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Development of bird ringing in Croatia and neighbouring countries in the period 1910–1992: new perspectives

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Abstract

Background and Purpose: *Based on preserved original bird ringers' reports and published annual reports on bird ringing, the development of the ringing of birds in Croatia from 1910 to 1992 is discussed in this paper. After the breakdown of the Austro-Hungarian Empire (1918), Serbia, Croatia and Slovenia made up the common country of Yugoslavia until 1992. Bird ringing is today organized independently in each of the newly founded states so new reports should not be cummulatively added to the older collective ones. The aim of this article is to emphasize the need of organizing the data collected between 1910–1992 separately for each country. This should provide a more realistic insight into earlier bird ringing activities and create a basis for further publication of national bird ringing reports. The article also studies the contribution of bird ringing as a method to the disciplinary development of ornithology in Croatia.*

Material and Methods: *Separation of data on bird ringing for the territory of Croatia from the cumulative data collected between 1910 and 1992 was conducted on the sample of 25 species. The sources used were the original annual reports written by bird ringers and kept in the* Bird ringing archive *in the Institute of Ornithology, Croatian Academy of Sciences and Arts (CASA). They contain information on bird species, location and date of ringing. To assess the contribution of bird ringing as a method to the disciplinary development of ornithology in Croatia, we studied the data distribution and the Croatian share in the total bird ringing on the territory of ex-Yugoslavia, as well as the use of the bird ringing data and the reports on ringed birds in conference presentations and research articles published by 1992.*

Results and Conclusions: *The separation of bird ringing data for 25 species (62,094 individual birds) shows that in former Yugoslavia the majority of bird ringing took place outside Croatia. Of the total of 47 reports on bird ringing and on recoveries on ringed birds published by 1992, 34 were used for writing 22 research articles and 16 conference presentations or abstracts. Throughout the history of bird ringing, the Institute of Ornithology, CASA, has remained the organizer of the activity and the custodian of the* Bird ringing archive*. The institute should now draw up an inventory of all data collected up to present time. Furthermore, the data should be digitalized and, as a* Digital bird ringing database*, made accessible to a wider ornithological audience. The year 2010 as the 100th anniversary of bird ringing offers an opportunity to highlight the role of Croatia in the development and organization of this activity, and to modernize data processing.*

INTRODUCTION

In the Austro-Hungarian Monarchy (1867–1918), bird ringing first began in Hungary in 1908 *(1),* in Croatia in 1910 *(2),* and in Austria in 1913 *(3)*. Rings with Hungarian marks, used mostly in the region of Vojvodina (Obedska bara, Zemun, Pančevo, Novi Sad and several towns in Srijem) and eastern Croatia (Kopački rit, Belje), remained in use until 1939, well after the dissolution of the Austro-Hungarian Monarchy. From the very beginning, bird ringing has been continuously conducted in the whole territory and organized by the *Croatian Ornithological Centre* (1910–1939). Nevertheless, Slovenia established an independent bird ringing organization in 1926 *(4)*. In the Socialist Federal Republic of Yugoslavia (1945–1991), bird ringing extended to the territories of five republics (Croatia, Bosnia and Herzegovina, Serbia, Macedonia, and Montenegro) and two autonomous provinces (Voivodina and Kosovo). Croatia, that is the Institute of Ornithology of the Yugoslav Academy of Sciences and Arts — today Department of Ornithology of the Croatian Academy of Sciences and Arts — had continued to organize bird-ringing for the remaining republics until Croatia proclaimed independence in 1992.

After 1992, Croatia continued to organize bird ringing exclusively on its own state territory. Bird ringing, data collecting and data processing in the rest of Yugoslavia was officially abolished. The last report on bird ringing for the territory of Yugoslavia stated that, between 1910 and 1992, 284 species with 547,442 individual birds *(5)* were ringed, and 5,528 recoveries of ringed birds were recorded *(6)*. The cummulative reports published by 1992 no longer satisfy the needs of new independent countries, so new solutions for their future use must be developed.

Although modern methods of bird marking to study different aspects of the bird's life, especially migration, have been created, bird ringing, first implemented in Europe in the early twentieth century, vitally contributed to the disciplinary development of ornithology *(7)*. Besides Slovenia, Croatia was the only former Yugoslav republic that invested organizational, knowledge and financial* resources into bird ringing. This study investigates the contribution of bird ringing to the disciplinary development of ornithology in Croatia between 1910 and 1992. It also tries to encourage seeking of solutions for access and use of data on bird ringing.

