# THE AVIFAUNA OF THE MIDDLE BASIN OF ARGES RIVER ARTIFICIAL LAKES

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**Abstract**. This study represents a concise analysis of the presence of bird species observed on the artificial lakes in the middle basin of Arges River. 189 bird species out of 16 orders and 44 families were identified here. The authors developed a research related to the bird species habitats, phenology, biogeographic origins, status of protection and their status according to the Bird Directive regulations.

**Keywords:** The middle basin of Arges River (the Danube Basin), artificial lakes and aquatic avifauna.

**Rezumat. Avifauna din zona lacurilor de acumulare, din bazinul mijlociu al râului Argeş**. In această lucrare, autorii fac o sinteza cu privire la prezenţa speciilor de păsări observate pe lacurile de acumulare din bazinul mijlociu al râului Argeş după anul 1990. Au fost descoperite 189 de specii care aparţin la 16 ordine şi 44 de familii. Se face o analiză a lor în funcţie de habitatul ocupat, fenologia, originea biogeografică, statutul de protecţie şi Directiva Păsări.

**Cuvinte cheie:** Bazinul mijlociu al râului Argeş (bazinul Dunării), lacuri de acumulare, avifaună.

## Introduction

Arges River is the most important river in Arges County and one of the most important tributaries of the Danube River. It flows due to the meeting of two small brooks, Buda and Capra. A range of artificial lakes was created along the river during the last decades. As a result, a number of dams were built from the upstream to the downstream direction. The first dam is built on the artificial lake Vidraru and the others on lakes Oieşti, Cerbureni, Zigoneni, Vâlcele, Budeasa, Bascov, Piteşti, Goleşti etc. (Fig. 1). The artificial lakes had a significant impact on the fauna of the area and influenced the bird species populations and their temporal and space dynamics.

## Material and Methods

The research was carried out in the area of the following artificial lakes: Golesti (649 ha), Pitesti (122 ha), Bascov (162 ha), Budeasa (412 ha) and Valcele (408 ha). They are important wintering, roosting and breeding sites for many bird species and are important guide marks for migrating birds. The Arges River follows the Rucar – Bran route and crosses the Southern Carpathians. This is a familiar migration route ***to passing*** birds.

The region has a continental clime with two characteristics: one is related to the temperate clime of the hill area of Muscel region and the other to the drier clime of the East Plain. The annual average temperature of the air is of 9 $^{o}$C. The annual average temperature of Arges River water is lower by 1-2$^{o}$ C and fluctuates between 6 and 4$^{o}$ C in Arges Straits, but in Pitesti area it is of 9 $^{o}$C. The temperature goes down during winter with strong continental clime (at the beginning of January). The temperature decreases under 1$^{o}$C in low regions and ice bridges appear (Barco & Nedelcu, 1974).

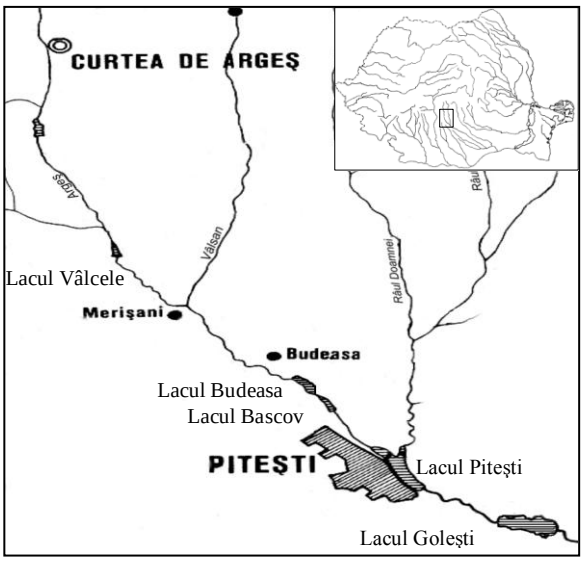


**Figure 1**. The middle basin of the Argeş River.

The vegetation in the lake areas is specific to the southern hilly region. Deciduous woods, orchards and agricultural crops cover the hills and valleys. On the former common oak forests spread wide, secondary steep meadows where mezophyla and xerophyla plants grow. With regards to the lake vegetation, this is represented by *Phragmites* sp., *Typha* sp., *Carex* sp., *Juncus* sp., *Salix* sp., *Rubus* sp., *Alnus incana, Populus alba, Rosa canina* ond other plants.

