

1 乐赏大自然
Joy of Nature

海南自然图鉴系列
Hainan Wildlife Field Guide Series

蜻蜓之地

海南蜻蜓图鉴

A Field Guide to the Dragonflies of Hainan



嘉道理农场暨植物园
嘉道理中国保育
Kadoorie Conservation China
Kadoorie Farm & Botanic Garden

主编

韦庚武 张浩淼 著
Graham REELS ZHANG Haomiao

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图书在版编目 (CIP) 数据

蜻蜓之地：海南蜻蜓图鉴/韦庚武，张浩森著。—
北京：中国林业出版社，2015.5

(乐赏大自然：海南自然考察图鉴)

ISBN 978-7-5038-8018-6

I. ①蜻… II. ①韦… ②张… III. ①蜻蜓目—海南
省—图集 IV. ①Q969.22-64

中国版本图书馆CIP数据核字(2015)第120910号



绿色印刷产品

中国林业出版社出版
(北京市西城区刘海胡同7号)
(邮政编码 100009)
责任编辑 严丽

新华书店北京发行所发行
2015年9月第1版 2015年9月第1次印刷
北京华联印刷有限公司

开本：880mm×1230mm 1/32 印张：14.75
印数：1~4000册

定价：150.00元 (USD 40.00)

(凡本版图书出现印刷、装订错误，请向出版社营销中心调换)

乐赏大自然 — 海南自然图鉴系列 Joy of Nature — Hainan Wildlife Field Guide Series

嘉道理农场暨植物园 嘉道理中国保育 资助出版, 主编

Produced by Kadoorie Conservation China, Kadoorie Farm and Botanic Garden

海南省林业厅 海南省野生动植物保护管理局 支持出版

With the support of Hainan Wildlife Conservation Bureau, Forestry Department of Hainan Province

蜻蜓之地 — 海南蜻蜓图鉴 A Field Guide to the Dragonflies of Hainan

作者: 韦庚武、张浩淼

Authors: Graham REELS & ZHANG Haomiao

摄影: 韦庚武 (除个别注明外)

Photography: Graham REELS (unless otherwise credited)

引文: 韦庚武, 张浩淼. 2015. 蜻蜓之地 — 海南蜻蜓图鉴 // 嘉道理农场暨植物园 嘉道理中国保育. 乐赏大自然 — 海南自然图鉴系列. 北京: 中国林业出版社.

Citation: Reels, Graham & Zhang, Haomiao, 2015. A Field Guide to the Dragonflies of Hainan. In Kadoorie Conservation China, Kadoorie Farm and Botanic Garden (eds) Joy of Nature — Hainan Wildlife Field Guide Series. Beijing: Chinese Forestry Publishing House.

序

海南省是中国纬度最低的省份，其中海南岛是中国第二大岛。由于海南全岛位于热带地区，加上岛屿的隔离而演化出丰富、独特的生态，是中国生物多样性最丰富的区域之一。自1998年起，嘉道理农场暨植物园组织专家与海南省林业厅合作，在海南各地及各自然保护区进行生物多样性考察，取得了脊椎动物、昆虫、植物等物种在海南的分布和生态状况的详细数据资料，发现了很多中国或海南省新纪录种，甚至新物种。这些本底数据对于海南省的生态保护与建设管理有十分重要的作用。

为了满足广大自然爱好者对海南岛生物多样性信息的殷切需求，嘉道理农场暨植物园和海南省野生动植物保护管理局将过去生物多样性考察的成果，依不同分类群整理成中英文对照的“海南自然图鉴系列”，将海南珍贵独特的物种呈现在读者面前，对各物种的基本数据及习性进行介绍。本系列图书内容丰富、图文并茂，知识性、趣味性、实用性、科学性兼备，是广大自然爱好者了解海南生态环境和生物多样性的入门之书，也是专业人士的参考书籍。

海南省林业厅 副厅长 刘艳玲

2014年8月25日

Foreword

Hainan Province is the southernmost province of China, and Hainan Island is the second largest island of the country. With the territory of the island being wholly situated within the tropics and isolated from the mainland, Hainan has diverse and unique biodiversity. Indeed, it is one of the most biodiverse areas in China.