MATERIAL AND METHODS

A study of the contribution of bird ringing to the disciplinary development of ornithology is based on separating the data on bird ringing collected in the territory of Croatia between 1910 and 1992 from the cumulative data, and on an analysis of the uses of published reports for research studies up to 1992.

Using original bird ringers' reports from the *Bird ringing archive*, we separated the data for 25 species ringed at locations in former Yugoslavia. The relation between the number of bird species and individual ringed birds within and outside Croatia has been taken as the indicator of bird ringing intensity distribution in former Yugoslavia.

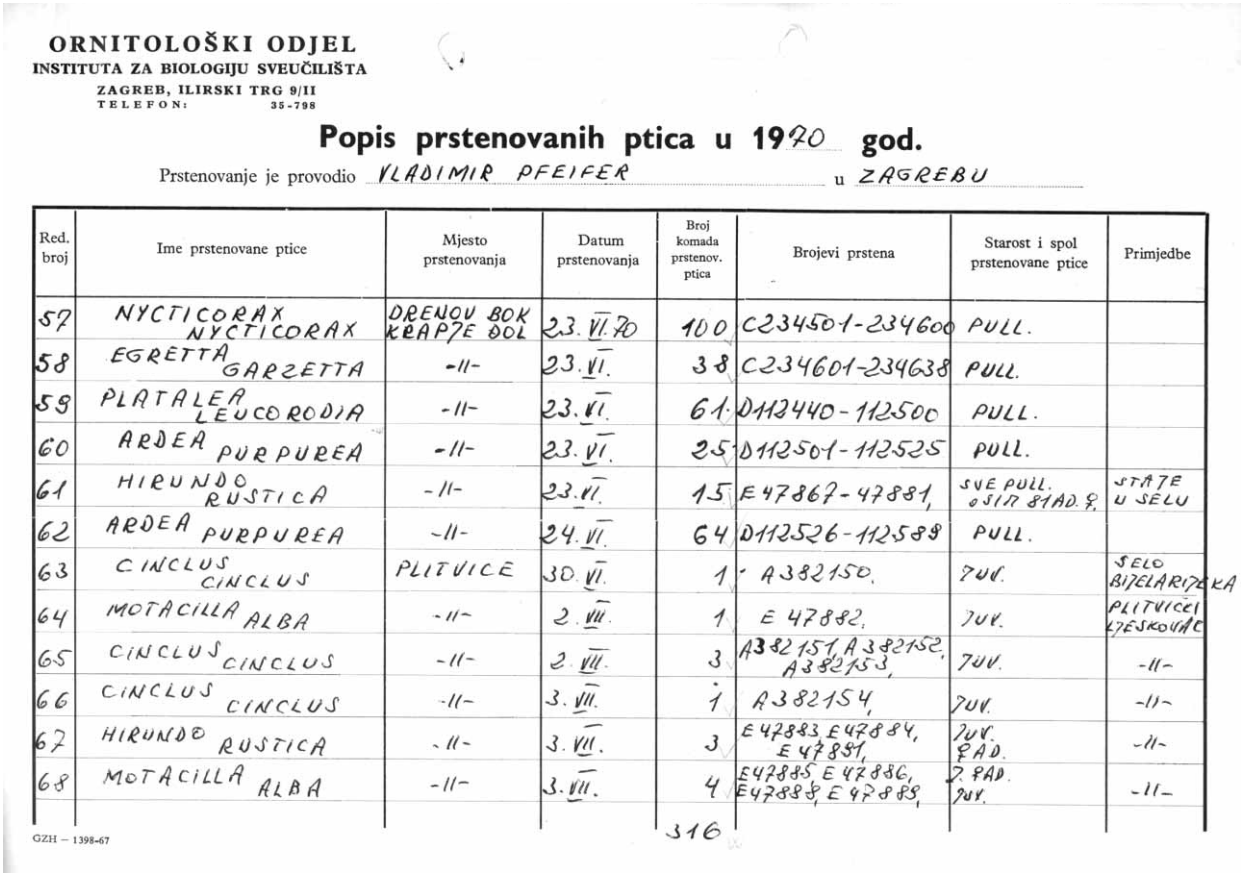
We selected data on bird ringing of 12 species from the *Ardeidae* family, five from *Sternidae*, four from *Lanidae*, two from *Turdidae* (*Muscicapidae*), and one each from *Cinclidae* and *Passeridae*. These species were chosen as representatives of key biotopes and eco-systems: water, forrest and agricultural areas. The ringing of young birds still in the nest helps find out the location and area of the nesting of a species. These data may thus be used as a valuable source for faunistic research. The use of bird ringing data and of reports on ringed bird recoveries is expressed as the number of published ornithological studies, conference presentations and abstracts. We examined five ornithological journals: *Aquila, Larus, Troglodytes, Acrocephalus* and *Ciconia*; four Croatian natural history journals: *Glasnik naravoslovnoga družtva, Periodicum biologorum*, *Priroda* and *Šumarski list* and three Serbian journals: *Ekologija, Arhiv bioloških nauka* and *Jelen*. We furthermore took into account articles published in the journals outside the study area, such as *The Ring*, as well as conference presentations and abstracts.

