

On some Hedge-Blues from North-West India.

(*Lycaenidae Australasiae* IV),

by

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A collection of only nine Blues, caught by Dr. G. VAN DER SLEEN, Harlem, Holland, and kindly presented to me by the Museum of "Natura Artis Magistra", Amsterdam, contained some specimens of what has hitherto been called *Celastrina huegeli* (MOORE). There were one female and two male specimens, one of which was darker than the other one. My new method of discriminating the *Lycaenidae* by means of a microscopical investigation of their scale-structure proved, what the naked eye already tended to believe: namely that the darker blue and lighter blue males were not the same species.

A fine series collected at Simla by Col. W. H. EVANS, Quetta, and very kindly presented to me two years ago, contained both the lighter and darker species, but the difference in these fresh specimens is so intangible, that I had not paid attention to it before. Besides, Col. EVANS had labelled them *Lycaenopsis huegeli* altogether. ¹⁾

¹⁾ In spite of a thorough search of the literature I could discover no name for the lighter male, and was about to introduce a new one to science when I had the good luck to send my proposed type specimens to the British Museum in London, in accordance with the wish expressed by Colonel Evans that any types that might be made from his material should be deposited there. On receipt of them Capt. H. D. Riley kindly informed me that in his opinion my new species was identical with *Celastrina gigas* recently described by Capt. A. J. Hemming (Proc. Ent. Soc. London, III, 1929) from a long series in the British Museum that had in the main been caught by Colonel H. D. Peile at Musoorie, but

***Celastrina gigas* (HEMMING) 1929.**

Description. ♂. Light caerulean blue, with a very narrow black border, and some traces of white lunules on the border of the hindwings. Otherwise like *C. huegeli* (MOORE).

Blue wing scales with a convex upper border, mostly with four or five blunt teeth.

Length of forewing averaging 19 mm., — looking somewhat more elongated than with *huegeli*.

♀. Differs from *huegeli*-♀ in having less white on the upper surface, the costal region of hindwing being grey suffused all over.

Blue scales broad, mostly with four to six teeth.

Length of fore wing averaging 17.5 mm.

My original type ♂, and Allotype (now degraded to ordinary specimens) from Simla (EVANS), 8-1925 and 4-1922, have been sent to the British Museum, 2 males (one from Simla, the other one from Kosgarh, 2300 M., 12.VI.1926, leg. VAN DER SLEEN) and four females (all from Simla, leg. EVANS) in my private collection, and in coll. N. A M. Amsterdam.

There are three *Celastrina* species of the *argiolus*-group in Sikkim, the smallest of which is *argiolus* itself. This has to bear the name *C. argiolus kollari* (WESTW.) and looks like a somewhat dull coloured small European Holly Blue. The female has a much restricted blue area on the forewings.

KOLLAR described it in 1848 as *Lycaena coelestina* [preocc. by *L. coelestina* EVERSMAAN (1843)] and bestowed the name *Lycaena argiolus* L. on the larger species; whether this was

also came from other localities in North-west India. Some of the type material that he sent me at the same time finally convinced me that the holotype ♂ of *gigas* and my new species were the same. In the meantime my paper had already been sent to the printer; fortunately it was not too late to withdraw the suggested new name and to convert my paper into a supplement to that by Capt. Hemming. This author, however, does not seem to have known of my paper on the so-called *Lycaenopsis* of Java, which deals at some length with the Indian *Celastrina* and how to distinguish them. Consequently both his investigations and his conclusions are scarcely coincident with mine, and, therefore, especially in view of the intricacy of the subject, I have thought it advisable to allow my description of his species to stand and to compare it afresh with its nearest relatives, in the confident belief that any new light I may shed upon the problem will be useful.

the later *huegeli* or *gigas*, or both, cannot be decided without seeing KOLLAR's material. If there were many specimens the ultimate supposition has best chances.

