

Vocalizations of female Great Snipe *Gallinago media* at the lek

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Received 17 December 1993, accepted 15 February 1994



The occurrence of loud vocalizations by female Great Snipe *Gallinago media* is reported for the first time. Such female loud calls were easily distinguished in the field from the male vocalizations. The female behaviour associated with the vocalizations resembled male display postures. Sonagrams show a structural resemblance with part of the male display call. The female loud call consisted of short notes with a large frequency spectrum repeated 18–27 times in 1 to 1.5 seconds. In 1992 a total of 96 female loud calls were heard at three leks in central Norway, including 63 at a single lek. Loud calls were heard from 22 May to 7 June, and the median date was 25 May. Loud calls occurred throughout the night from 23.20 to 02.51 h, with a peak around 02.00 h (summertime). Loud female vocalization seems to be a regularly occurring behaviour pattern for Great Snipe. Other female vocalizations heard on Great Snipe leks included flight calls, “walk calls” and faint postcopulatory calls.

1. Introduction

Loud female vocalizations during the breeding season are reported for a few avian species (Montgomerie & Thornhill 1989), but appear to be rare. This paper reports on another species, in which females utter loud calls during the breeding season.

The Great Snipe *Gallinago media* is a Eurasian wader with a classical lek-breeding mating system (e.g. Höglund 1989). The males gather at night on arenas where up to 30 males (even more in the last century, e.g. Rohweder 1891) defend adjacent territories of about 100 m² in size (Höglund & Lundberg 1987). Several authors have reported on the behaviour of Great Snipes at their leks (Söderberg 1832, Gadamer 1858, Rohweder 1891, Swanberg 1965, Ferdinand 1966,

Ferdinand & Gensbøl 1966, Lemnell & Larsson 1967, Spjøtvoll 1973, Lemnell 1978, Avery & Sherwood 1982, Höglund & Lundberg 1987, Höglund 1989, Müller & Königstedt 1989, Höglund et al. 1990a, Höglund & Robertson 1990, Höglund et al. 1992, Fiske & Kålås in press, Fiske et al. in press). The males are known to perform energy-demanding (Höglund et al. 1992) vocal displays on their territorial grounds. These display calls may be of importance in female mate selection (Höglund & Lundberg 1987). However, in neither the papers cited above, nor in the standard ornithological reference works (Glutz von Blotzheim 1977, Cramp & Simmons 1983) are there any mentions that also the females utter loud vocalizations while at the lek. I here describe the occurrence of such behaviour at leks in Norway.

2. Methods

Observations of the behaviour of Great Snipe were done at three leks near Kongsvoll (62°17'N, 9°36'E), Dovrefjell, central Norway in May–June (July) 1987–1993. The study area is described in Pedersen et al. (1983) and Løfaldli et al. (1992). The birds were observed from elevated (1.75 m) hides erected at the leks. Birds were caught each year, using mist-nets, and each individual bird was given a unique code of colour rings. Birds were sexed according to bill length (Höglund et al. 1990b). Since Great Snipes gather at night, torches were used to locate and identify birds early in the season. Female loud calls (hereafter referred to as “calls” or “vocalizations”) were heard in all years, but data were systematically collected only in 1992. Only the data from lek Hestesletta will be presented in detail here, because the other two leks (lek Armodshø and lek Bjørkerekka) were either not visited each night, or were insufficiently covered. At Hestesletta, a total of 30 males were observed in 1992, including 22 resident males (observed on at least five nights).

Hestesletta was visited by observers each night from 22 May to 13 June, as well as on 13 and 18 May and 19, 20, 24, 25 and 29 June. Observations were made from 23.00 h in the evening until 03.00 h in the morning (summertime). Each time a female call was heard, the observers recorded the time of day, and attempted to locate the female, and note her identity.

Female Great Snipe are known to be difficult to observe on the leks due to their cryptic behaviour (Lemnell 1978) and thus it was not possible to locate or identify every vocalizing female. Because of this, and because most of the females seen were unmarked, it was generally not possible to know exactly how many individual females made calls, or how many calls any one female made per night. In many cases, however, it was possible to follow the movements of several individual females simultaneously for some length of time. Therefore it was at least possible to state the minimum number of different females that uttered calls on a night. To estimate the total number of individual females uttering calls at Hestesletta in 1992, I calculated the sum of the minimum numbers of different females uttering

calls per night. This number is probably biased in two ways: the same female could have made calls on several nights, and thus have been counted more than once; and the true number of different individuals uttering calls on any night could have been higher. The minimum number of calls per female per night is also biased due to the disappearance and reappearance of individuals not known to be identical, and is therefore an underestimate.

