



Formosan Entomologist

Journal Homepage: entsocjournal.yabee.com.tw

【Research report】

亞洲地區水稻昆蟲相及其生物學之研究 XII 臺灣與菲律賓產之水棲性鞘翅目【研究報告】

矢野宏二、朱耀沂、佐藤正孝

*通訊作者E-mail:

Received: Accepted: Available online: 1983/09/01

Abstract

摘要

本文中整理曾在1979與1981年間在菲律賓與臺灣之水田採集之鞘翅目昆蟲，其主要調查地點仍為菲律賓呂宋 (Ruzon) 島明達那 (Mindanao) 島及臺灣南部之水田。在臺灣的調查中，於稻田及稻田附近甘蔗田內設立的誘蛾燈所採到的甲蟲也列為補充資料之內，並得如下之結果。 1) 屬於如下5科之20種甲蟲，曾在菲律賓與臺灣之水田及其附近之灌溉水路採到。小頭鼓蟲科 (Haliplidae)、微龍蟲科 (Noteridae)、龍蟲科 (Dytiscidae)、矯牙蟲科 (Hydraenidae)、牙蟲科 (Hydrophilidae)。此等種類仍在菲律賓、臺灣地區在水田與灌溉水路中首次被記錄。並對各種之棲所稍加以說明。 2) 在臺灣 *Berosus* (E.) *fairmairei*, *Strernolophus* (S. str.) *rufipes*, *Laccophilus sharpi*, *Hydroglyphus flammulatus* 和 *Eretes sticicus* 被認為較優占之種類，而在菲律賓 *Laccophilus sharpi* 和 *L. parvulus* 為優占種類。 3) 在臺灣，屬於7科19種、4科23種之甲蟲各在水田及甘蔗田之誘蛾中採集到。其中之各12、11種在水田和灌溉水路中也有採集之記錄。

Key words:

關鍵詞:

Full Text:  [PDF\(0.83 MB\)](#)

下載其它卷期全文 Browse all articles in archive: <http://entsocjournal.yabee.com.tw>

**FAUNAL AND BIOLOGICAL STUDIES ON THE INSECTS OF
PADDY FIELDS IN ASIA. XII. AQUATIC COLEOPTERA
FROM TAIWAN AND THE PHILIPPINES.**

Kôji Yano, Yau-I-Chu, P. W. Resma and Masataka Satô

*Laboratory of Applied Entomology, Faculty of Agriculture,
Yamaguchi University, Yamaguchi, 753, Japan*

*Department of Plant Pathology and Entomology, National Taiwan University,
Taipei, Taiwan*

*Bureau of Agricultural Extension, Quezon, Philippines
and*

Biological Laboratory, Nagoya Women's University, Nagoya, 468, Japan

ABSTRACT

The aquatic Coleoptera dwelling in paddy water of Taiwan and the Philippines are enumerated based on material collected in 1979 and 1981. Twenty species belonging to 5 families were collected from paddy water and irrigation ditches in these two countries. Besides these, specimens collected in light traps set in paddy fields and sugar cane fields in Taiwan are also examined and listed.

INTRODUCTION

Aquatic species of Coleoptera have been generally neglected in pest control carried out in the world's paddy fields with the exception of rice water weevils. The insect group has consequently not been well surveyed either in faunal or biological studies, though several species in addition to rice water weevils have been studied biologically as they are predaceous to paddy dwelling mosquitoes.

Aquatic Coleoptera in general are rather varied in their biology and economic importance. Some species of Curculionidae, Haliplidae, Hydraenidae, Helodidae, Dryopidae, Elmidae and Hydrophilidae are phytophagous. Several families such as Haliplidae, Dytiscidae, Noteridae, Gyrinidae and Hydrophilidae contain few or many species which are predaceous to insects or other animals. On the other hand, it is well known that larvae and adults of aquatic Coleoptera are a regular or major part of the food of aquatic animals such as fishes, birds, turtles, frogs and toads. It is also reported that people of some areas feed on certain species of aquatic Coleoptera.

The group in paddy fields plays a role in two main economic aspects. One is harmful in that they damage rice plants; rice water weevils are famous for this. Other phytophagous groups in the habitat may include those species which attack rice plants, but no data have been presented.

Predaceous species of aquatic Coleoptera are supposed to feed on aquatic natural enemies of rice insect pests, fishes and tadpoles. On the contrary, this group is useful in feeding rice insect pests. Some data on this aspect have already been reported, and more is certain to be discovered in further investigations. The present knowledge of aquatic Coleoptera of paddy fields is still far from being complete enough to be useful in meaningful discussions on rice pest management.

The purpose of this study was to determine the fauna of the group in Taiwan and the Philippines pursuing the argument mentioned in Yano (1978). In the present paper, aquatic Coleoptera collected from paddy water in Taiwan and the Philippines are enumerated; most of these were collected by the first author and identified by the last author. As collectings in these areas were limited by time, season, and locality surveyed, the records are preliminary presented here for further study. This is a continuation of preceding papers on the aquatic Heteroptera from these two areas (Yano et al., 1981, 1982).

MATERIALS AND LOCALITIES VISITED

The present materials were collected during the following two surveys. The one in the Philippines was made in 1979 and covered Luzon and Mindanao (Hirashima, 1981; Yano et al., 1981). The second in Taiwan was made in 1981 for ten days in late July and covered several places in the southern part of the country along the west coast (Yano et al., 1982). These two surveys were carried in cooperation with the second and the third authors in each area respectively. General situations and the respective environments of the places surveyed are described in Yano et al. (1981, 1982).

Collections were made in paddy water and irrigation ditches directly along paddy fields. Part of the light trap collections made in paddy and sugar cane fields in Taiwan were also examined for information. Discussions of these light trap collections are described in Yano et al. (1981). Materials from these four sources — paddy water, irrigation ditch, light trap in paddy field and light trap in sugar cane field — were strictly distinguished in the present paper. Specimens from the last three sources are indicated respectively, and those from paddy water not specially marked. Since the collections from the light traps were rich, specimens have not yet been completely sorted.

For abbreviations in the text, the first word of the locality name described below is used. Collector's name is abbreviated as KY for K. Yano.

