



Entomofauna

ZEITSCHRIFT FÜR ENTOMOLOGIE

Band 31, Heft 5: 33-48

ISSN 0250-4413

Ansfelden, 4. Januar 2010

Report on three collecting trips to Taiwan (Insecta: Diptera)

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Abstract

The paper deals with Diptera families collected in Taiwan, the material sorted to family level and the range of altitude registered for each family. Comments on some Diptera families rarely known or even unknown from Taiwan are given. The papers dealing with the collected material are cited. A change of *Oedaspis schachti* KORNEYEV, 2002 (Tephritidae) is announced in depository for the holotype.

Zusammenfassung

In dieser Arbeit werden Dipterenfamilien von Taiwan behandelt, das gesammelte Material, das auf Familienebene sortiert wurde, und der Höhenbereich, der für die einzelnen Familien festgestellt wurde. Zu einigen Familien, die erst seit Kurzem oder garnicht von Taiwan bekannt sind, wird ein Kommentar abgegeben. Arbeiten, die bisher über dieses Material erschienen sind, werden zitiert. Der Wechsel des Aufbewahrungsortes des Holotypus von *Oedaspis schachti* KORNEYEV, 2002 (Tephritidae) wird bekannt gegeben.

Introduction

During a journey of the author to Gambia together with his friend Keh-Miin CHEN, specialist of Scarabaeidae, a collecting trip to Taiwan was discussed and planned. The first trip of the author to Taiwan took place in 2000 as a holiday journey together with a couple

of students from Munich, Andreas DUBITZKY and Susanne SZCEPANEK. Keh-Miin CHEN, at that time employed in Munich, but at home in Taipei, arranged the necessary connection with a collecting and cooperation authority, the National Chung-Hsing University (NCU) in Taichung, Prof. Jeng-Tze YANG. In 2000 the collecting activities were included in a research project of the University maintained by Prof. YANG, who organized the necessary collecting permits. The second trip took place in 2001 together with Prof. Klaus SCHÖNITZER and Ulf BUCHSBAUM, both of the Zoological State Collections Munich (ZSM), and the third trip in 2002 together with Prof. SCHÖNITZER, BUCHSBAUM, DUBITZKY and SZCEPANEK. These latter two trips were organized by Prof. Klaus SCHÖNITZER, who became animated by the excellent collecting results from the first trip, especially of his students DUBITZKY and SZCEPANEK, and by Prof. Jeng-Tze YANG as a DAAD-NSC Joint Research Collaboration Project entitled: Entomological Contribution to the Biogeography of Taiwan.

The author's group of interest for collecting and research are the Diptera, an order of insects still rather unexplored in Taiwan. The Diptera were mainly collected by sweeping, but also individually using a net. Catches were often excellent from special substrates such as fruits, excrements, carrion, mushrooms, flowers, wet places, and even from roadside vegetation freshly flattened by the tires of a heavy vehicle, at places with sunshine in the morning or at hovering areas. The project gave an opportunity to collect specimens from most of the Diptera families occurring in Taiwan. More than 10,000 Diptera belonging to 81 families were collected (some Pediciidae should be included, but were not separated from Limoniidae).

In addition, in 2005 the author had a three weeks stay in the Department of Entomology of the National Museum of Natural Science (NMNS), with Dr. Mei-Ling CHAN and Dr. C.-S. LIN, for sorting Diptera to family level. More than 20,000 pinned Diptera were sorted. Aside from the pinned Diptera, several samples of Diptera preserved in alcohol were loaned from NMNS and sorted to family level. This material contains further specimens of families not captured by the author. According to the agreement, about 10% of the loans were kept at ZSM.

Additional Information will be placed on the homepage of ZSM (www.zsm.mwn.de) with the possibility of further updates.

Collecting sites and material

Because of later improvements the following locality data may differ from some labels to be found with the material (different spelling, altitude, etc.), but in such cases the date always remains the same. All undetermined insect material collected during these three trips by the author is furnished with a second label as follows: "Holotypes and one third of paratypes resulting from this material are property of Taiwan". Entomologists dealing with this material are requested to follow this rule.

The material collected by the author contains about 3,500 pinned Diptera and about 9,000 specimens preserved in alcohol (see list below). On average, more of the larger brachycerous species with at least a few examples of all families were pinned, the smaller nematocerous species were mainly preserved in alcohol. Most specimens, especially the

pinned ones were sorted to morpho-species level. About two thirds of this material are deposited at ZSM; one third, the duty part according to the Conservation Law of Taiwan (YEN & YANG 2001), has been returned to NCU.

In the following list of material the Pediciidae are not separated from Limoniidae.

Collecting excursions 17th June - 14th July 2000

a/Fushan. NE-Taiwan, Shiueshan Mts., Fushan Botanical Garden, ca. 24°46'N / 121°35'E, 650m, 17.-22.VI.2000, leg. W. SCHACHT:

19 Tipulidae, 7 Limoniidae, 1 Scatopsidae, 5 Culicidae, 22 Ceratopogonidae, 40 Chironomidae, 40 Cecidomyiidae, 1 Stratiomyidae, 17 Tabanidae, 5 Rhagionidae, 63 Asilidae, 2 Bombyliidae, 59 Empididae, 22 Hybotidae, 219 Dolichopodidae, 8 Phoridae, 1 Pipunculidae, 44 Syrphidae, 2 Conopidae, 3 Neriidae, 1 Megamerinidae, 1 Gobryidae, 3 Psilidae, 26 Diopsidae, 11 Platystomatidae, 1 Ctenostylidae, 1 Tephritidae, 2 Lonchaeidae, 1 Clusiidae, 9 Agromyzidae, 3 Periscelididae, 2 Sepsidae, 22 Lauxaniidae, 18 Sphaeroceridae, 3 Milichiidae, 6 Chloropidae, 49 Ephydriidae, 57 Drosophilidae, 37 Muscidae, 35 Calliphoridae, 3 Sarcophagidae, 17 Tachinidae.

b/Huisun. Taiwan, Taichung Co., Taiwan Mts. westside, Huisun Experim. Forest, ca. 24°05'N / 121°02'E, 600m, 23.-27.VI. 2000, leg. W. SCHACHT:

