INSECTA MUNDI

A Journal of World Insect Systematics

0104

Contributions to the faunistics of Odonata in Thailand

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Date of Issue: October 25, 2009

CENTER FOR SYSTEMATIC ENTOMOLOGY, INC., Gainesville, FL

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Insecta Mundi 0104: 1-24

Published in 2009 by
Center for Systematic Entomology, Inc.
P. O. Box 141874
Gainesville, FL 32614-1874 U. S. A.
http://www.centerforsystematicentomology.org/

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Printed Copy ISSN 0749-6737
On-Line ISSN 1942-1354
CD-ROM ISSN 1942-1362

INSECTA MUNDI 0104: 1-24 2009

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Abstract. Distribution and habitat information are provided for 1578 adult specimens of Odonata representing 127 species in 70 genera and 16 families that were collected from 143 locations throughout Thailand. Of the species collected, 25 (20%) were represented by a single specimen, and 40 (31%) were collected from a single location. Collections were made at 49 lentic and 85 lotic sites, and an average of 6.9 and 6.6 species were collected at each site in each habitat, respectively.

Introduction

The order Odonata (dragonflies and damselflies) is an ancient order of insects of interest to casual naturalists as well as to scientists focusing on questions of environmental contamination, community ecology, or biodiversity. Recently, Odonata were the focus of the first global assessment of an insect order as an indicator of global biodiversity loss (Clausnitzer et al. 2009). They found that the Indo-Malayan realm, which includes Thailand, had the highest proportion of Critically Endangered (2.05%) and Endangered species (3.32%). With the exception of the Oceania realm, for which only 21 species were evaluated, the Indo-Malayan realm had the lowest proportion of Least Concern species (30.95%), and the highest proportion of Data Deficient species (47.31%) (Clausnitzer et al. 2009).

The report by Clausnitzer et al. (2009) clearly illustrates the immense importance of species level distributional records of taxa in poorly known areas. An understanding of the current and historic distribution of a species is necessary to evaluate its conservation status, role in the community, range expansion or contraction, and reaction to anthropogenic perturbations, including climate change and alteration of habitat. Additionally, accurate distributional information is necessary to study patterns of biogeography, phylogeny, and habitat usage.

The Odonata of Thailand have been the subject of several amateur odonatologists over the years, although many undescribed species exist. The study of Thai odonates began in the late nineteenth century with a single species reported from "Siam" (Hämäläinen and Pinratana 1999). Subsequent zoological expeditions in the early 1900s yielded many adult specimens and the species count began to rise rapidly until the start of the Second World War. Understandably, few new species or even specimens were taken during the 1940s and 1950s, at which time 130 species were known. In the early 1960s, Dr. Syoziro Asahina began reporting on Thai odonates and later produced a 21-part series, which provided descriptions, illustrations, and taxonomic keys to the adults (Asahina 1993). In this reference, Asahina documented 257 species of odonates from the country, doubling the previously known fauna. The 1999 Atlas of the Dragonflies of Thailand (Hämäläinen and Pinratana 1999) summarized the current state of Thai odonatology and listed 315 species, of which 20 are still undescribed, 50 are known from 3 or fewer specimens, 31 listed as rare, 33 listed as uncommon, and 92 (29%) reported from only one province.

Hämäläinen (2002) updated the "Atlas" list and concluded that more than 330 odonate species occurred in Thailand, 30 of which were identified to genus only and probably represent undescribed species. In the following year, he described a new genus and three new species of damselflies from Thailand (Hämäläinen 2003). In an updated review of the critical species of Odonata in Thailand and surrounding countries, Hämäläinen (2004) increased the estimated number of species of Thai odonates to 340, with 20-30 still undescribed. He concluded that it would not be proper to place any species on the IUCN Red List of threatened species to evaluate which species are threatened due to lack of information on range, abundance, and habitats of individual species.

Researchers from the Enns Entomology Museum at the University of Missouri, Columbia have been conducting aquatic invertebrate research throughout Thailand since 1995. In 2003, adult odonates were specifically targeted by MLF who collected over 1500 identifiable specimens. Combined, the University of Missouri research teams have collected 1578 adult odonate specimens from 143 locations throughout Thailand. Herein, we provide distributional and habitat information for the 126 species represented by these collecting efforts.

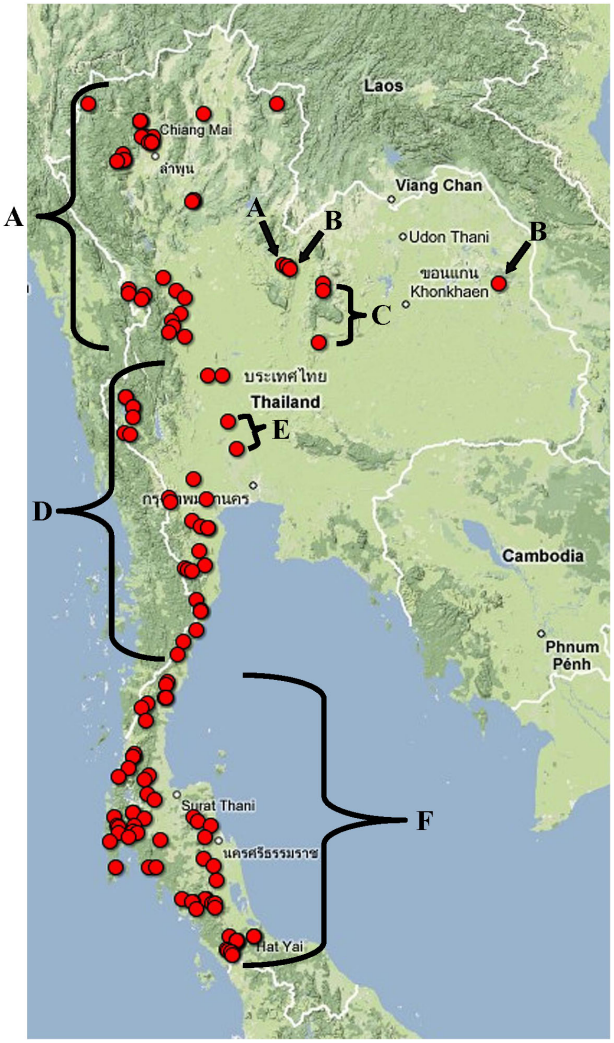

Figure 1. Map of Thailand showing collecting localities for which GPS coordinates were known. **A** = Northern Region; **B** = Northeastern Region; **C** = Eastern Region; **D** = Southwestern Region; **E** = Central Region; and **F** = Peninsular Region.

Material and methods

Adult odonates were collected primarily with aerial nets, although some were hand-collected live, found dead, or captured in ultra-violet light pan traps. At localities where MLF was a collector, an effort was made to collect all adult odonates (although some evaded collection). Specimens were photographed live to accurately record color. All specimens were killed in ethyl acetate, then soaked in acetone for 10-12 hours to preserve color, then papered and labeled. The specimens are deposited in the Enns Entomology Museum, University of Missouri, Columbia. Identification was performed using appropriate literature, and voucher specimens were sent to systematic authorities for verification of identification. Nomenclature is after Hämäläinen and Pinratana (1999).

When possible, localities were geo-referenced with GPS (WGS84 datum), given a designated locality number (L-), and photographed for inclusion in the Locality Image Database. Photographs of the localities (identified as L-numbers) in which these species were collected, are available in a Locality Image Database via a link from the internet site of the Enns Entomology Museum, University of Missouri. Each province was placed into one of seven floristic regions after Hämäläinen and Pinratana (1999). Each locality code is given a regional prefix as follows: A = Northern Region; B = Northeastern Region; C = Eastern Region; D = Southwestern Region; E = Central Region; and F = Peninsular Region (no specimens were collected in the Southwestern Region).

Results

The University of Missouri teams collected 1578 identifiable adult odonates (Table 1) from 143 locations (Table 2, Fig. 1) within Thailand from 1995 to 2005. Specifically, 127 species in 70 genera and 16 families were collected. Two genera, *Macromia* and *Indolestes*, could not be identified to species but were represented by single specimens and are included in the following species level descriptive statistics. Fifteen additional genera contained some individuals that could only be identified to genus.

Of the species collected, 25 (20%) were represented by a single specimen, 72 (56%) were represented by 5 or fewer specimens, and two (2%) were represented by more than 100 specimens (Table 1). The average number of locations from which a species was collected was 6.7 (range, 1-51), with 73 species (56%) collected at 3 or fewer locations, and 40 species (31%) collected from a single location (Table 1).

