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THE SYSTEMATIC POSITION OF *ARGYNNIS ARGYROSPILATA* KOTZSCH (Lepidoptera: Nymphalidae)

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This paper is the second preliminary work for the phylogenetic systematics of the subfamily Argynninae, and contains a discussion on the systematic position of *Argynnis argyrospilata* Kotzsch, 1938. This species was described from the specimens collected at the Hindu Kush of Afghanistan and up to the present it is considered to be one of the rarest and most unique species of the subtribe Argynnina of the world.

In the original description Kotzsch compared the wing markings of this species with those of *Issoria lathonia* (Linnaeus), *Fabriciana elisa* (Godart) and *Speyeria clara clarina* (Staudinger). Since then no detailed studies have been carried on its systematic position. Murayama (1965) illustrated two male specimens of this species collected at Anjuman Valley (3,000-4,000 m) of Afghanistan on early August by C. W. Wyatt and stated as follows: "At first sight the upperside does not much differ from that of *adippe*, but this species is small and its hindwing underside shows the green cloudy markings, without the silvery white spots; since Warren did not mentioned on this species in his "A review of the classification of the subfamily Argynninae (1955)", it is uncertain that what taxonomic treatment we should do for this species, but it seems to me that we can put it in *Fabriciana* only based on the external appearances" (translated from Japanese).

Wyatt and Omoto (1966) illustrated a female specimen of this species, and stated as follows: "Genitalic examinations show that *argyrospilata* is a good species and not conspecific with *elisa* Godart as suggested by Verity and others". However, they did not assign this species to any subgenera of the genus *Argynnis* of wide sense (they put *niobe* in the subgenus *Fabriciana* in the same paper), and listed them as *Argynnis* (?) *argyrospilata* Kotzsch, *Argynnis* (*Fabriciana*) *niobe kurana* Wy. and Om.

In the subfamily Argynninae the male genitalia are considered to be the most important character to decide the generic position of species,

but the basic pattern of the wing markings is also rather stable within a genus which is primarily characterized by the male genitalia. At the first glance, the wing markings of *argyrospilata* seems to be unique, and we can not receive the impression that this species resembles the *Fabriciana* species from this character. In this species the ground colour of the upperside is pale yellowish brown instead of orange-yellow to deep yellowish brown of the known species of *Fabriciana*, and the underside of the hindwing is uniformly pale green in the ground colour and marked with evenly scattered white spots including the outwardly convex submarginal markings. Moreover, the fringe of the wings is apparently much longer than in other species of the Argynnidi and it is characteristically checkered on the forewings. If, however, one carefully analyses the wing markings, especially of the hindwing underside, of this species, it will be easily understood that the number and arrangement of all the white spots on this side are fundamentally completely identical only with those of the silvery spots of *adippe* and its allies, and not with those of any species belonging to genera other than *Fabriciana*.

A. argyrospilata is one of a few Argynnidi species of which the male genitalia have not been studied in details, so that we hope to obtain its male specimens for this purpose. Through the courtesy of Mr. D. Kamimura and Mr. Y. Arita, we fortunately have an opportunity to examine three male specimens, and confirm its systematic position. As being described and illustrated in details in the following section, every genitalic structure of this species very much resembles that of the known species of the genus *Fabriciana* except *kamala* which has a simple uncus, a rather unusual character in this genus.

Before going further we express our cordial thanks to Mr. D. Kamimura of Kamakura City and Mr. Y. Arita, Meijo University, for their generosities giving us opportunities to examine the valuable materials, and to Prof. H. Kuroko, University of Osaka Prefecture, for his kindness sending us a copy of the original description.

Fabriciana argyrospilata (Kotzsch, 1938), **comb. nov.**

Argynnis argyrospilata Kotzsch, 1938, Ent. Redsch.: 360 (type-locality: Chodja-Mahomed, Hindu Kush, Afghanistan, 2800–3000 m alt.).

Specimens examined: 1♂, Bamyan, Afghanistan, 17. vii. 1967, Takahashi leg.; 1♂, Band-i-Amir, Afghanistan, 29. vii. 1970, T. Arita leg.; 1♂, same locality and collector, 30. vii. 1970.

Description of male genitalia: Tegumen large, slightly lower than vinculum; vannus well developed; saccus large. Lateral sclerotized areas of fenestrula indistinctly separated from tegumen by a line and from uncus by a weakly raised ridge. Uncus very much similar to that of

