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Dispersal of Heterocera species from North Africa to the Maltese Islands (Insecta: Lepidoptera)

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Abstract

Located right in the middle of the Mediterranean, the Maltese Islands are some of the richest in the region. When the winds are right, several North African Heterocera species can be observed during the same night, depending on the season. The purpose of this paper is to document the North African Heterocera recorded from Malta during the last 13 months ending December 2021.
Keywords: Insecta, Lepidoptera, migration, dispersal, North Africa, Malta.

Dispersión de especies de Heterocera desde el norte de África hasta Malta (Insecta: Lepidoptera)

Resumen

Situadas en pleno Mediterráneo, las islas maltesas son unas de las más ricas de la región. Cuando los vientos son adecuados, se pueden observar varias especies de Heterocera norteafricanas durante la misma noche, dependiendo de la temporada. El objetivo de este trabajo es documentar los Heterocera norteafricanos registrados en Malta durante los últimos 13 meses hasta diciembre de 2021.
Palabras clave: Insecta, Lepidoptera, migración, dispersión, África del Norte, Malta.

Introduction

With an area of just 316 sq km, the Maltese Archipelago is one of the smallest in the world. Yet it is also one of the densest, with over 514,000 residents as of 2019. Only the three largest islands - Malta, Gozo and Comino are inhabited whilst the other small islands such as Filfla, St. Paul's islands, Kemmunett and the Fungus Rock are unoccupied. The Islands are enviably located in the passageway between Africa and Europe, 93 km south of Sicily and 288 km north of Libya.

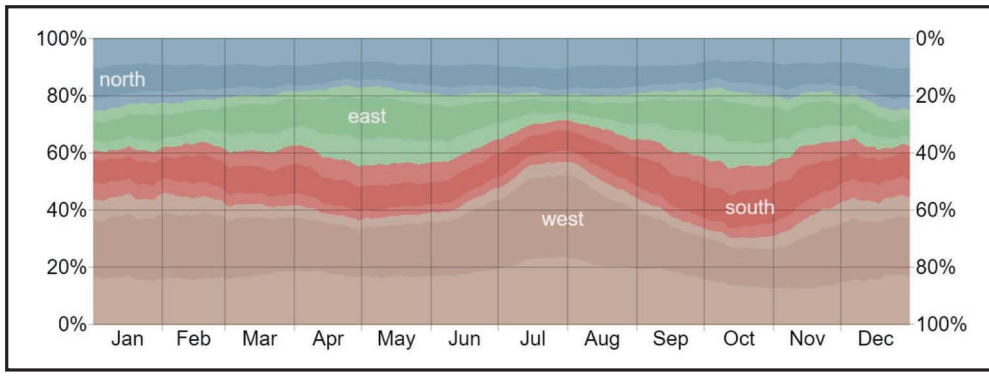
Malta is the largest and most developed of the three islands, and remains the cultural, commercial and administrative centre. Gozo is the second largest island and more rural; it is known for its more abundant countryside and open spaces. Comino, while largely uninhabited, is a popular destination for day-trippers and hikers. The highest point above sea level is 250 metres at Dingli Cliffs.

Malta has a Mediterranean climate according to the Köppen climate classification with very mild winters and warm to hot summers. Rain occurs mainly in autumn and winter, with summer being generally dry. According to the Troll-Paffen and the Siegmund / Frankenberg climate classifications, Malta lies within the subtropical zone, being at 35ºN latitude.

The average yearly temperature is around 23 ºC (73 ºF) during the day and 16 ºC (61 ºF) at night (one of the warmest temperature averages in Europe). January is normally the coldest month with the

typical maximum temperature ranging from 12 to 20 ºC (54 to 68 ºF) during the day and a minimum from 6 to 12 ºC (43 to 54 ºF) at night. In the warmest month - August - the typical maximum temperature ranges from 28 to 34 ºC (82 to 93 ºF) during the day and the minimum from 20 to 24 ºC (68 to 75 ºF) at night. Malta has an average of 90 precipitation days a year, and experiences from a few to a dozen rainy days per month (≥ 1 mm), ranging from half a day in July to around 15 days between November and December. The average annual precipitation is around 600 mm, ranging from ≈ 0.3 mm in July to ≈ 110 mm in December. The annual average relative humidity is high, averaging 75% per annum but ranging from 65% in July to 80% in December. As one might expect from an archipelago situated next to North Africa, Malta enjoys around 3,000 hours of sunshine per year (also one of the highest in Europe), from an average of about 5 hours of sunshine per day in December to an average of more than 12 hours of sunshine per day in July. Thus, Malta enjoys about twice the amount of sunshine as cities in the northern half of Europe. For comparison, London has 1,461 sunshine hours per year.

