Contribution to the Knowledge of the Tiger Beetles of Taiwan with Notes to the Species of Lanyu (Coleptera: Cicindelidae)

Karl Werner[1], Keh-Miin Chen[2], and Man-Miao Yang[3]*

[1]Dr. Kisselmannstr. 19, D-86971 Peiting, Germany.
[2]Department of International Information Services, 2, Tientsin Str., Taipei, 41, Taiwan 100, R. O. C.
[3]Department of Entomology, National Chung Hsing University, Taichung, Taiwan 402, R. O. C.

(Received August 20, 2002; Accepted November 29, 2002)

Abstract. An annotated list is given of all tiger beetle species known so far from Taiwan, with special reference to those from the island Lanyu, also named Orchid Island and Botel Tabago, off southeastern shore of Taiwan. Colour pictures of all species and subspecies are presented and their known distribution and synonymic names are cited. As far as known remarks and ecological notes are given. Asian species closely related to *Cosmodela batesi* (Fleutiaux, 1893) are pictured. A picture and data are given for the pioneer explorer, Hans Sauter, in honour of his work contribute to the study of entomological fauna of Taiwan and as a memorial of the 100th anniversary of his arrival in Taiwan in 1902.

Key words: Cicindelidae, Tiger beetles, Taiwan, Lanyu, Oriental region, Hans Sauter.

INTRODUCTION

The present publication was indicated by the second author a few years ago. Initial reason was the frequent misinterpretation of *Cosmodela batesi* (Fleutiaux, 1893), a common, but true endemic species of Taiwan, by collectors and in Taiwanese entomological collections. In most cases *Cosmodela batesi* was determined as *Cosmodela aurulenta* (Fabricius, 1801), a very common species with a wide distribution in the Oriental zoogeographic region. Now it was the question to publish a small note about this matter or to present all yet known species of *Cicindelidae* from Taiwan by word and picture to encourage particularly residents of this island to collect and study the comparatively rich tiger beetle fauna. We decided for the latter and show here all species and subspecies with this exception: two still undescribed species in the genus *Cylindera*, subgenus uncertain, which will be published soon by Robert Acciavatti (personal communication).

Cassola and Pearson (2000) listed 28 species for Taiwan, already including Acciavatti's two new species. As a result of this publication we can note (also including Acciavatti's undescribed two new species), 29 species to occur on this island. Eleven species (34 %) and 8 subspecies are endemic.

Hans Sauter (1871-1943)

The German entomologist Hans Sauter arrived in Taiwan in 1902. He made the most important contributions to entomological research in Taiwan during the first half of the 20th century.

His systematic collections of Taiwan insects were more extensive than those of any other Far East islands of that time. Since the present year is the 100th anniversary of his arrival, we would like to take this opportunity to commemorate his contribution to the study of Taiwan's insects and fauna.

Hans Sauter was born on June 21, 1871, in Augsburg, Bavaria in southern Germany. He majored in zoology, first studying under Professor Dr. Richard Hertwig at the University Munich and later with Professor Dr. Theodor Eimer in Tübingen. Under the guidance of Dr. Theodor Eimer, he began his dissertation on the coloration and stripes of Pentatomidae, especially the scutellerid bugs. However, shortly before completing his dissertation, Professor Eimer died, and there was no successor to instruct him for quite some time.

Sauter lost his desire to stay in an orphaned laboratory and was lured by the adventure of the Far East. He chose Formosa (Taiwan) as the

*Corresponding author. E-mail: mmyang@dragon.nchu.edu.tw

destination of his trip, because he realized that Taiwan was a comparatively unexplored area entomologically.

In May 1902, Sauter arrived at Anping, a prosperous seaport in southern Taiwan. Sauter stayed for half a year in Anping and collected specimens, mainly Hemiptera, for his dissertation. Subsequently, he went to Japan for two years and came back to Taiwan in 1905 with his Japanese wife.

He worked for Tait & Co., the British tea exporting company, which had branch offices in Yokohama, Kobe, Taipei, Anping, and Takao (Kaohsiung). Sauter stayed in Anping and Kaohsiung most of the time. He was an enthusiastic insect researcher and wandered through almost the entire area of Taiwan, except the areas that were not yet accessible because of headhunting aboriginal tribes and the rough east coast.

First Sauter sold or presented his extensive collections to museums or European entomologists. Then, in 1912, Sauter and the Deutsches Entomologisches Institute (DEI) reached an agreement and signed a contract, which required that all materials Sauter donated be scientifically researched and the results published in the institute's periodicals. All specimens were to be properly prepared and labeled. DEI was required to separate Sauter's specimens into an individual collection.

Sauter sent his collected tiger beetles to Walther Horn, the director of DEI, for study. In his publication about Sauter's material, Horn dedicated three species to him. In the year 1912, Sauter also sent a picture of himself (Figs. 1, 2) to Horn. This picture is reproduced here from the publication "Collectiones Entomologicae II" by Horn et. al. (1990).

Sauter delivered most of his specimens between 1910 and 1914. At first, he only sent duplicates, but from 1912 he began delivering original material. Unfortunately, World War I forced Sauter to suspend his intensive collecting activities.

Since Germany and Japan were in a state of war, the Japanese authorities in Taiwan carefully watched Sauter. Furthermore, because of his German nationality, he lost his job at Tait & Co. When Sauter used up his savings, he began to teach English, and he became the first person to offer private piano lessons in Taiwan. At the end of the war, Sauter got a position teaching German

Fig. 1. **Hans Sauter** (1871-1943).

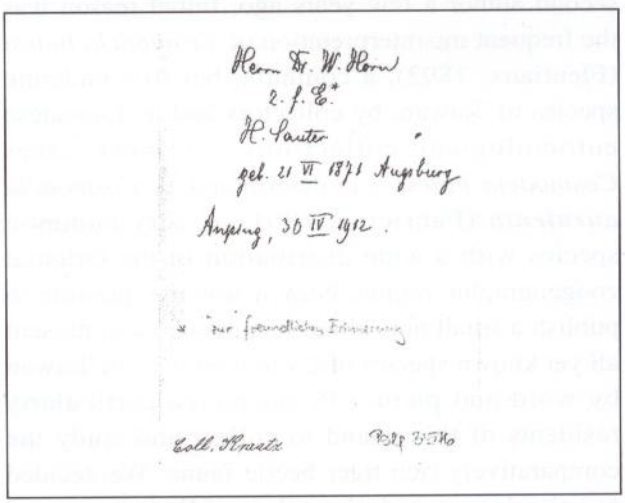

Fig. 2. **Sauter's** dedication to W. Horn.

at a medical school in Taipei. He then stopped teaching English, but continued private piano lessons.

Because of the war, only few of his specimens reached the Deutsches Entomologisches Institute between 1918-1919.

The Formosa-collection includes insects of 19 orders, in 2,872 genera, 6,001 species, and 2,258 types. In some insect orders, like Lepidoptera,

Diptera, and Neuroptera, Sauter collection is still the principal part of DEI's type specimens. After studying Sauter's materials, scholars published 120 papers under the title "Hans Sauter's Formosa Ausbeute" in the institute's periodicals.

After 1917, Sauter's eyesight began to fail, and he was no longer able to study insects. In the following five years until 1923, he was an eager collector and observer of frogs, lizards, and snakes, until his health condition could no longer allow.

Sauter's lived with his seven children, whom he brought up alone after his Japanese wife died, in the Dadaocheng district of Taipei near the Tamsui River. In the last years of his life, Sauter's was homesick.

The Taiwanese history researcher Chuang Yung-Ming relates an episode from his later years: He lay sick in bed at home and heard a special radio program with German songs performed by the Taiwanese artist Lu Chiuan-Sheng. Sauter was so homesick that he called the radio station and asked to meet with the singer; however, his wish was not realized, since the singer had already left the radio station and traveled to Japan shortly after the broadcast.

When the artist came back to Taiwan one year later, Sauter had already died. The incident motivated the artist to locate and be friend of Sauter's daughter. He even rented Sauter's former house as his choral studio.

References of his later ages are scattered and rare. Though most of European literature shows that Hans Sauter died in 1948. The references in Taiwan revealed a more reliable year 1943, or 1942, that he passed away. Hans Sauter was buried in the cemetery for foreigners in Liuchangli, southeast of Taipei. His grave can no longer be found, since the graveyard was destroyed after the second World War and the area was declared a military zone. With the exception of his daughter, who married a Japanese and occasionally returned to visit his grave before she died, the whereabouts of Sauter's children is unknown.

Although Sauter is not a famous historical personality, he made significant contributions to the study of Taiwan's fauna. In addition to insects, many endemic species of Taiwan's frogs, lizards, and snakes are named after Sauter. This is but small recognition for the long-term systematic collecting work to which this German naturalist dedicated his life in Taiwan.

Kano's List of Tiger Beetles from Lanyu Island

The Japanese entomologist Mr. Tadao Kano published not only the description of Taiwanese Tiger Beetles (1931), but also two publications (1929 and 1931) listing the Cicindelidae and Cerambycidae of Lanyu Island (Orchid Island, Botel Tobago, Japanese name Kotosho). Regarding these publications it must be mentioned that seven of the thirteen species of tiger beetles that he listed for Lanyu do definitely not exist on this island. Namely the species *Tricondyla aptera* (Olivier, 1790), *Therates labiatus* (Fabricius, 1801), *Prothyma proxima* (Chaudoir, 1860), *Thopeutica conspicua* (Schaum, 1862), *Lophyridia decemguttata* (Fabricius, 1801), *Plutacia dives* (Gory, 1883), and *Lophyra fuliginosa* (Dejean, 1826) are surely not members of the Taiwanese fauna. Only *Cylindera (Ifasina) viduata* (Fabricius, 1801), treated by Kano under it's junior synonym *Cicindela triguttata* (Herbst, 1806), could possibly occur on Lanyu Island and/or Taiwan. This species has a wide distribution from India to Southeast Asia and even to the Philippines and Papua New Guinea. Recent collecting efforts done by the third author M. M. Yang and J. F. Tsai resulted in the discovery of population of three species: *Therates alboobliquatus* ssp. *kotoshonis* Kano, 1931, *Cosmodela batesi* (Fleutiaux, 1893), and *Lophyra (Spilodia) striolata* ssp. *dorsolineolata* (Chevrolat, 1845).

List of Species Today Known from Taiwan, Including Lanyu

Genus PROTOCOLLYRIS MANDL, 1975

1. ***Protocollyris sauteri*** (Horn, 1912) *

Genus NEOCOLLYRIS HORN, 1901

Subgenus ISOCOLLYRIS NAVIAUX, 1994

2. ***Neocollyris (Isocollyris) formosana*** (Bates, 1866)
3. ***Neocollyris (Isocollyris) loochooensis*** (Kano, 1929)
4. ***Neocollyris (Isocollyris) obscurofemorata*** Mandl, 1970 *

Subgenus NEOCOLLYRIS s. str.