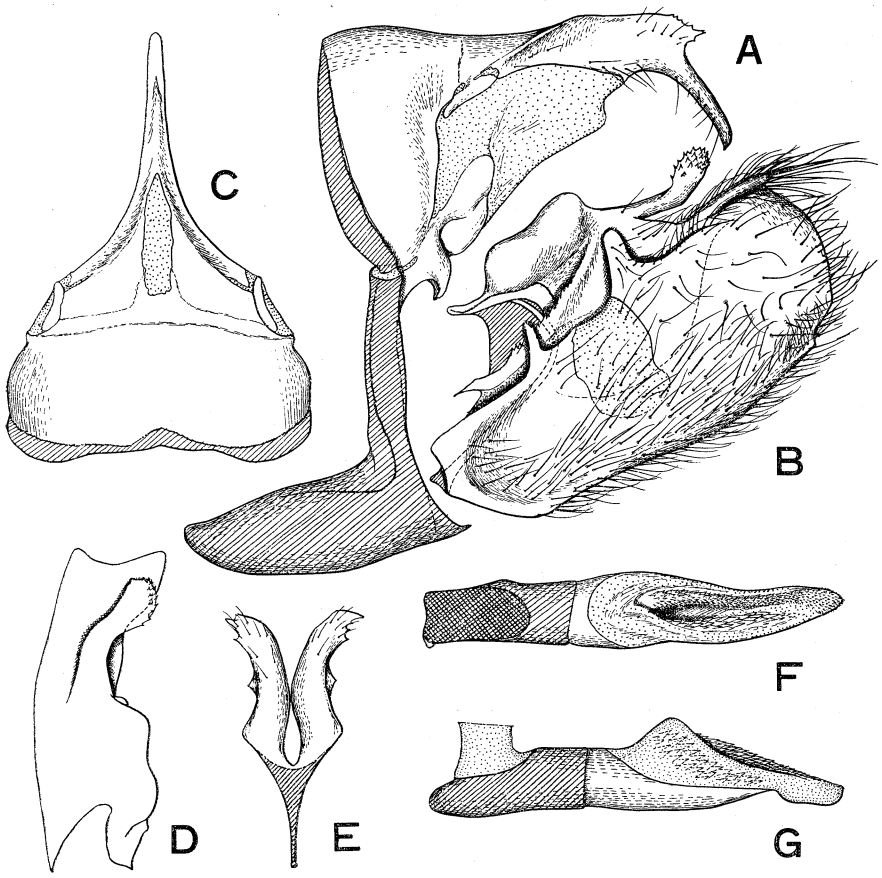

Fig. 1. Male genitalia of *Fabriciana argyrospilata* (Kotzsch). A: Lateral aspect of ring. B: Inner aspect of right valva. C: Dorsal aspect of dorsum. D: Outline of dorsal aspect of valva. E: Posterior aspect of juxta. F: Dorsal aspect of phallus. G: Ditto, lateral aspect.

adippe and *niobe*, a dorsal crest well developed and with several minute serrations, and apical prolongation of uncus rather long; gnathal remnant small, incompletely separated from dorsum. Valva moderately large, about 1.4 × as long as wide; costa moderately swollen; crista furnished with many spine-like minute denticles and separated from juxta; ampulla extraordinally short, ending far before the tip of dorsodistal flap of harpe, almost cylindrical, weakly bent dorsally at the middle and bearing several spinules at the tip which is only slightly swollen; sacculus broadly convex on basal 1/2, and forming a slender process near distal portion of its dorsal margin; harpe large and broad, not tapered apically, with a basal process well developed and tapered, dorsodistal flap not exceeding the

distal margin of harpe which is characteristically roundly produced and with a weak ventrodistal angle. Juxta strongly sclerotized, with tips of lateral arms denticulate. Phallus moderately large; left cornutus consisting of many larger spine-like processes on vesical surface, right cornutus of a slender fold furnished with numerous minute spinules.

The systematic position of argyrospilata: The genus *Fabriciana* is hitherto represented by four species, namely *adippe* and *niobe* (including *elisa*) both widely spread over the Palaearctic Region, *nerippe* from China to Japan, and *kamala* from the Western Himalayas to the Hindu Kush, and it is characterized in the male genitalia by the following points.

1. Gnathal remnant present and small.
2. Uncus usually with a dorsal crest.
3. Vannus well developed.
4. Valva having spinulate crista, cylindrical (not clavate or lamellate) ampulla, strong sacculus-process, basal process of harpe, and usually roundly produced distal margin of harpe, but lacking in preapical and apical processes of harpe.
5. Phallus without well-developed coecum penis.
6. Juxta with its arms strongly sclerotized and slender, produced into an elongate, cylindrical process with clavate or dentate tip.

Among these characters, the specialization of juxta is a unique feature attained only in this genus and it is the most distinctive apomorphous character of this genus. All of these generic characters of *Fabriciana* are well preserved in *argyrospilata*. On the other hand, the specialization of this organ in this species is very slight, i.e. the short ampulla and the expanded distal margin of the harpe, and such modification are safely regarded as the species character within a genus in the subfamily Argynninae. As already stated above, the basic pattern of the wing markings is quite identical with that of the known species of *Fabriciana*. Based on these data, this species undoubtedly belongs to *Fabriciana*.

We consider the intrageneric position of *argyrospilata* as follows. In the genus *Fabriciana*, *kamala* seems to be much isolated from other species and it occupies a rather primitive phylogenetic position. The uncus of the male genitalia in this species does not differentiated in the crest-formation and other genitalic characters all retain the generalized condition. On the other hand, the androconial streaks are so strongly developed that the some basal veins (veins 2 & 3) of forewings are much shifted proximally in their bases. The other three species, *adippe*, *niobe* and *nerippe*, compose a monophyletic group which is characterized by the apomorphous condition of the male uncus forming a prominent dorsal crest. In this group *adippe* and *niobe* are most closely related to each other in every character. These two are closely related sympatric sister-species with numerous geographical races being corresponded with their wide distributional ranges. *Nerippe* is advanced in the specialized ampulla with a

proximally directing accessory process and the furcate saccular process of the male valvae, and seems to be specialized from the *niobe*-like ancestor in the Eastern Asia. *Argyrospilata* has no close relationship with *kamala*, and undoubtedly belongs to the *niobe*-group characterized by the uncal crest. The specializations of this species are seen in the shortened ampulla and rounded distal margin of harpe of the male valvae, and peculiar wing markings. These specializations seem to be attained along a lineage quite different from *nerippe*. The *argyrospilata* occupies a rather specialized phylogenetic position descended from the *niobe*-like ancestor having no direct relation with *nerippe*.

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