Taiwan. Touliu, Yunlin Hsien; Talin, Chiai Hsien; Potyu, Chiai Hsien; Tungjen, Chiai Hsien; Fenchihu, Tainan Hsien; Anting, Tainan Hsien; Hsikang, Tainan Hsien; Kueijer, Tainan Hsien; Tungkang, Tainan Hsien; Hsinhua, Tainan Hsien; Chiatou, Kaohsiung Hsien; Pintung, Pintung Hsien; Wantan, Pintung Hsien; Hsinpei, Pintung Hsien; Fangliao, Pintung Hsien; Checheng, Pintung Hsien.

Philippines. Banaue, Ifugao, Luzon; Tugbok, Davao City, Mindanao; Bislig, Surigao del sur, Mindanao.

RESULTS

This paper covers species of which either the larvae and/or adult stages are aquatic. Semiaqua-

Table 1. Aquatic Coleoptera collected in paddy fields and related environments in Taiwan and the Philippines

Species	Locality and habitat*				Philippines		
	Taiwan	a	b	c	d	a	b
Haliplidae							
1. <i>Peltodytes</i> (s. str.) <i>sinensis</i> (Hope)	X			X			
Noteridae							
2. <i>Canthydrus semperi</i> Wehnke						X	
3. <i>Hydrocoptus</i> (s. str.) <i>bivittis</i> Motschulsky				X			
Dytiscidae							
4. <i>Copelatus socienus</i> Balfour-Browne					X		
5. <i>C. tenebrosus</i> Régimbart					X		
6. <i>Cybister</i> (<i>Gschwendtnerhydrus</i>) <i>tripunctatus convexior</i> Gschwendtner						X	
7. <i>C. (G.) tripunctatus orientalis</i> Gschwendtner					X		
8. <i>Eretes sticticus</i> (L.)	X	X	X	X	X		
9. <i>Hydaticus</i> (<i>Guignotites</i>) <i>rhantoides</i> Sharp	X	X		X	X		
10. <i>Hydroglyphus flammulatus</i> (Sharp)	X	X	X	X	X		
11. <i>H. japonicus</i> (Sharp)	X	X	X				
12. <i>H. pseudogeminus</i> (Régimbart)						X	
13. <i>Hydrovatus acuminatus</i> Motschulsky				X	X		
14. <i>Hyphydrus</i> (<i>Apriophorus</i>) <i>lyratus</i> Swartz					X		
15. <i>Laccophilus chinensis</i> Boheman						X	
16. <i>L. parvulus</i> Aube						X	
17. <i>L. sharpi</i> Régimbart	X	X	X	X	X	X	
18. <i>L. siamensis</i> ssp.					X		
Hydraenidae							
19. <i>Hydraena</i> (s. str.) <i>scabra</i> d'Orchymont						X	
Spercheidae							
20. <i>Spercheus siangli</i> Schwarz et Barber					X		
Hydrophilidae							
21. <i>Amphiops mater</i> Sharp					X		
22. <i>Berosus</i> (s. str.) <i>pulchellus</i> MacLeay	X			X	X	X	
23. <i>B. (Enoplurus) fairmairei</i> Zaitzev	X	X	X	X	X		
24. <i>Enochrus</i> (<i>Lumetus</i>) <i>esuriens</i> (Walker)		X	X	X	X	X	X
25. <i>E. (L.) parvulus</i> (Kuwert)	X	X	X	X	X		
26. <i>E. (s. str.) subsignatus</i> (Harold)				X			
27. <i>Helochares</i> (s. str.) <i>pallens</i> (MacLeay)	X	X	X	X	X	X	
28. <i>H. (Hydrobaticus) anchoralis</i> (Sharp)	X				X	X	
29. <i>H. (H.) sauteri</i> d'Orchymont					X		
30. <i>Hydrophilus bilineatus cashmirensis</i> Redtenbacher	X						
31. <i>Regimbartia attenuata</i> (Fabricius)	X			X			
32. <i>Sternolophus</i> (s. str.) <i>rufipes</i> (Fabricius)	X	X	X	X	X	X	
33. <i>S. (Neosternolophus) inconspicuus</i> (Nietner)					X		
Limnichidae							
34. <i>Byrrhinus formosanus</i> Pic				X			
35. <i>Pelochares ryukyuensis</i> M. Satô				X			
Helodidae							
36. <i>Scirtes japonicus</i> Kiesenwetter				X			
Heteroceridae							
37. <i>Heterocerus sauteri</i> Grouvelle				X	X		
Total number of species	14	10	19	23	11	1	

* a: paddy water, b: irrigation ditch by paddy field, c: light trap in paddy field, d: light trap in sugar cane field.

tic species are excluded (e.g., Carabidae, Staphylinidae, etc.). A total of 20 species belonging to 5 families were found from paddy water and irrigation ditches in these two countries. These are enumerated in Table 1 and the following lines along with the specimens collected in light traps in paddy and sugar cane fields.

So far as we are aware, these species are recorded here for the first time from paddy water habitats in these two areas. The following 9 species are recorded here for the first time from paddy water in the world: *Canthydrus semperi* Wehncke, *Cybister tripunctatus convexior* Gschwendtner, *Hydroglyphus flammulatus* (Sharp), *H. pseudogeminus* (Régimbart), *Hydaticus rhantoides* Sharp, *Laccophilus parvulus* Aube, *Hydraena scabra* d'Orchymont, *Berosus (Enoplurus) fairmairei* Zaitzev and *Enochrus (Lumetus) parvulus* (Kuwert).

Distribution locality based on the paddy water material, present data or former records, is shown with an asterisk. Light trap collections in paddy fields are excluded from this criteria since they may have been drawn from other water environments (Yano et al., 1982).

Haliplidae

Peltodytes (s. str.) *sinensis* (Hope)

Specimens examined. [TAIWAN] 1 ex., Hsinpei, 27. vii. 1981, KY. (light trap in paddy field) 1 ex., Touliu, 22-24. viii. 1981; 1 ex., Hsinhua, 20-21. viii. 1981.

Distribution: Korea, Nansei Is*, Taiwan*, China, Vietnam.

This species is common in the Nansei Is. Satô and Miyatake (1964) recorded this from paddy fields of Iriomote I., Nansei Is.

