

- Grusso, M. & Poddesu G. 1988. Confermata nidificazione dell'Uccello delle tempeste, *Hydrobates pelagicus*, in Sardegna. Riv. Ital. Orn. 58: 125-128.
- Guyot, I., Launay, G. & Vidal, P. 1985. Oiseaux de mer nicheurs du Midi de la France et de Corse: évolution et importance des effectifs. Pp. 31-47 in: Oiseaux marins nicheurs du Midi et de la Corse. Ann du C.R.O.P., n° 2.
- Heim de Balsac, H. & Mayaud, N. 1962. Oiseaux du Nord-ouest de l'Afrique, Lechevalier.
- Hemery, G. & D'Elbée, E. 1985. Discrimination morphologique des populations Atlantique et Méditerranéenne de Petrel tempéte *Hydrobates pelagicus*. Pp. 63-67 in: Oiseaux marins nicheurs du Midi et de la Corse. annales du C.R.O.P., n° 2.
- James, P.C. 1984. The status and conservation of Seabirds in Mediterranean Sea. Pp. 371-375 in: Croxall, J.T., Evans, P.G.H. & Schreiber, R.W., Status and conservation of the World's Seabirds. ICBP Technical Publ., n° 2.
- James, P.C. 1985. Geographical and temporal variation in the calls of the Manx Shearwater *Puffinus puffinus* and British Storm Petrel *Hydrobates pelagicus*. J. Zool. London 207: 331-334.
- Krpan, M. 1965. Ptice otoka Visa i njemu blizih otocica. Larus 16-18:106-150.
- Lacy, R.C. 1988. A report on population genetics in conservation. Conservation Biology 2:245-247.
- Massa, B. & Catalisano, A. 1986a. Observations on the Mediterranean Storm Petrel *Hydrobates pelagicus* at Marettimo isle. Avocetta 10:125-127.
- Massa, B. & Catalisano, A. 1986b. Status and conservation of the Storm Petrel *Hydrobates pelagicus* in Sicily. Pp. 143-151 in: Medmaravis & Monbailliu, X., Mediterranean Marine Avifauna. Springer-Verlag.
- Massa, B. & Lo Valvo, M. 1986. Biometrical and biological considerations on the Cory's Shearwater *Calonectris diomedea*. Pp. 293-313 in: MEDMARAVIS & Monbailliu, X., Mediterranean Marine Avifauna. Springer-Verlag.
- Meininger, P.L. & Baha El Din, S.M. 1986. Seabirds along the Mediterranean Sea Coast of Egypt. Pp. 107-121 in: MEDMARAVIS & Monbailliu, X., Mediterranean Marine Avifauna. Springer Verlag.
- Moltoni, E. 1970. Gli Uccelli ad oggi riscontrati nelle isole Linosa, Lampedusa e Lampedusa e Lampione Isole Pelagie, Canale di Sicilia, (Mediterraneo). Riv. Ital. Orn. 40:77-283.
- Paz, U. 1987. The Birds of Israel. Steimatzky.
- Schembri, M. 1843. Catalogo Ornitologico del gruppo di Malta. Anglo-Maltese. Malta.
- Slatkin, M. 1987. Gene flow and the geographic structure of natural populations. Science 236:787-792.
- Sultana, J., Gauci, C. 1982. A new guide to the Birds of Malta. MOS, Malta.
- Sultana, J., Gauci, C. & Beaman, M. 1975. A guide to the Birds of Malta. MOS, Malta.
- Thevenot, M. 1986. Storm-Petrel. In: European News, British Birds. 79:285 Vittery.
- Walmsley, J. 1986. The status of breeding Storm Petrels *Hydrobates pelagicus* on the Mediterranean coast of France. Pp. 153-160 in: MEDMARAVIS & Monbailliu, X., Mediterranean Marine Avifauna. Springer-Verlag.

Bruno Massa — Università di Palermo, Palermo, Sicily.

Joe Sultana — 3 Sciberras Flats, Fleur-de-Lys Junction, B'Kara BKR 02, Malta.

THE DISTRIBUTION OF THE SHORT-TOED LARK *CALANDRELLA BRACHYDACTYLA* DURING THE BREEDING SEASON IN THE EASTERN SECTION OF MALTA

Denis Cachia

Abstract

A survey was carried out during 1986 and 1987 to establish the distribution of the Short-toed Lark during the breeding season in the Eastern section of the island of Malta. A map has been drawn showing the areas where Short-toed Larks were found breeding or possibly breeding. The main breeding areas of the species in the area are briefly described. Some of the threats to the future of the Short-toed Lark and its breeding habitats are mentioned.

