

An observation of vocal mimicry by Dupont's Lark *Chersophilus duponti* in Catalonia

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This work reports an example of heterospecific vocal mimicry by Dupont's Lark *Chersophilus duponti*. Although mimicry is well documented in other lark species, there only appears to be one prior report of mimicry in Dupont's Lark. Birds were recorded opportunistically on 28 February and 13 March 2020 at Timoneda d'Alfés, Catalonia, approximately one hour before sunrise. On the first occasion, only territorial calls, consisting of a variant of the typical 'whee-ur-whee' note, were recorded. On the second visit, a multi-sequenced song was heard. This included mimicry of a species of *Galerida* that, on the basis of sonograms and measurements of average length(s) and frequencies (kHz) of the mimetic notes, appears to be Crested Lark *Galerida cristata* rather than the closely related Thekla's Lark *Galerida theklae*.

Key words: Dupont's Lark, *Chersophilus duponti*, mimicry, territorial call, song, Timoneda d'Alfés

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Received: 02/04/20; Accepted: 02/11/20 / Edited by J. Quesada.

Dupont's Lark *Chersophilus duponti* is one of the rarest passerines in Europe and is classified as Vulnerable (BirdLife International, 2015) and Near Threatened globally (BirdLife International 2017) on the IUCN Red List. The primary causes of its decline are habitat loss and degradation (Tella *et al.* 2005, Iñigo *et al.* 2008), reforestation and the proliferation of wind farms (Iñigo *et al.* 2008). Its Spanish population has been estimated at just 1,300–2,200 pairs (Tella *et al.* 2005, Suárez 2010), with Gómez-Catasús (2018) reporting an annual 3.9% population rate of decline with a further 32.8% average decline forecasted for the next ten years.

Due to recent technological advances, acoustic monitoring is an increasingly valuable tool in conservation biology and several studies have successfully used sound recording to study Dupont's Lark (Laiolo *et al.* 2005, Laiolo & Tella 2006, Pérez-Granados *et al.* 2018a, 2018b, 2019a, 2019b; Tella *et al.* 2005).

In all, eight species of lark are either resident or semi-resident in Catalonia, many of which are known to mimic other species to some extent

(Cramp 1988). To date, the exception is Dupont's Lark, for which there are few reports of mimicry, although one study by Laiolo *et al.* (2008) did detect three small populations (< 10 birds), each exhibiting heterospecific vocal mimicry. Despite this, these authors state that "this species does not imitate other birds as a general rule". Unfortunately, there appears to be no audio record or detailed description of this mimicry.

On the other hand, song-matching between neighbouring Dupont's Larks is not uncommon (Laiolo & Tella 2005). The most common vocalisations are songs and territorial calls (Cramp 1988), with wing-clapping occurring regularly as part of territorial displays (Hazevoet 1989, Suárez 2010). Furthermore, Laiolo *et al.* (2005) describe warning and stress calls emitted to ward off neighbouring rivals and when in danger. Territorial calls consist of short, discreet whistles and are typically given at dawn early in the breeding season, with a steady decrease in prevalence as the breeding season progresses (Pérez-Granados *et al.* 2018c). Songs are longer and more complex, and involve a greater variety of notes.

As a rare and declining species, Dupont's Lark is an ideal candidate for acoustic monitoring, above all as it is vocally active, particularly in the first hour and a half before dawn (de Juana & Suárez 2004, Pérez-Granados *et al.* 2018d). This work builds on a number of published studies of this species, which incorporate bioacoustic techniques, and aims to describe a previously undocumented case of vocal mimicry by Dupont's Lark (Laiolo *et al.* 2005, Laiolo & Tella 2006, Pérez-Granados *et al.* 2018a, 2018b, 2019a, 2019b; Tella *et al.* 2005).

Material and methods

The study site, Timoneda d'Alfés (41°32'58"N, 0°38'59"E), is an area of low shrub-steppe in Lleida (Catalonia, NE Spain) dominated by thyme *Thymus vulgaris*, shepherd's tea *Sideritis scordiodoides* and rockrose *Helianthemum* spp. (Pérez-Granados 2018a).

