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Japan-U. S. Co-operative Science Program : Zoogeography and
Ecology of Pacific Area Insects

SOME NEW SUBSPECIES OF THE GEOMETRIDAE
FROM THE RYUKYU ARCHIPELAGO
AND FORMOSA (Lepidoptera)

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4157, Kugenuma, Fujisawa

The new subspecies described in this paper are based on the collections made by a number of entomologists despatched to the Amami and Okinawa Islands in 1963 in connection with the Japan-U. S. Co-operative Science Program. Besides, many specimens personally denoted to me are also included. My hearty thanks are due to: Messrs. T. Fujioka, S. Higashihirachi, A. Kawazoe, T. Kikuchi, T. Nagayoshi, J. Okura (Formosan specimens), M. Sakae, Y. Sekiguchi, and Drs. S. Asahina and M. Okano (Formosan specimens) for the gift of specimens.

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Subfamily Geometrinae

Pingasa ruginaria pacifica subsp. nov.

Pingasa ruginaria (partim), Prout, 1914, Ent. Mitt. 3: 238; Prout, 1922, Arch. Natg. 87, All: 287 (Formosa); Hori & Nomura, 1935, Kontyû, 9: 133 (Iriomotejima); Kawazoe & Ogata, [1963], Trans. lep. Soc. Jap. 13 (1): 22, f. 17, 31, 32, 1962 (Amami-ôshima).

As stated by Prout (1922), the Formosan population has the wings beneath with slighter yellow tinge and moreover forewing beneath with proximal margin of fuscous band more strongly curved outward than in the nominate subspecies, discal spot in general heavy. These characteristics also hold good for the Okinawa and Amami Island specimens.

Holotype (♂): Yuwandake, Amami-ôshima, 11. viii. 1961 (A. Kawazoe). Paratypes: type-locality, 2. viii. 1959, 5♂; 7. viii. 1961, 2♂; 11. viii. 1961, 10♂; 15. viii. 1961, 2♂; Yakkachi, 13. viii. 1961, 2♂; Naze, 21. vii. 1961, 1♀; Taken, 30. vii. 1959,

1♂, 1♀ (A. Kawazoe); Naze, 1962, 1♂ (ex Y. Sekiguchi); Koza, Okinawa, 7. ix. 1961, 1♂; 25. viii. 1962, 1♂ (S. Higashihirachi); Mt. Ushiku (350 m), Iriomotejima, 7-10. xi. 1962, 1♀ (G. A. Samuelson); Central Formosa, 1959, 4♂, 2♀ (Native collector). Twenty-one paratypes from Amami-ôshima, including 1♀, in coll. Kawazoe; one paratype from Iriomotejima will be deposited in the Entomological Laboratory, Kyushu University.

Distribution: Formosa, Ryukyu Archipelago (Iriomotejima, Okinawa, Amami-ôshima).

***Agathia lycaenaria samuelsoni* subsp. nov.**

Forewing with median fascia consisted of three marks linear, starting from lisco-cellular spot, not from subcostal margin as in the nominate subspecies, subterminal fascia continuous from subcostal area to tornus, though frequently a little interrupted at M_3 , never enlarged into a roundish spot between M_3 and Cu_1 as in Formosan specimens and a part of North Indian specimens, apical mark square, moderately large, terminal line thin, never enlarged at middle. Hindwing with subterminal fascia nearly always continuous from apex to tail, weakly incurved or nearly straight, spot at hind margin vestigial, not connected with the fascia at subterminal area. The markings are decidedly thicker in female.

Holotype (♂): Mt. Ushiku (350 m), Iriomotejima 3-7. xi. 1963 (G. A. Samuelson). Paratypes: data as holotype, 2♂, 8♀; type-locality, 7-10. xi. 1963, 2♀ (G. A. Samuelson); Mt. Omoto, Ishigakijima, 18. vii. 1963, 1♂ (T. Nagayoshi); Koza, Okinawa, 11. viii. 1961, 1♂; 26. vii. 1962, 1♂ (S. Higashihirachi). The holotype will be deposited in the Entomological Laboratory, Kyushu University and some paratypes will be distributed to Bishop Museum, Honolulu.

Distribution: Ryukyu Archipelago (Iriomotejima, Ishigakijima, Okinawa).