8 Tipulidae, 13 Limoniidae, 7 Psychodidae, 7 Scatopsidae, 19 Culicidae, 2 Simuliidae, 100 Ceratopogonidae, 30 Chironomidae, 1 Bibionidae, 1 Diadocidiidae, 1 Xylomyidae, 6 Stratiomyidae, 11 Tabanidae, 3 Rhagionidae, 1 Acroceridae, 39 Asilidae, 9 Bombyliidae, 12 Empididae, 44 Hybotidae, 27 Dolichopodidae, 1 Platypezidae, 100 Phoridae, 3 Pipunculidae, 19 Syrphidae, 1 Conopidae, 1 Strongylophthalmyiidae, 4 Psilidae, 3 Diopsidae, 14 Platystomatidae, 1 Tephritidae, 4 Lonchaeidae, 2 Piophilidae, 1 Clusiidae, 7 Agromyzidae, 2 Asteiidae, 2 Sepsidae, 3 Celyphidae, 133 Lauxaniidae, 6 Sphaeroceridae, 21 Milichiidae, 33 Chloropidae, 21 Ephydriidae, 113 Drosophilidae, 29 Muscidae, 15 Calliphoridae, 17 Sarcophagidae, 30 Tachinidae.

c/Tsuifeng. Taiwan, N-Nantou Co., Road No. 14, NE Puli, Tsuifeng, ca. 24°06'N / 121°11'E, 2200m, 28.VI.-2.VII.2000, leg. W. SCHACHT:

3 Tipulidae, 84 Limoniidae, 6 Trichoceridae, 150 Psychodidae, 14 Scatopsidae, 6 Anisopodidae, 2 Culicidae, 8 Simuliidae, 43 Ceratopogonidae, 200 Chironomidae, 1 Diadocidiidae, 40 Cecidomyiidae, 16 Stratiomyidae, 15 Rhagionidae, 16 Asilidae, 98 Empididae, 134 Hybotidae, 112 Dolichopodidae, 8 Lonchopteridae, 109 Phoridae, 5 Pipunculidae, 50 Syrphidae, 1 Conopidae, 1 Micropezidae, 1 Psilidae, 1 Ulidiidae, 12 Tephritidae, 7 Lonchaeidae, 31 Agromyzidae, 1 Anthomyzidae, 21 Periscelididae, 2 Dryomyzidae, 13 Sepsidae, 128 Lauxaniidae, 1 Heleomyzidae, 350 Sphaeroceridae, 1 Milichiidae, 103 Chloropidae, 32 Ephydriidae, 126 Drosophilidae, 1 Diastatidae, 209 Anthomyiidae, 78 Fanniidae, 167 Muscidae, 14 Calliphoridae, 3 Sarcophagidae, 1 Rhinophoridae, 24 Tachinidae.

d/Yuanfeng. Taiwan, N-Nantou Co., Road No. 14, NE Puli, E Tsuifeng to Yuanfeng, 2500-2700m, ca. 24°07'N / 121°13'E, 1.VII.2000, leg. W. SCHACHT:

1 Tipulidae, 55 Limoniidae, 8 Trichoceridae, 11 Psychodidae, 10 Scatopsidae, 8 Aniso-

podidae, 1 Culicidae, 9 Simuliidae, 51 Ceratopogonidae, 100 Chironomidae, 14 Pleciidae, 1 Bibionidae, 40 Cecidomyiidae, 3 Stratiomyidae, 4 Rhagionidae, 3 Asilidae, 18 Empididae, 79 Hybotidae, 24 Dolichopodidae, 10 Lochopteridae, 32 Phoridae, 3 Pipunculidae, 16 Syrphidae, 4 Psilidae, 1 Tephritidae, 2 Lonchaeidae, 5 Agromyzidae, 1 Anthomyzidae, 6 Perisclididae, 3 Dryomyzidae, 10 Sepsidae, 23 Lauxaniidae, 2 Chamaemyiidae, 3 Heleomyzidae, 58 Sphaeroceridae, 17 Chloropidae, 9 Ephydriidae, 21 Drosophilidae, 2 Diastatidae, 1 Scatophagidae, 145 Anthomyiidae, 56 Fanniidae, 40 Muscidae, 29 Calliphoridae, 11 Tachinidae.

e/Kenting. S-Taiwan, Kenting NP, Kenting For.Recr.Area, ca. 21°57'N / 120°49'E, 200m, 3.-4.VII.2000, leg. W. SCHACHT (collecting was poor because of a typhoon): 1 Keroplatidae, 3 Asilidae, 4 Hybotidae, 1 Dolichopodidae, 1 Tephritidae, 1 Lauxaniidae, 2 Sarcophagidae, 2 Tachinidae.

f/Tengir. Taiwan, Kaohsiung Co., Jungyang Mts., Tengir, Endemic Spec.Res.Inst., ca. 23°07'N / 120°47'E, 1700m, 6.-10.VII.2000, leg. W. SCHACHT: 8 Tipulidae, 11 Limoniidae, 6 Psychodidae, 1 Scatopsidae, 2 Culicidae, 2 Simuliidae, 38 Ceratopogonidae, 12 Chironomidae, 28 Bibionidae, 3 Cecidomyiidae, 6 Stratiomyidae, 98 Tabanidae, 1 Athericidae, 12 Rhagionidae, 20 Asilidae, 5 Bombyliidae, 48 Empididae, 133 Hybotidae, 50 Dolichopodidae, 3 Lochopteridae, 1 Platypezidae, 12 Phoridae, 2 Pipunculidae, 22 Syrphidae, 1 Micropezidae, 2 Psilidae, 5 Platystomatidae, 3 Tephritidae, 9 Lonchaeidae, 1 Clusiidae, 10 Agromyzidae, 1 Anthomyzidae, 6 Perisclididae, 300 Sepsidae, 18 Lauxaniidae, 1 Heleomyzidae, 48 Sphaeroceridae, 11 Milichiidae, 42 Chloropidae, 11 Ephydriidae, 21 Drosophilidae, 8 Anthomyiidae, 47 Muscidae, 42 Calliphoridae, 3 Sarcophagidae, 34 Tachinidae.