Small numbers of Dupont's Larks are resident in this area, with Pérez-Granados *et al.* (2018a) counting nine males on-site in 2017. This population is the most easterly in Spain, being situated in a small fragmented patch of habitat that is mostly surrounded by dry agriculture or otherwise unsuitable habitat. Other larks recorded here include Calandra *Melanocorypha calandra*, Crested *Galerida cristata* and Thekla's *Galerida theklae*. Greater Short-toed Larks *Calandrella brachydactyla* are summer visitors, Eurasian Skylarks *Alauda arvensis* are present in winter, and Lesser Short-toed Larks *Alaudala rufescens* are scarce visitors to this site.

In order to hear and record Dupont's Lark the site was visited at 6:30 am on 28 February 2020, 65 minutes before sunrise. This time was chosen intentionally as the species is known to commence singing in darkness, with peaks between one hour and 30 minutes before sunrise (de Juana & Suárez 2004, Pérez-Granados *et al.* 2018d). Upon arrival, birds were immediately noted to be vocalising (giving territorial calls), with up to six birds heard at once at various distances from the recorder. A total of three recordings were made at 06:36 (2 m 27 s), 06:49 (4 m 9 s) and 06:54 (1 m 58 s).

Calls consisted solely of a repetition of a variation on the typical 'whee-ur-wheee' note (Figure 1), which was primarily given in flight.

This is reported by Cramp (1988) as the most common note in Dupont's Lark song. As a single repeated note, this note seems to be a territorial call rather than a song. Laiolo & Tella (2007) define territorial calls as consisting of between one and three short stereotyped call types, whereas songs are defined as being made up of several 'distinct sequences'.

On 14 March, a return visit was made to the site at 6 am with the hope of hearing song. Upon arrival, birds were immediately heard emitting a multi-sequenced song, consisting of several notes given in short verses. Two birds were singing very close to the track, which allowed for a clear recording to be made of one of these birds. A total of four recordings were made at 06:10 (29 s), 06:13 (2 m 6 s), 06:24 (1 m 45 s) and 06:34 (3 m 35 s).

Approximately one hour after sunrise, all Dupont's Larks had ceased vocalising, although other species including Calandra, Crested and Thekla's Larks continued to sing.

Recordings were made with an Olympus® LS-12 recorder and a Dodotronic® Hi-Sound stereo (A0M5024 sensor) parabola setup. The recorder was set to PCM 44.1 kHz/16 bit. Recordings were made of the closest male, which was singing directly overhead. As it was dark and the bird was not visible, it was not possible to determine the height from which the bird was singing. As birds were mostly singing in the air, the parabola was generally pointed upwards, away from traffic, which helped reduce unwanted noise. Audio taken from birds singing from the ground was too polluted with unwanted noise to be useful. The site is located some 700 m from a busy highway which presents unwanted low-frequency noise.

Audio files were edited in Audacity® 2.3.0, (Audacity Team 2018). To avoid altering the sound of the subject too drastically, a light noise-reduction filter was added to remove some of the unwanted background sounds before they were saved and uploaded to the Xeno-Canto repository (<http://www.xeno-canto.org>; <https://www.xeno-canto.org/536806> ; <https://www.xeno-canto.org/536788> ; <https://www.xeno-canto.org/536784>). Sonograms were created with Raven Lite 2.0.1, (Centre for Conservation Bioacoustics 2016) and further edited and annotated in Adobe Photoshop CS6 (Adobe systems).

To analyse the mimetic notes, the length (seconds) and average frequency (average of total low and high frequencies) were measured for the mimetic notes, along with the take-off notes of Crested and Thekla's Larks obtained from Xeno-Canto and from SR's personal database of sound recordings. Measurements were taken in Raven Lite 2.0.1 (Center for Conservation Bioacoustics 2016) by clicking and dragging a box around the extremities of each note. This gave a table that provided start and end times, as well as high and low frequencies. From here, averages and standard deviations were calculated in Microsoft Excel. A total of 15 cases of mimicry of Crested Lark take-off notes were recorded, of which 13 were measured, the two others being too unclear to work with. A total of 14 Crested Lark and 17 Thekla's Lark notes were measured.

