special feature

TRITHEMIS ANNULATA

POLYPHAGA AEGYPTIACA

VESPULA GERMANICA

MANTIS RELIGIOSA

INSECTS
of the
MALTESE ISLANDS

CICADA BARBARA

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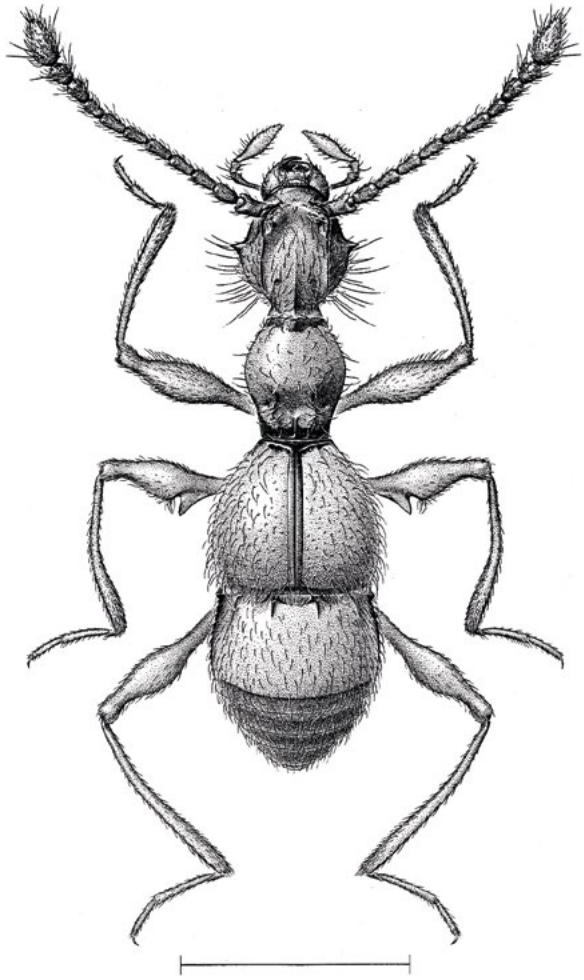
Images courtesy of Thomas Cassar



AMAUROPS MIFSUDI

Insects of the Maltese Islands *has recently been published by* ***Prof. David Mifsud*** *and* ***Thomas Cassar****. The book highlights the incredible diversity of Malta's insect world, its importance, and its mysteries yet to be uncovered.* ***Jonathan Firbank*** *speaks to Prof. Mifsud about the work behind it and the stories it tells.*

PIMELIA RUGULOSA MELITANA

Images courtesy of Armin Coray (left) and Thomas Cassar (right)

MEGACHILE PARIETINA

VANESSA CARDUI

We cannot meaningfully think about our ecosystem without considering insects. While an ecosystem refers to all the living things in an area, interacting with each other and their environment, in large part, insects *are* our ecosystem. Out of the world's animals, they make up over four-fifths of known species, account for around half of all animal biomass, and in terms of individual organisms, outnumber all other animals put together by multiple orders of magnitude. Insects number in the quintillions – tens of quintillions, in fact – and most feed and interact with almost every plant and tree present on planet Earth, with a minor component strictly associated with animals. For this reason, flowering plants evolved to take advantage of insects' proliferation. The topsoil, which supports so much life, is largely created by insect activity. And insects are, of course, a cornerstone of the food chain. The sheer scale of their impact is matched by the scale of what we have yet to learn. We may have only discovered a tenth of the insect species alive today.

Therefore, the act of documenting insect species is both Sisyphean and essential. Prof. David Mifsud, UM entomologist, and Thomas Cassar, biologist and filmmaker, are contributing to that effort with their recent publication, *Insects of the Maltese Islands*, released in December 2024. Mifsud and Cassar have created an encyclopedic book that depicts native insect species descriptively and photographically.

A crucial function of the text is accessibility. Between them, Mifsud and Cassar have over 300 scientific publications related to insect studies in Malta, but as with most academic texts, they are spread across different international journals. Texts such as these are often found in labyrinthine websites that are opaque or even inaccessible to laypeople. It is hard for Maltese people to engage with this cornerstone of their vulnerable ecosystem, all the more so given how invisible insect life can be. To that end, the book puts photography at the forefront. Cassar led the Herculean effort of capturing images of insects at crucial moments in their lifecycle, and two graphic designers, Daniel Spagnol and Melchiore Farrugia, sorted through the wealth of photographs. Cost is also crucial for accessibility. The book is set at a far lower price than similar publications, something that was made possible by funding provided by philanthropist Jean Claude Gandur.

An affordable compendium of Malta's insects, written in accessible language and showcasing exceptional photography, is something that should find a place in any Maltese home. Any conservationist can tell you about the importance of awareness – it can be hard for us to realise how vital something is if we don't have a relationship with it. Mifsud's own love for entomology started as a child, with the life in his family garden. A family bookshelf can be no less inspirational.