The Amami-ôshima population will better be assigned to subsp. *Chizumon* Inoue (1956, Entom. Rev. Japan, 7 (1): 1), which is known from the Island of Yakushima, the type-locality, and also from Kurokoshima, Hirato, Nagasaki Pref., Cape Muroto, Urashiri and Okinoshima, Kôchi Pref., characterized by incomplete subterminal bands on both wings, which are nearly always interrupted between M_1 and M_3 .

Subfamily Larentiinae

***Heterophleps (Lygranoa) fusca amamiensis* subsp. nov.**

Size nearly as large as the summer generation of the nominate subspecies; much darker, approaching in colouration to *H. (H.) confusa* (Wileman), forewing with two costal patches darker, more elongate, the distal one bent inward at middle, postmedian line more strongly curved inward behind cell, that on under surface stronger.

Holotype and paratypes: Yuwandake, Amami-ôshima, 16-17. vii. 1963, 3♂ (H. Inoue). The holotype will be deposited in the Entomological Laboratory, Kyushu University.

Although Wehrli (1931, Zeit. wiss. Insekt. 5 (2/3): 18) described *sinearia* Wehrli

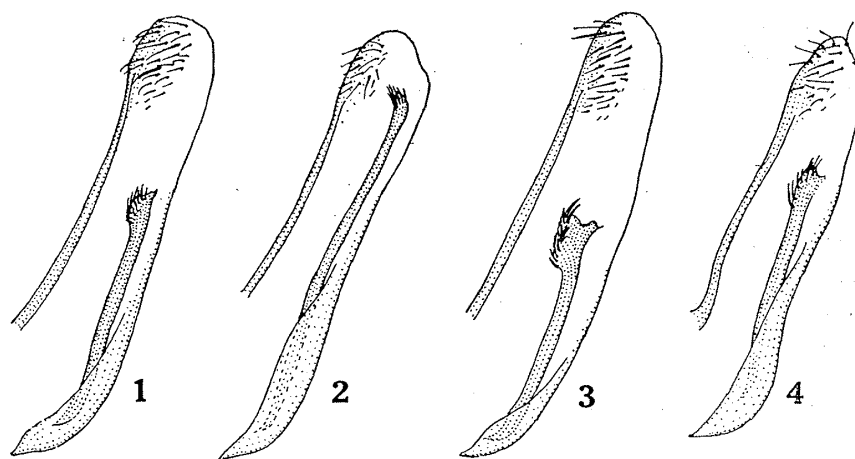
as the West Chinese subspecies of this species, Prout (1958, Bull. B. M. (N. H.) Entom. 6 (12): 448) treated it as a separate species. Consequently the present subspecies is the first one at present known.

Subfamily Ennominae

Buzura recursaria asahinai subsp. nov.

Distinguished from *B. r. superans* (Butler) as follows:

Forewing more elongate, termen little gibbous at M_1 , ground colour darker, brown patches at base and apical area darker, antemedian line more strongly produced behind cell, discal spot much heavier on above and beneath, forewing beneath with postmedian line and subterminal dark clouding well expressed at costal area. ♂ genitalia: harpe much longer than in the nominate and other subspecies.



Figs. 1-4. Right valva of *Buzura recursaria*. 1: *B. r. recursaria* (Walker), Formosa, 2: *B. r. asahinai* subsp. nov., Amami-oshima, 3: *B. r. superans* (Butler), Honshu, 4: *B. r. confusa* (Staudinger), Manchuria.

Holotype (♂): Barubidō, Ishigakijima, 7. vi. 1962 (S. Asahina). Paratypes: Yabu, Okinawa, 14. vi. 1955, 1♀ (S. Higashihirachi); Yakkachi, Amami-oshima, 13. viii. 1961, 1♂; Sumiyōson, 15. viii. 1961, 1♂ (A. Kawazoe); Naze, 1962, 2♂ (ex Y. Sekiguchi).

Distribution: Ryukyu Archipelago (Ishigakijima, Okinawa, Amami-oshima).

Biston robustum ryukyuense subsp. nov.

Male. Smaller, darker, postmedian lines of both wings more strongly angled than in the nominate subspecies, fuscous clouding proximal to subterminal line broader. Under surface with terminal area uniformly cream-buff, appreciably paler than in the nominate subspecies. Length of forewing: 26-32 mm, while in the nominate subspecies: 28-35 mm. ♂ genitalia: a small thorn-like cornutus weaker than in the

nominate race.

