	0,5	3	0,5	16	1,1	9	1	2	0,2	2	0,3	41	0,76	27	0,82
Parus major	**47**	**5,7**	22	4	**68**	**5,1**	**38**	**5**	**80**	**9,4**	**54**	**9,6**	**106**	**7,1**	**53**	**6,2**	**57**	**6,4**	**36**	**5,8**	**358**	**6,64**	**203**	**6,15**
Parus montanus	0	0	0	0	1	0,1	1	0,1	7	0,8	4	0,7	2	0,1	1	0,1	3	0,3	2	0,3	13	0,24	8	0,24
Parus palustris	10	1,2	7	1	4	0,3	3	0,4	2	0,2	1	0,2	7	0,5	5	0,6	1	0,1	1	0,2	24	0,44	17	0,52
Passer montanus	0	0	0	0	0	0	0	0	0	0	0	0	1	0,1	1	0,1	0	0	0	0	1	0,02	1	0,03
Phoenicurus phoenic.	1	0,1	1	0	4	0,3	4	0,5	0	0	0	0	0	0	0	0	0	0	0	0	5	0,09	5	0,15
Phylloscopus collybita	**42**	**5,1**	23	5	52	3,9	**38**	**5**	26	3	18	3,2	54	3,6	28	3,3	20	2,3	19	3,1	194	3,6	126	3,82
Phylloscopus sibilatrix	8	1	8	2	6	0,4	6	0,8	2	0,2	2	0,4	16	1,1	16	1,9	24	2,7	24	3,9	56	1,04	56	1,7
Phylloscopus trochilus	0	0	0	0	4	0,3	4	0,5	12	1,4	12	2,1	2	0,1	2	0,2	3	0,3	3	0,5	21	0,39	21	0,64
Picus canus	3	0,4	3	1	2	0,1	1	0,1	0	0	0	0	0	0	0	0	0	0	0	0	5	0,09	4	0,12
Picus viridis	2	0,2	1	0	0	0	0	0	2	0,2	2	0,4	1	0,1	1	0,1	0	0	0	0	5	0,09	4	0,12
Prunella modularis	3	0,4	2	0	7	0,5	3	0,4	13	1,5	11	2	10	0,7	5	0,6	3	0,3	2	0,3	36	0,67	23	0,7
Pyrrhula pyrrhula	3	0,4	3	1	6	0,4	5	0,7	5	0,6	4	0,7	1	0,1	1	0,1	0	0	0	0	15	0,28	13	0,39
Regulus ignicapillus	6	0,7	5	1	28	2,1	18	2,4	6	0,7	4	0,7	9	0,6	8	0,9	5	0,6	3	0,5	54	1	38	1,15
Regulus regulus	**43**	**5,2**	19	4	**78**	**5,8**	**40**	**5,3**	28	3,3	17	3	46	3,1	23	2,7	7	0,8	5	0,8	202	3,74	104	3,15

Species↓	Chrobry's Mt.				Bishop's Mt.				Olszak and Charbielin F.				Prudnik F.				Trzebina Forest				Total			
Surface→	c. 650 ha				c. 1100 ha				c. 750 ha				c. 1000 ha				c. 500 ha				c. 4000 ha			
	Nt	%	N_{max}	%	Nt	%	N_{max}	%	Nt	%	N_{max}	%	Nt	%	N_{max}	%	Nt	%	N_{max}	%	Nt	%	N_{max}	%
Scolopax rusticolus	2	0,2	1	0	0	0	0	0	1	0,1	1	0,2	0	0	0	0	0	0	0	0	3	0,06	2	0,06
Serinus serinus	2	0,2	1	0	0	0	0	0	4	0,5	3	0,5	2	0,1	2	0,2	2	0,2	2	0,3	10	0,19	8	0,24
Sitta europaea	**81**	**9,8**	**48**	**10**	**71**	**5,3**	**44**	**5,8**	39	4,6	24	4,3	**103**	**6,9**	**47**	**5,5**	33	3,7	30	4,8	**327**	**6,06**	**193**	**5,85**
Streptopelia turtur	0	0	0	0	0	0	0	0	10	1,2	10	1,8	5	0,3	5	0,6	8	0,9	8	1,3	23	0,43	23	0,7
Strix aluco	1	0,1	1	0	1	0,1	1	0,1	0	0	0	0	0	0	0	0	0	0	0	0	2	0,04	2	0,06
Sturnus vulgaris	4	0,5	4	1	11	0,8	7	0,9	18	2,1	17	3	33	2,2	20	2,3	21	2,4	14	2,3	87	1,61	62	1,88
Sylvia atricapilla	35	4,2	**35**	**7**	60	4,5	**59**	**7,8**	**47**	**5,5**	**28**	**5**	**89**	**6**	**89**	**10**	**65**	**7,4**	**65**	**11**	**296**	**5,49**	**276**	**8,37**
Sylvia borin	2	0,2	2	0	2	0,1	2	0,3	8	0,9	8	1,4	0	0	0	0	4	0,5	4	0,6	16	0,3	16	0,48
Sylvia communis	0	0	0	0	2	0,1	2	0,3	6	0,7	6	1,1	7	0,5	7	0,8	3	0,3	3	0,5	18	0,33	18	0,55
Sylvia curruca	0	0	0	0	2	0,1	2	0,3	0	0	0	0	0	0	0	0	1	0,1	1	0,2	3	0,06	3	0,09
Sylvia nisoria	0	0	0	0	1	0,1	1	0,1	1	0,1	1	0,2	0	0	0	0	0	0	0	0	2	0,04	2	0,06
Troglodytes troglodyt.	15	1,8	11	2	31	2,3	16	2,1	10	1,2	6	1,1	34	2,3	23	2,7	2	0,2	1	0,2	92	1,71	57	1,73
Turdus merula	40	4,8	24	5	18	1,3	9	1,2	27	3,2	16	2,8	59	4	35	4,1	41	4,6	21	3,4	185	3,43	105	3,18
Turdus philomelos	22	2,7	12	2	49	3,7	19	2,5	37	4,3	19	3,4	50	3,4	23	2,7	36	4,1	18	2,9	194	3,6	91	2,76
Turdus pilaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0,1	1	0,2	1	0,02	1	0,03
Turdus viscivorus	14	1,7	10	2	9	0,7	6	0,8	4	0,5	3	0,5	12	0,8	8	0,9	5	0,6	5	0,8	44	0,82	32	0,97
Total number of pairs	829		499		1337		758		854		564		1491		859		884		619		5395		3299	

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Author's address: Grzegorz Kopij, Department of Veretbrate Ecology, Wrocław University of Environmental & Life Sciences, Ul. Kożuchowska 5b, 31-051 Wrocław, Poland
E-mail: grzegorz.kopij@up.wroc.pl

Department of Integrated Environmetal Scince, University of Namibia, Ogongo Capmus Oshakati, Namibia
E-mail: gkopij@unam.na