

COMMENTS ON FORMS OF *GONEPTERYX ASPASIA* (PIERIDAE)
DESCRIBED BY SHU-ITI MURAYAMA

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The initial reason for writing this paper was to attempt a revision of the the forms of *Gonepteryx* described by Prof. Dr. Shû-iti Murayama of Ibaraki, Osaka-fu, Japan, with the aid of ultraviolet photography in order to determine their real position within the system for the genus, worked out in a recent monograph (Nekrutenko, 1968). In addition to this, it will be useful to express here some taxonomic suggestions, which I hope will show the correct position of the forms considered.

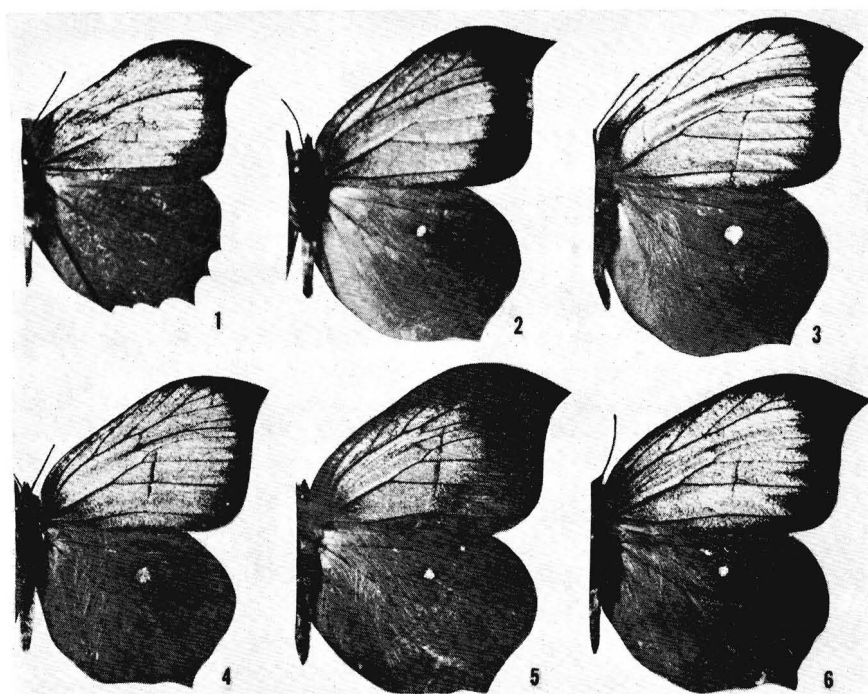
I quote Murayama (1964):

“... Bisher wurde *aspasia* aus dem Amur- und Ussuri-Gebiet als Synonym von *mahaguru* Gistel gedeutet. *Aspasia* ist jedoch oberseits beim ♂ am Vorderflügel, den heller gelben Saumbereich ausgenommen, tiefer gelb, ist grösser, und hat die Hinterflügel weniger tief gezähnt. Daraus ergibt sich, dass *aspasia* sicherlich nur eine gute Subspezies von *mahaguru* sein kann.”

I offer some comments concerning this combination:

(1) *Gonepteryx mahaguru aspasia* of Murayama (1964) is not a new combination. Hemming in 1935 suggested that *aspasia* is a subspecies of *mahaguru*, taking as type locality “montagnes de Chingan jusqu’a Khokhtsir”.

(2) The question of the relationship between the names *aspasia* Ménières and *mahaguru* Gistel is worthy of more detailed discussion. The source of confusion here lies in the fact that, as was pointed out by Hemming (1935), Gistel’s paper (1857) was unknown to his contemporaries and was overlooked by his successors, so that the names he proposed have never been brought into use. Search of the literature shows that there are four principal viewpoints on this subject: (i) *mahaguru* and *aspasia* are two names for the same species, and because the former is older than the latter (1857 versus 1859), *aspasia* is to be rejected; (ii) *aspasia* is a subspecies of *mahaguru*, which is in its turn, a senior synonym of *zaneka* Moore, 1865 (Talbot, 1935); (iii) *mahaguru* is a subspecies of *aspasia* (Hemming, 1935, et al.); (iv) *mahaguru* and *aspasia* are distinct species (Nekrutenko, 1968). The synonymy of *mahaguru* to *zaneka* is perfectly clear. Comparison of the texts of Gistel’s (1857) and Moore’s (1865) de-



Figs. 1-6. Hidden wing-pattern of males of *Gonepteryx* spp. 1, *G. mahaguru* Gistel, Kulu (Coll. Zool. Inst., Leningrad); 2, *G. aspasia aspasia* Mén. Amur, Radde, 22.VII.1912. G. Kotshubey leg. (Coll. Zool. Mus. Kiev University); 3, *G. a. nipponica* Vty., Mt. Daisen, Prof. Tottori, Japan, 9.VII.1959 (Coll. Murayama); 4, *G. a. iwateana* (Murayama), Paratype. Jôjôji near Morioka, Pref. Iwate, Japan, 30.VII.1954 (Coll. Murayama); 5, *G. a. coreensis* (Murayama), holotype, Kwangnung near Seoul, Central Korea, 12.IX.1959 (Coll. Murayama); 6, *G. a. kansuensis* (Murayama), Paratype, Kansu mer., Hsio Nganshan, 3000 m, Juli (Coll. Murayama).

scriptions show that they are both based on the same species from Himalaya, and that both are distinct from the form described by Ménétriès (1859).