The study did not take into account the few data on bird ringing and recoveries used for articles in compilations on the biology of European birds such as *Handbook of the birds of Europe, the Middle East and North Africa: the birds of the Western Palearctic (8, 9)*.

RESULTS AND DISCUSSION

The *Bird ringing archive* at the Institute of Ornithology, CASA, hold original annual bird ringers' reports (Figure 1). Bird ringers filled a predesigned form; they recorded the species name, age and sex of the bird, as well as the location and date of ringing. Reports for the period 1910–1929 are not in the Archive; instead, they were analyzed and published in the form of reports covering two periods: from 1910 to 1918. *(2,10–17)* and from 1919 to 1930. *(18)*. Bird ringing failed to take place in 1923 and 1924 *(18)* so reports for these two years do not exist. The report for 1932 as well as for the period between 1935 and 1938 are also missing, although bird ringing did take place in these years, as confirmed by a published report for the period 1931–1938 *(19)*. Štromar *(20)* reports that between 1940 and 1945 around 22,000 birds were ringed, but that the original bird ringers reports were destroyed in World War Two. Yet, research into the Archive reveals that these reports have survived, but probably not entirely. Unfortunately, reports for 1974 accidentally got charred and thus are almost completely illegible. In conclusion, the Archive holds annual reports of 62 years for the period 1930–1992.

* This refers to the costs of the production and transport of rings, as well as their distribution to bird ringers. Bird ringing itself was carried out by ringers in the field.



ORNITOLOŠKI ODJEL
INSTITUTA ZA BIOLOGIJU SVEUČILIŠTA
ZAGREB, ILIRSKI TRG 9/II
TELEFON: 35-798

Popis prstenovanih ptica u 1970 god.

Prstenovanje je provodio VLADIMIR PFEIFER u ZAGREBU

Red. broj	Ime prstenovane ptice	Mjesto prstenovanja	Datum prstenovanja	Broj komada prstenov. ptica	Brojevi prstena	Starost i spol prstenovane ptice	Primjedbe
57	NYCTICORAX NYCTICORAX	DRENOV BOK KRAPJE ĐOL	23. VI. 70	100	C234501-234600	PULL.	
58	EGRETTA GARZETTA	-11-	23. VI.	38	C234601-234638	PULL.	
59	PLATALEA LEUCORODIA	-11-	23. VI.	61	D112440-112500	PULL.	
60	ARDEA PURPUREA	-11-	23. VI.	25	D112501-112525	PULL.	
61	HIRUNDO RUSTICA	-11-	23. VI.	15	E47867-47881,	SVE PULL. OSIM 81 AD. ♀	STAJE U SELU
62	ARDEA PURPUREA	-11-	24. VI.	64	D112526-112589	PULL.	
63	CINCLUS CINCLUS	PLITVICE	30. VI.	1	A382150.	JUV.	SELO BIJELA RIJEKA
64	MOTACILLA ALBA	-11-	2. VII.	1	E 47882.	JUV.	PLITVIČKI LJESKOVAC
65	CINCLUS CINCLUS	-11-	2. VII.	3	A382151 A382152, A382153,	JUV.	-11-
66	CINCLUS CINCLUS	-11-	3. VII.	1	A382154,	JUV.	-11-
67	HIRUNDO RUSTICA	-11-	3. VII.	3	E47883 E47884, E47891,	JUV. ♀ AD.	-11-
68	MOTACILLA ALBA	-11-	3. VII.	4	E47885 E47886, E47888, E47889,	2 PAD. JUV.	-11-
				316			

GZH – 1398-67

Figure 1. *Original ringers report from Bird ringing archive at the Institute for Ornithology CASA for 1970.*

