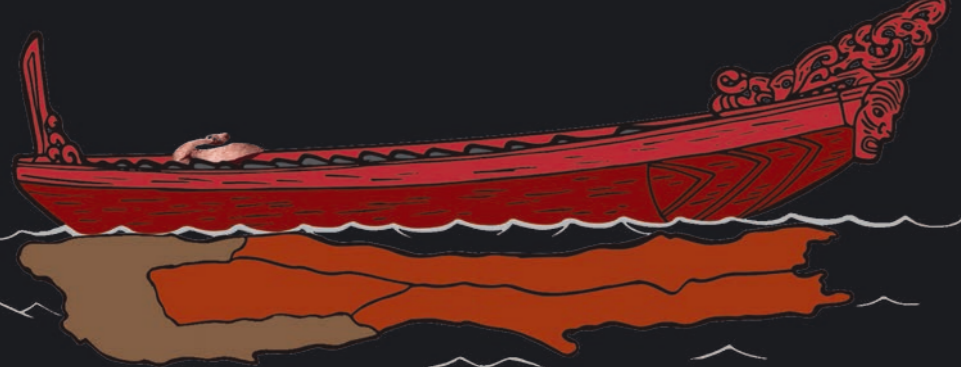


Beginners' Guide to Macro Moths

Te Taurapa



Te Takeka mai o te Pepe - The Origin of the Moth
 Tāne climbs to the highest heaven to visit his brother, Rēhua. Rēhua calls for a fire to be lit and calabashes to be brought forth. Tāne asks his brother "What will we be eating, brother?" At this, Rēhua shakes his head and two kōkō fall from his hair. Tāne refuses to eat the birds as they have been living in Rēhua's hair and are tapu. Tāne asks if he can return to earth with the birds. Rēhua agrees, and says that the birds will live in the trees, and feed on the fruits of the trees. When Rēhua shook his head other 'birds' also fell out: pēpepe, the moth; tātarakihi, the cicada; pihareika, the grasshopper; and kēkerewai, the beetle. Collectively these are known as 'Kā Manu a Rēhua' and come out in summer.

Kā Whetū - The Stars
 The story of the moth is told in the stars of the Rēhua constellation. Rēhua, the eldest son of Raki and Papatūānuku, is the reddish star Antares in the western Scorpius constellation

Wairua Takata - 'The Spirit of a Person'
 A common held belief was that the spirits of those who had passed would be reincarnated as a moth.

Moths are an important part of New Zealand's biodiversity
 Lepidoptera (moths and butterflies) are the third largest group of insects in New Zealand (over 1750 named species). Scientists estimate there are still more than 300 moth species to be discovered and named in New Zealand.

NZ moths are special
 More than 86% of the known moths in NZ are endemic. They only occur in NZ so we have to look after them.

Why are moths important?
 Moths are a key part of the wider ecosystem and they sit in the centre of a complex food web. The caterpillars are herbivores eating a range of native plants.