Malta can be windy. During an analysis carried out on surface wind speeds measured using cup anemometers and wind vanes which are situated at a standard height at the Malta Airport MetOffice between 1951 and 2010, the yearly average wind speed can range between of 10.3 knots (or 19.1 km/hr) to 7.1 knots (13.2 km/hr). (Galdes, 2011). Retrieving data from Malta Weather Station for the year 2021, there were 6 days where the wind speed exceeded the 80 km/hr mark with the average windspeed being 11.5 km/hr whilst the average gust speed reading 17.9 km/hr. The most prevailing winds in Malta are Northwest and North-northwest with southern winds normally experienced during winter to mid-spring and then again during mid-autumn as depicted in the chart below.



Discussion

Wind is a major contributor in the migration and dispersal of insects. The definition of the term migration that best suits the purposes of this research, and that is most consistent with insect behaviour has been provided by Kennedy (1985) by stating that *"Migratory behaviour is persistent and straightened-out movement effected by the animal's own locomotory exertions on or by its active embarkation on a vehicle. It depends on some temporary inhibition of station-keeping responses but promotes their eventual disinhibition and recurrence.*" An important term in this definition is the word persistent where the activity of the insect is tenacious so that it carries the migrant beyond its original habitat to a new one where it gathers previously unavailable resources. Dispersal is more simply defined as movement that results in an increase in the mean distance between individuals (Southwood, 1981) and which in the author's opinion is not normally initiated by the insect but normally the result of external factors such as weather conditions. Apparently, insects using kinetic energy of atmospheric circulation through downward movement has enormous survival rate and they are also able to locate and exploit ephemeral vegetation. A case in point is *Helicoverpa armigera* (Hübner, [1808]) which has

been documented travelling from North to Northeast of China and flew about 8.5 hours per night (Sujayanand et al. 2016).

In Malta, most species are not recorded on an annual basis but only when perfect atmospheric conditions coincide precisely with the peak emergence of the species in North Africa. It is important to highlight that the species recorded from North Africa have all been recorded either during or following southern winds. Furthermore, no larvae of these dispersed moths have been recorded so far in Malta. This could be the result of lack of proper foodplants, improper micro-environmental conditions or just an oversight from local naturalists. However, based on the above, it is logically to conclude that North African moths which are recorded in Malta are not the result of migration but simply dispersal due to southern winds.

Methods

The present paper will compile all records made by the author. None of these species are new to the Maltese islands but all species have been flagged as rare migrants in Maltese literature (Sammut, 2000). The cited material has been recorded using a 250 W mercury vapour light and / or an 18W UV Black light tube, with most specimens found in the author's private collection.

Results

NOCTUIDAE

Cucullia biskrana Oberthür, 1918

Material: Malta, Salina Nature Reserve, 1 ♂, 03-XII-2020 leg. J. Agius; Dingli Cliffs, 1 ♂, 15-XII-2020 leg. J. Agius

Cucullia syrtana Mabille, 1888

Material: Malta, Zurrieq, 1 ♂, 05-II-2021 leg. J. Agius

Agrotis haifae Staudinger, 1897

Material: Several specimens from both gender Malta, Zurrieq, 07-I-2021, 04-XI-2021, 05-XI-2021, 06-XI-2021, 07-XI-2021, and 08-XI-2021 leg. J. Agius.

Agrotis herzogi Rebel, 1911

Material: Several specimens from both gender Malta, Zurrieq, 23-XII-2020, 07-I-2021, 09-I-2021, 23-X-2021, 04-XI-2021, 05-XI-2021, 07-XI-2021, 08-XI-2021, 09-XI-2021, 10-XI-2021, 12-XI-2021, 16-XI-2021; Dingli Cliffs 07-XI-2021 leg. J. Agius.

Agrotis lasserrei (Oberthür, 1881)

Material: Malta, Zurrieq, 1 ♂, 17-XI-2021 leg. J. Agius

EREBIDAE

Cerocala algiriae Oberthür, 1876

Material: Malta, Zurrieq, 6 ♂♂, 8-XI-2021 leg. J. Agius

Tathorhynchus exsiccata (Lederer, 1855)

Material: Several specimens from both gender Malta, Zurrieq, 06-I-2021, 22-I-2021, 03-II-2021, 05-II-2021, 08-II-2021, 19-02-2021, 09-III-2021, 03-IV-2021, 14-IV-2021, 28-IV-2021, 29-IV-2021, 13-V-2021, 11-XI-2021; Salina Nature Reserve 05-V-2021; Simar Nature Reserve 21-II-2021; Qormi - Wied il-Kbir 03-IV-2021; Mellieha (next to Red tower) 04-VI-2021 leg. J. Agius

Autophila maura (Staudinger, 1888)
Material: MALTA, Qormi - Wied il-Kbir, 1 ♂, 03-IV-2021 leg. J. Agius

CRAMBIDAE

Evergestis desertalis (Hübner, [1813])
Material: MALTA, Zurrieq, 1 ♂, 19-II-2021 leg. J. Agius

TORTRICIDAE

Cydia blackmoreana (Walsingham, 1903)
Material: Several specimens from both gender MALTA, Zurrieq 08-I-2021, 09-I-2021, 04-II-2021, 06-II-2021, 07-II-2021, 08-II-2021, 10-II-2021 leg. J. Agius

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References

Galdes, C. (2011). *The Climate of Malta: statistics, trends and analysis 1951-2010*. National Statistics Office.