5. ***Neocollyris (Neocollyris) albocyanescens*** (Horn, 1912) *

Genus THERATES LATREILLE, 1817

6. ***Therates obliquefasciatus*** Horn, 1912 *
7. ***Therates alboobliquatus alboobliquatus*** Horn, 1909
8. ***Therates alboobliquatus kotoshonis*** Kano,

1931 *

9. ***Therates alboobliquatus fruhstorferi*** Horn, 1902
10. ***Therates alboobliquatus sauteri*** Horn, 1912 *

Genus CALOCHROA HOPE, 1838

11. ***Calochora flavomaculata*** (Hope, 1831)

Genus LOPHYRIDIA JEANNEL, 1946

12. ***Lophyridia brevipilosa brevipilosa*** (Horn, 1908)
13. ***Lophyridia brevipilosa klapperichi*** (Mandl, 1942)
14. ***Lophyridia angulata*** (Fabricius, 1798)
15. ***Lophyridia plumigera plumigera*** (Horn, 1892)
16. ***Lophyridia plumigera devastata*** (Horn, 1905) *

Genus COSMODELA RIVALIER, 1961

17. ***Cosmodela batesi*** (Fleutiaux, 1893) *

Genus LOPHYRA MOTSCHULSKY, 1859

Subgenus LOPHYRA s. str.

18. ***Lophyra (Lophyra) cancellata cancelata*** (Dejean, 1825)
19. ***Lophyra (Lophyra) cancellata subtilesculpta*** (Horn, 1912) *

Subgenus SPILODIA RIVALIER, 1961

20. ***Lophyra (Spilodia) striolata striolata*** (Illiger, 1800)
21. ***Lophyra (Spilodia) striolata dorsolineolata*** (Chevrolat, 1845)

Genus CYLINDERA WESTWOOD, 1831

Subgenus APTERODELA RIVALIER, 1950

22. ***Cylindera (Apterodela) shirakii*** (Horn, 1927) *

Subgenus CYLINDERA

23. ***Cylindera (Cylindera) sauteri*** (Horn, 1912) *
24. ***Cylindera (Cylindera) cylindriformis*** (Horn, 1912) *
25. ***Cylindera (Cylindera) pseudocylindriformis*** Horn, 1913 *

Subgenus nov. Acciavatti in prep.

26. **spec. nov.** Acciavatti in prep. *
27. **spec. nov.** Acciavatti in prep. *

Subgenus IFASINA JEANNEL, 1946

28. ***Cylindera (Ifasina) psilica*** (Bates, 1866)
29. ***Cylindera (Ifasina) kaleea kaleea*** (Bates, 1866)
30. ***Cylindera (Ifasina) kaleea angulimaculata*** (Mandl, 1955) *

Subgenus EUGRAPHA RIVALIER, 1950

31. ***Cylindera (Eugrapha) elisae elisae*** (Motschulsky, 1859)
32. ***Cylindera (Eugrapha) elisae reductelineata*** (Horn, 1912) *
33. ***Cylindera (Eugrapha) elisae formosana*** (Minowa, 1932) *

Genus MYRIOCHILE MOTSCHULSKY, 1862

34. ***Myriochile speculifera*** (Chevrolat, 1845)

Genus ABROSCELIS HOPE, 1838

35. ***Abroscelis anchoralis anchoralis*** (Chevrolat, 1845)
36. ***Abroscelis anchoralis punctatissima*** (Schaum, 1863)
37. ***Abroscelis psammodroma psammodroma*** (Chevrolat, 1845)
38. ***Abroscelis psammodroma reductescripta*** (Horn, 1912) *

Genus CALLYTRON GISTL, 1848

39. ***Callytron inspecularis*** (Horn, 1904)
40. ***Callytron yuasai yuasai*** Nakane, 1955
41. ***Callytron yuasai okinawense*** Hori & Cassola, 1989

* endemic

Abbreviations

DEI - Deutsches Entomologisches Institut, Eberswalde, Germany.
KWC - Karl Werner Collection, Peiting, Germany.
MNHP - Musée National d'Histoire Naturelle, Paris, France.
TARI - Taiwan Agricultural Research Institute, Taichung, Taiwan.
ZMB - Zoologisches Museum der Humboldt - Universitat, Berlin, Germany.

Treatment of Species

Family **CICINDELIDAE** LATREILLE, 1806
Subfamily **COLLYRINAE** CSIKI, 1906
Tribes **COLLYRINI** FLEUTIAUX, 1892
Subtribes **COLLYRINA** NAVIAUX, 1991

This subtribe has many species, most of these puzzling and all restricted to the Oriental region. All species have an ant-like habitus and are known to fly from leave to leave of bushes and trees hunting for prey. Larvae are deposited in trunks and branches. A detailed revision was presented by Naviaux (1994).

Genus **PROTOCOLLYRIS** MANDL, 1975

P. sauteri (Horn, 1912)

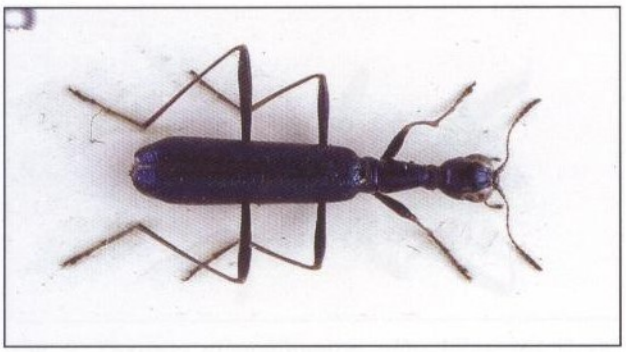

Fig. 3. ***Protocollyris sauteri*** (W. Horn, 1912).
♂, 8.5 mm, Taiwan, Puli - Yuchin, Sun Moon Lake, 16.VI. - 24.VI.1993, J. Dalihod leg., KWC.

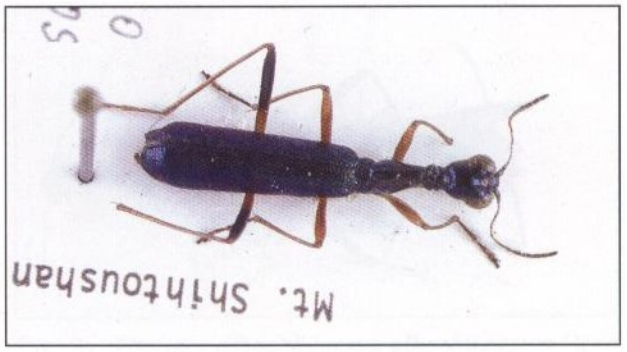

Fig. 4. ***Neocollyris (Isocollyris) formosana*** (Bates, 1866).
♀, 14 mm, Taiwan, Miaoli Hsien, Mt. Shihtousan, 4.VI.1976, H. Makihara leg., KWC.

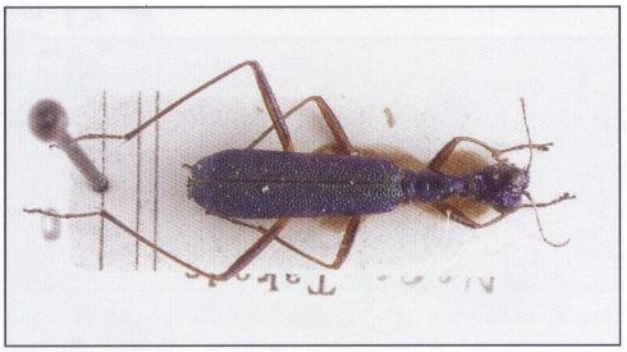

Fig. 5. ***Neocollyris (Isocollyris) lochooensis*** (Kano, 1929).
♂, 12 mm, Ryukyu, Ishigaki Isl., Takeda, 4.V.1963, V. Arita leg., KWC.

Fig. 6. ***Neocollyris (Isocollyris) obscurofemorata*** Mandl, 1970.
♂, 12 mm, Formosa, Taihorin, III.1910, S. Sauter leg., Paratype, DEI.

(Fig. 3)

Horn 1912; Ent. Mitt. I, p. 131.
Synonymy: *Taiwanocollyris akiyamai* (Mandl, 1981).

An endemic species of Taiwan named after its discoverer Hans Sauter. Naviaux (1994) gives a detailed description of *Protocollyris sauteri* and mentioned a similar appearance as species in subgenus *Isocollyris*.

Genus **NEOCOLLYRIS** HORN, 1901
Subgenus **ISOCOLLYRIS** NAVIAUX, 1994

N. formosana (Bates, 1866)
(Fig. 4)

Bates 1866; Proc. zool. Soc. London, p. 341.
Synonymy: Neocollyris formosana rufopedestris Mandl, 1970.

This species is not only known from Taiwan, but from mainland China too (Fujian). *N. formosana* is the type species for Naviaux's subgenus *Isocollyris*. Mandl's subspecies *rufopedestris* was synonymized by Naviaux (1994: 55).

N. loochooensis (Kano, 1929)
(Fig. 5)

Kano 1929, Lansania, p. 144.

Another species of the treated subgenus, *Neocollyris* (*Isocollyris*) *loochooensis* (Kano, 1929), known from the Japanese Ryukyu islands, might occur in northern Taiwan too, but no trustable reference was seen. Wiesner (1992) cited it with a questionmark in his catalogue. Naviaux (1994) mentioned specimens labelled as collected in Taiwan.

N. obscurofemorata Mandl, 1970
(Fig. 6)

Mandl 1970; Z. Arbeitsgem. öst. Ent., p. 65.

N. obscurofemorata is an endemic species of Taiwan and was described on the base of a long series of 70 specimens collected by S. Sauter in March, 1910.

Subgenus **NEOCOLLYRIS** s. str.

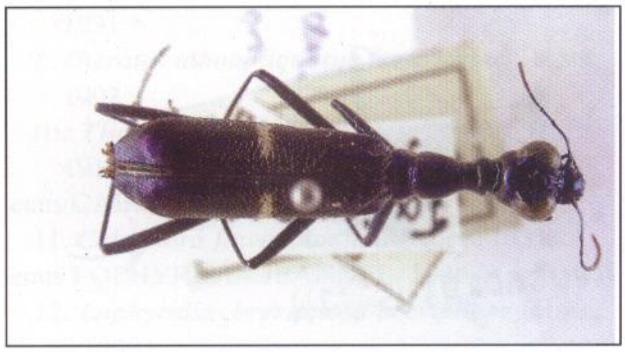

Fig. 7. ***Neocollyris (Neocollyris) albocyanescens*** (Horn, 1912).
♀, 18 mm, Formoe, "Tainau", *Holotypus*, DEI.