Noteridae

Canthydrus semperi Wehncke

Specimen examined. [PHILIPPINES] 1 ex., Tugbok, 28-30. viii. 1979, KY.

Distribution: Philippines*.

This species is recorded here for the first time from paddy water in the world.

Hydrocoptus (Neohydrocoptus) bivittis Motschulsky (Fig. 1)

Specimen examined. [TAIWAN] (light trap in paddy field) 1 ex., Hsinhua, 20-21. viii. 1981.

Distribution: Taiwan, China, Vietnam, Thailand*, Burma, Malaysia, India, Sri Lanka.

Heckman (1979) collected this species in Thai paddy fields. One specimen was found in a light trap collection in Taiwanese paddy fields. This species is undoubtedly distributed throughout the paddy fields of Taiwan. This species is also widely distributed in Southeast Asia, and the present data provides the most northern distribution yet found.

Dytiscidae

Copelatus socienus Balfour-Browne (Figs. 2, 3A)

Specimens examined. [TAIWAN] (light trap in sugar cane field) 2 exs., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Taiwan, China, Thailand, Nepal.

No specimens were collected from paddy water during the present surveys. But, we have other

data on specimens collected by light trap in paddy fields in Thailand as listed below. Until now, this species has been known only from China, and Taiwan, Thailand and Nepal are newly added here to its localities.

We wish to take this opportunity to illustrate the male genitalia which is one of the most useful characters for determination of the species. The structure differs slightly between the Taiwanese and the Nepalese specimens, though it would seem to be an infraspecific variation.

The genus *Copelatus* is recorded here for the first time from the world's paddy habitat.

Additional specimens examined. 6 exs., Minsheng Road in Kiukuei, Kaohsiung Hsien, Taiwan, 8-10. vi. 1977, K. Ushijima; 1 ex., Sanpatong, Thailand, 25. xi. 1968, M. Satô (light trap in paddy field); 5 exs., Khon Kaen, Thailand, 2-13. x, x-xii. 1972, M. Satô (light trap near paddy field); 1 ex., Kathmandu, Nepal, 27. ix. 1979, M. Satô.

Copelatus tenebrosus Régimbart (Fig. 3B)

Specimens examined. [TAIWAN] (light trap in sugar cane field) 7 exs., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Nansei Is., Taiwan, Vietnam, Laos, Thailand, Burma, Java, Sumatra, Sumbawa, Andaman Is., Bangladesh.

No specimens were collected from paddy water during the present surveys, though the last author collected many specimens attracted to light trap in paddy fields in Thailand. This species is abundant in Southeast Asia north as far as the Nansei Is. *C. hisamatsui* M. Satô described from the Nansei Is. is a synonym for the present species (M. Satô, 1983).

Additional specimens examined. 58 exs., Sanpatong, Thailand, 25. xi. 1968, M. Satô (light trap in paddy field).

Cybister (Gschwendtnerhydrus) tripunctatus convexior Gschwendtner

Specimen examined. [PHILIPPINES] 1 ex., Bislig, 1-4. ix. 1979, KY.

Distribution: Philippines*, Borneo, Sumatra, Java, Celebes, Malacca, New Caledonia.

This subspecies, which is recorded here for the first time from paddy water in the world, is widely distributed in the South Pacific area. Only one specimen was collected from Bislig, Mindanao, the Philippines.

Cybister (Gschwendtnerhydrus) tripunctatus orientalis Gschwendtner

Specimens examined. [TAIWAN] (light trap in sugar cane field) 3 exs., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Korea, Japan*, Nansei Is*., Taiwan, China.

This subspecies had been collected from paddy water of Iriomote I. near Taiwan, though it was not collected in the present survey.

Eretes sticticus (L.)

Specimens examined. [TAIWAN] 7 exs., Kueijen; 26. vii. 1981, KY; 3 exs., Fangliao, 27. vii. 1981, KY; 1 ex., Fenchihu, 29. vii. 1981, irrigation ditch, KY. (light trap in paddy field) 3 exs., Talin, 18-22. viii. 1981; 1 ex., Touliu, 22-24. viii. 1981. (light trap in sugar cane field) 11 exs.,

Chiatou, 28. vii. 1981, KY; 7 exs., ditto, 20. viii. 1981, Y. S. Pan.

Distribution: Cosmopolitan (Japan*, Taiwan*, N. America (U.S.A.*), Egypt* and others).

This common species in aquatic habitats has been known from paddy water in Japan, U.S.A. and Egypt. It was collected in Taiwan by the present collecting in due course.

Hydaticus (Guignotites) rhantoides Sharp

Specimens examined. [TAIWAN] 1 ex., Kueijen, 26. vii. 1981, KY; 1 ex., Fangliao, 29. vii. 1981, KY; 1 ex., Tungjen, 30. vii. 1981, irrigation ditch, KY. (light trap in sugar cane field) 13 exs., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Japan, Taiwan*, China, Vietnam.

Though several other species of the genus *Hydaticus* have been known from worlds paddy water, this species is recorded here for the first time.

Hydroglyphus flammulatus (Sharp)

Specimens examined. [TAIWAN] 1 ex., Anting, 25. vii. 1981, KY; 1 ex., Yung kang, 26. vii. 1981, KY; 1 ex., Kueijen, 26. vii. 1981, KY; 2 exs., Hsinpei, 27. vii. 1981, KY; 1 ex., Fangliao, 27. vii. 1981, KY; 1 ex., Pintung, 28. vii. 1981, KY; 4 exs., Hsikang, 25. vii. 1981, KY; 2 exs., Fenchihu, 29. vii. 1981, irrigation ditch, KY. (light trap in paddy field) 10 exs., Talin, 18-22. viii. 1981; 5 exs., Hsinhua, 20-21. viii. 1981; 2 exs., Touliu, 22-24. viii. 1981; 2 exs., Kueijen, 19-21. viii. 1981. (light trap in sugar cane field) 2 exs., Chiatou, 28. vii. 1981, KY; 15 exs., ditto, 20. viii. 1981, Y. S. Pan.

Distribution: Taiwan*, China, Vietnam, Thailand, Burma, India, Indonesia, Pakistan, Bangladesh, Sri Lanka.

