

A Brambling *Fringilla montifringilla* imitating the Chaffinch *F. coelebs* and Greenfinch *Carduelis chloris*

Svein Haftorn

Haftorn, S., The University of Trondheim, The Museum, N-7004 Trondheim, Norway

Received 9 September 1992, accepted 23 November 1992

1. Introduction

Birds imitating the sounds of other species are well known and have frequently been described in the literature (e.g. Poulsen 1960, Thorpe 1961, Armstrong 1963, Bondesen 1975, Baylis 1982). Typically, such birds keep their normal vocabulary, but increase their repertoire size and diversity by copying heterospecifics. The function of vocal mimicry has been much discussed in the literature and several hypotheses have been proposed, e.g. vocal mimicry may function as a means of defending an interspecific territory, may be used for the identification of potential mates, may have intraspecific social functions, or the resemblance may simply be due to chance (for a review, see Baylis 1982).

In June 1990 I tape-recorded a male Brambling *Fringilla montifringilla* with an extraordinary vocabulary. In contrast to the usual pattern among imitating birds, this individual did not utter vocalizations belonging to the species' normal repertoire, except for the prolonged *seet* alarm call, which the Brambling has in common with many other species. Instead, it delivered sounds similar to typical calls of the Greenfinch *Carduelis chloris* and Chaffinch *F. coelebs*. In this paper I describe the calls and speculate on how the bird obtained its remarkable vocabulary.

2. The study case and methods

On 12 June 1990 in the birch region at Venabu (61°N, 10°E), Ringebu in central Norway, about 900 m above sea level, I heard sounds bewilderingly like trills of the Greenfinch, the typical *fink* call ("social *chink* call", sensu Marler 1956) of the Chaffinch, and a sound (rendered as *rriit*, or *rreet* in English), which I thought was a version of the Chaffinch's "*huit* alarm call" (sensu Marler 1956), termed the "rain-call" by Sick (1939), Poulsen (1958) and others. If I was right, this rain-call would be quite new to the area. I was then astonished to discover that all three sounds came from a male Brambling. If it had not been for the peculiar "rain-call", which stimulated my interest and made me look for the bird, I would probably not have detected the real identity of the singer, because the Greenfinch and Chaffinch are both fairly common in the area. The Brambling was singing at the same locality the day after, and when I returned to the area on 20 June it was still singing there. In all I spent about 3 hours together with the bird.

On the morning of 13 June (06.00–07.00 hours), I taperecorded the Brambling, using a Sony TC-D5 PRO recorder fitted with a Telinga reflector. In all, 83 trills and 20 *rreet* "raincalls" were recorded. Unfortunately, I did not get the

fink call on tape, as this sound was heard only during the first few minutes of observation on 12 June. The sounds were analysed on Uniscan Fx-85.

3. Results

3.1. Behaviour and vocalizations

The bird was consistently found within a restricted part of the birch wood, roughly covering 100×100 m, which it evidently claimed as its territory. It delivered its remarkable song from various song posts scattered all over the territory. At the same time normal Brambling song was heard from surrounding individuals. Its marked black crown indicated an old bird (Hogstad & Røskoft 1987).

The bird gave three different vocalizations, all of which were probably imitations of the sounds of the Greenfinch and Chaffinch. Once it probably uttered a thin long-drawn "alarm" note, which the Brambling has in common with many other species (see below).

3.2. The "Greenfinch" trill

Fig. 1 shows two different trills of the Brambling together with two trills of a Greenfinch male recorded at Klaebu south of Trondheim. In both species the trills consist of trains of rapidly descending transients. The duration of the trills (Brambling mean = 0.66 s, SD = 0.035, n = 25; Greenfinch mean = 0.58 s, SD = 0.150, n = 17) and the frequency range (Brambling mean = 1.89 kHz, SD = 0.156, n = 25; Greenfinch mean = 1.98 kHz, SD = 0.288, n = 17) are about the same for the two species, but according to these recordings the intervals between transients are shorter in the Brambling (0.04–0.05s) than in the Greenfinch (0.08–0.09s). It is noteworthy, however, that the tempo of the Greenfinch trills is variable (Bergmann & Helb 1982). In both species the transients are slightly bow-shaped, but in opposite directions. Although the temporal pattern may differ slightly between the species, the tonal quality was strikingly similar. Most listeners to the Brambling's utterance would probably have mistaken it for a Greenfinch.

