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MONITORING OF SEDGE WARBLER (*ACROCEPHALUS SCHOENOBAENUS*) DURING AUTUMN MIGRATION IN SOUTHERN HUNGARY

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Abstract

Gyurácz, J. & Bank, L. (1998): Monitoring of Sedge Warbler (*Acrocephalus schoenobaenus*) during autumn migration in southern Hungary. *Aquila* 103–104, p. 59–66.

In this study fluctuations in the number of Sedge Warblers (*Acrocephalus schoenobaenus*) was investigated on the basis of the number of birds captured during autumn migration periods between 1983 and 1993 at the Sumony Bird Observatory (45°58' N, 17°56' E). The number of birds captured before and after 15 August was analysed separately. During the eleven year study period the total number of birds captured before or after 15 August was 2798 and 2097, respectively.
Our results indicate that the size of northern and central European Sedge Warbler populations which migrate through southern Hungary has declined. The reasons for the decline in central Europe are presumed to be similar to those for western Europe.

***Keywords**: Acrocephalus schoenobaenus, monitoring, ringing, population changes, Hungary.*

Introduction

In Hungary, important bird areas are found predominantly in wetlands. The extent of wetlands has decreased during the last decades and their conditions have also deteriorated (*Waliczky, 1991*). The changes that have occurred in the structure and sources are indicated by changes in the number of breeding or foraging bird populations in this habitat (*Greenwood et al., 1993*).

The Sedge Warbler (*Acrocephalus schoenobaenus*) is a very common breeding bird in wetlands throughout Europe, it even prefers reed marshlands during migration (*Ormerod, 1990*). Therefore, this species may be regarded as an excellent indicator species for detection of changes in this habitat. Sedge Warblers are long-distance migrants and they spend the winter in Africa, south of the Sahara (*Dowsett et al., 1988*). Recoveries show that those Sedge Warblers migrating across Hungary originate predominantly from Southern Scandinavia and the Baltic region, and only a smaller proportion from Central Europe. The direction of migration averaged 182°, the median capture date was 15 August for adults and 24 August for juvenile birds (*Csörgő & Ujhelyi, 1991*). The size of breeding populations has decreased during the last decades in Northern and Western Europe (*Haland, 1982; Spina & Bezzi 1990; Marchant et al., 1990*). Since populations breeding in the

Northwestern part of Europe have no direct contact with those of Northeastern and Central Europe any comparison of population changes with these populations is only indicative.

In this study we investigated the annual variation in the number of Sedge Warblers on the basis of birds captured during the autumn migration.

Materials and methods

Field work was carried out between 1983 and 1993, during the autumn migration of Sedge Warblers at the Sumony Bird Observatory (45°58' N, 17°56' E), Southern Hungary in the following periods: *1983*: 31 July – 28 August; *1984*: 28 July – 26 August; *1985*: 27 July – 25 August; *1986*: 27 July – 31 August; *1987*: 27 July – 30 August; *1988*: 31 July – 4 September; *1989*: 30 July – 10 September; *1990*: 28 July – 9 September; *1991*: 27 July – 8 September; *1992*: 26 July – 13 September; *1993*: 17 July – 19 September.

Birds were captured with mist nets that were 12 meters long and 2,5 meters high. The nets were mounted over the same marshland of Lake Sumony in each year. The surface of mist nets was 600 m^2 (1983–1985) and 900 m^2 (1986–1993). Birds had been captured from dawn to dusk, except on rainy and stormy days. Each bird was ringed. Changes in the number of birds captured before or after 15 August were analysed separately, since birds from Southern Scandinavia and the Baltic region migrate through Hungary in late August – early September, by which time the majority of local populations have already left the area (*Csörgő & Ujhelyi 1991; Gyurácz & Csörgő 1991; Gyurácz & Bank, 1995*). During the eleven years, the number of birds captured before 15 August was 2798, while the number of birds captured after 15 August was 2097 in total.

The number of birds captured during the first and second half of migration were averaged to a net surface of 900 m^2 and 100 hours of capturing time. The average of the first year was set 100 percent and the index of change in numbers ("chain") was calculated (*Greenwood et al., 1993*) with the following formula:

$$I_X = \frac{N_X}{N_{X-1}} \times I_{X-1}$$

where I is the chain index of the specific year, I_{x-1} is the chain index of the previous year, N_x is the number of birds captured with 900 m^2 net surface in 100 hours in the year x. N_{x-1} is the number of birds captured on 900 m^2 in 100 hours in previous years. Annual change in the index rates was checked with linear regression and "*t*"-test. The change of numbers during the two periods was compared with the Mann-Whitney *U*-test.