Kadoorie Farm & Botanic Garden (KFBG) began its collaboration with Forestry Department of Hainan Province in 1998. Since then, extensive biodiversity surveys have been carried out throughout Hainan, by KFBG and associated experts. They have studied the distribution and ecology of vertebrates, insects and plants in Hainan and collected detailed data. In addition to a large number of new provincial or national species records, many completely new species have also been discovered from this fieldwork. Such information is essential and fundamental for reserve management and conservation works in Hainan.

As more and more nature lovers are becoming concerned about biodiversity conservation in Hainan, KFBG and Hainan Wildlife Conservation Bureau have jointly published the *Hainan Wildlife Field Guide Series* by compiling the fruitful results of these island-wide surveys. The bilingual field guides are organized according to taxon groups, and include descriptions of diagnostic features, behaviour and habitats of the species. Illustrated with high quality photographs taken mainly in the wild, this series serves as a comprehensive reference to the diverse fauna and flora of Hainan.

Whether you are a layperson who loves and cares about nature and biodiversity in Hainan, or a professional who seeks to know more, this book is highly recommended.

Liu Yan-ling
Deputy Director-General of Forestry Department of Hainan Province
25 August 2014

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霸王岭国家级自然保护区 (卢刚 拍摄)
Bawangling National Nature Reserve
(Photo by Lu Gang)



Chapter 1 章

蜻蜓和豆娘

Introducing dragonflies
and damselflies



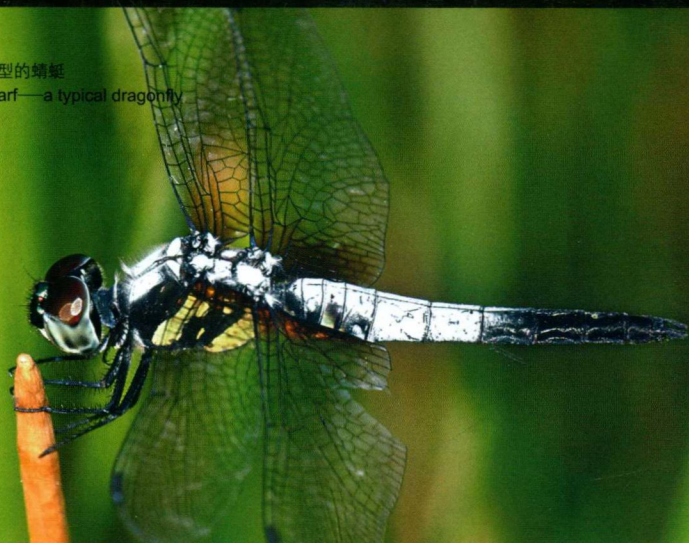
蜻蜓和豆娘都是蜻蜓目昆虫中最古老的类群之一，最早出现的蜻蜓化石可以追溯到两亿五千万年前。一些生活在石炭纪的蜻蜓祖先体型巨大，翅展接近1米。而现今最大的蜻蜓翅展约是20厘米，最小的只有2厘米，大多数种类体型都在这个范围之内。今天的蜻蜓目昆虫包括许多十分美丽的种类，它们一生的各个阶段也都十分有趣。蜻蜓目昆虫的幼虫称为稚虫，生活在水中，体色暗淡，而成虫则是飞行家，可以飞到远离水源的地方猎食，但是成虫必须飞回到水中繁殖。蜻蜓栖息的环境包括树洞中的积水坑、沼泽湿地、临时积水塘和大型湖泊等静水环境以及从涓涓细流到宽阔河溪等各种流水环境。少数种类可以忍耐咸水环境，它们可以在海岸或者河口的红树林中生活，而一些雨林中种类的稚虫可以是陆生——例如黄蓝扇山螳的稚虫主要生活在树林中溪流旁长满青苔的潮湿岩石上。

