

STATUS OF BREEDING POPULATION AND SITES OF MIGRATORY CONCENTRATIONS OF THE RUFF (*Philomachus pugnax*) IN THE NAREW RIVER-BASIN AND THE LOWER BUG VALLEY

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ABSTRACT

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The paper describes breeding sites of the Ruff in river valleys of the Narew basin and the lower Bug in years 1987-1999. During these thirteen years the number of breeding females decreased. At the beginning of the 1990s, up to 25 females bred in the area, while at the end of the decade – only 6 to 12. River valleys of the southern Biebrza basin and of the middle Narew are important areas of Ruff concentrations during spring migration. The studied valleys do not play a major role as sites of the species' concentration during autumn migration.

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INTRODUCTION

The Ruff occurs in the northern Palearctic in a continuous range that extends from Scandinavia to the Bering Strait. In Europe it breeds in isolated sites in the Netherlands, Denmark, Germany, Russia, Estonia, Latvia, Belarus, Lithuania and Poland (Cramp and Simmons 1983, Głowaciński 2001). In several recent decades, the decrease in numbers of breeding females and abandoning of sites has been observed, mainly in the southern part of the species' range, (Hagemeijer and Blair 1997). This process has been recorded also in Poland (Tomiałoć 1990, Bednorz *et al.* 2000). Polish breeding sites are threatened mainly by hydrological changes in river valleys that lead to deterioration of the flood zone and quick drainage of the area. Thus, there is an urge to document present breeding sites of the Ruff. Among them, stable breeding sites remained probably only in the north-eastern Poland.

The majority of world population of the Ruff winters in West Africa (Alerstam 1993). Trollet and Girard (2001) estimated the number of Ruffs wintering in this region in recent years at *ca* 1 million of birds. The Ruff presents the S-type life strategy (Alerstam and Hogstedt 1982). Species presenting such strategy migrate quickly, but on migration route they require foraging sites, where they can restore energetic reserves (Meissner 2001).

In Poland, data that point out important places of Ruff concentrations during migration are scarce. Also numerical estimates of migration peaks are lacking in the regional scale. Until now, migration dynamics of the Ruff in Poland was described only at several sites on the routes of its spring and autumn migration (Bednorz 1976, Meissner and Sikora 1995, Stawarczyk *et al.* 1996, Witkowski and Ranoszek 1998, Górski and Nowakowski 1999, Nowakowski 2001).

The paper is aimed to present the status of the breeding population of the Ruff in the middle Narew basin and the lower Bug valley and it attempts to define important stopover sites of the species on migration.

STUDY AREA AND METHODS

The paper assembles authors' own materials considering breeding of the Ruff between 1987 and 1999, collected during fieldwork conducted in river valleys of north-eastern Poland. In the Biebrza valley, studies were conducted in 1989-1999 – every year 6 to 12 controls of meadows and peat-bogs of the flood zone were performed between April and the end of July; except for 1993 and 1998, when only 4 and 3 controls were done, respectively. In the Narew valley between Łomża and Bronowo, the censuses of breeding birds were conducted in 1987-1988 from April to June (4 controls), 1990-1991 from May to June (3 controls), in 1994 from April to June (6 controls) and in 1996 from May to June (1-2 controls).

Methods of waterbirds' counts along the Omulew river was described in detail in paper of Kasprzykowski and Goławski (2000), from where data about this region were taken.

The study area (Fig. 1) included the Narew valley with its tributaries, from the outlet to the Vistula to village Zajki in Trzcianne district (up the Biebrza outlet to the Narew river). In the case of the Biebrza river, observations covered only the southern basin, and in the case of the Bug – the fragment of the river flow from its outlet to village Mołożew (Jabłonna Lacka district).