Results

Number of bird species captured in certain years, rates averaged on the basis of a net surface of 900 m^2 and 100 hours of capturing and chain indexes are shown in Table 1. The highest number of birds was captured in 1984, since then there has been a significant decline.

In the migration period before 15 August $Y_1 = 1.17 - 0.08$ X; r = 0.78; t = 5.67; d. f. = 9; $P < 0.01$, in the migration period after 15 August: $Y_2 = 1.48 - 0.06$ X; r = 0.68; t = 4.1; d. f. = 9; $P < 0.01$ were found (Fig. 1).

There is a negative tendency in the number of Central and also the Northern European migrating birds. There is no significant difference between the number of birds during the two migration periods (Mann-Whitney *U*-test, z = 1.4; $P > 0.05$), however the number of birds captured after 15 August increased in the late 1980s, but it began to decrease again in the early 1990s (Fig. 2).

	N	N/900 m²/100 h	Index	log Index	N	N/900 m²/100 h	Index	log Index
Year	**Before 15 August**				**After 15 August**			
1983	256	53	100	2.00	138	29	100	2.00
1984	736	153	289	2.46	420	88	303	2.48
1985	179	33	62	1.79	87	16	55	1.74
1986	261	30	56	1.74	100	12	41	1.61
1987	273	32	60	1.77	286	33	113	2.05
1988	121	13	24	1.38	174	19	65	1.81
1989	204	19	35	1.54	258	24	82	1.91
1990	190	17	31	1.49	245	22	75	1.87
1991	77	8	15	1.17	88	10	34	1.53
1992	223	15	28	1.44	138	9	31	1.49
1993	278	18	34	1.53	163	11	38	1.57

Table 1. *Data of population change of netted Sedge Warblers in Sumony between 1983 and 1993 before and after 15 August, respectively.*

1. táblázat. *A foltos nádiposzáta állományváltozása 1983–1993 között Sumonyban az augusztus 15. előtti, ill. azt követő fogási eredmények alapján.*

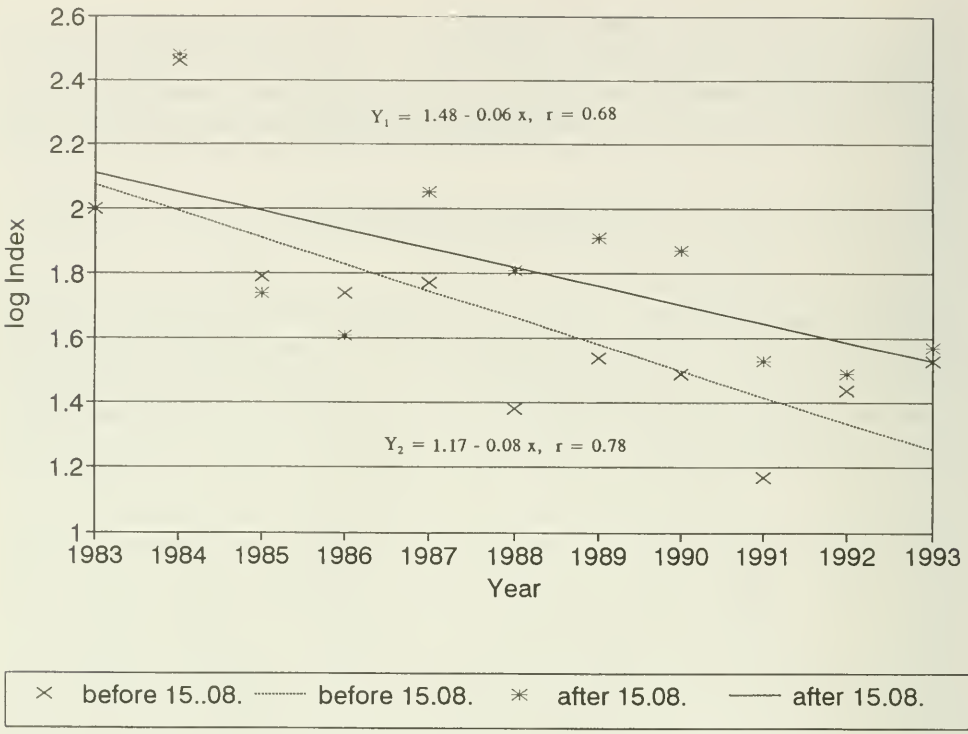

Figure 1. Population change of Sedge Warblers in the study areabetween 1983 and 1993 on the basis of log chain index after (Y_1) and before (Y_2) 15 August, respectively.

