

# Population size and habitat of the Aquatic Warbler *Acrocephalus paludicola* in Hungary

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**Kovács, G. & Z. Végvári 1999: Population size and habitat of the Aquatic Warbler *Acrocephalus paludicola* in Hungary. *Vogelwelt* 120: 121 – 125.**

The population of the Aquatic Warbler in Hungary has been increasing steadily since the first breeding record in 1971. A population increase from 19 singing ♂ in 1971 to 586 singing ♂ in 1997 was observed. The total population is estimated to comprise about 600 singing ♂, which concentrate on the Hortobágy Puszta, the only known breeding area in Hungary. Some possible breeding sites in eastern Hungary have not yet surveyed. The breeding range recently expanded eastwards in the southern part of the Hortobágy National Park. The species prefers larger patches of lowland marsh vegetation, sometimes with no water at all.

**Keywords:** *Acrocephalus paludicola*, population development, population increase, Hortobágy, habitat preferences.

## 1. Introduction

Although the first definite breeding record of Aquatic Warbler in Hungary was in 1971 in the Hortobágy Puszta, there are several claims of breeding from the first half of the 20<sup>th</sup> Century that were not confirmed later or which referred to egg collections lost in the Second World War (SZABÓ 1974). Breeding biology, inter- and intraspecific behaviour, population trends and means for conservation of the Aquatic Warbler were thoroughly studied on the Hortobágy (SZABÓ 1974; LEISLER 1988; KOVÁCS 1994). Although monitoring of the species has been carried out since 1959, this did not include all possible breeding sites (SZABÓ 1974; KOVÁCS 1994), and some large populations are thought not to have been found yet. However, so far no other breeding area was found in Hungary outside Hortobágy (KOVÁCS 1998). In 1996 and 1997 a field study was conducted in the southern part of the Hortobágy in order to identify habitat preferences and population densities.

## 2. Material and Methods

The Aquatic Warbler has been systematically looked for since 1959 in suitable habitat by only a couple of people (SZABÓ 1974, KOVÁCS 1994) up to the early 1980s. Since then, with the increase in the number of Hungarian bird-watchers, it became possible to monitor larger areas with the help of specifically trained people. New breeding sites were found, and it became a special task for the Hortobágy National Park staff and some NGOs to include this species in their yearly monitoring programmes. Censuses by counting singing ♂ (SCHULZE-HAGEN 1989; LEISLER 1988; WAWRZYŃIAK & SOHNS 1977) normally yield the absolute population size, since the breeding habitat is

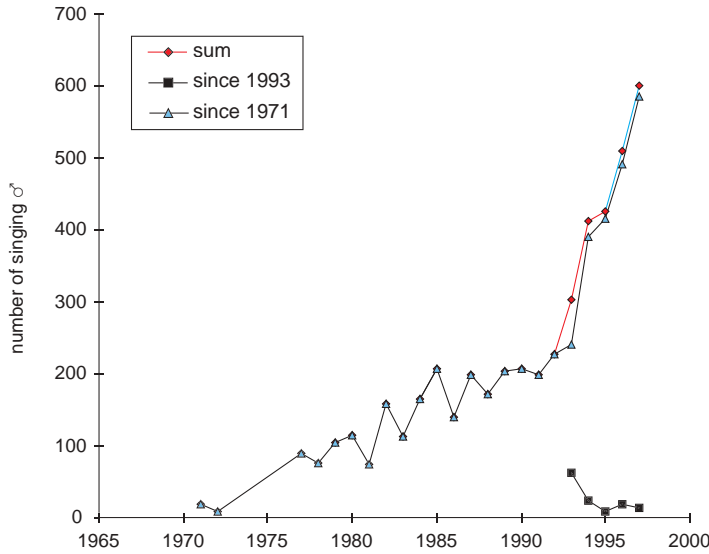
quite patchy and no extrapolation of the number of singing ♂ is necessary.

Singing ♂ have been counted in the 18 most important areas from 1971 onwards and in two more since 1993. Habitat patch sizes in the present study vary between 5 and 99 ha, averaging 23.86 ha. The habitat patches have been occupied for 4 - 26 years (13.85 years on average). Their distance from the first breeding site on the Hortobágy varied between <1 and 26 km (5.78 km on average).