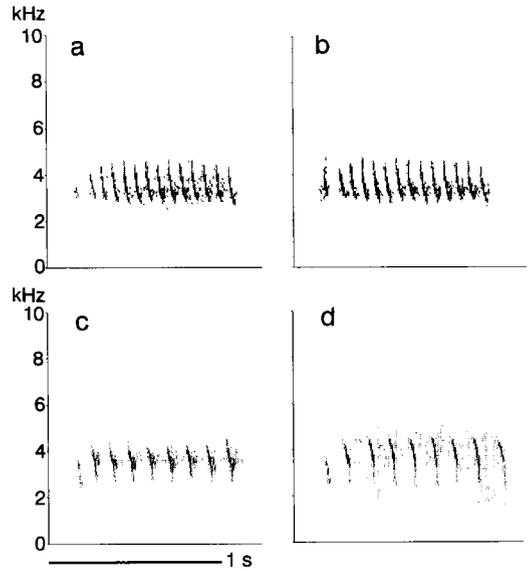


Fig. 1. a–b) Greenfinch-like trills uttered by the Brambling "imitator" at Venabu (13 June 1990). c–d) typical trills uttered by a Greenfinch male (Klaebu at Trondheim, 25 May 1992; spectrograms of Greenfinches at Venabu are not available, but the trills at Venabu and Klaebu sound similar).

3.3. The "fink" call

This call was delivered by the Brambling only when I first entered its territory on 12 June. I got the impression that it was used as an alarm call, just as in the Chaffinch. I was not able to distinguish this call by ear alone from the *fink* call of a genuine Chaffinch.

3.4. The "huit" alarm call ("rain-call")

At times the Brambling at Venabu interrupted its aberrant song and instead uttered a monosyllabic note (*rreet*, Fig. 2), very similar to a particular type of the Chaffinch's *huit* alarm call or rain-call, namely the Chaffinch's *breeze* note (spectrogram Fig. 2f in Marler 1956), or even more to the German "Rülschen" *wrüt* (spectrograms Fig. 52k in Thielcke 1970 and p. 364 in Bergmann & Helb 1982) or the Danish counterpart "hrit" (spectrogram Plate IIIf in Poulsen 1958). The contextual use of the *rreet* rain-call remained unclear, however. I was unable to associate the call with any environmental

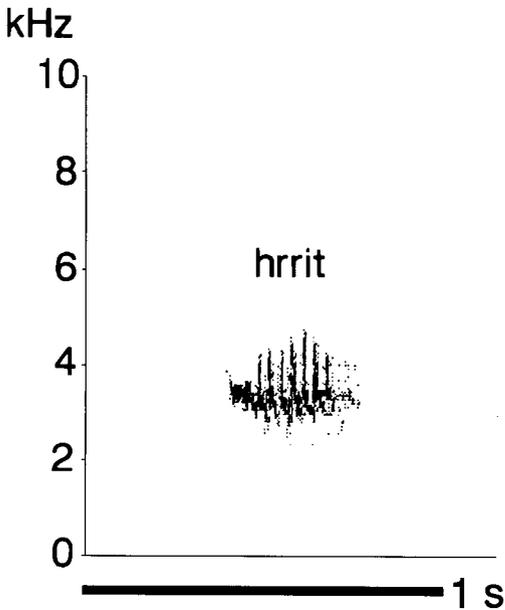


Fig. 2. The *rreet* call delivered by the Brambling "imitator", probably a copy of a particular rain-call of the Chaffinch.

factor. The *rreet* call was uttered in trains of 1–5 notes between continuous series of trills (containing 1–18 strophes according to the taperecordings).