Data from original bird ringers' reports are separately processed for each year and then published as *Bird ringing results* for the use of ornithological audience. As a rule, they contain information on the number of ringed birds but not about the location where the ringing took place. These reports have been traditionally published in the journal *Larus*. Before the foundation of *Larus*, bird ringing results had been published as annual reports on the activities of the *Croatian Ornithological Centre*, were self-published by E. Rössler *(2, 10–17),* in *Lovačko-ribarski vjesnik (18)* and by the *Ornithological Section of the Institute of applied zoology of the Banovina of Croatia (19, 20)*. These early reports lack serial numbers so Maštrović *(21)* numbered his report as the third in the series, because he thought that the first was the one by Plančić from 1932, and the second Maštrović's report from 1939. Between 1910 and 1992, 47 reports, including 9 by Rössler, were published. The 24 reports titled *Bird ringing results* combine two sections on 1) bird ringing results 2) recoveries on domestic and foreign ringed birds *(18–32, 34– 41)*. For the period 1976–1992, six separate reports on bird ringing results *(5, 42–46)* and six reports on the findings of ringed birds *(6, 47–51)* were published. Another two unnumbered reports analyse older bird ringers' reports: a report by Kroneisl-Rucner *(52)* focused on birds found in Croatia but ringed elsewhere (1940–1952), while the other report collected and examined data on birds ringed with Hungarian rings between 1908 and 1939 on the territories that today belong to Croatia and Serbia *(53)*. This report was prepared using the data that until then had been published in an incomplete form in the journal *Aquila (1, 54–67)* and that, until the publication in the journal *Larus*, had been unknown to Croatian ornithologists. These data complete the information on the early era of bird ringing in these territories. The report is especially valuable to Croatia because most of the data were gathered in the area of Kopački rit, today a nature park and a special zoological reserve, as well as one of four areas listed by the Ramsar convention and a candidate for the status of national park. The procedure and basic features of bird ringing were previously described in detail *(68),* and so were the method, organization and results of bird ringing between 1910 and 1987 *(69)*.

Bird ringing intensity distribution on the territory of former Yugoslavia

The majority of bird ringing activities in former Yugoslavia took place outside Croatia, as shown by the sample of 25 bird species, or 8.8% of all ringed species during the study period (Table 1). Of these 25, 18 species, or 72%, had more individual birds ringed in the territory of other republics than in Croatia. Furthermore, 81% of the total number of ringed birds (62,094) was ringed outside Croatia. The most active area was Vojvodina. Four species

TABLE 1

The number and percentage (%) of individual ringed birds in the sample of 25 species in Croatia and other Yugoslav republics between 1910 and 1992.

SPECIES	No (%) ringed birds in Croatia	No (%) ringed birds in former Yugoslavia except Croatia
1. Botaurus stellaris	0 (0.0)	8 (100.0)
2. Plegadis falcinellus	0 (0.0)	13 (100.0)
3. Egretta alba	0 (0.0)	51 (100.0)
4. Platalea leucorodia	0 (0.0)	720 (100.0)
5. Sterna albifrons	1 (11.0)	8 (89.0)
6. Ciconia nigra	3 (4.5)	63 (95.5)
7. Lanius excubitor	9 (75.0)	3 (25.0)
8. Chlidonias leucopterus	16 (73.0)	6 (27.0)
9. Ixobrychus minutus	24 (3.9)	595 (96.1)
10. Luscinia luscinia	27 (24.1)	85 (75.9)
11. Cinclus cinclus	34 (57.63)	25 (42.37)
12. Lanius senator	126 (76.80)	38 (23.20)
13. Ardea cinerea	175 (19.58)	719 (80.42)
14. Chlidonias niger	257 (58.0)	189 (42.0)
15. Motacilla cinerea	262 (36.0)	466 (64.0)
16. Egretta garzetta	279 (6.1)	4 276 (93.9)
17. Lanius minor	294 (20.60)	1 133 (79.40)
18. Ardea purpurea	406 (11.7)	3 060 (88.3)
19. Luscinia megarhynchos	893 (493)	919 (50.7)
20. Chlidonias hybridus	906 (74.0)	318 (26)
21. Ardeola ralloides	1 058 (25.7)	3 059 (74.3)
22. Sterna hirundo	1 438 (73.0)	545 (27.0)
23. Nycticorax nycticorax	1 468 (11.1)	11 852 (88.9)
24. Lanius collurio	1 605 (46.20)	1 868 (53.80)
25. Ciconia ciconia	2 466 (10.8)	20 328 (89.2)
Total:	**11 747 (18.9)**	**50 347 (81.1)**