HYLES EUPHORBIAE

Images courtesy of Thomas Cassar

DOCUMENTING THE INFINITE

Of course, this task also brings with it certain constraints – the book couldn't be a comprehensive account of Malta's insects lest it become too heavy to lift. As Mifsud explains, 'The first idea Thomas and I had was that, from each family or group of insects, we would include one species. But this idea had to be abandoned, as even that would have turned an 800-page book into a 3000-page one.' This forced Mifsud and Cassar to be ever more selective, but the end result 'is the first book to include information on all the insect orders of Malta'. Notable books have been published prior, including Gauci's *Dragonflies and Damselflies of the Maltese Islands* and Valletta's *The Moths of the Maltese Islands*. But there was a conspicuous absence of a broader insect compendium. As such, *Insects of the Maltese Islands* serves as both an overview of and introduction to Maltese entomology.

The sheer amount of information available presented one problem, but the information itself often presented another. A single historical, entomological mistake can create misconceptions that last centuries, as the sheer scale of the field means that some definitions are revisited or challenged less frequently. Righting these wrongs was a driving force in how Mifsud and Cassar chose which species to showcase. For example, Malta has over 70 species of ant, but Mifsud and Cassar decided to focus on two which look particularly similar to one another despite coming from separate genera. 'This is known as Batesian mimicry,' when one species evolves to look like another, more dangerous one. 'But why did we include them? It's because these two species are often recorded in natural history texts under the wrong name.' The ants' evolutionary disguise was effective enough to work on human beings. Selecting them for *Insects of the Maltese Islands* provides a multifaceted opportunity. Most simply, it clarifies which one is which. But it also gives the reader an example of and explanation for Batesian mimicry, while showcasing the breadth that a study of the tiny creatures involves.

Mifsud explains that 'in the past, there have been a lot of misidentified insects. So much so that, even 10 years ago, making this book would have been impossible.' Mifsud and Cassar addressed this through international collaboration with many experts to ensure historical mistakes weren't repeated. 'Let me give you an example: the most common insect in the Maltese Islands is the one featured on our front cover, our cicada,' the insect that spends years in a subterranean larval stage before emerging to sing, mate, and die. The insect's life cycle and deafening presence makes it famous. 'Every year, a local newspaper article will be published about it, everyone knows it, even by its scientific name. In fact, this insect has been reported on for almost 200 years by the name of *Cicada orni*. But one thing about science is that you cannot take anything for granted.' Mifsud and Cassar were perplexed by its song, which seemed distinct from other examples of this species. 'We invited a group of experts and recorded cicada sounds. We found that, after 162 years of Malta thinking its cicadas were *Cicada orni*, the species was misidentified, and its correct name should be that of another species – *Cicada barbara*, all along.'

Sometimes, insects do not need inscrutable disguises or century-old mistakes to be lost to science.

Images courtesy of Thomas Cassar

Sometimes, they simply disappear. 'In the old literature, over 100 years ago, a new species of beetle was recorded that was said to only live in mud.' There were no accompanying descriptions of the beetle itself, only the claim that when their mud was disturbed, the insects would fly into the air. Mifsud searched for the incompletely described insect for over 30 years, in spite of many considering it extinct. Eventually, they revealed themselves to him in a tiny, muddy habitat in Gozo after a century-long absence. This is a very rare and endangered species that should be protected at all costs.

Species of insects which spend all their life cycle deep in the soil, known as endogean insects, were never studied locally. Some 20 years ago, Mifsud decided to explore this unique habitat and found some exceptional surprises – more than a dozen species of insects were discovered, including *Amaurops mifsudi*, which was named in honour of their rediscoverer. The stories these animals present are endless – some depended on Maltese livestock and their dung, which declined as Malta became less hospitable to grazing. Some still dwell amongst the sand of beaches and dunes. A small group of species of the genus *Ochthebius* even lives in rockpools, endlessly swimming to the surface and back as they harvest bubbles of air.

THE ESSENTIALITY OF ECOSYSTEMS

Not all of these stories are Maltese. Malta hosts a vast number of invasive species, a few of which are showcased in *Insects of the Maltese Islands.* One such insect is *Phryneta leprosa*, a longhorn beetle that appeared on the islands some 25 years ago. Identifying it necessitated consultation and, eventually, a trip to archives in Germany to track down precisely what it was. The beetle originated in Cameroon, travelling from Central Africa within lumber that had not been properly debarked. Once it arrived in Malta, it found itself with no natural predators and set upon Malta's already sparse tree count. Specifically, they killed numerous century-old mulberry trees that, ironically, had been introduced to the Islands themselves as food for silkworm caterpillars when the British wanted to set up a silk industry here.

As Mifsud explains, 'Biodiversity is a network. In fact, we can imagine it as a net – a fine net entangled together, where all organisms depend on each other. When we make a mistake', such as introducing an invasive species or destroying a native species through overconstruction or pesticide use, 'we tear a hole in this net. Each mistake further compromises this structure, this network, which supports us. 90% of our vegetables and fruit depend on pollinators, bees, and other insects. Without those pollinators, a big chunk of our food diversity will simply disappear. I cannot tell you the story of each and every species of insect. Many are known only from one or two specimens housed in a museum. They aren't the subject of studies; we don't even know whether they have become extinct or not.'

To that end, *Insects of the Maltese Islands* draws a reader towards a different perspective of conservation: that we should not only protect what we know, but also protect what we don't know. There are habitats and ecosystems that contain life we may never encounter, hidden by size, stealth, and the enormity of diversity. But it is life that may prove indispensable, nonetheless. T

Images courtesy of Thomas Cassar (top) *and Guido Bonett* (bottom)