This species was collected from paddy water in many places in Taiwan as well as in light traps in paddy and sugar cane fields. This species, which is recorded for the first time from paddy water, is apparently dominant in Taiwanese paddy water.

Hydroglyphus japonicus (Sharp)

Specimens examined. [TAIWAN] 2 exs., Anting, 25. vii. 1981, KY; 1 ex., Kueijen, 26. vii. 1981, KY; 4 exs., Yung kang, 26. vii. 1981, KY; 1 ex., Tungjen, 30. vii. 1981, KY; 2 exs., Pintung, 28. vii. 1981, KY; 1 ex., Fangliao, 27. vii. 1981, KY; 1 ex., Checheng, 27. vii. 1981, KY; 1 ex., Wantan, 27. vii. 1981, irrigation ditch, KY. (light trap in paddy field) 5 exs., Hsinhua, 20-21. viii. 1981; 1 ex., Kueijen, 19-21. viii. 1981; 4 exs., Talin, 18-22. viii. 1981; 2 exs., Yunlin, 22-24. viii. 1981.

Distribution: Japan* Nansei Is*, Taiwan*.

This is one of the most dominant species in Japanese paddy water, and has also been found in Taiwanese paddy fields.

Hydroglyphus pseudogeminus (Régimbart)

Specimens examined. [PHILIPPINES] 3 exs., Bislig, 1-4. ix. 1979, KY.

Distribution: Philippines*.

This is the first record from paddy water in the world.

Hydrovatus acuminatus Motschulsky

Specimens examined. [TAIWAN] (light trap in paddy field) 7 exs., Hsinhua, 20-21. viii. 1981; 1 ex., Kueijen, 19-21. viii. 1981. (light trap in sugar cane field) 4 exs., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Taiwan*, China, Indonesia, Sumatra, Malacca, Celebes, Macassar, Burma, India.

This species was not collected from paddy water in Taiwan, though it was found in the light traps in paddy and sugar cane fields.

Hyphydrus (Apriophorus) lyratus Swartz

Specimen examined. [TAIWAN] (light trap in sugar cane field) 1 ex., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Japan, Taiwan, China, Thailand, Vietnam, Burma, India, Sri Lanka, Andaman Is., Indonesia, Java, Sumatra, Australia, New Guinea.

Only one specimen was found in a light trap collection made in sugar cane fields in Taiwan. This genus has not previously been recorded from paddy water in the world.

Laccophilus chinensis Boheman

Specimens examined. [TAIWAN] (light trap in sugar cane field) 3 exs., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Nansei Is*, Taiwan, China, Vietnam, Burma, India, Nepal, Pakistan, Sri Lanka, Malaysia.

This rather widely distributed species was recorded from paddy fields of Iriomote I., Nansei Is. by Satô and Miyatake (1964). It is expected to be present in paddy fields in Taiwan, though no specimens were collected in the present short term survey.

Laccophilus parvulus Aubé (Fig. 3D)

Specimens examined. [PHILIPPINES] 7 exs., Bislig, 1-4. ix. 1979, KY; 1 ex., Tugbok, 28-30. viii. 1979, KY.

Distribution: Thailand, Vietnam, Burma, India, Pakistan, Sri Lanka, Philippines*, Malaysia, Java, Sumatra, Sumbawa.

This Oriental species was collected in Philippine paddy water as had been expected. It seems to be dominant among aquatic Coeloptera in Philippine paddy fields, though available data is not enough. This species is recorded here for the first time from paddy water in the world.

Laccophilus sharpi Régimbart (Fig. 3E)

Specimens examined. [TAIWAN] 1 ex., Anting, 25. vii. 1981, KY; 1 ex., ditto, 25. vii. 1981, irrigation ditch, KY; 1 ex., Hsikang, 25. vii. 1981, KY; 5 exs., Yungkang, 26. vii. 1981, KY; 1 ex., Kueijen, 26. vii. 1981, KY; 1 ex., Fangliao, 27. vii. 1981, KY; 1 ex., Pintung, 28. vii. 1981, KY; 1 ex., Tungjen, 30. vii. 1981, KY; 4 exs., Fenchihu, 29. vii. 1981, irrigation ditch, KY; 3 exs., Wantan, 27. vii. 1981, irrigation ditch, KY. (light trap in paddy field) 11 exs., Talin, 18-22. viii. 1981; 3 exs., Potyu, 19-20. viii. 1981; 5 exs., Kueijen, 19-21. viii. 1981; 7 exs., Touliu, 22-24. viii. 1981; 8 exs., Hsinhua, 20-21. viii. 1981. (light trap in sugar cane field) 1 ex., Chiatou, 28. vii.

1981, KY; 1 ex., ditto, 20. viii. 1981, Y. S. Pan. [PHILIPPINES] 16 exs., Bislig, 1-4. ix. 1979, KY.

Distribution: Korea, Japan*, Nansei Is*, Taiwan*, China, Vietnam, Burma, India, Pakistan, Nepal, Sri Lanka, Iraq, Philippines*, Java, Sumatra, Sumbawa, New Guinea, Australia.

Rather many specimens of this widely distributed species were collected from paddy water in Taiwan and the Philippines. The species seems to be distributed throughout Taiwan. In Philippine paddy fields, this is the most abundant species so far as the present data shows.

Laccophilus siamensis sp. (Fig. 3F)

Specimens examined. [TAIWAN] (light trap in sugar cane field) 3 exs., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Taiwan.

This subspecies will be described shortly by Dr. M. Brancucci in his monograph on the Asian *Laccophilus*. The above mentioned examples will be cited as the type-series in the paper.

Hydraenidae

Hydraena scabra d'Orchymont (Fig. 4)

Specimen examined. [PHILIPPINES] 1 ex., Bislig, 1-4. ix. 1979, KY.

Distribution: Philippines*.

Only a few species of three genera of this family have been known from Asian paddy fields (Yano et al., 1983). The present specimen was collected in paddy water, though the species normal habitat may be a pond. Four additional specimens collected from a pond near Bislig support this assumption. The specimens collected from Bislig agree well with the original description. Male genitalia and the outline of pronotum, which are characteristic features of this species, are illustrated here. This is the first record of this species from paddy water in the world.