(16%) out of the examined 25 were ringed exclusively outside Croatia: *Botaurus stellaris*, *Egretta alba*, *Plegadis falcinellus* and *Platalea leucorodia* (Table 1). These are rare and endangered species with their nesting areas being sporadic and limited to specific regions, though they do nest in Croatia too. During the examined period *B. stellaris* nested on at least five locations: the valley of Neretva (Dubravica) *(70),* Crna Mlaka, National Park Krka, Kopački rit and fish ponds Končanica *(71)*. Moreover, 5–10 pairs of *E. alba* nested in Kopački rit, an unknown number of pairs of *P. falcinellus* on Vransko lake near Biograd *(71)* and 3 to 32 pairs *P. leucorodia* in Krapje Đol *(72)*. To conclude, these birds were not ringed in Croatia, but they had suitable nesting habitats. The higher intensity of bird ringing in other parts of former Yugoslavia may be explained by more bird ringers and, ultimately, stronger tradition. Most bird ringers in Vojvodina were of Hungarian ethnic origin, and were traditionally more interested in bird migrations. They then communicated the importance of bird ringing to amateurs and ornithologists.

Because a total of 284 species were ringed by 1992, we need to separate the data for another 259 species. Further data separation should be conducted in the Institute of Ornithology, CASA, which, as a former organizer of bird ringing in former Yugoslavia, holds the original *Bird ringing archive*. That would allow each country successor of Yugoslavia an insight into bird ringing activities on its state territory prior to independence.

Uses of data on bird ringing and recoveries of ringed birds

Out of the total of 47 reports on bird-ringing and recoveries of ringed birds published by 1992, 32 were used for 22 ornithological research articles *(73–94)*. Another 10 articles list collectively in their bibliographies reports on bird ringing or recoveries on ringed bird (such as: *Reports on bird ringing of Institute for Ornithology* or *Reports on bird ringing 1910–1966*) *(95–104)*. One author *(86)* used both ways in a single article, but we counted it only once, in the group of articles with accurately referenced reports.

The majority of articles were published in the journal *Larus (15),* while one article was published in each of the following journals: *Jelen (96), Priroda (104), Arhiv bioloških nauka (103), Šumarski list* (102), *Ekologija (78)* and *Acrocephalus (91)*. Five papers were published in the journal *Ciconia* (*85, 88–90, 93*) and four in *The Ring (97, 99–101)*.

Reports on ringing/recoveries were also used for writing 16 conference and symposium papers and abstracts *(68, 69, 105–118)*.

The published articles study 13 bird species and one subspecies, of which 7 belong to the ornithofauna of Croatia (*R. riparia, S. vulgaris, C. frugilegus, Ph. carbo carbo, S. albifrons, L. argentatus/L.c.michahellis*, and *O. oriolus*). The species *Ph. carbo, H. albicilla, L. ridibundus, E. schoeniclus, S. vulgaris, B. garrulus* and *R. riparia* have been researched for the entire territory on former Yugoslavia.

The first article to use bird ringing reports was published as late as 1967 *(96)*. This may be explained by the fact that more than half a century (1910–1967) was needed to collect sufficient amount of data that would allow drawing compelling conclusions and publishing research studies. Most articles were published in the 1980s. Although new methods to observe and study bird migration and biology have been developed, bird ringing is still in use worldwide. The statement that bird ringing is the largest and the longest-lasting zoological project in Croatia *(119)* will become false if the data collected by bird ringing are no longer utilised in ornithological research *(120)*. The interpretation of bird ringing data thus contributes to bird protection. The exceptionally important role of bird ringing in the popularization of ornithology

should not be neglected. Although bird ringing data from former Yugoslavia first became accessible to the European ornithological audience in 1975 via EURING (European Union for Bird Ringing, http://www.euring.org/), an organization that collects data from bird ringing centres across Europe, according to our knowledge no author from outside former Yugoslavia has used these data and published an article.

CONCLUDING REMARKS

Bird ringing data represent valuable sources that do not age and may always be used for research in the fields of ornithology and conservation biology. The Institute of Ornithology, CASA, as the organizer of bird ringing and custodian of the Bird ringing archives should carry out an assessment of all data collected up to present time and produce a digital *Bird ringing database*, to obtain assess to original data to a wider audience, under the condition of correct citation. The 100th anniversary of bird ringing in Croatia will take place in 2010. It presents a unique opportunity to highlight the role of Croatia in the organization of bird ringing and in the establishment of the disciplinary foundation of ornithology. It also offers a stimulus for the modernization of data processing, starting with the separation of data on bird ringing.

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