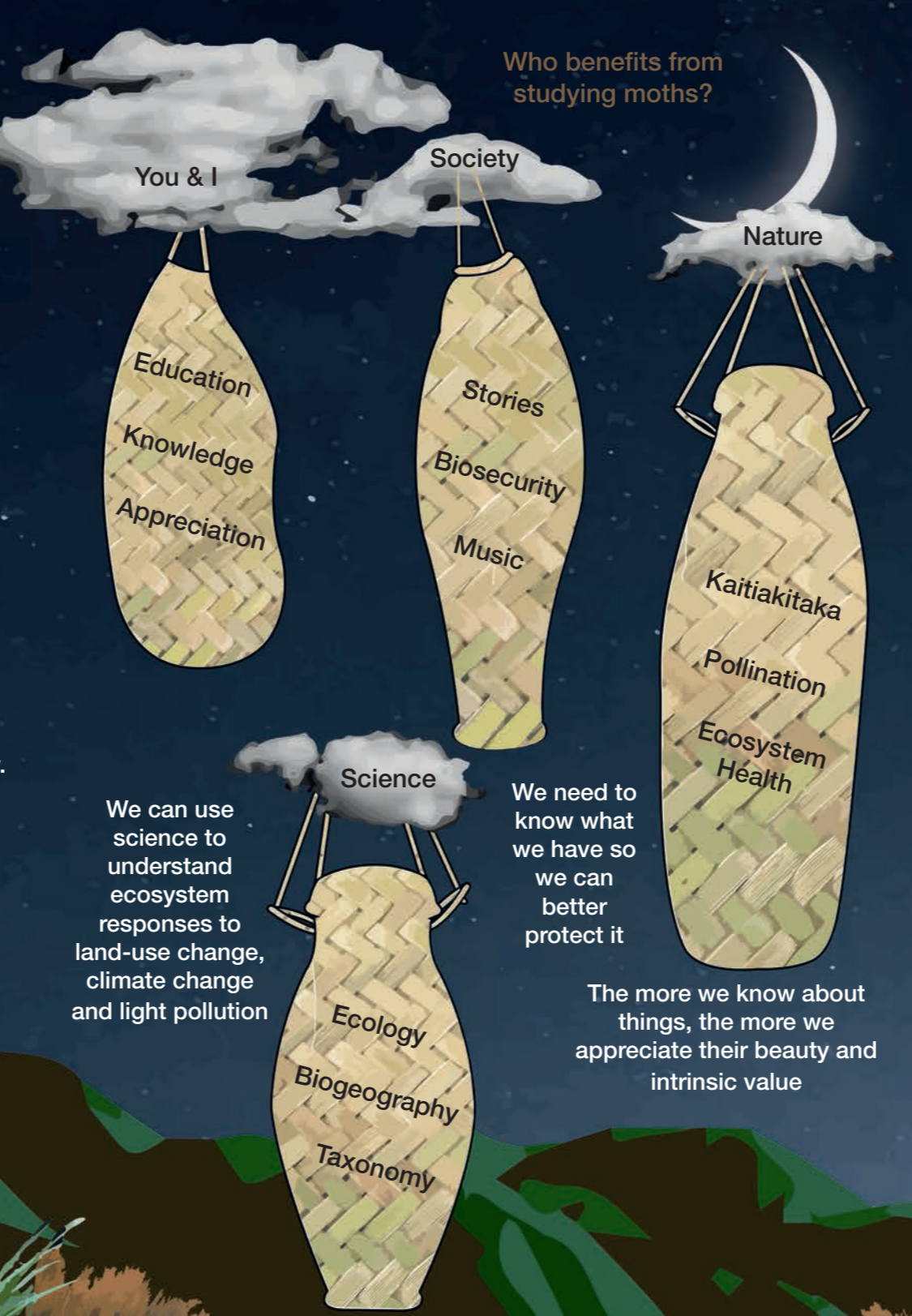
Many adult moths drink nectar and are important pollinators. Many of our native plants are likely pollinated by moths. Moths go quietly about this critical job during the night when most people are sleeping, which means we often overlook how important they are. Moths are a major food source for other insects and native birds. Unfortunately, they are also an important food source for introduced pests like mice, rats, and hedgehogs.

Moths can also be pests
 Hihue (the kūmara moth, *Agrius convolvuli*) had a large impact on kūmara crops and there are

many whakatauki written about the caterpillar and its capacity to eat. A more recent pest is the codling moth (*Cydia pomonella*). Introduced from Europe, it attacks apples, pears, walnuts, and other fruit.

Moths have a bad reputation for eating clothes, especially natural fibres like wool, silk, and fur. In reality there are very few moth species whose caterpillars eat clothes. You can easily solve this problem by putting the clothes in and out of the freezer a couple of times.

Puka Whakamārama o te Pepe Nui
 This guide contains only the most common larger moths in this large region. If you find a moth that is not in this guide, this may be because it is rare, a range extension (not normally found in this place), a 'micro-moth', an introduced species or a new species. Please let us know.



