



Avifauna of the Sandanski-Petrich Valley (Blagoevgrad Region, SW Bulgaria) after data from the Rupite Ornithological Station (1976-1978)

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Abstract. Data on seasonal distribution of 179 avian species in 1976-1978, represented by their migratory and/or residential populations in the area of the former Rupite Ornithological Station (SW Bulgaria) are presented. The dates of the birds' earliest arrivals and latest departures, as well as peak migration periods, are given. Also included is observational data on the biology and ecology of the recorded species, obtained over 420 days. A total of 6077 ind. belonging to 92 species were ringed. The established species of birds represent 42.9% of the modern avifauna of Bulgaria. This proves the exceptional importance of the Rupite Ornithological Station for the study of ecology, biology and phenology of the migrations of birds in this southern part of the country, which is one of the places with the greatest biological diversity in Bulgaria, on the Balkan Peninsula and Europe.

Key words: Birdlife, Via Aristotelis, Balkan birds, Seasonal bird migrations, Struma River Valley

Introduction

The former Ornithological Station in the Rupite locality (ROS) of the Sandanski-Petrich Valley was founded in 02. 1976 at the Ornithological Ringing Centre of the former Institute of Zoology

of the Bulgarian Academy of Sciences. It has been functioning successfully for more than 2 decades. Tens of thousands of birds were ringed there. This base served as a kind of natural science and nature protection school for hundreds of

young people and assisted in the last years of the totalitarian rule of Bulgaria for proper education in nature conservation.

The long-time head of the Bulgarian Ornithological Center Prof. Dimitar Nankinov (1942-2018) had a leading role in the establishment and organization of the work of the ROS.

The observations and results from the first spring ringing campaign have been published by Nankinov et al. (1979). Some data on the birds of prey were reported by Nankinov & Kantardzhiev (1980). In 1968, a Freshwater algae Production Plant was founded here on the eastern slope of the Kozhuh Mountain (Fig. 1). The team of observers stayed there for accommodation and food. This enterprise successfully used the available mineral water rich of carbon dioxide and the favourable microclimatic conditions.

The results reported here are of particular interest because the ROS is located on an inland flyway of migratory birds known since ancient times, the s. c. Via Aristotelis (Fig. 2). The international importance of the place is primarily due to its location. It is located at 41.28 N and 23.17 E at the latitude of southern Italy, Sicily, the Balearic Islands and the Pyrenees. Therefore, it is one the southernmost accessible point of Europe for such kind of avian studies. In 1976 a total of 2186 birds of 62 species were ringed here, including rare species like the Cetti's warbler (*Cettia cetti*), which is a common species here. In 1977 there were 2127 ringed birds of 75 species and in 1978 – 1764 ringed birds.

Material and methods

During these 3 years, the field work went as follows: 1976: 21.02.-10.04; 01.09.-30.10; 1977: 21.02.-30.04;

20.08.-30.10; 1978: 21.02.-30.04; 01.08.-30.10, i. e. a total of 420 days. The shifts lasted 10 days each with a team of 2-5 observers. Their work during these 3 years was supported by the voluntary work of a total of 47 ringers and bird lovers (see Acknowledgments section).

The internationally used standard methodology for bird netting and ringing was used. Ornithological nets for catching of birds imported from Japan were used (Fig 3.).

In this 3-year period, a total of 179 species have been identified in the area around the ROS. Between 38 and 61 species were caught each year during the ringing in the spring and autumn campaigns. A total of 6077 birds belonging to 92 species were ringed.

The systematics and taxonomy follows Ivanov et al. (2015) and del Hoyo (2020).

Abbreviations: ad. – adult/-s, b. p. – breeding pair/-s, btw. – between, imm. – immature, ind. – individual/-s, juv. – juvenile/-s, R. - river, SR - Struma River, ROS - Ornithological Station Rupite, r/w – railway, v. - village, 01. – January, 02. – February, 03. – March., 04. – April, 05. – May, 06. – June, 07. – July, 08. – August, 09. – September, 10. – October, 11. - November, 12. – December.

Description of the area of the Rupite Ornithological Station

With a length of 290 km, the Struma is the 4th longest Bulgarian river. In terms of catchment area (17,300 km²) and discharge (annual average 76,200 m³/ sec.), it ranks 2nd after the Maritsa river. The valley faces almost its entire length from North to South and lies btw. Rila and Pirin and the western Bulgarian border mountains. The geological structure of the SR Valley is very complex. It consists of its

series of valleys, e.g. Kyustendil, Blagoevgrad, Petrich and picturesque and biologically very interesting narrow gorges, 11 in total, such as Zemen Gorge and Kresna Gorge. It receives approx. equal inflows from both sides. In the valley there are huge alluvial cones at the mouths of the rivers and streams. A strong Mediterranean influence penetrates along the SR Valley. There are an average of 300 sunny days per year, with hot summers and long, dry autumns. Winter is short and almost snow-free. This influence becomes noticeably weaker towards the North.

Of particular interest is the extinct late Pliocene volcano Kozhuh (the “Fur Coat”), 281.2 m a.s.l. It was formed in the Pliocene at the interface of deep tectonic fissures through magma eruptions. Its activity went through 2 stages, at the end of the Pliocene and then at the beginning of the Pleistocene. The resulting caldera measures approx. 2 x 1 km. Today it is heavily eroded and the SR flows through it. As a sign of

extinct volcanic activity, mineral springs flow (some have been accessed through drilling) with unexpectedly different compositions and temperatures of 35-90⁰ C.

The Mediterranean influence is particularly noticeable. Therefore, the flora contains many southern species that are not found north of the Balkan Mountains (Stara Planina), the main climatic divide of the Balkan Peninsula. A gallery forest of willows (*Salix* spp.), Black alder (*Alnus glutinosa*), Silver poplar (*Populus alba*), Old World sycamore (*Platanus orientalis*), European hop-hornbeam (*Ostrya carpinifolia*) and others grows along the river. This type of forest is characteristic of the whole of southern Bulgaria. The oxbow lakes and small swamps located along the rivers have Central European wet vegetation. They provide suitable resting places for the migratory birds, especially the limicoles. In the deciduous forest zone, a secondary pseudomaquis shrubland has emerged around the ROS.



Fig. 1. Kozhuh Mountain. 11.07.2022. Photograph: Zlatozar Z. Boev.

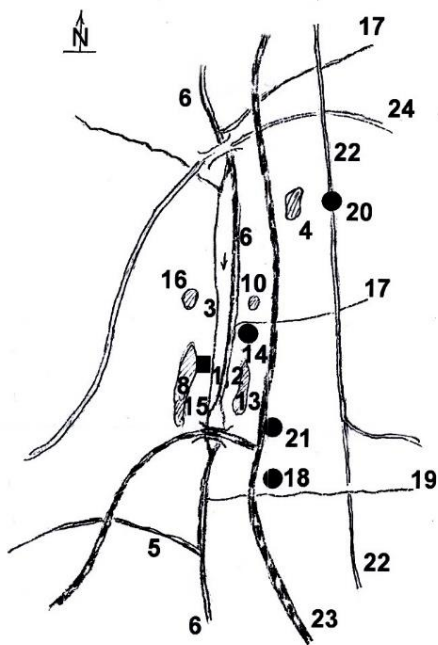


Fig. 2. A simplified scheme of the location of the mentioned geographical objects in the study area: Ornithological station Rupite (1), Freshwater algae Production Plant (2), Starchesko Swamp (3), Levunovo Swamp (4), Strumeshnitsa River, (5), Struma River, (6), Lebnitsa village (7), Kozhuh Mt. (8), Malak Kozhuh Hill (9), Levunovska Tumba Hill (10), Pump Station (11), Rupite village (12), Pchelina Hill (13), Starchevo village (14), Rupite Locality (15), Parvomay village (16), Levunovska River (17), General Todorov village (18), Melnishka River, (19), Levunovo village (20), Genetal Todorov r/w Station (21), Road Petrich – Kulata (22), R/w to Petrich (23), Road to Melnik (23).

Results

Here we present the complete list of observed 179 species represented with their migratory and resident populations in the ROS area during the study period (1976-1978).



Fig. 3. Field work on netting of birds at the Rupite Ornithological Station (one of the researchers, Eberhard Undzhiyan), 21.05.1987.

Podicipediformes

1. *Podiceps ruficollis*. In 02.1977, a pair settled in the small pond near the ROS. Their behavior suggested that they had built their floating nest not far from the pond canals. During the spring and autumn months, individual birds were observed in the oxbow lakes of the SR near the General Todorov v.

Pelecaniformes

2. *Microcarbo pygmaeus*. After the breeding period, from the end of summer, individual birds move up the SR from their breeding sites in Northern Greece (Raines, 1962). They stay on the partly swampy banks of the river and especially at the fishing ponds near Lebnitsa R.

3. *Botaurus stellaris*. Individual birds were recorded on the autumn migration: 03.09.1976 in the swamp near Levunovo v.; 02.09.1978 at the beginning of the mouth of the Strumeshnitsa R.

4. *Ixobrychus minutus*. The autumn migration occurs in 09. Btw. 01.09.-10.09. 1976 4 ind. stayed in the swamp near the ROS. Until the 14.09.1976 we saw a few more in the canals and ponds on the river. The species does not appear to migrate regularly. In the following years, it was only noticed on 19.04.1977 and 02.09.1978.

5. *Nycticorax nycticorax*. Migrating single ind. can be viewed in the SR Valley btw. 26.03.-29.04. and btw. 16.09.-30.10. On 29.03.1978 in the evening a flock of 9 birds were recorded on the poplars near the ROS.

6. *Ardeola ralloides*. Irregular migrant, only appeared late 04.1978 on 27.-29.04.1978. In 1978 a single bird remained in the surroundings of the ROS. At the same time another ad. discovered in the fish pond near Rupite v.

7. *Ardea alba*. Recorded only on spring migration during the 3-year observation period. It starts about the first half of 02. and lasts until 01.03. Before the ROS was founded, only 1 ind. was recorded on 26.04.1973. Rare species in Bulgaria.

8. *Egretta garzetta*. In contrast to the previous one, a characteristic and relatively numerous autumn migrant. Appears irregularly quite late in spring (from 20.04.) or in small groups of up to 10 birds and often stays here all summer long. We suspect that these summering birds are non-breeding or come from the colonies located in the lower reaches of the river, on Greek territory. Autumn migration btw. 21.08.-23.09. The first to arrive seem to be families: on 30.08.1977 1 ad. and 5 immat.; 02.09.1978 a troop of 6 birds and 3 birds

flying alone. The migrants spend the night on the river islands or the trees on the banks.

9. *Ardea cinerea*. The most numerous species of herons. The spring migration begins in 02. On 20.02. birds flying to the North were noted. In addition to the spring of 1976, larger groups were also observed on 26.02.1977 (20+16 ind.); on 20.03.1977 (3+7+8 ind.). The northward migration continues until mid-04. In summer, both individual birds and smaller groups stay on the SR, its right tributary Strumeshnitsa R., in swampy places there and in the fish ponds near the town of Petrich, and the Rupite v. and Lebnitsa v. In the area, the tall poplar trees along the rivers also provide favorable nesting conditions. The local waters are also relatively rich in fish and amphibians. Some pairs also have bred here in the past. Prostov (1963) found nests both in the willow-gallery forests at the mouth of the Strumeshnitsa R. and in the oxbow lakes of the SR near General Todorov v. The autumn migration begins in the 2nd half of 08. Btw. 19.08.-31.08.1977, 1-5 birds flew to South every day and evening. We were also able to identify the voices of migrating herons at night. The mass migration begins in 09.: eight birds on 08.09.1976; on 26.10.1977 22 ind. in flight and on 29.10. a total of 24 ind.; on 02.09.1978 there were 6 ind., on 12.09. - 5 ind., on 17.09. we counted 10 and on 10.10. - there were 3 even in the winter months there seems to be a migration in SW Bulgaria: 12.1977, individual birds were always flying along the SR.

10. *Ardea purpurea*. On 01.04.1977 the first observation of the species in the surroundings of the ROS. A total of 9 birds were counted on 09.04.1976. We found Purple herons here until 01.05. It is possible that individual pairs nest in the surroundings of the Levunovo Swamp.

We always spotted 1-2 birds there during the breeding season. Birds departing to the South were recorded on 28.08.-09.10.1976. Some ind. try to overwinter here, 1 bird noted on 08.12.1977. Relatively rare in Bulgaria.

11. *Plegadis falcinellus*. Flies in small groups, both in spring (25.03.-10.04.) and in autumn (09.-10.). On 10.04.1977 a flock of 11 birds.

Ciconiiformes

12. *Ciconia ciconia*. The spring migration on the Via Aristotelis began as follows: 20.03.1976; 14.03.1977; 20.03.1978. At the beginning only individual birds and smaller groups can be seen. The birds search for food along the rivers and on the surrounding farmlands. The autumn migration begins in 08. (a flight of 6 ind. on 08.08.1978) until early 10. Every year, individual birds spend the winter in the area around the ROS and the surrounding villages (Rupite, Mitino, Starchevo, and General Todorov). In the winter of 1976-1977, 2 ind. overwintered near Rupite v. They searched for food in the surroundings of the villages and at the Petrich slaughterhouse. Until 12.1977 a single White stork was seen in the surroundings of the ROS, which then took off. On 22.-23.02.1978 a bird was searching for food in the fish ponds near Strumeshnitsa R. and near the town of Petrich. According to local residents, the bird had stayed here throughout the winter. A pair was recorded at the ROS at the end of 11.1978.

13. *Ciconia nigra*. This rare species has so far only been observed on the autumn migration. On 04.09.1976 and 23.09.1978 a few birds were flying to the South over the river.

Anseriformes

14. *Anser albifrons*. Two sightings in flight of 9 and 3 geese, each heading

South on 22.12.1977. According to local hunters, a flock of 15 birds landed on 24.02.1976 near the General Todorov r/w Station. In the past, before the drainage in 1956, the geese always visited the swamps of Starchevo v. and General Todorov v. in large numbers. During cold snaps in the North, even larger foraging groups come to the fields of the villages of Marino Pole, Marikostinovo, Topolnitsa and Chuchuligovo, preferring the swampy areas.

15. *Anas platyrhynchos*. Relatively numerous breeding and migrating species in the region. In 1977 and 1978 the species was successfully breeding in a canal of the former Startchevo Swamp (1 nest), in the oxbow lakes of the river near the General Todorov v. (1 nest), on the islands of SR opposite the Levunovo Swamp (3 nests), and opposite the ROS (2+3 nests). Some pairs take up their breeding territory as early as 12. Nest building and egg-laying in the 2nd half of 03. At the beginning of 04. the females are already laying on their eggs and drakes are predominantly found on the river. Judging by the behavior of the females: stepping back pretending to be hurt, the ducklings drop out from mid-04. immediately after hatching, the families move to areas with dense vegetation where they have safe cover. We found young leading females in the small swamp near the large net wall on 29.04.1977. The moult migration begins in the first days of 08. On 03.08. and 07.08.1978, 7 and 53 ind. were counted. A small number are probably moulting in the area, in swampy places and on the islands. However, the majority flies South to the lower reaches of the SR and the coast of the Aegean Sea. Movements within the region can be observed both during the summer and at other times of the year. The autumn migration is, as usual, slow and leisurely. The birds stay for a long time in places that offer good

food. On 04.09.1976, ducks from North 30+8+7+9 invaded the Levunovo Swamp. On 30.10.1977 there were 40. The soft and snowless winters here, as well as the remaining swamp remnants in the area, create favourable wintering opportunities for the birds. Prostov (1963) also writes that in some years the mallards are very numerous. The spring migration lasts until the end of 02.

