

The Stone Curlew *Burhinus oedicnemus* in La Selva Plain: evidence of a new breeding population in Catalonia

Josep Rost, Alfons Delgado-Garcia & Quim Vilagran

In Catalonia the Stone Curlew *Burhinus oedicnemus* breeds essentially in the cultivated plains of the regions of Lleida and L'Empordà. To date, this species has only been reported as a winter visitor or migrant to La Selva Plain. However, an exhaustive review of the literature revealed the existence of over 30 observations during the breeding season (2002-2009) and five successful breeding attempts. A nocturnal census specifically focused on the Stone Curlew was carried out in summer 2009. Some individuals were detected, which confirms the previous records in the literature. Given that the species was not detected during the fieldwork for the recent Catalan Breeding Bird Atlas, these new records could represent a new breeding population for Catalonia. We discuss whether this discovery represents a recent colonization or is the result of the non-detection of the species during the Atlas fieldwork. Finally, we suggest that more species-specific methods should be used to study this species.

Key words: Stone Curlew, *Burhinus oedicnemus*, cryptic species, Catalan Breeding Bird Atlas, methodology, steppe birds, La Selva Plain.

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The Stone Curlew *Burhinus oedicnemus* is a bird of open habitats that occurs from Central Europe and North Africa to Central Asia (del Hoyo *et al.* 1996). Its global population is currently estimated at between 140,000 and 330,000 individuals (BirdLife International 2009). In Europe, the Stone Curlew is commonest in the Iberian Peninsula, Russia, Turkey and France, where there is an estimated population of 46,000-78,000 breeding pairs (BirdLife International 2004). This species has suffered a severe decline across Europe since the 1970s (>30%, including extinctions in some areas and ongoing declines in several countries) and has been assessed as Vulnerable in Europe (BirdLife International 2004). This decline has been attributed to the intensification of agricultural activities in recent

decades and the consequent loss of suitable habitats for farmland birds (Pain *et al.* 1997, Chamberlain *et al.* 2000, Wilson *et al.* 2005).

In Catalonia, the Stone Curlew occurs mainly in farmland in the Lleida and L'Empordà plains, with marginal populations located in La Cerdanya and El Camp de Tarragona; according to the last Catalan Breeding Bird Atlas (henceforth CBBA; Estrada *et al.* 2004) its estimated population is between 1,777 and 3,911 pairs, 2-4% of the total European population. The species has also been assessed as Vulnerable in Catalonia due to the rapid transformation affecting its current habitat, although no significant population trend was detected during the period 2002-2008 (ICO 2009a). In La Selva Plain, the species was historically considered to be rare,

recorded only during winter and migration (Motjé 1982). In fact, during the fieldwork for the CBBA (period 1999-2002; Estrada *et al.* 2004), it was not detected at all in the area. Nevertheless, since 2002 Stone Curlews have been regularly observed in La Selva in spring and summer, with the first successful breeding attempt documented from 2005.

The aim of this study was to review and update the situation of the Stone Curlew in this plain during the breeding season and provide new information about the distribution and abundance of this new population. We propose a more suitable methodology for studying this species and also discuss why this species was not detected during the fieldwork for the CBBA.

Methods

Study area

La Selva Plain is a lowland arable area (ca. 300 km²) located in northeastern Catalonia between the mountain systems of Les Guilleries and Gavarres-Cadiretes (Figure 1). Administratively, it is shared between the *comarques* (counties) of

La Selva and El Gironès. The landscape consists of a mosaic of small farms and mixed forests of holm oak *Quercus ilex*, downy oak *Q. pubescens* and pines *Pinus* spp. Cereal crops for cattle fodder dominate the land use, although tree crops (pears, apples, and peaches) and rape and sunflower cultivation also occupy noteworthy amounts of land surface.

