

# INDIVIDUAL VARIATION IN THE LIME BLUE BUTTERFLY *CHILADES LAJUS* (INSECTA: LEPIDOPTERA: LYCAENIDAE)

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## ABSTRACT

Distinctive markings on the wings of *Chilades lajus* quoted by several authors are shown to be unreliable.

## INTRODUCTION

Stoll (1780) described the taxon *Papilio lajus* based on specimens from Tranquebar on the Coromandel coast of India. He described the species as “shimmering violet blue, turning to almost rose colour near the margin, the antennae with alternate black and white rings as in *Argus*.”

Fabricius (1793) described it as *Papilio lajus*, “habitat in East Indies. *Museum. Dom. Lund.* Small. Wings plain fuscous. Disc bluish black, brown grey and white, brown spots.”

Doubleday (1849) listed “*laius*” in the British Museum, placing it as *Lycaena laius*. P. La. *Cram.* t.319, f. D.E. Hesp. Caius, *Fab. Ent. Syst.* iii.i.296, n. 126. Poly. Ca. *Godt. Enc. M.* a. N. India.

Westwood (1852) quoted Doubleday’s (1849) description.

Butler (1869) treated Fabricius’ (1793) *Papilio lajus* as *Hesperia cajus* and

described it as “plain black; disc cerulean; below grey; variable spots; black ocelli; habitat in East India. Horsfield & Moore (1857) listed references of “*lajus*” (*Papillio laius*, Cramer; *Lycaena laius*, Doubleday; *Hesperia caius*, Fabricius; *Polyommatus caius*, Godart).

Moore (1865) described *Polyommatus varunana* in the following terms: *Male*. Upperside dull purple-blue; exterior margins with a slight pale brown border; hind wing with two or three ill-defined blackish, pale-bordered, marginal spots from anal angle. Underside grey; fore wing with a brown, white-bordered spot closing the cell, a transverse row of blackish, white-bordered discal spots, and a double row of marginal white-bordered lunules : hind wing with three transverse sub-basal jet-black, white-bordered, round spots, and a fourth on the middle of the costa; a pale-brown streak closing the cell, a discal series of dark-brown spots, a submarginal row of brown lunules, and a marginal series of blackish triangular spots, all bordered with white. Palpi and legs above black, beneath white.

*Female*. Upperside brown; fore wing with a lower basal blue patch, and a narrow black spot closing the cell; hind wing with the black white-bordered marginal spots

more defined. Expanse  $1\frac{2}{12}$  inch. Bengal.

In Coll. A.E. Russell.

Moore (1881) erected the genus *Chilades* with three species viz., *lajus*, *varunana* and *putli*. He described *Type*, *C. Laius* as, "Forewing elongated, triangular in the female; costal vein extending to nearly half length of the margin; first subcostal branch free costal but running along its end, emitted beyond one-half before end of the cell, second at one-third, the third at one-sixth, fourth at one half from third and terminating before the apex, fifth from end of the cell; discocellulars slightly oblique, nearly straight, radial from their middle; cell long, extending to more than half the wing; middle median emitted at one-sixth before end of the cell, lower beyond one-half before the end; submedian straight: hindwing oval; exterior margin very convex; no tail; costal vein arched at base, extending to apex; first subcostal emitted at one-third before the end of the cell; upper discocellular oblique, lower erect, radial from their middle; cell short, broad; two upper median branches emitted from end of the cell, lower at one-half before the end; submedian and internal veins straight. Body small, short palpi slender, porrect, second joint long, projecting two-thirds beyond the head, attenuated at its tip, clothed with long adpressed scales, third joint very long, naked; legs slender; antennae with a stout grooved club".