1. ábra. A foltos nádiposzáták állományváltozása 1983 és 1993 között az augusztus 15. utáni (Y_1) és előtti (Y_2) fogási eredmények log chain indexe alapján.

Discussion

The reason for a change in the number of birds captured at stopover sites may lie in the alteration of migration strategy (*Langslow, 1978; Gatter & Steiof, 1992*) or in the succession of the actual habitats (*Karcza & Csörgő, 1994*) rather than in an actual population decrease or increase. However, the number of birds captured at resting and feeding sites is proportional to the number of birds that were detected at the same sites by using different observation methods (*Taylor, 1984*). Furthermore, this number mainly depends on the size of the breeding population (*Hussel, 1981; Safriel & Lavee, 1991*). That is the reason why the changing number of migrating population can be used for monitoring, especially if we are familiar with the breeding and wintering sites of migrating populations. *Hjort & Lindholm* (*1978*) proved that the number of Wrens *(Troglodytes troglodytes)* and

Whitethroats *(Sylvia communis)* ringed in autumn show correlation with weather conditions of the previous wintering season and there is a significant correlation between these facts and the change in their numbers. Population changes in the number of Whitethroats during the very same period have been detected in different parts of Europe (*Scott et al., 1976*).

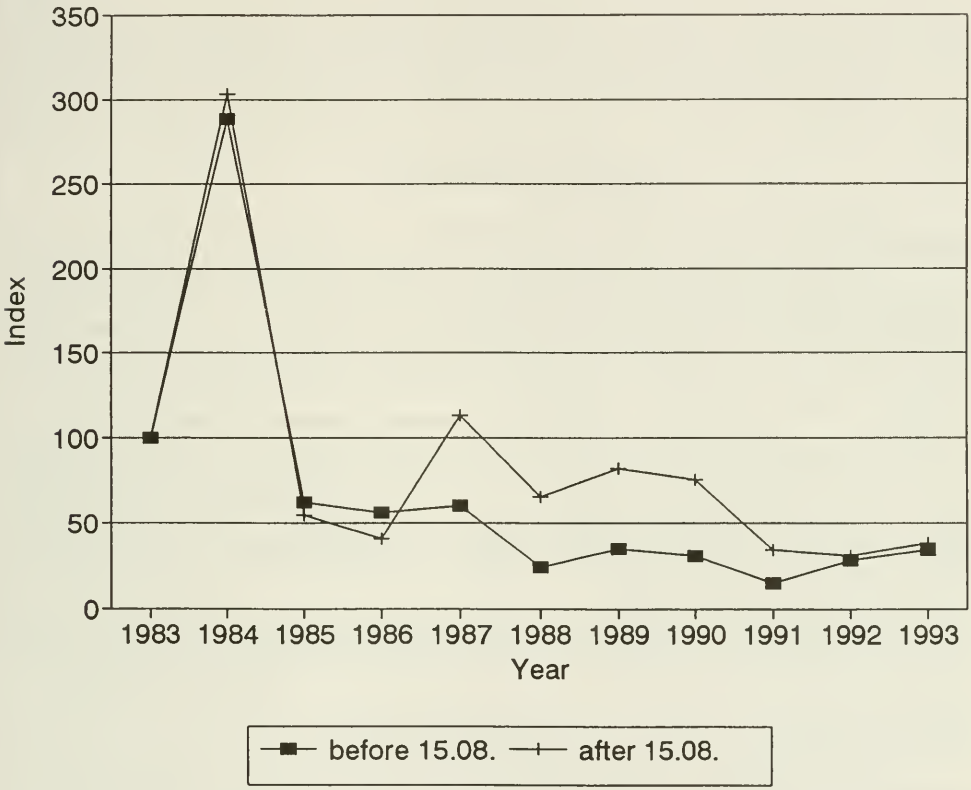

Figure 2. Population change between 1983 and 1993 on the basis of chain index after and before August 15, respectively. Mann-Whitney U-test, z=1.4; P>0.05.