16. *Anas crecca*. The last migrants in the spring were a pair on 25.02.1976 and a flock of 10 birds on 25.02.1978. In winter it can often be found on the local waters. On 22.12.1977 a total of 47 ind., the next day about the same number and a batch of 55 ind. on the flight to South.

17. *Spatula clypeata*. On 01.09.1976 there was a single male at the ROS, on 28.02.1978 there was a pair.

Accipitriformes

18. *Pernis apivorus*. Migrates btw. 09.03.-15.03. and 04.08. to 18.10. When observing the autumn migration, we were able to record individual birds almost every day until mid-10. They were observed to search for food on the slopes of the river valley.

19. *Circaetus gallicus*. Appears in about the same numbers as the honey buzzard, but sometimes occurs in smaller groups. On 02.08.1978 - 4 ind. The transit time is very short, in spring-the last decade of 04., in autumn-the first decade of 08. Prostov (1963) on 14.05.1955 observed a single, high-flying bird, probably a late migrant.

20. *Milvus migrans*. Seen only once – 1 ind. was flying over the net wall, probably an early spring migrant, 28.02.1978.

21. *Accipiter gentilis* is regular, although not common, breeding bird in the area (Nankinov & Kantardzhiev, 1980). Outside the breeding season the species number seem to increase due to

migrating birds. The species have been observed following migrating birds.

22. *Accipiter nisus* is regular, although not very common, breeding bird in the area (Nankinov & Kantardzhiev, 1980). Outside the breeding season the species number seems to increase due to migrating birds.

23. *Buteo lagopus*. Individual birds can be seen btw. 08.12.-25.02. They hunt on the ploughed fields and the bare hills. On 22.12. and 23.12.1977, a bird hunted small rodents mice in the fields with fodder alfalfa (*Medicago sativa*) near Starchevo v.

24. *Buteo buteo*. The most common bird of prey in the area. It also overwinters here. Spring migration probably begins in early 02. and continues until early 03. After that, only one pair nesting at Kozhuh Mnt. can be observed (Nankinov & Kantardzhiev, 1980). In autumn, migrating common buzzards were seen btw. the 01.08.-31.10. During the migration 1-6 birds can be seen every day, which stay mainly on the hills and in swampy and forested areas. According to Prostov (1963), the nominate form overwinters here. On 27.08.1977, an almost white bird stayed for a long time on the rocks near General Todorov v. On 30.10.1978 we noted a small, rusty-colored common buzzard at the ROS, probably of the form of, which is more common in eastern Bulgaria and resembled *B. b. vulpinus*.

25. *Hieraaetus pennatus*. Rare species in the region. Seen in the area, in spring btw. late 04. - late 05. (29.04.-05.05.1977), in autumn in the last decade of 08. (20.08.-31.08.1977). Mid-07.1980 1 ind. circling around the town of Melnik (G. Martin - pers. comm.). All the birds we spotted belonged to the light phase.

26. *Clanga pomarina*. Over the area of Parvomay v. on 27.04.1958 and over the Malak Kozhuh Hill on 26.03.1960. Migratory Lesser Spotted Eagles were spotted by Prostov (1963).

27. ***Aquila chrysaetos***. Every year on the hills and rocks non-breeding individuals were observed in the vicinity of the ROS (Nankinov & Kantardzhiev, 1980). In 1972, a large eagle was shot down over the local forestry (V. Avramov - pers. comm.). According to the description, it may have been *A. heliaca* or *A. chrysaetos*.

28. ***Neophron percnopterus***. Rare visitor in the SR Valley. It undoubtedly bred here in previous decades, but disappeared a long time ago. In spring btw. 21.03. and 24.04., individual birds were recorded flying in northwest direction. Not observed in the autumn so far, but we saw 2 ind. on 04.08.1978 near Dolna Gradeshnitsa v. About 10 years ago regularly observed in the area of the Kozhuh Mnt. (B. Mitov. - pers. comm.). Mid-07. 1980. 2 ind. circling around the town of Melnik (G. Martin - pers. comm.).

29. ***Gyps fulvus***. Described by residents of surrounding villages as being fairly common 60 years ago. Even though the species didn't breed here back then, it still flew over the valley regularly. At Karnalovo v., for example, up to 10-15 griffon and other vultures are said to have gathered at various animal carcasses during the period 1940-1945. The last time about 10 griffon vultures were counted around the carcass of an ox in the autumn of 1950. Afterwards, the law on animal carcass disposal was rigorously implemented throughout Bulgaria with corresponding consequences for vultures. In the period of our study, the following vulture observations have been made: a dead bird was found at the former State Forestry in Parvomay v. (Blagoevgrad Region), on 24.10.1978 (V. Avramov - pers. comm.), as well as at Dragichevo v. (Pernik Region), on 01.04.1977 and on 05.01.1978 (N. Minchev - pers. comm.). The flight of 13 birds sighted northwest of Sofia by A. Johnson and H. Hoekstra

on 02.10.1965 could also be included here (Roberts, 1979). The individuals flying over the SR Valley probably belong to the population of present day Northern Macedonia (Dobrev et al. 2021). According to Matvejev & Vasic (1973), this disappearing species has fortunately been able to survive in some areas of former Yugoslavia (northern Dalmatia, Bosnia and Herzegovina, Serbia, Montenegro and Northern Macedonia).

Falconiformes

30. ***Falco tinnunculus***. Breeding bird with a few pairs in the area. Migration in spring btw. 02.-04. and in autumn from the first days of 08. to the end of 10. During this time one can see a few birds every day. Some spend the winter here. On 08.12., and 22.-23.12.1977, 3+2+1 kestrels were hunting for Striped field mice (*Apodemus agrarius*) in the alfalfa fields near Starchevo v. We were even able to register a female on 14.09.1978 in the otherwise bird-free earth pyramids near the town of Melnik.

31. ***Falco columbarius***. On 13.04.1977 we made the only observation of this species in the area to date.

32. ***Falco subbuteo***. Migrants flew over the area on 02.10.1977 and 25.04.1978.

Galliformes

33. ***Alectoris graeca***. Both the heights on the left bank and the Kozhuh Mnt. itself have favorable breeding grounds for rock partridges. The gentle slope of the hills in front of the Levunovska Tumba Hill up to General Todorov v. is particularly appealing. Of course, the number of birds we survey or record varies in different years. 1976: on the eastern slope of the Kozhuh Mnt. 2 (displaying males or pairs) and on the Pchelina Hill - 3 pairs. 1977: at Pchelina Hill - 10, on the western slope of Kozhuh Mnt. - 6 pairs and at Levunovska

Tumba Hill - 6 pairs. 1978: at Pchelina Hill - 2 pairs and at Kozhuh Mnt. - 3 pairs. High courtship of the roosters was registered in the last decade of 02. However, later dates were also found, e.g. on 02.05.1977 at Kozhuh Mnt. During this period, rock partridges were also seen at the ROS itself. The chicks emerge in late 04. and early 05. Larger flocks were encountered at Kozhuh Mnt. In the autumn months: btw. 01.09.-10.09.1976 there were 18 ind., on 29.06.1976 - 5 ind., on 08.10.1978 - 10-12 ind., on 18.10.1878 - 7 ind. Sometimes, especially in autumn, they visit the vineyards on the outskirts of the settlements.

34. *Perdix perdix*. 1-2 pairs breed regularly in alfalfa fields on the former Starchevo Swamp and the former Ormana Island. The name (meaning "forest") goes back to the gallery forest that covered this early untouched piece of nature. In the 1960s the forest was cleared to create arable land. In the spring of 1977 and 1978, the Grey partridge courtship on the slopes of Kozhuh Mnt. was noted which suggests that this species could possibly replace the previous one in its breeding habitats. In 22-23.12.1977 a group of 17 birds was found in the alfalfa fields and remaining reeds.

35. *Phasianus colchicus*. This species is apparently subject to strong population fluctuations. In the spring of 1977 the pheasants were numerous. The roosters displayed actively in the last decade of 02. On 23.02.1977 we found a hen struck by a bird of prey. Prostov (1963) writes that he also saw pheasants on the former Ormana Island.

Gruiformes

36. *Crex crex*. Comes through on both spring and autumn migration. On 05.03.1976 - 3 birds, on 30.08.1978 - a single bird. Rare species in the region.

37. *Porzana porzana*. Migrates through in 08. On 27.08.1977 a single

bird came to be observed in the reedbeds of SR. During the winter (22.-23.12.1977) we counted about 10 birds in the canals of the Starchevo Swamp, while there were 2 more birds in the swamp opposite the ROS. The wetlands next to the ROS, although greatly reduced by human activity, form part of the wintering area in Bulgaria. Rare species in the region.

38. *Rallus aquaticus*. 3-4 pairs of these shy birds nest in the wider area around the ROS. In the winter, on 22.12.1977, we found 8 ind. in the Starchevo Swamp, as well as 5 ind., late 02.1977 in the pools near the ROS. A sign that this species is also migrates through the region

39. *Gallinula chloropus*. Common breeding bird in the area. Inhabits almost all the different bodies of water here. The number of nesting pairs in the swamps, ponds and canals on the SR dikes varies btw. 4-15. Either individual pairs or smaller groups nest depending on the size of the water bodies. We counted 15 pairs in an oxbow stream of the SR near General Todorov v. The mating games can be observed as early as 02., with the pairs choosing their future nesting sites. In 03.1977 we found 3 nests in the small swamp near the ROS, 1 on a pile of rushes, the second in the fork of a willow tree at a height of 40 cm and the third in a thorn bush at a height of 70 cm. By 08. the young have reached the body mass of their parents. It is possible that some of them leave the area in 09. In winter the number of Common moorhens increases. In 12.1977, about 50 ind. were counted in the 6 drainage canals of the Starchevo Swamp. At this time there were 9 birds in the pond near the ROS. They are likely to move through the area until the end of 02.

40. *Fulica atra*. The species can be found in various places around the ROS all year round. Breeds in the small

reservoir of Rupite v. and in the Levunovo Swamp. In 1978 a pair with offspring was recorded in a little lake near the large net wall high. In winter and spring the population increases due to the influx of non-native birds. In 02., 03. and 04. up to 30 ind. at the small reservoir in Rupite v. Smaller groups also usually found in the canals at the ROS.

Otidiformes

41. *Otis tarda*. On 25.02.1976, 2 groups of flying bustards of 3 ind. each were said to have visited the meadows on the left bank near the General Todorov r/w Station (B. Mitov - pers. comm.). The same observer told us that bustards used to come during harsh winters, and they are also said to have been observed in autumn.

Charadriiformes

42. *Charadrius dubius*. Arrives in the 2nd half of 03. to 04., breeds here and flies off again from the last days of 08. to the end of 09. Smaller groups stop on the wet meadows of the Petrich basin. 3-4 pairs nest on the section of the river btw. the railway bridge, the road to Petrich and the General Todorov r/w Station. Eggs are laid in 05. In 08. we encountered juv. and pretending to be injured adults on the island opposite ROS. Prostov (1963) notes the species as relatively rare for the Petrich area. He discovered the species on the gravel and sand banks of small creeks such as Strumeshnica and Luda Mara. This author suggests that a 2nd clutch is possible.

43. *Vanellus vanellus*. The most numerous species of plovers here. In 02. and 03., numerous birds resting in the meadows and flocks migrating North can be seen in the SR Valley btw. the former Radomir Swamp and the ROS. The Northern lapwing is one of the most emblematic migrants of the Via Arisotelis. The last flock was registered at

the ROS on 10.03.1976. The area is an important resting place for migrating flocks. Most of them fly on to the North. A smaller one, after they have rested and are somewhat full, go back a little way to the South and then head west from the mouth of the SR. During the summer, a few pairs stay to breed, for example in the drained Levunovo Swamp, in the meadows near the fish ponds of the town of Petrich, etc. The autumn migration is particularly common and noticed in the 2nd half of 10. On 22.10.1977 and 30.10.1977, flocks of 28 and 35 ind. respectively. Overwintered in the Starchevo Swamp and the neighboring meadows and fields.

44. *Tringa ochropus*. Individual birds migrating along the SR, the canals and swampy places until the end of 03. Later we only managed to flush out a bird once, on 29.04.1978 in the forest northeast of the ROS. Many old nests of thrushes and crows can be found in this forest, therefore breeding is probably possible. The autumn migration begins in the 2nd half of 08.: on 19.08.1977 3 ind. observed on SR. In the days of 09. up to 10-12 ind. can be found. Migrates mostly at night. The arrival of Green sandpipers after nocturnal migration was recorded on 02.09.1976 at 05:10 AM. Common in winter. On 22.12. and 23.12.1977 we counted 7 ind./km and 10 ind./km in the canal btw. the Starchevo Swamp and the forest. By this time pairs had already formed and courtship could be observed.

45. *Tringa totanus*. Arrives in 02. to 03. Only individual birds can be seen on the river. Flocks of up to 30 birds also rest at the fish ponds in Lebnitsa v. and the town of Petrich.

46. *Tringa glareola*. On 12.09.1978, the only individual of the species recorded at the ROS so far.

47. *Actitis hypoleucos*. Flies away in 09. On 01.04.1976 and 09.04.1976 some birds were noted.

48. *Calidris pugnax*. In some years numerous in spring, but irregular. On 22.-23.02.1978 on the wet meadows btw. ROS and the town of Petrich 7+38+20 ind., together with thrushes and snipes.

49. *Scolopax rusticola*. So far only detected during spring migration. Individual birds remained on the slopes of Kozhuh Mnt. and Pchelina Hill, in the forests and swamps along the river. Woodcocks also invaded the pool near the net wall late in the evening. The last birds were seen on 22.03.1976. We have not found it overwintering, but Prostov (1963) reports that it overwinters at the foot of the Belasitsa Mnt.

50. *Gallinago gallinago*. Often found in the winter months: 22.11.1977 and 28.02.1978. Prostov (1963) observed it near the town of Petrich on 26.03.1960. Both individual birds and entire flocks: on 22.-23.02.1978 at the ROS 5+30 birds, on a damp meadow along the road to Petrich 8+14 Ind. It was interesting that the last mentioned birds searched for food at only up to 15 m from the busy traffic.

51. *Gallinago media*. Irregular. Observed only a few times. From 21.02.1977 to 26.02.1977 there were always 1-2 birds in the swamp near the ROS. On 22.-23.12.1977 only 1 bird there. On the same day also in the canals of the Starchevo Swamp 4 ind. were ringed.