g/Mt. Chinan. Taiwan, Kaohsiung Co., Jungyang Mts., Tengir Endemic Spec. Res. Inst., Mt. Chinan, ca. 23°05'N / 120°48'E, 2300-2650m, 8.VII.2000, leg. W. SCHACHT: 11 Tipulidae, 200 Limoniidae, 3 Trichoceridae, 3 Psychodidae, 3 Anisopodidae, 1 Culicidae, 13 Ceratopogonidae, 40 Chironomidae, 18 Cecidomyiidae, 2 Rhagionidae, 1 Asilidae, 83 Empididae, 34 Hybotidae, 82 Dolichopodidae, 1 Lochopteridae, 91 Phoridae, 3 Syrphidae, 26 Strongylophthalmyiidae, 10 Psilidae, 3 Agromyzidae, 2 Teratomyzidae, 4 Perisclididae, 3 Dryomyzidae, 1 Sepsidae, 140 Lauxaniidae, 6 Heleomyzidae, 28 Sphaeroceridae, 31 Chloropidae, 2 Ephydriidae, 37 Drosophilidae, 1 Diastatidae, 57 Anthomyiidae, 6 Fanniidae, 14 Muscidae, 2 Rhinophoridae, 3 Tachinidae.

h/Sunmoon Lake. Taiwan, Sunmoon Lake, eastside, Youth Centre, ca. 23°51'N / 120°56'E, 600m, 11.-14.VII.2000, leg. W. SCHACHT: 5 Tipulidae, 19 Limoniidae, 5 Scatopsidae, 1 Mycetobiidae, 42 Culicidae, 38 Ceratopogonidae, 30 Chironomidae, 7 Pleciidae, 5 Cecidomyiidae, 1 Xylomyiidae, 12 Stratiomyidae, 2 Tabanidae, 7 Rhagionidae, 57 Asilidae, 23 Empididae, 69 Hybotidae, 103 Dolichopodidae, 13 Platypezidae, 200 Phoridae, 1 Pipunculidae, 28 Syrphidae, 1 Cypselosomatidae, 25 Micropezidae, 7 Neriidae, 1 Gobryidae, 1 Strongylophthalmyiidae, 9 Psilidae, 40 Diopsidae, 11 Platystomatidae, 11 Tephritidae, 3 Lonchaeidae, 20 Agromyzidae, 6 Perisclididae, 1 Asteiidae, 43 Sepsidae, 9 Celyphidae, 213 Lauxaniidae, 26 Sphaeroceridae, 21 Milichiidae, 124 Chloropidae, 56 Ephydriidae, 250 Drosophilidae, 23 Muscidae, 24 Calliphoridae, 11 Sarcophagidae, 24 Tachinidae.

Collecting excursions 3rd - 21st May 2001

i/Pihu temple. NE-Taiwan, Road No. 9, Shiueshan Mts., Pihu temple, ca. 24°54'N / 121°44'E, 400m, 7.V.2001, leg. W. SCHACHT (the place was only a short visit):
2 Stratiomyidae, 1 Dolichopodidae, 2 Muscidae, 2 Calliphoridae.

j/Fushan: NE-Taiwan, Shiueshan Mts., Fushan Botanical Garden, ca. 24°46'N / 121°35'E, 650m, 7.-9.V.2001, leg. W. SCHACHT:
23 Tipulidae, 25 Limoniidae, 10 Psychodidae, 1 Scatopsidae, 1 Dixidae, 4 Culicidae, 2 Simuliidae, 42 Ceratopogonidae, 39 Chironomidae, 2 Keroplatidae, 9 Mycetophilidae, 43 Sciaridae, 14 Cecidomyiidae, 1 Stratiomyidae, 4 Rhagionidae, 1 Acroceridae, 24 Asilidae, 8 Empididae, 74 Hybotidae, 170 Dolichopodidae, 1 Platypezidae, 41 Phoridae, 2 Pipunculidae, 13 Syrphidae, 1 Conopidae, 1 Pseudopomyzidae, 1 Micropezidae, 2 Neriidae, 3 Megamerinidae, 11 Gobryidae, 2 Psilidae, 13 Diopsidae, 1 Agromyzidae, 2 Periscelididae, 8 Sepsidae, 36 Lauxaniidae, 13 Sphaeroceridae, 2 Milichiidae, 4 Chloropidae, 81 Ephydriidae, 520 Drosophilidae, 32 Muscidae, 12 Calliphoridae, 19 Tachinidae.

k/Meifeng. Taiwan, N-Nantou Co., Road No. 14, NE Puli, Meifeng Experim. Farm, ca. 24°06'N / 121°10'E, 2200m, 10.-11.V.2001, leg. W. SCHACHT:
150 Tipulidae, 200 Limoniidae, 150 Trichoceridae, 35 Psychodidae, 1 Scatopsidae, 6 Anisopodidae, 2 Simuliidae, 76 Ceratopogonidae, 89 Chironomidae, 1 Pleciidae, 3 Keroplatidae, 35 Mycetophilidae, 180 Sciaridae, 44 Cecidomyiidae, 38 Stratiomyidae, 1 Asilidae, 26 Empididae, 36 Hybotidae, 22 Dolichopodidae, 10 Lonchopteridae, 33 Phoridae, 2 Pipunculidae, 10 Syrphidae, 2 Strongylophthalmyiidae, 2 Psilidae, 14 Agromyzidae, 1 Teraatomyzidae, 2 Anthomyzidae, 9 Periscelididae, 1 Dryomyzidae, 57 Lauxaniidae, 11 Sphaeroceridae, 40 Chloropidae, 19 Ephydriidae, 61 Drosophilidae, 99 Anthomyiidae, 13 Fanniidae, 14 Muscidae, 19 Calliphoridae, 7 Tachinidae.

l/Yuanfeng. Taiwan, N-Nantou Co., Road No. 14, NE Puli, Yuanfeng to Taroko NP, ca. 24°07'N / 121°15'E, 2700-3000m, 11.V.2001, leg. W. SCHACHT:
29 Tipulidae, 2 Limoniidae, 2 Trichoceridae, 1 Psychodidae, 25 Scatopsidae, 33 Simuliidae, 52 Ceratopogonidae, 1 Chironomidae, 55 Bibionidae, 5 Keroplatidae, 21 Mycetophilidae, 39 Sciaridae, 24 Cecidomyiidae, 12 Empididae, 5 Hybotidae, 1 Lonchopteridae, 50 Phoridae, 5 Pipunculidae, 2 Syrphidae, 3 Agromyzidae, 1 Anthomyzidae, 41 Lauxaniidae, 17 Sphaeroceridae, 2 Chloropidae, 2 Ephydriidae, 11 Drosophilidae, 2 Scatophagidae, 29 Anthomyiidae, 6 Fanniidae, 15 Muscidae, 1 Calliphoridae.