2. ábra. A foltos nádiposzáták állományváltozása 1983 és 1993 között az augusztus 15. utáni és előtti fogási eredmények chain indexe alapján. Mann-Whitney U-test, z=1.4; P>0.05.

Decline in the number of nesting sites and the fact that African wintering sites have become dry led to the decrease of the Sedge Warbler population in Britain in the last 25 years (*Peach et al., 1991*).

The population change of Sedge Warbler in Great Britain mainly depends on the weather conditions of the wintering sites in the western part of Africa (*Peach et al. 1991*).

The proportion of birds surviving the winter is higher after rainy summers, due to the more favourable living conditions in the wintering ground. However, since the mid-sixties following a rainy period in the summer (which has become very rare since then), larger populations could hardly find nesting sites in Great Britain, due to the declining number of wetlnads as a result of agricultural developments.

Our studies show that there has been a decline in the number of Northern and Central European Sedge Warbler populations that migrate through Southern Hungary, similarly to other reed bird populations (*Gyurácz & Bank 1994*). One part of our results, which does not fit into the picture, is the year 1987 when the number of northern populations increased. In Britain and Sweden there was a small increase in numbers in the late 1980s. During this period there was more rain at the African wintering sites than there had been in previous years (*Väisänen, 1989; Peach et al., 1991*).

We hypothesise that the reasons for the decline in numbers in Central Europe are similar to those of Western Europe. In these areas of Europe, a decline in wetland habitats occurred recently (*Waliczky, 1991*). This situation has been made worse by the drought that lasted for more than ten years. We speculate that dry periods may be very frequent at the African wintering sites of Hungarian and those populations that migrate through Southern Hungary.

Before and during migration, Sedge Warblers mainly live on reed aphids *(Hyalopteris pruni)* that live in huge numbers on reeds of deeper waters (*Bibby et al., 1976; Koskimies & Saurola 1989; Ormerod, 1990*). Consequently, the number of birds decrease mainly in dry stopover sites. In a Hungarian ringing camp near a wetland (in the reed beds of Lake Balaton), there has been no significant decline of Sedge Warblers or other passerines detected (*Karcza & Csörgő, 1994*).

In order to follow up any changes in population numbers and in the conservation status of wetland habitats, it is necessary that monitoring surveys will be continued in the future.

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A DÉL-MAGYARORSZÁGON ŐSSZEL ÁTVONULÓ FOLTOS NÁDIPOSZÁTÁK *(ACROCEPHALUS SCHOENOBAENUS)* MONITOROZÁSA

Összefoglalás

A foltos nádiposzáta a vizes, mocsaras élőhelyek gyakori költőfaja Európában, és a vonulási időszakban is kötődik a nádasokhoz. Ezért jó indikátorfajnak tekinthető a vizes élőhelyek állapotváltozását illetően. Vizsgálatainkat 1983–1993 között végeztük az őszi vonulási időszakban a Sumonyi Madárvártán, Dél-Magyarországon. Külön vizsgáltuk az egyes években az augusztus 15.

előtt, illetve után befogott madarak éves egyedszámváltozását, mert augusztus második felében a balti térségből vagy Baltikumból és Dél-Skandináviából származó egyedek vonulnak át nagyobb számban a Kárpát-medencén. A vonulási időszak első, illetve második felében befogott madarak egyedszámát minden évben 900 m^2 hálófelületre és 100 fogási órára átlagoltuk, majd az átlagokból a kezdő év átlagát önkényesen 100 százaléknak véve kiszámoltuk minden évre az állományváltozási („chain") indexet.

A sumonyi nádasokban a foltos nádiposzáta ősszel átvonuló közép-európai és északi populációinak egyedszámai egyaránt csökkenő tendenciát mutatnak a vizsgálati időszak alatt. A két vonulási időszakban tapasztalt egyedszámváltozás nem különbözött szignifikánsan egymástól.

References – Irodalom

Bibby, C. J., Green, R. E., Pepler, G. R. M. & Pepler, P. A. (1976): Sedge Warbler migration and reed aphids. *Brit. Birds* **69**, p. 384–399.

Csörgő, T. & Ujhelyi, P. (1991): Migration strategies of *Acrocephalus* species from an analysis of recapture. In: *Gyurácz, J. (ed.):* The 3rd Scientific Meeting of the Hungarian Ornithological and Nature Conservation Society. Szombathely, p. 11–122.