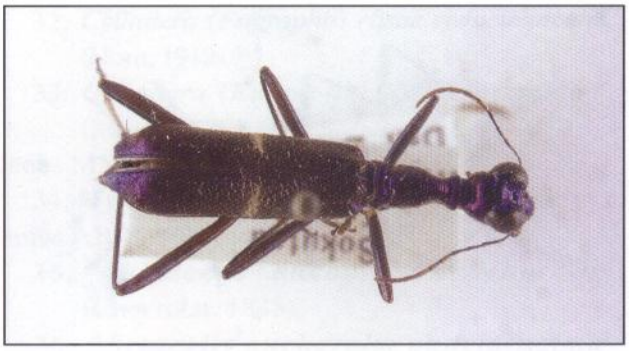

Fig. 7a. ***Neocollyris (Neocollyris) albocyanescens*** (Horn, 1912).
♂, 14 mm, Formosa, Sokotsu, VI.1912, H. Sauter, DEI.

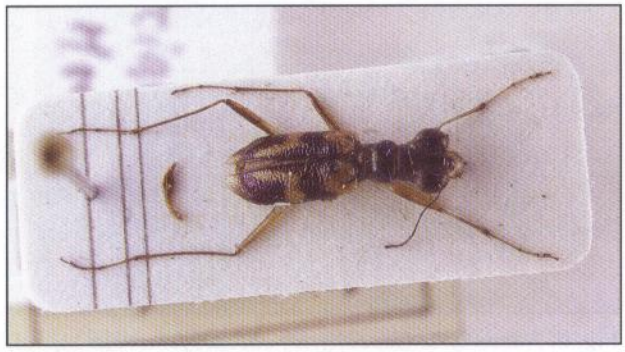

Fig. 8. ***Therates obliquefasciatus*** Horn, 1912.
♂, 7 mm, Formosa, H. Sauter, Syntype, DEI.

Fig. 8a. ***Therates obliquefasciatus*** Horn, 1912.
♂, 7 mm, Formosa, Kankau (Koshun), VII.1912, H. Sauter, DEI.

N. albocyanescens (Horn, 1912)
(Figs. 7, 7a)

Horn 1912; Ent. Mitt., p. 132.

A beautiful and endemic species of Taiwan. The holotype is originated from Tainan.

Tribus **CICINDELINI** SLOANE, 1906
Subtribus **THERATINA** HORN, 1910
This subtribe includes plenty of species in the oriental region only. Adults are usually found at moist habitats, prefering the shadow, where they are flying and running on the ground, on leaves, and on stones near water. Larvae are to be found generally in decayed wood. A revision of genus *Therates* was presented by Wiesner (1988).

Genus **THERATES** LATREILLE, 1817

T. obliquefasciatus Horn, 1912
(Figs. 8, 8a)

Horn 1912; Ent. Mitt., p. 133.

This is a very rare species and the distribution is restricted to Taiwan.

T. alboobliquatus alboobliquatus Horn, 1909
(Figs. 9, 9a)

Horn, 1909; Not. Leyden Mus. 31, p. 186.

The nominate *T. alboobliquatus* is known from Taiwan only. *T. alboobliquatus* ssp. *iriomotensis* Chujo, 1970 and *T. alboobliquatus* ssp. *Yakushimanus* Nakane, 1955 occur in the Ryukyu Islands and Japan.

T. alboobliquatus kotoshonis Kano, 1931
(Figs. 10, 10a)

Kano 1931; Proc. Imp. Ac. Tokyo 7 (2), p. 69.

This subspecies can be separated from the nominate taxon by the yellow-brown dorsal colour. Restricted to Lanyu Island, Taiwan.

T. fruhstorferi fruhstorferi Horn, 1902
(Fig. 11)

Horn, 1902: Deutsch. Ent. Zeitschr., p. 72.

According to Wiesner (1992) the nominate

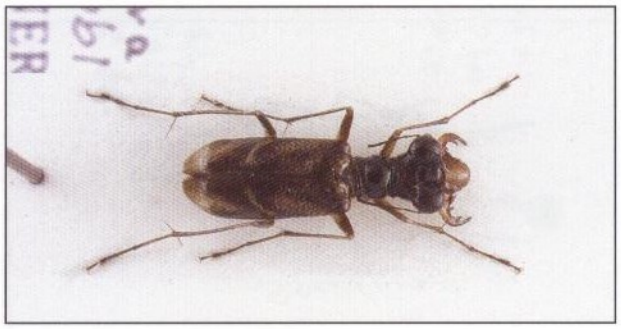

Fig. 9. ***Therates alboobliquatus alboobliquatus*** Horn, 1909.
♀, 10 mm, Formosa, Fenchihu, 1400m, 8.V.1977, Klapperich leg., KWC.

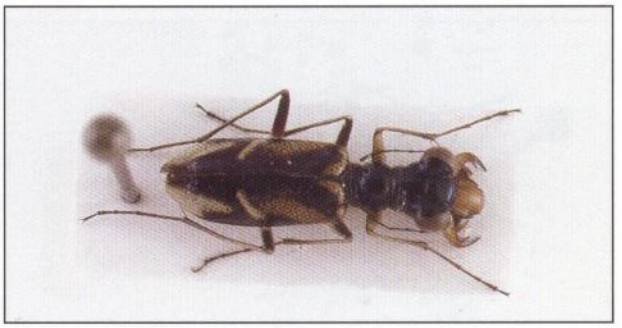

Fig. 9a. ***Therates alboobliquatus alboobliquatus*** Horn, 1909.
♂, 9.5 mm, Taiwan, near Kuangfu, ca. 250 m, 14.V.2001, U. Buchsbaum leg., KWC.

Fig. 10. ***Therates alboobliquatus*** **ssp.** ***kotoshonis*** Kano, 1931.
♀, 7.5 mm, Formosa, Lanhsu Island, Taitung Hsien, V.1971, ex coll. K. Sakai, KWC.

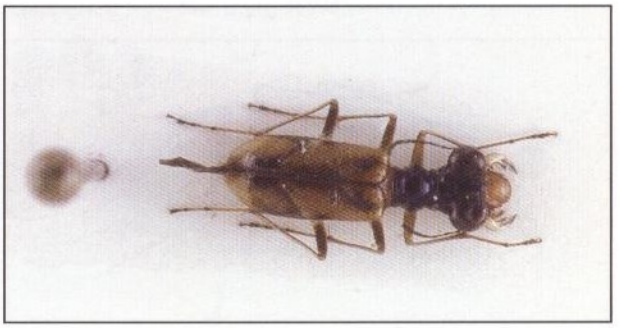

Fig. 10a. ***Therates alboobliquatus*** **ssp.** ***kotoshonis*** Kano, 1931.
♂, 7 mm, Taiwan, Orchid Island, Tien-ahyr, 3.IV.2001, M.M.Yang leg., KWC.

Therates fruhstorferi is restricted to Vietnam. Another subspecies, *Therates fruhstorferi* ssp. *vitalisi* Horn, 1913, is known to occur in China, Laos, Vietnam, and Myanmar.

T. fruhstorferi sauteri Horn, 1912
(Figs. 12, 12a)

Horn 1912; Ent. Mitt., p. 133.

This subspecies is known from Taiwan only.

Subtribus **CICINDELINA** Horn, 1908
Genus **CALOCHROA** HOPE, 1838

C. flavomaculata (Hope, 1831)
(Fig. 13)

Hope 1831; Zool. Misc. vol. 1, p. 21.

Synonymy: *sexpunctata* auct.; *risi* (Schmidt-Goebel, 1846); *javanica* (Doesburgh, 1893) ; *punctata* (Stebbing, 1908).
A common species all over tropical Asia. Recorded from Taiwan, Nepal, India, Bangladesh, Andaman Islands, Sri Lanka, Burma, Thailand, Vietnam, Laos, Cambodia, China (Yunnan, Hong Kong, Hainan), and Philippines. Two subspecies are known from tropical Africa.

Genus **LOPHYRIDIA** JEANNEL, 1946

L. brevipilosa brevipilosa (Horn, 1908)
(Fig. 14)

Horn 1908; Deutsch. Ent. Zeitschr., p. 33.

The nominate *Lophyridia brevipilosa* is only known from China (Gansu to Fukien). Two more subspecies were described from Korea (*L. brevipilosa* ssp. *Kaiyaensis* Horn & Cho, 1933) from Korea and *L. brevipilosa* ssp. *klapperichi* from China and Taiwan (see below).

L. brevipilosa klapperichi (Mandl, 1942)
(Fig. 15)

Mandl 1942; Mitt. Munch. Ent. Ges. 32 (1), p. 87.

L. brevipilosa ssp. *klapperichi* was described from China (Fukien). The record of this subspecific species from Taiwan (Heito) follows

Fig. 11. ***Therates fruhstorferi* ssp. *fruhstorferi*** Horn, 1902.
♀, 12 mm, N. Vietnam, Vinh Phu Prov., Tam Dao, 1100m, 2. - 6.VI.1999, Aherns, Jaeger, and Fabrizzi leg., KWC.

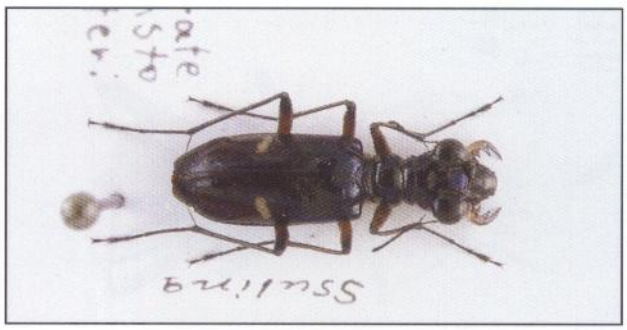

Fig. 12. ***Therates fruhstorferi* ssp. *sauteri*** Horn, 1912.
♀, 14 mm, Taiwan, Taipei Hsien, Ssuling, Taoyuan, 5.VI.1987, K. La leg., KWC.

Fig. 12a. ***Therates fruhstorferi* ssp. *sauteri*** Horn, 1912.
♂, 13.5 mm, Taiwan, near Kuangfu, ca. 250 m, 14.V.2001, U. Buchsbaum leg., KWC.

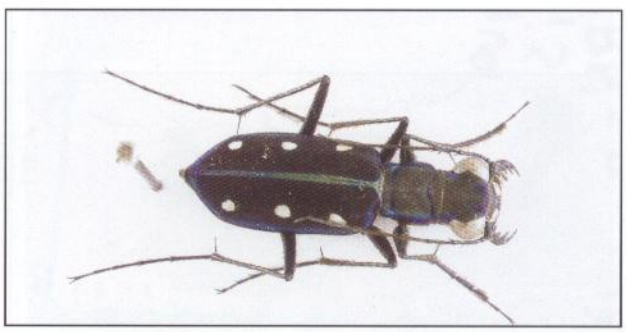

Fig. 13. ***Calochroa flavomaculata*** (Hope, 1831).
♂, 17 mm, N. India, Rishikesh, 450 m, Uttar Pradesh, VIII.1988, K.Werner leg., KWC.

Wiesner (1992), who cited it with a questionmark.

L. angulata (Fabricius, 1798)
(Fig. 16)

Fabricius 1798; Ent. Syst. Suppl., p. 62.