These investigated habitat patches held 65 % (1996) resp. 72% (1997) of the total number of singing ♂ on the Hortobágy. Counts were made at least twice a week during the period 10<sup>th</sup> May - 20<sup>th</sup> June, starting two to one hour before sunset. Size of the occupied area and vegetation type were recorded for each habitat patch. Vegetation type was characterised in terms of plant associations. Table 1 shows the list of plant associations covering 30 % of at least one habitat patch. Each habitat patch is given a single vegetation type category by linking the abbreviations (see Tab. 1.), starting with the most abundant vegetation type followed by the less abundant one. Each category includes only association types covering at least 30 % of the given habitat

**Table 1.** List of plant associations covering at least 30 % of at least one habitat patch of the Aquatic Warbler on the Hortobágy. – *Liste der Pflanzengesellschaften, die mindestens 30 % wenigstens eines vom Seggenrohrsänger in der Hortobágy Puszta besiedelten Habitatfleckens bedecken.*

Plant association	Abbreviation
Agrostetum albae	Ag
Alopecuretum pratensis	Al
Agrostio-Beckmannietum	Be
Bolboschoenetum maritimi	Bo



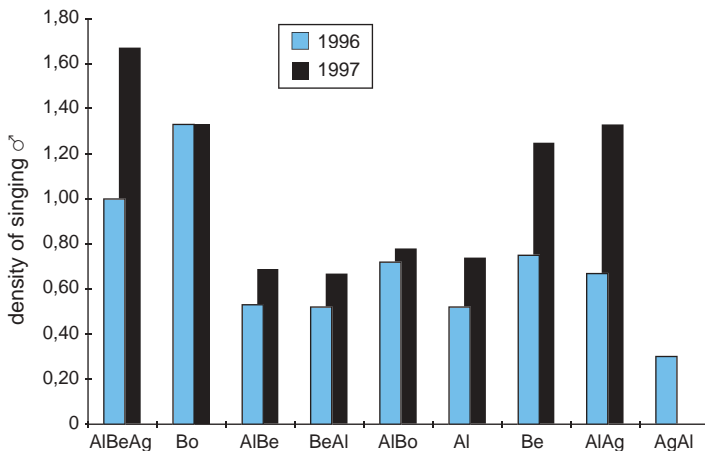
**Fig. 1:** Population trend of the Aquatic Warbler in Hungary in areas monitored since 1971 and 1993. – *Bestandsentwicklung des Seggenrohrsängers in Ungarn in Gebieten, in denen der Bestand seit 1971 bzw. 1993 alljährlich erfaßt wurde.*

patch. In this way 9 categories were found: Al; AlAg; AlBe; AlBeAg; AlBo; AgAl; Be; BeAl; Bo. Additional variables are the density of singing ♂, number of years between 1971 and the year of the first occupation of the habitat patch, duration of occupation in years and distance from the first breeding site.

### 3. Results

#### 3.1. Distribution

In Hungary, according to presently available information Aquatic Warblers breed exclusively on the Hortobágy, but some other potential sites, mostly in Eastern Hungary, have not yet been surveyed. Distribution on the Hortobágy is shown in Fig. 4. The population is concentrated in the southern, strictly protected part of the Hortobágy National Park.



#### 3.2. Population trend and habitat changes

The population trend (number of singing ♂) is shown in Fig.1. The first breeding site of the Aquatic Warbler, where the highest population densities are found up to now (see map, Fig. 4), is located in a marsh that is used as an emergency reservoir in case of large floods in the river Tisza. The first significant increase in the number of singing ♂ was observed in 1977 after a large flood in early spring. This year was followed by rather rainy years up to 1982, a period in which the population steadily increased with some fluctuations. The next seven years up to 1989 were dry, and the population increased more slowly with larger fluctuations. In the period 1990 and 1994, when there was an unusual drought with the exception of 1991, the population increased strongly with no fluctuation at all. This trend continued up to 1997, regardless of whether years were dry (1995) or very rainy (1996-1997). Decreases occurred only locally, e.g. in the easternmost population that was found and monitored since 1993, where the habitat was burnt down in the summer of that year.

The number of singing ♂ are stable or increasing especially in areas flooded artificially early in the spring (KOVÁCS 1994). The population increased very quickly in areas where mowing was stopped (KOVÁCS 1994).

#### 3.3. Habitat preferences and densities

##### 3.3.1. Effects of habitat patch size and duration of its occupation

In 1996, out of a total of 331 singing ♂, 2-70 (16.55 on average) were found per habitat patch, while in 1997 out of a total of 423 ♂, 0 to 80 (21.15 on average) were singing per habitat patch. Density of ♂ varied between 8 and 13.3 ♂/10 ha in 1996 (6.2 on average) and between 0 and 20 ♂/10 ha (average 8.2) in 1997.