One tape-recording of a female call was made in 1991 and six in 1993 (of one female), using a Sony TCD-5 Pro tape-recorder and an AKG directional microphone. The strophe-length of the recorded calls were measured on a Kay DSP 5500 Sonagraph, to the nearest 0.001 s.

The possibility of female vocalizations being abnormal male display call can be ruled out, because several individually marked females were seen to utter the vocalization. Most males were also individually marked, and despite over 1000 hours of observation at the leks (1987–1993) males were never observed uttering the loud call I describe in this paper. In addition, some of the unmarked females which uttered calls were seen to copulate with a male. Homosexual mounting has never been observed in this species.

3. Results

3.1. Description of the female loud call

A typical female loud call is shown as a sonagram in Fig. 1a. The sound can be described as a fast “gek-gk-gk-gk-gk-k-k-k”. When performing this vocalization, a female stood up, raised her breast, uttered the sound and quickly lay down again. Unlike the males, females did not usually spread their white tails or raise their heads during the vocalization. However, females were seen on a few occasions to spread their tails, both during vocalization and when not uttering calls. In the field I have not been able to notice (by ear) any individual differences in the sounds made by the females, apart from a few cases of unfinished (“half”) calls (one in 1991, one in 1992 and two in 1993). However, recordings of six calls uttered by a female on 25 May 1993 and the one on 6 June 1991 (used to produce Fig. 1a) reveal some

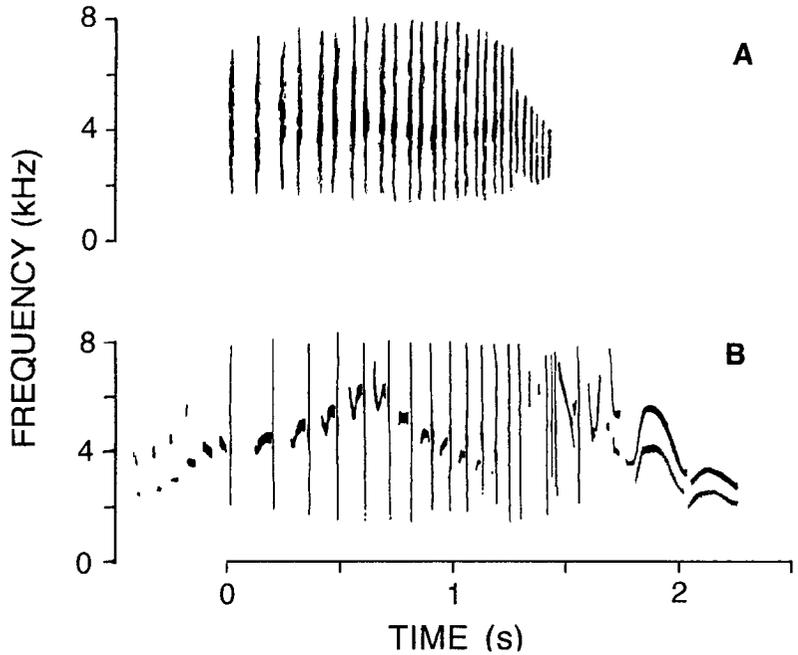


Fig. 1. (A) Sonogram (wideband) of a female vocalization (loud call) recorded at lek Hestesletta on 6 June 1991. (B) Sonogram (wideband) of a typical male vocalization. “Click-notes” can be seen as vertical bars. Between and before the “click-notes” are seen “melodic notes”. The “whistle” is the large frequency modulated structure at the end.

variation. The strophe-length varied from 1.034 to 1.544 s in the 1993 recordings ($\bar{x} = 1.3$ s, $SD = 0.177$, $n = 6$) and was 1.447 s in the 1991 recording. The number of “notes” (vertical bars in Fig. 1a) varied from 18 to 27 in the 1993 recordings ($\bar{x} = 22.5$, $SD = 3.15$, $n = 6$, which is $\bar{x} = 17.31$ notes s^{-1} , $SD = 0.42$) and was 27 (18.66 notes s^{-1}) in the 1991 recording.