Synonymy: *sumatrensis* (Herbst, 1806); *arcuata* (Kollar, 1836); *leguilloui* (Guerin-Menebille, 1841); *boyeri* (Blanchard, 1853); *renardi* (Fleutiaux, 1890).

Another common species from tropical Asia, which lives on river banks and beaches. Today known from Taiwan, Nepal, India, Sri Lanka, Thailand, Laos, Vietnam, Malaysia, Sumatra, Sumbawa, Borneo, Philippines (Luzon), China. A single subspecies, *L. angulata* ssp. *niponensis* (Bates, 1883), was described from Japan.

L. plumigera plumigera (Horn, 1892)
(Fig. 17)

Horn 1892; Deutsch. Ent. Zeitschr., p. 86.

Synonymy: *latipennis* (Parry, 1844).

A species known to occur on river banks and beaches. The nominate subspecies is located in India (Tamil Nadu, Karnataka) only. The figured specimen represents the subspecies *L. plumigera* ssp. *macrograptina* Accivatti & Pearson, 1989, which is bigger in size and has a stronger developed maculation as the nominate subspecies. It occurs in northern India, Nepal, Pakistan, Bangladesh, Myanmar, Laos, Cambodia, Vietnam, and China (Hainan). All in the species is divided in five subspecific taxa.

L. plumigera devastata (Horn, 1905)
(Figs. 18, 18a)

Horn, 1905; Syst. Ind. Cic., p. 36.

This subspecies represents an endemic element of southern Taiwan and Lanyu Island (Kano, 1929, 1931). The lack of the white elytral marking and the dark colour suggest an occurence on dark volcanic gravel or sand.

Genus **COSMODELA** RIVALIER, 1961

C. batesi (Fleutiaux, 1893)
(Figs. 19, 19a)

Fleutiaux 1893; Ann. Soc. Ent. Fr. LXII, p. 491.

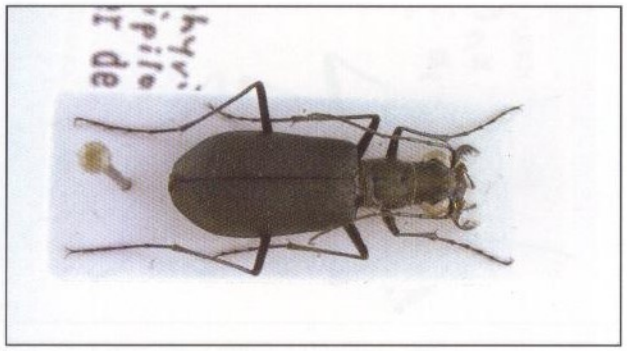

Fig. 14. ***Lophyridia brevipilosa brevipilosa*** (Horn, 1908).
♀, 14 mm, China, Gansu, S Min-Shan, VI.1992, J.M. Bousquet leg., KWC.

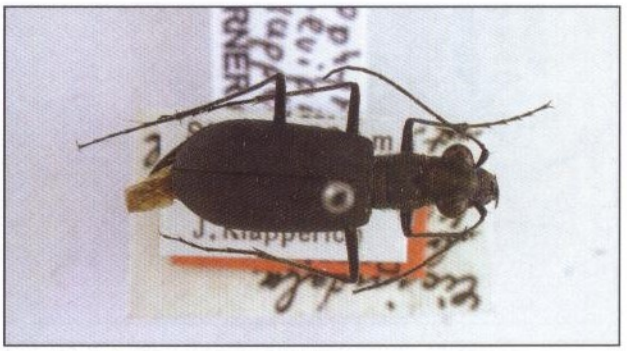

Fig. 15. ***Lophyridia brevipilosa* ssp. *klapperichi*** (Mandl, 1942).
♀, 14 mm, China, Fukien, Shaowu, 500 m, 15.V.1937, J. Klapperich leg., *Paratype*, KWC.

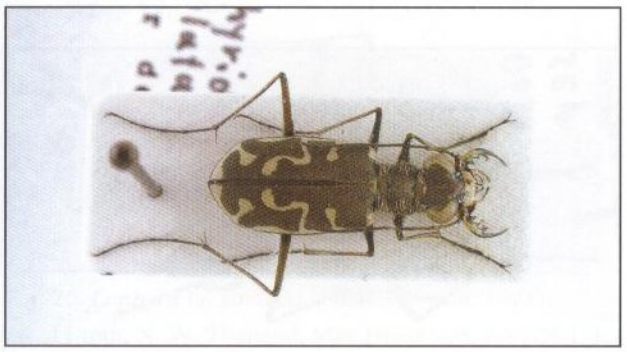

Fig. 16. ***Lophyridia angulata*** (Fabricius, 1798).
♂, 12 mm, N. India, Rishikesh, 450 m, Uttar Pradesh, VII.1991, K. Werner leg., KWC.

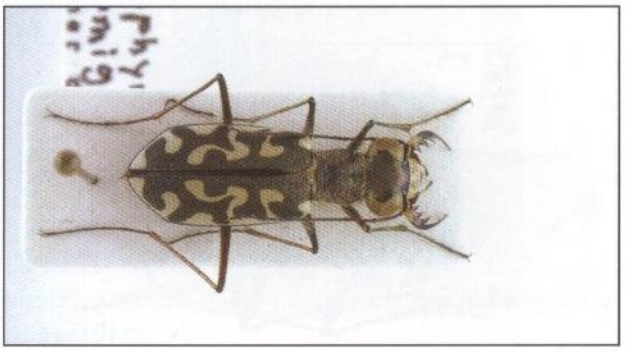

Fig. 17. ***Lophyridia plumigera plumigera*** (Horn, 1892).
♀, 17 mm, N. India, Rishikesh, 450 m, Uttar Pradesh, VII.1991, K. Werner leg., KWC.

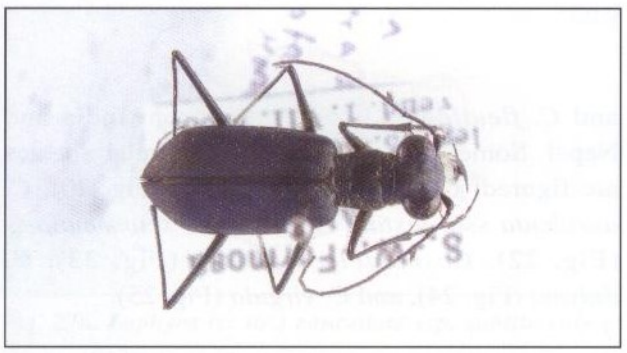

Fig. 18. ***Lophyridia plumigera* ssp. *devastata*** (Horn, 1905).
♂, 14 mm, S. W. Formosa, Akau, 15. - 30.XI.1907, H. Sauter leg., DEI.

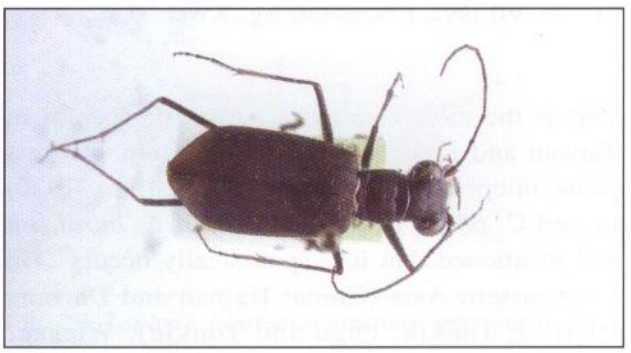

Fig. 18a. ***Lophyridia plumigera* ssp. *devastata*** (Horn, 1905).
♀, 15 mm, S. W. Formosa, Akau, 15. - 30.XI.1907, H. Sauter leg., DEI.

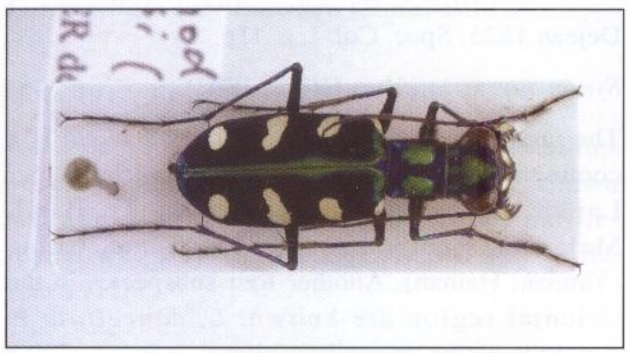

Fig. 19. ***Cosmodela batesi*** (Fleutiaux, 1893).
♂, 16 mm, Taiwan, Orchid Island, Yong Hsin Farm, 2.IV.2000, M.M.Yang leg., KWC.

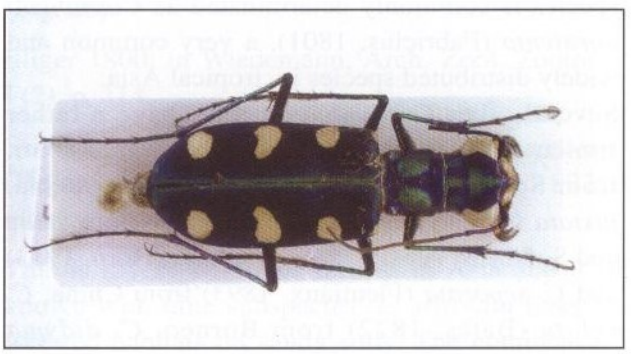

Fig. 19a. ***Cosmodela batesi*** Fleutiaux, 1893.
♀, 17 mm, Taiwan, near Shuanglin, 150 - 250 m, 16./17.V.2001, U. Buchsbaum leg., KWC.

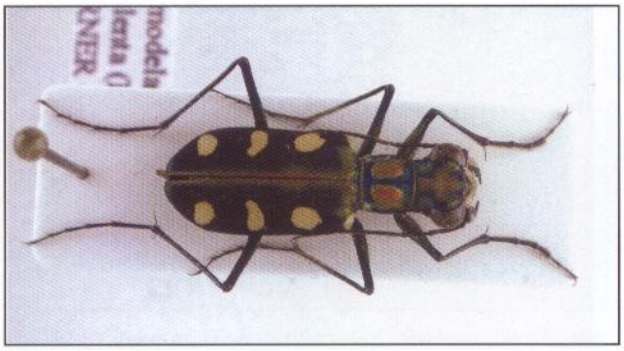

Fig. 20. ***Cosmodela aurulenta*** (Fabricius, 1801).
♂, 15.5 mm, W. Malaysia, Perak, 10 km S Ringlet, 900 m, 14. - 19.V.1999, A. Ballerio leg., KWC.