Holotype (♂): Naze, Amami-ôshima, 5. iv. 1962 (S. Tachikawa). Paratypes: Amami-ôshima, without date, 1♂ (M. Sakae); Koza, Okinawa, 25. ii. 1962, 1♂ (S. Higashihirachi).

Distribution: Ryukyu Archipelago (Okinawa, Amami-ôshima).

***Biston robustum subrobustum* subsp. nov.**

Male. Smaller, more thinly scaled than the other races, basal and central area tinged with vinaceous hue, transverse lines and shades frequently thicker, angles of postmedian lines on both wings weaker than in subsp. *ryukyuense*, apex of forewing creamy, termen of both wings, especially its center creamy. Under surface paler than in the other races. Length of forewing: 26–30 mm. ♂ genitalia: a small thorn-like cornutus developed in the nominate and above described subspecies entirely absent.

Holotype (♂): Puli, C. Formosa, Spring 1963 (Native collector). Paratypes: data as holotype, 2♂; Hori-Musha, vi. 1960, 1♂; Puli, 1959, 4♂ (Native collector). Two paratypes in coll. National Science Museum, Tokyo.

Distribution: Formosa.

***Hypochrosis festivarica manifesta* subsp. nov.**

The green patches on both wings much more developed than in the nominate race, usually two patches on forewing completely connected into a large mark, whose distal margin nearly straight from costa to hind margin, excepting that it is weakly sinuate on veins. The structure of the genitalia in both sexes is identical with the nominate subspecies.

Holotype (♂): Yuwandake, Amami-ôshima, 16. vi. 1963 (K. Mizusawa). Paratypes: Sumiyôson, Amami-ôshima, 28. vi. 1929, 1♂ (A. Kawada); Yuwan, 12. vii. 1960, 1♀ (T. Kikuchi); Uragami, Naze, 27. vi. 1962, 2♀ (M. Sakae); Naze, 25. vii. 1960, 1♀ (T. Fujioka); Ôyama, Okinoerabujima, 28. vii. 1963, 1♂ (H. Inoue); Kawahara, Ishigakijima, 9. vi. 1963, 2♀ (S. Higashihirachi); Inaba, Iriomotejima, 15. vii. 1963, 1♂ (T. Nagayoshi); Mt. Ushiku (350 m), Iriomotejima, 7–10. xi. 1963, 1♀ (G. A. Samuelson). Several paratypes will be distributed to Kyushu University, Bishop Museum, Honolulu, and Mr. S. Higashihirachi.

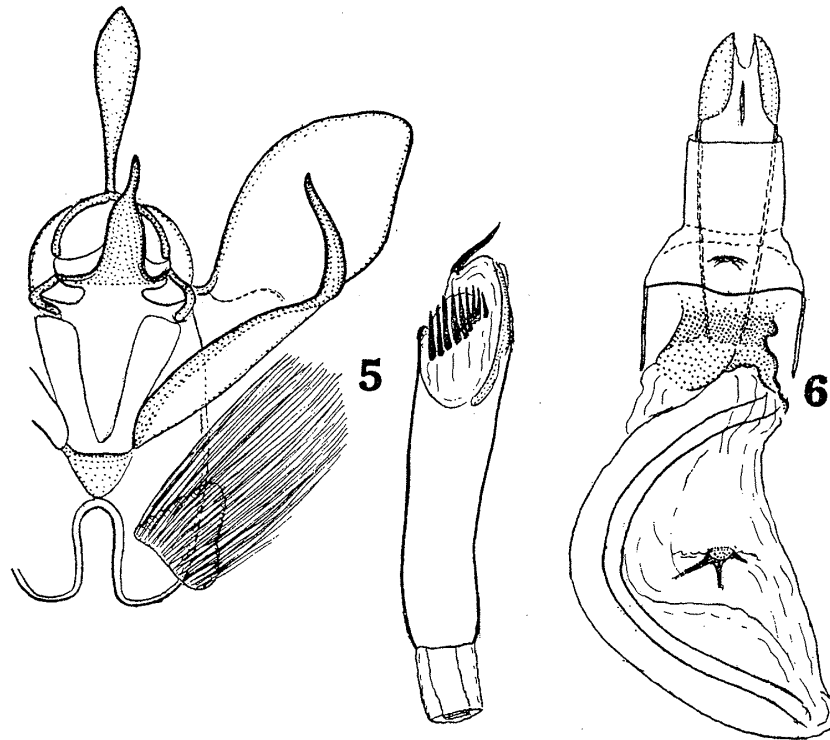
Distribution: Kyushu Archipelago (Iriomotejima, Ishigakijima, Okinoerabujima, Amami-ôshima).

