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Locusta migratoria cinerascens Fabricius, 1781 (Orthoptera: Acrididae) in the Maltese Islands

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ABSTRACT. Breeding of *Locusta migratoria cinerascens* in the wild is reported for the first time in the Maltese Islands. This was established following the discovery of four late-instar nymphs from Aħrax tal-Mellieħa, which were collected and reared. One individual successfully attained maturity in captivity. The presence of this species in the Maltese Islands is discussed.

KEY WORDS. Mediterranean, breeding record, Malta.

INTRODUCTION

Locusta migratoria Linnaeus, 1758, is widespread across the Palaearctic and Afrotropical realms. The subspecies *Locusta migratoria cinerascens* Fabricius, 1781 seems to occur within the Mediterranean region and the Sahara (Allal-Benfekih *et al*., 2011; Cassar *et al*. 2020). The species is vernacularly referred to as migratory locust and is one of two large grasshopper species (Orthoptera: Acrididae) known to occasionally 'migrate' to the Maltese Islands, the other being *Schistocerca gregaria* Forsskål, 1775 (Cassar, 1990a). The presence of *Locusta migratoria* in the Maltese Islands has been indicated in some of the earliest local literature dealing with entomology. Gulia (1858) writes how, in 1850, "a cloud of such locusts covered the sky to the eastern part of the island", with Żabbar and Wied il-Għajn (Marsaskala) bearing the brunt. However, the contribution in question is characterised by various misidentifications (probably as a result of a lack of accessibility to supporting literature, which was a common occurrence at the time), so the exact identity of the itinerant locusts – though he refers to them as *Locusta migratoria* – remains in doubt. Borg (1939) mentions the species in his list of migratory insects but implies that *Locusta migratoria* is not a locally-breeding species by stating that it "[does] not exist in these Islands"; he attributes this to the locusts' disposition to breed in "marshes along … large rivers", which do not exist in the Maltese Islands under the present climatic regime.

It is unclear why Valletta (1954, 1955) does not list *L. migratoria* in his contributions on Maltese Orthoptera, despite providing reference to other species (such as *Schistocerca gregaria*) discussed in an account by John Borg fifteen years earlier, even if he had not examined Borg's material. The first verified record of *Locusta migratoria* for the Maltese Islands was published by Lanfranco (1955), from a single specimen taken at Wied Inċita. Saliba (1963) makes a brief mention of *Locusta migratoria*, noting it as "Not very common. Sometimes on Vine", but the species' presence is not reliably recorded again until Baccetti (1973) reaffirms its presence once more, referring to it as a "holopalearctic" species. However, he does not discuss its status as migrant or resident.

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Finally, Cassar (1990b) suggests that a local population of *Locusta migratoria* exists, supplemented by "the occurrence of vagrants", but does not list any localities in which it is locally breeding. The present work records such evidence, following the recent discovery of four *Locusta migratoria cinerascens* nymphs at a coastal location on the northernmost Mellieħa promontory.

MATERIAL AND METHODS

Four nymphs were collected from L-Aħrax tal-Madonna, Mellieħa, in the northern part of the main island, Malta, by one of the authors [TC]. The nymphs were kept alive and placed in a 165 × 325 × 230 mm vivarium with a soil substrate and some dry vegetation, notably branches for perching. Fresh grasses (species of Poaceae) and chopped carrot were introduced into the tank periodically. Nymphs that died in captivity and the successfully moulted adult were dry mounted on continental pins. Photographs of live *in situ* nymphs and subsequently of pinned specimens, were taken with a compact camera model, set in macro mode with focus stacking.

RESULTS

Locusta migratoria cinerascens Linnaeus, 1758

(Figs. 1-6)

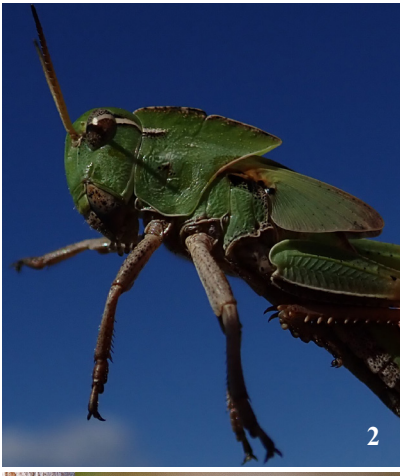
Material examined. MALTA: Mellieħa (L-Aħrax tal-Mellieħa, 35°59'17.1"N 14°22'29.1"E), 27.x.2019, 4 nymphs (two individuals illustrated in figures 1-2), leg. T. Cassar.

In the course of rearing the four nymphs, two died before reaching the final instar. One moulted once into the final instar but failed to progress to maturity. One nymph moulted and subsequently progressed to mature adult phase (Fig. 3).