To assess the importance of river valleys, and also of some fishpond complexes in the area for migrating Ruffs, one count was performed synchronically during peaks of the spring migration (1 May 1997) and the autumn migration (12-18 August 1997). Terms of the spring migration peak and of the post-breeding migratory concentrations were established based on earlier studies of migration dynamics conducted in the lower Biebrza and the Narew valleys (Górski and Nowakowski 1998a, 1999; J.J. Nowakowski – unpubl. data). In the study, numbers of Ruff in

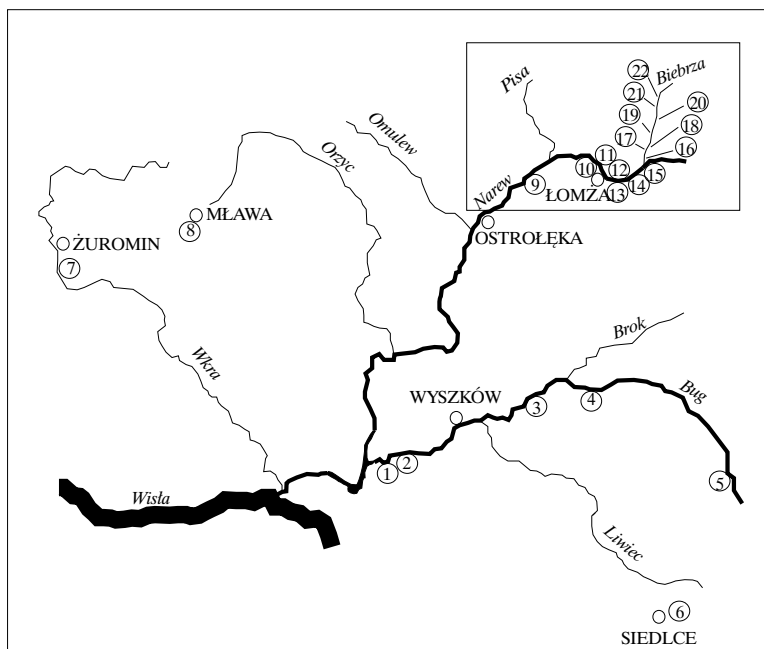


Fig. 1. Map of the study area – location of points of counts during migration (numbers correspond to Table 1). Sites numbered 1-8 lie in Mazowieckie voivodship and these 9-22 in Podlaskie voivodship. Area of the rectangle is shown at Figure 2.

peaks of spring concentrations in the lower Biebrza valley in years 1989-1999 are also presented.

Beside the authors, following persons took part in the fieldwork: Krzysztof Antczak, Andrzej Dombrowski, Artur Goławski, Zbigniew Kasprzykowski, Piotr Pagórski, Konrad Sachanowicz, Tadeusz Smoleński, Tomasz Wiewiórko and Janusz Zawadzki. We are grateful to all of them.

RESULTS

Breeding sites

Location of breeding sites of the Ruff within the described area are presented in details at Figure 2.

A place of regular breeding of the species is the lower Biebrza valley, where in the period 1989-1999, up to 16 females breeding were noted. However, the breeding population in this area is a subject of negative changes. In years 1989-1991, every year 10-16 females were noted breeding. In these years, nesting of the Ruff was stated on meadows in the outlet of the Biebrza to the Narow (1-2 females), in the vicinity of village Rutkowskie (1-2), near village Szostaki (1), near the Honczarowska dam close to village Mocarze (2-3), on meadows near villages Brzostowo

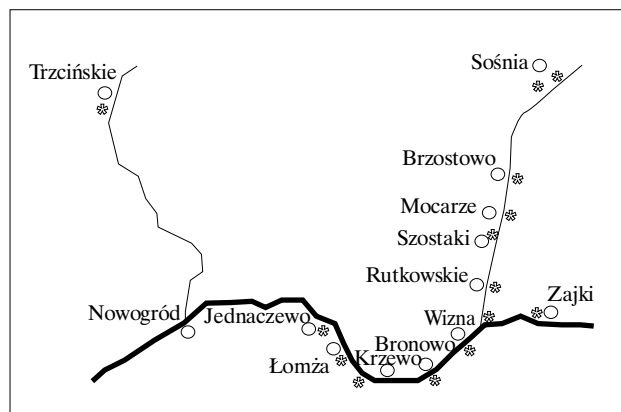


Fig. 2. Location of breeding sites. The area of the rectangle at Figure 1 is shown.

and Chyliny (2-5), in the vicinity of village Sośnia (1) and on meadows near village Zaczkowo (1-2).