Although this species has a wide range of distribution in India, Ceylon, Hongkong, Penang, Java, Tonkin, and North Borneo, no definite racial differences have been discovered (cf. Prout, 1932, Journ. F. M. S. Museum, 17: 85). However, as described above, the Ryukyuan specimens are readily distinguishable from the nominate race at a glance. The nominate race specimen here illustrated was given to me as a gift from Mr. D. S. Fletcher, British Museum (Natural History) for comparison.

***Hypochrosis festivarica formosensis* subsp. nov.**

This subspecies is unexpectedly not intermediate between the nominate and the

above described subspecies, but much closer to the latter and the characteristics described for it will also be applicable to this race. However, the present subspecies is distinguished from the Ryukyuan population by its darker ground colour,



Figs. 5-6. Genitalia of *Hypochrosis festiviaria formosensis* subsp. nov.
5: Male, 6: Female.

narrower terminal area caused by enlargement of the green patches, on hindwing the green mark is much larger anteriorly than in the above described subspecies.

Holotype (♀): Mt. Taihei, Taihoku-shu, Formosa, 23-24. vi. 1938, (H. Inoue). Paratypes: Lushan, Nantow-hsien, ix. 1959, 1♂, 4♀; Puli, 1963, 2♂, 1♀ (Native collector). Three paratypes in coll. Dr. M. Okano.

Distribution: Formosa.

Unless otherwise stated all the types designated in this paper are preserved in my collection.

摘 要

琉球列島及び台湾から次のようなシャクガ科の新亜種を記載した。

Pingasa ruginaria pacifica Inoue タイワンアヤシャク (ソトムラサキアヤシャク)

分布: 台湾・琉球 (西表島・沖縄・奄美大島). Prout (1922) が指摘したように, 台湾のものは裏面の黄色斑が原名亜種より弱い. 筆者は琉球と台湾の多数の標本を北インド産

の原名亜種とくらべた結果、上記の特徴のほかにも相異があるので別亜種とした。

Agathia lycaenaria samuelsoni Inoue マダラチズモンアオシヤク

分布：琉球（西表島・石垣島・沖縄）。琉球の標本を多数調べた結果、奄美大島のものは subsp. *chizumon* Inoue とほとんど一致するが、沖縄群島のはかなり固定した特徴をもつので、表記の亜種とした。

Heterophleps (Lygranoa) fusca amamiensis Inoue ウスクモナミシヤク

分布：琉球（奄美大島）。原名亜種より、はるかに色が暗い。

Buzura recursaria asahinai Inoue ウスイロオオエダシヤク

分布：琉球（石垣島・沖縄・奄美大島）。日本の亜種 *superans* Butler より、翅がいつそう細長く、地色が暗く、褐色斑が濃厚、横脈紋がはるかに大きい。原名亜種（インドから台湾）を含めて他の亜種と比べ、雄交尾器の *harpe* が著しく長いのも特徴である。