Information from literature and local people

We collated all published records up to 2009 of Stone Curlews from La Selva Plain between April and September, the period in which egg-laying, care of young and growth takes place (Cramp 1998). Information sources included local records (Delgado-Garcia 2001–2003, Delgado-Garcia 2003–2008, Ateneu Juvenil Cultural i Naturalista 2009) and Catalan (Martínez-Vilalta 2001, Aymí & Herrando 2005, Sales 2006, Estrada & Anton 2007, Anton 2008), as well as on-line databases (Ferrer 2009, ICO 2009b). In order to gather extra information we also talked to 14 farmers and hunters from Campllong, Cassà de la Selva, Riudellots de la Selva and Sant Andreu Salou, areas in which

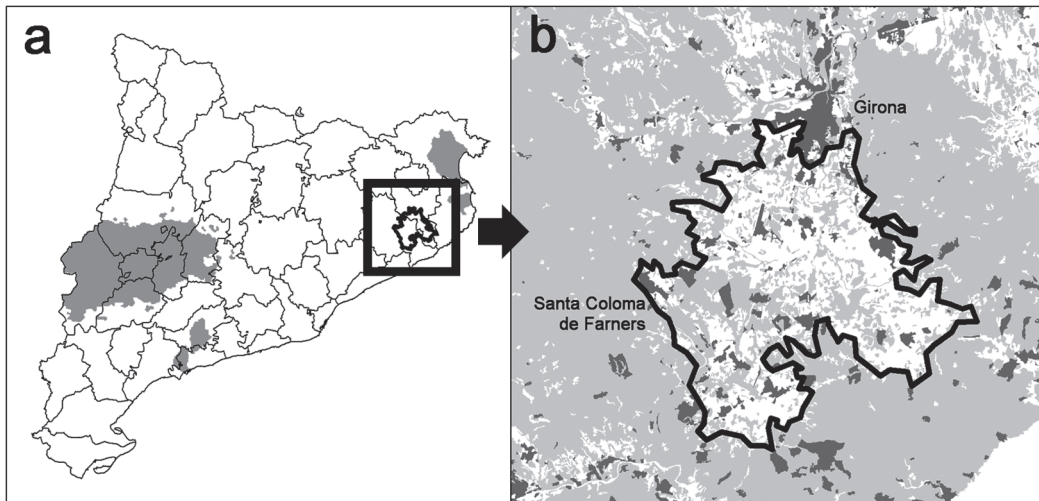


Figure 1. a) Map of Catalonia with Stone Curlew distribution (grey) according to the Catalan Breeding Bird Atlas (Estrada *et al.* 2004). Solid lines show borders of the *comarques*. b) Detail of La Selva Plain. The thick black line shows the limits of the study area. White areas represent farmland, light grey forests and dark grey urban areas. a) Mapa de Catalunya amb la distribució del Torlit (gris) segons l'Atlas dels Ocells Nidificants de Catalunya (Estrada *et al.* 2004). Les línies contínues mostren els límits comarcals. b) Detall de la plana de La Selva. La línia negra gruixuda mostra els límits de la zona d'estudi. L'àrea blanca representa zones agrícoles, la de color gris clar són boscos i la de color gris fosc són zones urbanes.

the Stone Curlew has been recorded. We asked local people if they knew the species and in some cases showed them pictures to check whether they could correctly identify it or not.

Field census

We carried out the fieldwork during the last week of June and the first of July 2009. The censuses were nocturnal since this species is more active and easier to detect at night when it is calling. We used point-count methodology, taking the methodology used in Italy as a guide (Caccamo 2007). Point counts were performed for 90 minutes immediately after dusk, when breeding pairs are still in their nesting territories (D. Giunchi pers. comm.). Later on in the night, pairs move away to forage, generally only a few hundred meters from the nest, although they can move as far as 3.5 km (Green *et al.* 2000, Dalle Mura 2009, D. Giunchi pers. comm.). Therefore, by restricting the census to this period and by ensu-

ring a separation of at least 1 km between point counts (the mean home range during breeding period is 30 ha; Green *et al.* 2000), we were able to minimize the probability of double counts and could assume that the individuals detected during different point counts belonged to different nesting territories. The census provided a good initial estimate of the number of breeding pairs in the studied area.