Additional specimens examined. 4 exs., 15 km southwest of Bislig, 6, 7. vii. 1977, M. Satô.

Spercheidae

Spercheus stangli Schwarz et Barber (Fig. 3C)

Specimen examined. [TAIWAN] (light trap in sugar cane field) 1 ex., Chiatou, 28. vii. 1981, KY.

Distribution: Taiwan, Cambodia, Philippines, Sumatra.

As shown in Table 1 in Yano et al. (1983), this genus has been known from paddy fields in Africa. No specimens were collected during the present survey. Taiwan is newly recorded here as the northern most limit of distribution for this species.

Hydrophilidae

Amphiops mater Sharp

Specimen examined. [TAIWAN] (light trap in sugar cane field) 1 ex., Chiatou, 28. vii. 1981, KY.

Distribution: Japan*, Nansei Is*, Taiwan.

No specimens were collected from paddy water in Taiwan, though one was found in a light trap in a sugar cane field. Satô and Miyatake (1964) recorded this species from paddy fields of

Iriomote I., Nansei Is., and Satô (1981) mentioned its occurrence in the Japanese paddy field.

Berosus (s. str.) *pulchellus* MacLeay

Specimens examined. [TAIWAN] 6 exs., Hsikang, 25. vii. 1981, KY; 3 exs., Kueijen, 26. vii. 1981. (light trap in paddy field) 4 exs., Talin, 18-22. viii. 1981; 1 ex., Potyu, 19-20. viii. 1981; 8 exs., Kueijen, 19-21. viii. 1981; 3 exs., Touliu, 22-24. viii. 1981; 5 exs., Hsinhua, 20-21. viii. 1981. (light trap in sugar cane field) 11 exs., Chiatou, 20. viii. 1981, Y. S. Pan. [PHILIPPINES] 1 ex., Tugbok, 28-30. viii. 1979, KY.

Distribution: Japan*, Nansei Is., Taiwan*, Philippines*, China, S. E. Asia, India, Sri Lanka*

This species is also common in the Oriental region, and has been known from paddy water in Japan and Sri Lanka. It was collected in due course from the habitat in the two countries surveyed.

Berosus (*Enoplurus*) *fairmairei* Zaitzev

Specimens examined. [TAIWAN] 65 exs., Kueijen, 26. vii. 1981, KY; 8 exs., Fangliao, 27. vii. 1981, KY; 2 exs., Fenchihu, 29. vii. 1981, irrigation ditch, KY. (light trap in paddy field) 9 exs., Talin, 18-22. viii. 1981; 9 exs., Potyu, 19-20. viii. 1981; 5 exs., Kueijen, 19-21. viii. 1981; 3 exs., Touliu, 22-24. viii. 1981; 5 exs., Hsinhua, 20-21. viii. 1981. (light trap in sugar cane field) 3 exs., Chiatou, 28. vii. 1981, KY; 24 exs., ditto, 20. viii. 1981, Y. S. Pan.

Distribution: Nansei Is*, Taiwan*, China, Vietnam, Cambodia, Thailand, Philippines, Sumatra.

Many specimens of this Oriental species were collected in Taiwan, though none from Philippine paddy fields. Judging from the available data, this is the most dominant species among the aquatic Coleoptera of Taiwanese paddy fields. This is the first record of this species from paddy water in the world.

Enochrus (*Lumetus*) *esuriens* (Walker)

Specimens examined. [TAIWAN] 3 exs., Fenchihu, 29. vii. 1981, irrigation ditch, KY. (light trap in paddy field) 1 ex., Talin, 18-22. viii. 1981; 2 exs., Touliu, 22-24. viii. 1981; 5 exs., Hsinhua, 20-21. viii. 1981. (light trap in sugar cane field) 1 ex., Chiatou, 20. viii. 1981, Y. S. Pan. [PHILIPPINES] 1 ex., Tugbok, 28-30. viii. 1979, KY; 5 exs., Bislig, 1-4. ix. 1979, KY; 1 ex., ditto, 1-4. ix. 1979, irrigation ditch, KY.

Distribution: Japan*, Taiwan, Sri Lanka*, Philippines*, Sumatra, Australia, Fiji, Society Is.

This Oriental and Australasian species has been known only from Japan and Sri Lanka so far as paddy water habitat is concerned. Several specimens were collected from Philippine paddy water, and three from irrigation ditches by paddy fields in Taiwan in the present short term survey.

Enochrus (*Lumetus*) *parvulus* (Kuwert)

Specimens examined. [TAIWAN] 12 exs., Kueijen, 26. vii. 1981, KY; 1 ex., Anting, 25. vii. 1981, irrigation ditch, KY; 1 ex., Fenchihu, 29. vii. 1981, irrigation ditch, KY. (light trap in paddy field) 5 exs., Kueijen, 19-21. viii. 1981; 1 ex., Potyu, 19-20. viii. 1981; 23 exs., Hsinhua, 20-21.

viii. 1981; 1 ex., Talin, 18-22. viii. 1981. (light trap in sugar cane field) 1 ex., Chiatou, 28. vii. 1981, KY; 5 exs., ditto, 20. viii. 1981, Y. S. Pan.

Distribution: Taiwan*, Syria, Egypt, Tropical Africa, Madagascar, Aldabra, Seychelles, Samoa, Australia.

This is the first record in the world from a paddy water habitat. The species is apparently dominant in Taiwanese paddy water.

Enochrus (Lumetus) subsignatus (Harold)

Specimens examined. [TAIWAN] (light trap in paddy field) 1 ex., Hsinhua, 20-21. viii. 1981; 1 ex., Kueijen, 19-21. viii. 1981.

Distribution: Japan, Taiwan.

This species, originally described from Japan, has not previously been recorded from paddy water in the world. The present data are the first from Taiwan and may indicate the occurrence in Taiwanese paddy water.