m/Tsuifeng. Taiwan, N-Nantou Co., Road No. 14, NE Puli, Tsuifeng, ca. 24°06'N / 121°11'E, 2200m, 12.V.2001, leg. W. SCHACHT:
1 Tipulidae, 1 Limoniidae, 1 Psychodidae, 1 Scatopsidae, 3 Simuliidae, 18 Chironomidae, 54 Pleciidae, 1 Keroplatidae, 1 Mycetophilidae, 21 Sciaridae, 3 Cecidomyiidae, 2 Stratiomyidae, 10 Empididae, 6 Hybotidae, 3 Dolichopodidae, 1 Lonchopteridae, 4 Phoridae, 4 Syrphidae, 1 Cypselosomatidae, 1 Tephritidae, 1 Sepsidae, 7 Lauxaniidae, 1 Sphaeroceridae, 2 Chloropidae, 2 Drosophilidae, 30 Anthomyiidae, 130 Fanniidae, 13 Muscidae, 2 Calliphoridae, 1 Sarcophagidae, 4 Tachinidae.

n/Shueilian. Taiwan, east coast, Hualien to Shueilian, 0-100m, 13.V.2001, leg. W. SCHACHT (we made only a short rest at this place):

1 Pleciidae, 4 Stratiomyidae, 3 Dolichopodidae, 2 Syrphidae, 1 Tephritidae, 2 Lonchaeidae, 2 Muscidae, 1 Calliphoridae, 4 Sarcophagidae, 4 Tachinidae.

o/Butterfly Valley. Taiwan, Hualien Co., Jungyang Mts., Butterfly Valley, ca.350m, S Guangfu, near Fuiuan, ca. 23°35'N / 121°21'E, 13.-15.V.2001, leg. W. SCHACHT:

6 Tipulidae, 16 Limoniidae, 7 Psychodidae, 1 Scatopsidae, 3 Culicidae, 36 Ceratopogonidae, 24 Chironomidae, 3 Pleciidae, 1 Keroplatidae, 3 Mycetophilidae, 38 Sciaridae, 8 Cecidomyiidae, 6 Stratiomyidae, 6 Rhagionidae, 37 Asilidae, 36 Hybotidae, 75 Dolichopodidae, 2 Platypezidae, 21 Phoridae, 1 Pipunculidae, 20 Syrphidae, 6 Micropezidae, 1 Neriidae, 3 Megamerinidae, 3 Gobryidae, 60 Strongylophthalmyiidae, 2 Psilidae, 46 Diopsidae, 3 Platystomatidae, 15 Tephritidae, 3 Lonchaeidae, 1 Clusiidae, 7 Agromyzidae, 6 Periscolidae, 1 Sepsidae, 3 Celyphidae, 102 Lauxaniidae, 22 Sphaeroceridae, 5 Milichiidae, 49 Chloropidae, 14 Ephydriidae, 22 Drosophilidae, 13 Muscidae, 3 Calliphoridae, 8 Sarcophagidae, 8 Tachinidae.

p/Shouangliou. Taiwan, S-Pingtung Co., Road No. 9, Shuangliou For. Recr. Area, near Danlu, ca. 22°13'N / 120°48'E, ca. 200m, 16.-18.V.2001, leg. W. SCHACHT:

3 Tipulidae, 3 Limoniidae, 1 Psychodidae, 4 Culicidae, 13 Ceratopogonidae, 12 Chironomidae, 1 Keroplatidae, 6 Mycetophilidae, 7 Sciaridae, 11 Cecidomyiidae, 3 Stratiomyidae, 3 Tabanidae, 1 Rhagionidae, 8 Asilidae, 4 Bombyliidae, 3 Hybotidae, 13 Dolichopodidae, 2 Platypezidae, 59 Phoridae, 2 Pipunculidae, 8 Syrphidae, 3 Megamerinidae, 1 Diopsidae, 8 Platystomatidae, 15 Tephritidae, 6 Agromyzidae, 5 Sepsidae, 4 Lauxaniidae, 106 Sphaeroceridae, 2 Milichiidae, 1 Canacidae, 13 Chloropidae, 22 Ephydriidae, 260 Drosophilidae, 13 Muscidae, 38 Calliphoridae, 18 Sarcophagidae, 20 Tachinidae.

q/Hosher. Taiwan, S-Nantou Co., Road No. 21, Hosher, ca. 23°36'N / 120°53'E, ca. 900m, 19.-21.V.2001, leg. W. SCHACHT:

1 Tipulidae, 150 Limoniidae, 1 Psychodidae, 4 Scatopsidae, 3 Culicidae, 1 Simuliidae, Ceratopogonidae, 5 Chironomidae, 1 Keroplatidae, 4 Mycetophilidae, 40 Sciaridae, 4 Cecidomyiidae, 4 Stratiomyidae, 1 Tabanidae, 2 Rhagionidae, 2 Asilidae, 24 Hybotidae, 12 Dolichopodidae, 2 Platypezidae, 37 Phoridae, 1 Pipunculidae, 8 Syrphidae, 2 Micropezidae, 2 Neriidae, 2 Strongylophthalmyiidae, 1 Psilidae, 3 Diopsidae, 3 Platystomatidae, 3 Tephritidae, 6 Lonchaeidae, 1 Clusiidae, 5 Agromyzidae, 1 Asteiidae, 20 Sepsidae, 26 Lauxaniidae, 39 Sphaeroceridae, 9 Milichiidae, 15 Chloropidae, 16 Ephydriidae, 500 Drosophilidae, 31 Muscidae, 1 Calliphoridae, 2 Sarcophagidae, 4 Tachinidae.