Since 1992, the number of breeding birds has decreased. In 1995, breeders were found only near the Biebrza outlet to the Narew (1), near Szostaki (1) and Mocarze (1), on meadows near Brzostowo (1) and in the vicinity of Sośnia (1). In 1998, only one female behaved in a way suggesting breeding was found (near Sośnia) and in 1999 nesting of three females was recorded (region of Mocarze and Brzostowo). Between 1989 and 1999 in the area of the lower Biebrza also the number of leks fell down.

The second area of the probably regular breeding is the Narew valley near Wizna town. In years when the censuses of breeding birds were conducted there, breeding of the Ruff was confirmed. In 1995, a single female bred in the area and two behaved in a way suggesting breeding were observed, in 1998 three breeding females were recorded.

The vast peat lowland between villages Laskowiec and Zająki north to the Narew is the next probably stable breeding site of Ruffs. In 1995, broods of 1-2 pairs were recorded and in 1998 one nest was found. Another important breeding area for the Ruff is the Narew valley between the city of Łomża and village Krzewo (Piątnica district). Ruffs bred there often but not every year. Nesting of 1 to 4 females was recorded there in 1987-1988 (Chyl and Górski 1993) and in 1994-1995 (Górski and Nowakowski 1998b). The species did not breed in this area in 1990 and 1996. In addition, breeding of these birds was recorded in Wizna Bog near village Bronowo (Wizna district) – 2 females in 1994, in the Narew valley near Jednaczewo – 1 female in 1995 and in the Pisa valley near village Trzcińskie (Turośl district) – 1 female in 1988. In valleys of remaining rivers of the middle Narew basin no breeding Ruffs were recorded in the described period (Kasprzykowski and Gołowski 2000; A. Górski, J.J. Nowakowski – unpubl. data). Also in the Bug valley, the Ruff ceased breeding in the studied period (A. Dombrowski – unpubl. data).

Migratory concentrations of Ruff

In 1997, during censuses performed on 1 May, nearly 17 000 of Ruffs were observed on flooded areas in the valleys of the described rivers (Table 1). The most important sites for the Ruff during spring migration are located in the lower Biebrza valley, and locally – in the Narew valley. In the Biebrza valley from Chyliny to the outlet, in total 6755 Ruffs were recorded, and in the Narew valley from the outlet of the Biebrza to the city of Łomża – over 8400 birds. At the remaining controlled sections of the rivers the number of birds was low (Table 1).

Table 1
Numbers of Ruffs in the spring migration period in selected sites in the basin of the lower Bug river and the middle Narew river observed on 1 May 1997, except for those pointed with asterisks

No	Controlled area	Nearest village, district	N
1	Bug valley	Kuligów, Dąbrówka distr.	19
2		Ślężany-Sekundowo, Dąbrówka distr.	62
3		Section Wyszaków – Brok	30
4		Prostyń, Małkinia distr.	489
5		Mołożew, Jabłonna Lacka distr.	30
6	Siedlce fishponds	Siedlce, Siedlce distr.	489 (1000**)
7	Wkra valley	Mołocin, Biezuń distr.	100
8	Rumoka fishponds	Rumoka, Mława distr.	200
9	Narew valley	Czartoria, Miastkowo distr.	38*
10		Łomża, Łomża distr.	4000
11		Piątnica, Piątnica distr.	474
12		Drozdowo, Piątnica distr.	355
13		Bronowo, Wizna distr.	198
14		Wizna, Wizna distr.	2971
15		Ruś, Wizna distr.	414
16	Biebrza valley	Sambory, Wizna distr.	1924
17		Wierciszewo, Wizna distr.	714
18		Sieburczyn, Wizna distr.	1345
19		Rutkowskie, Wizna distr.	1972
20		Burzyn, Jedwabne distr.	208
21		Mocarze, Jedwabne distr.	60
22		Brzostowo, Jedwabne distr.	532

* – observation from 2 May 1997, ** – observation from 4 May 1997

During autumn migration Ruffs were observed only at five sites (no 4, 5, 6, 7 and 19 – Fig. 1) and the total number of birds was 14.

DISCUSSION

In the 1960s, the Ruff was a relatively frequent breeder in Poland, nesting probably mainly on flooded meadows and rushes of the emmersion zone. The birds

bred locally in large concentrations. In 1967 and 1968, on alluvial meadows formed on mineral uplifts in the flood zone of the Biebrza valley near village Mocarze, the concentrations of breeding pairs on a sample plot were 7 to 9 pairs / 10 ha (Dyrz *et al.* 1972). High concentrations were also noted in the emersion zone of the Biebrza marshes – from 2.3 to 4.3 pairs / 10 ha, and the Ruff was one of dominants in this habitat (Dyrz *et al.* 1972).