Helochaeres (s. str.) pallens (MacLeay)

Specimens examined. [TAIWAN] 1 ex., Hsikang, 25. vii. 1981, KY. 2 exs., Fenchihu, 29. vii. 1981, irrigation ditch, KY. (light trap in paddy field) 6 exs., Touliu, 22-24. viii. 1981; 1 ex., Hsinhua, 20-21. viii. 1981; 6 exs., Talin, 18-22. viii. 1981; 1 ex., Kueijen, 19-21. viii. 1981. (light trap in sugar cane field) 6 exs., Chiatou, 20. viii. 1981, Y. S. Pan. [PHILIPPINES] 3 exs., Tugbok, 28-30. viii. 1979, KY.

Distribution: Japan*, Taiwan*, Philippines*, Warmer region of Asia and Africa, New Hebrides, Kenya*.

Present record from Taiwan may indicate general distribution in paddy fields between Kenya and Taiwan judging from the known distribution.

Helochaeres (Hydrobaticus) anchoralis (Sharp)

Specimens examined. [TAIWAN] 1 ex., Kueijen, 26. vii. 1981, KY. (light trap in sugar cane field) 2 exs., Chiatou, 28. vii. 1981, KY; 1 ex., ditto, 20. viii. 1981, Y. S. Pan. [PHILIPPINES] 1 ex., Tugbok, 28-30. viii. 1979, KY.

Distribution: Nansei Is.,* Taiwan,* China, Vietnam, Cambodia, Thailand, Sri Lanka, Philippines,* Java, Sumatra.

Judging from the wide distribution of this species in the Oriental region and the present collections, this species is probably commonly found in paddy water in the region.

Helochaeres (Hydrobaticus) sauteri d'Orchymont

Specimens examined. [TAIWAN] (light trap in sugar cane field) 2 exs., Chiatou, 28. vii. 1981, KY; 2 exs., ditto, 20. viii. 1981, Y. S. Pan.

Distribution: Nansei Is., Taiwan.

Four specimens were found in light traps in sugar cane fields in Taiwan. No specimens have been collected from paddy fields. Satô and Myatake (1964) recorded one specimen attracted to light in Iriomote I., Nansei Is. Further surveys may decide whether or not this is a paddy water

dweller.

Hydrophilus bilineatus cashimirensis Redtenbacher

Specimens examined. [TAIWAN] 4 exs., Fangliao, 27. vii. 1981, KY; 1 ex., Pintung, 28. vii. 1981, KY.

Distribution: Japan, Nansei Is*., Taiwan*, China, Vietnam, Thailand*, Burma, India, Sri Lanka, Java, Sumatra.

Regimbartia attenuata (Fabricius)

Specimens examined. [TAIWAN] 1 ex., Checheng, 27. vii. 1981, KY; 1 ex., Pintung, 28. vii. 1981, KY. (light trap in paddy field) 6 exs., Talin, 18-22. viii. 1981; 1 ex., Potyu, 19-20. viii. 1981; 2 exs., Kueijen, 19-21. viii. 1981; 1 ex., Touliu, 22-24. viii. 1981.

Distribution: Japan, Taiwan*, China, Vietnam, and other S. E. Asia, Burma, India, Pakistan, Sri Lanka*, Afghanistan, Arabia, N. Australia.

Though the number of specimens collected by the present survey is not large, this species seems to be rather common in Taiwanese paddy fields.

Sternolophus (s. str.) *rufipes* (Fabricius)

Specimens examined. [TAIWAN] 11 exs., Hsinpei, 27. vii. 1981, KY; 5 exs., Fangliao, 27. vii. 1981, KY; 1 ex., Kueijen, 26. vii. 1981, KY; 1 ex., Fenchihu, 29. vii. 1981, irrigation ditch, KY. (light trap in paddy field) 6 exs., Talin, 18-22. viii. 1981; 3 exs., Potyu, 19-20. viii. 1981; 4 exs., Kueijen, 19-21. viii. 1981; 3 exs., Touliu, 22-24. viii. 1981; 6 exs., Hsinhua, 20-21. viii. 1981. (light trap in sugar cane field) 25 exs., Chiatou, 28. vii. 1981, KY; 14 exs., ditto, 20. viii. 1981, Y. S. Pan. [PHILIPPINES] 2 exs., Banaue, 1. viii. 1979, KY.

Distribution: Korea, Japan*, Nansei Is*., Taiwan*, China, Philippines*, and other S. E. Asia, Nepal, India.

Many specimens were collected from paddy water, irrigation ditches and in light traps in paddy and sugar cane fields in Taiwan. Few were collected from the Philippines. This is apparently common among the paddy water dwelling species in Taiwan. Philippine specimens were collected only at Banaue, Ifugao, Luzon but not from other places where all other aquatic Coleoptera were collected. *Sternolophus mergus* (Redtenbacher) is a synonym for this species. The species recorded by Nakane (1963) under the name of *S. mergus* from the Nansei Is., however, seems to be of the genus *Neohydrophilus* judging from his brief description and figure.

Sternolophus (*Neosternolophus*) *inconspicuus* (Nietner)

Specimens examined. [TAIWAN] (light trap in sugar cane field) 2 exs., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Taiwan, India, Sri Lanka, Philippines, Java, Sumatra.

This species was not collected from paddy water, but was found in light traps in sugar cane fields in Taiwan. It is the first record of this species from Taiwan. Usually found together with the preceding species, *rufipes*, it is rather rare in each locality.

Limnichidae*Byrrhinus formosanus* Pic

Specimens examined. [TAIWAN] (light trap in paddy field) 1 ex., Talin, 18-22. viii. 1981; 1 ex., Touliu, 22-24. viii. 1981.

Distribution: Taiwan.

This species is frequently attracted to light.

Pelochares ryukeyuensis M. Satô

Specimens examined. [TAIWAN] (light trap in paddy field) 3 exs., Talin, 18-22. viii. 1981; 1 ex., Hsinhua, 20-21. viii. 1981.

Distribution: Nansei Is., Taiwan.

Four specimens of this species were found in the light trap collections in paddy fields. This family has not previously been recorded from the world paddy water habitat.

Helodidae*Scirtes japonicus* Kiesenwetter

Specimens examined. [TAIWAN] (light trap in paddy field) 10 exs., Hsinhua, 20-21. viii. 1981.

Distribution: Japan*, Nansei Is., Taiwan.

