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Brief report

Ortolan Bunting *Emberiza hortulana* singing like Yellowhammer *E. citrinella*

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In 2001, we began studies on song variation and their possible function(s) in isolated and declining population of Ortolan Bunting *Emberiza hortulana* in Norway (Osiejuk *et al.* 2003). In this communication we present strong evidence of an Ortolan Bunting singing phrases typical for the closely related Yellowhammer *E. citrinella*. To our knowledge, this is the first report on an Ortolan Bunting singing phrases typical for other species. This observation is especially important as it concerns an individual of known descent in a well studied population (Dale 2000, 2001 a, b, Dale & Olsen 2002).

The mixed Ortolan Bunting singer was recorded on 11 May 2001 at Glesmyra raised peat bog (county Hedmark, Norway, 60°41´N, 11°51´E). The male was recorded four times between 7:40 and 8:30 a.m. with an HHB PDR 1000 Portadat Profesional DAT recorder coupled with a Telinga V Sciences DAT microphone. In total, 98 song phrases were recorded during 16 min and 50 s.

Soon after the beginning of the recording, the male switched to song types which, to the human auditory perception, sounded like Yellowhammer phrases. Therefore, the recording person (TSO) made efforts to see the male singing atypical phrases. Finally, the bird was seen at the moment of uttering mixed song phrases at a distance of less than 10 m. The other members of the research team observed this male also on 12 and 14 May. After that he disappeared and was not discovered anywhere else, although all habitats suitable for Ortolan Bunting were intensively surveyed in that area. Thus he should be regarded as unmated in that year.

The observed male, hereafter called ALOO, was ringed (aluminium-lilac = orange-orange) as a nestling in 2000 at Glestad Grustak, which is about 2.5 km east of where he was recorded in 2001. The habitat was gravel pit (ca. 1 ha) surrounded by farmland . The nest was found on 11 June 2000, and nestlings were ringed on 13 June (age at ringing would then be approximately 7 ± 2 days). This was not a late nest (5 nests were ringed 1–2 days earlier, 4 nests the same day, and 6 nests within the following 10 days). The presumable father (no genetic proof) of ALOO and his close neighbour both had normal songs. There