For want of a further source of verification of the identity of the species being mimicked, all clips containing mimicked take-off calls were pasted together in one file in Audacity®, before being saved as a WAV file and uploaded to BirdNET. This artificial neural network, created by The Cornell Lab of Ornithology and the Chemnitz University of Technology, focuses on "the classification of avian sounds using machine learning" (available at: <https://birdnet.cornell.edu/>).

Another WAV file containing all instances of the three-note sequence, also considered to be mimicry of a Crested Lark, was uploaded to BirdNET.

To measure the prevalence of Crested Lark mimicry in the song, the total length of vocalisations (seconds) were measured in Raven Lite 2.0.1 for each of the three songs recorded on 13 March 2020 (at 06:13, 06:24 and 06:34). This was done by clicking and dragging a box around the extremities of every note/sequence in each song, thereby discarding empty spaces without vocalisation. This gave a table with start and end times for each measurement, allowing for the length (seconds) of each sequence to be calculated, as well as its total length. The same was done for each of the mimetic sequences, which were then expressed as a percentage of the total period of active vocalisation for each of the three audios.

Results and Discussion

In the field, the apparent mimicry of either Crested or Thekla's Lark, repeated at the beginning of one particular sequence, was noted in at least two Dupont's Larks. Upon subsequent inspection of the sonograms, the mimetic notes were isolated and were indeed identified as corresponding to either Crested or Thekla's Lark, a pair of species that are notoriously challenging to separate on vocalisations alone.

The first song sequence began with four mimetic notes and was predictably repeated in each song. (see Figure 2). The first of the four notes is a *Galerida* spp. 'take-off' call with

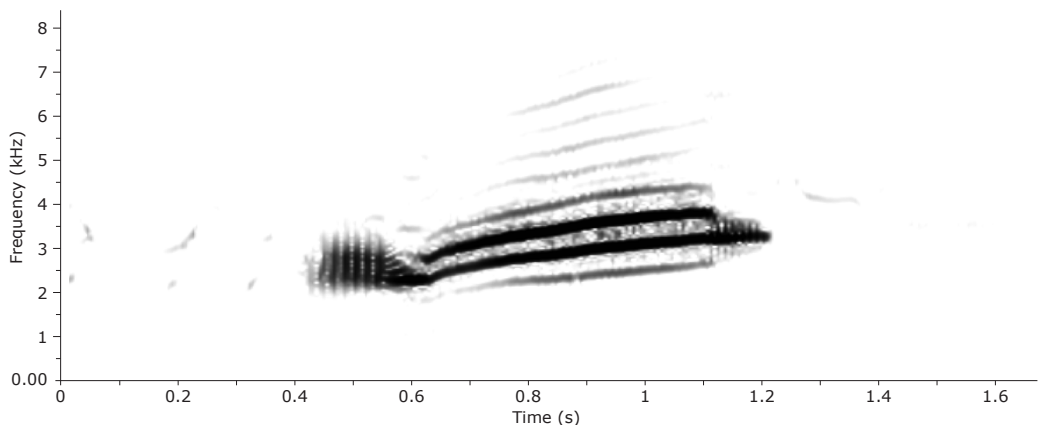


Figure 1. Dupont's Lark: Territorial Call, 28/02/20, 6:54 am. To hear the full original recording, visit: <https://www.xeno-canto.org/536784>
Alosa becuda: Crit territorial, 28/02/20, 6:54 am. Per escoltar l'original sencer visiteu: <https://www.xeno-canto.org/536784>

