

| Name | Counterpart | Title |
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| Damayanti Buchori, Purnama Hidayat, Rizky Nazarreta | Z02 | Arthropods collection and identification books |

Background and Objectives

Arthropods are the most numerous and diverse group of animals. Tropical rainforests are important habitats that ensure the existence of a wide variety of arthropods, especially insects. Currently, there have been major changes in the lowland tropical rainforest ecosystem. The rapid changes associated with changing human lifestyles have transformed lowland tropical rainforests into agricultural land, industrial forests and mining areas. Within the framework of *EFForTS* project, we collected arthropods from the canopy in a nested design in four land-use systems (i.e. rainforest, jungle rubber, rubber and oil palm plantation) in Jambi Province, Sumatra. Studies on insect diversity and responses to land use change in forest areas are still limited, so more research is needed on a regular basis to document various community parameters of insect diversity for conservation and sustainable management efforts. Based on this study, we made an updated key identification for ants “A Guide to the Ants of Jambi (Sumatra, Indonesia): Identification Key to Ant Genera and Images of the *EFForTS* collection”, a field guide of butterflies “The Butterflies of Eastern Jambi”, a field guide of coleopterans “Guidebook of Beetles and Weevils of Jambi, Sumatra, Indonesia (Chrysomelidae, Curculionidae, Elateridae Staphylinidae)”, and a scientific popular book (Keanekaragaman Serangga di Hutan Hujan Tropis Dataran Rendah di Provinsi Jambi, Sumatra: Dampak dari Perubahan Penggunaan Lahan). All of those books are a collection of the results of collaborative research through the *EFForTS* project and focused as a book that can provide information about the important value of insect biodiversity, increase scientific knowledge about insect ecology and the most up-to-date dichotomous key identification of ants.



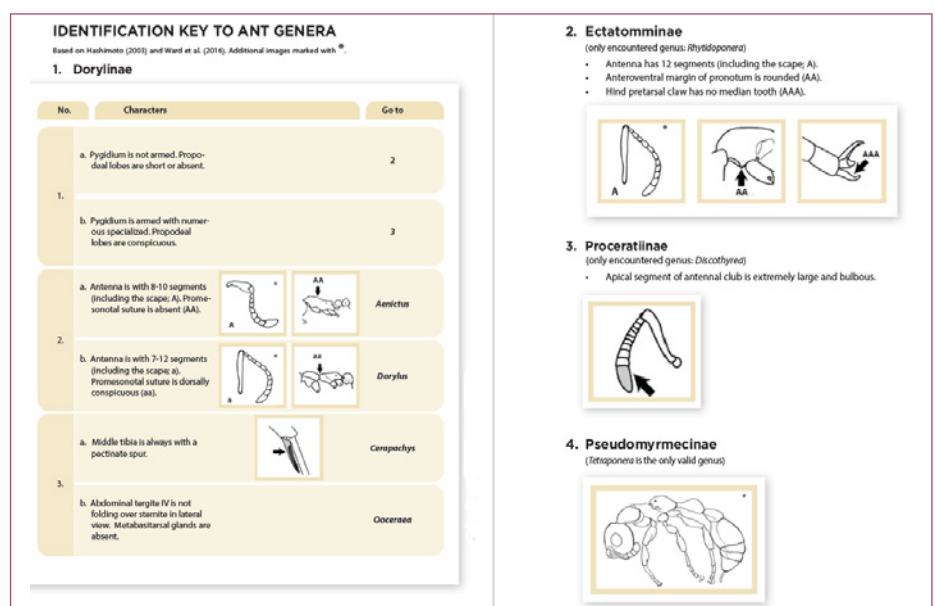
Picture 1. A guide to ants of Jambi.

of butterflies “The Butterflies of Eastern Jambi”, a field guide of coleopterans “Guidebook of Beetles and Weevils of Jambi, Sumatra, Indonesia (Chrysomelidae, Curculionidae, Elateridae Staphylinidae)”, and a scientific popular book (Keanekaragaman Serangga di Hutan Hujan Tropis Dataran Rendah di Provinsi Jambi, Sumatra: Dampak dari Perubahan Penggunaan Lahan). All of those books are a collection of the results of collaborative research through the *EFForTS* project and focused as a book that can provide information about the important value of insect biodiversity, increase scientific knowledge about insect ecology and the most up-to-date dichotomous key identification of ants.