52. *Chroicocephalus ridibundus*. Moves through the SR Valley in large numbers, from the first days of 08. until the last third of 03. There are also regular movements in search of food, which can mislead the observer about the direction. Spring migration is most intense during the last decade of 02. Every day are counted 35-300 birds. The flocks returning north stop for a few days at places rich in food and form significant accumulations. During the plowing of the former Starchevo Swamp and the Ormana Island (24.-25.02.1976 and 20.-

22.02.1978), in addition to flocks of thrushes and Northern lapwings, up to 300 Black-headed gulls also flew after the tractor. As long as the gathering existed, the Black-headed gulls flew to the lower reaches of the river to sleep. However, on 20.02.1978, the birds gathered in the reeds btw. the bridges near General Todorov v. before an approaching storm. After plowing and the resulting shortage of food, the birds move further north in smaller flocks. On 21.02.1976, in the Brezhani v., we saw 2 flocks of 40 and 100 birds passing the Kresna Gorge at a height of about 100 m. We spotted them at the fish ponds near Lebnitsa v., towns of Petrich, Blagoevgrad and other places. These are usually individual birds or smaller groups that rarely reach greater numbers (on 17.10.1978 - 24 ind.).

53. *Sterna hirundo*. Passage dates btw. 19.08.-28.04. Previously, before the ROS was founded, we also saw Common terns in summer (Topolnitsa v., 24.06.1972). These are non-breeding birds. They fly singly or in pairs and look for their food in the river. They stay for a long time in places rich in food, such as the fish ponds of Lebnitsa v.

54. *Hydroprogne caspia*. This species, which is relatively rare in Bulgaria, was collected on 27.09.1978 in the ROS. Another ind. near the Pokrovnik v., also in Blagoevgrad, shot on 24.09.1978, is deposited in the Blagoevgrad Museum. Both birds were in winter plumage.

Columbiformes

55. *Columba livia*. The rocky areas of the Kozhuh Mnt. and Pchelina Hill with their numerous niches and ledges offer favourable nesting opportunities. The species affiliation has often been questioned because of the frequent mixing with feral domestic pigeons. But Bulgaria is a part of the rock pigeon's "ancestral area". However, like the stock dove, it is generally increasingly rare in

recent decades. In 02.1976, a pair was hanging out on the rocks not far from the General Todorov r/w Station.

56. ***Columba palumbus***. Quantitatively subject to strong fluctuations depending on the years and seasons. In the spring of 1976 and 1978 only individual birds and once a flock of 15 ind. were observed on 27.03.1978. However, in the autumn of 1976, as well as the spring and autumn of 1977, they were there in large numbers. 10-50 birds could be counted every day. Flocks of 20- 40 ind. were observed. On 28.02.1977, a flock of 43 Wood pigeons appeared in the area after a cold snap (strong north wind with snow). Breeds in varying numbers. The mating call can be heard throughout 04. and 05. On 02.05.1977 we found 4 nests in the forest on the right bank of the SR opposite the ROS, built at a height of 10-12 m in the poplars and willows. Also breeds on the forested northern slope of Kozhuh Mt. The small autumn flocks of 3-5 birds usually appear in the 2nd half of 08. From 19.08. to 01.09.1977 we registered 15-50 ind./day. The autumn flocks in 09. and 10. become significantly larger. The birds often spend the night on the tall poplar trees by the river. Only partially winters here.

57. ***Streptopelia turtur***. Numerous migrants in autumn. Small groups (3-5 birds), perhaps families, can be seen from 08. onwards. But they only became numerous a month later. From 01.09.1976 to 06.09.1976 we counted 130-150 birds every day in the gallery forest on the SR. Afterwards their number decreases and after 08.09. the migration is only barely noticeable. The birds gather after 6 PM to spend the night on the poplars and alders, in groups of up to 20 birds. We determined the beginning of spring migration on 25.04.1977 and 28.04.1978.

58. ***Streptopelia decaocto***. Breeds at the ROS in 1-2 pairs. Courtship was heard after 29.02.1976 and 28.02.1978. Larger

groups are formed in the autumn. 14 juv. and ad. at the sheepfolds of General Todorov v. on 25.08.1977. Later nest building was discovered 4 days later at town of Kresna. Autumn courtship on 07.09.1977.

Cuculiformes

59. ***Cuculus canorus***. Arrival at the earliest 03.04.1977. On 01.-02.05.1977 2 males called in the forest on the right bank of the SR and 1 in the Levunovo Swamp. Common cuckoos also visit the reed beds of swamps and canals, as well as the slopes of the surrounding hills. Flying south btw. 10.08. and 29.08.

Strigiformes

60. ***Tyto alba***. Registered irregularly in 10., in the first half of the month, as far as we could determine. A dead bird was found on 18.10.1977. 1 ind. seen at Kozhuh Mt. on 24.10.1977 (Nankinov & Kantardzhiev, 1980).

61. ***Otus scops***. Arrival btw. late 02.-late 03. (25.02.1978; 13.03.1977; 23.03.1976). Departure early 08. to early 09. (10.08.1978; 29.08.1977; 02.09.1976). In some years it will probably arrive later and depart later. One heard in 1971 above the town of Kresna on 26.04. (VI. Beshkov - pers. comm.) and at the latest by 04.10. Prostov (1963) did not find his first Scops owls in the Petrich Field until 27.04. and 28.08.1958.

62. ***Bubo bubo***. At Kozhuh Mt., Pchelina Hill and Kolibarski Rid Hill 1-3 ind. The birds living here were found btw. 23.02. and 29.10. Outside this period they seem to decline. During the winter months they were neither seen nor heard.

63. ***Athene noctua***. 2 pairs permanently live on the roof of the ROS and the surrounding houses. A bird ringed on 22.02.1976 was found here again on 21.03.1978. As far as we could determine, the hatched young birds leave the area and settle elsewhere.

64. *Strix aluco*. Detected several times in 02.: on 27.02.1976; 26.02.1977; courtship heard on 24.02.1978. On 06.08.1978, 2 ind. were seen hunting for rodents in an alfalfa field. A bird was also noted at the General Todorov r/w Station.

Caprimulgiformes

65. *Caprimulgus europaeus*. Its number increases in 04. and 08.-10. On 11.10.1956 Prostov (1963) saw 1 at the foot of the Belasitsa Mnt. The birds we recorded resting during the day in the oak forest on the northern slope of Kozhuh Mnt. (24.04.1978). On 02.08.1978, 2 birds caught in a huge crowd of flying insects over the swamp next to the ROS.

Apodiformes

66. *Apus apus*. Autumn migration strongly noticeable. Movement southwards in the first days of 08. Greatest density recorded in the late of 08. and early 09. Often associated with swallows. Wave-like passage. Days with hundreds of birds are followed by days with no more than 10 or no birds at all. On 01.09. and 02.09.1976 about 200 ind. each; on 23.08.1977-120, on 25.08. and 26.08.1977-100 each, on 31.08.1977 a whole 400 were counted btw. 5:00 and 7:00 PM. Autumn migration until about 10.09. The spring migration is only marked by a few birds that visited the ROS on the 22.03.1978, observed also on 23.03.1978.

Coraciiformes

67. *Alcedo atthis*. The river habitat, with its pure fish-rich waters and nesting areas, is extremely favourable for both nutrition and reproduction. Up to 4 pairs breed here every year. The results of the catch and ringing include the migration dates btw. 21.02.-26.04. and btw. 02.08.-29.10. Peaks of the autumn migration on 14.-15.09. and 28.09.1976; btw. 08.09.-14.08.1977; and btw. 23.08.-10.09. and

btw.19.09.-29.09.1978 The Common kingfishers were very numerous in the spring of 1976 (22 birds ringed) and also in the autumn of the 3 observation years (25+38+21 ind. ringed). We can give information for the migratory route and distance based on ring recoveries (Nankinov & Djingova, 1979). A kingfisher ringed by us at the ROS on 26.10.1977 was caught 42 days later near the town of Strumitsa in Serbia. As far as we can conclude from our own recaptures, the birds stay in places that are convenient for them for up to 10 days or more.

68. *Merops apiaster*. Numerous autumn migrants throughout 08. until 17.09. Moves in flights of 5-200 ind., at a fairly high altitude, towards west and east. It is possible for entire families to migrate together. There are 3 highlights during the day: in the morning btw. 8:00 and 9:00 AM, at midday btw. 12:00 AM and 1:30 PM and especially in the afternoon btw. 4:00 and 5:30 PM. Sometimes the flight lasts until 7:00 or 3:00 PM. The passage occurs at intervals. The birds maintain ongoing acoustic contact. Some, there are not many, return to West and then continue on their way. Data of our counts: 01.-06.09.1976 approx. 200 birds/day, on 07.09.1976 – 100, 19.-22.08.1977 - on average 250 birds/day, 230-180, 14.08-310, 25.08-170, 26-28.08 - on average 110 birds/day, 29.08-340 and 31.08-80; 01.-10.08.1978 - 150-400 birds/day. According to Prostov (1963), the European bee-eater appears in the spring after 28.04. and in 05. According to the same author, in 1960s Malak Kozhuh Hill was the best-visited biotope in the Petrich Field. In the late 1970-s, a few pairs occasionally dig out their breeding burrows on the eastern slopes of the Kozhuh Mnt. above the hot mineral springs.

69. *Merops persicus*. Observed in the study area on 25.05. and 27.05.1988 (Dittberner & Kage, 1990).

70. ***Coracias garrulus***. Earliest arrival on 20.04.1977. In 05. the birds had taken up their breeding cavity in a tall poplar tree on the right bank of the SR, and also, as often in Bulgaria, in a small cavity in the rocks at the overpass to Petrich.

71. ***Upupa epops***. Spring migration after 24.03. Found in autumn until late 09., with a peak in 08.-4 birds/day. In 05.1977 a pair bred in the hole in a poplar tree opposite the ROS, 2 pairs at the Levunovo Swamp and 2 pairs in the deciduous forest with many hollow trees north of the ROS.

Piciformes

72. ***Picus viridis***. Common bird in the area. Intense courtship from late 02. Calls can be heard until early 05. Every year 2-3 pairs breed in the poplar trees by the river at a height of about 8-10 m. Autumn courtship btw. 19.08. and 14.09. The migration is relatively difficult to notice and takes place btw. the end of 02. and 03. and btw. 08. and the first half of 09. During this time, the number of birds observed and heard increases significantly. On 28.02.1977 we counted 7 birds over a distance of 300 m, and from 04.-07.09.1976 we counted 6 birds each on Pchelina Hill, the northern slopes of the Kozhuh Mnt. and on the right bank of the SR.

73. ***Picus canus***. Generally less numerous than the previous one. Both sighted and ringed btw. 21.03. and 05.04. and 03.08. and 22.10.

74. ***Dendrocopos major***. 2-3 pairs breed along the SR and on the slopes of Kozhuh Mnt. On 03.05.1977, 3 birds were seen on the Kozhuh Mnt.

75. ***Dendrocopos syriacus***. In winter, individual birds migrating with the mixed flights of tits, nuthatches and treecreepers (22.-23.12.1977). Usually in 03. and 04. one or more birds are spotted (seen or heard) every day in search of food or courtship. In the last days of 03.1977, a

pair could be seen regularly at their nesting hole, 6 m high in a white poplar tree.

76. ***Dendrocoptes medius***. Rare species in the region. On 02.04.1977 a female was on the large net wall at the ROS.

77. ***Dendrobates minor***. Also not a breeding bird in the area. Appears in the reed thickets in 02. and 03. Individual birds observed in 08. to 09. The only one of all woodpecker birds to be caught and ringed. Heard after 22.02.

78. ***Jynx torquilla***. Individual birds were seen, caught and ringed during the autumn migration.

Passeriformes

79. ***Galerida cristata***. Resident bird, on paths, fields and hills. Btw. 02. and 03., especially in late 08. and 09., large numbers gather on the slopes of the surrounding hills. From the end of 02. can be observed courtship and pairs that have already established their nesting territory. 2-3 b. p. can be counted on the surrounding paths per 2 km. Prostov (1963) discovered 2 broods here.

80. ***Alauda arvensis***. Arrives in late 02.-early 03. and displays courtship at the same time as the Crested lark. In that period also flocks of migrants (15 ind. on 25.02.1977). The migration of populations living further north occurs even later. Autumn migration in the Petrich Field starts from 10.10. (Prostov, 1963). We discovered migrating flocks over the Starchevo Swamp on 30.10.1977 (counted a total of 135 ind.). On 31.10.1977 - a large number on the slopes of Pchelina Hill. On 22.12.1977 in the same swamp there were 80 birds and on 23.12.1977 - 3 flocks: 150+120+100. The Eurasian skylark flew together with sparrows and Common starlings.

81. ***Lullula arborea***. A courting bird on 10.04.1977. In the autumn of the same year, 01.10.1977 a small flock at Kozhuh Mnt.

82. *Riparia riparia*. In the spring after 23.03.1976. Autumn migration in 08.-09. Largest numbers: from 23.-25.08.1977 - 400-1300 Sand martins flew per day; on 28.08. btw. 6:45 PM and 7:00 PM there were 600 ind.; on 01.09.1976 - 150 ind. On the evening of 02.09.1976, a strong thunderstorm occurred far south of the Kozhuh Mnt. and a large stream of several thousand Sand martins flew back in a northerly direction. They usually formed mixed flocks with other species of swallows.

83. *Ptyonoprogne rupestris*. Breeding bird in the wider area, not just on Kozhuh Mnt. (Vatev & Simeonov, 1978). Spring migration almost unnoticeable-after 22.03. only 5-7 birds/day. In autumn, however, there are hundreds to count: 01-02.09.1976 approx. 150 each; 24.08.1977-240 and on 25.08.1977 - 300.

84. *Hirundo rustica*. The most numerous migrant on the Via Aristotelis. Arrival in 1976 on 20.03.1976; in 1977 on 14.03.1977; and 1978 on 20.03.1978. In the 1st half of 04., hundreds of birds were counted every day. On 29.04.1977 we saw the "local" pairs building nests. 4-8 pairs raise their offspring in the Pump Station. One nest had a somewhat unusual location: under a concrete beam, only 1.5 m above the level of the river branch that flows past here. The young left their nest on 08.09.1976 at the latest. The autumn migration occurs in waves. It seems that some of it starts in 07. A particularly large number of birds were counted: in 1976 - a few thousand each on 01.-02.09.1976, on 03.09.1976 at 1000, on 04.09.1976 huge crowds, from 3:00 PM - 4,000 counted, from 05.09. to 10.09. - exactly the same, on 09.09. - 14,000 ind. flew over our observation post btw. 4:00-7:00 PM. 1977 - on 23.-24.08.1977 - approx. 9000 birds/day. On 28.09.1977 btw. 6:45-7:00 PM - 3,000 House martins, 5,000 Barn swallows and 600 Sand martins appeared over the SR Valley and settled

down to spend the night in the reedbeds of the Levunovo Swamp. Such gatherings were also recorded during the following days, with the number of Barn swallows reaching 7,000 on 31.08.1977. Until mid-09., thousands of swallows passed through every day. In the autumn of 1978, the mass migration took place btw. 28.08.-17.09. When there is a strong wind, for example on 06.-07.09.1976, some of the flocks move in the opposite direction. The same can be observed during sudden weather changes in the southern part of the migration route. During mass migration, the flocks fly in an almost continuous stream, consisting of successive flocks of 100 to 800 birds. In autumn about 90-95% of the swallows are immat. with outer tail feathers (streamers) still underdeveloped. The last wave was registered on 12.10.1977 - a flock of about 100 ind.