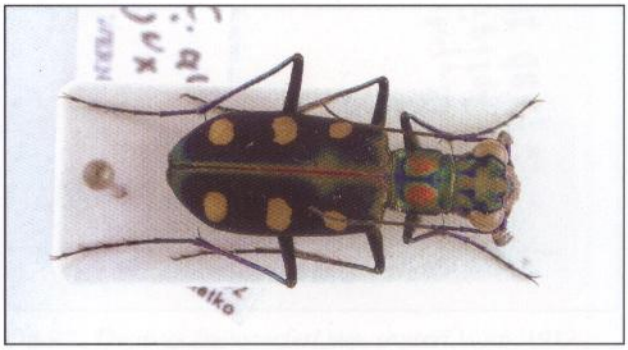

Fig. 21. ***Cosmodela aurulenta*** **ssp.** ***juxtata*** (Accivatti & Pearson, 1989).
♀, 17 mm, NW Thailand, Mae Hong Son, 28.IV. - 3.V.1992, P. Pacholatko leg., KWC

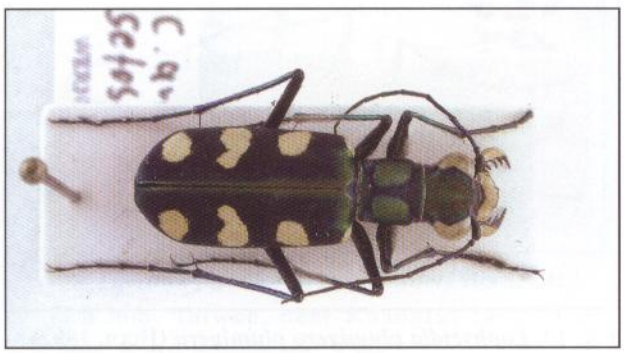

Fig. 22. ***Cosmodela setosomalaris*** (Horn, 1913).
♂, 17.5 mm, China, Szechuan, Gonga Shan Mt., Moxi, 21. - 24. VII.1992, J. Schneider leg., KWC.

Fig. 23. ***Cosmodela separata*** (Fleutiaux, 1893).
♀, 18 mm, China, Fujian, Shaowu env., 5. - 10.VII.1991, KWC.

This is the most common tiger beetle species in Taiwan and Lanyu. Normally seen along forest paths, in open gardens and in fields. Horn (1926) treated C. *batesi* as a subspecies of *C. aurulenta* and mentioned that it "sporadically occurs" in southeastern Asia (China: Hainan and Darrang District; Tonkin, Pegu and Tonkin). Wiesner (1992) cited it from China and Thailand with questionmarks. In the authors opinion *C. batesi* is an endemic species of Taiwan. As the second author discovered, in Taiwanese collections this species is commonly determinated as *Cosmodela aurulenta* (Fabricius, 1801), a very common and widely distributed species in tropical Asia.
Several other *Cosmodela* species have a rather similar appearance: *Cosmodela aurulenta* s. str. from South Asia and China, *C. aurulenta* ssp. *juxtata* (Acciavatti & Pearson, 1989) from India and Southeast Asia, *C. setosomalaris* (Horn, 1913) and *C. separata* (Fleutiaux, 1893) from China, *C. velata* (Bates, 1872) from Borneo, *C. didyma* (Dejean, 1825) from Indonesia, *C. virgula* (Fleutiaux, 1893) from India and Southeast Asia, and *C. fleutiauxi* (Horn, 1915) from India and Nepal. Some of these related and similar species are figured: *C. aurulenta aurulenta* (Fig. 20), *C. aurulenta* ssp. *juxtata* (Fig. 21) *C. setosomalaris* (Fig. 22), *Cosmodela separata* (Fig. 23), *C. didyma* (Fig. 24), and *C. virgula* (Fig. 25).

Genus **LOPHYRA** MOTSCHULSKY, 1859
Subgenus **LOPHYRA** s. str.

L. cancellata cancellata (Dejean, 1825)
(Fig. 26)

Dejean 1825; Spec. Col. I, p. 116.

Synonymy: *striatifrons* (Horn, 1892).

The nominate *Lophyra cancellata cancellata* is a common species known from southern India, Sri Lanka, Bangladesh, Myanmar, Thailand, Malaysia, Cambodia, Laos, Vietnam, China (Yunnan, Hainan). Another four subspecies in the Oriental region are known. *L. cancellata* is generally active on sandy habitats.

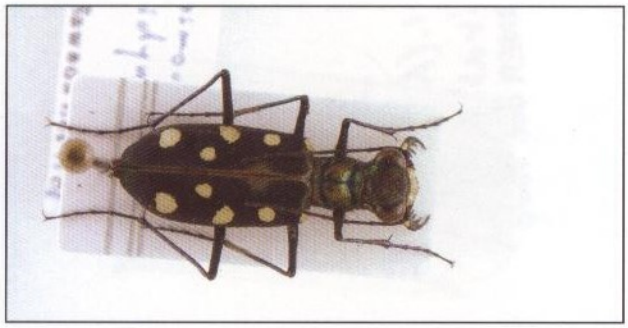

Fig. 24. ***Cosmodela didyma*** (Dejean, 1825).
♀, 17 mm, Sumatra, Brastagi, X.1985, local collector, KWC.

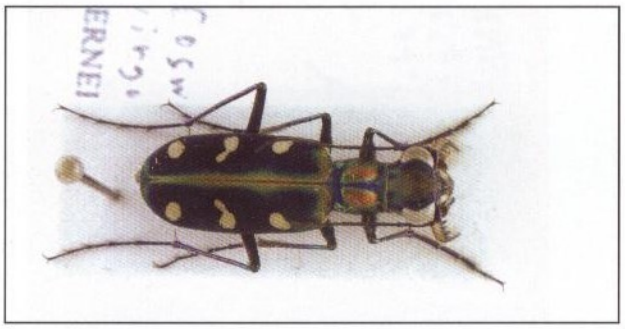

Fig. 25. ***Cosmodela virgula*** (Fleutiaux, 1893).
♂, 16.5 mm, India, Assam, Kaziranga N. P., 4./5. VII.1995, K. Werner leg., KWC.

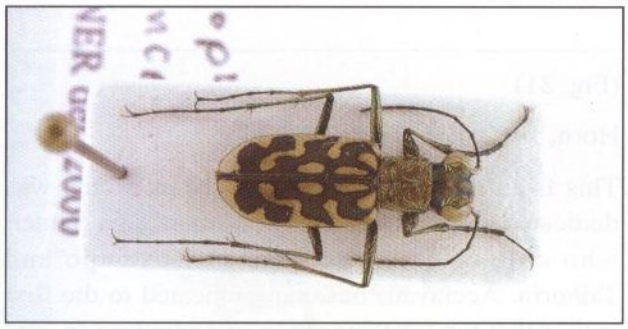

Fig. 26. ***Lophyra (s. str.) cancellata*** (Dejean, 1825).
♂, 11 mm, N. W. Thailand, Mae Hong Son, 7.V.1991, L. Dembicky leg., KWC.

Fig. 27. ***Lophyra (s. str.) cancellata ssp. subtilesculpta*** (Horn, 1912).
♀, 12 mm, Formosa, Tainan, 13.VIII.1911, H. Sauter leg., *Syntype*, DEI.

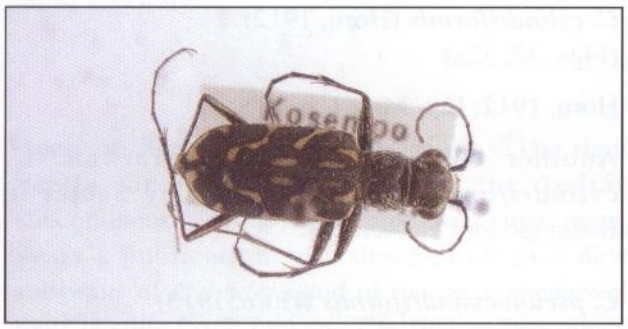

Fig. 27a. ***Lophyra (s. str.) cancellata ssp. subtilesculpta*** (Horn, 1912).
♂, 10 mm, Formosa, Kosempo, 1911, H. Sauter leg., DEI.

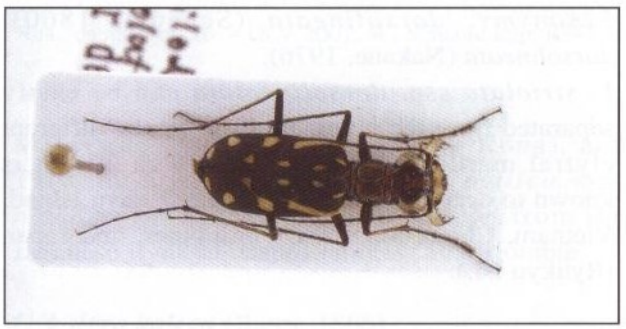

Fig. 28. ***Lophyra (Spilodia) striolata striolata*** (Illiger, 1800).
♂, 12 mm, India, Bihar, Palamau N. P., VII.1992, K.Werner leg., KWC.

L. cancellata subtilesculpta (Horn, 1912)
(Figs. 27, 27a)

Horn 1912; Ent. Mitt. I, 138.

An endemic subspecies in Taiwan. As localities only "Tainan" and "Kosempo" are known and after our knowledge *L. cancellata subtilesculpa* was only collected by Hans Sauter in the year 1911.

Subgenus **SPILODIA** RIVALIER, 1961

L. striolata striolata (Illiger, 1800)

(Fig. 28)

Illiger 1800; in Wiedemann, Arch. Zool. Zootom. I (2), p. 114.

Synonymy: *semivittata* (Fabricius, 1801); *vigorsii* (Dejean, 1831); *mandarinorum* (Dohrn, 1872); *multiguttata* (Fleutiaux, 1890).

This is a very common species in Asia and it is known with nine subspecies. *L. striolata* lives in forested habitats on sandy soils. The nominate *L. striolata* ssp. striolata is distributed in India, Nepal, Bangladesh, Myanmar, Thailand, Malaysia,

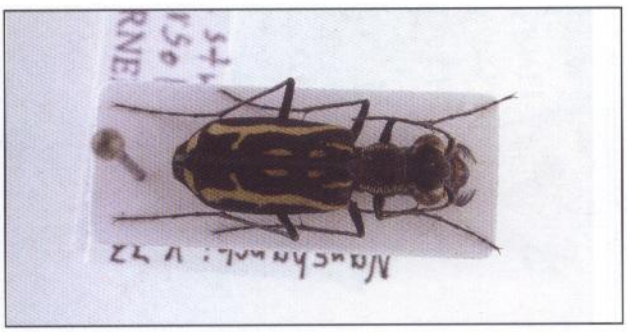

Fig. 29. ***Lophyra* (*Spilodia*) *striolata* ssp. *dorsolineolata*** (Chevrolat, 1845).
♀, 14 mm, Taiwan, Nanshanchi, Nantou Hsien, V.1973, H. Akyama leg., KWC.

Fig. 30. ***Cylindera* (*Apterodela*) *shirakii*** (Horn, 1927).
♂, 14 mm, Taiwan, Alishan, 2400 m, 17. - 26.VI.1995, J. Dalihod leg., KWC.