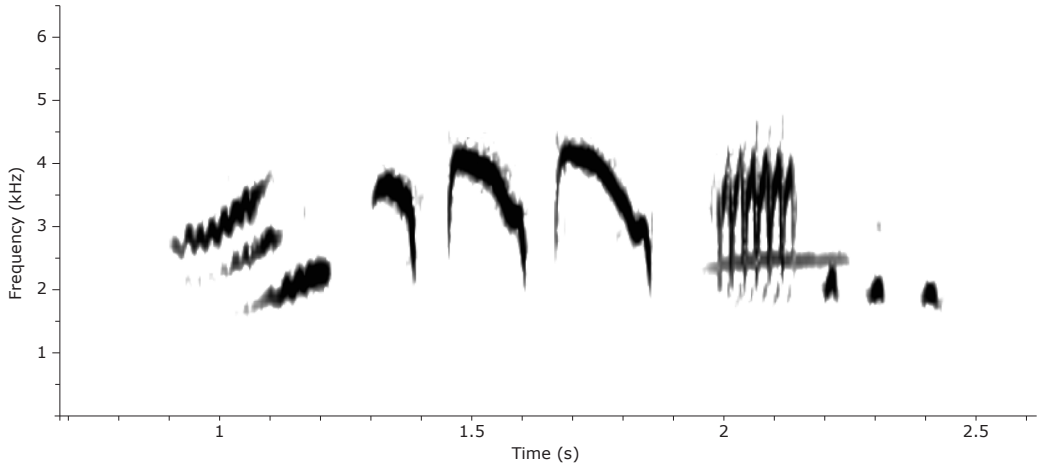


Figure 2. Sequence 1: proposed Crested Lark take-off/flight call, with the preceding three notes also assigned to mimicry of Crested Lark. This sequence can be heard at <https://www.xeno-canto.org/536806> (at 20s, 43s, 1m 13s, 1m 46s, 2m, 14s).
La seqüència 1 correspon a un crit en vol de cogullada vulgar amb les tres notes següents que s'assignen a imitacions de cogullada vulgar. Aquesta seqüència es pot escoltar a <https://www.xeno-canto.org/536806> (als 20s, 43s, 1m 13s, 1m 46s, 2m, 14s).

variations emitted by both Crested and Thekla's Larks (see Figure 4 for a detailed comparison). This call is common when birds alight from the ground, in flight or just before a bird takes off. In Crested Larks, this call is described as a "slightly cracked, upward inflected 'dvuee'" (Svensson *et al.* 2009) or as a "cheerful, melodic 'dwuee'" (Shirihai & Svensson 2018).

The take-off call has been noted as a useful feature for separating Crested and Thekla's Larks: according to van den Berg & The Sound Approach (2020), in Thekla's the take-off call

is much shorter, repeated more quickly and is slightly higher-pitched than in Crested. As shown in Figure 4, the first mimetic note is a better match for the take-off call in Crested Lark, with the equivalent call in Thekla's being shorter, faster and rising much more steeply in pitch.

Analyses of the take-off notes of all three subjects (see appendices 1-3) reveal an average length (seconds) of 0.3 +/- 0.02 in the Dupont's Lark mimicry; 0.25 +/- 0.03 in Crested Lark; and 0.14 +/- 0.03 in Thekla's Lark (see Figure 3a).

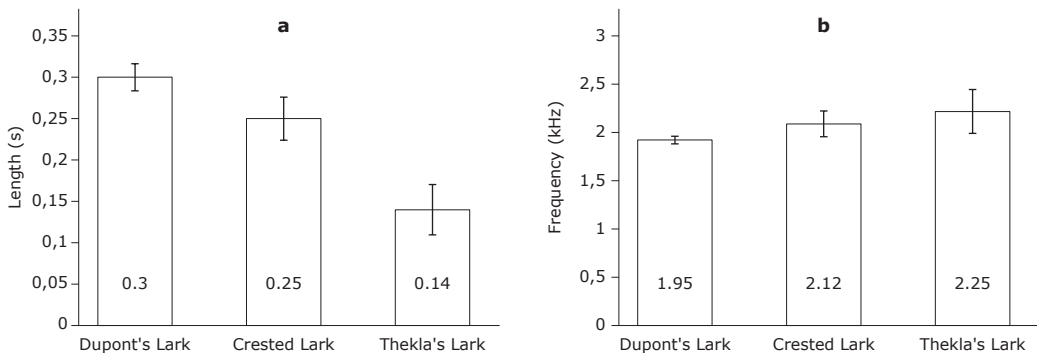


Figure 3. Average length (a) and frequency (b) of mimetic take-off notes by Dupont's Lark, as well as actual take-off notes from Crested and Thekla's Larks, with standard deviations.
Durada (a) i freqüència (b) mitjana de les notes d'imitació en vol de l'aloa becuda, així com les notes reals en vol de la cogullada vulgar i fosca, amb les desviacions estàndard.