Collecting excursions 3rd - 24th September 2002

r/Huisun. Taiwan, Taichung Co., Taiwan Mts. westside, Huisun Experim. Forest, ca. 24°07'N / 121°03'E, 600m, 3.-8.IX.2002, leg. W. SCHACHT:

7 Tipulidae, 5 Limoniidae, 53 Psychodidae, 3 Scatopsidae, 1 Culicidae, 36 Ceratopogonidae, 32 Chironomidae, 1 Pleciidae, 4 Keroplatidae, 33 Mycetophilidae, 14 Sciaridae, 12 Cecidomyiidae, 5 Stratiomyidae, 1 Tabanidae, 1 Rhagionidae, 17 Asilidae, 3 Empididae, 27 Hybotidae, 77 Dolichopodidae, 1 Platypezidae, 151 Phoridae, 12 Pipunculidae, 22

Syrphidae, 5 Micropezidae, 9 Neriidae, 1 Megamerinidae, 1 Gobryidae, 1 Strongylophthalmyiidae, 1 Psilidae, 12 Diopsidae, 46 Platystomatidae, 4 Tephritidae, 7 Lonchaeidae, 1 Piophilidae, 1 Clusiidae, 24 Agromyzidae, 9 Periscelididae, 1 Asteiidae, 143 Sepsidae, 3 Celyphidae, 121 Lauxaniidae, 23 Sphaeroceridae, 44 Milichiidae, 72 Chloropidae, 1 Cryptochetidae, 45 Ephyridae, 430 Drosophilidae, 278 Muscidae, 250 Calliphoridae, 15 Sarcophagidae, 49 Tachinidae.

s/Meifeng. Taiwan, N-Nantou Co., Road No. 14, NE Puli, Meifeng Experim. Farm, ca. 24°06'N / 121°10'E, 2200m, 9.-11.IX.2002, leg. W. SCHACHT:

2 Tipulidae, 16 Limoniidae, 2 Trichoceridae, 26 Psychodidae, 4 Scatopsidae, 2 Anisopodidae, 1 Simuliidae, 21 Ceratopogonidae, 124 Chironomidae, 1 Ditomyiidae, 15 Keroplatidae, 2 Diadocidiidae, 49 Mycetophilidae, 104 Sciaridae, 12 Cecidomyiidae, 2 Stratiomyidae, 1 Acroceridae, 1 Asilidae, 15 Empididae, 24 Hybotidae, 123 Dolichopodidae, 1 Lonchopteridae, 48 Phoridae, 2 Pipunculidae, 21 Syrphidae, 1 Strongylophthalmyiidae, 1 Psilidae, 5 Tephritidae, 3 Lonchaeidae, 21 Agromyzidae, 2 Teratomyzidae, 2 Anthomyzidae, 6 Periscelididae, 1 Dryomyzidae, 7 Sepsidae, 151 Lauxaniidae, 1 Chamaemyiidae, 29 Sphaeroceridae, 17 Milichiidae, 44 Chloropidae, 1 Cryptochetidae, 47 Ephyridae, 270 Drosophilidae, 3 Scatophagidae, 77 Anthomyiidae, 14 Fanniidae, 125 Muscidae, 15 Calliphoridae, 6 Sarcophagidae, 59 Tachinidae.

t/Yuanfeng. Taiwan, N-Nantou Co., Road No. 14, NE Puli, Yuanfeng to Taroko NP, ca. 24°07'N / 121°15'E, 2700-3000m, 12.IX.2002, leg. W. SCHACHT:

1 Pleciidae, 1 Bibionidae, 2 Sciaridae, 8 Asilidae, 1 Empididae, 1 Dolichopodidae, 5 Phoridae, 19 Syrphidae, 2 Conopidae, 1 Platystomatidae, 2 Lauxaniidae, 1 Sphaeroceridae, 1 Cryptochetidae, 1 Ephyridae, 12 Anthomyiidae, 1 Fanniidae, 13 Muscidae, 3 Calliphoridae, 2 Sarcophagidae, 8 Tachinidae.

u/Hohuanshan. Taiwan, Road No. 14, NE Puli, Taroko NP, Hohuanshan, Endemic Spec. Res. Inst., ca. 24°10'N / 121°17'E, 3000m, 12.IX.2002, leg. W. SCHACHT:

3 Tipulidae, 47 Limoniidae, 7 Trichoceridae, 5 Psychodidae, 1 Scatopsidae, 7 Anisopodidae, 1 Simuliidae, 99 Ceratopogonidae, 14 Chironomidae, 4 Keroplatidae, 53 Mycetophilidae, 240 Sciaridae, 6 Cecidomyiidae, 2 Empididae, 19 Hybotidae, 6 Dolichopodidae, 3 Lonchopteridae, 5 Phoridae, 1 Agromyzidae, 1 Anthomyzidae, 4 Lauxaniidae, 3 Heleomyzidae, 3 Sphaeroceridae, 1 Milichiidae, 2 Chloropidae, 1 Ephyridae, 9 Drosophilidae, 2 Anthomyiidae, 8 Fanniidae, 24 Muscidae, 5 Tachinidae.

v/Tengir. Taiwan, Kaohsiung Co., Jungyang Mts., Tengir Endemic Spec. Res. Inst., ca. 23°07'N / 120°47'E, 1700m, 14.-19.IX.2002, leg. W. SCHACHT:

4 Tipulidae, 17 Limoniidae, 1 Psychodidae, 4 Culicidae, 18 Ceratopogonidae, 41 Chironomidae, 4 Pleciidae, 6 Keroplatidae, 27 Mycetophilidae, 40 Sciaridae, 18 Cecidomyiidae, 2 Stratiomyidae, 3 Rhagionidae, 5 Acroceridae, 14 Asilidae, 3 Bombyliidae, 6 Empididae, 92 Hybotidae, 32 Dolichopodidae, 1 Lonchopteridae, 51 Phoridae, 23 Pipunculidae, 50 Syrphidae, 1 Strongylophthalmyiidae, 2 Platystomatidae, 56 Tephritidae, 4 Lonchaeidae, 3 Clusiidae, 12 Agromyzidae, 2 Periscelididae, 12 Sepsidae, 1 Celyphidae, 82 Lauxaniidae, 7 Sphaeroceridae, 4 Milichiidae, 42 Chloropidae, 7 Ephyridae, 51 Drosophilidae, 3 Scatophagidae, 39 Anthomyiidae, 169 Muscidae, 59 Calliphoridae, 71 Sarcophagidae, 120 Tachinidae.