L. de Nicéville (1890) described the Wet and Dry Season Form of *Chilades laius*. According to him, **Wet Season Form**- "MALE- UPPERSIDE, *both wings* dull purple-blue, exterior margins with a slight pale brown border. *Hindwing* with two or three ill-defined blackish pale-bordered marginal spots from anal angle. UNDERSIDE, *both wings* grey. *Forewing* with a brown white-bordered spot closing the cell, a transverse row of blackish white-bordered discal spots, and a double

row of marginal white-bordered lunules. *Hindwing* with three [four] transverse sub-basal jet-black white-bordered round spots and a fourth [fifth spot] on the middle of the costa; a pale brown streak closing the cell, a discal series of dark brown spots, a sub-marginal row of brown lunules, and a marginal series of blackish triangular spots, all bordered with white. *Palpi* and *legs* above black beneath white. FEMALE. UPPERSIDE, *both wings* brown. *Forewing* with a lower basal blue patch, and a narrow black spot closing the cell. *Hindwing* with the black white-bordered marginal spots more defined, "a basal blue patch. UNDERSIDE, *both wings* as in the male. (*C. varunana*, Moore, 1. e. in *Proc. Zool. Soc. Lond.*, 1865).

He described **Dry Season Form** as, MALE. UPPERSIDE, *both wings* as in the male of the wet-season form. UNDERSIDE, *both wings* are in the wet-season form, but the hindwing with the anal third bearing a blackish nebulous patch. FEMALE. UPPERSIDE, *both wings* bright purple-olive. *Forewing* pale on apical and exterior margins. [*Hindwing* with] a row of small rounded darker brown marginal spots. UNDERSIDE *both wings* white, at the base greyish white. *Forewing* with a dark brown white-bordered spot closing the cell, and a transverse discal series beyond, two marginal rows of dusky lunules. *Hindwing* with a large dark brown patch on the lower exterior quarter of the wing, a marginal and an irregular discal series of dark brown white-bordered spots, crossing the brown patch bordered with darker brown, a double row of marginal dusky lunules" (*C. kandura*, Moore, 1. e. in *Proc. Zool. Soc. Lond.*, 1865). He also quoted "No author except Mr. W. Doherty has placed the two very distinct forms which occur in the rains and dry season respectively under one specific name. Should it be desirable to separate them, *lajus* (*lajus*), Cramer, (*cajus*), Fabricius and Godart, (*kandura*) Moore and

(*brahmina*), Felder, represent the dry season form, with the large patch on the underside of the hindwing in both sexes; while *varunana*, Moore represents the rainy-season form which lacks the black patch. Though these extremes are well-marked, I find that every gradation exists between them in the long series of specimens now before me. In every way the species is very variable; not only in the black patch both present and absent, but the other markings are sometimes very prominent at others very obscure. The female on the upperside is sometimes almost entirely fuscous, just sprinkled with blue scales at the base of the wings, sometimes with almost as much blue as in the male, but of a more metallic sheen”.

Bingham (1907) described *Chilades laius* in the following terms: *Wet-season brood*. ♂. *Upperside*: bluish purple. Forewing: base and basal half of costa flushed with pale blue ; costa and termen edged by a slender dark brownish-black even line, beyond which along the termen the cilia are brown at base, white outwardly. Hind wing : costa somewhat broadly dusky black ; a slender black conspicuous anticiliary line, beyond which the cilia are white traversed medially by a brown line ; dorsum broadly pale brown, two subterminal pale-bordered black spots in interspace 1, and one similar spot in interspace 2, often obsolescent and barely indicated. *Underside*: grey. Forewing: a transverse broad lunule on the discocellulars and a transverse discal series of six spots edged with white; the posterior four spots of the discal series elongate and each obliquely placed, the anterior two round and curved inwards ; a subterminal series of transverse elongate spots with an inner series of lunules dusky brown, both series edged inwardly and outwardly with white; finally, an anticiliary slender black line. Cilia white, medially traversed by a dark brown line. Hindwing: the following jet-black spots slenderly encircled with