At the beginning of the 1980s in the Biebrza valley a decrease in the number of leks and displaying birds, and a drastic fall in the number of breeding birds (Dyrz *et al.* 1984) were recorded. Between 1970 and 1980, size of the breeding population of the Ruff decreased by 80%.

In years 1987-1993, in the southern basin 15 leks of the Ruff were known (J.J. Nowakowski – unpubl. data). In 1994, the number of leks started to decrease and in 1998 only 4 were found (J. Witkowski, T. Stawarczyk, J.J. Nowakowski – unpubl. data). In the same period, further fall in the number of breeding Ruffs occurred. Abandoning of the breeding sites was accompanied by leaving the sites of leks (J.J. Nowakowski – unpubl. data). At the beginning of the 1990s, in the studied area of the Narew basin, 14-25 females were recorded as breeding, while at the end of this decade – only 6 to 12. This indicates a further rapid decrease in the size of breeding population.

There can be two main reasons of such a decrease. One of them may be associated with the changes in size of the whole population. The decrease in the number of breeding females and abandonment of breeding sites was noted in many areas of Ruff's range, especially in southern part of the breeding area (Hagemeijer and Blair 1997). Poland is crossed by the border of the species' range, what can negatively affect the number dynamics. The second reason are unfavourable local changes in habitats. Polish breeding sites of the Ruff and other waders in flooded river valleys are threatened mainly by hydrological changes that lead to a decrease in the range of the spring flood zone, a quick outflow of water and a rapid drying of this area. Dyrz *et al.* (1984) already suggested that a reason of the decrease in the number of breeding females can be the quick drying of meadows. In addition, at the beginning of the 1990s mowing and cattle grazing were ceased in many areas of meadows and sedge rushes. This usually results in rapid succession of plant communities, changes in habitat structure and gradual predomination of high herbaceous plants and rapid invasion of Reed Grass (*Calamagrostis* sp.), Reed (*Phragmites communis*) and willow bushes (*Salix* sp.). Changed in such way sites are not inhabited by waders, including the Ruff. The situation was noted in many areas of the Narew valley (Nowakowski and Górski 2001).

Despite drastic changes in size of the breeding population, the valleys of the studied rivers play an important role as sites of birds' concentration during spring migration. The migration dynamics of the species allows to suspect that Ruffs gradually accumulate in this area reaching the migration peak in the first decade of May, and then they suddenly depart (Górski and Nowakowski 1998a). Similar migration dynamics, with the migration peak falling on the turn of April and May, was noted by Cieślak *et al.* (1991) on Przemkowskie Fishponds, by Witkowski *et al.*

(1995) in the Barycz valley and by Kunysz and Hordowski (1992) in the middle San valley. The migration dynamics similar with respect to timing was observed in northern Italy, southern France and on Sivash in Ukraine (Wymenga 1999).

Differences between the regions of Poland studied so far and the valleys of the Biebrza and the Narew rivers refer clearly to the number of migrating and remaining birds. Assembled results of the survey showed that in the studied part of the valleys up to 17 000 individuals gathered. The main sites of concentration cover almost entire area of the flood zone of the lower Biebrza valley and the Narew valley between the Biebrza outlet and Łomża. In the lower Biebrza valley (along the fragment between Chyliny and the outlet) Ruffs stay every year in high numbers. On average *ca* 8000 birds gathered there (Fig. 3) and the most numerous concentrations reached over 18 000 birds (7 May 1993). In unfavourable years of very high floods (flood wave) or with lack of floods the accessibility of good foraging places for Ruffs is limited and the number of birds that stopover there is clearly lower. In such conditions the birds stay outside the valley feeding on spring crops and gather only for roosting. Such a night site is *e.g.* the outlet of the Biebrza to the Narew river, where 10 700 birds were recorded on 2 May 1992 (Z. Kasprzykowski – unpubl. data) and at the Wizna Bog where 4880 Ruffs were observed on 9 April 1990 (Górski and Nowakowski 1998a).