Thirty-eight (38) localities were sampled in the Northern Region, 10 in the Northeastern Region, 3 in the Eastern Region, 28 in the Southwestern Region, 2 in the Central Region, and 62 in the Peninsular Region (Table 2). Collections were made at 49 lentic sites, with an average of 6.9 species collected at each site (range 1-17). Collections were made at 85 lotic sites, with an average of 6.6 species collected at each site (range 1–26). The average number of species per site was 4.2 in the Northern Region, 8.4 in the Southwestern Region, and 7.8 in the Peninsular Region (in other regions there were too few collection sites to compute meaningful averages). Thirteen species were collected only from the Northern Region, 6 only from the Northeastern Region, 8 only from the Southwestern Region, and 28 only from the Peninsular Region (Table 1).

Discussion

To reduce the number of odonate species with Data Deficient standings, Clausnitzer et al. (2009) called for extensive new field surveys. The survey presented here represents an enormous amount of collecting effort over a large geographic scale, and even so, 26 species were represented by single specimens and 41 species were collected at only a single location. These observations illustrate the difficulty of obtaining an accurate understanding of the ranges of odonate taxa. Published data about large collections of poorly known taxa, or taxa from poorly known locations, provide invaluable information for nearly all subsequent studies beyond alpha taxonomy. Published records of taxa at the species level (with appropriate vouchers placed in museums) may be of more importance to future generations than some overly general ecological studies.

Aquatic and semi-aquatic invertebrates have been collected by the University of Missouri teams at over 850 unique location/time sampling events (some locations have been sampled multiple times over several years). Odonata collected at 133 of those locations are reported in this paper. All taxa of interest were collected at each sampling event and preserved for later research. Published records of the following taxa collected from these locations include: Ephemeroptera (Sites et al. 2001), Ephemerellidae (Wang and Sites 1999, Jacobus et al. 2005b), Ephemerellidae and Vietnamellidae (Jacobus et al. 2005a); Odonata: Gomphidae (Ferro and Sites 2006); Heteroptera: Aphelocheiridae (Sites and Zettel 2005, Sites 2005 (2006)), Gerridae (Vitheepradit and Sites 2007a, b), Helotrephidae (Sites and Polhemus 2001b), Hydrometridae (Sites and Polhemus 2003, Vitheepradit et al. 2003), Nepidae (Sites and Polhemus 2001a), Naucoridae (Sites et al. 1997, Sites and Vitheepradit 2007). A compilation of the published records of the various taxa collected from each discrete locality provides a valuable species level record of community structure at those locations. This addition of the adult Odonata will provide a more complete understanding of the aquatic communities at those locations and a better understanding of the odonate fauna of Thailand as a whole.

Acknowledgments

We thank T. W. Donnelly for help with determination of specimens. We also thank Penkhae Thamsenanupap and Pensri Bunlue (Chiang Mai University) and Tang-On Prommi (Prince of Songkla University) for assistance with field work and Brad Kiefer (University of Colorado – Denver) for assistance with preparing the map. We are grateful to the National Research Council of Thailand and the Royal Forestry Department for permission to conduct field work in Thailand. John C. Abbott and Dennis

R. Paulson reviewed this manuscript and provided valuable suggestions. Funding for MLF was provided by the Dorris D. and Christine M. Brown Graduate Research Fellowship. This publication was approved by the Director, Louisiana Agricultural Experiment Station as manuscript number 2009-234-3645.

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Received August 31, 2009; Accepted September 24, 2009.

Table 1. List of odonate species collected by the University of Missouri teams in Thailand from 1995 through 2005. **T#** = taxon number; **#L.** = number of locations from which a taxon was collected; **#I.** = number of individuals of that taxon collected; refer to Table 2 for locality code assignments.

T#	Species	#L.	#I.	Locality Code (no. and sex)
ANISOPTERA				
Aeshnidae				
1	*Gynacantha subinterrupta* Rambur	3	6	A10 (1m), A15 (1m), A26 (4m)
Corduliidae				
2	*Idionyx optata* Selys	2	2	A8 (1f), A9 (1f)
3	*Idionyx selysi* Fraser	1	1	A9 (1f)
4	*Macromia* sp.	1	1	A27 (1m)
5	*Procordulia artemis* Lieftinck	1	2	B5 (1m 1f)
Gomphidae				
6	*Asiagomphus xanthenatus* (Williamson)	1	1	A1 (1f)
7	*Burmagomphus arboreus* Lieftinck	4	11	D15 (6m 1f), F11 (2m), F19 (1m), F51 (1m)
8	*Burmagomphus divaricatus* Lieftinck	2	2	F51 (1f), F57 (1m)
9	*Burmagomphus* spp.	5	6	D5 (1m), D15 (1m), D17 (1f), F19 (1f), F51 (1m 1f)
10	*Gomphidictinus perakensis* Williamson	2	2	D21 (1m), F17 (1m)
11	*Ictinogomphus decoratus melaenops* (Selys)	12	18	A15 (1m), A20 (1m), A22 (1m), A23 (1m), D15 (2m), D17 (2m 1f), D20 (2m 1f), F2 (2m), F23 (1m), F36 (1m), F58 (1m), F60 (1m)
12	*Ictinogomphus rapax* (Rambur)	1	2	B4 (2m)
13	*Leptogomphus* sp.	1	1	A34 (1f)
14	*Leptogomphus gestroi* Selys	1	1	D4 (1m)
15	*Macrogomphus borikhanensis* Fraser	1	1	F11 (1m)
16	*Macrogomphus kerri* Fraser	1	1	F23 (1f)
17	*Megalogomphus sumatranus* (Krueger)	1	1	F5 (1m)
18	*Merogomphus parvus* (Kruger)	1	1	F12 (1m)
19	*Microgomphus chelifer* Selys	2	2	F5 (1m), F44 (1m)
20	*Microgomphus thailandica* Asahina	1	1	B6 (1m)
21	*Orientogomphus* sp.cf *naninus* (Donnelly's sp.B)	4	6	D22 (2m), F5 (1m), F52 (1m), F55 (2m)
22	*Orientogomphus* spp.	2	2	D15 (1f), D24 (1f)
23	*Paragomphus capricornis* (Forster)	3	4	D24 (1m), F11 (2m), F44 (1m)
24	*Sieboldius japponicus* Selys	1	1	F43 (1m)
Libellulidae				
25	*Acisoma p. panorpoides* Rambur	14	36	A22 (1f), A37 (2m 1f), D6 (2m 3f), D17 (3m), D19 (3m 1f), D23 (2m), E1 (1m), F4 (1m 1f), F9 (2m), F18 (3f), F21 (1m 1f), F24 (2m 1f), F47 (2f), F56 (3m)
26	*Aethriamanta brevipennis* Rambur	1	2	B4 (2f)
27	*Brachydiplax c. chalybea* Brauer	17	28	D20 (1m), E1 (2m), F3 (2m), F9

Table 1 (continued).

T#	Species	#L.	#I.	Locality Code (no. and sex)
				(1m), F11 (1m), F13 (2m), F15 (1m), F16 (1m), F18 (1m), F21 (1m), F24 (1m), F28 (1m), F31 (6m), F33 (1m), F36 (2m), F56 (2m), F62 (2m)
28	*Brachydiplax farinosa* Kruger	4	5	D19 (1m), D20 (1m), F18 (1m 1f), F33 (1m),
29	*Brachydiplax sobrina* (Rambur)	3	4	D9 (1m), F9 (1m), F31 (2m)
30	*Brachythemis contaminata* (Fabricius)	37	132	A15 (3m), A20 (5m 3f), A24 (1m 2f), B2 (4m 3f), B10 (1m 1f), D7 (2m), D8 (3m 2f), D9 (1m 1f), D12 (1m 2f), D16 (1m 1f), D17 (3m 1f), D18 (2m 2f), D19 (4m 2f), D20 (4m), D23 (1m), D26 (7m 9f), D27 (1f), E1 (1f), E2 (4m 2f), F1 (1m 3f), F2 (2m 2f), F4 (2m 1f), F5 (2m 3f), F11 (1m), F13 (2f), F14 (1m 1f), F16 (2m 1f), F19 (1m 1f), F20 (2m 2f), F21 (2m), F33 (1f), F47 (3m 1f), F51 (1f), F54 (2m 2f), F56 (4m 3f), F58 (1m 1f), F60 (1f)
31	*Cratilla lineata calverti* Forster	1	1	D4 (1f)
32	*Crocothemis s. servilia* (Drury)	26	45	A12 (1f), A19 (1m 1f), A20 (1m 1f), A22 (1m), A36 (1m 1f), B2 (2m), D9 (2m), D11 (1m), D12 (2f), D15 (1m), D17 (2m), D19 (3f), D20 (2m), D23 (1m 2f), D27 (1m), D28 (1m), E1 (1m), F3 (1m), F16 (2m 1f), F31 (1m), F47 (1m), F51 (1f), F56 (3m 2f), F58 (1m), F60 (1m), F61 (1m 1f)
33	*Diplacodes nebulosa* (Fabricius)	4	11	F4 (1m 1f), F28 (4m 1f), F31 (1f), F47 (3m)
34	*Diplacodes trivialis* (Rambur)	25	48	A9 (1f), A16 (1f), A20 (1m), A21 (1f), A22 (3m), A26 (1m 1f), A30 (1m 1f), A32 (4m), A33 (1m), A38 (4m 2f), D8 (1m), D9 (2m), D10 (1f), D11 (2m 1f), D26 (3m 2f), D27 (2m), D28 (2m 2f), E2 (1f), F20 (1f), F24 (1m), F27 (1f), F33 (1m), F34 (1m), F36 (1m), F60 (1m)
35	*Hydrobasileus croceus* (Brauer)	2	3	D6 (1m), D20 (1m 1f)
36	*Indothemis carnatica* (Fabricius)	1	1	D8 (1m)
37	*Lathrecista a. asiatica* (Fabricius)	2	2	F47 (1m), F60 (1f)
38	*Neurothemis fluctuans* (Fabricius)	21	28	A24 (1m), D12 (2m), D15 (1m), D17 (2m), D19 (2m), D20 (1m), E1 (1m), F2 (2m), F3 (1m), F5

Table 1 (continued).