As collecting for immature stages was not carried out enough in the present survey, this family as well as the following Heteroceridae were not collected except for some adults attracted to light. The present species is common in Japan and the Nansei Is., though hitherto unknown from Taiwan.

Heteroceridae*Heterocerus sauteri* Grouvelle

Specimens examined. [TAIWAN] (light trap in paddy field) 6 exs., Kueijen, 19-21. viii. 1981; 2 exs., Hsinhua, 20-21. viii. 1981; 1 ex., Potyu, 19-20. viii. 1981. (light trap in sugar cane field) 15 exs., Chiatou, 20. viii. 1981, Y. S. Pan.

Distribution: Taiwan.

Based on material obtained through the present short term surveys in both areas, the following preliminary note is provided.

As mentioned in Yano et al. (1983), 14 aquatic families have been known from the world paddy fields. Present materials undoubtedly do not present all fauna of the group judging from the known world records. However, the abundance tendencies of the species concerned may be pointed out. In Taiwan, *Berosus* (*E.*) *fairmairei*, *Sternolophus* (s. str.) *rufipes*, *Laccophilus sharpi*, *Hydroglyphus flammulatus* and *Eretes sticticus* are probably major species in the paddy water habitat. In the Philippines, *Laccophilus sharpi* and *L. parvulus* may be the major ones.

In Taiwan, 10 species were collected from irrigation ditches by paddy fields, 9 of which were also collected from the paddy water. This may suggest that the aquatic Coleopterous fauna in paddy field and adjacent irrigation ditches is similar in species composition, as has been expected.

The respective diversities of each habitat should, however, be investigated further.

Light trap collection in sugar cane fields in Taiwan offers additional speculation. Ten species among 23 thus collected were also collected from paddy water. The remaining species were not collected by light traps in paddy fields or from paddy water except for two. *Hydrovatus acuminatus* and *Heterocerus sauteri*. This data may support a view that the aquatic fauna in paddy fields is rather different from that in other water environments. We suppose, however, that the difference seen in the present data may be more exaggerated than that expected owing to the limited material available.

ACKNOWLEDGEMENTS

The first author wishes to express his sincere gratitude to the following scientists who helped him in field surveys and other ways. Dr. Y. Hirashima (Kyushu University), Dr. Francisco R. Rentutar (Bureau of Agricultural Extension, Philippines), Dr. B. P. Gabriel, Dr. C. R. Baltazar and Dr. L. E. Padua (University of the Philippines), Dr. T. Miura (Shimane University), Mr. Fu-cheng Yen (Tainan District Agricultural Improvement Station), Dr. Yung-song Pan (Taiwan Sugar Research Institute), Mr. Yi-hsiung Tseng (Tainan Branch Office, Bureau of Commodity Inspection & Quarantine) and Mr. Hsin-chuan Lee (Kaohsiung District Agricultural Improvement Station). Mr. Fu-cheng Yen and Dr. Yung-song Pan were kind in offering us the valuable specimens collected by light traps and we are especially indebted to them.

SUMMARY

The aquatic Coleoptera dwelling in paddy water from Taiwan and the Philippines were studied based on the specimens collected in 1979 in the Philippines and in 1981 in Taiwan. Several places in Luzon and Mindanao in the Philippines and the southern part of Taiwan were surveyed during a limited period. Light trap collections made in paddy fields and sugar cane fields in Taiwan were also examined for subsidiary information. Following results were obtained through the surveys.

- 1) Twenty species belong to the following 5 families were found from paddy water including irrigation ditches in these two countries: Haliplidae, Noteridae, Dytiscidae, Hydraenidae and Hydrophilidae. These species are recorded here from its habitat for the first time in these two areas.
- 2) In Taiwan, *Berosus (E.) fairmairei*, *Sternolophus (s. str.) rufipes*, *Laccophilus sharpi*, *Hydroglyphus flammulatus* and *Eretes sticticus* were collected rather abundantly compared with other species. In the Philippines, *Laccophilus sharpi* and *L. parvulus* are probably major species in the habitat.
- 3) Nineteen species belonging to 7 families and 23 species belonging to 4 families were found in light trap collections in paddy and sugar cane fields in Taiwan respectively. Twelve species among the former collections and 11 species among the latter were collected from paddy water including irrigation ditches.

REFERENCES

- Heckman, C. W. 1979. Rice field ecology in northeastern Thailand. W. Junk, 228 pp. Monographiae Biologicae, Vol. 34.
- Nakane, T. 1963. Dytiscidae and Haliplidae. pp. 55-61, pls. 28-31. In: Iconographia Insectorum Japonocorum Colore naturali edita 2 (Coleoptera) (Nakane, T. et al., eds.), Hokuryukan, Tokyo. (In Japanese)
- Satô, M. 1981. An outline of aquatic Coleoptera in Japan II. Hydrophiloidea. Nature and Insects 16: 2-6. (In Japanese)
- Satô, M. 1983. Distribution of the genus *Copelatus* in Japan (Coleoptera: Dytiscidae). Spec. Iss. Aquat. Coleopt. Work. XVI Intern. Congr. Ent. Kyoto, 1983: 35-41.
- Satô, M. and Y. Miyatake 1964. Aquatic beetles of Iriomote-jima collected by the member of the second expedition of Kyushu University to the Yaeyama Group, the Ryukyus. Rept. Comm. Foreign Sci. Res. Kyushu Univ. 2: 135-144.
- Yano, K. 1978. Faunal and biological studies on the insects of paddy fields in Asia. Part 1. Introduction and Sciomyzidae from Asia (Diptera). Esakia 11: 1-27.
- Yano, K., S. Miyamoto and Yau-I Chu 1982. Ditto, VI. Preliminary report on the aquatic and semiaquatic Heteroptera from Taiwan. Chinese J. Ent. 2: 1-13.