Why we need to trap the moths?
 Moths are mainly out at night, so most people don't see how many there are or what's happening to them. Unfortunately we need specimens for identification.

Why we need standardised data?
 If we all use the same type of trap (e.g. a Heath Moth Trap) we can compare data from different places and over time. With standardised information we can all work together to keep an eye on the moths. This way, if they start to decline we can see something is happening and work together to take better care of the moths.

Why we need quantitative data?
 Counting the number of individuals of each species gives us more information than just a list of the species present. This quantitative information helps to detect change over time or between places.

Why do we need to study moths?
 Moths breed fast and have lots of offspring. There are lots of different moth species playing different roles in the ecosystem. Moths have links to lots of other species (e.g. plants, birds, introduced pests, other invertebrates).

If something is changing in the ecosystem, moths are amongst the first creatures to respond. They are likely to be good indicators of change.

What does that word mean?
Lepidoptera: moths and butterflies
Endemic: found only in that place
Ecosystem: all biological and physical processes in an area
Food web: what eats what
Herbivores: animals that eat plants
Nocturnal: active at night
Community: species in an area

Note 1. A new species to be described in Hoare, R.J.B. in press. *Noctuinae* (Insecta: Lepidoptera: Noctuidae) part 1: *Austramathes*, *Cosmodes*, *Proteuxoa*, *Physetica*. *Fauna of New Zealand*. Name not nomenclaturally available from this guide.

Note 2. *Wiseana mimica*, *W. jocosa*, *W. cervinata*, and *W. fuliginosa* cannot be distinguished from *W. copularis* on the basis of photos; see 'Hepialidae' by J.S. Dugdale (*Fauna of New Zealand*, vol. 30) for identification keys and further information.

Note 3. *Aoraia* species cannot readily be distinguished based only on photos; see 'Hepialidae' by J.S. Dugdale (*Fauna of New Zealand*, vol. 30) for identification keys.

Note 4. *Physetica funerea* also occurs in this area, and can only be told apart from *P. cucullina* by detailed examination of male antennae.

Where to get more information & help
www.landcareresearch.co.nz/mothnet
 Email: MothNetOtago@gmail.com
 @MothNetNZ
 MothNetNZ
www.naturewatch.org.nz/
 Entomological Society of New Zealand:
www.ento.org.nz

Acknowledgements
 The text, content, and design are by the Ahi Pepe MothNet project partners: Dr Barbara J Anderson, Komene Cassidy, Victoria Campbell, Dr Robert Hoare, Tiahuia Kawe-Small, Tahu MacKenzie, Dr Ralf Ohlemüller, Tangiwai Rewi, Dr Priscilla Wehi and Emma Burns. Illustrations are by Sean W Gilles. The moth list was compiled by Dr Robert Hoare, with help from Brian Patrick and NZ's lepidopterist community. The moth images are photographs by Birgit Rhode of specimens in the NZAC, taken with funding from the Terrestrial Freshwater Biodiversity Information System (TFBIS) programme.

This guide was produced by Manaaki Whenua – Landcare Research as part of the Ahi Pepe MothNet project funded by the MBIE Unlocking Curious Minds initiative and Biological Heritage National Science Challenge.
 ISBN: 978-0-947525-29-3 (2017)



Ka hou ki te whenua, he tūkōkō; ka puta ki te raki he pepe – The pupa enters the Earth, a moth emerges to the sky

Te āwheto kai paeka – The caterpillar eats the leaf (Said of someone who goes around tasting various dishes)

Me te upoko tūkōkō – like the chrysalis of the Sphinx moth (When likening something to especially fine weaving)

I hikaina te ahi titi, engari i whakapoapoa kē i te pepe – The fire was lit to attract the mutton birds and the moths flew into it