Results and Conclusion

- Nazarreta R, Buchori D, Hashimoto Y, Hidayat P, Scheu S, Drescher J (2021) A Guide to the Ants of Jambi (Sumatra, Indonesia): Identification Key to Ant Genera and Images of the *EFForTS* Collection. e-Publishing, Penerbit BRIN

This guide (Picture 1) documents more than 300 ant species that were found in rainforests and agroforestry of Jambi Province, Sumatra, and also includes a recently updated identification key to the ant genera of Southeast Asia.

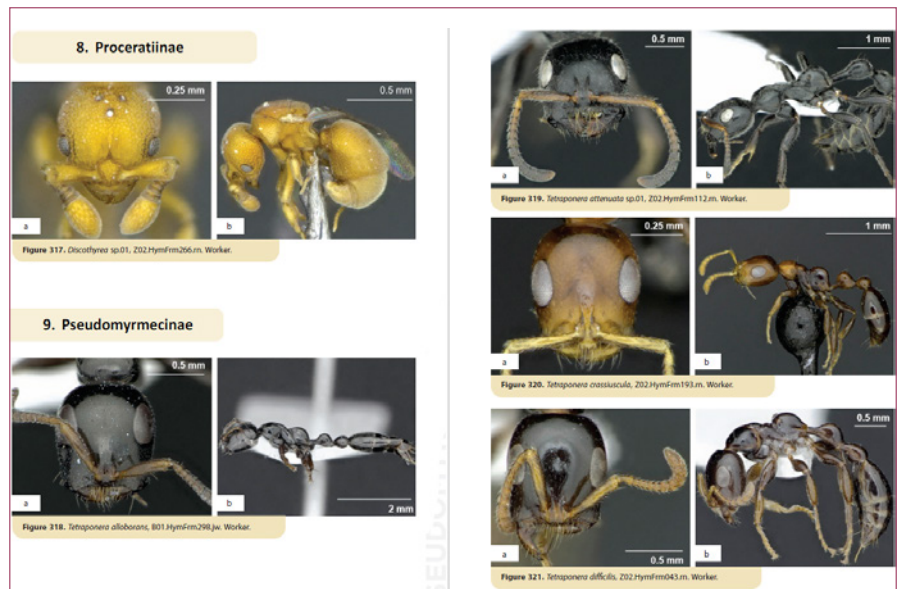


Picture 2. Identification key to ant genera.

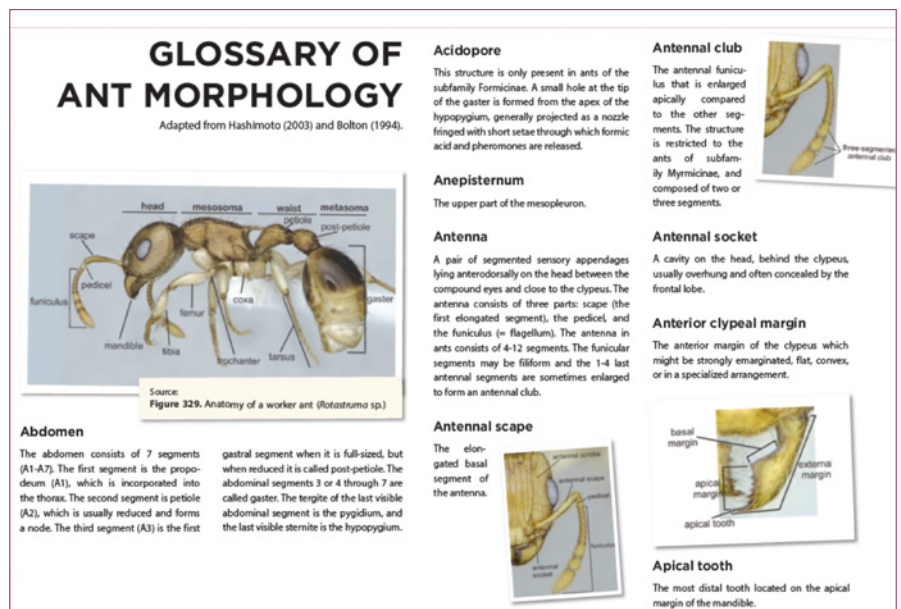
The identification keys provided in this guide are designed to identify workers caste only (Picture 2).

The reason is that workers ants have morphological characters that allow differentiation between species, while those characters are often obscure in queen or males. The main part of this guide consists of images of our collection of (morpho-) species (Pictures 3 and 4).