DISCUSSION

The discovery of nymphs in the Maltese Islands is, at the time of this publication, the first published record of *Locusta migratoria cinerascens* ovipositing locally. Nymphs, incapable of flight, can be treated as discernable biomarkers that signify the breeding of migratory locusts within a region (e.g. Nicolas & Farrow, 1984), especially in the case of isolated islands such as Malta. The local breeding of *L. migratoria cinerascens*, however, comes as no surprise, since the species is known to breed in northern Africa, as also in Italy (Labadessa, 2014) and in various other parts of the Mediterranean (Cassar *et al*., 2020). In fact, one of the authors [LFC] encountered nymphs of the species in the past, notably on the headwaters of Wied Qannotta in the limits of Wardija (35° 55' 39.10" N; 14° 23' 02.65" E) in 1981, on the Lippija plateau (35° 55' 33.40" N; 14° 20' 48.60" E) in 1986, and more recently, in 2019, on the Rdum il-ħmar clifftop (Aħrax), overlooking Għadira Bay (35° 59' 00.80" N; 14° 21' 46.41" E), where local populations have been known to occur. A mating pair (figs. 4-5) was also photographed on open karst in Pembroke some years ago (♂♀ 09.iii.2013; credit: G. Bonett).

Voucher specimens (adult phase) in this same author's collection [LFC] attest to a relatively widespread overall distribution within the main island's northern and north-western segments (Fig. 6), though in small population densities, with confirmed records from Baħrija valley, Binġemma Gap, Lippija, Wied Għajn Riħana, Wied il-Fiddien, Wied Qannotta, and Wied il-Qlejgħa. Moreover, sightings of adult individuals within *Juncus acutus* stands at the Għadira saltmarsh can also be



Figures 1-3: *Locusta migratoria cinerascens* from Malta. **Figure 1**: nymph, *in situ* (at site of collection); **Figure 2**: nymph, (detail of the forepart); **Figure 3**: adult ♂, collected as a nymph from L-Aħrax tal-Mellieħa, reared in captivity (significantly damaged by other individuals in the vivarium). **Figures 4-5**: *Locusta migratoria cinerascens* mating pair photographed by Guido Bonett in Pembroke, 9.iii.2013.

confirmed. Interestingly, all the localities (within which the species was encountered) fall within two principal habitat-types, namely sheltered valley systems and grabens with fairly lush vegetation, and karstic areas with grasses-dominated biotopes, such as Andropogonid grass steppe, characterized by *Hyparrhenia hirta* among other species.

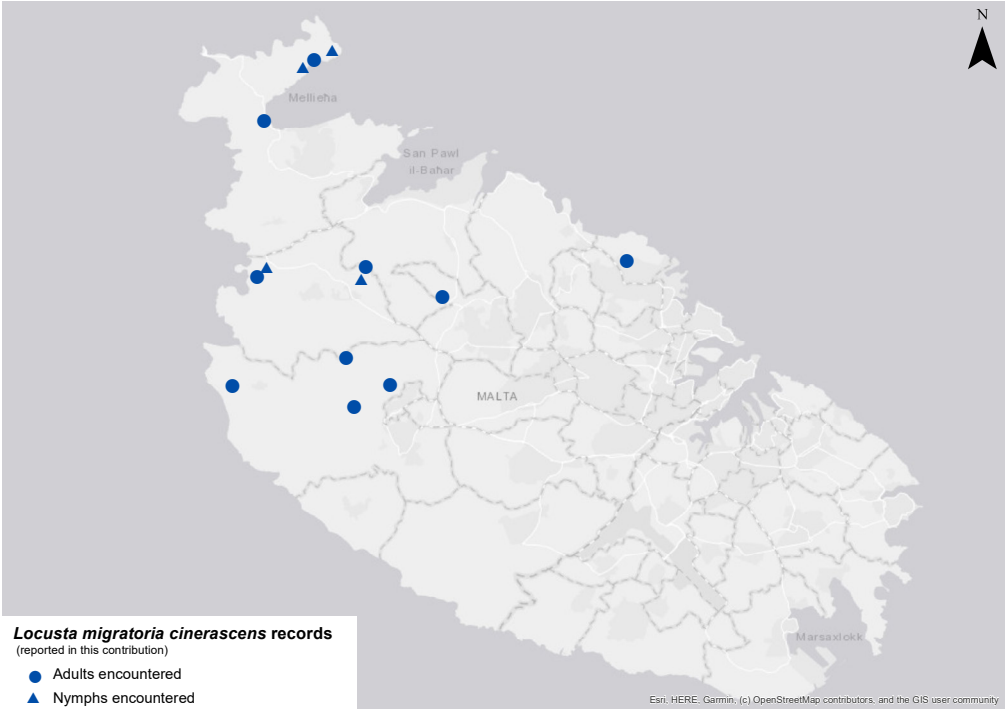


Figure 6: Distribution of *Locusta migratoria cenerascens* Fabricius, 1781

Since *L. migratoria cinerascens* is not considered to be a serious crop pest locally and as long as the aforementioned localities remain somehow connected via natural ecological corridors, it is unlikely that the species will face a severe decline. Notwithstanding, its subpopulation numbers remain relatively small and therefore somewhat vulnerable. In this regard, further research is warranted in order to monitor the species' population density and distribution, as also to better understand whether influxes of immigrants augment local numbers and, if so, whether these incoming individuals belong to the solitary or gregarious phase.

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