Biston robustum ryukyuense Inoue トビモンオオエダシヤク

分布：琉球（沖縄・奄美大島）。原名亜種より小型、色は暗く、外横線がいつそう強く突起する。Cornutus はいつそう弱い。

Biston robustum subrobustum Inoue

分布：台湾。この亜種は小型、翅はうすい感じで、多少紫色をおびる。クリーム色斑が他の亜種よりも発達している。Cornutus を欠く。

Hypochrosis festivaria manifesta Inoue リョクモンエダシヤク（新称）

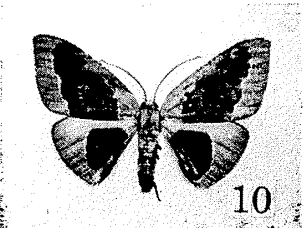
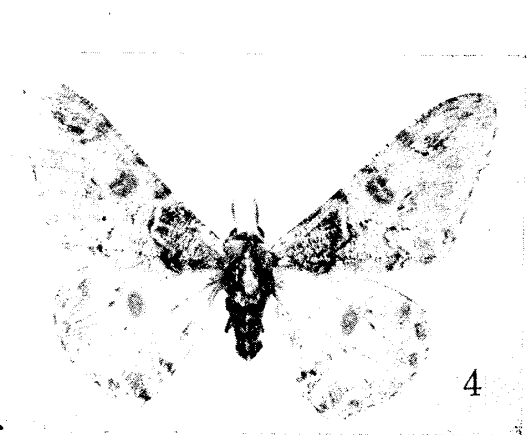
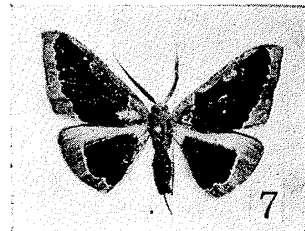
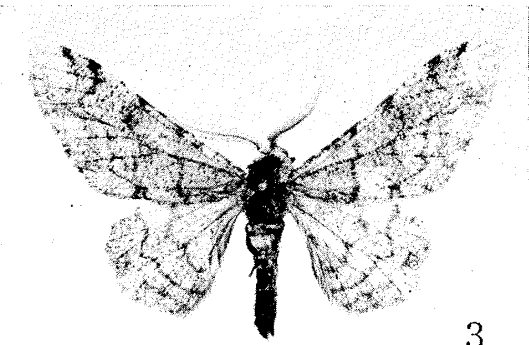
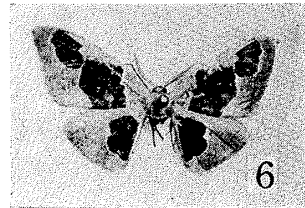
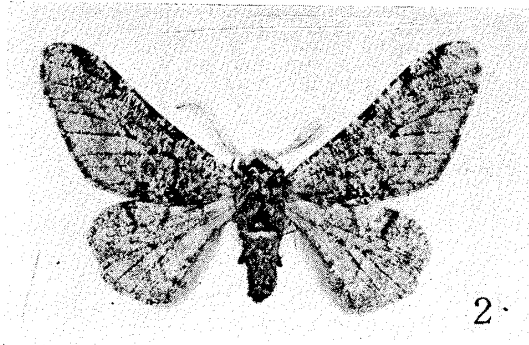
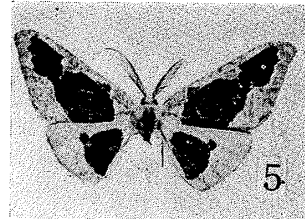
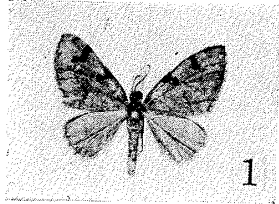
分布：琉球（西表島・石垣島・沖永良部島・奄美大島）。日本未記録だが、翅表に大きな緑色紋があるので同定は容易。インドからホンコンに分布する原名亜種より緑紋がはるかに拡大され、前翅の2紋は結合して1つになっている。

Hypochrosis festivaria formosensis Inoue リョクモンエダシヤク

分布：台湾。上記の亜種によく似ているが、地色がいつそう暗く、緑色部が外方に拡大されて、外縁部の褐色斑は狭い。後翅の緑紋は前縁部で広い。

Explanation of Plate 8

- Fig. 1. *Heterophleps (Lygranoa) fusca amamiensis* subsp. nov. (Holotype, ♂).
 Fig. 2. *Biston robustum ryukyuense* subsp. nov. (Holotype, ♂).
 Fig. 3. *Biston robustum subrobustum* subsp. nov. (Holotype, ♂).
 Fig. 4. *Buzura recursaria asahinai* subsp. nov. (Holotype, ♂).
 Fig. 5. *Hypochrosis festivaria festivaria* (Fabricius) from North India, ♂.
 Fig. 6. ditto, ♀.
 Fig. 7. *Hypochrosis festivaria formosensis* subsp. nov. (Paratype, ♂).
 Fig. 8. ditto. (Holotype, ♀).
 Fig. 9. *Hypochrosis festivaria manifesta* subsp. nov. (Holotype, ♂).
 Fig. 10. ditto. (Paratype, ♀).



Inoue—Geometridae from the Ryukyus and Formosa.