white:- a transverse subbasal series of four and a subcostal spot somewhat larger than the others in the middle of interspace 7; below the latter a catenulated line of slenderly white-edged dusky brown spots, including the lunular spot on the discocellulars, crosses the wing, and beyond these opposite apex of the cell are three similar discal spots, the middle one elongate; the terminal markings consist of an inner continuous subterminal series of dusky lunules, bordered inwardly and outwardly with white, an outer subterminal series of inwardly conical dusky-brown spots, and a slender anticiliary black line. The posterior two spots of the outer line of subterminal markings are also black. Cilia white. Antennae black, the shafts obscurely ringed with white; head, thorax and abdomen brown, the head, thorax and base of the abdomen with a little blue scaling; beneath: the palpi, thorax and abdomen white. — ♀. *Upperside*: dark brown. Fore and hind wings from their bases outwards to a varying extent shot with bright iridescent blue, this colour not extended on either wing to the costa, termen or dorsum. Hindwing: in addition a curved postdiscal series of whitish lunules very often obsolescent, in some specimens entirely wanting; followed by a subterminal series of black, narrowly white-encircled spots that are often obscure and in some specimens do not reach the apex. Anticiliary black lines and cilia as in the ♂. *Underside*: precisely similar to that of the ♂. Antennae, head, thorax and abdomen as in the ♂.

*Dry-season brood*. ♂ ♀. Closely resemble specimens of the wet-season brood, but can always be distinguished by the somewhat paler ground colour of the upperside, while on the underside of the both the sexes bear a large nebulous brown patch on the hindwing posteriorly. Sometimes the ground colour on the underside is much paler, almost white, especially in the ♀.

Fruhstofer (1916) mentioned location records of *Chilades lajus* and treated *varunana* as the WSF of *lajus* on the basis of male genitalia of *varunana* and *lajus*, which are identical.

Evans (1932) described *C. lajus* in the following terms: Above blue. Below pale brown with large spots arranged as usual; un<sup>f</sup> with an additional costal spot in the angle formed by the junction of v<sub>9</sub> with v<sub>7</sub>, always a spot in 1b; un<sup>h</sup> always spot base 1c and the discal spot in 6 shifted in. In DSF un<sup>h</sup> there is a large clouded discal patch. Androconia 9 ribbed.

α. Smaller. ♂ above dark border linear. ♀ WSF dark brown, bases metallic blue; DSF rather pale blue with a broad border.

\**laius laius*, Cr. (26-30). The Lime Blue. Ceylon, India, N. Burma— Moulmein. C. (= *kandura*, *varunana*, M.).

β. Larger. ♂ above dark border diffused inwards and un<sup>h</sup> with prominent marginal black spots. ♀ paler blue with broad borders. Below markings much darker and more pronounced; seasonal difference not nearly so marked.

*laius tavoyana*, Evans. (30- 35). Tavoy. Rare.

Wynter-Blyth (1957) described *Chilades laius* in the following terms: 26-30 mm. ♂: above, dull purple-blue; threadlike dark border. ♀: WSF dark brown; bases metallic blue. DSF rather pale blue, broad brown borders. ♂♀: below, pale brown or grey with more or less the usual arrangement of spots. UNF with additional costal spot in angle formed by junction of v<sub>7</sub> and v<sub>9</sub>. UNH discal spot in 6 out of line. DSF with clouded dark discal patch UNH.

Kehimkar (2016) described *Chilades lajus* in the following terms: Tailless. One pair

of spots on each wing, joined together at angles. UP male purplish blue, thin black border; female blackish brown, metallic blue wing bases. DSF: Markings vary, UN brownish.

Bhakare & Ogale (2018) described *Chilades lajus* in the following terms: 26-30 mm. Size variable. Tailless. Underside pale grey to brown with discal row of dark spots, spots, UNH brown in colour. **All spots white edged.** UNF additional small costal spot in angle formed by junction of vein 9 with vein 7, always a spot in 1b. UNH discal spot in space 4 elongated and spot in space 6 shifted in. Seasonal forms differ. Dry season form with UNH brown diffuse discal patch. **Male:** Upperside entirely blue with thread like dark border. **Female:** Upperside pale blue [dry season form] and metallic blue [wet season form], with broad dark brown border UPF. UPH blue more extensive with dark costa and a row of sub-marginal black spots.