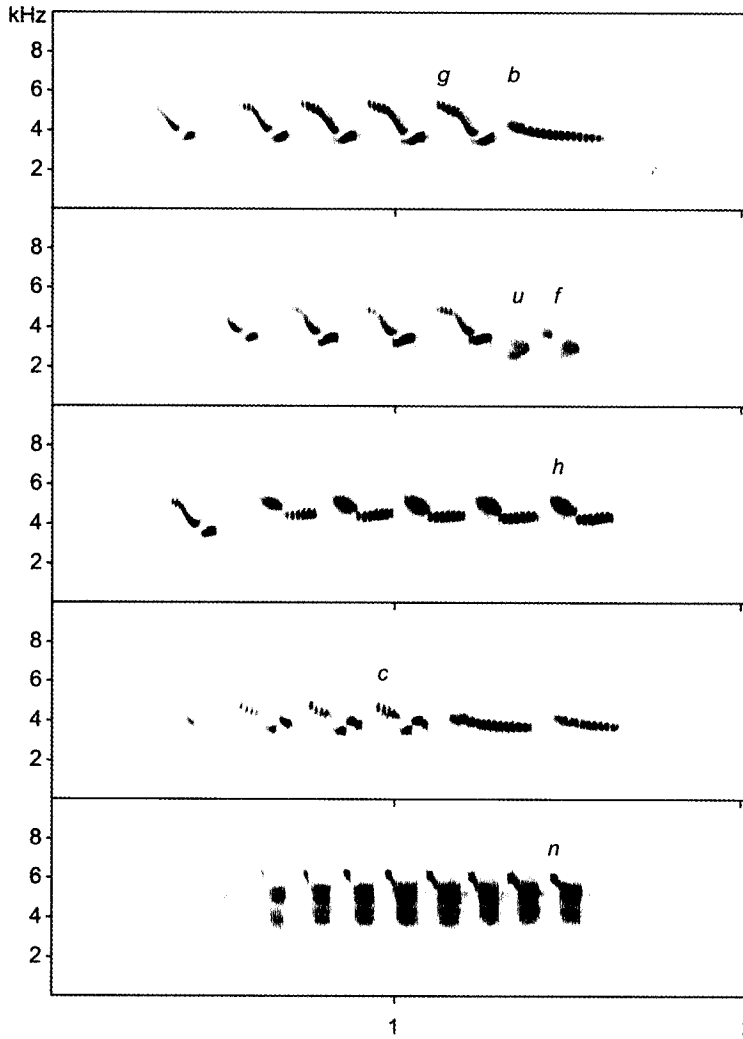

Fig. 1. A set of song phrases of an Ortolan Bunting male recorded at Glesmyra (county Hedmark, Norway) on 11 May 2001. All types of syllables from his repertoire are shown. Indicated by the following letters *g, b, u, f, h, c* and *n*.

were also Yellowhammers at the same place, which is a typical situation for most sites where Ortolan Buntings occur. Three other Ortolan Bunting males, all with normal songs, inhabited the other side of a large field (ca. 250 m away, well within hearing range).

The mean recorded song rate of the ALOO male was 5.8 (phrases/min) and varied between

Table 1. Comparison between basic acoustic properties of Ortolan Bunting and Yellowhammer syllables from county Hedmark, Norway. As syllables of particular type are essentially similar, we took for analysis average values calculated for random samples of 10–20 syllables for each recognized type.

Species	n	Min frequency	Max frequency	Frequency of maximal amplitude	Frequency range
Ortolan Bunting	20	3.1±0.48	4.9±0.80	4.0±0.59	1.9±0.70
Yellowhammer	9	3.8±0.56	6.6±0.58	5.2±0.41	2.7±0.98
Between species differences		$z = -3.02$	$z = -3.91$	$z = -4.01$	$z = -2.26$
Wilcoxon test		$P = 0.03$	$P < 0.001$	$P < 0.001$	$P = 0.023$

