Ann. Zool. Fennici 21:239-242. 1984

Polygyny in Blyth's Reed Warbler Acrocephalus dumetorum

Pertti Koskimies

Koskimies, P. 1984: Polygyny in Blyth's Reed Warbler Acrocephalus dumetorum. — Ann. Zool. Fennici 21:239-242.

The breeding ecology of a colour-ringed population of Blyth's Reed Warbler has been studied in Lappeenranta, SE Finland, since 1978. Nearly all nests were found and inspected daily from building to fledging. Polygyny was observed in a single year in a luxuriant meadow optimal for the species. One of the three polygynous males paired with two, another with three conspecific females; the third male paired with a conspecific and a female Marsh Warbler *Acrocephalus palustris*. Polygyny was polyterritorial and successive. The number of young that left the nest was over twice as large in polygamous as in monogamous males.

Polygyny in other European *Acrocephalus* warblers is briefly discussed. In one species with small territories it was reported as being polyterritorial, in two other species with large territories as being monoterritorial. The breeding success of polygynous males in one species was better, in another less good than among monogamous males. Some evidence was found that females select males with optimal territories.

Pertti Koskimies, Department of Zoology, University of Helsinki, P. Rautatiek. 13, SF-00100 Helsinki 10, Finland.

1. Introduction

Monogamy is the most common mating type in birds but, according to a now 15-year-old estimation, about 5 per cent of the European passerines are known to be polygynous (von Haartman 1969). Occasional polygyny is recorded in many other well-studied passerines. There is no sharp boundary between regular and occasional polygyny. Besides, natural selection favouring polygyny may increase or decrease e.g. with man-made changes in the environment or with the expansion of species into new breeding areas and habitats.

In the New World many of the polygynous species inhabit some kind of marshes (e.g. Orians 1980). In Europe, polygyny in habitats of this kind seems to be less largely spread than among hole-nesting species (von Haartman 1969). The *Acrocephalus* warblers are abundant breeding species of eutrophic lakes, marshes and half-open bushy meadows. Polygyny is known to be regular in two of the eight European species, the Great Reed Warbler *A. arundinaceus* (Kluyver 1955, Peltzer 1972, Dyrcz 1977, Beier 1981) and the Aquatic warbler *A. paludicola* (Catchpole 1980). Occasionally polygyny is found in the Reed Warbler *A. scirpaceus*, Sedge Warbler *A. schoenobaenus*, and Marsh Warbler *A. palustris* (Dowsett-Lemaire 1979).

Blyth's Reed Warbler *A. dumetorum*, a close relative of the Marsh Warbler, is one of the least studied European passerines, perhaps due to its restricted breeding range (Koskimies 1980). I have studied the ecology of the species in SE Finland since 1978, and have found three cases of polygyny. In the following text I will present my observations and briefly discuss polygyny in the genus.

2. Study area and methods

My study area lies in SE Finland, near the town of Lappeenranta (61° 03′ N, 28° 13′ E). The study area is about 12 km², of which the habitats suitable for the warblers cover about 4 km². The most frequently used habitats of the warblers are abandoned fields and pastures, forest edges, road sides, and yards with scattered bushes and small trees (*Salix, Alnus, Betula, Prunus*) 2-7 m high, and the luxuriant understorey of *Rubus idaeus, Urtica dioica, Epilobium angustifolium, Filipendula ulmaria,* and *Aegopodium podagraria.*

The males arrive in late May or early June, usually a few

days before the females. The territories were found by listening for the song at night. Soon after arrival the males were trapped and colour-ringed individually and most of the females were mist-netted when feeding young.

After pairing the song ceases completely. Almost all nests were found, most of them during the building phase. The nests and territories were inspected daily. The number of breeding pairs fluctuated annually from 26 to 44.

3. Results

During the study years (1978-83) I found polygyny in only one summer, 1981, when three polygynous males nested in the same meadow. This lush and bushy meadow, c. 5 ha large, seems to represent the optimal breeding habitat of the species in SE Finland. The number of breeding males in this meadow was 1979: 5, 1980: 6, 1981: 12, 1982: 4, and 1983: 7. The density of 1981, 2.4 males or 3.2 pairs per ha, is the highest I ever recorded.

The polygynous males mated as follows: (1) with two female Blyth's Reed Warblers, (2) with three female Blyth's Reed Warblers, and (3) with one female Blyth's Reed Warbler and one female Marsh Warbler. In every case polygyny was successive and polyterritorial (Fig. 1); normally the diameter of the territory is only 15-30 metres.

As polygyny has not been recorded previously in the species, and as all cases were different, I will present them in some detail. As far as I know, the third case is the first one with a polygynous bird having two females of separate species.

(1) The male was heard singing for the first time on the afternoon of 28 May and for the last time in the evening of 31 May. The female built her nest (1 a in Fig. 1) during the five following days and laid the first egg on 6 June. All 6 eggs produced fledglings.

In spite of daily visits, I did not hear the male singing later in the first territory, but on 15 June it accompanied a new female about 90 m from the first nest. The building of the nest (b) of this second female was started apparently two days earlier, and finished on 16 June, when the first of the 6 eggs was laid. All eggs hatched but the youngest nestling died on 9 July, at the age of 7 days. The male assisted his first female in incubating and feeding, his second female incubated and fed her young unaided.