## MATERIAL EXAMINED

On 20.ix.2021 and 27.x.2021, the authors collected 3 specimens of *Chilades lajus* from Bhelona, (26°52'08"N; 81°32'10"E) Ram Nagar and two specimens from village Malinpur (26°47'11"N, 81°32'08"E), near Ram Sanehi Ghat, both in Barabanki district, Uttar Pradesh. The specimens are deposited in the collection of the Butterfly Research Centre, Bhimtal, Uttarakhand.

## DISCUSSION

In three of the five specimens we found that the distinctive feature of *C. lajus* according to Evans (1932), Wynter-Blyth (1957) and Bhakare & Ogale (2018), namely the forewing “costal spot in angle formed by junction of vein 9 with vein 7” was not evident. The additional small costal spot of UNF on the junction of vein 9 with vein 7 was present in two female

specimens but only on one forewing, left in one specimen and right in the other, and not on the other forewing (Figures 1 and 3). In a male, the distinctive costal spot is not present on either forewing (Figure 2). A second distinctive feature, which was mentioned by Kehimkar (2016), that is, “one pair of spots on each wing, joined together at angles” was also not found to be valid after examination of the above mentioned specimens (figures 1 & 2).

It will be noted that the feature of the costal spot was introduced by Evans (1932) but not by earlier authors, who usually gave very vague descriptions of the species. It was quoted by Wynter-Blyth (1957) and Bhakare & Ogale (2018). Although Evans (1932) examined many collections while compiling his work, especially the collection of the Natural History Museum, London which undeniably has the most extensive collection of Indian and Asian butterflies, the variants illustrated in this paper appear to have been missing; neither Wynter-Blyth (1957), Kehimkar (2016) nor Bhakare & Ogale (2018) had access to extensive collections and long series of the species, which would show individual variation.

Therefore, we conclude that the above mentioned features proposed as distinctive for *C. lajus* are not consistent and therefore not reliable but are individually variable from specimen to specimen. Although they are distinctive when present, they are not always present.

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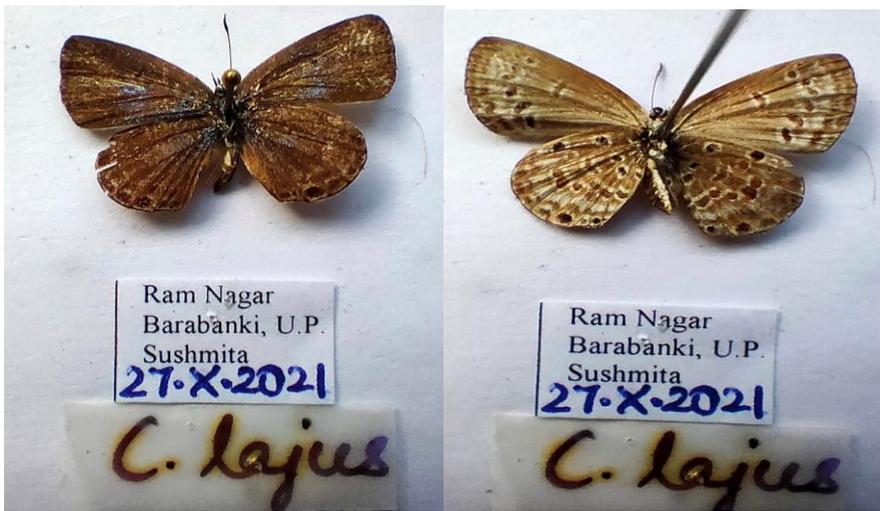


Figure 1: with distinctive costal spot missing on right underside forewing of the butterfly but present on the left forewing of the butterfly and postmedial spots not joined to form an angle.



Figure 2: male with distinctive costal post missing on both forewings.



Figure 3: female with distinctive costal spot missing on the right forewing of the butterfly but present on the left forewing of the butterfly.