85. *Hirundo daurica*. Breeds in a few pairs in the surrounding area and further afield, under the road bridge to Starchevo v., at Pchelina Hill in an old, no longer used tunnel and the associated abandoned signalman's house, under concrete culverts on the railway line, also at the entrance to smaller natural caves, for example the Levunovska Tumba Hill (an erosion remnant of the caldera on the left bank of the SR, north of the Pchelina Hill). A Red-rumped swallow nest was attached to an old, almost destroyed nest, occupied by a pair of Tree sparrows (02.05.1977). Often flies in association with other swallow species, in spring after 09.04. and autumn btw. 08. mid 09. In the last days of 08., 100-120 ind./day were counted. This is a very high number for a species that is still rare in Bulgaria. The SR Valley (and further north the Iskar, which lies in the same direction) represents the ecological corridor for the intensive area expansion. (Since 1972, it has been breeding in increasing numbers in the Rusenski Lom Valley near Russe

on the Danube. On 18.07.1972, a young bird was ringed by B. Ivanov (f. Institute of Zoology, BAS).

86. ***Delichon urbicum***. Arrival in 03.: 21.03.1976; 20.03.1978. In the "peak days" several hundred were registered. Nest building on the ROS buildings started on 28.04.1977 and on 02.05.1977 some nests were already finished. There were always 6-8 pairs/year under the above-mentioned roof of the Freshwater algae Production Plant. With the advent of modern architecture, especially in administrative buildings, the number of b. p. there increased. In the past, the ecological separation was clear. The one on the rocks above General Todorov v. can be considered a somewhat unusual nest location. There is a large nesting colony at the natural nesting site at Cape Kliakra (Dobrich Region) on the Black Sea Coast. The birds whose nests were built under the roof of the Pump Station suffered greatly from the attacks of the Black rats (*Rattus rattus*). The rodents penetrated through widened board joints in the nests. In the spring of 1976 we found 8 previous year's nests; the next year only a single pair had nested there. Apparently the rats were the cause. Of course we also found ectoparasites (nidicole fauna) in the nests. The last young left the nest on 21.08.1977, but returned there to rest for the night for a whole week. The autumn migration is much more noticeable. It probably starts in early 07. Along with the Barn swallow, it is the most numerous migrating species; On some days it even exceeds this. On 22.08.1977 btw. 4:35-4:50 PM we counted 300 *D. urbicum*, 280 *H. rustica*, 70 *R. riparia* and 40 *H. daurica*. On 23.08.1977 in the morning btw. 7:00-9:00 AM 700 *D. urbicum* were counted, in the afternoon from 3:40 PM to dusk about 9000 *D. urbicum* were counted. On 24.08.1977 btw. 10:00-11:00 AM - 586, btw. 11:30 AM - 3:00 PM - about 3000.

The intensity was the same the next day. The peak is btw. 10.-25.09. In other years it can shift or expand slightly, e.g. btw. 10.-25.09. The last stragglers were registered by Prostov (1963) on 11.10.

87. ***Motacilla alba***. Residential bird. Numbers naturally increase during migration season, 02.-03. and 09.-10. Then along the SR often seen 20-30 birds in the vicinities of the ROS. There are up to 100 fish breeding ponds near the town of Petrisch and Lebnitsa v. In 1977, White wagtails built their nests under the roof of the Freshwater algae Production Plant and under the bridge of the road to Petrich. Wintering on the rivers and canals. On 22.12.1977, 3 ind./ km were counted.

88. ***Motacilla flava***. Noted btw. 21.02.-10.04. and btw. 01.09.-09.09. It is likely that some pairs breed in the area. It is a common breeding bird in meadows and along the upper reaches. On 22.-23.06.1972 7 pairs were on the road from the town of Zemen to the town of Blagoevgrad, while near the town of Boboshevo an adult bird was feeding 3 newly fledged young birds. Btw. 26.04.-28.04.1973 individuals were observed near the towns of Melnik, Kresna and others along the SR.

89. ***Motacilla cinerea***. Seen in small numbers during spring migration (02.-03.) and autumn migration (08.-10.). On individual days there can be up to 10 birds along the SR and the canals are counted. On 22.-23.12.1977, 9+12 ind./ km were recorded on the canals.

90. ***Anthus trivialis***. Can be observed during migration and overwintering (31.08.-27.02.). In 09. and 02. up to 10-20 ind. can be counted. On 22.-23.12.1977 2 flocks of 40-50 birds in the alfalfa fields of the swamp near Starchevo.

91. ***Anthus pratensis***. One bird was caught in the nets on 07.09.1977, and another was spotted on the western slope of Kozhuh Mnt. on 14.09.1977.

92. *Anthus campestris*. Not captured by us, but captured by Prostov (1963) near the town of Petrich during the passage. The specimen is stored at the National Museum of Natural History, BAS in Sofia.

93. *Lanius collurio*. One of the most common songbird species in the country. Mainly seen on the autumn migration and only within a short period: 03.-10.09.1976, 27.09.-02.10.1977, 19.08.-08.09.1978. Btw. 21.08.-01.09: in 08. and 09. mainly females and young birds are caught and spotted. In 1978, catches and observations showed that the Red-backed shrike had declined significantly in numbers compared to the previous 2 years. In spring the first birds arrive after 25.04.

94. *Lanius minor*. Only noticed on the passage in late 10. and early 11. (20.10.-01.11.1977). During the breeding season, it prefers the cultivated landscapes in the eastern part of the Petrich Field (Prostov, 1963).

95. *Lanius excubitor*. Seen in the area until the end of 02. The species probably overwinters here.

96. *Lanius senator* (Fig. 4). So far we haven't got it yet. Seen in the immediate vicinity of the ROS, although its presence is expected. Balat (1962) encountered the species near the town of Petrich on 18.06. and 19.06.1957. Prostov (1963) describes this shrike as a resident of Jujube (*Ziziphus jujube*), Oriental hornbeam and other wasteland areas, mainly in the eastern part of the Sandanski-Petrich Valley. On 15.06.1959 he saw 2 pairs with young that had already left the nest but were not fully fledged. Vatev & Simeonov (1978) observed Woodchat shrikes building nests on 14.05.1976. A few days later they found 2 nests with 2, respectively 4 eggs. The first clutch was obviously not yet complete. On 30.05.1976 the young had already hatched. These observations were

generally successful at the surroundings of the Yavorov r/w Station, a little north of our area. We saw a pair feeding their young a little later, on 04.08.1978 near Hotovo v.



Fig. 4. Woodchat shrike (*Lanius senator*). Kozhuh Mnt. 11.07.2022.
Photograph: Zlatozar Z. Boev.

97. *Lanius nubicus*. This Mediterranean species was discovered in Bulgaria in the 1960-s (Mauersberger & Stübs, 1963; Dončev, 1964) in the SE Rhodopes Mnt. It was recorded in the town of Petrich on 10.05.1964 by Dr. M. Paspaleva. Vatev & Simeonov (1978) succeeded in proving breeding. On 10.06.1976 P. Simeonov captured a bird at the nest at the Yavorov r/w Station. We ringed ind. of this species around the ROS several times, but no b. p. have been recorded during our study, even though the habitat looks very favourable. On 24.02.1976 unexpectedly early passage (Nankinov et al., 1979). Similar early migration dates are given by Dementjev (1954), again young males, for various locations in Europe and Asia. Later, on 21.04.1978 other birds were observed at the ROS. Autumn migrants were noted on 05.09.1976.

98. *Bombycilla garrulus*. It is only a winter guest in Bulgaria. On 22.12.1977, a small flock of 7 birds was in the gallery forest along the SR on the top of an alder tree. Another bird had perched nearby.

99. ***Cinclus cinclus***. In Bulgaria it is an indicator of clear mountain streams and rivers. The absence of industrial pollution in this part of the country, which generally pollutes the rivers, is favourable for the species. In the spring of 1976 we found some birds on the left bank of SR and at the Levunovska R. In 1977 a pair lived in the canals at the ROS. A White-throated dipper ringed on 26.09.1977 was found in the winter of that year, observed 2 km further north. The bird had already occupied its breeding territory and was courting (Nankinov & Djingova, 1979).

100. ***Troglodytes troglodytes***. In the 1950-s the natural gallery forest of the Ormana Island, a small river island measuring 1.75 x 0.6 km, was cut down and the stumps and roots were piled up in some places. The SR was corrected and forced into its eastern bed. The piles were very favorable nesting places for Eurasian wrens. Judging by the catches, the species migrates btw. 22.02.-06.04. and btw. 22.09.-30.10. In 1978 the autumn migration began on 10.10. So the dates can change slightly from year to year. By the end of 10., 10 ind. had been caught. Many stayed here to overwinter, especially on the canals and in the swamp of Starchevo v., where 15 and 18 ind./ km were counted on 22.-23.12.1977.

101. ***Prunella modularis***. In different years the autumn migration begins here after 09.10., 12.10, and 13.10., depending on the weather. In spring it migrates until 30.03. In some years the number of birds increases, especially in 03. and 10. Then up to 30-80 ind. can be counted. This phenomenon is particularly characteristic of spring, after drops in temperature and short snow autumns, which, however, are rare here.

102. ***Erithacus rubecula***. In large numbers both on the spring and autumn migrations; about 500 ind. ringed. Spring migration from the last decade of 02., depending on the weather until 04.04.,

14.04, and 17.04. The rhythm of the migration apparently depends on the weather, especially in spring. The peaks are as follows: 21-29.03.1976; 01.-03.04.1977; 19-31.03.1978. Departure from 09.09., also 23.08, and 30.08., probably until 11. The peaks were as follows: 27.09.-07.10.1976; 04.10.-17.10.1977; 11-25.10.1978. The mass appearance of the European robin usually occurs after sharp temperature fluctuations. Winters in the area in significant numbers. On 22.-23.12.1977 we counted 22 ind./km over swampy areas, canals and bushes.

103. ***Phoenicurus ochruros***. In Bulgaria it is mainly a mountain dweller. Arrives in spring after 23.03. About this time we saw a courting male defending his chosen nesting territory under the roof of a house. Departure btw. 15.10. and 26.10. The migratory birds stick to hills and open areas. Seen on 25-26.10.1977 and 17.10.1977 at Pchelina Hill and the surrounding hills 8+7+12 ind.

104. ***Phoenicurus phoenicurus***. In the spring, the species was caught at the earliest on 01.04.1977. In autumn it is more frequent and passes btw. 01. and 16.09. On 09.-10.09.1976 there were 4 birds each on a 300 m route near the nets. On 06.-07.09.1977, 3+2 ind. were caught in the nets.

105. ***Luscinia luscinia***. We have caught this species at the ROS only in autumn, btw. 01.08. and 02.10. The first arrivals are well-fed young birds - a sign that they are at the beginning of the migration and that they come from nearby nesting areas in the southern part of their distribution area.

106. ***Luscinia megarhynchos***. Arrival from 02.04.1976, 31.03.1977 and 17.04.1978 The song of the migrating males can be heard practically at any time of the day or night. A breeding bird in the area. The departure probably starts in early 07. And lasts until

14.09.1976, 01.10.1977, and 05.09.1978. Autumn courtship could be heard all day and evening on 29.09.1977. On peak days, up to 10-30 birds can be counted at the nets at 300 m.

107. *Saxicola rubetra*. Found on Kozhuh Mnt., Levunovska Tumba Hill and Pchelina Hill in the last decade of 04.

108. *Saxicola rubicola*. Single pairs nest in the area. Net catches on the Kozhuh Mnt. from early 03. to late 04., in autumn in the last decade of 09. Single ind. also seem to overwinter: on 22.12.1977 a male was found at the canals of the Starchevo Swamp.

109. *Oenanthe oenanthe*. A breeding bird in the area. The beginning of the spring migration usually starts in last decade of 03.

110. *Oenanthe hispanica*. Arrives at the same time as the previous one. Relatively common breeding bird of the Kozhuh Mnt. and Pchelina Hill. In the 2nd half of the 20th century, the species expanded in Northern Bulgaria.

111. *Monticola saxatilis*. 1-2 pairs breed at Pchelina Hill.

112. *Monticola solitarius*. This southern species predominates here in numbers. In the spring on 23.03.1976; Observed 01.04.1977 and 21.04.1978. On the slopes of Pchelina Hill, 2 pairs were feeding their young (06.05.1977). Feeding adult birds were also seen later (15.05.1977). Vatev & Simeonov (1978) found a nest on a rocky ledge at a height of 3 m on 22.05.1977, approx. further north, near the Yavorov r/w Station. The nest was observed on 04.09., 12.09. and 26.09.1976 and on 15.09.1977. Apparently some birds remain in the area to overwinter, or the species migrates in the area during the winter. An observation, again by Yavorov r/w Station on 24.12.1977, suggests this.

113. *Turdus merula*. The spring migration lasts until the last decade of 03. Single ind. caught until 20.04. The departure is not uniform, the “waves” are

pretty much synchronized with the temperature fluctuations. Cold snaps, e.g. 21.03.1976 or 01.03.1977, always led to a significant increase in the number of migrants. The autumn migration lasts longer and also happens in “waves”. In 1976 the passage lasted btw. 02.09.-21.10., although only btw. 05.09. and 10.09. a wave was noticeable. In 1977 there were 2 waves: from 20.08.-14.09.1977 (peak btw. 21.08. and 29.08.) and from 16.-27.10.1977. The autumn migration of 1978 took place in 3 stages: 02.-06.08.1978; 21.08.-15.09.1978; 05.-28.10.1978. Peaks btw. 05.08.-06.08. and 21.08. to 22.08.1978; btw. 01.09.-02.09. and btw. 11.10.-12.10.1978. During the first half of 08. there were mostly young birds present. Blackbirds moult mainly during the 2nd half of 08. and the first days of 09. In some cases, the back of the head is almost bald. The courtship noticed from 20.02. We recorded about 3 b. p. in the area surrounding the ROS. About 5-6 b. p. raise their young on the left bank of the SR, btw. Levunovska Tumba Hill and General Todorov r/w Station. We also found 2 old nests, in a pear tree and a willow at 3.5 and 8 m high. The Common blackbirds that overwinter in the area, predominantly males, find their food in the old foliage around the non-freezing parts of the swamps. In 12. were valued 6 ind./ km.