T#	Species	#L.	#I.	Locality Code (no. and sex)
(				2m), F6 (1m), F15 (1m), F21 (1m), F30 (1m), F31 (1m), F32 (1m), F33 (2m), F34 (2m), F47 (1m), F50 (1m), F58 (1m)
39	*Neurothemis fulvia* (Drury)	9	13	A27 (1m), A30 (1m), D6 (1m), D24 (5m), F1 (1m), F11 (1m), F31 (1m), F35 (1m), F60 (1m)
40	*Neurothemis intermedia* (Rambur)	6	6	D19 (1f), F15 (1f), F31 (1f), F34 (1f), F47 (1f), F58 (1f)
41	*Neurothemis t. tullia* (Drury)	13	30	A19 (3m), A21 (1m), D11 (1f), D19 (1m), D20 (1m), D26 (3m 3f), F3 (1m), F4 (2m 4f), F13 (2m), F16 (2m 2f), F24 (1m 1f), F31 (1f), F47 (1m)
42	*Onychothemis culminicola* Forster	4	5	A5 (1m), F11 (1m), F12 (1m), F17 (2m)
43	*Onychothemis t. testaceae* Laidlaw	5	6	D15 (2m), F1 (1m), F11 (1m), F44 (1m), F56 (1m)
44	*Orchithemis pulcherrima* Brauer	1	4	F27 (1m 3f)
45	*Orthetrum chrysis* (Selys)	10	11	A28 (1f), A30 (1m), D6 (1m), D17 (1m), D24 (1m 1f), F5 (1m), F15 (1m), F25 (1m), F26 (1m), F34 (1m)
46	*Orthetrum glaucum* (Brauer)	8	11	A5 (1m), A8 (1m), A30 (2m), D24 (2m), D25 (1m), F25 (1m), F30 (2m), F35 (1m)
47	*Orthetrum luzonicum* (Brauer)	4	11	D6 (1m), D17 (3m), F28 (2m), F36 (5m)
48	*Orthetrum pruinosum neglectum* (Rambur)	2	2	A5 (1m), A36 (1m)
49	*Orthetrum sabina* (Drury)	22	28	A18 (1m), A20 (1m), A21 (1f), A22 (2m), A38 (2m), B2 (1m), D6 (1m), D8 (1m), D9 (1m), D10 (1m 1f), D18 (1m), D20 (1m), D23 (1m), D27 (1m 1f), D28 (1m), F2 (1m), F31 (2m 1f), F33 (1m), F34 (1m), F47 (1m), F48 (1m), F56 (1m)
50	*Orthetrum t. testaceum* (Burmeister)	4	6	F11 (1m), F33 (2m), F44 (1m), F50 (1m 1f)
51	*Orthetrum t. triangulare* (Selys)	4	6	A4 (1m), A8 (3m), A13 (1m), F47 (1f)
52	*Orthetrum* spp.	5	5	D17 (1f), F2 (1f), F23 (1f), F47 (1f), F49 (1f)
53	*Pantala flavescens* (Fabricius)	9	12	A16 (1m 1f), A29 (1m), B5 (1m), B9 (1m), C2 (1f), D27 (2m 1f), F15 (1m), F28 (1f), F31 (1m)
54	*Potamarcha congener* (Rambur)	6	8	D10 (1m), F16 (1m 1f), F24 (1m), F31 (1f), F33 (1m), F60 (1m 1f)
55	*Pseudothemis jornia* Forster	3	5	F2 (2m), F45 (1m), F58 (2m)

Table 1 (continued).

T#	Species	#L.	#I.	Locality Code (no. and sex)
56	*Pseudothemis zonata* (Burmeister)	1	1	B2 (1m)
57	*Rhodothemis rufa* (Rambur)	3	3	D12 (1m), F24 (1m), F56 (1m)
58	*Rhyothemis obsolescens* Kirby	1	1	F17 (1m)
59	*Rhyothemis p. phyllis* (Sulzer)	9	14	B4 (1m), D6 (2m 1f), D12 (2m), D20 (2m), F14 (1m), F24 (1m), F27 (1f), F31 (1m), F34 (1m 1f)
60	*Rhyothemis plutonia* Selys	3	8	B4 (2m), D20 (2m), F36 (4m)
61	*Rhyothemis triangularis* Kirby	5	6	F21 (2m), F25 (1m), F28 (1m), F34 (1m), F59 (1m)
62	*Rhyothemis variegata* (Linnaeus)	2	3	B3 (2f), B4 (1f)
63	*Tetrathemis platyptera* Selys	3	3	D9 (1m), D17 (1m), F5 (1m)
64	*Tholymis tillarga* (Fabricius)	12	15	A26 (1m 1f), A37 (1m), D12 (1m), D19 (1m), D26 (2m), F3 (1m), F4 (1m), F8 (1m), F13 (1m), F31 (1m), F58 (1m), F62 (2m)
65	*Tramea limbata* (Desjardins)	1	1	F10 (1m)
66	*Tramea transmarina euryale* Selys	3	3	A22 (1m), D8 (1m), F60 (1m)
67	*Trithemis aurora* (Burmeister)	51	117	A14 (1m), A15 (3m), A16 (2m), A17 (1f), A22 (1m), A26 (1m), A30 (1m), A36 (4m 1f), B1 (1m), B9 (1m), C3 (1f), D5 (1m), D6 (4m 1f), D7 (1m), D8 (2m), D12 (3m), D14 (2m), D15 (4m), D17 (3m), D20 (1m), D21 (1m), D24 (3m 2f), D25 (1m), F1 (1m), F2 (3m), F4 (3m), F5 (1f), F7 (2m 1f), F11 (3m 1f), F12 (2m 1f), F14 (2f), F15 (3m 3f), F17 (2m), F19 (1m), F20 (2m 3f), F25 (1m), F26 (1m 1f), F28 (4m 1f), F32 (2m), F47 (1f), F49 (1m), F51 (1m 2f), F52 (1m), F53 (1m), F54 (1m), F55 (1m 1f), F56 (7m 1f), F58 (2m 3f), F59 (1m), F60 (1f), F61 (1m)
68	*Trithemis festiva* (Rambur)	16	21	A5 (1m), A8 (1m), C3 (1f), D5 (1m), D9 (1m), D14 (1m), D17 (1m), D20 (1m), D24 (1m), F1 (1m), F11 (4m), F14 (1m), F17 (1m), F25 (3m), F30 (1m), F60 (1m)
69	*Trithemis pallidinervis* (Kirby)	2	3	F28 (1m), F60 (2m)
70	*Tyriobapta torrida* Kirby	2	2	F5 (1m), F6 (1m)
71	*Urothemis s. signata* (Rambur)	2	3	D17 (1f), D20 (2m)
72	*Zygonyx iris malayana* (Laidlaw)	25	48	A2 (1m), A4 (1m), A5 (7m 4f), A7 (1m), A8 (1m), A17 (2m), A25 (1m), A30 (1m), A31 (1m 1f), A32 (1m), A34 (3m), D5 (3m), D6 (1m), D17 (1m), D21

Table 1 (continued).