The study of the artificial lake area was initiated by Mircea Maties (Mătieş, 1969). This research brings additional information with regards to the area bird species, observed here after 1990 (Conete & Mestecaneanu, 2004; Gava, 1997; Gava *et al.*, 2004 a, b; Mestecăneanu *et al.*, 2003; Mestecăneanu *et al.*, 2004 a, b; Mestecăneanu *et al.*, 2005). The field trips had been made on the shore of each lake and covered the observation of both aquatic and the river neighbourhood avifauna. 10 x 50 binoculars were used for observation. The observations were made by itinerary methods. Birds have been also observed from fixed spots. Observation techniques: naked-eye observations, scope or binocular observations and song listening observations.

**Table 1.** Bird species observed in the Middle Basin of Arges River area.

| No | Species | Main habitat | Phenology | Biogeographical origin | SPEC list | Bird Directive |
|---|---|---|---|---|---|---|
| 1. | *Gavia arctica* | Ac | Oi | S | 3 | A I |
| 2. | *Gavia stellata* | Ac | Oi | A | 3 | A I |
| 3. | *Podiceps cristatus* | Ac | Ov, Ri | Tp | ns | |
| 4. | *Podiceps grisegena* | Ac | Ov | E | ns | |
| 5. | *Podiceps nigricollis* | Ac | Mp | E | ns | |
| 6. | *Tachybaptus ruficollis* | Ac | Ov, Ri | E | ns | |
| 7. | *Phalacrocorax carbo* | Ac | Ov, Ri | Tp | ns | A I |
| 8. | *Phalacrocorax pygmeus* | Ac | Ov, Ri | M | 1 | A I |
| 9. | *Botaurus stellaris* | Am | Ov, Ri | Mo | 3 | A I |
| 10. | *Ixobrychus minutus* | Am | Ov | E | 3 | A I |
| 11. | *Egretta garzetta* | Ac | Ov | M | ns | A I |
| 12. | *Egretta alba* | Ac | Ov, Ri | Ch | ns | A I |
| 13. | *Ardeola ralloides* | Ac | Ov | M | 3 | A I |
| 14. | *Ardea cinerea* | Ac | Ov, Ri | Tp | ns | |
| 15. | *Ardea purpurea* | Ac | Ov | M | 3 | A I |
| 16. | *Nycticorax nycticorax* | Ac | Ov | M | 3 | A I |
| 17. | *Ciconia ciconia* | T | Ov | E | 2 | A I |
| 18. | *Ciconia nigra* | Am | Ov | E | 2 | A I |
| 19. | *Cygnus olor* | Ac | Mp | E | e | A II/2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 20. | *Cygnus cygnus* | Ac | Oi | S | e | A I |
| 21. | *Branta ruficollis* | Ac | Oi | A | 1 | A I |
| 22. | *Anser anser* | Ac | Mp | Mo | ns | A III/2 |
| 23. | *Anser albifrons* | Ac | Oi | A | ns | A II/2, A III/2 |
| 24. | *Anas platyrhynchos* | Ac | Mp, Oi | Tp | ns | A II/1, A III/1 |
| 25. | *Anas strepera* | Ac | Ov | Tp | 3 | AII /1 |
| 26. | *Anas acuta* | Ac | P, Oi | S | 3 | A II/1, A III/2 |
| 27. | *Anas penelope* | Ac | P, Oi | S | e | A II/1, A III/2 |
| 28. | *Anas querquedula* | Ac | Ov, P | Tp | 3 | A II/1 |
| 29. | *Anas crecca* | Ac | P, Oi, Ov | Tp | ns | A II/1, A III/2 |
| 30. | *Anas clypeata* | Ac | P, Ov | Tp | 3 | A II/1, A III/2 |