Borneo, Laos, Cambodia, Vietnam, Indonesia (Sumatra, Java, Sulawesi), Philippines, China, and it is cited for Taiwan too. The record of the nominate taxon from Taiwan (Horn, 1926; Wiesner, 1992) is doubted by the authors and most presumably only the following subspecies can be counted to be an element of the Taiwanese fauna.

L. striolata dorsolineolata (Chevrolat, 1845)
(Fig. 29)

Chevrolat 1845; Rev. Zool. III, p. 95.

Synonymy: *dorsolineata* (Schaum, 1860); *dorsolineata* (Nakane, 1976).
L. striolata ssp. *dorsolineolata* can be easily separated from the nominate form by the different elytral markings (see Figures 28 & 29). It is known to occur in Taiwan including Lanyu Island, Vietnam, China, Sulawesi, Philippines, and Japan (Ryukyu Isl.).

Genus **CYLINDERA** WESTWOOD, 1831

Subgenus **APTERODELA** RIVALIER, 1950

C. shirakii (Horn, 1927)
(Fig. 30)

Horn, W. 1927; Wiener Ent. Zeitsch. 44, 1/2, p. 41.

Synonymy: *niitakana* (Kano, 1931).

A true endemic element of the Taiwanese fauna with a "palaearctic" appearance. Living on meadows between grasses in higher altitudes. The subgenus *Apterodela* includes three more species in China and Japan, all occuring in similar situations.

Subgenus **CYLINDERA** s. str.

C. sauteri (Horn, 1912)
(Fig. 31)

Horn, 1912; Ent. Mitt. I, p. 134.

This is an endemic species in Taiwan, which was dedicated by Horn to its discoverer Hans Sauter, who collected this species in Kosempo and Taihorin. Acciavatti has communicated to the first author that the type specimen of *Cylindera (s. str.) sauteri* is not the same species as the commonly as *"Cylindera sauteri"* interpreted individuals. This case must be left for Acciavatti's publication.

C. cylindriformis (Horn, 1912)
(Figs. 32, 32a)

Horn, 1912; Ent. Mitt. I, p. 135.

Another endemic species in Taiwan. *C. cylindriformis* was discovered by Sauter in Kosempo and Taihanroku.

C. pseudocylindriformis (Horn, 1913)
(Fig. 33)

Horn, 1913; Arch. Naturg. LXXIX, A 11, p. 15.

A puzzling species described from Taiwan, but according to Horn (1929) and Wiesner (1992) known from Vietnam (Sa Pa) too. These records are definitely very doubtful and we treat *C. pseudocylindriformis* as an endemic element of the Taiwanese fauna. In his publication, Wiesner (1992) listed *C. pseudocylindriformis* provisorily in the genus *Prothyma* (subgenus *Symplecthyma*), but Cassola (2002) placed *C. pseudocylindriformis* in a recent publication in the subgenus *Cylindera* and cited *C. cylindriformis* from this subgenus too.

Subgenus **nov. ACCIVATTI** in prep.

In the first stage of this publication Fabio Cassola draw our attention to the matter that Robert

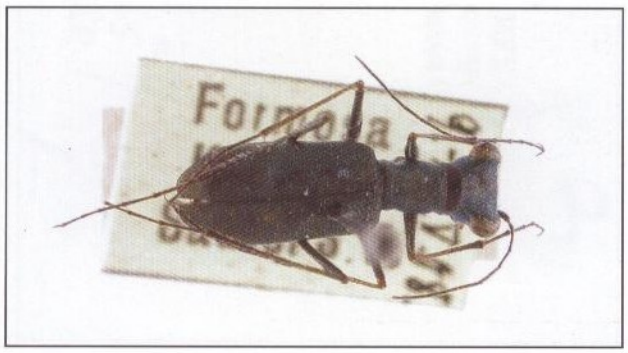

Fig. 31. ***Cylindera* (*Sg.?*) *sauteri*** (Horn, 1912).
♀, 10 mm, Formosa, Kosempo, 9.- 17.V.1908, H. Sauter leg., ZMB.

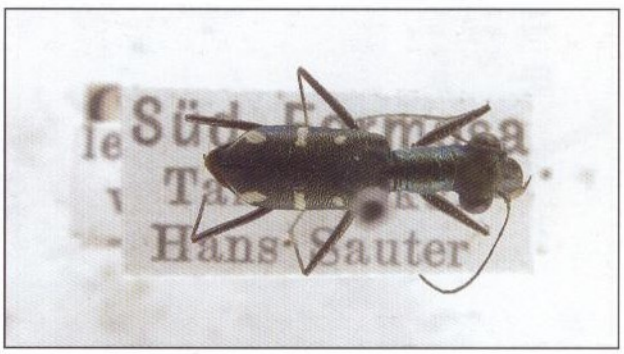

Fig. 32. ***Cylindera* (*Sg.?*) *cylindriformis*** (Horn, 1912).
♀, 9 mm, Taiwan, Sud-Formosa, Taihanroku, 1.-15,VI.1908, leg. H. Sauter, MNHP.

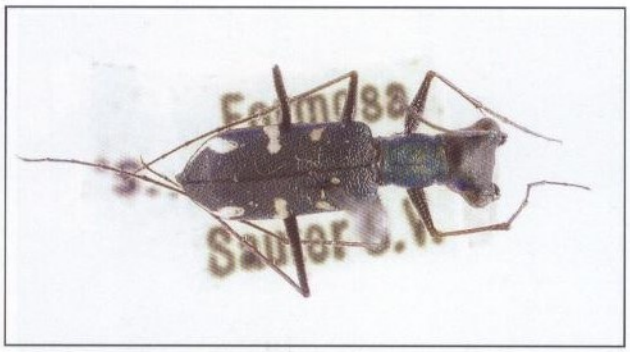

Fig. 32a. ***Cylindera* (*Sg.?*) *cylindriformis*** (Horn, 1912).
♂, 9.5 mm, Formosa, Taihanroku, 1.- 7.IV.1908, H. Sauter leg., ZMB.

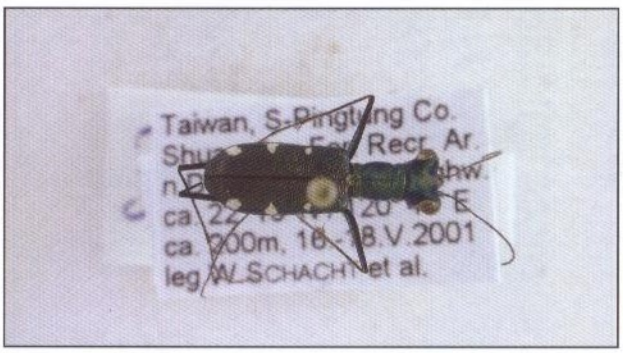

Fig. 33. ***Cylindera* (*Sg.?*) *pseudocylindriformis*** (Horn, 1913).
♀, 11 mm, Taiwan, S-Pingtung Co., Shuangliou For. Res., ca. 200 m, 16. - 18.V.2001, W. Schacht leg., KWC.

Accivatti, the well-known author of "The tiger beetle Genus *Cicindela* from the Indian subcontinent" (1989), was preparing since many years a publication with description of a new subgenus of *Cylindera* and of two new species of tiger beetles from Taiwan. The first author got in touch with Accivatti, who was very friendly and cooperative, and a joint publication was planned. But due to the complicated situation of three authors in three continents and the fact that the avalaible specimens could not be seen together, it was finally much more easier to publish separately. Therefore Accivatti has priority to describe the two new species which are not treated and figured here.

Subgenus **IFASINA** JEANNEL, 1946

C. psilica (Bates, 1866)
(Figs. 34, 34a)

Bates 1866; Proc. Zool. Soc., p. 340.

Cylindera (*Ifasina*) *psilica* is a rare but widely distributed species and today known from Malaysia, Vietnam, China (Hong Kong), and Taiwan. A subspecies, *C.* (*I.*) *psilica* ssp. *luchuensis* (Nidek, 1957), is known from the Japanese Ryukyu islands Ishigaki and Iriomote.

C. kaleea kaleea (Bates, 1866)
(Fig. 35)

Bates 1866; Proc. Zool. Soc., p. 340.

A common species known from northeast India, Myanmar, Laos, Vietnam, and China. Another subspecies was described from China, ssp. *cathaica* (Bates, 1874) and one subspecies is known from Japan (Honshu and Kyushu). The occurence of the nominate subspecies in Taiwan is doubtful and Wiesner's record (1992) originates most probably from Horn (1926) and is related to the following subspecies.

C. kaleea angulimaculata (Mandl, 1955)
(Fig. 36)

Mandl 1955; Ent. Arb. Mus. Frey 6, p. 338.

This subspecies is known from Taiwan only.

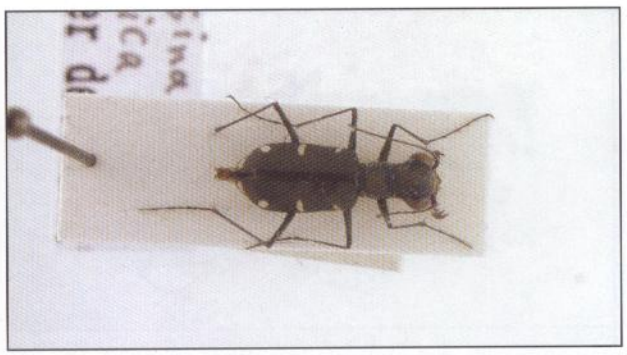

Fig. 34. ***Cylindera (Ifasina) psilica*** (Bates, 1866).
♀, 8 mm, Formosa, Banshoryo District, Sokutsu, 1912, H. Sauter leg., KWC.

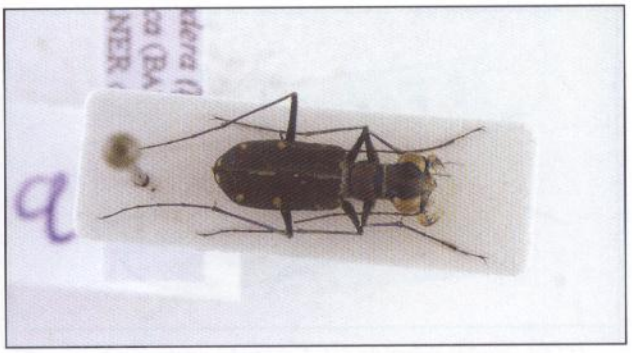

Fig. 34a. ***Cylindera (Ifasina) psilica*** (Bates, 1866).
♂, 8 mm, Taiwan, near Kuangfu, ca. 250 m, 14.V.2001, U. Buchsbaum leg., KWC.