T#	Species	#L.	#I.	Locality Code (no. and sex)
				(1m), D24 (2m), D25 (2m), F5 (2m 1f), F12 (1m), F14 (1m 1f), F15 (1m), F17 (1m), F25 (1m), F30 (2m), F57 (2m),
ZYGOPTERA				
Amphipterygidae				
73	*Devadatta a. argyoides* (Selys)	1	1	F37 (1m)
Calopterygidae				
74	*Echo modesta* Laidlaw	1	2	A34 (2m)
75	*Matrona basilaris nigripectus* Selys	2	2	A1 (1f), A10 (1f)
76	*Mnais andersoni* McLachlan in Selys	5	15	A3 (1m), A4 (3m), A10 (5m 4f), A27 (1f), A29 (1m)
77	*Neurobasis c. chinensis* (Linnaeus)	42	72	A4 (3m), A5 (2m 1f), A6 (1m), A12 (1m), A16 (1m), A17 (2m 1f), A30 (2f), D3 (1m), D5 (2m 1f), D6 (2m 1f), D7 (1m), D15 (1m 1f), D17 (2m), D21 (1m 1f), D22 (3m 1f), D24 (2m), D25 (1m 1f), F1 (1m), F5 (2m 1f), F7 (2m), F11 (1m), F12 (1m), F14 (1m 1f), F15 (1f), F17 (1m 1f), F19 (1m), F22 (3m), F25 (1m), F28 (1f), F32 (1m 1f), F39 (1m 1f), F42 (1m), F44 (1m), F45 (1m), F46 (1m), F49 (1f), F51 (1m), F53 (1m 1f), F55 (1m), F56 (1m), F57 (1m), F59 (1m 1f)
78	*Vestalis amethystina* Lieftinck	1	1	F35 (1m)
79	*Vestalis amoena* Hagen in Selys	7	13	F12 (1m), F14 (1m 1f), F27 (4m), F44 (1m 2f), F45 (1m), F49 (1m), F52 (1m)
80	*Vestalis g. gracilis* (Rambur)	21	27	A10 (1m), A13 (2m), D5 (1m), D6 (1f), D12 (1f), D15 (1m 1f), D17 (2m 1f), D21 (1f), D25 (1m), F1 (1m), F7 (1m), F11 (2m), F15 (2m), F19 (1f), F26 (1m), F49 (1m), F51 (1f), F54 (1m), F55 (1m), F56 (1f), F59 (1m)
Chlorocyphidae				
81	*Aristocypha fenestrella* (Rambur)	19	34	A1 (1m), A4 (3m), A5 (1m), A6 (1m), A9 (5m), A10 (2m), A11 (3m), A16 (1m), B7 (3m), D6 (2m), D22 (1m), D24 (1m), F5 (1m), F17 (2m), F25 (1m), F27

Table 1 (continued).

T#	Species	#L.	#I.	Locality Code (no. and sex)
				(1m), F30 (1m), F49 (1m), F57 (3m)
82	*Aristocypha* spp.	8	10	A5 (1f), A9 (1f), A34 (1f), D25 (1f), F17 (1f), *F25* (2f), F30 (1f), F57 (2f),
83	*Heliocypha b. biforata* (Selys)	18	26	A35 (2m), D1 (1m), D17 (1m), D21 (2m), F1 (1m), F14 (2m), F15 (3m), F17 (1m), F19 (2m), F25 (1m), F28 (1m), F32 (1m), F35 (2m), F42 (1m), F44 (1m), F45 (1m), F53 (2m), F55 (1m)
84	*Heliocypha performata limbata* (Selys)	11	19	A13 (2m), C1 (2m), D2 (1m), D5 (5m), D6 (1m), F7 (1m), F12 (1m), F22 (1m), F41 (2m), F44 (2m), F57 (1m)
85	*Heliocypha* spp.	19	25	A12 (1f), A17 (1f), A30 (1f), D1 (1f), D5 (2f), D22 (1f), F5 (2f), F7 (1f), F12 (1f), F14 (1f), F17 (2f), F19 (2f), F25 (1f), F27 (1f), F29 (1f), F44 (2f), F45 (1f), F49 (1f), F57 (2f)
86	*Libellago aurantiaca* (Selys)	3	4	F17 (1m), F19 (2m), F26 (1m)
87	*Libellago l. lineata* (Burmeister)	15	24	D5 (2m 1f), D7 (1m), D15 (3m 1f), D17 (2m), F1 (1m), F11 (1m), F32 (1m), F38 (1m 1f), F40 (1m), F51 (1m), F52 (1f), F54 (1m 1f), F56 (2m), F58 (1m), F59 (1m)
Chlorolestidae				
88	*Megalestes kurahashii* Asahina	1	1	A3 (1f)
Coenagrionidae				
89	*Aciagrion pallidum* Selys	1	1	A8 (1m)
90	*Agriocnemis f. femina* (Brauer)	6	14	A36 (1m 1f), A38 (2m 3f), D16 (1m 1f), D18 (1m 1f), F20 (2m), F47 (1m)
91	*Agriocnemis minima* Selys	3	3	A37 (1f), D26 (1f), F31 (1m)
92	*Agriocnemis nana* Laidlaw	1	1	F9 (1f)
93	*Agriocnemis pygmaea* (Rambur)	5	6	A21 (1m), A36 (1m 1f), A38 (1f), F16 (1f), F47 (1m)
94	*Agriocnemis rubsecens* (Selys)	1	1	D6 (1f)
95	*Agriocnemis* spp.	2	3	D8 (1f), D28 (2f)
96	*Ceriagrion aurantiacum* Fraser	2	3	D16 (1m), F47 (2m)
97	*Ceriagrion cerinorubellum* (Brauer)	4	8	B10 (1m), F18 (1m), F21 (2m), F47 (2m 2f)
98	*Ceriagrion chaoi* Schmidt	1	2	D17 (2m)
99	*Ceriagrion fallax pendleburyi* Laidlaw	2	2	A8 (1m), A10 (1f)
100	*Ceriagrion indochinense* Asahina	11	13	A22 (1m 1f), D8 (1m), D9 (1m), D11 (1f), D16 (1f), D18 (2m),

Table 1 (continued).

T#	Species	#L.	#I.	Locality Code (no. and sex)
				D19 (1m), D23 (1m), F9 (1m), F13 (1f), F60 (1m)
101	*Ceriagrion latericum* Lieftinck	4	5	D16 (1m), F13 (1m), F31 (2m), F33 (1m)
102	*Ceriagrion praetermissum* Leiftinck	2	2	F24 (1m), F56 (1m)
103	*Ischnura aurora* (Brauer)	2	4	A20 (1m), D27 (2m 1f)
104	*Ischnura senegalensis* (Rambur)	13	23	A22 (1f), D9 (1m 1f), D14 (1f), D16 (2m 1f), D19 (1m 1f), D26 (2f), D27 (1m 1f), D28 (1m 3f), E1 (1m), F13 (1f), F31 (1m), F33 (2m), F62 (1f)
105	*Onychargia atrocyana* (Selys)	2	2	A9 (1f), F36 (1m)
106	*Pseudagrion australasiae* Selys	6	6	D8 (1m), D17 (1m), D18 (1m), D20 (1m), D23 (1m), F13 (1m)
107	*Pseudagrion microcephalum* (Rambur)	7	10	D12 (2m 1f), D17 (1m), F19 (1m 1f), F24 (1m), F28 (1m), F34 (1m), F56 (1m)
108	*Pseudagrion pruinosum* (Burmeister)	17	39	D15 (4m), D17 (2m 1f), D21 (1m 1f), F7 (4m 1f), F11 (2m), F12 (2m), F14 (1m 1f), F15 (2m), F17 (2f), F19 (2m), F20 (2m), F51 (1m), F53 (1m), F54 (2m), F55 (3m), F56 (1m), F59 (2m 1f)
109	*Pseudagrion r. rubriceps* Selys	11	16	A14 (1m 2f), A15 (2m), D8 (1m 1f), D9 (1f), D14 (1m 1f), D15 (1m), D19 (1f), F16 (1m), F20 (1m), F56 (1f), F59 (1f)
110	*Pseudagrion* sp.	1	1	F20 (1f)
Euphaeidae				
111	*Dysphaea dimidiata* Selys	7	9	D5 (1m), D6 (1m), E1 (1m), F14 (2m), F17 (2m), F25 (1m), F44 (1m)
112	*Dysphaea gloriosa* Fraser	2	4	B8 (1m), D15 (3m)
113	*Euphaea masoni* Selys	25	60	A13 (1m), A16 (5m), A17 (2m), D5 (10m 1f), D6 (2m), D14 (2m), D15 (4m), D17 (2m), D21 (5m), D22 (1m), D24 (3m), D25 (3m), F1 (1m), F5 (1m), F7 (1m), F12 (3m), F14 (2m), F15 (2m), F17 (1m), F32 (1m), F44 (2m), F49 (1m), F53 (1m), F55 (1m), F57 (2m)
114	*Euphaea ochracea* Selys	13	28	A10 (1m), A30 (1m), A34 (2m), D13 (2m), D24 (1m), F5 (3m), F14 (4m 1f), F15 (2m), F25 (2m), F27 (2m), F37 (1m), F45 (1m), F57 (3m 2f),

Table 1 (continued).