Dragonflies and damselflies are amongst the most ancient groups of insects, and first appear in the fossil record from 250 million years ago. Some of the early ancestors of the Odonata living in the Carboniferous period were huge, with a wingspan of nearly a metre. The largest species today have a wingspan of about 20 cm, with the smallest only 2 cm. Most species lie between these extremes of size. The order today includes many very beautiful species, fascinating in all stages of their life cycle. The larvae are drab creatures that live in water, whereas the adults are lords of the air, and may hunt far from water. They must always however return to the water to breed. Standing water habitats range from water collected in tree holes, boggy seepages and temporary ponds to broad open lakes. Running water habitats range from tiny trickles arising from springs to broad rivers. A few species are tolerant of brackish water and can breed in coastal or estuarine habitats including mangroves, while several rainforest species have larvae that are terrestrial—the larvae of the Blue Spinetail (*Rhipidolestes cyanoflavus*), for example, probably live among damp mossy rocks beside forest streams.



▲ 褐斑异痣螳——典型的豆娘
Common Bluetail—a typical damselfly

▣ 蓝额疏脉蜻——典型的蜻蜓
Common Blue Dwarf—a typical dragonfly



全世界大约已知5500多种蜻蜓和豆娘，分布于除南极洲以外的各个大陆。中国幅员辽阔，经纬度跨度大，水系十分发达，蜻蜓目昆虫种类丰富。目前中国已经记录了超过700种蜻蜓目昆虫，几乎是拥有最多蜻蜓目种类的国家。海南至少有165种蜻蜓，其中有22种（13.4%）为海南特有种。

所有的蜻蜓和豆娘都是肉食性昆虫，无论稚虫和成虫都是凶猛的捕食者。稚虫主要以其他水生昆虫，蝌蚪甚至小鱼为食。成虫主要捕食飞行的昆虫，也会残食同类，能在飞行中用足捉住猎物。它们拥有极佳的视力，巨大的复眼由上千个小眼组成，使它们能够准确地追随小型和快速飞行的昆虫。此外，修长的翅和强大的飞行肌使许多蜻蜓都是强健的飞行家，也是全世界飞行最快的昆虫，所有的蜻蜓都有十分高超的飞行技巧，前后翅可以相对独立的向前、向后、向外、向上和向下扇动。飞行最快的蜻蜓可以达到每小时35千米（以体长比例来看，相当于以时速3500千米行驶的小型喷气式飞机）。由于飞行快速，动作敏捷，它们可以捕捉到多种猎物。它们的外表有些可怕，但蜻蜓不会叮咬人类，也不会给人们带来任何伤害。

敏捷的飞行能力和艳丽的体色有助于每一种蜻蜓发展其独特的领域行为、求爱方式和繁殖习性。雄性个体间会为争夺领域、雌虫而争斗，它们会在飞行时炫耀亮丽的体色来引起竞争对手和潜在配偶的注意。而雌性个体通常不显眼，体色灰暗。在这一点上，蜻蜓和豆娘与鸟类十分相似，所以蜻蜓目昆虫在西方也被称为“观鸟者的昆虫”。

Approximately five and a half thousand species of dragonfly and damselfly are known worldwide, with representatives on every continent apart from Antarctica. China, because of its great size, its wide altitudinal and latitudinal ranges, and its huge river systems, is very rich in odonates. Over 700 species have been recorded—almost the highest total for any nation. At least 165 species are known to occur on the island of Hainan, of which 22 (13.4%) are currently thought to be endemic to the island.

All species of dragonfly and damselfly are carnivorous. Indeed, they are formidable predators, both as larvae and as adults. The larvae of odonates feed on other aquatic insects, tadpoles and even small fish. Adults mainly prey on flying insects, including other dragonflies or damselflies, catching them with their legs whilst in flight. They have extremely good eyesight, with huge compound eyes composed of thousands of tiny “facets”, which enable them to accurately follow the flight of small or fast-flying insects. In addition, with their long wings and powerful flight muscles, many dragonflies are very strong fliers. They include the fastest flying insects in the world, and all species are superbly aerobic, able to move their four wings independently to fly forwards, backwards, sideways, up, or down. The fastest dragonflies can reach a speed of 35 km per hour (equivalent to a small jet travelling at 3 500 km per hour!). Their speed and agility allows them to catch a wide variety of prey. In spite of their fearsome appearance, odonates do not have a sting and cannot harm people.