In the current version, we include 335 (morpho-) species from 71 genera and 10 subfamilies in 629 images. For non-taxonomists and taxonomists alike, the photographs displayed in the image section shows the variety of morphology of the ants we have found. This will hopefully be helpful in determining ants to genera, or possible even (morpho-)species. Studying this book will bring you closer to our planet's fascinating diversity, and the little things that run our world. This book is an excellent starting point for those who want to know more about the ants of Southeast Asia, as well as a valuable resource for scientists and students studying ants in this part of the world. All in all, this book is a compendium of the ants of Jambi, Sumatra, and embodies a starting point for further ant research in Indonesia.



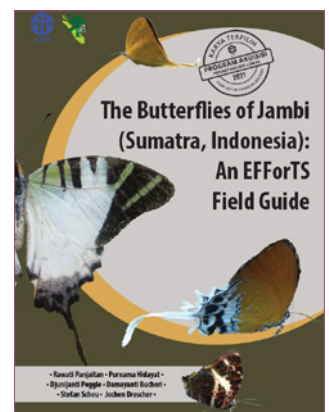
Picture 3. Images of the EFForTS ant collection.



Picture 4. Glossary of ant morphology.

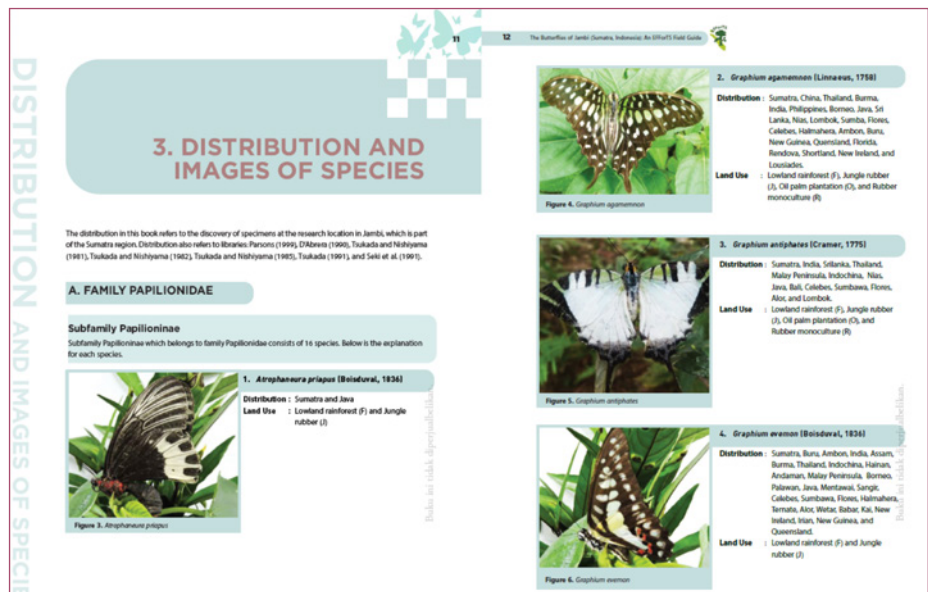
- Panjaitan R, Hidayat P, Peggie D, Buchori D, Scheu S, Drescher J (2021). The Butterflies of Jambi (Sumatra, Indonesia): An EFForTS field guide. e-Publishing Penerbit BRIN

Butterflies are probably the most attractive insects among the arthropods. For centuries, both professional scientists and amateur enthusiasts have collected, catalogued and scientifically described butterflies from all over the world. Unsurprisingly, they belong to the most well-known insect groups in terms of taxonomy and global species record completeness. More than 17,500 described species are distributed throughout the entire world, with the exception of Antarctica. As butterflies are among the species facing population decline due to climate changes, the need to document them is more urgent than ever. Our data are based on 6,653 captured and/or observed butterfly individuals that we identified to 209 species from 106 genera, 19 subfamilies and 5 families. This guide includes a checklist and images of all 209 species observed and collected. It provides scientists working in the region with an easy to use reference, and will be



Picture 5. The butterflies of Jambi.

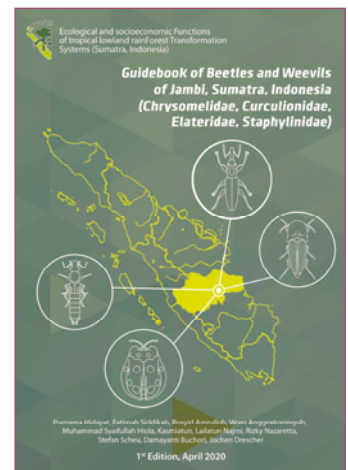
updated regularly. Moreover, this book also offers complete and detailed information on each butterfly's name, habitat, distribution and image (Pictures 5 and 6).