The count-point locations were established by choosing areas of suitable farmland habitat and by taking into account a minimum distance between census points as mentioned above (Figure 2). Woodland areas were avoided. A total of 64 point counts were conducted, which covered most of the study area (Figure 2). In order to simplify the census, no fixed radius for the detection distance was established. Censuses lasted 15 minutes at each point, a time interval that provides the best balance between the chances of detecting individuals and the possibilities of conducting several counts per

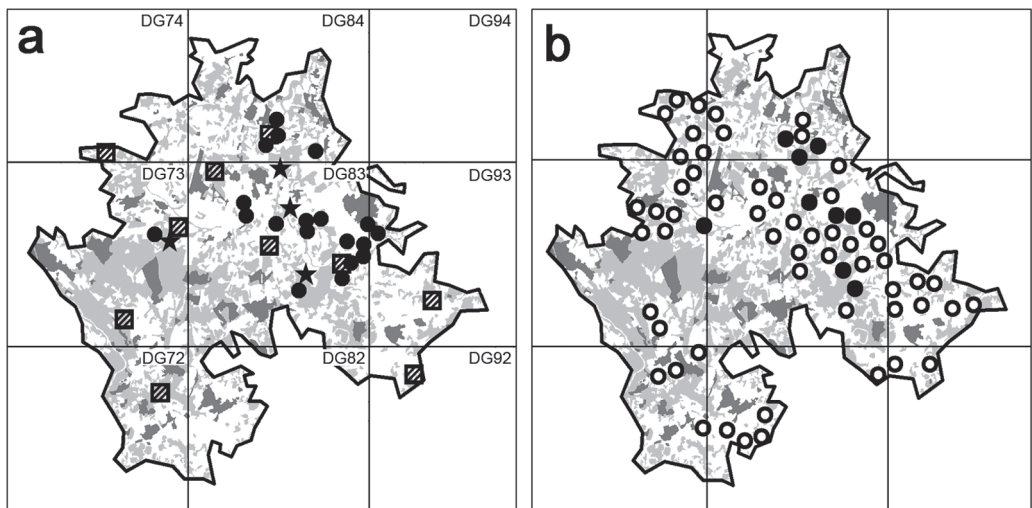


Figure 2. Location of Stone Curlew records from La Selva Plain during the breeding season. The grid represents the borders of the 10x10 UTM squares (codes shown in the top right-hand corner of the squares in map a). (a) Information gathered from literature. Stars represent confirmed breeding attempts and black points the other observations. In this map, the 1x1 UTM squares sampled during the CBBA are shown as hatched squares. (b) Distribution of censuses carried out during the present study. Solid dots represent censuses with Stone Curlew presence and empty dots represent points with no results for the species. Colour codes for land use as in Figure 1. *Localització de les citacions de Torlit a la plana de la Selva durant el període reproductor, a partir d'informació procedent de revisió bibliogràfica (a) i a partir del censos propis (b). La quadrícula representa els límits dels quadrats UTM 10x10 km (els codis es mostren al mapa a). En el mapa (a) les estrelles representen les observacions de nidificació confirmada, i els punts la resta d'observacions. També es mostren els UTM 1x1 km mostrejat durant l'Atlas dels Ocells Nidificants de Catalunya (Estrada *et al.* 2004). En el mapa (b) els punts negres representen els punts amb presència de Torlit i els blancs els d'absència. Les àrees grises i blanques representen els diferents tipus d'hàbitats seguint el mateix codi que a la Figura 1.*

night. One observer censused a maximum of five consecutive points per night. The average number of points censused per night was 8.2 (± 2.2 SE). If no individual was recorded after 10 minutes of census, we played a recording of a Stone Curlew call during the last five minutes of the 15-minute period to increase the possibility of detecting birds. Point counts were carried out on nine days by 12 observers trained in Stone Curlew identification (Rost 2009). Censuses were only performed in good weather (i.e. without rain or wind). At each point, the main crop types were qualitatively recorded in order to give an approximation of the Stone Curlew's habitat preferences in the study area.

Results

Literature review

Stone Curlews were recorded during the breeding season from 34 sites in La Selva Plain between 2002 and 2009 (Table 1), mostly in the eastern part of the plain between the municipalities of Fornells de la Selva and Cassà de la Selva (Figure 2a). Of these records, five correspond to confirmed breeding attempts. The first dates from September 2005, when a pair with a chick was found in a young tree plantation in Campllong (Delgado-Garcia 2005, Ateneu Juvenil Cultural i Naturalista 2009). The second breeding record in the area was also in the municipality of Campllong and in

this case a pair with two chicks was observed in August 2007 (Anton 2008, Ateneu Juvenil Cultural i Naturalista 2009). During 2008, two successful breeding attempts were confirmed in Vilobí d'Onyar and Caldes de Malavella (Delgado-Garcia 2008) and, finally, in 2009 a pair fledged two chicks at the same location as 2007 in Campllong (Ateneu Juvenil Cultural i Naturalista 2009, ICO 2009b). The presence of the species in the study area during the breeding season and another reported breeding attempt in 2008 (one nest with eggs; Delgado-Garcia 2008) suggest that more pairs have bred in La Selva Plain in recent years. Almost all the observations of Stone Curlews were from open habitats with a certain amount of bare ground, e.g. ploughed fields, fallows, abandoned fields, spring cereal (maize), sunflower or tree crops.