| 31. | *Tadorna tadorna* | Ac | Ov, Ri | Mo | ns | |
| 32. | *Netta rufina* | Ac | Ov, Ri | M | ns | A II/2 |
| 33. | *Aythya marila* | Ac | Oi | A | 3 | A II/2, A III/2 |
| 34. | *Aythya fuligula* | Ac | Oi, Ov | S | 3 | A II/1, A III/2 |
| 35. | *Aythya ferina* | Ac | Mp | E | 2 | A II/1, A III/2 |
| 36. | *Aythya nyroca* | Ac | Ov, Ri | E | 1 | A I |
| 37. | *Bucephala clangula* | Ac | Oi | S | ns | A II/2 |
| 38. | *Mergus merganser* | Ac | Oi | Tp | ns | A II/2 |
| 39. | *Mergus albellus* | Ac | Oi | S | 3 | |
| 40. | *Melanitta fusca* | Ac | Ac | S | 3 | A II/2 |
| 41. | *Haliaeetus albicilla* | Ac | Mp | Tp | 1 | A I |
| 42. | *Aquila pomarina* | T | Ov | E | 2 | A I |
| 43. | *Circaetus gallicus* | T | Ov | E | 3 | A I |
| 44. | *Buteo buteo* | T | Mp | Tp | ns | |
| 45. | *Pernis apivorus* | T | Ov | E | e | A I |
| 46. | *Accipiter gentilis* | T | S | Tp | ns | |
| 47. | *Accipiter nisus* | T | S, Oi | Tp | ns | |
| 48. | *Accipiter brevipes* | T | Ov | M | 2 | A I |
| 49. | *Circus aeruginosus* | T | Ov, Ri | Mo | ns | A I |
| 50. | *Circus cyaneus* | T | Oi | E | 3 | A I |
| 51. | *Circus pygargus* | T | Ov | E | e | A I |
| 52. | *Falco subbuteo* | T | Ov | Tp | ns | |
| 53. | *Falco vespertinus* | T | Ov | Mo | 3 | |
| 54. | *Falco tinnunculus* | T | Mp | Tp | 3 | |
| 55. | *Perdix perdix* | T | S | E | 3 | A II/1, A III/1 |
| 56. | *Phasianus colchicus* | T | S | Ch | ns | A II/1, A III/1 |
| 57. | *Coturnix coturnix* | T | Ov | E | 3 | A II/2 |
| 58. | *Rallus aquaticus* | Am | Mp | E | ns | A II/2 |
| 59. | *Porzana porzana* | Am | Ov | E | e | A I |
| 60. | *Gallinula chloropus* | Am | Ov | E | ns | A II/2 |
| 61. | *Fulica atra* | Ac | Mp | Tp | ns | A II/1, A III/2 |
| 62. | *Vanellus vanellus* | Am | Ov | Mo | 2 | A II/2 |
| 63. | *Charadrius dubius* | Am | Ov | Mo | ns | |
| 64. | *Pluvialis apricaria* | Am | P, Ri | A | e | A I, A II/2, A III/2 |
| 65. | *Scolopax rusticola* | Am | P, Ov | E | 3 | A II/1, A III/2 |
| 66. | *Gallinago gallinago* | Am | P, ?Ov | E | 3 | A II/1, A III/2 |
| 67. | *Limosa limosa* | Am | P, ?Ov | Mo | 2 | A II/2 |
| 68. | *Calidris minuta* | Am | P | A | ns | |
| 69. | *Calidris temminki* | Am | P | A | ns | |
| 70. | *Actitis hypoleucos* | Am | Ov | Tp | 3 | |
| 71. | *Tringa ochropus* | Am | P | S | ns | |
| 72. | *Tringa glareola* | Am | P | S | 3 | A I |
| 73. | *Tringa nebularia* | Am | P | S | ns | A II/2 |
| 74. | *Tringa totanus* | Am | P, Ov | Mo | 2 | A II/2 |
| 75. | *Tringa erythropus* | Am | P | S | 3 | A II/2 |
| 76. | *Tringa stagnatilis* | Am | P, Ov | Mo | ns | |
| 77. | *Philomachus pugnax* | Am | P | S | 2 | A I, A II/2 |
| 78. | *Himantopus himantopus* | Am | Ov | Mo | ns | A I |
| 79. | *Larus cachinnans* | Ac | S | Tp | e | A II/2 |