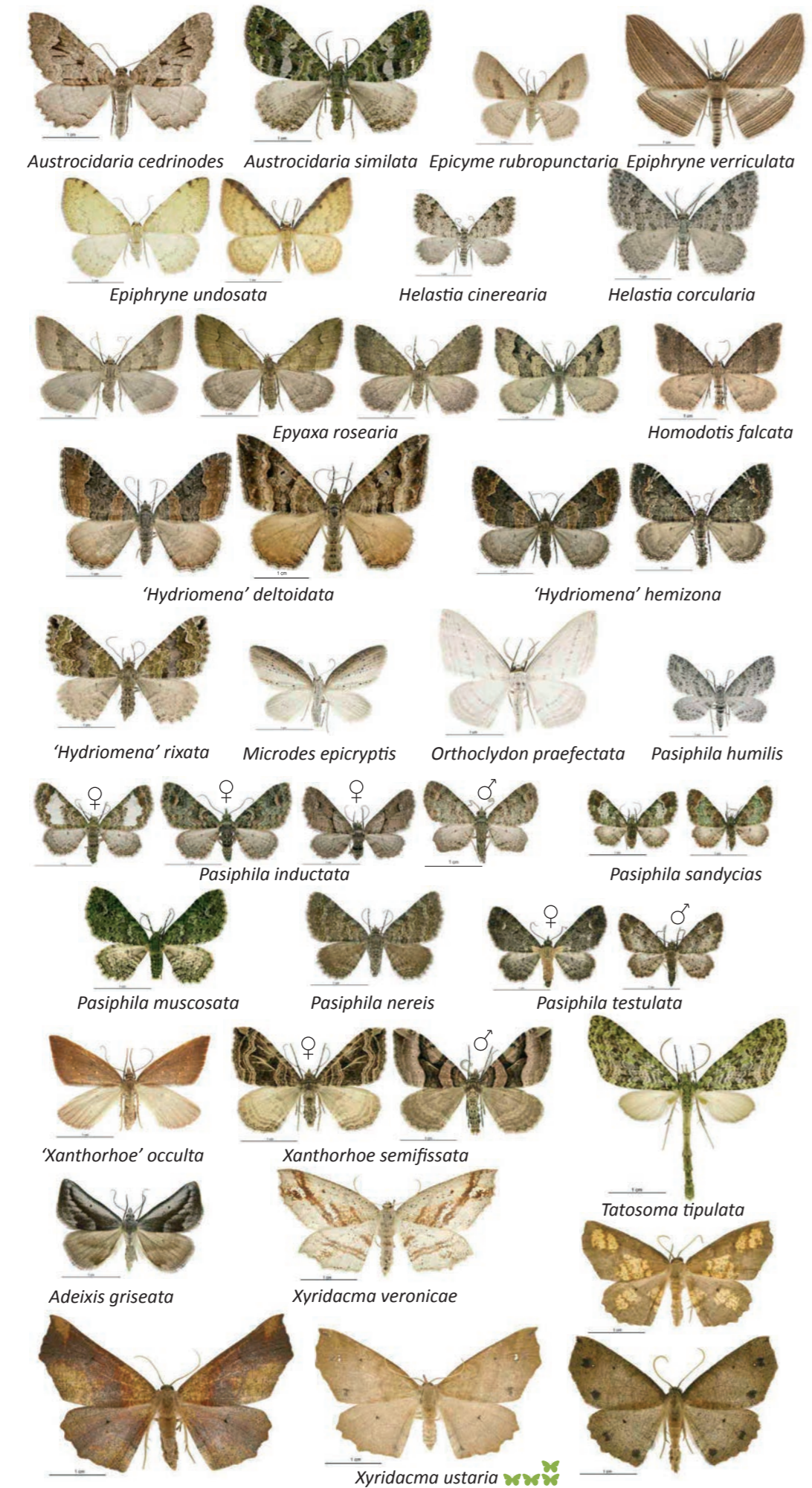
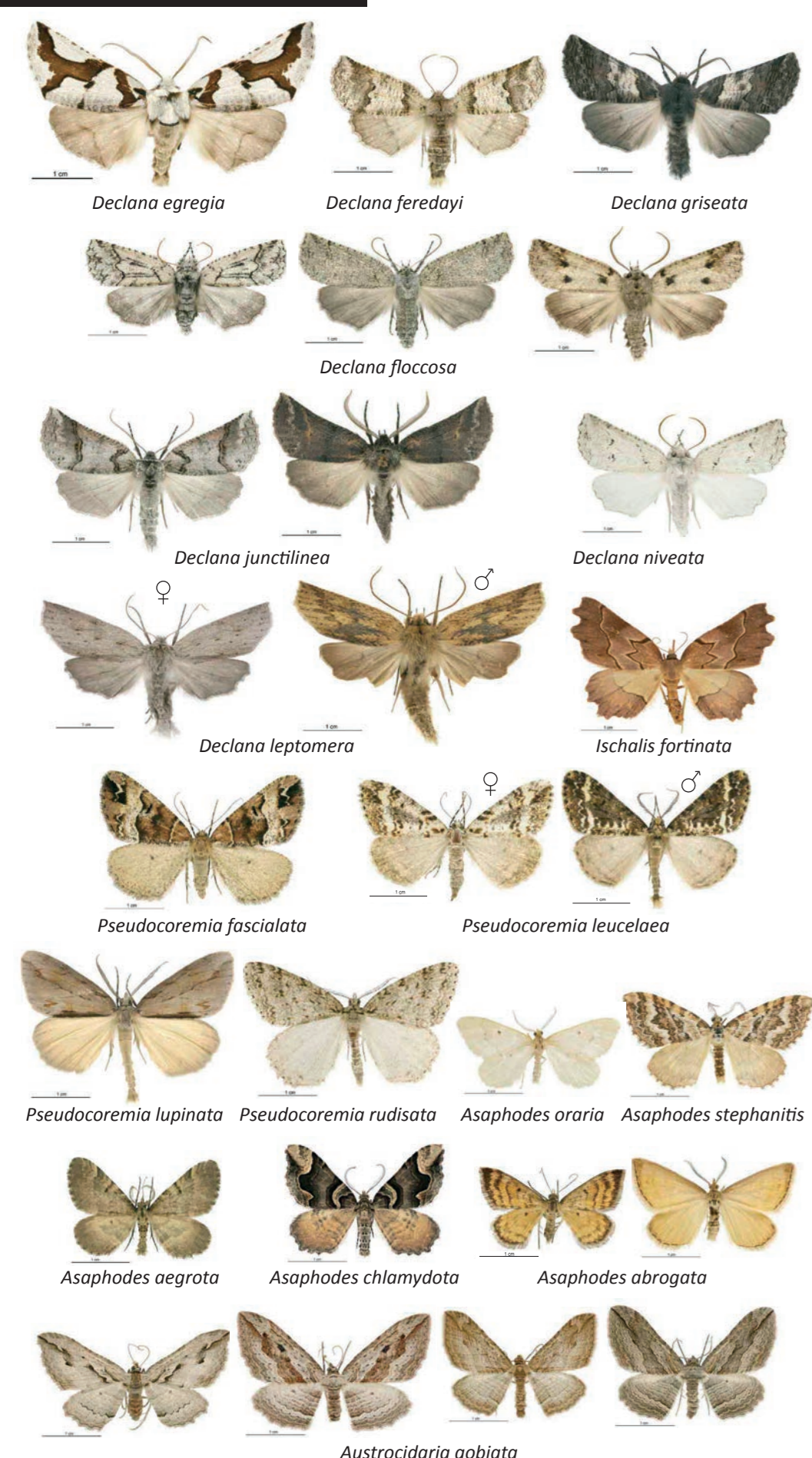
He iti hoki te mokoroa, nāna i kakati te Kahikatea – Although the mokoroa is small it attacks the Kahikatea