亞洲地區水稻昆蟲相及其生物學之研究

XII 臺灣與菲律賓產之水棲性鞘翅目

矢野宏二 朱耀沂 佐藤正孝

山口大學農學部害蟲研究室、國立臺灣大學植物病蟲害
學系、菲律賓農業推廣局及名古屋女子大學研究室。

本文中整理曾在1979與1981年間在菲律賓與臺灣之水田中採集之鞘翅目昆蟲，其主要調查地點仍為菲律賓呂宋 (Ruzon) 島明達那 (Mindanao) 島及臺灣南部之水田。在臺灣的調查中，於稻田及稻田附近甘蔗田內設立的誘蛾燈所採到的甲蟲也列為補充資料之內，並得如下之結果。

- 1) 屬於如下5科之20種甲蟲，曾在菲律賓與臺灣之水田及其附近之灌溉水路採到。小頭豉蟲科 (Haliplidae)、微龍蝨科 (Noteridae)、龍蝨科 (Dytiscidae)、矯牙蟲科 (Hydraenidae)、牙蟲科 (Hydrophilidae)。此等種類仍在菲律賓、臺灣地區在水田與灌溉水路中首次被記錄。並對各種之棲所稍加以說明。
- 2) 在臺灣 *Berosus* (E.) *fairmairei*, *Sternolophus* (S. str.) *rufipes*, *Laccophilus sharpi*, *Hydroglyphus flammulatus* 和 *Eretes sticticus* 被認為較優占之種類，而在菲律賓 *Laccophilus sharpi* 和 *L. parvulus* 為優占種類。
- 3) 在臺灣，屬於7科19種、4科23種之甲蟲各在水田及甘蔗田之誘蛾燈中採集到。其中之各12、11種在水田和灌溉水路中也有採集之記錄。

EXPLANATION OF FIGURES

Fig. 1. *Hydrocoptus (Neohydrocoptus) bivittis* Motschulsky.

Fig. 2. Male genitalia of *Copelatus socienus* Balfour-Browne. A: Nepal, B: Taiwan, C: Hong Kong (after Balfour-Browne, 1946).

Fig. 3. A: *Copelatus socienus* Balfour-Browne, B: *Copelatus tenebrosus* Régimbart, C: *Spercheus stangli* Schwarz et Barber, D: *Laccophilus parvulus* Aube, E: *Laccophilus sharpi* Régimbart, F: *Laccophilus siamensis* ssp.

Fig. 4. *Hydraena* (s. str.) *scabra* d'Orchymont. A: Pronotum, B: Male genitalia.

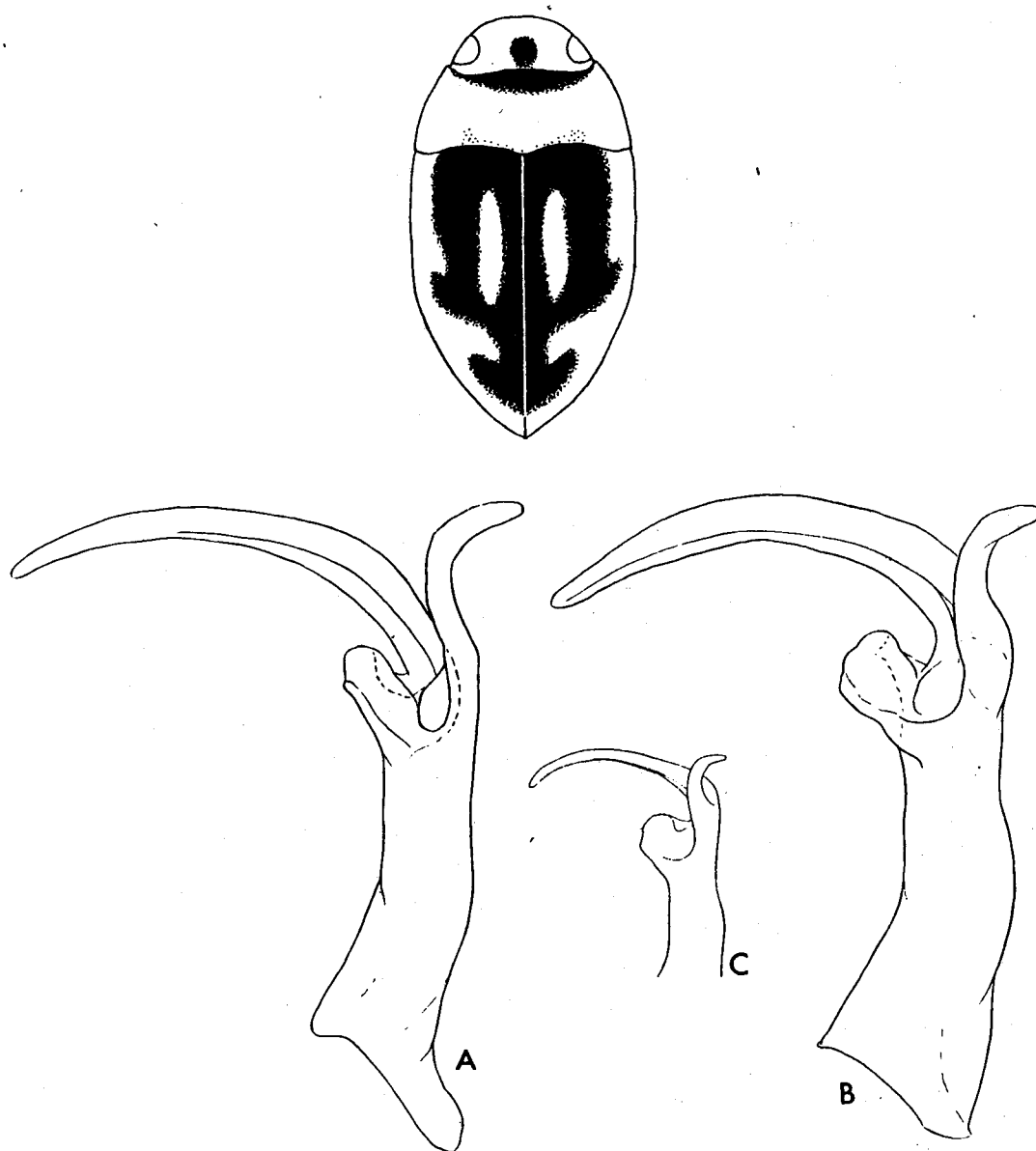


Fig. 3. Fig. 4. Fig. 1. [*Hydrocoptus (Neohydrocoptus) bivittis* Motschulsky] Fig. 2.

Fig. 3. Fig. 4. *Hydraena (s. str.) scabra* d'Orchymont