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|---|---|---|---|---|---|---|
| 80. | *Larus canus* | Ac | Oi | S | 2 | A II/2 |
| 81. | *Larus ridibundus* | Ac | Mp | Tp | e | A II/2 |
| 82. | *Larus minutus* | Ac | P, ?Ov | S | 3 | |
| 83. | *Chlidonias niger* | Ac | Ov | E | 3 | A I |
| 84. | *Chlidonias hybridus* | Ac | Ov | M | 3 | A I |
| 85. | *Sterna hirundo* | Ac | Ov | E | ns | A I |
| 86. | *Columba oenas* | T | Ov | E | e | A II/2 |
| 87. | *Columba palumbus* | T | Ov, Ri | E | e | A II/1 |
| 88. | *Streptopelia turtur* | T | Ov | E | 3 | A II/2 |
| 89. | *Streptopelia decaocto* | T | S | M | ns | A II/2 |
| 90. | *Cuculus canorus* | T | Ov | Tp | ns | |
| 91. | *Athene noctua* | T | S | Mo | 3 | |
| 92. | *Strix aluco* | T | S | E | e | |
| 93. | *Asio otus* | T | S | Tp | ns | |
| 94. | *Apus apus* | T | Ov | E | ns | |
| 95. | *Alcedo atthis* | Ac | Mp | E | 3 | A I |
| 96. | *Merops apiaster* | T | Ov | M | 3 | |
| 97. | *Coracias garrulus* | T | Ov | E | 2 | A I |
| 98. | *Upupa epops* | T | Ov | E | 3 | |
| 99. | *Picus viridis* | T | S | E | 2 | |
| 100. | *Picus canus* | T | S | E | 3 | A I |
| 101. | *Dendrocopos major* | T | S | Tp | ns | |
| 102. | *Dendrocopos syriacus* | T | S | M | e | A I |
| 103. | *Dendrocopos medius* | T | S | E | e | A I |
| 104. | *Dendrocopos minor* | T | S | Tp | ns | |
| 105. | *Jynx torquilla* | T | Ov | Tp | 3 | |
| 106. | *Galerida cristata* | T | S | Mo | 3 | |
| 107. | *Alauda arvensis* | T | Mp | Mo | 3 | A II/2 |
| 108. | *Lullula arborea* | T | Ov | E | 2 | A I |
| 109. | *Riparia riparia* | T | Ov | Tp | 3 | |
| 110. | *Hirundo rustica* | T | Ov | Tp | 3 | |
| 111. | *Delichon urbica* | T | Ov | Tp | 3 | |
| 112. | *Anthus trivialis* | T | Ov | E | ns | |
| 113. | *Anthus campestris* | T | Ov | Mo | 3 | A I |
| 114. | *Anthus spinoletta* | T | Ov | Ti | ns | |
| 115. | *Motacilla flava* | T | Ov | Tp | ns | |
| 116. | *Motacilla cinerea* | Am | Ov, Ri | E | ns | |
| 117. | *Motacilla alba* | T | Ov | E | ns | |
| 118. | *Lanius collurio* | T | Ov | E | 3 | A I |
| 119. | *Lanius minor* | T | Ov | E | 2 | A I |
| 120. | *Lanius excubitor* | T | Mp, Oi | Tp | 3 | |
| 121. | *Oriolus oriolus* | T | Ov | E | ns | |
| 122. | *Sturnus vulgaris* | T | Mp | E | 3 | A II/2 |
| 123. | *Bombycilla garrulus* | T | Oi, Ac | S | ns | |
| 124. | *Garrulus glandarius* | T | S | E | ns | A II/2 |
| 125. | *Pica pica* | T | S | E | ns | A II/2 |
| 126. | *Corvus monedula* | T | S | E | e | A II/2 |
| 127. | *Corvus frugilegus* | T | S | E | ns | A II/2 |
| 128. | *Corvus corone cornix* | T | S | E | ns | A II/2 |
| 129. | *Corvus corax* | T | S | Tp | ns | |
| 130. | *Cinclus cinclus* | Am | S | E | ns | |
| 131. | *Troglodytes troglodytes* | T | Ov, Ri | E | ns | |
| 132. | *Prunella modularis* | T | Ov, Ri | E | e | |
| 133. | *Locustella luscinioides* | Am | Ov | E | e | |
| 134. | *Locustella fluviatilis* | Am | Ov | E | e | |