"When the pepetuna are in great numbers it is a good night for eeling"
 Tangiwai Rewi

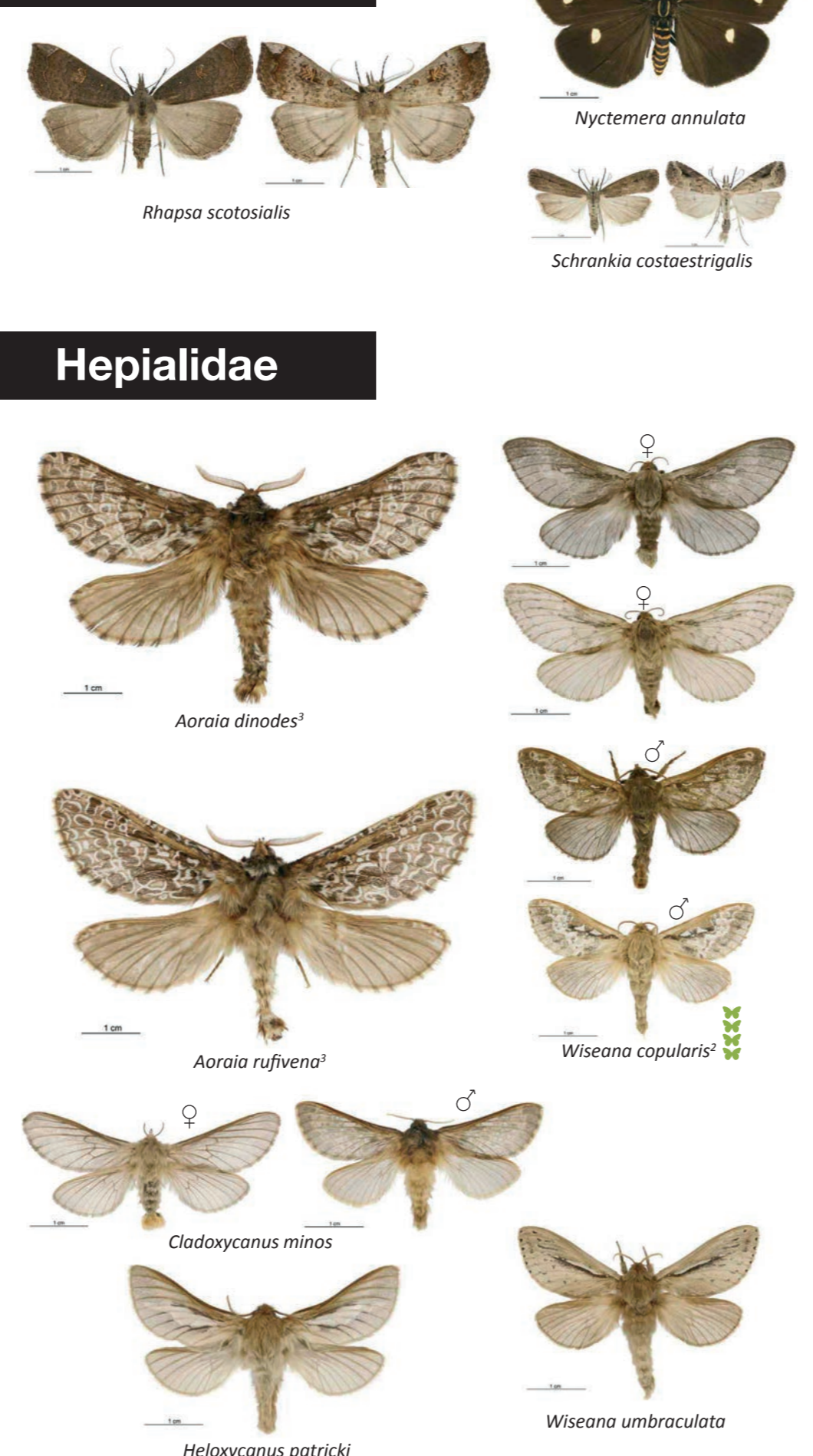
This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 New Zealand License. To view details of this license go to www.creativecommons.org/licenses/by-nc-nd/3.0/nz/