3.2. Occurrence

In 1991, 26 female calls were heard on two leks (21 at Hestesletta and five at Armodshø), but the vocalizing females could be located in only eight of these cases. In 1992 a total of 96 calls were heard on three leks, including 50 cases where the females involved were seen. At Hestesletta, 63 calls were heard of which 36 were seen. At Armodshø, 25 calls were heard (13 seen) and at Bjørkerekka, eight were heard (one seen). In 1993, 50 calls were heard (22 seen) at Hestesletta and 13 at Armodshø (four seen). The following data refer to Hestesletta, in 1992. Loud calls occurred from 22 May to 7 June, with a median date of 25 May (see Fig. 2). The mean number of calls made per night on nights when females were

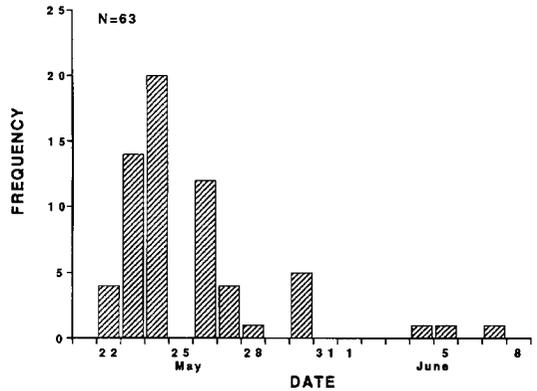


Fig. 2. Distribution of female loud calls per night at lek Hestesletta in 1992. No records for 25 May due to poor observational conditions. (At lek Armodshø, calls were heard as early as 20 and 21 May 1992.)

present was 2.62 ($n = 24$ nights, $SD = 5.26$, range 0–20), and the mean number of calls per present female per night was 0.31 ($SD = 0.57$, range 0–2.33). Considering only those nights on which female calls were recorded, the mean was 6.3 calls per night ($n = 10$ nights, $SD = 6.7$, range 1–20), and the mean number of calls per present female per night was 0.754 ($SD = 0.68$, range

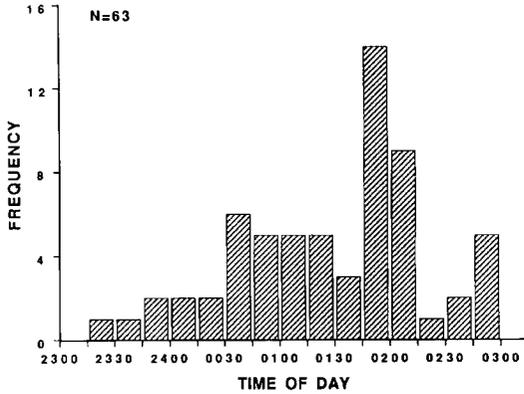


Fig. 3. Distribution of female loud calls according to time of day (sumvertime) at lek Hestesletta in 1992.

0.1–2.33). The total number of different females uttering calls was estimated to be 19. The average minimum of different females uttering calls per night (on nights with calls) was 1.9 ($n = 19$ females, 10 nights, $SD = 1.3$, range 1–5). Each vocalizing female made a minimum average of 2.0 calls per night ($n = 17$ females, 34 calls, $SD = 1.77$, range 1–8). Two calls had to be excluded since the identity of the female was uncertain). Female calls occurred throughout the night from 23.20 to 02.51 h (sumvertime), with a peak around 02.00 h (Fig. 3).

3.3. Other female vocalizations at the lek

On several occasions, almost every night, sounds reminiscent of the Woodcock *Scolopax rusticola* ("oort") have been heard to be made by flying Great Snipes at the leks (pers. obs.). This sound has never been heard to be made by birds known to be males, but several times by birds known to be females. Lemnell & Larsson (1967) mention this "oort" sound uttered by birds in flight, but, as I believe, erroneously thought it was made by males. More rarely, calls (see Fig. 4) reminiscent of the flight call have been uttered by females on the ground. At least sometimes, these calls were given by females walking slowly around at the lek. These calls appear to be less loud, but otherwise resembles the flight calls. Recordings of a

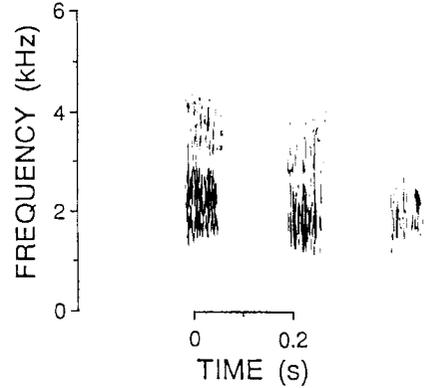


Fig. 4. Sonagram (wideband) of three "walk calls" (part of a longer sequence) recorded at lek Hestesletta, 25 May 1993. The three calls are drawn closer together in time than on the original recording (see text for intervals).

sequence of 13 such "walk-calls" showed a mean interval of 2.16 s ($SD = 1.66$, range 0.25–5.6). This sequence was recorded on 25 May 1993, and was uttered by a female which shortly thereafter made loud calls.

I have also heard very faint "whistling" sounds coming from some females after they have copulated. This sound can only be heard a few metres away (heard only using recording equipment).