Four out of the 14 local people asked knew and could identify the species correctly, while two confused it with other waders (e.g. Golden Plover *Pluvialis apricaria*). The remaining people did not know the species. According to those who identified it correctly, the Stone Curlew is most easily seen in winter and autumn, but is also present in spring and summer. Unfortunately, no precise numbers of birds could be obtained.

Census results

We detected Stone Curlews in nine out of the 64 point counts (14%), eight in the municipalities of Fornells de la Selva, Campllong, Cassà de la Selva and Caldes de Malavella (NE La Selva

Table 1. Reported records of Stone Curlew in La Selva Plain during the breeding season. For each year we show the number of different localities where observations were reported, the number of breeding attempts, the number of successful breeding attempts (presence of chicks), an estimation of the maximum number of adults based on all records and the references (1: Sales 2006; 2: Delgado-Garcia 2003-2008; 3: Ateneu Juvenil, Cultural i Naturalista de Girona 2008; 4: Estrada & Anton 2007; 5: Anton 2008; 6: ICO 2009b). *Citacions de Torlit a la plana de la Selva en període reproductor. Per a cada any, es mostra el nombre de localitats on s'han fet observacions, el nombre d'intents de reproducció i el d'intents exitosos, una estima del nombre màxim d'adults, entre totes les citacions, i les referències.*

Year	Localities	Breeding attempts	Successful breeding	Adults	Reference
2002	1	—	—	4	1
2004	3	—	—	5	2
2005	3	1	1	4	2, 3
2006	8	—	—	11	2, 3, 4
2007	8	1	1	15	2, 3, 5
2008	8	4	2	19	2, 3
2009	3	1	1	7	3, 6

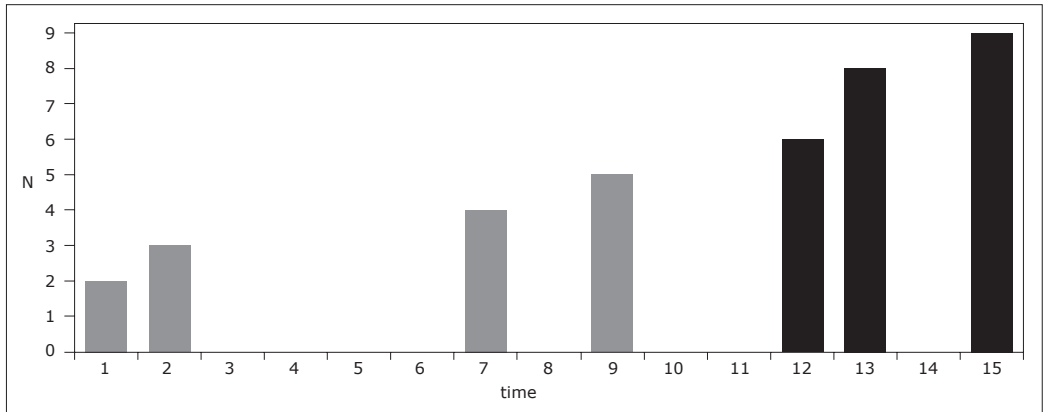


Figure 3. Distribution of cumulative Stone Curlew detection during the 15-minute censuses. Grey bars represent detections before playing the recording and black bars detections after playing it.
Distribució de les deteccions acumulades de Torlit al llarg dels 15 minuts de cens. Les barres grises representen les deteccions acumulades abans de reproduir el reclam, i les barres negres les deteccions acumulades després de reproduir-lo.

plain), and the ninth in Vilobí d'Onyar (NW) (Figure 2b). In four cases, the Stone Curlews were detected after playing the recording (Figure 3). Positive contacts were obtained from stubble, fields with low maize plants and areas of tree crops.