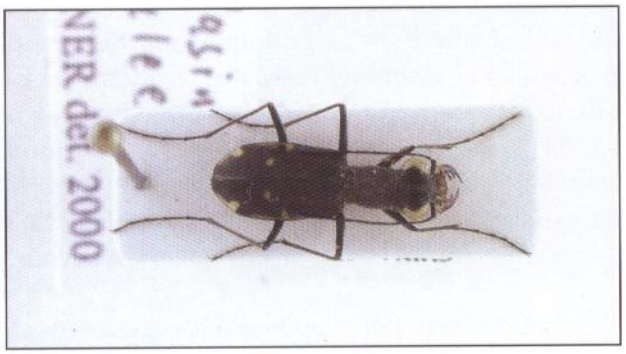

Fig. 35. ***Cylindera (Ifasina) kaleea*** (Bates, 1866).
♀, 9 mm, China, S.W. Anhui, Quianshan Co., Tianzhu Mts., 600-1300 m, 13./16.VII.1995, L. + R. Businsky leg., KWC.

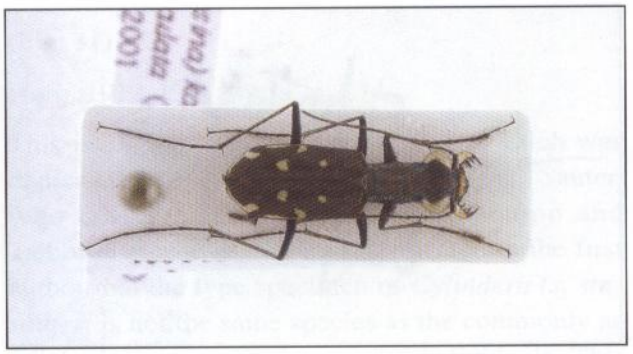

Fig. 36. ***Cylindera (Ifasina) kaleea*** **ssp.** ***angulimaculata*** (Mandl, 1955).
♂, 9 mm, Taiwan, near Shuanglin, 150 - 250 m, 16./17.V.2001, U. Buchsbaum leg., KWC.

Subgenus **EUGRAPHA** RIVALIER, 1950

C. elisae elisae (Motschulsky, 1859)
(Fig. 37)

Motschulsky 1859; Bull. Moscou XXXII, 2, p. 487.

The nominate subspecies *C. elisae elisae* is known from southern Korea, China, Tibet, and Mongolia. Seven additional subspecies were described from Korea, China, Japan and the Russian Amur/Ussuri regions, two of these subspecies are valid from Taiwan.

C. elisae reductelineata (Horn, 1912)
(Fig. 38)

Horn, 1912; Ent. Mitt. I, p.137.

This subspecies was described by Horn after material collected by Sauter. As the name suggests, *C. elisae* ssp. *reductelineata* has reduced elytral markings. It must be supposed that it lives as most species of genus *Cicindina* on beaches and river banks.

C. elisae formosana (Minowa, 1932)
(Fig. 39)

Minowa 1932; Trans. Nat. Hist. Soc. Formosa 22, 121, 294.

This valid subspecies is restricted to Taiwan. The pictured specimen from TARI is the yet only material of this subspecies known to the first author. Major public and private collections are lacking this taxon.

Genus **MYRIOCHILE** MOTSCHULSKY, 1862

M. speculifera (Chevrolat, 1845)
(Fig. 40)

Chevrolat 1845; Rev. Zool. III, p. 96.

Synonymy: *specularis* (CHAUDOIR, 1865).
M. speculifera is known from Taiwan, Thailand, Malaysia, Cambodia, Vietnam, China, and Japan. Another subspecies, *M. speculifera* ssp. *suensoni* (Mandl, 1981) was described from China (Shanghai) and one, ssp. *brevipennis* (Horn, 1897) from Indonesia (Sumatra, Java, Sulawesi,

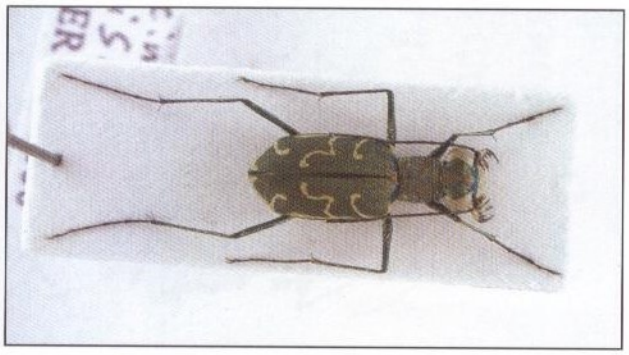

Fig. 37. ***Cicindina elisae elisae*** (Motschulsky, 1859).
♂, 10.5 mm, China, Szechuan, Wudu, 30.V. - 2.VI.1997, E. Kucera leg., KWC.

Fig. 38. ***Cicindina elisae* ssp. *reductelineata*** (W. Horn, 1912).
♂, 8 mm, Formosa, Pilam, VI.1912, H. Sauter leg., KWC.

Fig. 39. ***Cicindina elisae* ssp. *formosana*** (Minowa, 1932).
♂, 8 mm, Formosa, Tainan, , 4. IV. 1933. M. Yanagihara leg., TARI.

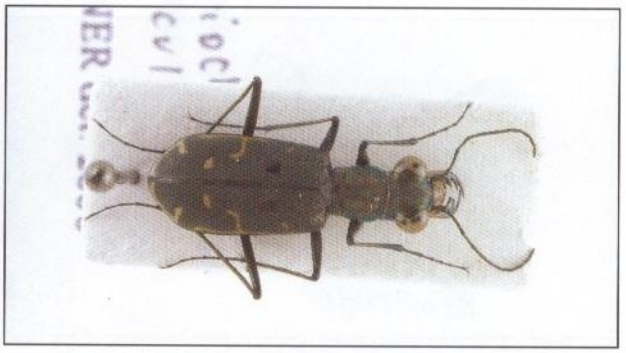

Fig. 40. ***Myriochile speculifera*** (Chevrolat, 1845).
♀, 12.5 mm, N. Vietnam, Hoa Binh, 26./27.V.1989, Brantlova leg., KWC.

Sumbawa). As all other known species of genus *Myriochile* sensu stricto, the females have two reflecting patches on the elytrae.

Genus **ABROSCELIS** HOPE, 1838

A. anchoralis anchoralis (Chevolat, 1845)
(Fig. 41)

Chevrolat 1845; Rev. Zool. III, p. 97.

The nominate *A. anchoralis* ssp. *anchoralis* is cited to occur in China only (Wiesner, 1992), but in the opinion of the authors it represents populations with enlarged white elytral markings which can be discovered all over the distribution range of the species. In the senior author's collection are specimens from a population in Japan (Kyushu, Fig. 41), which have the typical elytral maculation of the nominate form and specimens from the same island (Kyushu, Fig. 42), but a different locality, representing the subspecies *punctatissima*. However, to confirm this opinion in the case of Taiwan, such a population is still to be found.

A. anchoralis is a species of ocean beaches.

A. anchoralis punctatissima (Schaum, 1863)
(Fig. 42)

Schaum 1863; Journ. Ent. II, p. 58.

Synonymy: *swinhoei* (Bates, 1878); *punctatipennis* (Horn, 1891); *copulata* (Fleutiaux, 1917).
A specimen of *A. anchoralis* ssp. *punctatissima* collected by Sauter in July, 1911, at Anping, Taiwan, was figured by the senior author earlier (Werner, 1992, pl. 56, Fig. 495). This subspecies is known to occur also in Vietnam, China, Korea, and in Japan (Honshu and Kyushu).

A. psammodroma psammodroma (Chevrolat, 1845)
(Fig. 43)

Chevrolat 1845; Rev. Zool. III, p. 97.

The nominate *A. psammodroma* ssp. *psammodroma* was recorded from southern China only (Hongkong, Macao, Hainan).

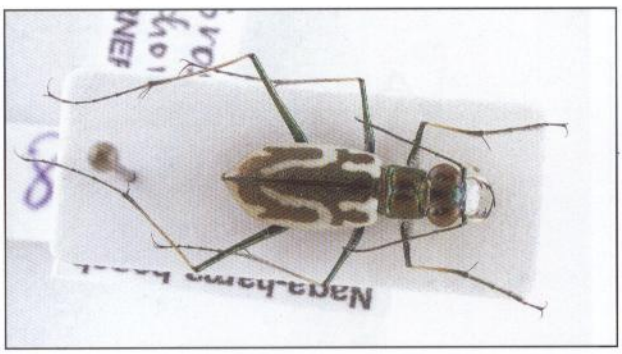

Fig. 41. ***Abroscelis anchoralis anchoralis*** (Chevrolat, 1845).
♂, 13 mm, Japan, Kyushu, Tane-ga-shima Is., Nagahama Beach, 17.VII.1995, H. Ashida leg., KWC.

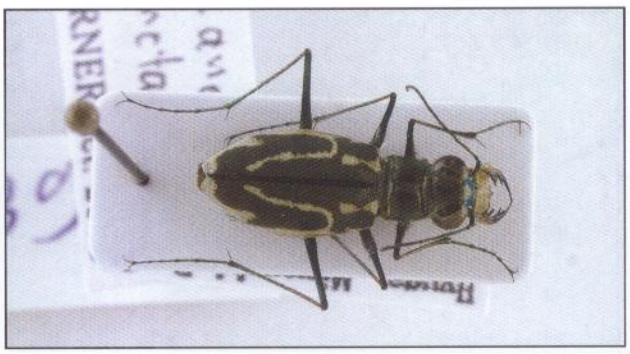

Fig. 42. ***Abroscelis anchoralis* ssp. *punctatissima*** (Schaum, 1863).
♀, 14 mm, Japan, Kyushu, Miyazaki Pref., Hyuga, 12.VIII.1992, H. Ashida leg., KWC.

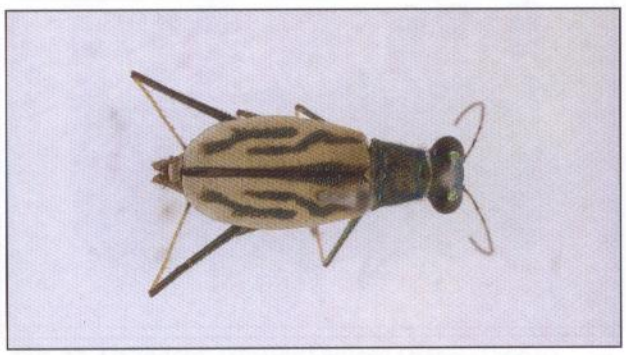

Fig. 43. ***Abroscelis psammodroma*** (Chevrolat, 1845).
♀, 12.5 mm, Hongkong, ZMB.

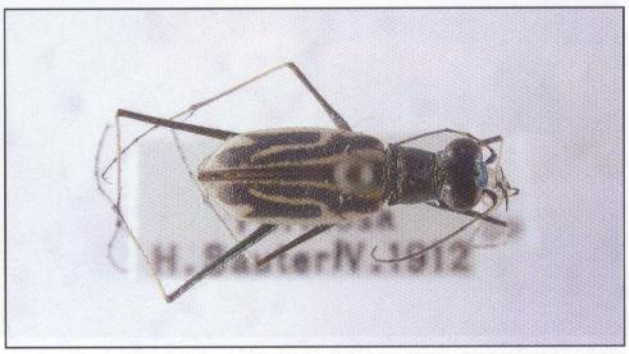

Fig. 44. ***Abroscelis psammodroma* ssp. *reductescripta*** (Horn, 1912).
♂, 9 mm, Hooxotoo, V.1930, S.M. Nqwa leg., ex coll. MIWA, DEI.