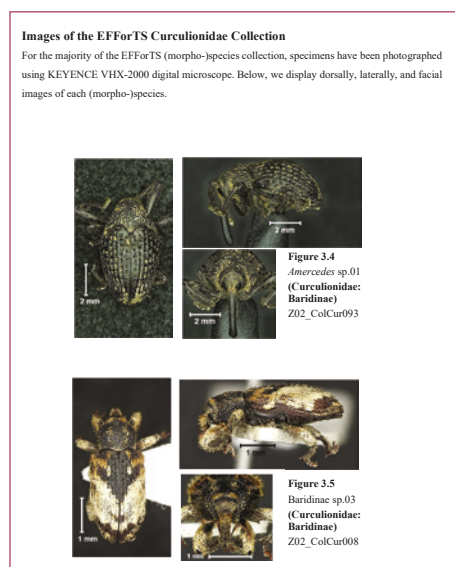
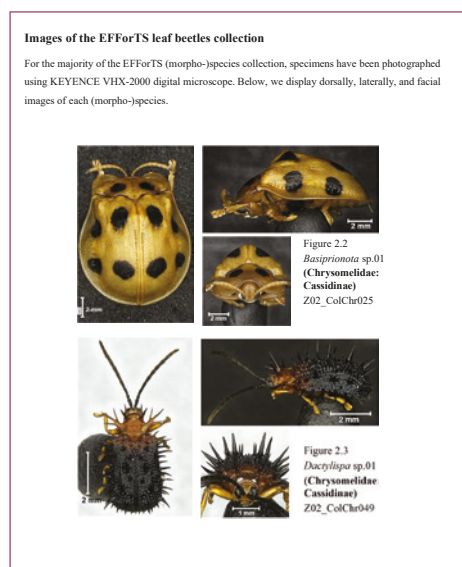
Picture 6. Distribution and images of species

- Hidayat P, Siddikah F, Amrulloh R, Anggraitoningsih W, Hiola MS, Kasmiatun, Najmi L, Nazarreta R, Scheu S, Buchori D, Drescher J (2022). Guidebook of Beetles and Weevils of Jambi, Sumatra, Indonesia (Chrysomelidae, Curculionidae, Elateridae, Staphylinidae). e-Publishing Penerbit BRIN, accepted and in copyediting.

Beetles are the largest and most diverse insects in the world, about 40% of all the insects and 30% of all animals are beetles. About 350.000 described species of beetles are spread around the world (Grimaldi and Engel, 2005). About 25.000 individuals of beetles have been collected by *EFForTS*, four major groups (families) with the highest number of species and individuals have been identified, i.e. Elateridae (click beetles), Staphylinidae (rove beetles), Curculionidae (true weevils), and Chrysomelidae (leaf beetles). A total of 4,295 individuals of Elateridae belonging to 7 subfamilies, 27 genera, and 80 (morpho-)species; 4,089 individuals of Staphylinidae belonging to 13 subfamilies, 13 genera, and 74 (morpho-)species; 3,544 individuals of Curculionidae belonging to 12 subfamilies, 34 genera, and 214 (morpho-)species; and 1697 individuals of Chrysomelidae belonging to 6 subfamilies, 69 genera, and 154 (morpho-)species. Many of the (morpho-)species are still unknown to science, and there-



Picture 7. A guidebook of beetles and weevils of Jambi.



fore need further taxonomic (and biological or ecological) investigation. We hope that this guidebook will be of interest to both taxonomists and ecologists, and may represent a first step in exploring the diversity of beetles in tropical Indonesia (Pictures 7 and 8).

Picture 8. Images of the *EFForTS* beetles and weevils collection.

- A scientific popular book: *Keanekaragaman Serangga di Hutan Hujan Tropis Dataran Rendah di Provinsi Jambi, Sumatra: Dampak dari Perubahan Penggunaan Lahan*. <https://penerbit.brin.go.id/press/catalog/book/280>

Authors: Buchori D, Hidayat P, Nazarreta R, Ardiyanti RM, Siddikah F, Amrulloh R, Azhar A, Kasmiatun, Scheu S, & Drescher J

Summary:

This book in Bahasa Indonesia summarizes the work of the Department of Plant Protection (Buchori) in the *EFForTS* framework. It focuses mainly on the results achieved within *EFForTS-Z02*, but also on several ABS projects. The target audience is the general, interested public in Indonesia (Pictures 9, 10, 11).



Picture 9. Keanekaragaman Serangga di Hutan Hujan Tropis Dataran Rendah di Provinsi Jambi, Sumatra.



Picture 10. (top) Ants transporting food.



Picture 11. (bottom) Parasitoid wasps.