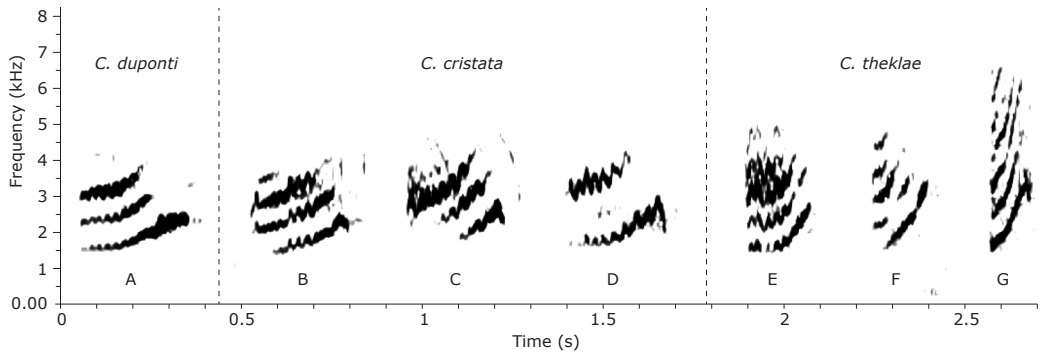


Figure 4. From left to right: proposed mimicry by Dupont's Lark of the take-off/flight call of Crested Lark (A), take-off/flight calls of three different Crested Larks (B, C, D), and the equivalent calls from three different Thekla's Larks (E, F, G). The calls given by Thekla's Lark (E, F, G) are shorter, faster and rise in pitch in a much more accentuated manner than in Crested (B, C, D) and Dupont's Larks (A). To hear the audio associated with this sonogram, visit <https://www.xeno-canto.org/536811>. For a summary of dates, locations and observers, see Table 1.

D'esquerra a dreta: imitació de l'alosa becuda de la cogullada vulgar en vol (A), reclams en vol de tres cogullades vulgars diferents (B, C, D) i els seus equivalents en tres cogullades fosques diferents (E, F, G). Els reclams emesos per la cogullada fosca (E, F, G) són més curts, més ràpids i augmenten el to d'una manera molt més accentuada, en comparació amb la cogullada vulgar (B, C, D) i l'alosa becuda (A). Per escoltar l'àudio associat amb aquest sonograma, consulteu: <https://www.xeno-canto.org/536811>. Per obtenir un resum de dates, ubicacions i observadors, vegeu la Taula 1.

The average frequency of the take-off notes is 1.952 kHz \pm 0.04 in Dupont's Lark; 2.116 kHz \pm 0.135 in Crested Lark; and 2.248 \pm 0.231 in Thekla's (see Figure 3b). Thus, the mimicked take-off notes are indeed a better match for Crested Lark, with a difference of 0.05 seconds, compared to the 0.16-second difference in Thekla's Lark. The average frequencies of the mimetic notes were also closer to Crested Lark (difference of 0.164 kHz) than to Thekla's Lark (difference of 0.296 kHz).

BirdNET reveals that the WAV file containing all instances of proposed Crested Lark mimicry had a 100% probability match, with Thekla's Lark as the next alternative, with a 54% probability.