Fig. 1: The author collecting Diptera in deciduous rain forest in Taiwan.
(Foto: Klaus SCHÖNITZER)



Fig. 2: A male Micropezidae, *Mimegralla cedens* (WALKER, 1856) ssp. *formosana* (CZER-
NY, 1932), sitting on a large leaf of *Alocasia macrorrhiza*, an Araceae quite common in
the lowland forests of Taiwan. These leaves seem to be the mating place of the species.
The mirror-like spots of pollination on thorax, coxae and abdomen make the animal diffi-
cult to see. Only the white on the foreleg tips represents true colour. (Foto: Susanne
SZCEPANÉK)

w/Tungyenshan. Taiwan, Taoyuan Co., Tungyenshan Recr.Area, ca. 24°50'N /
121°24'E, 900m, 21.-24.IX.2002, leg. W. SCHACHT:

7 Limoniidae, 1 Culicidae, 16 Ceratopogonidae, 11 Chironomidae, 3 Pleciidae, 1 Kero-
platidae, 1 Mycetophilidae, 184 Sciaridae, 4 Cecidomyiidae, 5 Hybotidae, 3 Dolichopo-
didae, 3 Phoridae, 1 Ctenostylidae, 1 Tephritidae, 1 Agromyzidae, 14 Lauxaniidae, 1 Mili-
chiidae, 3 Chloropidae, 2 Ephydriidae, 110 Drosophilidae, 1 Muscidae, 3 Tachinidae.

x/Shayin. Taiwan, Taoyuan Co., Tungyenshan-Region, Kudji-River valley near Shayin,
ca. 24°49'N / 121°23'E, ca. 500m, 22.IX.2002, leg. W. SCHACHT:

2 Tipulidae, 5 Limoniidae, 1 Psychodidae, 1 Scatopsidae, 1 Culicidae, 19 Ceratopo-
gonidae, 8 Chironomidae, 2 Pleciidae, 1 Keroplatidae, 13 Mycetophilidae, 33 Sciaridae, 14
Cecidomyiidae, 5 Stratiomyidae, 3 Rhagionidae, 9 Asilidae, 3 Bombyliidae, 3 Empididae,
19 Hybotidae, 44 Dolichopodidae, 2 Platypezidae, 27 Phoridae, 1 Pipunculidae, 24 Syr-
phidae, 1 Conopidae, 1 Gobryidae, 3 Psilidae, 15 Diopsidae, 1 Tephritidae, 4 Lonchae-
idae, 3 Agromyzidae, 1 Perisclididae, 48 Lauxaniidae, 4 Sphaeroceridae, 5 Milichiidae,
28 Chloropidae, 16 Ephydriidae, 27 Drosophilidae, 10 Muscidae, 13 Calliphoridae, 2 Sar-
cophagidae, 8 Tachinidae.

List of collected Diptera families and the registered range of altitude
(Pediidae are not separated from Limoniidae)

Nematocera / Orthorrhapha

- Tipulidae: a, b, c, d, f, g, h, j, k, l, m, o, p, q, r, s, u, v, x = 200-3000 m.
Limoniidae: a, b, c, d, f, g, h, j, k, l, m, o, p, q, r, s, u, v, w, x = 200-3000 m.
Trichoceridae: c, d, g, k, l, s, u = 2200-3000 m.
Psychodidae: b, c, d, f, g, j, k, l, m, o, p, q, r, s, u, v, x = 200-3000 m.
Scatopsidae: a, b, c, d, f, h, j, k, l, m, o, q, r, s, u, x = 350-3000 m.
Anisopodidae: c, d, g, k, s, u = 2200-3000 m.
Mycetobiidae: h = 600 m.
Dixidae: j = 650 m.
Culicidae: a, b, c, d, f, g, h, j, o, p, q, r, v, w, x = 200-2700 m.
Simuliidae: b, c, d, f, j, k, l, m, q, s, u = 600-3000 m.
Ceratopogonidae: a, b, c, d, f, g, h, j, k, l, o, p, q, r, s, u, v, w, x = 200-3000 m.
Chironomidae: a, b, c, d, f, g, h, j, k, l, m, o, p, q, r, s, u, v, w, x = 200-3000 m.
Pleciidae: d, h, k, m, n, o, r, t, v, w, x = 0-3000 m.
Bibionidae: b, d, f, l, t = 600-3000 m.
Ditomyiidae: s = 2200 m.
Keroplattidae: e, j, k, l, m, o, p, q, r, s, u, v, w, x = 200-3000 m.
Diadocidiidae: b, c, s = 600-2200 m.
Mycetophilidae: j, k, l, m, o, p, q, r, s, u, v, w, x = 200-3000 m.
Sciaridae: j, k, l, m, o, p, q, r, s, t, u, v, w, x = 200-3000 m.
Cecidomyiidae: a, c, d, f, g, h, j, k, l, m, o, p, q, r, s, u, v, w, x = 200-3000 m.

Brachycera / Orthorrhapha

- Xylomyiidae: b, h = 600 m.
Stratiomyidae: a, b, c, d, f, h, i, j, k, m, n, o, p, q, r, s, v, x = 0-2700 m.
Tabanidae: a, b, f, h, p, q, r = 200-1700 m.
Athericidae: f = 1700 m.
Rhagionidae: a, b, c, d, f, g, h, j, o, p, q, r, v, x = 200-2700 m.
Acroceridae: b, j, s, v = 600-2200 m.
Asilidae: a, b, c, d, e, f, g, h, j, k, o, p, q, r, s, t, v, x = 200-3000 m.
Bombyliidae: a, b, f, p, v, x = 200-1700 m.
Empididae: a, b, c, d, f, g, h, j, k, l, m, r, s, t, u, v, x = 500-3000 m.
Hybotidae: a, b, c, d, e, f, g, h, j, k, l, m, o, p, q, r, s, u, v, w, x = 200-3000 m.
Dolichopodidae: a, b, c, d, e, f, g, h, i, j, k, m, n, o, p, q, r, s, t, u, v, w, x = 0-3000 m.

Brachycera / Cyclorrhapha, Aschiza

- Lonchopteridae: c, d, f, g, k, l, m, s, u, v = 1700-3000 m.
Platypezidae: b, f, h, j, o, p, q, r, x = 200-1700 m.
Phoridae: a, b, c, d, f, g, h, j, k, l, m, o, p, q, r, s, t, u, v, w, x = 200-3000 m.
Pipunculidae: a, b, c, d, f, h, j, k, l, o, p, q, r, s, v, x = 200-3000 m.
Syrphidae: a, b, c, d, f, g, h, j, k, l, m, n, o, p, q, r, s, t, v, x = 0-3000 m.

Brachycera / Cyclorrhapha, Schizophora / Acalyptratae

- Conopidae: a, b, c, j, t, x = 500-3000 m.