| 135. | *Acrocephalus schoenobaenus* | Am | Ov | E | e | |
| 136. | *Acrocephalus palustris* | Am | Ov | E | e | |
| 137. | *Acrocephalus scirpaceus* | Am | Ov | E | e | |
| 138. | *Acrocephalus arundinaceus* | Am | Ov | E | ns | |
| 139. | *Hippolais icterina* | T | Ov | E | e | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 140. | *Hippolais pallida* | T | Ov | M | 3 | |
| 141. | *Sylvia nisoria* | T | Ov | E | e | A I |
| 142. | *Sylvia borin* | T | Ov | E | e | |
| 143. | *Sylvia atricapilla* | T | Ov | E | e | |
| 144. | *Sylvia communis* | T | Ov | E | e | |
| 145. | *Sylvia curruca* | T | Ov | E | ns | |
| 146. | *Phylloscopus collybita* | T | Ov | Tp | ns | |
| 147. | *Phylloscopus sibilatrix* | T | Ov | E | 2 | |
| 148. | *Phylloscopus trochilus* | T | P, Ov | E | ns | |
| 149. | *Regulus regulus* | T | Mp, Oi | E | e | |
| 150. | *Regulus ignicapillus* | T | Mp | E | e | |
| 151. | *Ficedula hypoleuca* | T | P, Ov | E | e | |
| 152. | *Ficedula parva* | T | Ov | S | ns | A I |
| 153. | *Ficedula albicollis* | T | Ov | E | e | A I |
| 154. | *Muscicapa striata* | T | Ov | E | 3 | |
| 155. | *Oenanthe oenanthe* | T | Ov | Tp | 3 | |
| 156. | *Saxicola rubetra* | T | Ov | E | e | |
| 157. | *Saxicola torquata* | T | Ov | Mo | ns | |
| 158. | *Phoenicurus phoenicurus* | T | Ov | E | 2 | |
| 159. | *Phoenicurus ochruros* | T | Ov | Mo | ns | |
| 160. | *Erithacus rubecula* | T | Ov, Ri | E | e | |
| 161. | *Luscinia megarhynchos* | T | Ov | E | e | |
| 162. | *Luscinia luscinia* | Am | Ov | E | e | |
| 163. | *Turdus merula* | T | Mp | E | e | A II/2 |
| 164. | *Turdus philomelos* | T | Ov | E | e | A II/2 |
| 165. | *Turdus viscivorus* | T | Mp | E | e | A II/2 |
| 166. | *Turdus pilaris* | T | Mp, Oi | S | e | A II/2 |
| 167. | *Parus palustris* | T | S | E | 3 | |
| 168. | *Parus lugubris* | T | S | M | e | |
| 169. | *Parus caeruleus* | T | S | E | e | |
| 170. | *Parus ater* | T | S | E | ns | |
| 171. | *Parus major* | T | S | E | ns | |
| 172. | *Aegithalos caudatus* | T | S | Tp | ns | |
| 173. | *Remiz pendulinus* | Am | Mp | Mo | ns | |
| 174. | *Sitta europaea* | T | S | Tp | ns | |
| 175. | *Certhia familiaris* | T | S | E | ns | |
| 176. | *Passer domesticus* | T | S | Tp | 3 | |
| 177. | *Passer montanus* | T | S | Tp | 3 | |
| 178. | *Fringilla coelebs* | T | Mp | E | e | |
| 179. | *Fringilla montifringilla* | T | Oi | S | ns | |
| 180. | *Pyrrhula pyrrhula* | T | S | S | ns | |
| 181. | *Coccothraustes coccothraustes* | T | S | E | ns | |
| 182. | *Serinus serinus* | T | Ov | M | e | |
| 183. | *Carduelis chloris* | T | S | E | e | |
| 184. | *Carduelis spinus* | T | Mp, Oi | E | e | |
| 185. | *Carduelis carduelis* | T | S, Oi | E | ns | |
| 186. | *Carduelis cannabina* | T | Mp | E | 2 | |
| 187. | *Emberiza schoeniclus* | Am | Mp | Tp | ns | |
| 188. | *Miliaria calandra* | T | Mp | E | 2 | |
| 189. | *Emberiza citrinella* | T | S | E | e | |