Kennedy, J. S. (1985). Migration, behavioural and ecological. In M. A. Rankin (Ed.). *Migration: Mechanisms and Adaptive Significance, Contributions in Marine Science, 27 (Supplement)* (pp. 5-26). University of Texas Marine Science Institute.

MALTA WEATHER STATION (2022). http://www.maltaws.com/

Sammut, P. (2000). *Kullana Kulturali. 12 - Il-Lepidoptera*. Pubblikazzjonijiet Indipendenza.

Southwood, T. R. E. (1981). *Ecological Methods*. Chapman and Hall.

Sujayanandm, G. K., & Karuppaiah, V. (2016). Aftermath of climate change on insect migration: A review. *Agricultural Reviews, 37*(3), 221-227.

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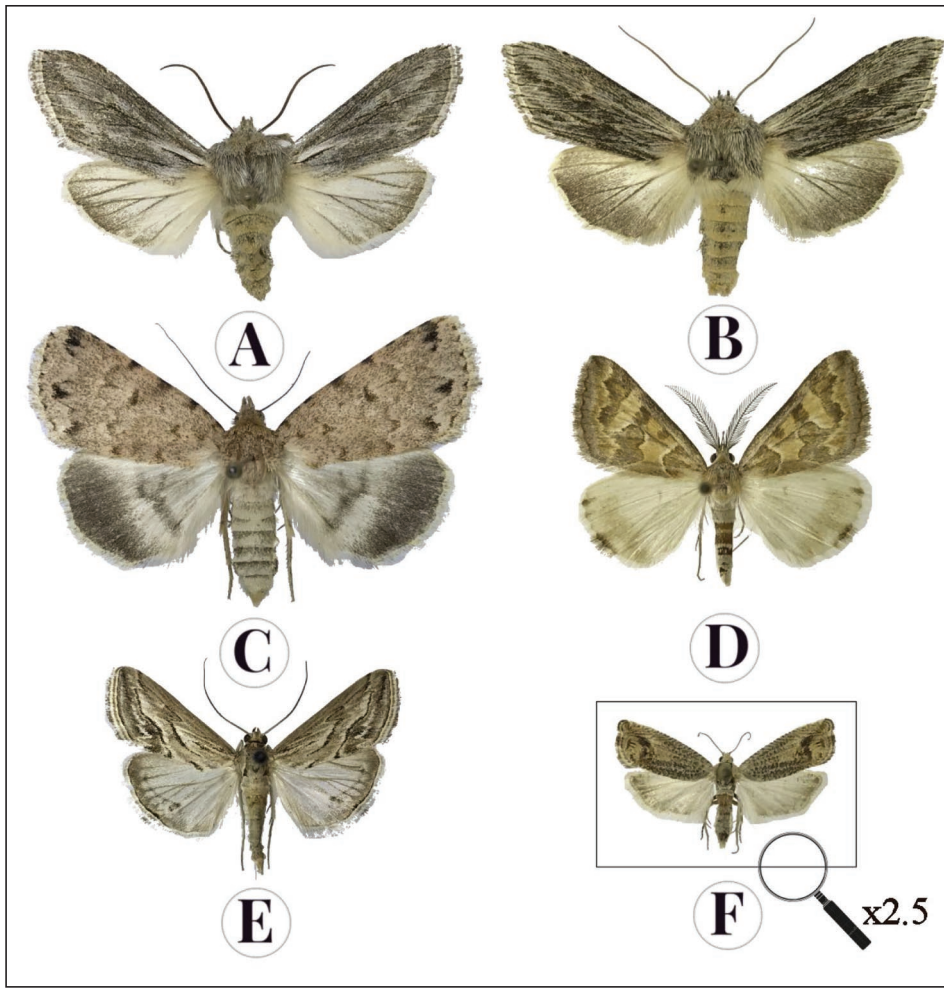

Figures A-F. A. *Cucullia biskrana* **B.** *Cucullia syrtana* **C.** *Autophila maura* **D.** *Cerocala algiriae* **E.** *Evergestis desertalis* **F.** *Cydia blackmoreana.*