Cypselosomatidae: h, m = 600-2200 m.
Pseudopomyzidae: j = 650m.
Micropezidae: c, f, h, j, o, q, r = 350-2200 m.
Neriidae: a, h, j, o, q, r = 350-900.
Megamerinidae: a, j, o, p, r = 200-650 m.
Gobryidae: a, h, j, o, r, x = 350-650 m.
Strongylophthalmyiidae: b, g, h, k, o, q, r, s, v = 350-2650 m.
Psilidae: a, b, c, d, f, g, h, j, k, o, q, r, s, x = 350-2700 m.
Diopsidae: a, b, h, j, o, p, q, r, x = 200-900 m.
Platystomatidae: a, b, f, h, o, p, q, r, t, v = 200-3000 m.
Ulidiidae: c = 2200 m.
Ctenostylidae: a, w = 650-900 m.
Tephritidae: a, b, c, d, e, f, h, m, n, o, p, q, r, s, v, w, x = 0-2700 m.
Lonchaeidae: a, b, c, d, f, h, n, o, q, r, s, v, x = 0-2700 m.
Piophilidae: b, r = 600 m.
Clusiidae: a, b, f, o, q, r, v = 350-1700 m.
Agromyzidae: a, b, c, d, f, g, h, j, k, l, o, p, q, r, s, u, v, w, x = 200-3000 m.
Teratomyzidae: g, k, s = 2200-2650 m.
Anthomyzidae: c, d, f, k, s, u = 1700-3000 m.
Periscelididae: a, c, d, f, g, h, j, k, o, r, s, v, x = 350-2700 m.
Asteiidae: b, h, q, r = 650-900 m.
Dryomyzidae: c, d, g, k, s = 2200-2700 m.
Sepsidae: a, b, c, d, f, g, h, j, m, o, p, q, r, s, v = 200-2700 m.
Celyphidae: b, h, o, r, v = 350-1700 m.
Lauxaniidae: a, b, c, d, e, f, g, h, j, k, l, m, o, p, q, r, s, t, u, v, w, x = 200-3000 m.
Chamaemyiidae: d, s = 2200-2700 m.
Heleomyzidae: c, d, f, g, u = 1700-3000 m.
Sphaeroceridae: a, b, c, d, f, g, h, j, k, l, m, o, p, q, r, s, t, u, v, x = 200-3000 m.
Milichiidae: a, b, c, f, h, j, o, p, q, r, s, u, v, w, x = 200-3000 m.
Canacidae: p = 200 m.
Chloropidae: a, b, c, d, f, g, h, j, k, l, m, o, p, q, r, s, u, v, w, x = 200-3000 m.
Cryptochetidae: r, s, t = 600-3000 m.
Ephydriidae: a, b, c, d, f, g, h, j, k, l, o, p, q, r, s, t, u, v, w, x = 200-3000 m.
Drosophilidae: a, b, c, d, f, g, h, j, k, l, m, o, p, q, r, s, u, v, w, x = 200-3000 m.
Diastatidae: c, d, g = 2200-2700 m.

Brachycera / Cyclorrhapha, Schizophora / Calyptratae

Scatophagidae: d, l, s, v = 1700-3000 m.
Anthomyiidae: c, d, f, g, k, l, m, s, t, u, v = 900 1700-3000 m.
Fanniidae: c, d, g, k, l, m, s, t, u = 2200-3000 m.
Muscidae: a, b, c, d, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x = 0-3000 m.
Calliphoridae: a, b, c, d, f, h, i, j, k, l, m, n, o, p, q, r, s, t, v, x = 0-3000 m.
Sarcophagidae: a, b, c, f, e, h, m, n, o, p, q, r, s, t, v, x = 0-3000 m.
Rhinophoridae: c, g = 2200-2650 m.
Tachinidae: a, b, c, d, e, f, g, h, j, k, m, n, o, p, q, r, s, t, u, v, w, x = 0-3000 m.

Comments on some Diptera families

Taiwan belongs clearly to the Oriental Region, but in the vertical dimension its fauna is somewhat split into Palearctic and Oriental species. Taiwan has a high mountainous region with at least 15 mountains higher than 3000 metres, and with the Jade mountain nearly 4000 m high. The Entomologists of Taiwan call the existence of Palearctic elements in their country the Himalayan phenomenon. A distinct Palearctic element are the Trichoceridae. But also Anisopodidae, Lonchopteridae, Anthomyzidae, Dryomyzidae, Heleomyzidae, Scatophagidae, Anthomyiidae and Fanniidae indicate the Palearctic fauna in Taiwan.

Studying the collected and loaned material or sorting Diptera to family level at NMNS, several specimens were found belonging to families previously unknown from Taiwan or rarely known only for a few years. The material of the reported families is deposited in ZSM and/or NMNS.

Mycetobiidae (PAPP 2007): 1 specimen collected at h/Sonmoon Lake.

Dixidae (PAPP 2007): 1 specimen collected at j/Fushan and several specimens found among material of NMNS.

Ditomyiidae (PAPP 2007): 1 specimen collected at s/Meifeng and few selected from alcohol samples loaned from NMNS (loc.: "Taiwan, Nantou Co., Piluchi, Malaise trap, 1.-15.VI.1998, leg. M.-M. YANG").

Diadocidiidae (PAPP & ŠEVČIK 2005): 4 specimens collected at b/Huisun, c/Tsuifeng and s/Meifeng and several specimens found in alcohol samples loaned from NMNS (loc.: "Taiwan, Nantou Co., Chunyang, 1300 m, near Lushan Hot Sp., ca. 24°1' N / 121°10' E, 9.II.-8.III.2000, leg. C.S. LIN & W.T. YANG"; ""Taiwan, Nantou Co., Meifeng, Malaise trap, 26.VI.-28.VII.1997 / 28.VII.-25.IX.1997, leg. C.S. LIN & W.T. YANG"; "Taiwan, Nantou Co., Lienhuachih, Malaise trap, 9.IX.-6.X.1996 / 9.IV.-19.V.1998 / 9.VI.-6.VII.1998 / 6.VII.-12.VIII.1998 / 11.II.-12.III.1999 / 13.IV.-18.V.1999, leg. C.S. LIN & W.T. YANG").

Lygistorrhinidae (PAPP 2002): Several specimens from alcohol samples of NMNS (loc.: "Taiwan, Nantou Co., Chunyang, 1300 m, near Lushan Hot Sp., ca. 24°1' N / 121°10' E, 19.V.-9.VI.1998 / 9.II.-8.III.2000, leg. C.S. LIN & W.T. YANG").