G. aspasia and *mahaguru* are two separate species, and, thus all forms described by Murayama under the specific name of *mahaguru*, really belong to *aspasia*. Let us now consider their hidden wing-pattern (for method and terminology see Nekrutenko, 1964, 1968).

Gonepteryx aspasia iwateana (Murayama, 1964)

Original description. "Kleiner als ssp. *nipponica* Verity. Beim ♂ ist oberseits der gelbe Farbton satter, und zieht, den Saumbereich ausgenom-

men, mehr ins Orange. Der Apex des ♀ springt etwas schwächer vor, der rote Fleck am Zellschluss ist klein."

Hidden wing-pattern (Fig. 4). *Zona opaca marginalis* of the forewing narrow, far narrower than in other subspecies of *aspasia*. *Macula lucida centralis* on the hind wing is not bright, but rather grey, and sharply limited. This subspecies, with its orange forewing color which is well correlated with a narrowing of the dark elements of the hidden wing pattern, is unique within the *aspasia* group.

Occurrence. The subspecies was described from northern Japan (Praef. Iwate). No additional distributional data are available.

Gonepteryx aspasia coreensis (Murayama, 1965)

Remarks. Murayama suggested (personal communication) that this subspecies is a synonym of *aspasia f. pultaina* Doi (1929). Such a suggestion seems questionable for the following reasons: (1) *G. pultaina* was described as a spring form of *aspasia*, and specimens on which Murayama based his description were collected from April to September. (2) The main diagnostic character to distinguish *pultaina* are clearly visible fuscous spots on the underside of both wings. The latter character raises the question as to whether *pultaina* is a senior synonym of *f. guttifera* Mell (1943) which has very similar spots. Similar "guttiferous" aberrations were also found among normal specimens of *aspasia nipponica* by Murayama and of *G. rhamnii* by the author. The presence of these spots may be explained, I think, by effect of environmental conditions on the overwintering insect. Thus the presence of the spots does not relate to the taxonomic position of a given specimen. Moreover, the presence of the spots has not been pointed out in Murayama's description (see below), nor by this author when discussing the holotype of *coreensis*.

Original description. ". . . Ground colour of upperside in male more light yellow than (in) *nipponica* Verity, hindwing paler yellow than in forewing. The subspecies *aspasia* from Ussuri and North Korea is fairly smaller."

Hidden wing-pattern (Fig. 5). *Zona opaca marginalis* wide, wider than in all other subspecies, occupying more than half of wing surface. *Macula lucida centralis* of hindwing small, sharply limited, bright, clearly recognizable.

Occurrence. Central Korea, probably down to the southern shore of the Korean peninsula.

Gonepteryx aspasia kansuensis (Murayama, 1965)

Original description. "The Chinese form, collected in Hsio, Nganshan, Kansu is very allied to *coreensis*, but yellow ground colour of upperside in

male somewhat deeper, the projecting angle of hindwing more distinctly sharp and outer margin of that more dentate.”

Hidden wing-pattern (Fig. 6). *Zona opaca marginalis* of forewing somewhat wider than in *niphonica*, deeply penetrating into *area lucida superior* between veins. *Macula lucida centralis* of hind wing small, of nearly same size as in *coreensis*.

Occurrence. Northern slope of the Kwen-lung mountain system, on the border with Gobi desert.

Discussion and Conclusions

(1) All forms described by Murayama are valid subspecies, and the study with ultraviolet rays supports their subspecific status within the species *aspasia* Mén.

(2) In the present state of our knowledge of variation in *G. aspasia*, *ivateana* and *coreensis* appear to be extreme forms in an array of subspecies with different degree of development of single elements of the hidden wing-pattern.

(3) As was established for other than species of the *aspasia*-group of *Gonepteryx s. str.*, orange wing coloration is strictly correlated with reduction of the dark elements in the hidden wing-pattern. Such forms occur under warm and wet climatic conditions. The forms considered show a similar interrelation between visible wing color and hidden pattern in representatives of *aspasia*-group, but the environmental conditions on which these characters depend are reversed from those for the *ramni*-group. *G. aspasia coreensis* has far broader dark zones in its hidden wing-pattern than *aspasia aspasia* from the far-eastern U.S.S.R. (Fig. 2); the hidden wing-pattern of *aspasia ivateana* from northern Japan is decidedly brighter than that of *aspasia niphonica* inhabiting the southern parts of Japan. This puzzling phenomenon cannot yet be explained, because only extensive material will provide a solution to the problem of direction of evolutionary changes, and perhaps also provide a pattern of geographic variation within the group.

(4) The slight hind wing dentition in *aspasia kansuensis* may be evidence of a close relationship between *aspasia* and *mahaguru* (Fig. 1), but once again the question arises as to which of these two species is the more primitive.

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NEW SPHINX MOTH RECORD FOR THE UNITED STATES

A high school student, Mr. Thane Hodson of Ottawa, Kansas found a huge moth seated on his back porch light on August 14, 1969. Mr. William D. Field, curator of insects at the United States National Museum, identified the moth as a male specimen of *Protoparce albiplaga* (Walker). The moth was evidently a windborne example from the neotropics. Many other tropical species such as *Pholus labruscae*, *P. vitis*, *Erynnis ello*, *E. alope*, *Erebus odora*, and *Thysania zenobia* (see season summaries) have all been taken at Ottawa during previous summers. However, this is the first time that *Protoparce albiplaga* has been taken in the United States. It is a Brazilian species normally occurring no farther north than southern Mexico. The specimen, in nearly perfect condition, has been deposited in the United States National Museum.

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