Discussion

Information from the literature review and the census provide a similar picture of the distribution of the Stone Curlew in La Selva Plain: a small breeding nucleus exists, of probably about 10 pairs, which constitutes a new population for Catalonia. This species was only detected as a possible breeder in the study area for the first time in 2002. Interestingly, the Stone Curlew was not found in the area during the fieldwork for the CBBA (1999-2002) and here we suggest two alternative hypotheses for this non-detection: 1) the Stone Curlew has in fact colonized the study area since 2002; 2) the CBBA methodology was not suitable for this species and thus it was not detected. Colonization from nearby populations (e.g. from L'Empordà or from further afield) could have occurred as the result of recent habitat degradation and fragmentation in the species' traditional Catalan distribution areas (see Fig. 1a), possibly due to urban growth, the intensification of industrial activities and/or the construction of the high speed train line),

which may have forced birds to move to other areas to breed.

Alternatively, if the species was present before 2002 and went unnoticed during the CBBA fieldwork, the CBBA methodology may well be unsuitable for the species and thus should be reconsidered for future projects. The CBBA methodology for nocturnal species such as the Stone Curlew consisted of two nocturnal visits of one hour each between February and May to five 1x1 km squares within any 10x10 km UTM square, without the use of recordings or decoys (Estrada *et al.* 2004). Ten 1x1 km squares were prospected using this methodology within our study area between 1999 and 2002 (S. Herrando, pers. comm.). The main habitat type in four of these squares is forest and they are consequently not suitable for Stone Curlews. The other six 1x1 km squares were in farmland areas, two of which coincide with areas in which Stone Curlews were detected according to our literature review. The effective sampling effort during the CBBA only lasted for 360 minutes (60 minutes x 6 suitable 1x1 squares) since Stone Curlews do not start breeding until April and thus could not be detected in the early round of censuses (February–March). Our censuses during 2009 lasted 975 minutes, which represents an increase of 170% over the CBBA sampling effort. Furthermore, we used recordings, which seem to be essential for detecting this species. Many surveys suffer from false negatives due to the fact that

some species are found at low densities or exhibit cryptic behaviour, or as a result of insufficient sampling effort or inter-observer bias (Gu & Swihart 2003, Fitzpatrick 2009). Observer bias would not seem to be a plausible explanation given the unmistakably loud call of this species. However, other factors could have affected the detection of the species during the CBBA as there are other examples of non-detected species in the same area during the CBBA sampling. For instance, the Long-eared Owl *Asio otus* was not detected in the DG83 square (see Figure 2a), but in 2005 one of the authors (Q.V.) found 21 breeding pairs there (unpublished data). Since such a rapid colonization does not seem realistic, this difference would seem to indicate that the species was present but not detected during the CBBA in 2002. Moreover, a number of local people have seen Stone Curlews in spring, which suggests that the species was already present in La Selva plain during the breeding season before the first records from 2002. Finally, we suggest that the increasing number of observations since 2002 is attributable to increased effort by local naturalists, rather than to any real population increase. Therefore, even though we cannot reject or accept any of the hypotheses with absolute certainty, the absence of the species during the CBBA sampling due to its low density in the area would seem to be the most plausible hypothesis.

The methodology developed in this study could be useful for improving knowledge of the Stone Curlew population in La Selva Plain and in other areas of its breeding range. This was the first time we performed this type of census in the area and there are still some weaknesses in the methodology. Playing recordings of calls increased detectability, since individuals were only heard in the last five census minutes in four out of nine points, which thus almost doubled the probability of detecting the species. The used time interval for each census point (15 min) is probably not long enough for properly detecting the species at a point count given that several detections occurred only in the final minutes and most probably only due to the use of a recording (see Figure 3). Stone Curlews were detected on average after 3.3 minutes (± 0.63 SE) of playing a recording and thus we believe that they should be played right from the beginning of the censuses; otherwise, point counts should last more than 15 minutes to increase

the chances of species detection. In addition, we believe that censuses should be carried out more than once during the breeding season; farmland management induces quick changes in habitats during the breeding season and consequently the spatial distribution of this species may also change since some sites that are suitable early in the season may disappear, while others may only become suitable later on in the season. Therefore, a double census would enhance the detectability and knowledge of the distribution of this species.