3.5. The "seeet" alarm call

I did not notice this call in the field, but when analysing the recordings afterwards I once detected a weak thin elongated *seeet* note, which was combined with the *rreet* rain-call and almost certainly stemmed from the same Brambling. However, the Brambling species has this note in common with many other birds, including the Chaffinch (Marler 1956), so it is impossible to know whether the Brambling at Venabu had copied the sound from other species or not. Finches tend to use this *seeet* alarm call when sighting predators in flight (Marler 1956, Thorpe 1961).

4. Discussion

The outward appearance of the male Brambling in question was definitely normal. The possibil-

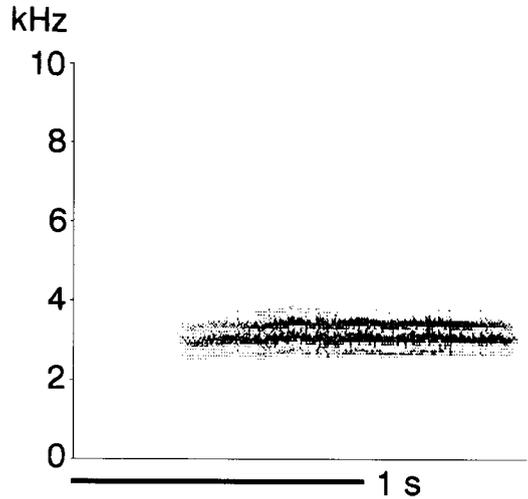


Fig. 3. Normal song of a male Brambling (Venabu, 13 June 1990). The male Brambling imitator apparently lacked this song.

ity of hybridization is therefore unlikely. During the periods of observation the bird did not utter sounds which could be identified as belonging to the species' normal vocal repertoire (except for the *seeet* alarm call, see section 3.5). This is most remarkable, since birds imitating heterospecifics usually add alien sounds to their own vocabulary. Thus, the Brambling's typical song *ryyyt* (Fig. 3) was completely replaced by the Greenfinch-like trill, which evidently served as song and was uttered with the same steady rhythm as in normal song. Apparently, it also completely lacked the characteristic *zilp* alarm call (sensu Haftorn 1971) of the male Brambling (Fig. 4), a call which I believe is homologous to the Chaffinch's "huit alarm call" ("rain-call", sensu Sick 1939, Poulsen 1958). Neither did I hear the *kväää* or *äää* alarm call (Fig. 4), which the two sexes have in common (Haftorn 1971). Besides the Greenfinch-like trill, I only heard the bird uttering a Chaffinch-like *fink* or *chink*, furthermore a particular type of the Chaffinch's *huit* rain-call, and, as already mentioned, probably the *seeet* alarm call.

The Chaffinch's rain-call (termed "Regenruf" in Germany) varies geographically in areas with discontinuous habitats (Sick 1939), even over short distances. Thus, in May 1947 I recorded three different calls in the surroundings of Im-

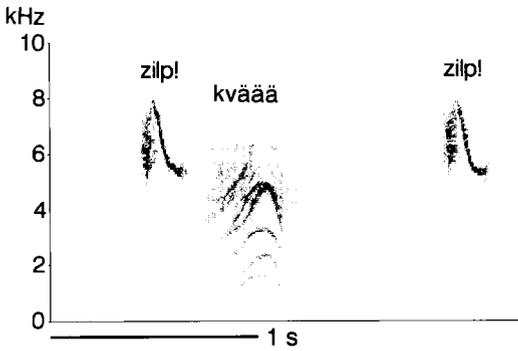


Fig. 4. Typical species-specific alarm calls given by a male Brambling (Venabu, 30 June 1990), never heard from the male Brambling imitator.

mendorf, Germany (patches of woods separated by meadows). According to Marler (1956), the commonest form of the rain-call is a mono- or di-syllabic *whit* or *huit*, and this observation also applies to the situation in Norway (Haftorn unpubl.). The commonest alternatives in Britain are *hrreet* and a buzzy *breeze*.