T#	Species	#L.	#I.	Locality Code (no. and sex)
115	*Euphaea* spp.	7	7	D5 (1f), D21 (1f), D24 (1f), F12 (1f), F44 (1f), F45 (1f), F57 (1f)
Lestidae				
116	*Indolestes* sp.	1	1	D8 (1f)
117	Lestes elata Hagen in Selys	1	1	D18 (1m)
118	Lestes platystyla Rambur	1	2	F47 (2m)
119	Lestes praemorsus decipiens (Kirby)	1	1	F9 (1m)
Megapodagrionidae				
120	*Burmargiolestes melanothorax* (Selys)	3	4	A8 (2m), A9 (1m), A10 (1f)
Platycnemididae				
121	*Calicnemia imitans* Leiftinck	2	3	A11 (1m), F17 (2m)
122	*Calicnemia miles* (Laidlaw)	1	2	A9 (1m 1f)
123	*Calicnemia* spp.	1	2	A8 (1m 1f)
124	*Coeliccia chromothorax* (Selys)	4	5	A7 (1m), A8 (1m 1f), A10 (1m), F45 (1f)
125	*Coeliccia didyma* (Selys)	2	2	A10 (1f), F30 (1m)
126	*Coeliccia doisuthepensis* Asahina	1	2	A27 (2m)
127	*Coeliccia loogali* Laidlaw	3	22	A27 (8m), A28 (1m), B5 (10m 3f)
128	*Coeliccia* spp.	2	2	A8 (1f), A28 (1f)
129	*Copera ciliata* (Selys)	2	2	F24 (1m), F56 (1m)
130	*Copera marginipes* (Rambur)	24	31	A5 (1m), A16 (1m), A17 (1m), A36 (1m), D5 (1m), D6 (1m), D12 (1m), D17 (2m), D21 (1m 2f), F1 (1m), F5 (1m), F12 (1m), F14 (1m), F19 (2m), F26 (1m), F30 (1m 1f), F32 (2m), F44 (1m), F45 (1m), F49 (1m), F55 (1m), F57 (2m), F58 (1m), F59 (1m)
131	*Copera vittata* Selys	1	1	F24 (1m)
132	*Copera* spp.	6	7	A5 (2f), D22 (1f), F44 (1f), F57 (1f), F58 (1f), F59 (1f)
133	*Indocnemis orang* (Forster)	4	8	D20 (1m), D24 (1m), F27 (2f), F45 (4m)
Platystictidae				
134	*Drepanosticta cf khaochongensis*	1	1	F17 (1m)
135	*Drepanosticta* sp.	1	2	A34 (2f)
136	*Protosticta medusa* Fraser	2	6	A34 (5m), A35 (1m)
137	*Protosticta* sp.	1	1	A35 (1f)
Protoneuridae				
138	*Prodasineura autumnalis* (Fraser)	26	48	D2 (1m), D5 (3m 1f), D6 (1m), D15 (7m 3f), D17 (3m 1f), D21 (1m), D24 (2m), D25 (1m), F1 (1m), F2 (1m 1f), F5 (1m), F7 (1m), F11 (2m), F12 (2m), F14

Table 1 (continued).

T#	Species	#L.	#I.	Locality Code (no. and sex)
				(2m), F15 (1m), F17 (1m), F19 (2m 1f), F26 (1m), F30 (1m), F49 (1m), F51 (1m), F56 (1m), F57 (1m), F58 (1m), F59 (1m)
139	*Prodasineura coerulescens* (Fraser)	2	2	D15 (1m), F60 (1m)
140	*Prodasineura laidlawii* (Forster)	12	16	D22 (1m), D24 (1m), F25 (2m), F26 (1m), F27 (2m), F28 (1m), F35 (1m), F45 (1m), F49 (1m), F52 (3m), F54 (1m), F57 (1m)
141	*Prodasineura verticalis* (Selys)	3	3	D1 (1m), F27 (1m), F44 (1m)
142	*Prodasineura* spp.	6	9	D17 (1f), F11 (1m 3f), F25 (1f), F28 (1m), F44 (1f), F54 (1f)

Table 2. List of localities from which odonates were collected by the University of Missouri teams in Thailand from 1995 through 2005. **LC** = locality code; **Elev**. = elevation, **L#** = L-number, see text for details; **#sp** = number of species collected from that location; **T#** = taxon number, refer to Table 1 for taxon number assignments.

Collector data are listed by locality code, CMU= Chiang Mai University, PSU= Prince of Songkla University: A1-A5, A12-A14, A23, D1-D4 by UMC, CMU teams; A6 by RWS, AV, Kirawanich; A7, A25, A31-A33 by RWS, AV, Prommi; A8-A11 by AV, MLF, Thamasenanupap; A15, A17, F23, F47-F48, F62, F8 by MLF; A16, A19-A22, A27-A30, A34-A38, B5, D23-D25, D27-D28, D5-D8, E1, F45, F61 by AV, Prommi, MLF; A18 by RWS, AV, Prommi, Setaphan; A24, A26 by AV, Prommi, Setaphan; B1-B4, B6-B9 by RWS, Simpson, AV; B10, C1-C3 by AV, Sawangsak; D14 by AV, Kirawanich; D15-D22, D26, D9-D13, F1-F7, F9, F11-F21, F24-F27, F30-F34, F50-F52, F56-F58, by AV, MLF; E2 by AV; F10 by RWS, AV, Simpson, Prommi; F22, F44 by RWS, AV; F28-F29, F35-F37, F43 by RWS, AV, MLF; F38, F41-F42 by AV, Kirawanich, Suwonno; F39-F40 by RWS, Nichols; F46 by [unknown]; F49, F53-F55 by AV, Laudee, MLF; F59-F60 by CMU, PSU teams.

LC	Locality	Lat/Long	Elev.	Date	L#	Notes	Hab.	#sp	T#
Chiang Mai Province									
A1	Doi Inthanon NP: Mae Pan Noi at Ban San Pathana	18°31'N 98°25'E	750 m	7 May 2002	393	bedrock stream	lotic	3	6, 75, 81
A2	Doi Inthanon NP: Mae Pan Noi at at Ban San Pathana	18°31'N 98°25'E	750 m	4 April 2003	446	bedrock stream	lotic	1	72
A3	Doi Inthanon NP: Siriphum Waterfall	18°32'N 98°31'E	1460 m	9 May 2002	401	waterfall	lotic	2	76, 88
A4	Doi Inthanon NP: Thai Royal Agriculture Research Station at Khun Wang	18°37'N 98°30'E	1431 m	1 May 2003	493	UV light trap	—	5	51, 72, 76, 77, 81
A5	Doi Inthanon NP: Mae Klang River at Ecolodge	18°32'N 98°32'E	1000 m	2 May 2003	494	gravel stream	lotic	10	42, 46, 48, 68, 72, 77, 81, 82, 130, 132
A6	Doi Suthep-Pui NP: creek from Mohk Fah Waterfall	19°06'N 98°46'E	564 m	18 March 2002	304	gravel stream	lotic	2	77, 81
A7	Doi Suthep-Pui NP: creek from Mohk Fah Waterfall	19°06'N 98°46'E	564 m	25 March 2003	415	gravel stream	lotic	2	72, 124
A8	Doi Suthep-Pui NP: Namtok Huay Pa Lad	18°48'N 98°54'E	1250 m	29 April 2003	488	waterfall	lotic	11	2, 46, 51, 68, 72, 89, 99, 120, 123, 124, 128
A9	Doi Suthep-Pui NP: Namtok Monthathan	18°49'N 98°55'E	700 m	29 April 2003	489	waterfall with stream	lotic	8	2, 3, 34, 81, 82, 105, 120, 122
A10	Doi Suthep-Pui NP: Pa Ngerb stream	18°48'N 98°56'E	530 m	29 April 2003	490	waterfall with stream	lotic	10	1, 75, 76, 80, 81, 99, 114, 120, 124, 125
A11	Doi Suthep-Pui NP: creek from Mohk Fah Waterfall	19°06'N 98°46'E	564 m	30 April 2003	491	gravel stream	lotic	2	81, 121
A12	Amphur Mae Rim, Mae Sa Waterfall	18°52'N 98°48'E	1030 m	6 April 2002	327	waterfall with stream	lotic	3	32, 77, 85
A13	Amphur Mae Rim, Mae Sa River	18°53'N 98°51'E	649 m	6 April 2002	328	gravel stream	lotic	4	51, 80, 84, 113