Opetiidae: 1 specimen *Opetia* spec. mounted on a slide and returned to NMNS; one female specimen found in an alcohol sample of NMNS (loc.: "Taiwan, Nantou Co., Lienhuachih, Malaise trap, 11.II.-12.III.1999, leg. C.S. LIN & W.T. YANG").

Pseudopomyzidae (PAPP 2005): 1 specimen collected at j/Fushan and few specimens selected from alcohol samples of NMNS (loc.: "Taiwan, Nantou Co., Lienhuachih, Malaise trap, 9.IV.-19.V.1998, leg. C.S. LIN & W.T. YANG"; "Taiwan, Nantou Co., Chunyang, 1300 m, near Lushan Hot Sp., ca. 24°1' N / 121°10' E, 19.V.-9.VI.1998, leg. C.S. LIN & W.T. YANG").

Ulidiidae Otitinae: 1 specimen collected at c/Tsuifeng.

Ctenostylidae (KORNEYEV 2001): 2 specimens collected at a/Fushan and w/Tungyenshan, 2 specimens received from U. BUCHSBAUM (loc.: Meifeng and Chun-Yang) and 1 specimen received by exchange from NMNS (loc.: "Taiwan, Taichung, Wushihkenghsi, X/27-28/2003, W.T. YANG & K.W. HUANG, UV light trap").

Oдиниidae: 2 pinned specimens from Taiwan in NMNS.

Teratomyzidae: 5 specimens collected at g/Mt. Chinan, k/Meifeng and s/Meifeng.

Anthomyzidae: 8 specimens collected at c/Tsuifeng, d/Yuanfeng, f/Tengir, k/Meifeng, s/Meifeng and u/Hohuanshan.

Periscelididae (*Stenomicro* and *Cyamops* spp.): More than 50 specimens collected at a/Fushan, c/Tsuifeng, d/Yuanfeng, f/Tengir, g/Mt. Chinan, h/Sunmoon Lake, j/Fushan, k/Meifeng, o/Butterfly Valley, r/Huisun, s/Meifeng, v/Tengir and x/Shayin and one specimens found in an alcohol sample loaned from NMNS (loc.: "Taiwan, Nantou Co., Chunyang, 1300 m, near Lushan Hot Sp., ca. 24°1' N / 121°10' E, 19.V.-9.VI.1998, leg. C.S. LIN & W.T. YANG").

Cremifaniidae: At least 1 specimen seen in NMNS among Chamaemyiidae and 2 specimens collected by Prof. YANG, one of these deposited at NCU and one at ZSM (loc.: "Taiwan, Shei-pa NP, Mt. Xueshan Ridge, 11.8.2005/099, leg. J.-T. Yang").

Diastatidae: 4 specimens collected at c/Tsuifeng, d/Yuanfeng and g/Mt. Chinan.

By exchange from NMNS, the author has received a Tachinidae ("Taiwan, Chiayi, Shihtzulu, X/16-17/2003, Y.C. Hsueh, light") with a three-lobed 3rd antennal segment, which can be determined as an **Axiniidae** COLLESS & BALLARD 1994, but the validity of the family seems doubtful, because the description lacks a clear differential diagnosis against the Tachinidae.

The material of some families has been studied by specialists and several publications issued:

Revisions of genera of **Sciaridae** from Taiwan with species records and descriptions of new species are published by RUDZINSKI (2004, 2005 a, 2005 b, 2006, 2008).

A new species of **Conopidae** from Taiwan is described by STUKE (2005).

A new species of **Uliidiidae** is described from Japan and China including Taiwan by KAMENEVA (2006).

A record of **Ctenostylidae** from Taiwan is published by KORNEYEV (2001).

In **Tephritidae** a new species, *Oedaspis schachti* KORNEYEV, 2002, is described from Taiwan, with the holotype depository at ZSM, but according to the Conservation Law of Taiwan the type specimen had to be transferred to NCU.

Several species records and new species of **Lonchaeidae** from Taiwan are published by MCGOWAN (2004, 2005).

A revision of the **Lauxaniidae** genus *Oestrotus* from China including Taiwan is published by LI, YANG & GAIMARI (2009).

Several Diptera specimens (Chloropidae, Drosophilidae, Calliphoridae) with attached **Laboulbeniales** (small mushrooms occurring on insect bodies during late summer) have been found among the collected material and now are loaned to a specialist.

All pinned Diptera from the collected material have been compared with determined specimens in the German Entomological Institute in Eberswalde (now Münchenberg) where a large collection of Diptera from Taiwan collected by SAUTER is stored. About 240 species became provisionally determined. A correct determination for 50 species of Drosophilidae was received from Dr. Gerhard BÄCHLI, Zürich.

Acknowledgements

The author thanks first of all Keh-Miin CHEN, Taipei, for introducing the author and his Munich colleagues to Taiwan. Thanks are due to Prof. Jeng-Tze YANG, NCU Taichung, and to Prof. Klaus SCHÖNITZER, ZSM Munich, for including us in their research program granted by DAAD-Germany and PPP-Taiwan (DAAD Nr. D/0039914 / PPP-Taiwan). Thank you also to many of Prof. YANG's students, who transported us to the collecting sites and assisted us in many situations. Special thanks to Dr. Mei-Ling CHAN, Taichung, who introduced all of us to NMNS, Taichung, and gave kind hospitality to the author in 2005. And the author has to thank many persons not named here from NCU, NMNS, TARI, NTU Shiraki collection, Zoo Teipei, etc. for a lot of helpful information, assistance and hospitality. Thank you to Martin SPIES, ZSM Munich, for English language editing.

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Maximilian SCHWARZ, Konsulent für Wissenschaft der Oberösterreichischen Landesregierung,
Eibenweg 6, A-4052 Ansfelden, E-Mail: maximilian.schwarz@liwest.at

Redaktion: Erich DILLER, ZSM, Münchhausenstraße 21, D-81247 München;
Fritz GUSENLEITNER, Lungitzerstraße 51, A-4222 St. Georgen / Gusen;
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Zeitschrift/Journal: [Entomofauna](#)

Jahr/Year: 2010

Band/Volume: [0031](#)

Autor(en)/Author(s): Schacht Wolfgang

Artikel/Article: [Report on three collecting trips to Taiwan \(Insecta: Diptera\) 33-48](#)