The rain-call is reserved for the Chaffinch male, and it is frequently heard in the spring as soon as the males have settled on their territories, which suggests that the call serves for territory marking (Krägenow 1981, Haftorn unpubl.). The call is most likely a type of song substitute (Poulsen 1958, Thielcke 1969, 1970). Furthermore, it is evoked by "moderate danger" (Marler 1956), often in combination with the *fink* call.

The fact that the Brambling never uttered calls from the species' natural vocabulary (with the probable exception of the *seet* alarm call) suggests that these vocalizations must be learned and that the Brambling in question lacked a conspecific tutor during the critical phase of vocal development. Interestingly, Chaffinches reared in auditory isolation present anomalous *fink*'s and only simple types of the *huit* rain-call, which implies that the more complex types, as for example "Rülschen", are probably learned by imitation (Marler 1956, Poulsen 1958). The song of the Chaffinch has an innate basis, but to acquire natural song, learning is required (Poulsen 1951, Thorpe 1954). To what degree the natural vocalizations of the Brambling are dependent on learning remains to be shown, however.

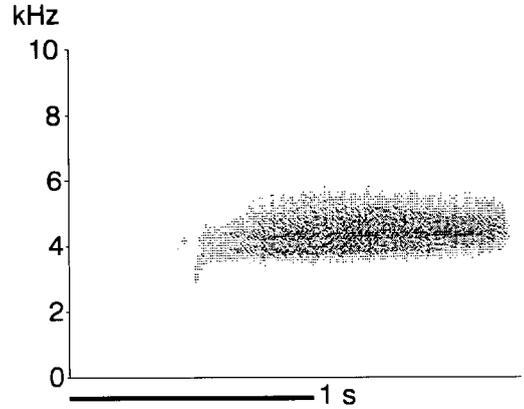


Fig. 5. The *dsryiyy* note of the Greenfinch, which is an important element in its song and which sounds very similar to the Brambling's normal song (see Fig. 3). Recorded at Klaebu on 15 June 1990.

How the Brambling acquired its exceptional repertoire remains uncertain, although it seems reasonable to conclude that a process of imitation was involved.

Numerically, the Brambling is one of the dominant species at Venabu. The Greenfinch and the Chaffinch occur less abundantly, but both breed regularly. I am not aware of any case of Bramblings having parasitized nests of the Chaffinch during egg-laying, but theoretically this may have happened. If the Brambling was brought up by a Chaffinch pair, it may have learned the *fink* call from its foster parents and the Greenfinch trill from neighbouring Greenfinches. A deciding factor during the learning process may have been that the structure of the Brambling song is exceedingly unlike the Chaffinch song, but has, on the other hand, clear similarities to Greenfinch song (I am not aware of any other Scandinavian species with similar vocalizations). People may in fact have difficulty in distinguishing the two species by song alone. Admittedly, the similarities concern only the elongated *dsryiyy* part (sensu Haftorn 1971) of the Greenfinch song (Fig. 5). But the Greenfinch's trills may also correspond more closely to the potential innate "auditory template" for learning (see for example Slater 1989) than the complex flourish of the Chaffinch. The reason why the Brambling did not pick up the Green-

finch's *dsryyy* note may be the fact that this is delivered much less frequently than the trills.

The Brambling's *rreet* "rain-call" somewhat complicates the situation. At any rate, this sound did not conform with the local rain-call of the Chaffinch, which is of the widely distributed *huitt* type. In contrast, the particular call of the Brambling "imitator" was of the "Rülschen" type (Fig. 2), which the bird must have obtained elsewhere. A likely explanation would be, of course, that the bird was hatched and brought up outside Venabu, i.e. at a locality where the Chaffinches possess the appropriate rain-call. That the Brambling may learn the rain-call as well as the *fink* call when isolated in a Chaffinch population was noted by v. Haartman at Lemsjöholm in Finland. The individual in question, a male, imitated the Chaffinch's *huitt* and *fink fink* "so perfectly that it demanded considerable time to establish that it really was he, who uttered the call" (v. Haartman & v. Numers 1992). Bramblings with a vocabulary deviating from normal have also been recorded in Valassaaret in Finland; one of them even sang like a Chaffinch and had paired with a Chaffinch female (v. Haartman et al. 1963–72).