114. *Turdus pilaris*. Mainly spring migrants with numbers fluctuating greatly from year to year. Mass migration in several waves until 23.03.1976, when we were able to detect an accumulation of about 2,000 ind. The next year there were btw. 23.02. and 20.03. only single individuals and once a flock of 100 birds can be noted. It is of course possible that the migration took place before the start of our work period in 01. and the first half of 02. In 1978 the spring migration was again quite numerous, especially in early 02., where we recorded 250-600 ind./day.

Often migrates mixed with other species of thrushes or with Common starlings, and gatherings have also been seen in wet meadows with snipes and Ruffs. Overnight stay in the Blackberry bushes (*Rubus fruticosus*), in the reeds (*Phragmites australis*) and in the forest along the SR. When they were taken out of the nest, the birds excreted their excrement, a reaction of nest defence. Autumn migration begins after 20.10. and probably lasts until 12.

115. *Turdus iliacus*. Moves together with previous species, also on the same dates, but much less numerous. In 1976 there were flocks of up to 270 ind. The next year no more than 1-4 birds were seen daily (01.-21.03.). In 02.1978 we were again able to estimate flocks of 40-300 ind./day. The birds spent the night in the willows by the river in small groups of 2-5 each.

116. *Turdus viscivorus*. Few spring migrants, usually together with the flocks of fieldfares. Arrival btw. 20.02. and 06.03.

117. *Cettia cetti*. Relatively rare in Bulgaria. Known mainly from the Black Sea coast and the SR Valley. It can be described as a typical bird for the area. Very tame, allows the observer to come within a few meters. Has a voice that cannot be confused. Spring migration btw. 25.03.-04. In 1978 the passage was quite weak and stopped a month early. Some birds are probably moving away as early as 07. New ones were caught again and again in 08., 09. and 10. A slight increase in catches by year: 02.09.-08.10.1976; 20.08.-02.09.1977 and 08.-26.10.1977; 02.-07.08.1978, 22.-27.09.1978 and 11.-19.10.1978. In 08. almost all Cetti's warbler moult, with the ad. more intense. Pretty large numbers stay here to overwinter. On 22.-23.12.1977 an average of 11-15 ind./km were counted on the canals. There were 2-6 ind. in the Starchevo Swamp. Some

were observed feeding: pecking duckweed (*Lemna minor*) from the surface. The question of migration and wintering of the Cetti's warbler in Bulgaria (Pateff, 1950; Prostov, 1963) can hereby be considered clarified. The 3-year systematic observations and ringing in the ROS showed that the species is autumning in South-West Bulgaria within the wintering area of the species. In addition, ind. of this species that have overwintered further south can be found here in 03.

118. *Acrocephalus melanopogon*. Very rare species in Bulgaria. Previously reported by Paspaleva-Antonova (1965), Dontschev & Darakchiev (1971), Prostov (1977), and Nankinov and Darakchiev (1977). 1 ind. on Kozhuh Mnt. ringed on 20.10.1978. Also 1 ind., observed at the Burgas Salt Flats, Black Sea coast, 15.09.1978 (L. Müller - in litt.) In summary it can be said that the Moustached Warbler in Bulgaria passes through in autumn (10.), sometimes also overwinters here and flies to its breeding grounds in 04. to 05.

119. *Acrocephalus paludicola*. Comes through in small numbers in autumn, according to our findings btw. 08.09.-12.10.

120. *Acrocephalus schoenobaenus*. Compared to the other marsh warblers in the SR Valley, they are quite numerous. Spring migration from 04.-27.04. In larger numbers in autumn, about late 07. to early 11. Passage waves in 1977: 19-29.08.1977, 04.-15.09.1977, 30.09.-08.10.1977 and on 23.10.1977. In 1978: 04.-10.08.1978; 26.-30.08.1978, 27.09.1978 and 10.-25.10.1978. Peaks 1976 btw. 25.09.-30.09.1977, 30.09.-08.10.1978, 10.-25.10.1978. Nests in swampy areas with reeds in the studied area.

121. *Acrocephalus palustris*. Mainly on the autumn migration - 11.09.-09.10.1976, 03.08-09.10.1978, 21.08-11.10.1978.

Peak in 1978 btw. 21.08.-25.08. (12 ind. caught). Some of the birds nesting in Central Europe seem to fly through the SR Valley. On 26.08.1978, 1 ind. that had been ringed in Poland 20 days earlier was caught in the net (Nankinov and Djingova, 1979). During the spring we have encountered Marsh warblers here btw. 02.-12.04.

122. *Acrocephalus scirpaceus*.

According to previous research by Prostov (1963), encountered only once, 06.03.1959. The systematic observations at the ROS have shown that the species is present throughout the spring migration, 04. late 04. and early 05.1977 several singing males in the Levunovo Swamp and the adjacent area. For the autumn migration caught btw. 21.08.-12.10.

123. *Acrocephalus arundinaceus*.

Common breeding and migratory bird. Comes in spring after 06.04., the migration lasts until 05. Beginning of autumn migration probably from late 07. Encountered in catches from early to late 08. and until 04.09. Nests in large numbers in the swamps and canals in the area and throughout the SR Valley. On 02.03.1977, about 15 males were singing in the Levunovo Swamp. On 06.08.1978, we were able to observe the feeding of young ones at the ROS, which had already reached the size of their parents. The ringing work showed that the "local" Great Reed Warblers had arrived before 30.04. Starts flying away after 08.08.

124. *Hippolais icterina*. Previously it was found only once by Prostov (1963) on 06.04.1959. Therefore, it can be assumed that the species migrated in 05., since so far, the spring dates are before 30.03. However, it can be seen regularly in autumn. The autumn migration probably started in 07 and continued until 21.09.1976 or 28.10.1977 and 23.08.1978. As you can

see, the dates of the autumn migration are quite scattered. We observed a particularly large number of Icterine warblers in 08.1977, when 30-40 birds were counted in and around the nets every day. The main share was withdrawn until 01.09. Latecomers could be caught until the end of 10. In 1978, the migration wave lasted until 04.08.

125. *Iduna pallida*. Spring migration after 20.04.1977 and 12.04.1978. Autumn migration lasts btw. 02.08.-04.09.

126. *Hippolais olivetorum*. Only in autumn. Data as for previous species. The Olive-tree warbler nests, albeit in small numbers, in suitable habitats in southern Bulgaria. Vatev & Simeonov (1978) often found the Eastern olivaceous warbler north, in the surroundings of Yavorov r/w Station. A nest with 2 eggs, low in a Greek juniper, 23.03.1976, a second with 4 eggs on 01.05.the same year. 3 juv. ind. were ringed there on 13.06.1976.

127. *Curruca curruca*. Ranks 4th in terms of numbers. Spring migration after 06.03.1977 and 23.03.1978 Autumn migration within the dates 01.09.-23.10.1976.; 19.08.-13.09. and 27.08.-26.09.1978. In terms of numbers, the autumn 1977 passage was the highest and took place in the shortest period.

128. *Curruca crassirostris*. The species was first identified by Patev (1950), after an ind. from Kresna Gorge. Prostov (1963) collected a 2nd one from the town of Petrich. Dontschev (1965) reports some observations, including breeding birds, from the Rhodopes in 1964 and 1965. Robel and Königstedt (1978) cite an unpublished ind. Observed by Dr. Schubert, who found a feeding pair near the town of Melnik in 05.1974 and describes young birds etc. Eastern Orphean warblers after 17.05.1975, from

the area of Sandanski (Valkovo v.). Not too rare in the area. Observed on Kozhuh Mnt. and Levunovska Tumba Hill after 25.04.1978. Vatev & Simeonov (1978) describe it as a species that often breeds in the Kresna Gorge. Most of the birds that breed here seem to arrive in 05.

129. *Sylvia borin*. Mainly autumn migrants. Noted in the spring after 23.03.1978. Starts to move away in the autumn from 08. (possibly as early as 07.). Passage noted until 27.09.1976; 30.09.1977 and 29.09.1978. Comes 3rd in terms of numbers after Blackcap and Whitethroat. Migration waves were on 02.-15.09.1976; 20.08.1977 and 24-30.08.1978.

130. *Sylvia atricapilla* (Fig. 5). Numerous in both spring and autumn. During peak times, up to 130 ind. were observed over a counting distance of 300 m along the net walls. First registered on 23.03.1976; 15.03.1977; 12.03.1978. Passage until late 04. Noticeable migration waves in the spring of 1977: 29.03.-09.04., 15.-17.04., 22.-28.03. In the following spring again numerous, peak 05.-28.04. Autumn migration starts in 07. and lasts throughout 08., 09. and 10. 1976 waves of migration throughout 09. in 1977 - 25.08.-08.09.1977, and in 1978 - 03.08.-07.09.1978, 13.-30.09.1978. On 09.09.1976, a young Eurasian blackcap with a beak anomaly was caught. (The lower beak is curved laterally 1 mm from the tip.). Nevertheless, the bird was fed normally. A male, caught on 28.08.1977, had a black tumor on his right foot, L-5, W-4 and H-2.5 mm. The courtship song began in the first days of 04. In the valley and surroundings of the town of Petrich, the species nests in stream valleys, forest edges and hills covered with prickly bushes up to 300 m above sea level. Prostov (1963) writes that it probably produces 2 broods here.



Fig. 5. Eurasian blackcap (*Sylvia atricapilla*), killed by Eurasian magpies (*Pica pica*). ROS, 09.1978. Photograph: Eberhard Undzhiyam.

131. *Sylvia cantillans*. Found in 1963 as a new species for Bulgaria by Mauersberger & Stübs (1963) near the towns of Melnik and Sandanski, and the Kresna Gorge. Also detected by the same and Dončev (1964) for SW Bulgaria (Rhodopes) and observed there again in 1964 (Dončev, 1964). Vatev & Simeonov, who have been observing in the Kresna Gorge since 1973, ringed 5 juv. there on 30.05.1976. Later, adults and young were repeatedly found there and in the spring of 1977. Ivanov (1977) also photographed the nest. Usually nests in the thickets of *Juniperus oxycedrus* and *J. excelsa*.

132. *Phylloscopus trochilus*. Strongly represented during spring and autumn migration, being more numerous in autumn. Probably starts moving about the end of 06. In 1977-1978 the passage lasted until 14.10.1978 and 30.10.1977. In favorable years it can last until 11. The migration waves lasted quite a long time: 08.09.-06.10.1976; 18.09.-23.09.1977; 28.09.- 06.10.1977; and 10.10.-17.10.1977; 19.09.-14.10.1978. In spring the species migrated from the 2nd half of 01. or 03. to mid-04.: 23.03.-10.04.1976; 22.02.-07.04.1977; 30.03.-17.04.1978. The main passage lasted from 22.02.-01.03.1977 and 20.03.-30.03.1978.

The Willow warbler and Chiffchaff initially concentrate in the crowns of the alders and only then in the poplars. They also mix with other songbirds.

133. *Phylloscopus collybita*. The Chiffchaff has always been the most common among the song birds. Spring migration: 27.02.-08.04.1976; 02.03.-05.04.1977; 21.02.-19.04.1978. Autumn migration: 20.09.-28.10.1976; 09.09.-30.10.1977; 05.10.-30.10.1978. It can be seen that the migration times in different years autumn on different dates and are not of the same length. In the Petrich Field Prostov (1963) has the latest passage dates: 10.-11.10.1956. and 27.-28.04.1958. He writes that the birds can always be observed in groups and everywhere. Our catches at the ROS confirmed the same. Both species were always caught in the nets in groups of 3-5. During the research period we detected the following migratory waves of chiffchaff: 14.03.-08.04.1976 and 28.09.-28.10.1976; 14.03.-20.03.1977 and 25.09.-30.10.1977; 28.02.-13.03.1978, 18.03.-28.03.1978 and 03.04.-19.04.1978. In the autumn of 1978, the Common chiffchaff migrated in only one wave, which coincided with the beginning of the migration. Some of the migratory waves were accompanied by strong temperature fluctuations. Because of the drop in temperature on 13.03. in 1976 we were able to observe small flocks of 60-70 birds at the nets. They stuck to the small puddles filled with aquatic plants, where they foraged for food on the surface or on the leaves. In 12.1977, about 16 ind./km overwintered in the same habitats.

134. *Phylloscopus sibilatrix*. In terms of numbers, it is less abundant compared to Willow warbler and Common chiffchaff and doesn't appear every year. Autumn 23.09.1976; 25.08.-21.10.1977 and 02.08.-24.09.1978. It was more numerous in the autumn of 1977, with 2

waves of migration btw. 26.08.-02.09.1977 and 07.-13.09.1977.

135. *Phylloscopus orientalis*. Only a few individuals were ringed on 21.09.1976 and 21.10.1977. Autumn migration probably lasts a month from late 09. to late 10.

136. *Regulus regulus*. The species migrates in mixed flocks with tits, waders, warblers and other birds. It is registered only in the spring, until 30.03. We caught it mostly in cold weather.

137. *Regulus ignicapilla*. The species migrate in mixed flocks with tits, treecreepers, warblers and other birds. It was recorded btw. 24.10.-02.04. They spent the night on the forested slope of Kozhuh Mnt. and in the reeds of the swamps and water canals.

138. *Muscicapa striata*. A common autumn migrant in this part of the country. The passage starts in 06. and lasts until 08.10.1976, 12.10.1977 and 07.10.1978. It was most numerous in 08. and 09. Every day btw. 02.09.-08.09.1976, 6-15 ind. were observed over a 300 m route; 19.08.-24.08.1977 25 ind. each, on 03.08. early in the morning even 40 ind. Arrives quite late in the spring – 11.04.1977. Relatively rare in 04. In 1978, for example, not found.

139. *Ficedula hypoleuca*. Comes 3rd in number during migration after Spotted flycatcher and Collared Flycatchers. During the period 19.08.-24.08.1977 the ratio was approx. 25:23:4 ind. Appeared in the ROS different years from 17.03., 06.04. and 11.04. and was detectable until 27.04. In the autumn of 1976 btw. 02.-10.09.1976; 19.08.-13.09.1977 and on 22.08.1978.

140. *Ficedula albicollis*. The Collared Flycatcher arrived after 26.03.1976, 11.04.1977, and 23.03.1978 in different years. At the beginning of 04., dozens of birds searched for insects in the poplar tree crowns. Arrives by 27.04., but also by the beginning of next month.

The dates of the departure can follow each other shortly after each other (e.g. 22.08.-04.09.1977) or be far apart (19.08.-02.10.1977).

141. *Ficedula parva*. Rare species in the region on Via Aristotelis. Only detected in autumn. Due to the few observations, the data can only be btw. 30.08. (1 male ind. observed) - 05.09.1977 (1 ad. ind. ringed).

142. *Aegithalos caudatus*. A common breeding, migratory and wintering bird in the SR Valley. Two nests on pasture at a height of 7 and 3.5 m. The young fly out early, btw. 15.04.20.04. On 23.04.1977, a total of 14 birds, i.e. 2 families, were caught. The young ones were as big as the old ones. At the end of 04., the number of families on migrations after the nesting period increases. The families stay together until late 08. and early of the autumn migration. In 09., observations of long-tailed tits increase. Judging by their catches, they migrate throughout 10. In spring until 27.04. In some years they move for very short periods: 21.02.-05.03.1978, btw. 07.08.-08.08. and btw. 13.10.-18.10. Subspecies: Of all 106 long-tailed tits ringed so far, 105 belong to *A. caudatus europaeus*. On 28.02.1977, a white-headed ind. of the northern subspecies *A. c. caudatus* was captured. Its southern border runs through Ukraine (Voinstvensky, 1954). Based on this catch, it can be assumed that individual birds migrate further and reach the Mediterranean zone.