Dowsett, R.. J., Backhurst, G. C. & Oatley, T. B. (1988): Afrotropical ringing recoveries of Palaearctic Migrants (I. Passerines). *Tauraco* **1**, p. 29–63.

Gatter, W. & Steiof, K. (1992): Ermittlung von Bestandstrends durch Zugbeobachtungen. *Die Vogelwelt* **113**, p. 240–255.

Greenwood, J. J. D., Baillie, S. R., Crick, H. P. Q., Marchant, J. H .& Peach, W. J. (1993): Integrated population monitoring: detecting the effects of deverse changes. *In: Furness, R. W. & Greenwood, J. J. D. (eds.):* Birds as monitors of environmental change. Chapman – Hall, London, p. 267–328.

Gyurácz, J. & Bank, L. (1994): Population dynamics of the migrating birds in autumn migration season from 1983 to 1993. In: Peregovits, L.& Lőkös, L. (eds.): The 3rd Hungarian Ecological Congress. Szeged, p. 60.

Gyurácz, J. & Csörgő, T. (1991): Differences between autumn migration of adult and juvenile birds in four reed warbler *(Acrocephalus spp.)* species In: *Gyurácz, J. (ed.)*: The 3rd Scientific Meeting of the Hungarian Ornithological and Nature Conservation Society, Szombathely 164–171.

Gyurácz, J. Bank, L. (1995): Study of autumn migration and wing shape of Sedge Warblers *(Acrocephalus schoenobaenus)* in South-Hungary. *Ornis Hungarica* **5**, p. 25–32.

Haland, A. & Burkjeland, S. (1982): Distribution and breeding habitat of the Sedge Warbler. Fauna Norv. Ser. C, *Cinclus* **5**, p. 65–72.

Hjort, C., Lindholm, C. & Lindholm, G. (1978): Annual bird ringing totals and population fluctuations. *Oikos* **30**, p. 387–392.

Hussel, D. J. T. (1991): Fall migrations of Alder and Willow Flycatchers in Southern Ontario. *J. Field Ornithol.* **62**(1), p. 69–77.

Karcza, Zs. & Csörgő, T. (1994): Monitoring with Passerines. In: *Peregovits, L. & Lőkös, L. (eds.):* The 3rd Hungarian Ecological Congress, 1994, Szeged. Abstracts of lectures and posters, p. 82.

Koskimies, P. & Saurola, P. (1985): Autumn migration strategies of the Sedge Warbler *Acrocephalus schoenobaenus* in Finland: a preliminary report. *Ornis Fennica* **65**, p. 145–152.

Langslow, D. R.. (1978): Recent increases of Blackcaps at bird observatories. *British Birds* **71**, p. 345–354.

Marchant, J. H., Hudson, R., Carter, S. P. & Whittington, P. (1990): Population Trends in British breeding birds. British Trust for Ornithology/Nature Conservancy Council, Tring.

Ormerod, S. J. (1990): Possible resource partitioning in pairs of *Phylloscopus* and *Acrocephalus* Warblers during Autumn migration through a South Wales reedswamp. *Ringing and Migration* **11**, p. 76–109.

Peach, W., Baillie, S. & Underhill, L. (1991): Survival of British Sedge Warblers *Acrocephalus schoenobaenus* in relation to west African rainfall. *Ibis* **133**, p. 300–305.

Spina, F. & Bezzi, E. M. (1990): Autumn Migration and Orientation of the Sedge Warbler *(Acrocephalus schoenobaenus)* in Northern Italy. *J. Orn.* **131**, p. 429–438.

Safriel, U. N. & Lavee, D. (1991): Relative abundance of migrants at a stopping-over site and the abundance in their breeding ranges. *Bird Study* **38**, p. 71–72.

Scott, B., Cawkell, H. & Riddiford, N. (1976): Dungeness. In: *R.. Durman (ed.):* Bird Observatories in Britain and Ireland, T. & A. D. Poyser, Berkhamsted, p. 94–114.

Taylor, M. (1984): The patterns of migration and partial migration at a north Norfolk bird-ringing site. *Ringing and Migration* **5**, p. 65–78.

Väisänen, R. A., Hildén, O. & Pulliainen, E. (1989): Monitoring of Finnish land bird populations in 1979-88. *Lintumies* **24**, p. 60–67.

Waliczky, Z. (1991): Európai jelentőségű madárélőhelyek Magyarországon. MME, Budapest, p. 7–19.

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