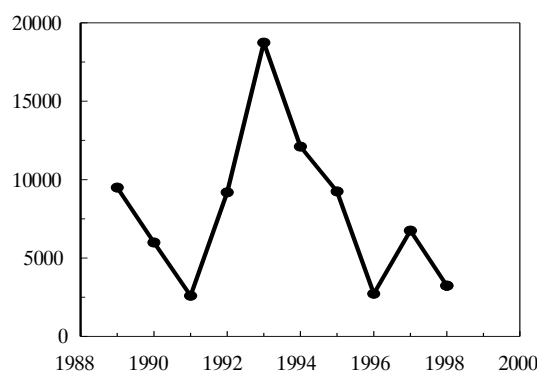


Fig. 3. Maximal numbers of Ruffs staying in years 1989-1998 in the lower Biebrza valley between the Chyliny village and the outlet to Narew

The second important site of birds' concentrations is the Narew valley. Many-thousand flocks of birds locally stay there. The most important feeding site seems to be the outlet of the Gać river to the Narew. In 1997, 4000 Ruffs were noted there, but in some years the number of birds was much higher – for example in the first decade of May 1992 not less than 10 000 birds were observed feeding on shallow flooded areas. Ruffs gather also in great numbers at the Wizna Bog, in the Narew valley between Łomża and Niewodów (5 April 1994 – 4820 birds) and down to Łomża (30 April 1996 – 6600, 1 May 1997 – 4050 indiv.: Rzępała *et al.* 1999).

At the time of spring migration, both described valleys form one large complex of flood waters which is very attractive for migrants. This area is undoubtedly of the

national and the European importance for the Ruff. Numbers given in the paper are of orientative character allowing to define the rank of the described areas at the list of sites important for migrating birds. They are not absolute numbers, especially in case of those remarkable but not possible to estimate Ruffs' migratory flocks that feed on the fields at days. Despite that, the number of Ruffs staying in this area can be estimated as not less than 15-20 thousand in unfavourable years and 50 thousand in years of optimal floods. Wymenga (1999), who assembled several simultaneous censuses of Ruffs migrating over Europe in spring 1998, pointed at Fryslam in the Netherlands as one of the most important sites of the species' concentrations. In the migration peak on 3 April 1998, over 45 000 birds were recorded there. In the remaining studied sites numbers of gathering birds did not exceed 10 thousand. In the light of the presented data, the Biebrza and the Narew valleys seem to be among the most important European areas of this species' concentration, besides Fryslam (the Netherlands), Sivash (Ukraine) and Northern Italy.

The studied river valleys seem to have a marginal importance for the Ruff during summer migration. In the Biebrza valley, migration of the species after breeding (in July and the first decade of August) was observed. The number of flocks passing during a day (up to 10) as well as the number of birds staying on flooded areas was low. For example, on 6 August 1990 on meadows near Brzostowo 60 birds were noted, and on 3 July 1996 – 25 birds. There was no visible migration of the species in autumn.

The autumn migration was pronounced quite well in the San valley (Kunysz and Hordowski 1992), in the Barycz valley (Witkowski *et al.* 1995) and at the Nyski and Turawski reservoirs (Stawarczyk *et al.* 1996). However, in many areas the species was less abundant in the post-breeding and the autumn passage periods than in spring (Cieślak *et al.* 1991, Kunysz and Hordowski 1992, Witkowski *et al.* 1995), or birds occurred sporadically like at the Oder river between the towns of Brzeg and Oława (Stajszczyk 1994). Only Stawarczyk *et al.* (1996) noted at the Nyski reservoir higher numbers of migrating Ruffs in post-breeding period and in autumn than in spring. Also in north-eastern Poland at the flooded polder near village Sątopy-Samulewo, 140 migrating Ruffs were recorded on 8 October 1998 (J.J. Nowakowski, A. Górski, K. Lewandowski – unpubl. data).

The remarkable disproportion in numbers of birds passing between the spring and the autumn migration both in the Narew and the Bug valleys and also in other regions of Poland may suggest a loop migration, *i.e.* the spring passage along the inland route and the autumn passage – along the coastal route. Such explanation was suggested earlier (OAG Münster and OAG Schleswig-Holstein 1992).

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