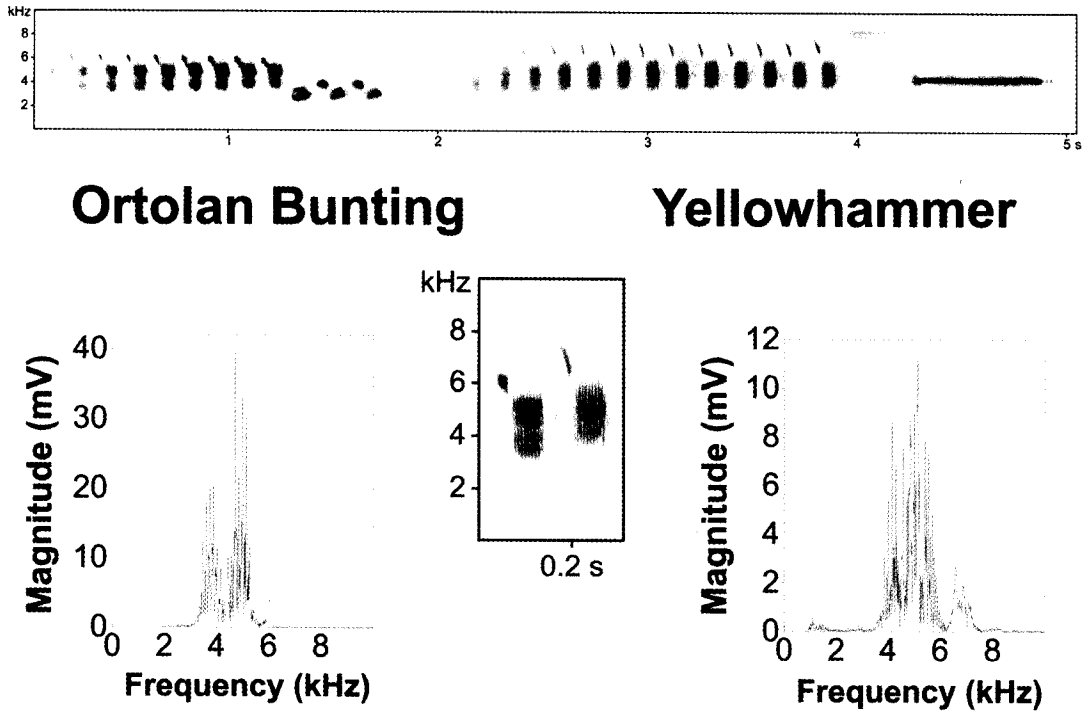

Fig. 2. Sonograms and amplitude spectrums of mimic *n* syllables of the Ortolan Bunting (left side) and a typical Yellowhammer syllable 4 (right side), which is supposed to be the model.

3.0 and 10.4, which is typical for the studied population (Osiejuk *et al.* 2003). The syllable repertoire of the male consisted of seven units, which formed nine different combinations, further called song types (Fig. 1). Some types occurred in one to five versions, which differ only in the number of syllables, not in their content or order in sequence.

For interspecific song comparisons we used recordings of 10 Yellowhammer males and randomly selected recordings (representing all syllables found) of 58 Ortolan Bunting males recorded this year in the same study area (ca. 500 km^2). The syllable repertoire of all Ortolan Buntings recorded in 2001 consists of 20 different syllables denoted by letters from *a* to *u* (more details in Osiejuk *et al.* 2003). In the case of Yellowhammer, we found nine different syllables denoted by Arabic numerals. Table 1 shows basic characteristics of these syllables. The compared species differed significantly in their syllables characters. Most of the syllables sung by the ALOO male are similar to those found in the song repertoire of the other members of the Ortolan Bunting population, but syllable denoted as *n* is evidently more similar to syllable 4 of some Yellowhammer males (Fig. 2).

The similarity concerns not only acoustic parameters (Fig. 3), but also within-phrase rate of syllable performance. If we compare rates (syllables number/second) within the introductory parts of the recorded Yellowhammer song types (mean = 7.5, range 5.6–11.8, n = 9), they are evidently higher than rates within the songs of the ALOO male typical for Ortolan Buntings (mean = 4.45, range 3.9–5.2, n = 7). For the mixed-song phrases (i.e. *n*, *nu* and *nuf*) of the ALOO male the average rate was 6.5 (range 5.9–7.4, n = 3), overlapping only with those of Yellowhammer. The differences between groups are statistically significant (Kruskal-Wallis ANOVA, $\chi_2^2 = 13.04$, P = 0.001). The frequency parameters of syllable *h* were also similar to parameters of some Yellowhammer syllables, but syllable *h* was sung by many Ortolan Bunting males, with a slower rate of repetition (typical for the species)

and did not resemble Yellowhammer by ear (Fig. 3).

The ALOO male was singing from trees and bushes along a drainage ditch on the Glesmyra peat bog. The male had two conspecific neighbours and was observed to interact with them (countersinging) while uttering Ortolan Bunting-like phrases. The neighbours seemed to ignore Yellowhammer-like phrases, as during long series of *n*, *nu* and *nuf* song types they did not increase the song rate, did not alternate or overlap songs of the mixed-singer and did not fly towards the ALOO male.

Some species within the family Emberizidae regularly imitate songs of other species, e.g. Indigo Bunting *Passerina cyanea* and Lazuli Bunting *P. amoena*, when occurring in sympatry (Emlen *et al.* 1975). Corn Buntings *Miliaria calandra* quite frequently sing songs of Ortolan Bunting or Yellowhammer and sometimes even interact with the latter species (Cramp & Perrins 1994). Mimicry in Ortolan Buntings seems to be extremely rare. We failed to find any published information on this subject, despite extensive studies in many European countries (Conrads 1994, Cramp & Perrins 1994, Helb 1997, TSO unpubl. data from Poland). On the other hand, M. Lang (pers. comm.) recorded in Bavaria Ortolan Bunting males that sang a full Yellowhammer phrase or its parts. Also song phrases of some dialects from South Europe contain buzzes that resemble those of Yellowhammers.