Further synonymy shows much confusion. I therefore put it into the following scheme together:

	<i>argiolus</i> L.	<i>huegeli</i> MOORE	<i>gigas</i> HEMMING.
KOLLAR 1848 . .	<i>Lycaena coelestina</i> (praeocc.)	<i>Lycaena argiolus</i> L.	
WESTWOOD 1852 .	id. <i>kollari</i>		
KIRBY 1871 . . .	240. <i>Cupido argiolus</i> L. var. a. <i>Kollari</i> WESTW.	omitted	
	253. <i>C. Kasmira</i> MOORE		
MOORE 1865 . . .	<i>Polyommatus kasmira</i>		
» 1874 . . .	id. id.		
» 1882 . . .	<i>Cyaniris coelestina</i> KOLL.	<i>C. huegeli</i>	
BUTLER 1886 . .	id. <i>kollari</i> WESTW.		
» 1888 . . .	<i>Cyaniris kollari</i> WESTW.	<i>C. ? kasmira</i> MOORE	<i>C. ? huegeli</i> MOORE
» 1900 . . .	id. <i>coelestina</i> KOLL.	<i>C. huegeli</i> MOORE	
DE NICÉVILLE 1890	<i>Cyaniris coelestina</i> KOLL.	<i>C. huegeli</i> MOORE	
MACKINNON & DE NIC. 1898 . . .	id. id.	id. id.	
LESLIE & EVANS 1903.	id. id.	id. id.	
BINGHAM 1907 . .	id. id.	id. id.	
CHAPMAN 1909 . .	<i>Lycaenopsis argiolus</i> L. var. <i>coelestina</i> KOLL.	<i>L. argiolus</i> L. var. <i>huegeli</i> MOORE	<i>L. argiolus</i> L. (pale var.)
SEITZ (Pal.) 1909 .	<i>Cyaniris argiolus</i> L. f. <i>coelestina</i> KOLL. (? seasonal form)	<i>C. argiolus</i> L. f. <i>huegeli</i> MOORE	
FRUHSTORFER 1909	<i>C. coelestina coelestina</i> KOLL. + <i>C. c. kasmira</i> MOORE	<i>C. singalensis huegeli</i> MOORE	
» 1916	<i>Lycaenopsis argiolus</i> <i>coelestina</i> KOLL. f. <i>coelestina</i> KOLL.	<i>L. argiolus coelestina</i> KOLL. f. <i>huegeli</i> MOORE (probably summer generation of the mts.)	
FRUHST. (in SEITZ' Ex. Ind.) 1922	id. id. and	id. id.	
SWINHAE (in MOORE's Lep. Ind.) 1910	<i>L. argiolus trita</i> SWINH. }	<i>L. huegeli</i> MOORE	<i>L. huegeli</i> MOORE
» 1919.	<i>Lycaenopsis coelestina</i> KOLL.	(Wet season ♂ + dry season ♀)	(Dry season ♂ + wet season ♀)
EVANS 1925 . . .	<i>Lycaenopsis trita</i>	<i>Lycaenopsis huegeli huegeli</i> MOORE	
» 1927 . . .	<i>Lycaenopsis argiolus</i> <i>coelestina</i> KOLL. id. id. (= <i>kollari</i> WESTW. = <i>kasmira</i> MOORE = <i>trita</i> SWINH.)	id. id.	
HEMMING 1929 . .	<i>Lycaenopsis kollari</i> WESTW.	<i>L. huegeli huegeli</i> MOORE	<i>L. gigas</i>
TOXOPEUS 1926 .	<i>Celastrina argiolus</i> <i>coelestina</i> KOLL.	<i>Celastrina huegeli</i> MOORE	
» 1927 . . .	<i>C. argiolus kollari</i> WESTW.		<i>C. huegeli</i> MOORE
(at the moment.)	id. id.	<i>C. huegeli</i> MOORE	<i>C. gigas</i> HEMMING.