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	I#	Notes	Hab.	#sp	T#
A14	Amphur Mae Rim, Mae Sa River	18°53'N 98°58'E	345 m	7 April 2002	329	gravel stream	lotic	2	67, 109
A15	Chiang Mai University Lake	18°48'N 98°57'E	–	5 May 2003	—	lake	lentic	5	1, 11, 30, 67, 109
Kamphaeng Phet Province									
A16	Khlong Lan NP: Khlong Nam Lai Waterfall	16°11'N 99°15'E	290 m	9 May 2003	518	waterfall with stream	lotic	7	34, 53, 67, 77, 81, 113, 130
A17	Khlong Lan NP: stream from Klong Lan Waterfall	16°07'N 99°16'E	244 m	10 May 2003	--	stream	lotic	6	67, 72, 77, 85, 113, 130
A18	Mae Wong NP: Kaeng Pa Nang Koi	16°02'N 99°13'E	–	7 April 2003	451	bedrock stream	lotic	1	49
A19	Kosamphi Nakhon, Ban Klong Meung	16°38'N 99°19'E	97 m	9 May 2003	515	unplanted rice paddy	lentic	2	32, 41
A20	Amphur Meung; Ban Rai Tai	16°32'N 99°27'E	98 m	9 May 2003	516	reservoir	lentic	6	11, 30, 32, 34, 49, 103
A21	Amphur Meung; Ban Mor Sombat	16°18'N 99°23'E	98 m	9 May 2003	517	pond	lentic	4	34, 41, 49, 93
A22	Amphur Khanu Woralaksaburi, Tumbon Pang Mapha	15°58'N 99°27'E	165 m	10 May 2003	520	pond	lentic	9	11, 25, 32, 34, 49, 66, 67, 100, 104
Mae Hong Son Province									
A23	Namtok Mae Surin NP: Mae Nam Pai	19°21'N 97°59'E	310 m	31 March 2003	431	pan UV lt. trap	—	1	11
Nan Province									
A24	Amphur Chiang Klang, 8 km N of Chiang Klang on Hwy 1080	19°21'N 100°51'E	277 m	20 April 2003	—	lights	lentic	2	30, 38
Phayao Province									
A25	Doi Luang NP: Namtok Cham Pa Thong	19°13'N 99°44'E	620 m	27 March 2003	420	lime stone waterfall	lotic	1	72
A26	Naresuan University; lights on campus	—	—	19 April 2003	467	lights	—	4	1, 34, 64, 67
Phitsanulok Province									
A27	Phu Hin Rongkla NP: Huai Kha Mheun Waterfall	16°59'N 101°00'E	1253 m	6 May 2003	505	waterfall	lotic	5	4, 39, 76, 126, 127

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	L#	Notes	Hab.	#sp	T#
A28	Phu Hin Rongkla NP: Waterwheel falls and stream	16°59'N 101°00'E	1280 m	6 May 2003	506	waterfall with stream	lotic	3	45, 127, 128
A29	Phu Hin Rongkla NP: Namtok Romglao	16°59'N 101°00'E	1190 m	6 May 2003	507	waterfall	lotic	2	53, 76
A30	Phu Hin Rongkla NP: Namtok Palad	17°01'N 100°56'E	300 m	7 May 2003	509	waterfall	lotic	9	34, 39, 45, 46, 67, 72, 77, 85, 114
Phrae Province									
A31	Wieng Ko Sai NP: Namtok Mae Koeng Luang	17°58'N 99°35'E	350 m	28 March 2003	423	waterfall	lotic	1	72
A32	Wieng Ko Sai NP: Namtok Punjane	17°56'N 99°34'E	430 m	28 March 2003	424	waterfall	lotic	2	34, 72
A33	Wieng Ko Sai NP: —	17°58'N 99°35'E	350 m	29 March 2003	425	pan UV light trap	—	1	34
Tak Province									
A34	Namtok Pachareon NP: Pa Wai Waterfall	16°34'N 98°50'E	791 m	8 May 2003	510	lime stone waterfall	lotic	7	13, 72, 74, 82, 114, 135, 136
A35	Namtok Pachareon NP: Pachareon Waterfall	16°30'N 98°48'E	679 m	8 May 2003	511	lime stone waterfall	lotic	3	83, 136, 137
A36	Amphur Mae Sot, Tumbon Ban Koo Noi	16°36'N 98°36'E	219 m	8 May 2003	512	vegetated pond	lentic	6	32, 48, 67, 90, 93, 130
A37	Amphur Mae Sot, Ban Huay Pak La	16°39'N 98°35'E	220 m	8 May 2003	513	vegetated pond	lentic	3	25, 64, 91
A38	Amphur Meung; Tumbon Nhong Bua Tai	16°49'N 99°07'E	106 m	9 May 2003	514	vegetated pond	lentic	4	34, 49, 90, 93
Kalasin Province									
B1	Phu Pan NP: Huay Pla Duk	—	—	4 June 1998	148	stream w/ boulders & veg.	lotic	1	67
B2	Phu Pan NP: Huay Wein Prai	—	—	5 June 1998	153	ponds w/ sedges & grasses	lentic	4	30, 32, 49, 56
B3	Phu Pan NP: Huay Yai Namtok	—	—	5 June 1998	154	stream w/ waterfall & veg.	lotic	1	62
B4	Phu Pan NP: Lahm Huay Noi	—	—	7 June 1998	161	vegetated margins of river	lotic	5	12, 26, 59, 60, 62

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	I#	Notes	Hab.	#sp	T#
Loei Province									
B5	Phu Hin Rongkla NP: Mhun Daeng Noi	16°57'N 101°03'E	1340 m	6 May 2003	504	waterfall	lotic	3	5, 53, 127
B6	Phu Rua NP: Namtok Huay Pai	—	—	10 June 1998	175	waterfall	lotic	1	20
B7	Phu Rua NP: Namtok Hin Sahm Shan	—	—	10 June 1998	176	waterfall	lotic	1	81
B8	Mae Nam Heung Gang Tah Kad	—	—	10 June 1998	177	river between Laos & Thailand	lotic	1	112
Mukdahan Province									
B9	Phu Pa Yon NP: Namtok Keang Pho	16°45'N 104°14'E	314 m	6 June 1998	157	river w/ 10 m waterfall	lotic	2	53, 67
Phetchabun Province									
B10	Amphur Nam Nao; vegetated pond on Hwy 2216, 83 km N of Hwy 21	—	—	3 July 1998	232	vegetated pond	lentic	2	30, 97
Chaiyaphum Province									
C1	Nam Noa NP: Huay Prom Lang	16°38'N 101°34'E	253 m	19 June 1998	194	bedrock stream	lotic	1	84
C2	Nam Noa NP: Visitor Center	16°44'N 101°34'E	820 m	1 July 1998	225	black light trap	—	1	53
C3	Sai Thong NP: Sai Thong Waterfall, stream	15°52'N 101°30'E	380 m	19 June 1998	192	stream	lotic	2	67, 68
Kanchanaburi Province									
D1	Amphur Thong Pha Phum, Huay Koeng Kra Wia	14°55'N 98°40'E	325 m	11 April 2002	331	stream	lotic	3	83, 85, 141
D2	Amphur Sai Yok; Thong Pha Phum Reforestation Station; Mae Nam Noi	14°31'N 98°37'E	204 m	12 April 2002	335	gravel stream	lotic	2	84, 138
D3	Amphur Sangkhla Buri, Huay Li Jia	15°04'N 98°33'E	169 m	13 April 2002	338	gravel stream	lotic	1	77
D4	Amphur Thong Pha Phum; small waterfall 6.3 km W of Border Police Stn. at Ban Padsadoo Klang	14°32'N 98°32'E	568 m	10 April 2003	463	waterfall	lotic	2	14, 31
D5	Amphur Thong Pha Phum, Huay Ou Long	14°46'N 98°40'E	139 m	12 May 2003	525	stream	lotic	14	9, 67, 68, 72, 77, 80, 84, 85, 87, 111, 113, 115, 130, 138

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	I#	Notes	Hab.	#sp	T#
D6	Amphur Sangkhla Buri, Huay Li Jia	15°04'N 98°33'E	169 m	12 May 2003	526	gravel stream	lotic	18	25, 35, 39, 45, 47, 49, 59, 67, 72, 77, 80, 81, 84, 94, 111, 113, 130, 138
D7	Amphur Thong Pha Phum, Huay Koeng Kra Wia	14°55'N 98°40'E	325 m	12 May 2003	527	stream	lotic	4	30, 67, 77, 87
D8	Amphur Tha Muang; Ban Khao Yai Pim	13°51'N 99°35'E	69 m	13 May 2003	528	pond	lentic	11	30, 34, 36, 49, 66, 67, 95, 100, 106, 109, 116
Phetchaburi Province									
D9	Amphur Nong Ya Plong, Tumbon Nong Ya Plong	13°09'N 99°41'E	69 m	15 May 2003	533	unplanted rice paddy	lentic	10	29, 30, 32, 34, 49, 63, 68, 100, 104, 109
D10	Amphur Khao Yoi, Tumbon Huay Ta Chang	13°08'N 99°48'E	20 m	15 May 2003	534	pond	lentic	3	34, 49, 54
D11	Amphur Khao Yoi, Tumbon Huay Ta Chang	13°08'N 99°48'E	21 m	15 May 2003	535	pond	lentic	4	32, 34, 41, 100
D12	Amphur Tha Yang; Ban Yang Chum	12°47'N 99°40'E	46 m	15 May 2003	536	stream	lotic	10	30, 32, 38, 57, 59, 64, 67, 80, 107, 130
Prachuap Khiri Khan Province									
D13	Kaeng Krachan NP: Pa La Ou Waterfall	12°32'N 99°27'E	319 m	16 May 2003	538	waterfall	lotic	1	114
D14	Amphur Hua Hin; stream from irrigation dam at Ban Pa La Ou	12°31'N 99°30'E	164 m	20 April 2002	357	stream	lotic	5	67, 68, 104, 109, 113
D15	Amphur Hua Hin, Tumbon Huay Pheung, Ban Sad Yai	12°29'N 99°34'E	114 m	16 May 2003	537	stream	lotic	17	7, 9, 11, 22, 32, 38, 43, 67, 77, 80, 87, 108, 109, 112, 113, 138, 139
D16	Amphur Hua Hin, Ban Nong Yai Oum	12°35'N 99°46'E	83 m	16 May 2003	539	pond	lentic	6	30, 90, 96, 100, 101, 104
D17	Amphur Kui Buri Forest Plantation Station	12°04'N 99°37'E	117 m	17 May 2003	540	gravel stream	lotic	26	9, 11, 25, 30, 32, 38, 45, 47, 52, 63, 67, 68, 71, 72, 77, 80, 83, 87, 98, 106, 107, 108, 113, 130, 138, 142
D18	Amphur Meung; Tumbon Aow Noi	11°54'N 99°42'E	103 m	17 May 2003	541	pond	lentic	6	30, 49, 90, 100, 106, 117