**Legend:**

***Habitat*: Ac** - *aquatic*; **Am** - *amphibian*; **T** – *terrestrial*.

***Phenology***: **Oi** - *winter guest*; **Ov** - *summer guest*; **Ri** - *rare in winter*; **Mp** - *partial migratory*; **P** - *passing*; **Ac** - *accidentally*; **S** - *sedentary*; **?** - *uncertain*;

***Biogeographic origin*: S** - *Siberian*; **A** - *Arctic*; **Tp** - *Transpalearctic*; **E** - *European*; **M** - *Mediterranean*; **Mo** - *Mongolian*; **Ch** - *Chinese*.

***SPEC List***: **1** - *SPEC 1*; **2** - *SPEC 2*; **3** - *SPEC 3*; **e** - *Non-SPEC*$^{E}$; **ns** - *Non-SPEC*; ***Bird Norm*: A I** - *Annex I*; **A II/1** - *Annex II, part 1*; **A II/2** - *Annex II, part 2*; **A III/1** - *Annex III, part 1*; **A III/2** - *Annex III , part 2*.

**Results and Discussion**

189 bird species out of 16 orders and 44 families were identified during the research period (Table 1) on the upper flow of Arges River.

The identified species can be found in different existing habitats: 109 species (57.67%) live in terrestrial habitat, 34 species (17.99%) live in amphibious habitat andf 46 species (24.34%) live in aquatic habitat (Table 1, Fig. 2).

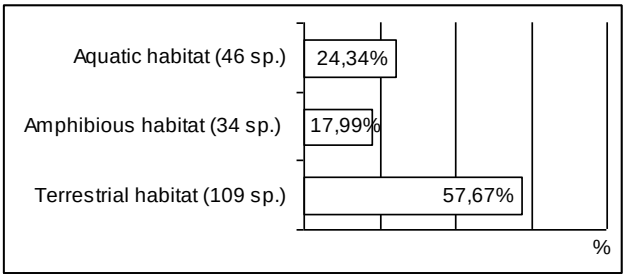


**Figure 2.** The distribution of the species according to their main habitat.

Phenology: in our country 14 species (7.41%) are winter guests and mainly winter guest, 90 species (47.62%) are summer guests and mainly summer guests, 26 species (13.76%) are partial migratory and mainly partial migratory, 20 species (10.58%) are passing species and mainly passing, 1 species (0.53%) is exclusively accidental and 38 species (20.11%) are sedentary or mainly sedentary (Table 1, Fig. 3).

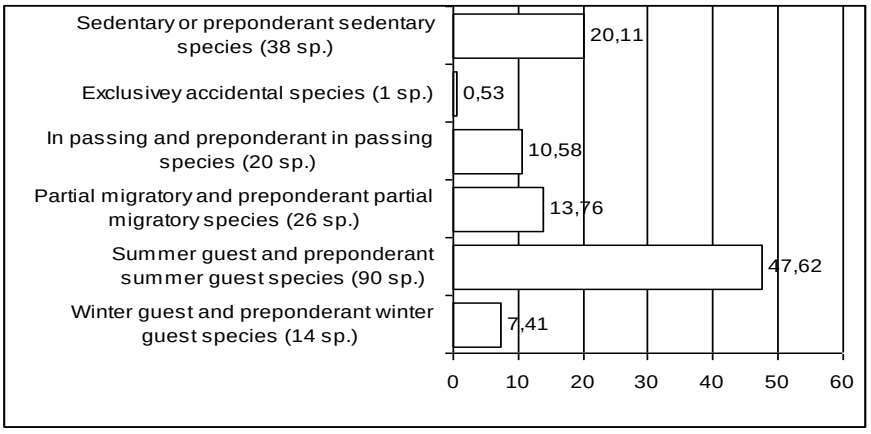


**Figure 3.** The distribution of the birds according to their phaenology.

Bio-geographical origins: 7 species (3.70%) have Arctic origins, 20 species (10.58%) have Siberian origins, 37 species (19.58%) have Transpalearctic origins, 90 species (47.62%) have European origins, 14 species (7.41%) have Mediterranean origins, 18 species (9.52%) have Mongolian origins, 2 species (1.06%) have Chinese origins and one species (0.53%) has Tibetan origins (Table 1, Fig. 4). SPEC list (Species of European Conservation Concern) (Table 1, Fig. 5), four species (2.19%) are listed as SPEC 1 (globally threatened species), 18 species (9.52 %) are listed as SPEC 2 (European species having an unfavorable status), 51 species (26.98%) listed as SPEC 3 (non-European species having an unfavorable preservation status), 45 species (23.81%) are Non-SPEC$^{E}$ and 71 species (37.57%) are Non-SPEC (these species do not need special measures of preservation).