I have been long in doubt whether I could use SWINHOE's recent name *trita* for my species or not. It is certainly *not* an ordinary *argiolus* as FRUHSTORFER (in SEITZ) and EVANS (Ident. Ind. Butt. 1927) proposed, because the wing-expanse given, $1\frac{3}{10}$ inch, is not nearly reached by Indian *argiolus*. It should have a "creamy underside", but none of my examples of either *huegeli* or *gigas* show anything of the kind: they have a whiteish blue underside, even somewhat dirty greyish. The comparison to *ladonides* DE L'ORZA from Japan (SWINHOE) has no value, for FRUHSTORFER distinguishes three forms of this Japanese insect, one of which is like *levetti* BTL. from Corea, one like *huegeli* MOORE and one (*kobei* TUTT) like *oreas* LEECH from China. I had at last decided in favour of a *huegeli* form, considering that "caerulean-blue" is rather dark and that, had SWINHOE wanted to redescribe his former "dry season male" of *huegeli* ¹⁾, he would have alluded to the excellent picture in MOORE's Lep. Ind. (Pl. 623, fig. 3c).

Capt. HEMMING however declared *trita* a *kollari* after having examined the types, a statement confirmed by Capt. RILEY of the British Museum.

The male of *gigas* looks more transparant: the marginal spots of the underside of the hind wings shine through: there is a very faint trace of white lunules, which already drew CHAPMAN's attention. The costal region of the hind wings is suffused with grey, and there is an ill-defined grey marginal spot in interspace 6. The gloss of both wings is somewhat that of ground glass (in fresh specimens). The underside is slightly more greyish than in the *huegeli* male. The *gigas* male is even in the freshest specimens *not* darker blue than the same sex of *argiolus kollari* (MOORE stated of *huegeli* that it *is* darker). *C. gigas* has on its upper-side broad blue scales, which show four or five incisions as a rule.

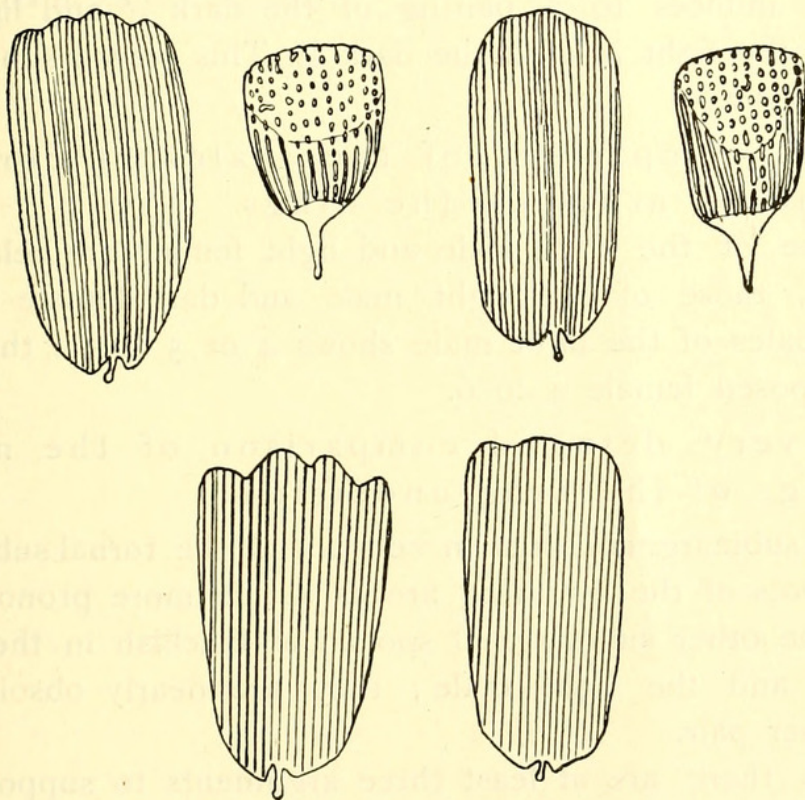
The male of *huegeli* shows little transparency, so that the border of the hind wings is plain blue. There is some

¹⁾ I have so-called dry- and wet-season ♀♀ from the same locality (Simla) and the same month (April 1922); they represent the two species in question.

whitish suffusion at the apex of these wings in the costal region. The spot in interspace 6 is more linear, or absent.