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	I#	Notes	Hab.	#sp	T#
D19	Amphur Meung; Tumbon Aow Noi, Ban Nikom km 9	11°53'N 99°42'E	81 m	17 May 2003	542	pond	lentic	11	25, 28, 30, 32, 38, 40, 41, 64, 100, 104, 109
D20	Amphur Thap Sakae; Ban Huay Yang	11°36'N 99°38'E	25 m	18 May 2003	543	pond	lentic	16	11, 27, 28, 30, 32, 35, 38, 41, 49, 59, 60, 67, 68, 71, 106, 133
D21	Amphur Bang Saphan; stream from Kha On Waterfall	11°26'N 99°26'E	117 m	18 May 2003	544	gravel stream	lotic	11	10, 67, 72, 77, 80, 83, 108, 113, 115, 130, 138
D22	Amphur Bang Saphan Sai Koo Waterfall	11°14'N 99°20'E	73 m	18 May 2003	545	waterfall with stream	lotic	7	21, 77, 81, 85, 113, 132, 140
Ratchaburi Province									
D23	Chareumkiat Thaiprachan NP: pond behind dam	13°15'N 99°33'E	200 m	13 May 2003	529	vegetated pond	lentic	6	25, 30, 32, 49, 100, 106
D24	Amphur Suan Phueng; Namtok Kao Chan	13°31'N 99°14'E	210 m	14 May 2003	530	vegetated pond	lentic	16	22, 23, 39, 45, 46, 67, 68, 72, 77, 81, 113, 114, 115, 133, 138, 140
D25	Amphur Suan Phueng; Huay Nam Sai Waterfall	13°35'N 99°12'E	204 m	14 May 2003	531	waterfall with stream	lotic	8	46, 67, 72, 77, 80, 82, 113, 138
D26	Amphur Meung, Tumbon Jadi Hak	13°33'N 99°47'E	7 m	14 May 2003	532	vegetated pond	lentic	6	30, 34, 41, 64, 91, 104
Uthai Thani Province									
D27	Amphur Meung	15°23'N 100°01'E	18 m	11 May 2003	521	unplanted rice paddy	lentic	7	30, 32, 34, 49, 53, 103, 104
D28	Amphur Nong Chang; Tumbon Uthai Kao	15°23'N 99°48'E	38 m	11 May 2003	522	pond	lentic	5	32, 34, 49, 95, 104
Suphan Buri Province									
E1	Amphur Sam Chuk	14°43'N 100°06'E	25 m	11 May 2003	523	pond	lentic	7	25, 27, 30, 32, 38, 104, 111
E2	Amphur Bang Pla Ma, Tumbon Salee, Moo Sarm	14°18'N 100°14'E	11 m	14 April 2003	—	—	—	2	30, 34

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	L#	Notes	Hab.	#sp	T#
Chumphon Province									
F1	Amphur Tha Sae, Ban Meung Thong	10°50'N 99°11'E	98 m	19 May 2003	546	pond	lentic	12	30, 39, 43, 67, 68, 77, 80, 83, 87, 113, 130, 138
F2	Amphur Tha Sae, Tumbon Sa Lui	10°48'N 99°10'E	44 m	19 May 2003	547	pond	lentic	8	11, 30, 38, 49, 52, 55, 67, 138
F3	Amphur Tha Sae, 18.3 km N Int. Hwy 4 X 327	10°36'N 99°09'E	44 m	19 May 2003	548	pond	lentic	5	27, 32, 38, 41, 64
F4	Amphur Tha Sae, 19.2 km N Int. Hwy 4 X 327	10°36'N 99°10'E	25 m	19 May 2003	549	pond	lentic	6	25, 30, 33, 41, 64, 67
F5	Khun Mae Yam Oum Wildlife Sanctuary, Hawe Lome Waterfall	09°43'N 98°40'E	122 m	21 May 2003	555	waterfall with stream	lotic	17	17, 19, 21, 30, 38, 45, 63, 67, 70, 72, 77, 81, 85, 113, 114, 130, 138
F6	Khun Mae Yam Oum Wildlife Sanctuary, pond near Hawe Lome Waterfall	09°43'N 98°40'E	120 m	21 May 2003	556	vegetated pond	lentic	2	38, 70
F7	Amphur Phato, Klong Yai Mon	09°45'N 98°41'E	99 m	21 May 2003	557	ond	lentic	8	67, 77, 80, 84, 85, 108, 113, 138
Krabi Province									
F8	Amphur Muang, Riverside Hotel	08°02'N 98°54'E	—	29 May 2003	—	—	—	1	64
F9	Amphur Plai Phraya; Ban Khao Tor	08°34'N 98°44'E	46 m	29 May 2003	579	pond	lentic	6	25, 27, 29, 92, 100, 119
F10	Amphur Nuea Khlong; Tumbon Nuea Khlong; Ban Paga Sai	08°02'N 99°01'E	27 m	8 August 2005	864	pond	lentic	1	65
Nakhon Si Thamarat Province									
F11	Nopphitam, Ban Pitam, Tumbon Krung Ching	08°44'N 99°39'E	89 m	26 May 2003	570	gravel stream	lotic	17	7, 15, 23, 27, 30, 39, 42, 43, 50, 67, 68, 77, 80, 87, 108, 138, 142
F12	Nopphitam, Tumbon Krung Ching; Klong Pod	08°48'N 99°35'E	130 m	26 May 2003	571	stream	lotic	13	18, 42, 67, 72, 77, 79, 84, 85, 108, 113, 115, 130, 138
F13	Amphur Tha Sala Tumbon Ban Thaiburi	08°40'N 99°51'E	22 m	26 May 2003	572	pond	lentic	8	27, 30, 41, 64, 100, 101, 104, 106

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	L#	Notes	Hab.	#sp	T#
F14	stream from Yong Waterfall	08°10'N 99°44'E	112 m	31 May 2003	581	gravel stream	lotic	15	30, 59, 67, 68, 72, 77, 79, 83, 85, 108, 111, 113, 114, 130, 138
F15	stream from Pliew Waterfall	08°29'N 99°45'E	110 m	31 May 2003	582	gravel stream	lotic	14	27, 38, 40, 45, 53, 67, 72, 77, 80, 83, 108, 113, 114, 138
F16	Amphur Chulabhorn, pond 56 km N of Phatthalung	08°03'N 99°53'E	21 m	31 May 2003	583	pond	lentic	7	27, 30, 32, 41, 54, 93, 109
Phangnga Province									
F17	Khao Lampi-Hat Thai Mueang NP: Ton Prai Waterfall	08°26'N 98°18'E	92 m	29 May 2003	577	waterfall with stream	lotic	18	10, 42, 58, 67, 68, 72, 77, 81, 82, 83, 85, 86, 108, 111, 113, 121, 134, 138
F18	Amphur Takua Pa; Tumbon Bang Sai	08°48'N 98°22'E	26 m	22 May 2003	560	pond	lentic	4	25, 27, 28, 97
F19	Amphur Kapong; stream 5.4 km N of int. Hwy 4090 x Ban Kradai Ban Lum Roo Road	08°39'N 98°26'E	69 m	28 May 2003	575	gravel stream	lotic	13 83,	7, 9, 30, 67, 77, 80, 85, 86, 107, 108, 130, 138
F20	Amphur Kapong; Ban Tha Na	08°40'N 98°25'E	32 m	28 May 2003	576	stream	lotic	7	30, 34, 67, 90, 108, 109, 110
F21	Amphur Muang; pond 10.2 km W of int. Hwy 4 X 4240	08°33'N 98°26'E	53 m	29 May 2003	578	pond	lentic	6	25, 27, 30, 38, 61, 97
F22	Amphur Thap Put, Tao Thong Waterfall	08°29'N 98°35'E	63 m	7 June 2003	599	waterfall	lotic	2	77, 84
F23	—	08°35'N 98°39'E	—	28 May 2003	—	Pond	lentic	3	11, 16, 52
Phatthalung Province									
F24	Amphur Pa Phayom, Ban Pa Phayom	07°50'N 99°56'E	19 m	31 May 2003	584	pond	lentic	11	25, 27, 34, 41, 54, 57, 59, 102, 107, 129, 131
F25	Khao Kram Waterfall	07°30'N 99°52'E	101 m	1 June 2003	585	waterfall	lotic	15	45, 46, 61, 67, 68, 72, 77, 81, 82, 83, 85, 111, 114, 140, 142
F26	Srinagarindra; stream from Prae Thong Waterfall	07°29'N 99°54'E	51 m	1 June 2003	586	gravel stream	lotic	7	45, 67, 80, 86, 130, 138, 140
F27	Wang Khor Waterfall	07°26'N 99°55'E	70 m	1 June 2003	587	waterfall	lotic	10	34, 44, 59, 79, 81, 85, 114, 133, 140, 141