143. *Remiz pendulinus*. Every year there are about 5 b. p. in the area, 3 of which are btw. the SR and the Levunovo Swamp. Pairs already formed in 02. It is possible that the pairs exist all year round because the birds overwinter together. Whenever 1 ind. was caught in the net, the partner would fly around in fear. Build their nests from 15.04. The peak is reached in the last

decade of the month. But individual pairs are still active in mid-05. The nesting material is mainly wool and plant fibers. So far, 13 old and new nests have been counted, all of which were located at a height of 4 to 9 m. Only one hung just 50 cm above the ground, another 22 (!) m high in a white poplar tree. The first eggs were laid on 29.04. The migration begins imperceptibly and can only be detected by catching and ringing birds: spring - from 24.03.-08.03., autumn btw. 27.09.-25.10. Number fluctuates widely - often encountered during spring 1976, but autumn 1978 was completely absent. An ind., ringed at 1:00 PM in the ROS area on 06.10.1977, was caught again 8 days later in the reed beds of Lake Coronya in Greece (Nankinov & Djingova, 1979).

144. *Poecile palustris*. 3 ind. were discovered on 26.10 and 28.10.1976, and ringed on 08.03.1978. The marsh tits probably migrate through the area.

145. *Cyanistes caeruleus*. The most numerous species among the tits. The spring migration begins in 02. in various years and lasts until 08.03., 16.03., and 25.03. and the autumn migration is btw. 08.-10. The species is likely to be encountered all year round. As previously stated (Nankinov et al., 1979), the migration of Eurasian blue tits is wave-like. The species can be seen in large numbers at certain times, but not at all at other times. Eurasian titmice prefer to feed on poplar blossoms. Most often seen in the first half of 03. They look for insects that overwinter in the crowns of the alder trees and on the reeds. The flocks are either mixed or consist only of Eurasian blue tits. On 28.02.1977 we observed a mixed flock of 15 Eurasian blue tits, 6 Great tits, 8 Long-tailed tits, 4 Goldcrests, 2 Common firecrests, and 5 Willow warblers. The Eurasian blue tits captured in 08. Were at the peak of their moult.

146. *Parus major*. Great and Eurasian blue tits began to form pairs as early as 02. Both species show a wave-like migration, with the great tit decreasing in number. In the spring of 1978 the great tits moved very briefly, btw. 22.02.-05.03., and on 26.03. The autumn migration showed 2 waves: 20.08.-13.09.1977 and 29.09.-29.10.1977; 01.08.-14.09.1978 and 30.09.-28.10.1978. A large number of Great Tits were found 07.09.-10.09.1976 and 24.08.-01.09.1977. There were 100-120 Great tits in the forest. The birds captured in 08. consistently moulted. They spent the night together with the other tit species in the reed beds and willow thickets.

147. *Poecile lugubris*. In 1976, breeding in a rock crevice was recorded on the eastern slope of the Kozhuh Mnt. (Nankinov et al., 1979). The Sombre tit has 2 broods here, always occurs singly, does not form flocks even in autumn and winter, does not migrate or only migrates for short distances (Prostov, 1963).

148. *Sitta europaea*. 1-2 b. p. nest in the area surrounding the ROS. After the breeding period, individual birds searched for food in the gallery forest on the SR and were also caught in the nets.

149. *Sitta neumayer*. The species is found on the rocks in the area (Nankinov et al., 1979).

150. *Tichodroma muraria*. The wallcreeper is a regular but rare migrant. Individual birds are recorded at the ROS in spring btw. 03.03. and 03.04. and in autumn late 10. The birds stay in the habitats that are characteristic of the species, i.e. rocks and abandoned buildings. On 30.10.1977, 1 ind. spent a long time at the Pump Station looking for food. It inspected walls, the shafts and tunnels and also the surface of the water.

151. *Certhia brachydactyla* was encountered more often. We have them in the last decade of 02. and btw.

20.09.-19.10. and occasionally caught in the nets on 08.12.1978.

152. *Certhia familiaris*. Two Eurasian treecreeper was caught on 01.10. and 09.10.1976. In autumn, winter and spring both species spend the night in the reeds and migrate together with tits.

153. *Emberiza calandra*. Nests in the region. 2 b. p. were observed on the eastern slope of Kozhuh Mnt. on 03.05.1977, with the males showing mating behavior. Also noted during migration in 02. and 09.

154. *Emberiza citrinella*. Every year in late 02. and early 03. (21.02. to 04.03.) Yellowhammers were recorded in small flocks migrating north. Some stayed at the reed massifs in the water bodies. We have no observations in the autumn, but we do have observations from Prostov (1963) on 11.10.1956.

155. *Emberiza cia*. It appears in 03. on the surrounding slopes.

156. *Emberiza hortulana*. Also arrives at the same time. On 29.04.1977 we counted 6 pairs on Kozhuh Mnt. and 5 pairs on Levunovska Tumba Hill.

157. *Emberiza cirrus*. Prostov (1963) records them on the foothills of the western Bulgarian border mountains, the Belasitsa Mnt. and Ograzhden Mnt. There it inhabits areas of Oriental Hornbeam with cultivated strips and individual larger trees btw. Nested at Kozhuh Mnt. It is seen only sporadically during migration, for example 27.02.-10.04.1976 and also on 06.10.1976; after 28.02.1976 and btw. 28.08.-07.10.1977; after 20.02.1978 and in after 03.08.1978 it sometimes mixes with the flocks of Common reed buntings. We recorded the largest group of Cirl buntings of 17 ind. on 28.08.1977. Singing males were noted btw. 02.-04., and in 08.1978 a wintering ind. on 08.12.1977.

158. *Emberiza schoeniclus*. The most numerous species of bunting, mostly on spring migration. Listed btw. 02.-19.03.

Left after 28.09.1978 and 27.10.1977. Winters in the canals of the Starchevo Swamp. On 22.12.1977, during a taxation in 03. approx. 8 ind./km.

159. *Fringilla coelebs*. In different years with different migration times, both dates and numbers. Massively in the spring of 1976 (Nankinov et al., 1979). At that time, chaffinches were observed until 08.04. In the following 2 years, a passage was recorded up to 03.04. and 12.04., although no more than 100-200 ind. were estimated. The departure began on 03.09.1976; on 23.08.1977; and only after 11.10.1978. Probably move until 11. too. Passage waves were in 21.10.-28.10.1976; 28.09.-03.10.1977; 07.10.-10.10.1978, 16.10.-23.10.1977; 11.10.-30.10.1977; 26.10.-23.10.1978. On 23.12.1977, 53 ind./km were counted. Spend the night in the reeds. Nesting in the deciduous forests along the SR. On 02.05.1977 we recorded 11 b. p. north of the ROS.

160. *Fringilla montifringilla*. Migrates with the Eurasian chaffinch, in spring until 21.03. and in autumn after 23.09. On 22.02.1978, a flock of Bramblings of about 30 birds moved north. In spring, the mixed flocks of finches search for food in cultivated fields, meadows and waterways.

161. *Serinus serinus*. Both heard and observed on 27.02.1976 and 21.03.1977.

162. *Spinus spinus*. The migratory behavior is like that of the European greenfinch, although it is less in numbers. Comparatively often found in spring 1976 and 1978, as well as autumn 1977. Absent in autumn 1976 and 1978. Usually arrives by 28.03. and leaves btw. 28.09.-30.10.1977 away.

163. *Chloris chloris*. Very different migratory phenology. In 1976 he was represented in large numbers in both spring and autumn. The following year it was rare in spring and numerous in autumn. In 1978 it was the other way

around. The passage dates were also very different. 23.02.-22.03.1976 and 03.09.-26.10.1976; 07.04.-13.04.1977 and 21.08.-26.10.1977; 21.02.-19.04.1978 and 04.09.-13.10.1978. Passage waves were recorded on 03.09.-04.10.1976; 12.09.-13.10.1977 and 21.02.-27.02.1978. At the time of the last wave, up to 300 birds were present each day. We found nests in the low false acacia (*Robinia pseudoacacia*) on the left bank of the SR.

164. *Carduelis carduelis*. Prostov (1963) reports 2 broods per year, nesting on the Malak Kozhuh Hill. We ringed a very late brood (3 young aged 12 days) on 03.09.1976. The nest was built in a Western thuja tree (*Thuja occidentalis*) at a height of 2.5 m. From 10. onwards, many European Goldfinch families were wandering around the region. We both spotted and caught them until 09.10.1976; 29.10.1977 and 12.09.1978. Some of the birds caught in 08. were already in molt. On 05.09.1976 we caught a semi-albinoid European Goldfinch, a young bird with a completely white head. In spring we saw flocks until almost 04. In 02., 03. and 04. 1977 the flocks numbered up to 100-120 birds each. At the same time (29.04.-02.05.1977) the local birds were already building nests and laying their first eggs: 4 pairs on the Kozhuh Mnt., 3 pairs on the Levunovska Tumba Hill, and 3 pairs on the right bank of the SR.

165. *Linaria cannabina*. Observed btw. 02.04. to 09. Kept to the slopes of the surrounding heights. By 04. they were already occupying breeding territories and nesting. We counted about 15 b. p. on the Kozhuh Mnt. in 04.1976 and 8 the next spring only on the western slope. In 12.1977 a flock of 80 birds overwintered in the surroundings of the ROS.

166. *Loxia curvirostra*. A flock of this species, which is not at all characteristic of the study area, was seen on the poplars

on the banks of the SR on 22.09.1978. The previous days were cold and rainy.

167. *Pyrrhula pyrrhula*. Eurasian bullfinches migrated together with European greenfinches at the gallery forest spring until the end of 03. and autumn after 22.09. The flocks numbered up to 14 birds.

168. *Coccothraustes coccothraustes*. Appears in various numbers in different years and seasons. In the last decade of 02.1978 we counted 20-30 birds at the SR. However, we did not record more than 5 birds the previous spring. In late 10.1977, flocks of 4, 6, 7, 8, 10, 15, 30 ind. were present on the eastern slope of Pchelina Hill (31.10.1977). Migrates in spring until 03.04. The last ones come in pairs. In the autumn only after 27.10. Also common in the winter. Surroundings of the ROS. On 22.-23.12.12.1977 we recorded 3+5 ind.

169. *Passer domesticus*. As early as the end of 02., the pairs take up their breeding grounds under the roofs of buildings and defend them. The house sparrow is notable for its very long breeding cycle. We have nest building registered on 09.04.1976; 29.04.-01.05.1977 and 19.08.1978. We counted 12 nests on the ROS buildings, 6 nests under the roof of an abandoned signalman's house next to the Levunovska Tumba Hill, in the forest on the right bank of the SR, in tree hollows of poplars, alders, old willows - 4 b. p. on 02.05.1977, in abandoned nests the House martin, in open nests, in the crowns of thuja, apple trees, pears, etc. Some pairs probably produce up to 3 and even 4 broods, as we have just recorded fledged young up to 09. Based on the results of the systematic catches, we are inclined to assume that the House sparrow migrates here, even if only for short distances, in the spring until 27.03.1976; 12.04.1977 and 29.03.1978. In the autumn, probably btw. 07.-28.10.1976; 02.10.1977 and 10.17.1978

periods of numerous catches alternated with periods of complete absence from the area. This indicates that the house sparrow is moving back and forth in waves. Such waves were recorded on 23.02.-01.03.1976, 11.03.-27.03.1976, 02.-10.09.1976; 01.-06.10.1976 and 20.-28.10.1976; 21.02.-27.02.1977, 03.03.-09.03.1977; 27.03.-05.04.1977 and 20.08.-23.08.1977; 21.02.-28.02.1978, 27.03.-29.03.1978, 01.08.-09.08.1978 registered. We also base our conclusion on the fact that in 12. 1977 only very few House sparrows were seen in the ROS area. 5 ind. were observed in a flock of Eurasian tree sparrows in Starchevo Swamp. Remarkably, of the more than 300 ringed House sparrows, only 9 were recaptured. A female, ringed on 16.03.1976, was recaptured 7 km west of the ROS near the Karnalovo v. (Nankinov and Grigorov, 1978).

170. *Passer hispaniolensis*. The Spanish sparrow migrates and winters in SW Bulgaria (Oundjian, 1968). We also caught willow sparrows in 02. On 23.12.1977 we were able to spot 3 male willow sparrows in a mixed flock of Eurasian skylark, Common starlings, Eurasian chaffinches, Eurasian tree and House Sparrows at Starchevo Swamp. Individual birds were both observed and captured btw. 02.-03.-06.04. and then in the autumn btw. 08.-09.-03.10. The Spanish sparrows caught in the 2nd half of 08. and 09. moulted from summer to winter plumage.

171. *Passer montanus*. According to Prostov (1963), 2 decades ago the Eurasian tree sparrow was significantly less represented than the House sparrow, and always at a distance from the towns. Today it is the most numerous sparrow species at all times of the year. 02. 1976 the ratio of Eurasian tree to House sparrows in the surroundings of ROS was 15: 1. They spent the night in the bushes and the reeds. The flocks stayed together

until 04. But individual birds took up their breeding grounds as early as the end of 02. In 1976, nest building began a month before House sparrows. In 04.-05.1977, about 18 pairs nested under the roofs of the ROS. We found clutches of 6 and 7 eggs in last year's nests of the House martin and once in the nest of the rock nuthatch. The nests were lined with blades of grass, bird feathers, horse's and other hairs. Nests also in rock crevices, walls, abandoned buildings, etc. During the autumn migration the Eurasian tree sparrow is very numerous in the area around the ROS. In the spring we found it until 01.04.1976, 31.03.1977 and 03.04.1978. Remarkable migratory waves on 08.03.-01.04.1976 and 24.04.03.04.1978. The autumn migration probably begins in 07., but many flocks, each of 5-90 birds, were recorded in the 3 following months. Well noticeable migration waves in 02.09.-15.09.1976 19.09.-28.10.1976; 20.08-01.09. and 26.09.-03.10.1977; 1978: 02.08.-09.08.1978; 06.09.-11.09.1978; 24.09.-05.10.1978, and especially a lot btw. 12.10.-30.10.1978. On 29.08.1977, the migrating Eurasian tree sparrows gathered in the reeds of the swamp around the ROS in 100 ind.; in the canal at Pump Station - 70; on SR island - 5,000 ind.; Surroundings of General Todorov v. - 2,000 ind. Three days later they moved on and only about 200 remained on SR Island. A leucistic bird (6 white feathers on the crown) was caught in the net on 28.02.1978. Another ind., with ca. 30 tick nymphs, was caught on 04.08.1978.