4. Discussion

The behaviour I have described has apparently escaped the notice of previous Great Snipe researchers. At Dovrefjell, female loud calls have been heard every year since 1987, but until 1992 only on a few occasions each year. J. Höglund (pers. comm.) has also heard such female vocalizations a few times on leks in Härjedalen, central Sweden. The sound is not very distinctive relative to the background noise (i.e. males and other bird species) unless one is "attuned" to it. However, the vocalization could be heard at least 100 metres away. I consider that 1992 does not constitute an unusual year in regard to the occurrence of female vocalizations, but merely re-

flects the increased attention paid towards this behaviour in that year. Although females utter loud calls regularly, the frequency of female calls is very low compared to the frequency of male display calls. Males utter on average about 2.5 display calls min^{-1} (Höglund & Lundberg 1987, Fiske et al. in press), whereas females can be estimated to make on average less than 1 display call night^{-1} .

There is confusion in the literature (see Cramp & Simmons 1983, p. 431) concerning the vocal repertoire of male Great Snipe. I suggest that much of this confusion has arisen because previous researchers have heard female loud calls but interpreted these as being made by males. This includes (cited from Cramp & Simmons 1983) the deep, hollow, almost ventriloquial “orrroooooo” of Rohweder (1891), the bubbling “kloklokloklo...” of Swanberg (1965) and the throaty gurglings or smacking sounds of Bannerman (1961). Other previous observations of the female loud call might include the report by Godman & Godman (1861) that a female, while performing a distraction display near her nest, uttered a drumming sound.

The structure of the female loud call (Fig. 1a) somewhat resembles the “click notes” part of the male display call (Fig. 1b), but sounds “harsher” and lacks the whistle and other melodic components. The vertical bars of the female call appear less narrow in time than those of the male call. The male Great Snipe is known to possess an unusual syrinx, in that the membrana seminularis is well-developed (Lemnell 1978). This membrane could be involved in sound production. Lemnell (1978) has suggested that the high-crested posture of the male during display “may be a pre-requisite for the sound production where possibly seminularis can be actively involved”. Whether the females also have this membrane well-developed I do not know, but they certainly rise up in a male-like posture when uttering the loud call.

The female loud call (Fig. 1a) shows many of the features known to facilitate locating vocalizing birds, including “broad-band frequency spectrums, high sound energy represented at the low – to mid- frequencies, short note duration with distinct onset and offset, and repetitiveness” (McDonald & Greenberg 1991, see also Dooling 1982). Nest departure calls of some female

American passerines show similar structures (McDonald & Greenberg 1991).

The loud call can be described as a “display call” or “vocal display” because the sound is loud, and resembles the male display song in its acoustical structure and associated postures. There is no consensus in the literature about the function of loud female vocalizations in the breeding season, and several hypotheses have been proposed (see e.g. Montgomerie & Thornhill 1989, McDonald & Greenberg 1991). The possible adaptive significance of the loud call of female great snipe will be discussed elsewhere.

Montgomerie & Thornhill (1989) mention one lekking species (the Sharp-tailed Grouse *Tympanuchus cupido*) in which the females make loud calls during the mating period, as well as 17 non-lekking species. In addition, Gerber (1955) mentions female song heard at leks of the Black Grouse *Tetrao tetrix*. According to J. Höglund (pers. comm.) female song is common in Black Grouse. Montgomerie & Thornhill (1989) listed no waders (Charadriiformes) in their review, although female song is not unknown in waders, and may be widespread, e.g. Little Stint *Calidris minuta* females are known to regularly perform aerial vocalizations (Hildén 1978). The Little Stint, however, is a “double-clutching” species where the females might be expected to compete for males and therefore show sexual role-reversal (although the males also display). Female Woodcock are reported to use a call while on the ground to attract flying males (Cramp & Simmons 1983). Some anecdotal observations of female song by several other species of waders are listed in Gerber (1955). The Great Snipe is therefore one of the few waders for which the regular occurrence of female “song” has now been documented.

Acknowledgements. I thank Yngve Espmark and John Atle Kålås for supervising my work on the Great Snipe. Peder Fiske, John Atle Kålås, Ivar Myklebust, Thor Harald Ringsby and Sten Svartaa provided excellent support with the fieldwork. I thank Jacob Höglund for supplying information from Sweden and Jacob Höglund, Hannu Pietiäinen and an anonymous referee for comments. Aslaug Tomelthy Nastad and Philip Tallantire improved the English. Peder Fiske and John Atle Kålås have contributed in numerous ways, both in the field and at home, and without their help this work could not have been carried out.

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