Their agility in flight and superb colour vision has facilitated the development of a large repertoire of territorial, courtship and breeding behaviours amongst different species. The males engage in contests over territory and access to females and, while in flight, often advertise their presence to rival males and potential mating partners by being brilliantly coloured. The females, on the other hand, are often relatively drab and inconspicuous. In this respect, dragonflies and damselflies are rather similar to birds. Indeed, odonates have been termed “the bird-watcher’s insect”.

蜻蜓和豆娘的区别

蜻蜓和豆娘都属于节肢动物门的昆虫纲。节肢动物门除昆虫外，还包括甲壳纲、蛛型纲、多足纲以及已经灭绝的主叶虫。现存的节肢动物已超过1000 万种。

蜻蜓目 (ODONATA) 分为两个主要的亚目：束翅亚目 (Zygoptera, 俗称豆娘或螳) 和差翅亚目 (Anisoptera, 狭义上的蜻蜓)。“蜻蜓”一词通常代表了整个蜻蜓目的所有种类，亦可以单指差翅亚目种类。第三个亚目，即间翅亚目 (Anisozygoptera)，只有 3 个近缘种，分别分布于日本、中国东北部和喜马拉雅山脉。部分学者认为应把差翅亚目和间翅亚目归为同一个亚目 (Epirocta)，但这种观点还没有被广泛接受。

目前认为，束翅亚目包括大约 20 个科，差翅亚目包括大约 10 个科（确切的数目尚有争论）。尽管蜻蜓和豆娘的关系十分密切，但还是可以从以下的特征加以区分：

- 豆娘的前翅和后翅形态相似；而蜻蜓的后翅较前翅在基部更为宽阔。
- 大多数豆娘种类的翅基部呈柄状，而蜻蜓的翅基部宽阔。
- 豆娘的两复眼相隔很远；蜻蜓的复眼则是以不同程度相连或是仅以狭缝分隔。
- 豆娘的雄虫腹部末端都拥有一对上附属器和一对下附属器；蜻蜓的雄虫有两个上附属器，仅有一个下附属器。
- 同样体长的蜻蜓会比豆娘粗壮许多。
- 除了少数种类，豆娘休息时会将翅合拢竖直于腹部上方，而蜻蜓休息时会将翅展开或者向前方和后方推进。

How do dragonflies and damselflies differ?

Dragonflies and damselflies are insects, a class of animals grouped within the huge Phylum Arthropoda (with more than 10 million living species), which also includes crustaceans, arachnids and myriapods, as well as the extinct trilobites.

The insect order Odonata is divided into two main suborders: the Zygoptera (commonly known as damselflies) and the Anisoptera, or 'true' dragonflies. The word 'dragonfly' can refer generally to all Odonata species (as in 'dragonfly watching'), or specifically to Anisoptera (true dragonflies), while 'damselfly' refers specifically to Zygoptera; the term 'odonates' is used collectively for both suborders. A third suborder, the archaic Anisozygoptera, has just three closely related species, one found in Japan, one in northeast China, and the other in the Himalayas. It has been argued that Anisoptera and Anisozygoptera actually form a single suborder (Epiprocta), but this term has not yet been widely adopted.

As currently recognised, the Zygoptera comprises approximately 20 families, and the Anisoptera about 10 families (the exact numbers are a matter of some debate). Although closely related, damselflies and dragonflies are usually readily distinguished by the following attributes:

- Damselflies commonly have similarly-shaped fore wings and hind wings, whereas dragonflies usually have hind wings larger, and wider at the base, than fore wings.
- In most families of damselflies, the wings are narrowly stalked at the base, whereas in dragonflies the wings are typically broad at the base.
- In damselflies, the eyes are widely separated; in dragonflies the eyes are either confluent to some extent or are only narrowly separated.
- Damselfly males have a pair of both superior (upper) and inferior (lower) appendages at the end of the abdomen; dragonfly males have two superior appendages, but only one inferior appendage.
- Damselflies are generally less robustly built than dragonflies of a similar body length.
- With some exceptions, damselflies perch with their wings closed and held above the abdomen, whereas dragonflies typically perch with wings held wide open or thrust forward and downward.