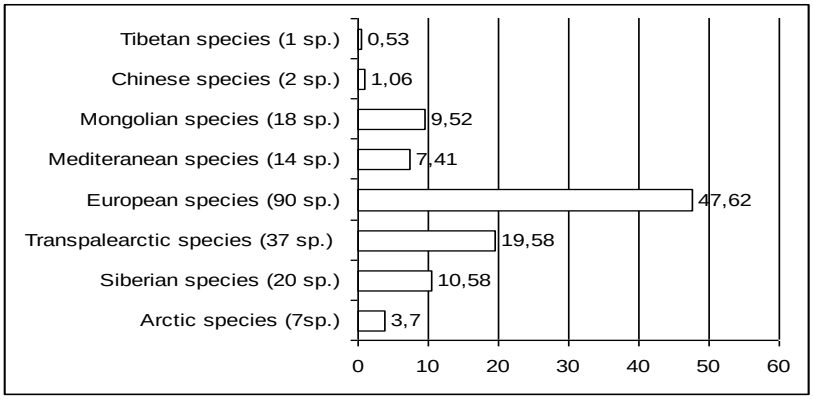


**Figure 4.** The distribution of the birds according to their biogeographhic origins.

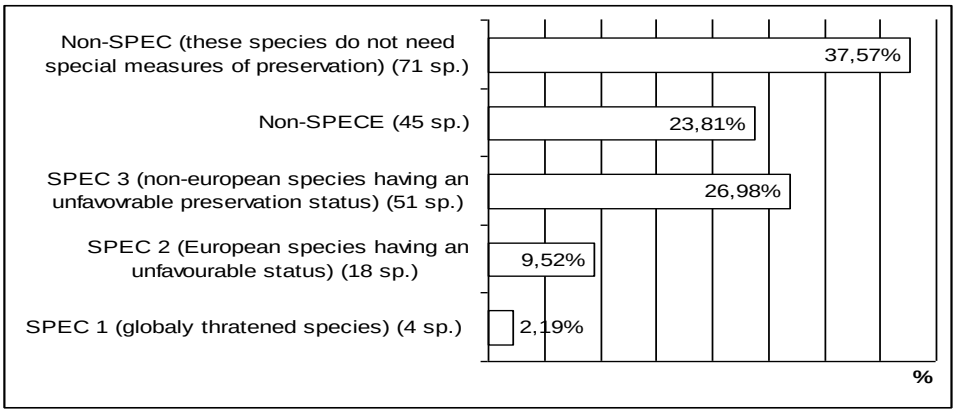


**Figure 5.** The distribution of the birds according to their protection status.

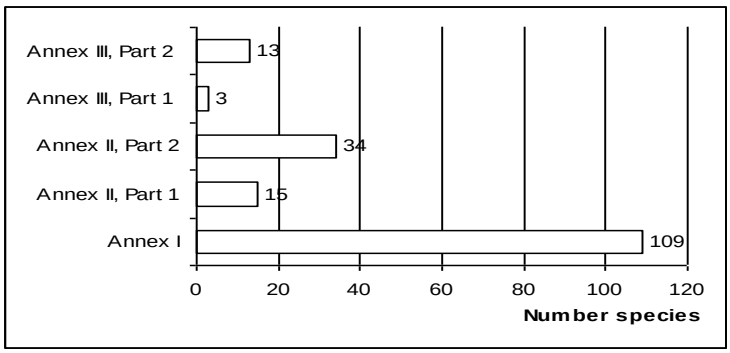


**Figure 6**. Bird species mentioned in the Bird Directive.

According to Bird Directive, 109 species are listed under Annex I; 15 species in Annex II, Part 1; 34 species in Annex II, part 2; 3 species in Annex III, Part 1 and 13 species in Annex III, part 2 (Table 1, Fig. 6)

## Conclusions

The fauna of the artificial lakes of the middle basin of Arges river is rich and has 189 species that are part of 16 orders.

Most species live in terrestrial habitat.

The summer guest species and the sedentary species are the main ones.

The most numerous are the species of European and Transpalearctic origins.

Rare and protected species were observed in the area: 4 species are listed under Spec 1 category and are globally threatened (*Phalacrocorax pygmeus, Branta ruficollis, Aythya nyroca, Haliaeetus albicilla*) and 109 species are listed in Annex I of Bird Directive, which are to be considered under a special preservation status.

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