**Fig. 2:** Density of singing ♂ in various vegetation types 1996-1997. Abbreviations see Table 1. – *Dichte singender Seggenrohrsänger in verschiedenen Vegetationstypen (vgl. Tab. 1 und 2) in der Hortobágy Puszta 1996-1997.*

**Table 2:** Correlations between habitat variables and population characteristics. – *Korrelationen zwischen Habitatvariablen sowie Anzahl und Dichte singender Seggenrohrsänger in den einzelnen Habitatflecken der Hortobágy.*

Variables	Habitat patch size		Years between 1971 and first occupation		Years of occupation		Distance from first breeding site	
	1996	1997	1996	1997	1996	1997	1996	1997
no. of singing ♂	0.6701**	0.7028**	-0.1382	-0.1984	0.1382	0.1984	-0.1788	-0.2944
density	-0.1361	-0.1596	0.1338	0.0521	-0.1338	-0.0521	0.0842	-0.1049

\*\* p < 0.01, n=20

Table 2 shows correlations between the number of singing ♂, ♂ density, and habitat patch size, years between the first breeding record on the Hortobágy and the first occupation of the area, duration of occupation, and distance from the first breeding site. A significant correlation was found only between the number of ♂ and the size of the habitat patch. The number of singing ♂ did not correlate significantly with the distance from the first breeding site, although sites further away tended to hold fewer ♂. No correlations were found between habitat variables and ♂ density. However, larger breeding sites tended to have lower densities.

### 3.3.2. Effects of vegetation type

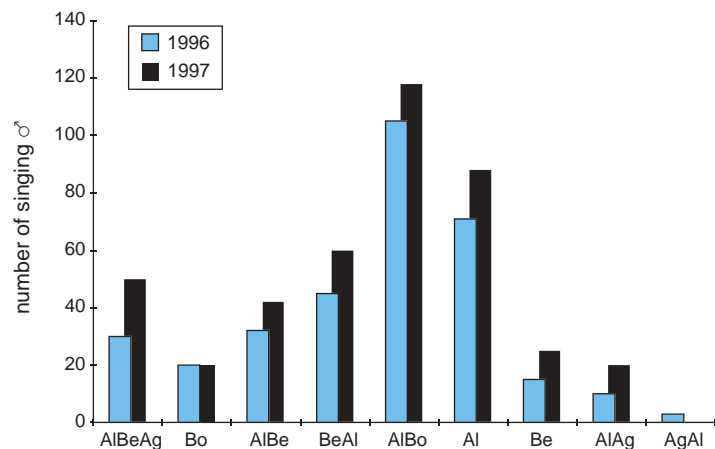
Density of singing ♂ in different vegetation types are shown in Fig. 2. The highest density was in Bo in 1996, while in 1997 it was in AlBeAg. The lowest density in 1996 as well as in 1997 was found in AgAl. Figure 3 shows the number of singing ♂ in different vegetation types. It was in AlBo, where most ♂ were found both in 1996 and in 1997. Lowest numbers in 1996 and in 1997 were found in AgAl and Bo, respectively. In vegetation types, where Al is dominant (71% of total study area), 75 % of the singing ♂ were found in both years.

## 4. Discussion

### 4.1. Distribution

Although there is no evidence for breeding Aquatic Warblers in Hungary outside Hortobágy, the recent discovery of some small populations indicates that the species is easily overlooked. Possible areas include large parts of eastern Hungary. Populations on the Hortobágy concentrate around the first breeding site

**Fig. 3:** Number of singing ♂ in various vegetation types 1996-1997. – *Verteilung der absoluten Zahl singender Seggenrohrsänger auf verschiedene Vegetationstypen (vgl. Tab. 1 und 2) in der Hortobágy Pusztá 1996-1997.*