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	L#	Notes	Hab.	#sp	T#
F28	Royal Thai Dept. Ag. Prop. Cntr. ca. 3 km E of Khao Chong Wildlife Management Station	07°34'N 99°47'E	145 m	6 June 2003	595	stream	lotic	12 69,	27, 33, 47, 53, 61, 67, 77, 83, 107, 140, 142
Phuket Province									
F29	Khao Prataew Wildlife Non-hunting Area; Bang Pae Waterfall	08°02'N 98°23'E	51 m	8 June 2003	600	waterfall	lotic	1	85
Ranong Province									
F30	Thung Raya-Na Sak Wildlife Sanctuary Chumsang Waterfall	10°30'N 98°53'E	176 m	20 May 2003	550	waterfall	lotic	9	38, 46, 68, 72, 81, 82, 125, 130, 138
F31	Amphur Kra Buri, Tumbon Ma Moo	10°27'N 98°48'E	9 m	20 May 2003	551	unplanted rice paddy	lentic	17	27, 29, 32, 33, 38, 39, 40, 41, 49, 53, 54, 59, 64, 91, 101, 104
F32	Amphur Kra Buri; stream from Huay Liang Waterfall	10°15'N 98°51'E	38 m	20 May 2003	552	gravel stream	lotic	7	38, 67, 77, 83, 87, 113, 130
F33	Amphur Kapoe, Tumbon Bang Hin	09°32'N 98°35'E	8 m	22 May 2003	558	pond	lentic	10	27, 28, 30, 34, 38, 49, 50, 54, 101, 104
F34	Tumbon Ging Sooksamran, Ban Na Ka	09°24'N 98°26'E	21 m	22 May 2003	559	pond	lentic	8	34, 38, 40, 45, 49, 59, 61, 107
Satun Province									
F35	Thale Ban NP: Ranee Waterfall	06°42'N 100°10'E	94 m	4 June 2003	590	waterfall	lotic	5	39, 46, 78, 83, 140
F36	Thale Ban NP: fountain in front of lake	06°45'N 100°10'E	66 m	4 June 2003	591	fountain	lentic	6	11, 27, 34, 47, 60, 105
F37	Thale Ban NP: Ya Roi Waterfall	06°45'N 100°09'E	66 m	4 June 2003	592	waterfall	lotic	2	73, 114
F38	Amphur Kuan Don, Tumbon Kuan Don, Ban Hua Sa Pan Lek	06°48'N 100°05'E	60 m	3 May 2002	390	gravel stream	lotic	1	87
Songkhla Province									
F39	Amphur Hat Yai; stream from Ton Nga Chang Waterfall at Buddhist Temple	06°56'N 100°15'E	44 m	7 January 1995	60	gravel stream	lotic	1	77
F40	stream from Ton Plieuw	—	—	8 January 1995	64	stream	lotic	1	87

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	I#	Notes	Hab.	#sp	T#
F41	Amphur Hat Yai; stream from Ton Nga Chang Waterfall at Buddhist Temple	06°56'N 100°15'E	78 m	3 May 2002	388	gravel stream	lotic	1	84
F42	Amphur Rattaphum 45 km NNE of Satun Prov on Hwy 406	07°00'N 100°08'E	79 m	3 May 2002	389	gravel stream	lotic	2	77, 83
F43	Amphur Hat Yai; Ton Nga Chang Wildlife Sanctuary; Ton Nga Chang Waterfall	06°56'N 100°14'E	53 m	3 June 2003	588	waterfall with stream	lotic	1	24
F44	Amphur Hat Yai; stream from Ton Nga Chang Waterfall at Buddhist temple	06°56'N 100°15'E	44 m	3 June 2003	589	gravel stream	lotic	16 83,	19, 23, 43, 50, 77, 79, 84, 85, 111, 113, 115, 130, 132, 141, 142
F45	Amphur Hat Yai, Prince of Songkla University pond near reservoir	07°00'N 100°30'E	58 m	5 June 2003	594	pond	lentic	11	55, 77, 79, 83, 85, 114, 115, 124, 130, 133, 140
F46	Ton Nga Chang Wildlife Sanctuary	—	—	7 July 1997	—	—	—	1	77
F47	Prince of Songkla University; pond	07°00'N 100°30'E	—	3 June 2003	—	pond	lentic	17	25, 30, 32, 33, 37, 38, 40, 41, 49, 51, 52, 67, 90, 93, 96, 97, 118
F48	—	06°46'N 100°06'E	—	4 June 2003	—	forest	—	1	49
Suratthani Province									
F49	Kang Krung NP: Bang Jam Waterfall	09°22'N 98°50'E	159 m	25 May 2003	568	gravel stream	lotic	11	52, 67, 77, 79, 80, 81, 85, 113, 130, 138, 140
F50	Ban Chong Lom	08°52'N 98°40'E	43 m	23 May 2003	562	water filled tire rut	lentic	2	38, 50
F51	Amphur Phanom, Ban Chong Lom; Klong Sok	08°52'N 98°40'E	43 m	23 May 2003	563	gravel stream	lotic	11	7, 8, 9, 30, 32, 67, 77, 80, 87, 108, 138
F52	Amphur Phanom, Bang Kui Waterfall	08°47'N 98°50'E	94 m	23 May 2003	564	gravel stream	lotic	5	21, 67, 79, 87, 140
F53	Viphavadi, stream from Viphavadi Waterfall	09°09'N 98°53'E	43 m	24 May 2003	565	gravel stream	lotic	5	67, 77, 83, 108, 113
F54	Amphur Khiri Ratthanikhom, Klong Yan	09°04'N 98°59'E	26 m	24 May 2003	567	gravel stream	lotic	7	30, 67, 80, 87, 108, 140, 142
F55	Amphur Tha Chang , Klong Mai Daeng	09°25'N 98°54'E	153 m	25 May 2003	569	gravel stream	lotic	8	21, 67, 77, 80, 83, 108, 113, 130
F56	Amphur Chai Buri, Tumbon Chai Buri, Klong Pak	08°27'N 99°04'E	29 m	27 May 2003	573	gravel stream	lotic	17	25, 27, 30, 32, 43, 49, 57, 67, 77, 80, 87, 102, 107, 108, 109, 129, 138

Table 2 (continued).

LC	Locality	Lat/Long	Elev.	Date	I#	Notes	Hab.	#sp	T#
F57	Amphur Phanom; Ton Yai Waterfall	08°40'N 98°41'E	67 m	28 May 2003	574	waterfall	lotic	14	8, 72, 77, 81, 82, 84, 85, 113, 114, 115, 130, 132, 138, 140
Trang Province									
F58	Amphur Muang; Ang Thong Waterfall	07°33'N 99°24'E	55 m	30 May 2003	580	waterfall	lotic	12	11, 30, 32, 38, 40, 55, 64, 67, 87, 130, 132, 138
F59	Khao Chong Wildlife Management Station	07°33'N 99°46'E	50 m	6 June 2003	596	creek	lotic	10	61, 67, 77, 80, 87, 108, 109, 130, 132, 138
F60	Prince of Songkla Univeristy; muddy pond near rubber trees	07°31'N 99°35'E	55 m	7 June 2003	597	pond	lentic	13	11, 30, 32, 34, 37, 39, 54, 66, 67, 68, 69, 100, 139
F61	Prince of Songkla University; concrete fountain	07°31'N 99°34'E	36 m	7 June 2003	598	fountain	lentic	2	32, 67
F62	—	07°25'N 99°38'E	—	30 May 2003	—	pond	lentic	3	27, 64, 104