Introduction

The Short-toed Lark *Calandrella brachydactyla* is a very common migrant and breeding summer resident. In the Maltese archipelago it breeds on the islands of Malta, Gozo and Comino, being relatively most common on the island of Gozo. The species occurs from early March to late September or early October raising two broods between April and early July. The nest is built on the ground, usually beside a small stone or plant, and 3 to 5 (usually 4) eggs are laid. The Short-toed Lark breeds in open, dry, generally tree-less habitats. It breeds on cultivated and uncultivated ground with little vegetation or with short grass including "garigue" areas and airfields. It avoids areas dominated by buildings or trees but may tolerate small, widely scattered buildings and a few well-spaced trees and/or shrubs in its breeding territory (Sultana & Gauci 1982).

Methods

A survey to establish the distribution of the Short-toed Lark during the breeding season in the Eastern section of Malta was carried out by the author during 1986 and 1987.

For the purpose of the survey, the Eastern section of Malta is taken to mean as that part of the island of Malta lying east of longitude 14° 26' 00". The survey was carried out between 7th June and 3rd July 1986 and between 14th May and 2nd July 1987. The periods chosen for the survey more or less coincide with the raising of the second brood by the Short-toed Larks. The same periods are also away from the spring and autumn migration periods, thus sightings of Short-toed Larks during the survey periods refer to summer resident adult birds or locally bred first-brood juveniles.

A map (1:25,000 MALTA, Sheet 3 — D.O.S. Series M898, 1962) was used as the basis for the study of the Short-toed Lark's distribution in the area. The UTM grid, dividing the map into equal quadrants of 1sq. km., allowed the author to tackle the area in a systematic way. Every quadrant, or part of a quadrant, was visited at least once during 1986 or 1987. Only heavily built-up areas and afforested areas were not surveyed as these are known to be unsuitable for Short-toed Larks' breeding requirements. In the case of Luqa Airport, observations were made from outside the perimeter fence.

Fourteen visits were made in 1986 while twenty-eight visits were made in 1987. Visits were always made in the afternoon, generally between 16.00 and 19.30 hours (C.E.T.). The time spent and the area covered per visit were not recorded in 1986 but in 1987 these were recorded on an estimation basis.

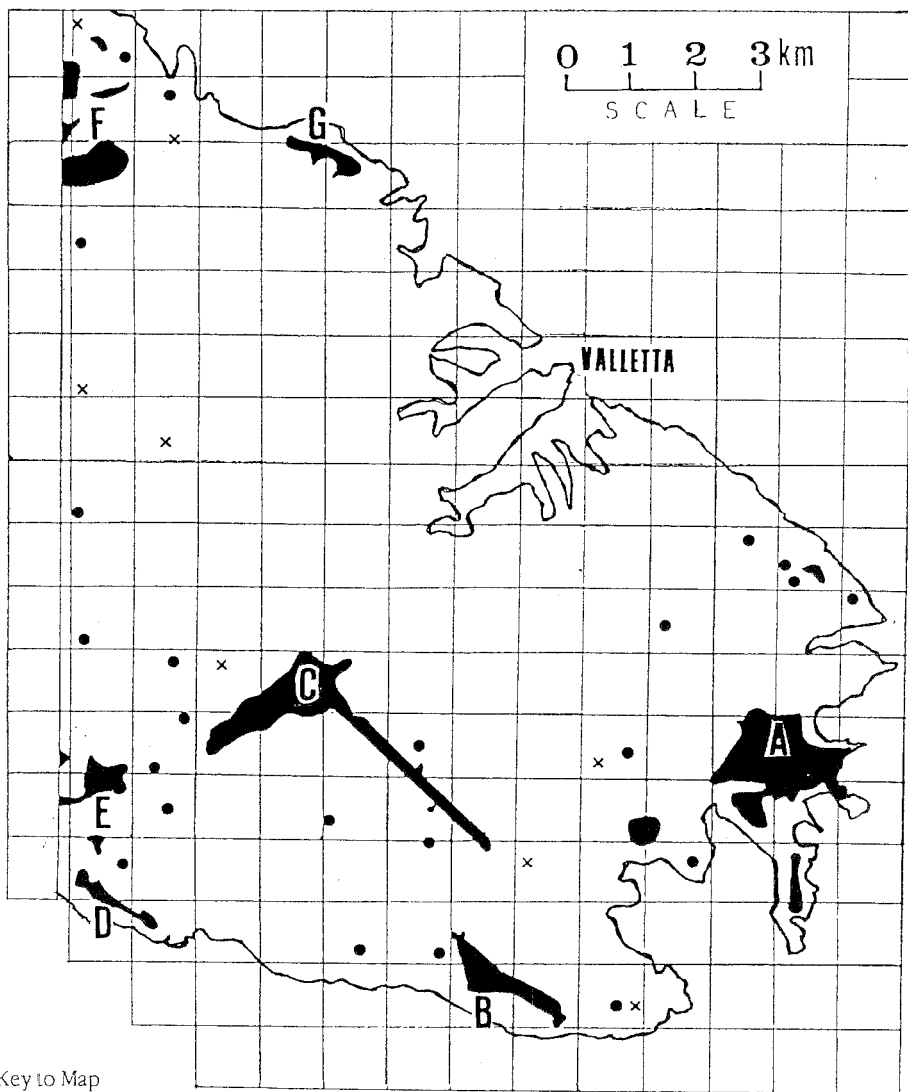
During 1987, about 51 sq. km. were tackled in about 65 hours, bringing an average time allocation per 1 sq. km., to about 1 hour 17 minutes. The duration of each visit in 1987 ranged from about 1 hour 15 minutes to about 3 hours 30 minutes (average about 2 hours 19 minutes). The area covered per visit ranged from about 1 sq. km. to about 4 sq. km. (average about 1.82 sq. km.). No similar records were kept during 1986 but the author estimates that the average time allocated per 1 sq. km. was not substantially different from that calculated for 1987.