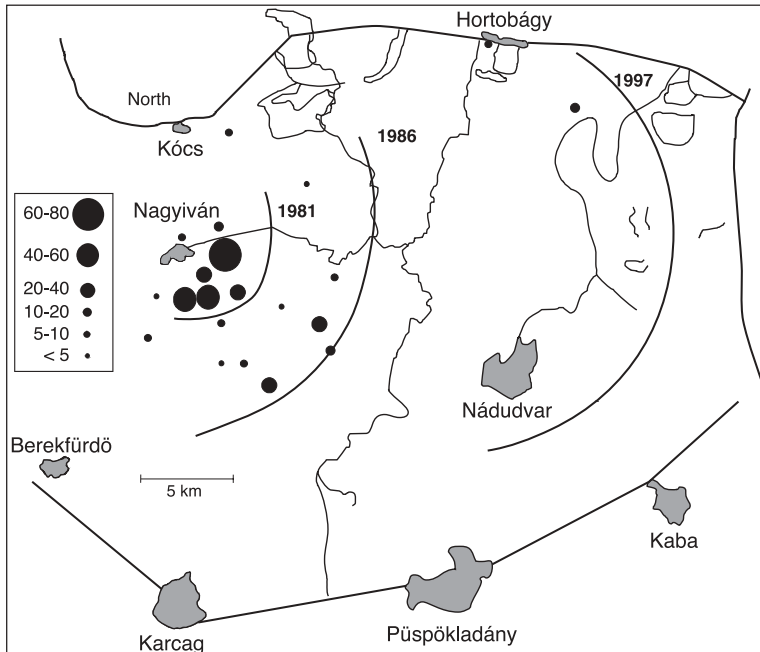


with some satellite populations in the south-eastern part of the Hortobágy.

### 4.2. Effects of habitat changes on the population trend

According to aerial photos, marshland vegetation was very short in the middle of the century, perhaps due to the more intensive pastoral use of the Hortobágy, while it is generally undergrazed nowadays (MOLNÁR 1997). Although changes in habitat structure have not been studied in the area, it could be a very important factor for the increase of the Aquatic Warbler population. Vegetation types found in the present study are the same that have been observed at the first breeding record (SZABÓ 1974).

Water level does not seem to play an important role in the habitat preferences of the species, since it was quite often found breeding in dry grassland vegetation (KOVÁCS 1994). In addition, Aquatic Warbler showed a very strong population increase in unusually dry years (1992-1994). According to some authors, the Aquatic Warbler's tolerance of rather dry habitats can be explained by the avoidance of interspecific competition with Sedge Warbler *Acrocephalus schoenobaenus*. The latter, more aggressive, species prefers higher water levels (SZABÓ 1974; LEISLER 1988; KOVÁCS 1994).



**Fig. 4:** Map of distribution, progression of occurrence (lines with year indicate distributional limits) and number of singing ♂ Aquatic Warblers on the Hortobágy. – Karte von Verbreitung, Ausbreitungsgrenzen (Linien mit Jahreszahlen) und Anzahl singender ♂ des Seggenrohrsängers in der Hortobágy Puszta.

### 4.3. Nature conservation

In order to maintain high water levels up to the end of the first brood of Aquatic Warbler (as well as for other species), most important habitats are flooded artificially. This means is also effective against uncontrolled mowing. In some areas, where cutting has been prohibited to improve the habitat for Aquatic Warbler, its population started to increase rapidly (KOVÁCS 1994). As a rule of thumb, in Aquatic Warbler habitats mowing is postponed up to July to let the

birds finish breeding in safety. In some cases fires have damaged important breeding sites, so fire control plays an important role in the nature conservation fieldwork of the National Park. Habitat restoration projects of the Hortobágy National Park concentrate on wetlands, with special regard to Aquatic Warbler, which is a strictly protected species in Hungary and which breeds only in the strictly protected zone of the National Park.

## 5. Zusammenfassung

**Kovács, G. & Z. Végyvári 1999: Bestand, Bestandsentwicklung und Habitatwahl des Seggenrohrsängers *Acrocephalus paludicola* in Ungarn. Vogelwelt 120: 121 – 125.**

Seit dem ersten Brutnachweis 1971 hat der Bestand des Seggenrohrsängers in Ungarn beständig zugenommen. Es wurde ein Bestandszuwachs von 19 singenden ♂ 1971 auf 586 singende ♂ in 1997 beobachtet. Der ungarische Gesamtbestand von aktuell etwa 600 ♂ konzentriert sich in der Hortobágy Puszta, dem einzigen bekannten Brutgebiet in Ungarn, wengleich einige weitere mögliche Brutgebiete in Ostungarn bisher nicht untersucht wurden. Das Brutgebiet der Art hat sich im Verlauf der beschriebenen Zeitperiode im südlichen Teil des Hortobágy Nationalparks nach Osten ausgedehnt. Die Art bevorzugt größere Flecken von Niedermoor-

Sumpflvegetation, die manchmal überhaupt kein anstehendes Wasser aufweisen. Die besiedelten und bevorzugten Vegetationstypen werden beschrieben (Tab. 1 und 2, Abb. 2 und 3). Die Zunahme des Seggenrohrsängers in Ungarn ist in wesentlichen Teilen auch auf speziell auf die Art ausgerichtete Managementmaßnahmen der Nationalparkverwaltung zurückzuführen: Reduzierung der Beweidungsintensität, Herausögern des Beweidungsbeginns auf Mitte Juli, künstliche Überflutung der Habitate im zeitigen Frühjahr, dadurch auch Vermeidung von ungewollter/unkontrollierter Mahd zur Brutzeit.

## 6. References

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