According to Marler (1956), the Chaffinch's *breeze* note has some resemblance to the corresponding notes of the Greenfinch and the Brambling. Presumably Marler is here referring to the song of the respective species. However, when Fig. 2 is compared with Fig. 3, the depicted vocalizations are seen to be so different structurally that it seems unlikely that the "imitator's" "rain-call" is simply an abbreviated form of the species' natural song.

After all, we can only speculate on how the present bird acquired its exceptional vocabulary.

Acknowledgements. I thank M. von Numers and an anonymous referee for valuable comments on an earlier draft of the manuscript. The study was supported financially by the University of Trondheim, the Museum.

Selostus: Järripeippo imitaattorina

Venabussa, Keski-Norjassa nauhoitettiin kesäkuussa 1990 järripeippokoiraan laulua, joka koostui viherpeipon ja peipon laulujen ja äänien elementeistä.

References

- Armstrong, E. A. 1963: A study of bird song. — Oxford University Press, London. 335 pp.
- Bergmann, H.-H. & Helb, H.-W. 1982: Stimmen der Vögel Europas. — BLW Verlagsgesellschaft, München Wien Zürich. 416 pp.
- Baylis, J. R. 1982: Avian vocal mimicry. — In: Kroodsmä, D. E., Miller, E. H. & Quillet, H. (eds.), Acoustic communication in birds, vol. 2:51–83. Academic Press, New York, London.
- Bondesen, P. 1975: Kommunikation i dyreverdenen.— Haase & Søns forlag, København. 120 pp.
- Haftorn, S. 1971: Norges fugler. — Universitetsforlaget, Oslo. 20+862 pp.
- von Haartman, L., Hilden, O., Linkola, P., Suomalainen, P. & Tenovuo, R. 1963–72: Pohjolan linnut värikuvien. — Otava, Helsinki. 1092+192 pp.
- von Haartman, L. & von Numers, M. 1992: Rain call dialects of the Chaffinch *Fringilla coelebs* in the archipelago of SW Finland. — *Ornis Fennica* 69:65–71.
- Hogstad, O. & Røskoft, E. 1987: Variation in the head plumage of the Brambling *Fringilla montifringilla*. — *Fauna norv.*, Ser. C, *Cinclus* 10:7–10.
- Krägenow, P. 1981: Der Buchfink *Fringilla coelebs*. — Die neue Brehmbücherei, A. Ziemsen Verlag, Wittenberg Lutherstadt. 104 pp.
- Marler, P. 1956: The voice of the Chaffinch and its function as a language. — *Ibis* 98:131–261.
- Poulsen, H. 1951: Inheritance and learning in the song of the chaffinch, *Fringilla coelebs*. — *Behaviour* 3:216–228.
- 1958: The calls of the chaffinch (*Fringilla coelebs* L.) in Denmark. — *Dansk Orn. Foren. Tidsskr.* 52:89–105.
- 1960: Vocal imitations in some birds. — *Proc. XII Int. Congr. Ornithol.*: 621–625. Helsinki.
- Sick, H. 1939: Ueber die Dialektbildung beim "Regenruf" des Buchfinken. — *J. Orn.* 87:568–592.
- Slater, P. J. B. 1989: Bird song learning: causes and consequences. — *Ethology Ecology & Evolution* 1:19–46.
- Thielcke, G. 1969: Geographic variations in bird vocalizations. — In: Hinde, R. A. (ed.), *Bird vocalizations*: 311–339. University Press, Cambridge.
- 1970: *Vogelstimmen*. — Springer Verlag, Berlin, Heidelberg, N.Y. 156 pp.
- Thorpe, W. H. 1954: The process of song-learning in the Chaffinch as studied by means of the sound spectrograph. — *Nature* 173:465–467.
- 1961: *Birdsong: The biology of communication and expression in birds*. — Cambridge Univ. Press, London and New York. 143 pp.