The next three notes (after the initial mimicked take-off note at 20s, 43s, 1m 13s, 1m 46s and 2m 14s directly after the take-off call mimicry note) are more difficult to assign but can probably also be attributed to Crested Lark. These three notes can also be heard at <https://www.xeno-canto.org/536806>. Svensson *et al.* (2009) describe one of the commoner calls of Crested Lark as consisting of a variable combination of 2–4 straight whistling notes. Shirihai & Svensson (2018) further describe a multisyllabic call, consisting of a short series (often 3–5) of piping, drawn-out, desolate notes

with an onomatopoeic description of 'tree-lee-puuh'. For an example of a similar series of notes, see <https://www.xeno-canto.org/479900> (recorded by Grzegorz Lorek, 09/06/19 in Poland). Svensson *et al.* (2009) further state that, whilst similar, Thekla's Larks vocalisations are softer and more melodic, and lack these piping, melancholy notes. Thus, taking into account this information, and the fact that the first note matches the take-off note of Crested Lark, it is possible to designate with a high degree of confidence these three notes as mimicry of Crested Lark. Furthermore, The WAV file containing all instances of the three-noted sequence, also proposed as mimicry of Crested Lark, processed by BirdNET, gave a 100% probability for Crested Lark, with Thekla's Lark as an alternative with 33% probability.

The prevalence of Crested Lark mimicry was calculated at 12.83% \pm 0.51% (see Table 2). This figure may increase or decrease in the future if further recordings are obtained. This sample of 446 seconds of recording is small due to the imposition of COVID-19 restrictions within a week of the first set of recordings being made.

Dupont's Lark alternated two song variations, initially with one containing mimetic notes, specifically in the opening sequence (see Figure 2). This first sequence was followed

Table 1. Species, Location, Date, Observer and Xeno-canto Codes (in the case of external recordings) of all compared calls.
Espècie, lloc, data, observador i codi a Xeno-canto (en el cas de gravacions externes) de tots els reclams comparats.

Call	Species	Location	Date	Observer	Xeno-canto
A	<i>C. duponti</i>	Timoneda d'Alfés, Catalonia	14/03/2020	Seán Ronayne	N/A
B	<i>G. cristata</i>	Huesca, Spain	06/12/2019	Seán Ronayne	N/A
C	<i>G. cristata</i>	Timoneda d'Alfés, Catalonia	14/03/2020	Seán Ronayne	N/A
D	<i>G. cristata</i>	Île-de-France, France	18/01/2020	Stanislas Wroza	XC522189
E	<i>G. theklae</i>	Garraf, Catalonia	01/01/2020	Seán Ronayne	N/A
F	<i>G. theklae</i>	Mas de Melons, Catalonia	23/02/2020	Seán Ronayne	N/A
G	<i>G. theklae</i>	Occitanie, France	21/04/2018	Stanislas Wroza	XC412498

by between 1 and 2 additional sequences, the second sequence appearing occasionally. After these 2–3 sequences and after a brief pause, a few seconds later another song type only consisting of two further sequences was given.

Very little variation was heard in the birds singing on-site and neighbours were noted to exhibit a very high degree of song-sharing. This is possibly a result of habitat fragmentation and the small site population, a tendency noted previously in other isolated populations. For example, Pérez-Granados *et al.* (2016) concluded that a low song repertoire of just eight song types out of a maximum of 12 was probably due to a combination of poor habitat, isolation from other populations, less opportunity to learn/imitate songs from other adult males, and the fact that a poor song repertoire may reduce the number of immigrants from which the population can learn song types.

Vocal mimicry is more commonly associated with long and complex songs (Ferguson *et al.* 2002). Hindmarsh (1986) suggests that birds with complex songs are more prone to including mimicry as a result of errors made in the “rapid sequencing of complex song”. Unlike the Crested Lark, which is an adept mimic with a complex song, Dupont's Lark has a much simpler song with, as a general rule, no mimicry. Vocal mimicry in birds is a well-documented, widespread phenomenon that has been recorded in a large number of species (Vernon 1973). Garamszegi *et al.* (2007) found that it occurs in up to 40% of European passerines. Its actual function is still a topic of debate, with a number of accepted hypotheses that include mate attraction (Kelley & Healy 2011), the avoidance of heterospecific competition (Catchpole & Baptista 1988), warn-

ing of the presence of predators (Dobkin 1979) and even the direct deterring of predators (Igic *et al.* 2015, Dutour *et al.* 2020).