The Stone Curlew habitat in La Selva Plain is similar to that reported from other farmland areas (Green *et al.* 2000, Martí & del Moral 2003, Calvet *et al.* 2004, Estrada *et al.* 2004). Different crops provide different nesting possibilities, since maize crops can be used before the plant grows too high, while wheat or barley fields can be used once the cereal has been harvested. Currently, the most typical crop management in La Selva consists of intensive agriculture with rapid succession between wheat/barley and maize, essentially inadequate for Stone Curlews since there is not enough time to successfully nest between the cereal harvest and the subsequent sowing of the maize. Moreover, some nests are probably destroyed during agricultural work (Calvet *et al.* 2004). The very late (September) observations of chicks could be a consequence of the failure of previous breeding attempts due to disturbance. However, certain management actions could be implemented to favour the breeding of Stone Curlews, as occurs in England where tilled plots are created in the middle of fallow land (Evans & Green 2007). Interestingly, we found that in our area Stone Curlews tolerate human presence fairly well, since we found them breeding less than one kilometre from a small town and very close to a secondary road. This contrasts with previous studies that have reported that the species tends to avoid areas close to roads and inhabited places (Green *et al.* 2000, Brotons *et al.* 2004). Our findings may suggest that Stone Curlews can tolerate disturbances in areas of relatively high human population density.

Our study demonstrates that designing specific census methodologies is essential for correctly detecting and monitoring cryptic species that exist in low numbers. This fact becomes especially important for species such as the Stone Curlew with some degree of conservation concern.

La Selva Plain is not protected or managed for wildlife (like most Catalan farmland habitats), and this new breeding population of the vulnerable Stone Curlew should be taken into account in future territorial planning in this area. The current intensive agricultural model needs to be modified in order to combine agricultural activities with the conservation of species.

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Resum

El Torlit *Burhinus oediconemus* a la plana de la Selva: primers evidències d'una nova població reproductora a Catalunya

El Torlit *Burhinus oediconemus* és una espècie nidificant a Catalunya, que es troba bàsicament a les planes agrícoles de Lleida i de l'Empordà. A la plana de la Selva, fins ara aquesta espècie havia estat considerada com a hivernant o present en migració. Tanmateix, a partir de la revisió de la bibliografia existent s'han trobat més de 30 observacions en període reproductor entre 2002 i 2009, incloent-hi cinc episodis de nidificació confirmada. A més, l'estiu de 2009 es va dur a terme un cens, específicament dissenyat per a la detecció del Torlit, i se'n van localitzar alguns individus, confirmant les dades prèvies de bibliografia. Considerant que l'espècie no va ser detectada durant el mostreig del darrer Atlas dels ocells nidificants, això representaria una nova població reproductora per Catalunya. En aquest article es discuteix si els resultats que s'exposen poden ser fruit d'una nova colonització de la plana de la Selva en els últims anys, o bé un problema de no-detecció de l'espècie durant el mostreig de l'Atlas, quan hauria pogut passar desapercibuda a causa de la seva baixa densitat i detectabilitat. Per tant, suggerim la conveniència d'estudiar l'espècie amb mètodes més específics.

Resumen

El Alcaraván Común *Burhinus oediconemus* en el llano de la Selva: primeras evidencias de una nueva población reproductora en Cataluña

El Alcaraván Común *Burhinus oediconemus* es una especie reproductora en Catalunya, donde se encuentra básicamente en los llanos agrícolas de Lleida y el Empordà. En el llano de la Selva, hasta la fecha esta especie había sido considerada como invernante o presente durante el paso migratorio. No obstante, a partir de la revisión de bibliografía existente se han encontrado más de 30 observaciones en periodo reproductor entre 2002 y 2009, incluyendo cinco episodios de reproducción confirmada. Además, en verano de 2009 se llevó a cabo un censo, específicamente diseñado para la detección del Alcaraván Común, en el cual se localizaron algunos individuos, confirmando los datos previos de la bibliografía. Considerando que esta especie no fue detectada durante el muestreo del último Atlas de las aves nidificantes, esto representaría una nueva población reproductora para Catalunya. Se discute si los resultados que se exponen pueden ser consecuencia de una nueva colonización del llano de la Selva en los últimos años, o si pudiera tratarse de un problema de no-detección de la especie durante el muestreo del Atlas, cuando hubiera podido pasar desapercibida debido a su baja densidad y detectabilidad. Por tanto, sugerimos la conveniencia de estudiar la especie con métodos más específicos.

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