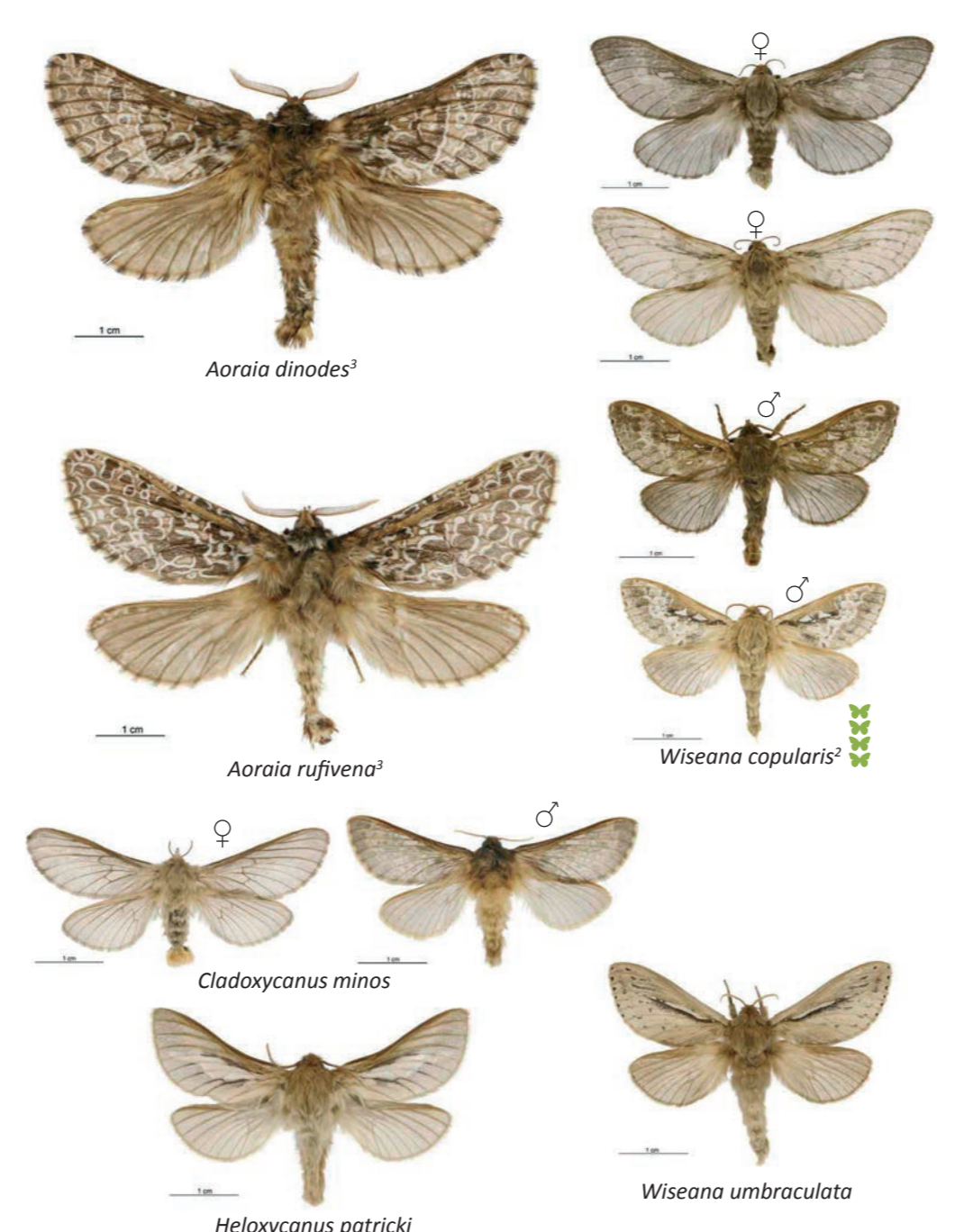
Geometridae



Erebidae



Hepialidae



Noctuidae