The population at Timoneda d'Alfés recently underwent an extinction event, followed by recolonisation (Gómez-Catasús *et al.* 2018). According to Laiolo *et al.* (2008), birds from populations prone to extinction have poorer repertoires than those from healthy populations. This would be consistent with the vocally limited song repertoire with approximately five sequences in this population, which compares poorly to the maximum of 12 sequences given in other populations (Laiolo & Tella 2007, Pérez-Granados *et al.* 2016). These authors also state that, whilst this lark generally does not include heterospecific mimicry, it can shift strategy to do so. This allows it to increase its song base, when there are few or no conspecifics to learn from, which may explain the inclusion of mimicry in this study.

This paper highlights gaps in our knowledge of vocalisations in Dupont's Lark, with this being the first detailed report of mimicry in this species. Further detailed studies of Dupont's Lark vocalisations will provide much needed information to help gain knowledge of this lark and combat the accelerating decline of this enigmatic steppe-species. It would also be of interest to conduct further, more extensive research into mimicry in this species. Several studies have already proven the worth of autonomous recording units (ARU) in the study of vocalisation in Dupont's Lark (Pérez-Granados *et al.* 2018a, 2018b, 2019a, 2019b). Thus, ARUs could be used as a relatively cheap method for studying mimicry in this species over large

Table 2. Prevalence of mimicry of Crested Lark by Dupont's Lark in all audio files recorded at Timoneda d'Alfes on 14/03/20.

Prevalença d'imitacions de cogullada vulgar per l'alosa becuda obtinguda de tots els fitxers d'àudio enregistrats a la Timoneda d'Alfés el 14/03/20.

Song	Time	Total Length (s)	Measured Length (s)	Length of Mimicry (s)	Prevalence of Mimicry (%)
A	06:13	126	30.61	3.78	12.35
B	06:24	105	29.2	3.73	12.77
C	06:34	215	49.01	6.55	13.36
Mean					12.83
Standard Deviation					0.51

temporal/spatial scales. As this study was cut short by the COVID-19 restrictions, only a small sample size was obtained and so further recordings and analyses should be made in the coming spring.

Acknowledgements

I would like to thank Magnus Robb for his continued advice and for his second opinion on the identity of the mimicked species, Dr Nick Watmough for the through proof-reading, and Xavier Riera and Gerard Bota for their valuable advice. This article also benefitted from suggestions from Cristian Pérez-Granados and Dr. Javier Quesada. Finally, I would like to thank Ivano Pelicella for kindly providing me with the Dodotronic Hi-Sound Stereo Parabola (an exceptional piece of equipment) and my partner Alba, who supports me even at the height of my obsessions.

Resum

Una observació d'imitació vocal de l'alosa becuda *Chersophilus duponti* a Catalunya

Aquest treball descriu un exemple d'imitació vocal heteroespecífica de l'alosa becuda *Chersophilus duponti*. Tot i que les imitacions vocals estan ben documentades en altres espècies d'alosa, sembla que només hi ha un informe previ d'imitació de l'alosa becuda. Els cants dels ocells es van enregistrar oportunament els dies 28 de febrer i 13 de març de 2020 a la timoneda d'Alfés, Catalunya, aproximadament una hora abans de la sortida del sol. En la primera ocasió, només es van registrar els reclams territorials, que consistien en una variant de la nota típica "whee-ur-whee". En la segona visita, es va escoltar un cant amb diverses seqüències. Això incloïa la imitació d'una espècie de *Galerida* que, basant-se en sonogrames, i mesures de longitud (s) mitjana i freqüència (kHz) de les notes

imitades, sembla que es correspon més aviat amb la cogullada vulgar *Galerida cristata* que no pas a la cogullada fosca *Galerida theklae*.