The gloss is silky, but less shining than in *oreana* SWINH (1910) and less plumbeous than in *oreas* LEECH (1892). *C. huegeli* has nearly the same shape of blue scales as *C. oreana* SWINH., which I have figured in Tijdschr. v. Ent. 1927, p. 245, text-fig. 2.

The female of *gigas* is as a rule more purple than that of *huegeli*, it has a broader border on its forewings, and the costal region together with the greater part of interspace 6 of the hindwings is filled up with clear grey. The marginal spots of these wings are encircled with sordid bluish light grey, whereas the female of *huegeli* bears a white apical marginal streak, and cell 6 is for the greater part filled up with light blue-grey: its marginal spots are em-



Left side: *Celastrina gigas* HEMMING, ♂ blue-scale, androcone and ♀ blue-scale. — Right side: *C. huegeli* MOORE, the same.

bedded in greyish white to pure white. The disc of both wings (*huegeli*) is as a rule strewn with clear white scales between the veins. The scales of *gigas*-♀ (taken from the lower outer end of the cell of the fore wing) are broad

and have an irregular indented outer border, and are rather different from the narrow scales of the *huegeli*-♀. (See figs.).

I have united the respective sexes by the following methods:

1°. by measuring the wing lengths.

These are for the light ♀♀ (right fore wing): 1.9; 1.8; 2.0 cm.

Average: 1.9 cm.

The same for the darker ♀♀: 1.8; 1.6 cm.

Average: 1.75 cm.

Idem for the light ♀♀: 1.6; 1.6; 1.5 cm.

Average: 1.57 cm.

Idem for the dark ♀♀: 1.8; 1.7; 1.75; 1.75; 1.7 cm.

Average: 1.74 cm.

This induces to a pairing of the dark ♂ and light ♀, and of the light ♂ with the dark ♀. This view is supported strongly by:

2°. the comparison of the scales of corresponding areas on the wings.

Those of the dark male and light female are relatively narrow, those of the light male and dark female broad. The scales of the light male shows 4 or 5 teeth, those of its supposed female 4 to 6.

3°. a very detailed comparison of the markings of the wing-underside.

The submarginal spots in cell 2 and the tornal submarginal spots of the hindwing are as a rule more pronounced than the other submarginal spots and blackish in the dark female and the light male; they are nearly obsolete in the other pair.

Thus there are at least three arguments to support my arrangement of the sexes of those two species. My guide has been the suggestion that the sexes of the same species in most cases display a certain parallelism in the development of their structural and pattern peculiarities, in this case a more or less elongated wing, a broader or narrower scale and a more or less vivid colouring of the marginal

spots. In a long series perhaps some of these points will prove less sharp (among my dark females there is one example with nearly as much white as is normally found in the light female), but on the other hand averages will be better founded. Control by breeding experiments is much desired, but the capture of a single couple *in coitu* would give a welcome clue. ¹⁾

¹⁾ The ♀ which I described from Simla is a much lighter insect than that which Capt. HEMMING diagnosed from Mussourie, according to the small series which Capt. RILEY sent to me. This may be merely a question of small local variation (sub-form) or of specific value. Among the males received there was one from Mussourie, 6000', which Capt. RILEY marked with: "small *gigas*, or aberrant *huegeli*?", and which proved to be *oreoides* EVANS. This differs from the other Indian species by its dull opaque greyish blue wing-surface without submarginal spots, and from all but *oreana* SWINHOE by its truncate scales. I think Capt. HEMMING was not right to coordinate *oreana*, *oreas* and *oreoides* as subspecies of *huegeli* MOORE.



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