A. psammodroma reductescripta (Horn, 1912)
(Figs. 44, 44a)

Horn 1912; Ent. Mitt. I, p.139.

As indicated by the given name, *A. psammodroma* ssp. *reductescripta* represents a subspecies with reduced elytral markings. It was definitive collected by Sauter and others in Taiwan. Wiesner (1992) recorded it from China (Kiau Tschou) with a questionmark.

Genus **CALLYTRON** GISTL, 1848

C. inspecularis (Horn, 1904)
(Fig. 45)

Horn 1904; Deutsch. Ent. Zeitsch., p. 87.

Synonymy: *niveicinctum* (Bates, 1866); *yodo* (Nakane, 1955).

A specimen of *C. inspecularis* collected by Sauter in July, 1911, at Anping, Taiwan, was figured by the senior author earlier (Werner, 1992, pl. 56, Fig. 501). Hori & Cassola (1989) noted *C. inspecularis* to occur "on muddy sand shore at estuary". The species is today known from China, South Korea, southwestern Taiwan and Lanyu (Kano, 1931), and Japan.

C. yuasai yuasai Nakane, 1955
(Fig. 46)

Nakane 1955; Sci. Rep. Saikyo Univ. 2 (A), p. 26.

Synonymy: *miyakejimana* Nakane, 1961.

C. yuasai ssp. *yuasai* occurs in South Korea and Japan. Hori & Cassola (1989) noted *C. yuasai* to be found "on rocky shore usually mingled with sandy shore open to ocean".

C. yuasai okinawense Hori & Cassola, 1989
(Fig. 47)

Hori & Cassola 1989; Jap. Journ. Ent. 57 (3), p. 509.

This subspecies is known from Taiwan (Xinbao, Changhau) and the Japanese Ryukyu Islands. Hori and Cassola (1989) mentioned that *C. yuasai* ssp. *okinawense* to occur on various habitats ("rocky

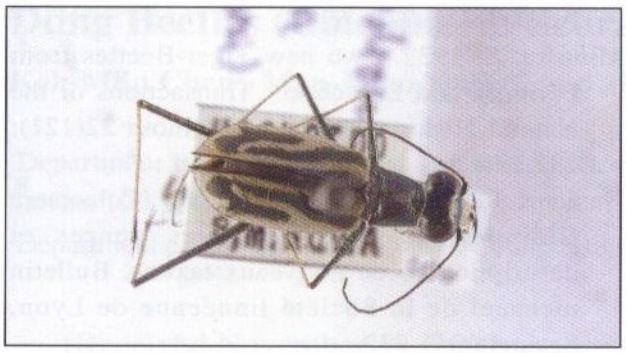

Fig. 44a. ***Abroscelis psammodroma* ssp. *reductescripta*** (W. Horn, 1912).
♂, 8.5 mm, Formosa, Amping, IV.1912, H. Sauter leg., DEI.

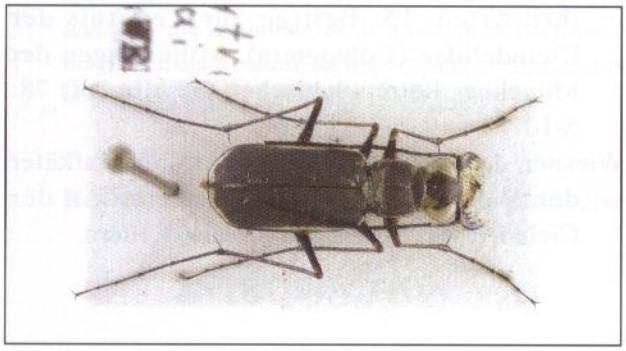

Fig. 46. ***Callytron yuasai yuasai*** Nakane, 1955.
♂, 11.5 mm, Japan, Chiba Pref., Shirahama, Nemoto, 9.VIII.1980, Kezuka leg., KWC.

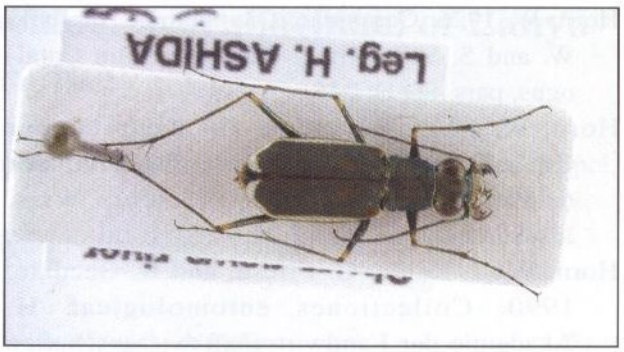

Fig. 45. ***Callytron inspecularis*** (Horn, 1904).
♂, 10 mm, Japan, Kyushu, Tane-ga-shima Is., Ohura-gawa River, 21.VII.1996, H. Ashida leg., KWC.

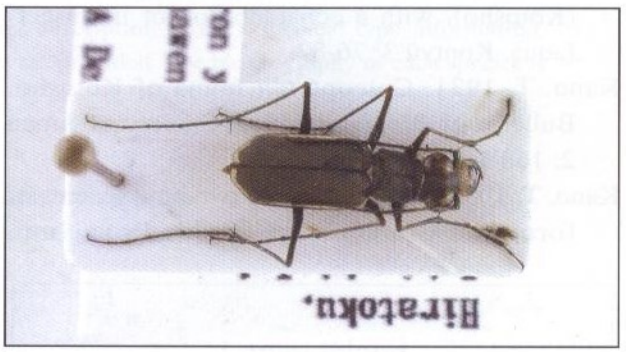

Fig. 47. ***Callytron yuasai* ssp. *Okinawense*** Hori & Cassola, 1989.
♀, 11 mm, Okinawa Pref., Hiratoku, Ishigaki Island, 11.VI.1983, Minorutanaka leg., KWC.

shore, mangrove, river mouth, and sandy beach").

ACKNOWLEDGEMENTS

Our special thanks are to Dr. Lothar Zerche from Eberswalde (DEI), Germany, who borrowed missing species to the senior author. Thanks to Dr. Manfred Uhlig from Berlin (ZMB), to Dr. Thierry Deuve (MNHP), and to Dr. Chyi-Chen Ho and Mr. Hsien-Tzung Shih (TARI), who kindly allowed to take photographs of specimens in their collections. Thanks as well to our friend Dr. Fabio Cassola, who helped the senior author producing this publication and to Mr. J. F. Tsai for his help in the field work in Lanyu. Prof. Dr. Roland Gerstmeier and Jürgen Wiesner kindly reviewed the manuscript. The third auther would like to thank the National Science Council for the grant support of Lanyu biodiversity work (NSC 89-2621-Z-005-012; NSC 90-2313-2-005-B-005-167; NSC 91-2621-B-005-006)

REFERENCES

Acciavatti, R.E. and D.L. Pearson. 1989. The tiger beetle Genus *Cicindela* (Coleoptera, Insecta) from the Indian subcontinent. Annals of Carnegie Museum 58 (4): 77-353.

Cassola, F. 2002. On four presumed *"Prothyma"* species from China and the Oriental region (Coleoptera: Cicindelidae). Z. Arb. Gem. Öst. Ent. 54: 87-94.

Cassola, F. and D.L. Pearson. 2000. Global patterns of tiger beetle species richness (Coleoptera: Cicindelidae): Their use in conservation planning. Elsevier. Biological Conservation 95: 197-208.

Hori, M. and F. Cassola. 1989. Notes on the tiger beetle complex of *Callytron nivicinctum* (Coleoptera, Cicindelidae) with description of a new subspecies. Japanese Journal of Entomology 57(3): 504-516.

Horn, W. 1912. H. Sauter's Formosa-Ausbeute. Cicindelinae. Entomologische Mitteilungen 1(5): 129-139.

Horn, W. 1926. Carabidae, Cicindelinae. *In* Junk, W. and S. Schenkling, Coleopterorum Catalogus, pars 86(1): 345.

Horn, W. 1929. Bausteine zur Kenntnis der Cicindelinen-Fauna des Ostens der orientalischen Region. Zeitschr. Wiss. Insektenbiologie 24: 17-22.

Horn, W., I. Kahle, G. Friese, and R. Gaedike. 1990. Collectiones entomologicae II. Akademie der Landwirtschaftswissenschaften der Deutschen Demokratischen Republik, Berlin, pp. 223-573.

Kano, T. 1929. A list of Cicindelidae and Cerambycidae from the Island of Botel Tobago (Kotosho), with a consideration of its insect-fauna. Kontyû 3: 76-82.

Kano, T. 1931. Coleopteran fauna of Kotosho. Bulletin of Biogeographical Society of Japan 2: 168-192, pl. 16-17.

Kano, T. 1931. Descriptions of two new species of formosan Cicindelidae (Col.). Proc. Imp. Acad. Tokyo 7(2): 69-71.

Minowa, S. 1932. Two new Tiger-Beetles from Formosa and Loo-choo. Transactions of the Natural History Society of Formosa 22(121): 293-295.

Naviaux, R. 1994/1995. Les Collyris (Coleoptera Cicindelidae), Révision des genres et description de de nouveaux taxons. Bulletin mensuel de la Société linnéenne de Lyon, Separatum: 1-332 .

Werner, K. 1992. Cicindelidae Regionis Palaearcticae, Cicindelini 2. Science Nat, Beetles of the World 15: 1-94.

Wiesner, J. 1988. Die Gattung *Therates* Latr. und ihre Arten, 15. Beitrag zur Kenntnis der Cicindelidae (Coleoptera). Mitteilungen der Münchner Entomologischen Gesellschaft 78: 5-107.

Wiesner, J. 1992. Verzeichnis der Sandlaufkäfer der Welt. 27. Beitrag zur Kenntnis der Cicindeliden. Verlag Erna Bauer, Keltern.

臺灣虎甲蟲之修訂
兼含蘭嶼已紀錄種類之討論

Karl Werner [1] 陳克敏 [2] 楊曼妙 [3]

[1]Dr. Kisselmannstr. 19, D-86971 Peiting, Germany.

[2]行政院新聞局資料編譯處

[3]國立中興大學昆蟲學系

本文針對臺灣已知之虎甲蟲，修訂其名錄，提供所有種與亞種之異名、彩色圖片、地理分布與生態資訊。並針對臺灣東南方之蘭嶼島上已紀錄之種類進行探討。另就亞洲地區與 *Cosmodela batesi* (Fleutiaux 1893) 相近之種類繪圖描述。時逢臺灣早期的重要昆蟲採集探險家漢斯邵德(Hans Sauter)來臺百週年，本文並提供其照片與資料以爲紀念。

關鍵詞：虎甲蟲科，斑蟲，臺灣，蘭嶼，東方區。