(2) The male arrived in the night 25—26 May, and was heard singing for the last time three days later. The nest (territory A, nest a,

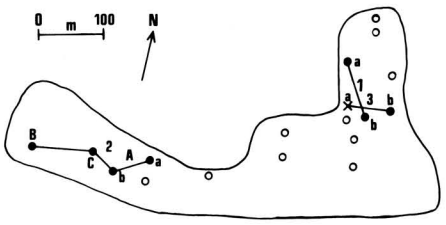

Fig. 1. The distribution of Blyth's Reed Warbler nests in a meadow in Lappeenranta 1981. — o = a nest of monogamous male, • = a nest of polygynous male (1-3), × = a nest of mixed dumetorum-palustris pair.

Fig. 1) was built 30 May - 1 June and laying began on 2 June. Because of strong winds on 11 June the nest, which was built in *Aegopodium*, slanted, and 3 of the 6 eggs fell out. After this, the female (F1) abandoned the nest. The male began again to sing here on the 12 June, continuing on the 13 June. C. 50 m from the first nest (A:a) F1 built a new (A:b) between 13 and 16 June. On the 17 June she started laying. Three of 4 young hatched, the smallest of which died soon afterwards.

Meanwhile, on 4 June male (2) sang about 40 m from nest A:a. Surprisingly, I saw him accompanying another female (F2) about 150 m from nest A:a in the opposite direction. Later F2 built alone until 8 June (nest B). In the morning of 9 June she laid her first egg. One of the eggs failed to hatch but the others produced fledglings.

On 10 July, between nest A:b and the B-nest, I found an intensively warning pair of Blyth's Reed Warbler, the male being male (2). The birds were feeding six large nestlings in the nest C. Judging from the age of the young, laying had commenced c. 13 June. The male assisted in incubating and feeding in the B nest, and fed the young in the C-nest. According to short period observations it did not aid the female in the repeat nest A:b.

(3) The third polygynous male was heard singing for the first time in the evening of 3 June. Next morning I saw it with a female Marsh Warbler (the identification was confirmed in the hand). It should be noted, that I have found mixed pairs between *A. dumetorum* and *palustris* regularly in my study area (Koskimies 1980 and unpubl.) She built her nest (3a) 4-8 June, and started to lay on 8 June. When I measured the eggs, one of them broke, but the other 4 hatched.

On 5-9 June the male sang c. 50 m from this nest. A female Blyth's Reed Warbler built a nest (b) in this territory during the 3 following days, but abandoned it after that. A repeat nest was built on 13-16 June. Commencing 17 June the female laid 5 eggs, which all hatched. The nestlings disappeared on 8 July, probably taken by a predator, after which the female abandoned the meadow.

The male assisted in incubating both clutches, until the first one hatched (that of the Marsh Warbler), after which he assisted in feeding these young, while the secondary female incubated and fed the young unaided until the nest was robbed.

The average number of young that left the nest (unable to fly, as typical of *Acrocephalus* was higher in polygamous than in monogamous males in the very same meadow (Table 1, the nesting success was calculated by Mayfield's (1961) method). In this single-brooded species the maximum number of nestlings of a monogamous male is 6.

Incubation lasted on the average 1 day longer in the nests of polygamous than in those of monogamous males (Table 1), partly due to long incubation periods (13.5 and 14.5 days) in nests where the female incubated unaided. The nestling periods in these nests lasted 11.5 and 9.5 days, respectively. The wing length and weight grew slightly slower in broods fed by unaided females than in broods fed by both mates (Fig. 2).

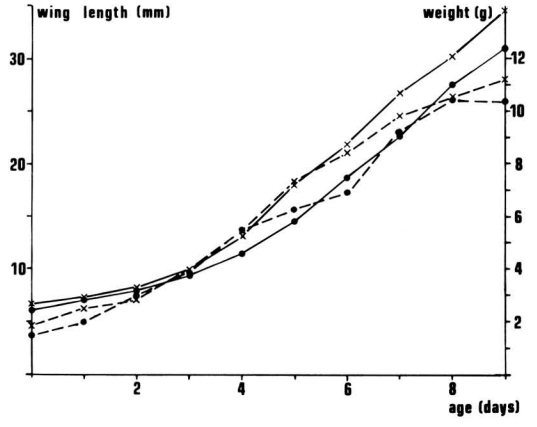

Fig. 2. The average growth of Blyth's Reed Warbler nestlings in two nests of the polygynous male number 1. — Continuous line = wing length, broken line = weight, × = both the male and female feeding, • = only the female feeding.

Table 1. Breeding biology of monogamous (n = 7) and polygynous (n = 3) males in a meadow optimal for the species in Lappeenranta in 1981.