It resulted that in those areas where no Short-toed Larks were observed, these were tackled in a shorter time span than in those areas where Short-toed Larks were present. It was found to be more time-consuming to establish the location of a lone singing Short-toed Lark or to establish the outer boundary-line of an area where Short-toed Larks were present in some numbers.

Short-toed Larks are easily flushed from the ground simply by approaching or intruding into their breeding territories. Keeping this in mind, the author surveyed the areas on foot and made his presence obvious to encourage birds on the ground to fly and start calling. The behaviour of the flushed birds was noted, especially whether they were singing or just calling. Observations were made by the naked eye or with the random use of an 8 x 30 binocular.

Results

From Map 2 it results that the Short-toed Lark is completely absent as a breeding bird from large areas,



Key to Map

- x 1-3 Short-toed Larks observed but not heard singing. Probably non-breeding adults or first year birds. Possibility of breeding not excluded but not very likely.
- 1-5 Short-toed Larks observed. At least one male heard singing and breeding is very probable. Less than 3 pairs apparently present in the area.
- Short-toed Larks present and singing all over the shaded areas. A minimum of 3 pairs present in the small areas but many more pairs present in the larger areas. Judging by the behaviour of the birds, breeding is certain.

especially the Valletta peninsula and its suburbs. The presence of large towns and villages, with little open spaces between them, is the main cause for the absence of breeding Short-toed Larks here and in similar areas.

In agricultural land, the type of crops grown often influences the presence or absence of breeding Short-toed Larks. For example, Short-toed Larks were found breeding in areas where the last harvested crop was Red Clover *Hedysarum coronarium* but appeared to avoid breeding in those areas just harvested from cereal crops especially wheat. This may be due to the fact that clover is harvested in late March and cereals in mid-late June.

In the last two or three decades, tree-planting by land-owners and the government is becoming more popular. While tree-planting is beneficial to various species of birds, it poses a threat to the habitat of the Short-toed Lark.

Direct persecution of the species (trapping and shooting), as well as indirect human disturbance, appear to be the reasons why certain areas offering apparently adequate habitat hosted no breeding Short-toed Larks. These adverse human activities also result in the reduction of their population density in those areas where Short-toed Larks breed.

Apart from a few scattered breeding pairs, the Short-toed Lark was found breeding in the following main areas. (Refer to Map).

A. Ta' Lombardi, limits of Marsaxlokk, including Xrobb il-Ghaġin peninsula and Il-Ballut. A few pairs were also found breeding at It-Tumbrell, limits of Delimara, and at Il-Fiddien near Qajjenza. The habitat in this area is mainly agricultural land with some "garigue". Parts of these areas are being developed and a power station is being built at Delimara.

B. Hal Far disused airfield. The area is threatened by the building of more factories. Parts of the area are also being used for the dumping of soil and rubble.

C. Luqa airport. An important breeding area of the Short-toed Lark in the Eastern section of Malta. Short-toed Larks breed in good numbers within the perimeter fence of the airport wherever the grass grows short especially as a result of mowing. The species avoids breeding in those parts of the airfield where the grass and vegetation grows high and dense.

D. From Mnajdra and Hagar Qim prehistoric temples to near Wied Hoxt and Wied iż-Żurrieq. The habitat here consists of "garigue".

E. Tal-Providenza, limits of Siġġiewi. The habitat in this area is mainly agricultural land.

F. Għallis area to Ta' San Pietru near the Victoria Lines. In this area Short-toed Larks breed in isolated patches. The habitat here is mainly agricultural with some "garigue" and land reclaimed from rubbish dumping ground.

G. Pembroke. An area consisting of "garigue" and partly occupied by the Pembroke Rifle ranges. Building development in the area is a serious threat to the future of the habitat.

The map consulted was 1:25,000 Malta, Sheet 3 - D.O.S. Series M898, 1962.

References

Sultana, J. & Gauci, C. 1982. A New Guide to the Birds of Malta. The Ornithological Society: Malta.

Dennis Cachtia - 17 Gardenja Street, Santa Lucija PLA 09, Malta.