172. *Sturnus vulgaris*. During the last decade of 02., many thousands of migrating Common starlings can be seen, e.g. on 21.02.1976 about 4,000. They stay in fallow fields, forests and southern areas, as well as in the towns. Some birds start courting there. The flocks migrate until about 10.04. On 29.04.1977, 4 b. p. were feeding their young in the poplar

trees at the hot spring. Three days later the youngs had flown out. The adult birds collected nesting material for the 2nd brood. At the same time, 9 pairs were feeding or breeding in the mixed deciduous forest on the right bank of the SR. Autumn migration begins during the last decade of 08. but is strongest in 09. and 10. The Common starlings at the ROS migrate mainly north in spring and south in autumn, but a migration in the opposite direction can also be observed. In spring, individual flocks come from the west along the Strumeshnitsa valley (a right tributary of the SR) and spread north and south in the SR Valley. In addition, outside of the breeding season, there are also local day and night migrations of the flocks that rest here to search for food. Common starlings often fly with other songbirds. On 25.02.-27.02.1978, about 700 ind. migrated with the flocks of thrushes. On 15.10.1978, a flock of about 1,000 ind. flew south in a broad front. The migration of Eurasian tree sparrows also took place at the same time. In autumn the Common starlings migrate along the Kresna Gorge by roughly following the bends. On 03.10.1978 we counted 4 flocks of 50+300+90+20 ind. in the Kresna Gorge on the route btw. the Krupnick and the Kresna Inn located approx. in the middle of the Kresna Gorge.

173. *Oriolus oriolus*. Usually arrives at the ROS in 04. (in 1978 after 27.04.). The male birds come first and fights can already be observed. It is found in the forested areas of the region. We recorded a late autumn courtship on 02.09.1977. The autumn migration begins in 08. and is then more noticeable in the 2nd half of the month. Btw. 10.08.-24.08.1977 we counted 15-17 ind. each. They were mainly groups of 5-7 birds, possibly families. Further waves of migration were noted btw. 02.09.-05.09.1977.

We counted 7-50 ind./day, mostly males and on 11.10.1976 about 10 ind.

174. *Garrulus glandarius*. The migration of this species was noticeable in 02. and 03. Especially in the morning hours, up to 20 ind. could be counted in the area around the ROS (20.02.-25.02.1978). Individual groups of 6-8 birds could also be seen. Prostov (1963) noted wandering groups in the surroundings of the town of Petrich on 27.04.-28.04.1958. Individual birds appear again in 08. In 10. we registered up to 6 ind./day. Eurasian jays also overwinter here, on 23.12.1977 we recorded 3 ind. On 25.02.1976, a bird was caught and fell into apparent death. It was cold and hard for about 2 hours. Only then did it revive. Individual jays migrating through the area repeatedly kill small songbirds caught in the nets.

175. *Pica pica*. Magpies also show this "bird of prey" behavior. Btw. 01.08.-10.08.1978, 3 Eurasian blackcaps, 1 Common nightingale and 1 Great tit were killed; on 17.09.1978 2 European robins and 4 Eurasian blackcaps; on 19.09.1978 1 European robin and 1 Eurasian treecreeper and on 04.10.1978 another 3 songbirds. The number of magpies observed increases in spring and autumn, probably due to migration. In 02. we counted up to 20-30, 08. to 10. up to 15-23. We recorded nest building in late 03. and the last feeding of fledged young on 02.09.1976 in the gallery forest along the SR we counted about 20 old and new nests. Btw. the ROS and the General Todorov v. there were 7 nests in the poplar trees, 10-14 m high. On a small poplar tree in the reeds we found a nest very low, only 1.7 m high from the water. In addition to wool from poplar, alder, willow and acacia, dry blackberry stalks are also used to build nests. We recorded collecting nest material up to a distance of 150 m from the nest.

176. *Corvus monedula*. In 02.1976, small flocks of 5-13 ind. could be seen every day. The same on 22.09.1976 and on 16.09.1978. The neighboring General Todorov v. was also well populated. The occupation of nesting sites was recorded in 02. and 03., but also in 09. and 10. Prostov (1963) reports that the Western jackdaws used to breed in the rocks of the Malak Kozhuh Hill and in the narrow area around the General Todorov r/w Station.

177. *Corvus frugilegus*. Overwintering and migratory rooks appear in 09. and then move North in 03. Their numbers probably increase in 10. and also, in 02., but mainly in smaller groups.

178. *Corvus cornix*. Hooded crows migrate in the area outside the breeding season in small groups of 1-8, with their numbers usually increasing in 10. On 02.05.1977, we discovered two nests on willow and alder on the right bank of the SR, 500 m apart. The adult birds were feeding at a nest. At the same time 2 b. p. were nesting along the river on the road to Petrich. The breeding season is very extensive. We observed nest building on 23.03.1976 and 02.03.1977.

179. *Corvus corax*. In different years, Common ravens bred in 1-3 pairs around the ROS. The nest in a rock crevice on the Pchelina Hill at a height of 18 m was regularly observed. It is built on a block, about 60 cm wide, wedged into a column. The earliest date on which repair work and nest building was observed was 20.02.-24.02.1978. The nest consisted of an approx. 50 cm thick layer of brushwood. Every year the pair raised 3 young, which fledged about 03.05.-05.05. The adult birds searched for food in the valley and the surrounding heights, including following the plowing tractors and on the sheep farms. On 25.08.1978 we found 2 pellets (6 x 2 cm). Contents: grape

seeds, bones and scales of small fish, songbird feathers, limb bones and fur, and the skull of a small turtle. After fledging, parent birds and young wander around together and were temporarily no longer seen in the area.

Discussion and conclusions

The area surrounding the ROS represents a migratory crossroads for many species of birds (Northern lapwing, European bee-eater, Common starling, etc.). Of course, the migration of soaring birds (storks and diurnal birds of prey) is nowhere near as strong as along the Black Sea coast.

Nevertheless, they still get through here on the way there and home. The most migratory birds on the Via Aristotelis are the swallows, especially the Western house martin and Barn swallows, European robin, Black-headed gull, Northern lapwing, Eurasian blackcap, Common chiffchaff and Willow warbler, Eurasian tree sparrow, Great tit and Eurasian blue tits.

Species with expressed migratory waves are Common swift, Barn swallow, Red-backed shrike, European robin, Common starling, Fieldfares and Redwings, Sedge warblers, Eastern olivaceous warbler, Eurasian blackcap, Garden warbler and Common whitethroat, Common chiffchaffs and Willow warbler, Great tits and Eurasian blue tits, European greenfinches, Eurasian tree sparrows and Eurasian golden orioles.

The net catches, which were uninterrupted during the study period, although not so high in quantity, as well as the field observation provide a real look at the migration of the various species in the SR Valley. The dynamics of the catches also provide some insight into the dynamics of the passage. The highest numbers of catches (Table 1) coincide with the peaks of bird

migration, e.g. European robin, Eurasian blackcaps, Common whitethroat, Common chiffchaff, Eurasian blue tit, Great tit, European greenfinch, Eurasian tree sparrows, Willow warblers, Spotted flycatcher, Common blackbird, etc.

In general, according to the catch, there are fewer migratory birds in spring than in autumn. In spring the birds are in a hurry to get to their traditional breeding grounds. Therefore, they spend less time in biotopes that suit them. The autumn migration takes place much more slowly and comfortably, in stages, with longer stays in favorable locations. Here the birds recharge their energy reserves, so to speak, and only then do they move on. A declining trend was noted among the swallows, depending on the climatic conditions or changes in the weather. In individual cases the cause was also the availability of food sources. For many species, mass migration coincides with certain climatic conditions. The flocks of tits, warblers and flycatchers migrate in spring mainly when the poplar and alder trees are in bloom.

Storms usually cause migration waves, as well as spikes or increases in the number of migrating birds - Dunnock, European robin, Common blackbird, Common chiffchaff and Willow warbler, Eurasian blue tits and great tits, or the appearance of species uncharacteristic of the area, such as Red crossbill or Common firecrest and Goldcrest.

Some of the Black-headed gulls, Pygmy cormorants, Grey herons and Great egrets are nesting species in the neighboring Greece, which visit areas that offer good food, especially in spring, summer and autumn, to search for food or during migration after the breeding season. It is quite possible that

waterfowl species, especially the Mallards that breed here, spend their summer moult in the lower reaches of the SR and on the coast of the Aegean Sea. The autumn moult of the Willow warbler, Common blackbird, Eurasian blue tit, Great tit, Eurasian tree sparrow and other species was clearly noticeable.

For some species, we found differences in times depending on age groups and gender. In the autumn, Red-backed shrikes were predominantly female and young, 90-95% of the departing Barn swallows were young birds, while in spring the male orioles arrive first.

The rare and irregular migratory guests on the Via Aristotelis route include the Common little bittern, Eurasian bittern, Squacco heron, Black stork, Caspian tern, Egyptian vulture, Booted eagle, Black kite, Western Osprey, Merlin, Eurasian hobby, Barn owl, Great bustard, Northern shoveler, Bohemian waxwing, Red crossbill, Eurasian sparrowhawk, Wallcreeper and Red-breasted flycatcher to count.

Some species start migrating before the start date of our research. Others also move according to our limited time. A significant number have a strictly limited migration time. Only during the spring migration period did we catch or observe Great egrets, Common redshanks, Ruffs, Woodcocks, Common snipes and Great snipes, European roller, Redwings and Mistle thrushes, Goldcrests and Rock buntings. Others only during autumn migration: Black stork, Eurasian bittern, Barn owl, Wood sandpiper, Eurasian wryneck, Common nightingale, Sedge warbler, Western Bonelli's warbler, Red-breasted flycatcher, etc. We noticed an unstable spring and autumn migration period for the following species: Ruff, Common

wood pigeon, Fieldfare, Eurasian wren, European greenfinch, Eurasian siskin, European goldfinch, Eurasian bullfinch, and Hawfinch.

In winter and spring, Greater white-fronted goose, Eurasian teal, Common snipe and Great snipe, as well as the Long-legged buzzard and Great grey shrike could be found. In favorable biotopes Mallards, Eurasian skylark, European robins, Eurasian wrens, warblers, Common reed buntings, Common linnets and Common chiffchaffs wintered in the area around the ROS. The favorable climatic conditions as well as the rich food sources offer the following species the opportunity to stop their migration: White stork, Spotted crane, Western yellow wagtail, Eurasian tree sparrows, European stonechat, Willow warbler, Corn bunting.

The 3-year investigations at the ROS to date have provided a lot of additional data regarding the status and distribution of many Bulgarian birds: Spotted crane, Barn Owl, Willow warbler, Moustached warbler, Marsh Warbler and Common reed Warbler, Icterine warbler, Eastern olivaceous warbler and Olive-tree warbler, Red-rumped swallow, Blue rock thrush, Western black-eared wheatear, Eastern Orphean warbler, Masked shrike, Penduline tit, Long-tailed tit, Eurasian tree sparrow, Western rock nuthatch, Wallcreeper, etc.

The investigations have also confirmed the methodological correctness of the research. Through long-term and uninterrupted research, extensive data on particularly rare faunal members have been collected. During 3 years of research in the ROS area, another 81 species were identified here. All these species were not yet listed in the previous literature (Prostov, 1963) as well as Balat (1962), Donchev (1963),

Paspaleva-Antonova (1965). Our data mark their occurrence in this southwestern part of Bulgaria. For many bird species, information on the number and migration data are being determined for the first time: Little grebe, Little cormorant, Eurasian bittern and Common little bittern, Squacco and Purple heron, Little and Great egret, Glossy ibis, Black stork, Greater White-fronted Goose, Northern shoveler, Western osprey, Black kite, Rough-legged buzzard, Booted and Golden eagles, Griffon and Egyptian vultures, Merlin, Corncrake, Eurasian coot and Common moorhen, Little ringed plover, Northern lapwing, Wood sandpiper and Redshank, Common and Great snipes, Black-headed gull, Common and Caspian terns, Rock dove, Barn, Eurasian eagle owl, Tawny owl, Grey-headed, Middle spotted and Lesser spotted woodpeckers, Sand, Eurasian crag, and Western House martins, Western yellow wagtail, Tree and Meadow pipits, Great grey shrike Bohemian waxwing, White-throated dipper, Dunnock, Thrush nightingale, Black redstart, Whinchat, Common and Blue rock thrushes, Redwing, Fieldfare and Mistle thrush, Sedge warbler, Olive-tree warbler, Garden warbler, Eastern Bonelli's warbler, Common firecrest and Goldcrest, Collared flycatcher and Red-breasted flycatcher, Western rock nuthatch, Wallcreeper, Eurasian and Short-toed treecreepers, Common reed, Rock, and Ortolan buntings, Brambling, Common linnet, Red crossbill, Common raven and Rook.

After the termination of the activity of ROS (in the middle of the 1990-s) organized bird ringings in this area have not been carried out for more than three decades. In this sense, the data collected and reported in this article are unique and represent a significant addition to

our information about migratory birds in Bulgaria.

The established 179 species of birds represent 42.9% of the modern avifauna of Bulgaria, numbering 417 species (Ivanov et al., 2015). This is an amazing fact and proves the exceptional importance of the ROS for the study of the ecology, biology and phenology of the migrations of migratory birds in this southern part of the country, long known as one of the places with the greatest biological diversity in Bulgaria, on the Balkan Peninsula and in the whole of Europe.