	Monogamous	Polygynous
Breeding success (%)	66.8	62.8
Number of fledglings (mean ± *SD*)	3.9 ± 2.4	9.3 ± 4.7
Incubation period (mean ± *SD*, days)	12.6 ± 0.6	13.8 ± 0.8
Nestling period (mean ± *SD*, days)	10.0 ± 0.4	10.5 ± 0.8

4. Discussion

The most important feature of the territory of Blyth's Reed Warbler (as well as of the Marsh Warbler) is a dense ground vegetation hiding the nest and bushes supplying part of the food. This feature was eminently characteristic of the meadow where polygamy took place. The vegetation of the meadow is very homogenous and the territories of Blyth's Reed Warbler did not differ much in quality.

The territory of the species is quite small and the male defends it only during the beginning of the breeding season. As the song ceases completely after pair formation, its main function is probably the attraction of a female. In order to become polygamous the male must begin to sing again after he has mated his primary female. The male accompanies the building female 3-5 days after pairing and copulates with her during the laying period but he is otherwise "free" to mate a new female.

Actually, I have found biterritorial males every summer in my study area but, perhaps due to shortage of unmated females, they have not obtained another mate. The proportion of unmated males varied annually between 30 and 40 per cent. Why then do some males obtain extra females? One reason for polygyny in 1981 may have been the high density of males in the meadow in question. All the time some males were singing and attracting females to the site. In a semi-colony the female's chance of selecting a fit mate is obviously increased. The optimal habitat itself, of which the concentration of males testifies, may attract females by providing food and shelter.

Blyth's Reed Warbler has expanded into Finland since the 1930s (von Haartman et al.

1963-72). The species has invaded luxuriant bushy meadows, the bird communities of which seem to be quite poor in spite of the seemingly rich insect production. In the future, with advancing expansion and growing population density, the increasing female/male ratio may increase the chances of the males to become polygynous. Even in a cool and rainy summer like 1981 the female was able to raise a brood alone, at least in a favourable habitat. Because of small territory size there is enough space for secondary territories.

5. Polygyny in other Acrocephalus species

In *Acrocephalus* species breeding in marshes, lack of breeding space rather than of food more frequently is the limiting ecological factor, because insect production is high and continuous (e.g. Orians 1980). However, breeding facilities differ between the territories. The food production in marshes is probably higher than that in dry meadows and this may explain the evolution of polygamy of bird species in the former, but not in the latter (*Anthus, Alauda*, etc.) habitat.

The polygamy of the Great Reed Warbler is simultaneous and monoterritorial (Kluyver 1955, Peltzer 1972). According to Dyrcz (1977) in Poland 12% of its nests belonged to polygynous males. The females of polygynous males built their nests in the same territory, very close to each other. The nests of polygynous males were usually near bushy feeding areas. The breeding success of polygynous males was higher than that of monogamous ones but the success of females of polygynous and monogamous males was of the same order.

Another *Acrocephalus* species regularly polygynous is the Aquatic Warbler (Catchpole 1980). Males defend large territories, and there is some evidence that those with territories of superior quality attract more females.

In the Marsh Warbler Dowsett-Lemaire (1979) found 5 cases of biterritorial bigyny. The breeding success of bigynous males was lower than that of monogamous males, which, if a more general phenomenon, should tend to eliminate polygyny. Some of the males took part in incubation, others did not. In Belgium 15% of the male Marsh Warblers were biterritorial.

References

Beier, J. 1981: Untersuchungen an Drossel- und Teichrohrsänger (Acrocephalus arundinaceus, A. scirpaceus): Bestandsentwicklung, Brutbiologie, Ökologie. — J. Ornithol. 122:209-230.

Catchpole, C. 1980: Sexual selection and the evolution of complex songs among European warblers of the genus Acrocephalus. — Behaviour 74:149-165.

Dowsett-Lemaire, F. 1979: The sexual bond in the Marsh Warbler Acrocephalus palustris. — Gerfaut 69:3-12.

Dyrcz, A. 1977: Polygamy and breeding success among Great Reed Warblers Acrocephalus arundinaceus at Milicz, Poland. — Ibis 119:73-77.

von Haartman, L. 1969: Nest-site and evolution of polygamy in European Passerine birds. — Ornis Fennica 46:3-12.

von Haartman, L., Hildén, O., Linkola, P., Suomalainen, P. & Tenovuo, R. 1963-72: Pohjolan linnut värikuvin: — 1092 pp. Otava, Helsinki.

Kluyver, H. 1955: Das Verhalten des Drosselrohrsängers, Acrocephalus arundinaceus (L.), am Brutplatz mit besonderer Berücksichtigung der Nestbautechnik und der Revierbehauptung. — Ardea 43:1-50.

Koskimies, P. 1980: Breeding biology of Blyth's Reed Warbler Acrocephalus dumetorum in SE Finland. — Ornis Fennica 57:26-32.

Mayfield, H. F. 1961: Nesting success calculated from exposure. —Wilson Bull. 73:255-261.

Orians, G. 1980: Some adaptations of Marsh-nesting blackbirds. — 296 pp. Princeton University Press, Princeton.

Peltzer, R. 1972: Notes on the polygamous behaviour of Acrocephalus arundinaceus. — Proc. 15th Int. Ornithol. Congr. The Hague, 1970:676-677. Leiden.

Received 10.VIII.1983
Printed 16.XI.1984