Resumen

Una observación de imitación vocal de la alondra de Dupont *Chersophilus duponti* en Cataluña

Este trabajo describe un ejemplo de imitación vocal heteroespecífica de la alondra de Dupont *Chersophilus duponti*. Aunque las imitaciones vocales están bien documentadas en otras especies de alondras, parece haber solo un informe previo de mimetismo en la alondra de Dupont. Los cantos de las aves se registraron de forma oportunista el 28 de febrero y el 13 de marzo de 2020 en el tomillar de Alfés, Cataluña, aproximadamente una hora antes del amanecer. En la primera ocasión solo se registraron reclamos territoriales, consistentes en una variante de la típica nota "whee-ur-whee". En la segunda visita, se escuchó un canto de varias secuencias. Esto incluyó la imitación de una especie de *Galerida* que, sobre la base de sonogramas y medidas de longitud (s) promedio y frecuencia (kHz) de las notas imitadas, parece ser de la cogujada común *Galerida cristata* en lugar de cogujada montesina *Galerida theklae*.

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Appendix 1. Measurements of length and frequency of 13 Crested Lark take-off notes mimicked by Dupont's Lark. *Valors de longitud i freqüència de 13 notes de cogullades vulgars en vol imitades per l'aloša becuda.*

Dupont's Lark				
Number	Length (s)	Low Freq. (kHz)	High Freq. (kHz)	Mean Freq. (kHz)
1	0.31	1.46	2.52	1.99
2	0.29	1.35	2.41	1.88
3	0.30	1.35	2.47	1.91
4	0.30	1.46	2.47	1.96
5	0.29	1.40	2.58	1.99
6	0.30	1.46	2.52	1.99
7	0.27	1.40	2.41	1.91
8	0.29	1.40	2.47	1.93
9	0.28	1.46	2.47	1.96
10	0.28	1.51	2.52	2.02
11	0.31	1.40	2.47	1.93
12	0.32	1.40	2.47	1.93
13	0.33	1.40	2.52	1.96
Average	0.30	1.42	2.49	1.95
Standard Deviation	0.02	0.05	0.05	0.04

Appendix 2. Measurements of length and frequency of 14 Crested Lark take-off notes. *Valors de longitud i freqüència de 14 notes de cogullada vulgar en vol.*

Crested Lark				
Number	Length (s)	Low Freq. (kHz)	High Freq. (kHz)	Mean Freq. (kHz)
1	0.21	1.35	2.93	2.14
2	0.23	1.59	3.17	2.38
3	0.28	1.59	2.93	2.26
4	0.24	1.51	2.86	2.18
5	0.21	1.43	2.86	2.14
6	0.25	1.43	2.93	2.18
7	0.24	1.11	2.70	1.90
8	0.25	1.27	2.62	1.94
9	0.28	1.35	2.86	2.10
10	0.27	1.35	2.70	2.02
11	0.28	1.19	2.70	1.94
12	0.27	1.35	2.70	2.02
13	0.26	1.35	3.01	2.18
14	0.28	1.43	3.01	2.22
Average	0.25	1.38	2.86	2.12
Standard Deviation	0.03	0.13	0.16	0.14

Appendix 3. Measurements of length and frequency of 17 Thekla's Lark take-off notes mimicked by Dupont's Lark. *Valors de longitud i freqüència de 17 notes de cogullada fosca en vol imitades per l'aloša becuda.*

Thekla's Lark				
Number	Length (s)	Low Freq. (kHz)	High Freq. (kHz)	Mean Freq. (kHz)
1	0.15	1.27	2.30	1.78
2	0.09	1.35	3.17	2.26
3	0.10	1.67	3.33	2.50
4	0.18	1.35	2.46	1.90
5	0.09	1.59	3.41	2.50
6	0.17	1.27	2.38	1.82
7	0.16	1.43	3.01	2.22
8	0.14	1.35	2.86	2.10
9	0.12	1.67	3.17	2.42
10	0.16	1.59	3.25	2.42
11	0.11	1.35	3.49	2.42
12	0.15	1.51	3.17	2.34
13	0.12	1.43	3.01	2.22
14	0.14	1.51	3.17	2.34
15	0.19	1.82	3.25	2.54
16	0.14	1.51	3.01	2.26
17	0.14	1.43	2.93	2.18
Average	0.14	1.47	3.02	2.25
Standard Deviation	0.03	0.15	0.35	0.23