The conclusion is that Ortolan Buntings are able to learn not only foreign notes but also full phrases of syllables. Baptista *et al.* (1981) reported that birds hatched late in the season may be exposed to fewer conspecific songs in their acoustic environment and thus mimic interspecifically. However, this is not the case here, as the ALOO male hatched in the middle of the hatching season, so he did not lack conspecific model-tutors in the neighbourhood. Baptista *et al.* (1981) also suggest that occasional interspecific mimicry may simply reflect individual variation to improvise. There is probably a strong selection towards eliminating such incidental phrases from the Ortolan Bunting repertoire. The ALOO male was the only mixed singer found after two years study (2001–02), in which 124 males (of ca. 150 in the whole population) was recorded.

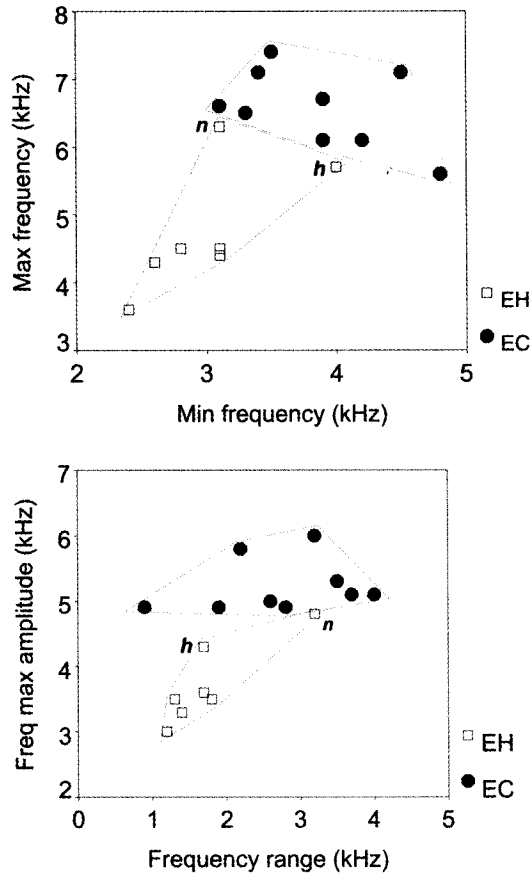

Fig. 3. A comparison of frequency parameters of all mixed-singer syllables (EH) and syllables of Yellowhammers (EC) from the study area. Indicated is syllable *n*, which is supposed to be copied from the Yellowhammer model.

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Selostus: **Keltasirkun kaltaisesti laulava peltosirkku**

Norjassa tehdyn peltosirkkututkimuksen yhteydessä havaittiin peltosirkkuyksilö, joka lauloi

keltasirkun säettä. Tämä lienee ensimmäinen kerta, kun peltosirkun on havaittu laulavan jonkin muun lintulajin säettä. Lauluhavainto tehtiin tarkoin tutkitussa peltosirkkupopulaatiossa ja laulavan yksilön synnyinhistoria tunnettiin. Keltasirkkumaisesti laulava peltosirkku havaittiin 11 toukokuuta vuonna 2001 Glesmyran suoalueella Norjassa. Linnun laulu saatiin tutkimuksen yhteydessä äänitettyä (ks. kuva 1). Sama lintuyksilö kuultiin ja nähtiin vielä 12.5. ja 14.5. Tämän jälkeen lintu katosi alueelta eikä sitä löydetty enää muualtakaan. Kyseinen peltosirkkuyksilö jäi siis oletettavasti parittomaksi. Lintu oli rengastettu pesäpoikasena vuonna 2000 noin 2.5 kilometrin päässä kesän 2001 havaintopaikasta. Linnun emon laulu, kuten myös sen lähinaapureiden laulu, oli normaalia peltosirkun laulua. Alueella pesi myös keltasirkkuja. Tutkijat äänittivät lajien välistä vertailua varten 10 keltasirkkuyksilön ja 58 peltosirkkuyksilön laulua samalta tutkimusalueelta. Laulujen rakenne ja lajien väliset erot laulussa on esitetty taulukossa 1 ja kuvissa 2 ja 3. Vaikuttaa siltä, että peltosirkku kykenee oppimaan myös muiden lintulajien laulun rakenteita.

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