Acknowledgments

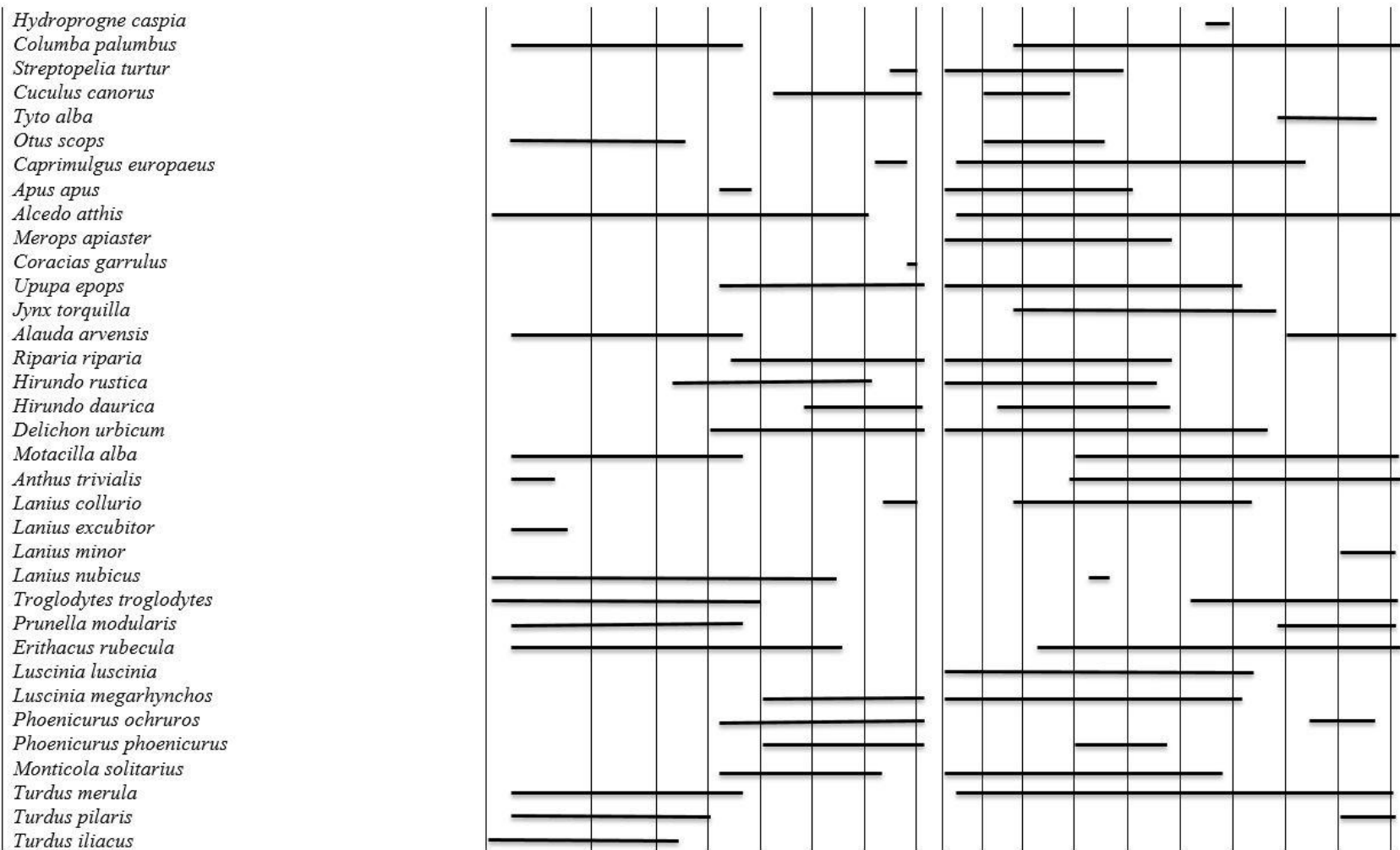
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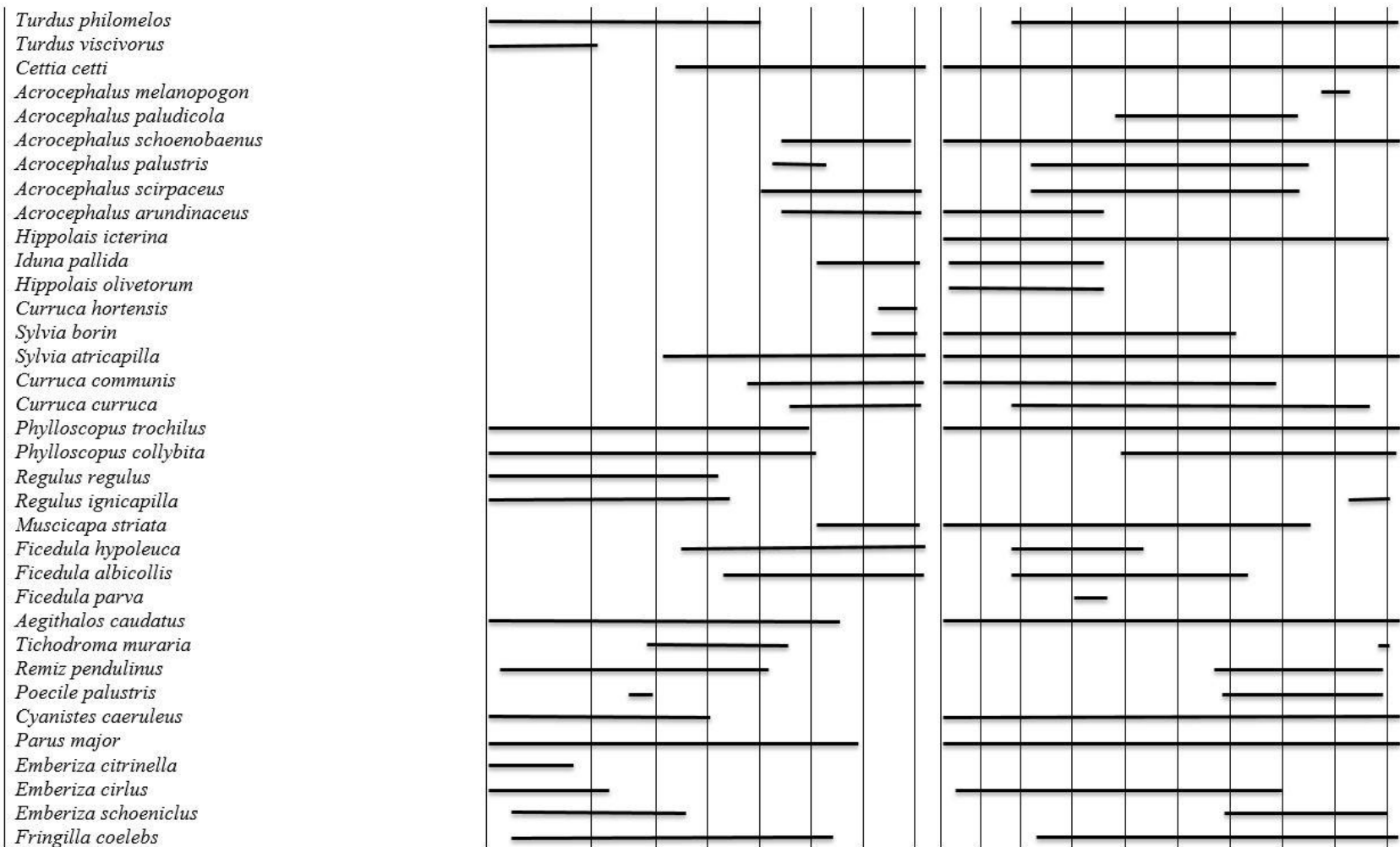
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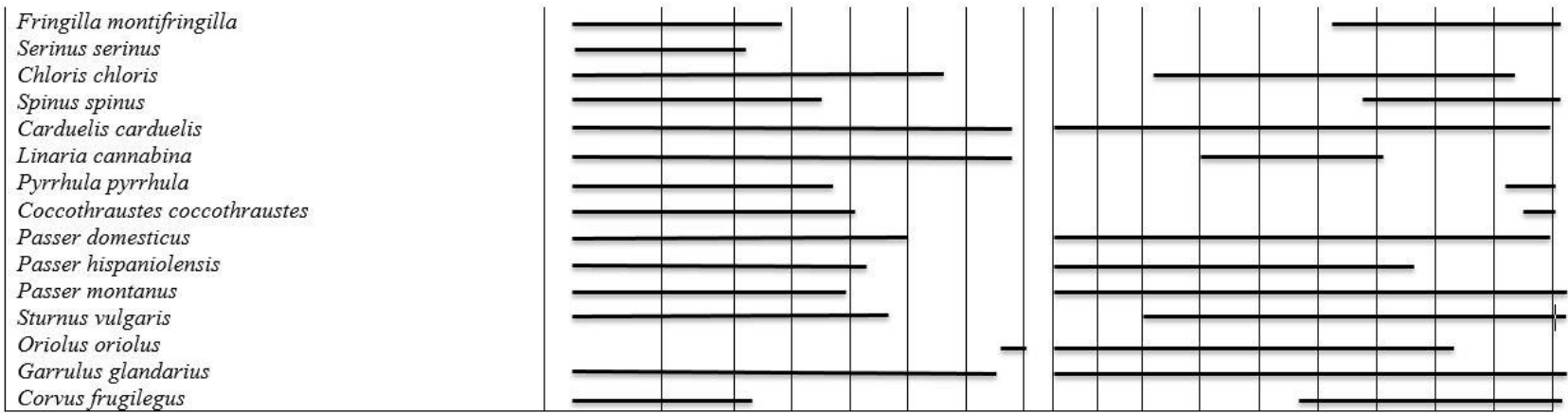
Table 1. Timings of bird migration based on the ROS survey (1976-1978).

Species	Spring migration			Autumn migration		
	February	March	April	August	September	October
<i>Botaurus stellaris</i>						
<i>Ixobrychus minutus</i>						
<i>Nycticorax nycticorax</i>						
<i>Ardeola ralloides</i>						
<i>Ardea alba</i>						
<i>Egretta garzetta</i>						
<i>Ardea cinerea</i>						
<i>Ardea purpurea</i>						
<i>Plegadis falcinellus</i>						
<i>Ciconia ciconia</i>						
<i>Ciconia nigra</i>						
<i>Anas platyrhynchos</i>						
<i>Anas crecca</i>						
<i>Spatula querquedula</i>						
<i>Spatula clypeata</i>						
<i>Pernis apivorus</i>						
<i>Milvus migrans</i>						
<i>Buteo lagopus</i>						
<i>Buteo buteo</i>						
<i>Hieraaetus pennatus</i>						
<i>Neophron percnopterus</i>						
<i>Circaetus gallicus</i>						
<i>Falco tinnunculus</i>						
<i>Vanellus vanellus</i>						
<i>Tringa ochropus</i>						
<i>Tringa totanus</i>						
<i>Scolopax rusticola</i>						
<i>Gallinago gallinago</i>						
<i>Gallinago media</i>						
<i>Larus michahellis</i>						
<i>Sterna hirundo</i>						





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References

- Balat Fr. 1962. Contribution to the knowledge of the avifauna of Bulgaria. *Acta Academiae Scientiarum Cechoslovenicae Basis Brunensis*, 34(10): 445-497.
- del Hoyo (Ed.) 2020. *All the Birds of the World*. Lynx Edicions, Barcelona. 967 p.
- Dementjev G. 1954. Family Laniidae, *Birds of the Soviet Union*. Moscow, 6: 5-61. (in Russian).
- Dittberner H., J. Kage 1990. Blue-cheeked bee-eater (*Merops persicus*) in the Balkans. *Beiträge zur Vogelkunde*, 36(2): 127.
- Dobrev D., R. Tsiakiris, T. Skartsis, V. Dobrev, V. Arkumarev, K. Stara, A. Stamenov, N. Probonas, T. Kominos, A. Galanaki, E. Kret, B. Hallman, B. Grubač, G. Susic, S. Marinković, I. Hribšek, S. Skorić, H. Jerrentrup, V. Lucic, D. Demerdzhiev (2021). Long-term size and range changes of the Griffon Vulture *Gyps fulvus* population in the Balkans: A review. *Bird Conservation International*. 32: 1-16.
- Dončev St. 1964. Ober die Verbreitung Einiger Neuer und Seltener Vogel in Bulgarien. Bulgaria. *Bulletin de L'Institut de zoologie et Muzée, Académie Bulgare des Sciences*, 16: 23-28. (in Bulgarian, German ummary.).
- Dontschev St., A. Darakchiev 1971. Ergänzungen zur Vogelwelt Thrakiens. *Beiträge zur Vogelkunde*, 17(3): 244-250.
- Ivanov A., B. Stegmann 1978. *Short identification guide of the birds of the SSSR*. Nauka Publishing House, Leningrad., 560 p. (in Russian).
- Ivanov B., P. Iankov, Z. Boev, D. Georgiev, L. Profirov, M. Dimitrov 2015. List of the birds recorded in Bulgaria (Bulgarian List). (1-23). – At: <http://www.bunarco.org/bg/dokladi.html>
- Matvejev S., V. Vasic 1973. *Catalogus Faunae Jugoslaviae*. IV/3. Aves, Ljubljana, 118 p. (in Serbian)
- Mauersberger G., J. Stübs 1963. Drei für Bulgarien neue Vogelarten. *Journal für Ornithology*, 104: 440-441.
- Nankinov D., A. Darakchiev 1977. Ornithofauna structure of the Atanasov Lake. 05. 1978. *Travaux scientifiques*, 15(4) Biologie. Université de Plovdiv., 15(4): 75-96. (in Bulgarian, English summary).
- Nankinov D., B. Grigorov 1978. *Bulletin bird banding*. Bulgarian Ringing Centre. BAS. 5. Sofia. 64 p.
- Nankinov D., D. Kantardzhiev 1980. Distribution of birds of prey in the ornith environment. Station "Rupite" during the breeding period. *Ornitologicheski informatsionen byuletin*, BAS, 7-8: 38-44. (in Bulgarian).
- Nankinov D., M. Djingova 1979. *Bulletin bird banding*, Bulgarian Ringing Center. BAS. Sofia, 6, 106 p.
- Nankinov D., T. Mitshev, V. Kostova, B. Ivanov, V. Penkov 1979. First results of ornithological research at the Rupite Station (South-West Bulgaria). *Vestnik Zoologii*, 3: 45-52. (in Russian).
- Oundjian E. 1968. Über den weidensperling-*Passer hispaniolensis* (Temminck, 1820) in Nordost-Bulgarien. *Mitteilungen des Volksmuseums-Russe*, 3:245-257. (in Bulgarian, German summary).
- Paspaleva-Antonova M. 1965. Angaben über neue und seltene bulgarische Vogelarten. *Bulletin de L'Institut de zoologie et Muzée*. Académie

Avifauna of the Sandanski-Petrich Valley (Blagoevgrad Region, SW Bulgaria)...

- Bulgare des Sciences, 19: 33-38. (in Bulgarian, German summary).
- Patev P. 1950. The birds of Bulgaria, BAS, 364 p. (in Bulgarian, English summary).
- Prostov A. 1963. Beitrag zur erforschung der ornithofauna im Gebiet von Petrič. *Bulletin de L'Institut de zoologie et Muzée*, Académie Bulgare des Sciences, 13: 33-77. (in Bulgarian, German summary).
- Prostov A. 1977. New data on the distribution of the red-necked warbler, *Luscinia melanopogon* (Temming) in Bulgaria. *Ornitologicheski informatsionen byuletin*, BAS, 2: 14-16. (in Bulgarian).
- Raines R. 1962. The distribution of birds in northeast Greece in summer. *The Ibis*, 194: 490-502.
- Robel and Königstedt 1978. Breeding records of the Orpheus warbler, *Sylvia hortensis* Gmelin, in Southwest Bulgaria. *Beiträge zur Vogelkunde*, 24, 1-2, 104-106.
- Roberts D. 1979. Observations of the migration of raptors and other rare soaring birds in Bulgaria 1975 – 1978. *The Ibis*, 121; 301-312.
- Vatev I., P. Simeonov 1978. Notes on some birds in the southern part of the Kresna Gorge. *Ornitologicheski informatsionen byuletin*, BAS, 4: 15-20. (in Bulgarian).
- Vatev I., P. Simeonov, T. Michev, B. Ivanov 1980. The masked shrike (*Lanius nubicus* Lichtenstein) breeds in Bulgaria. *Acta zoologica bulgarica*, 15: 115-118. (in Bulgarian, English summary).
- Voinstvensky M. 1954. Tits, treecreepers, nuthatches, parrotbills. *Birds of the Soviet Union*. Moskow, 5: 696-796. (in Russian)

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