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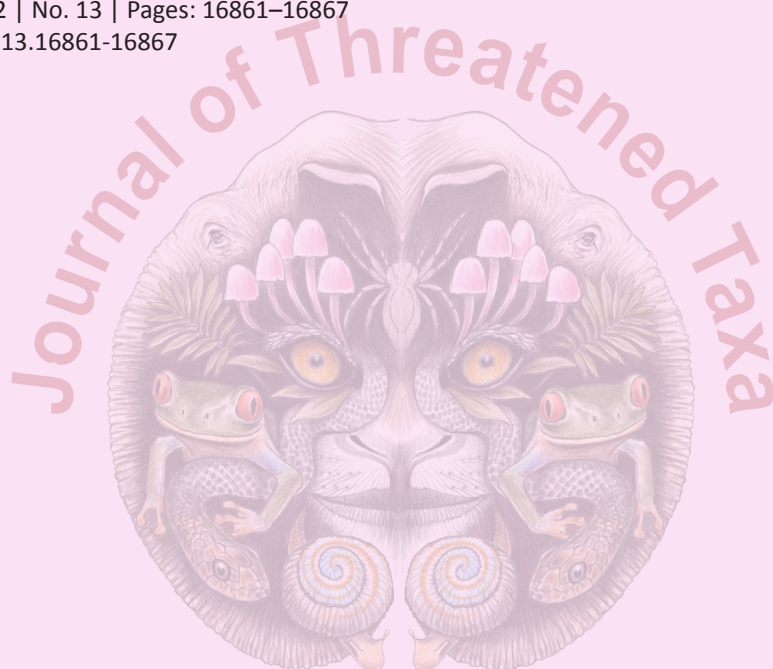
## SHORT COMMUNICATION

### A FIRST COMPLETE DOCUMENTATION OF THE EARLY STAGES OF HAMPSON'S HEDGE BLUE *ACYTOLEPIS LILACEA LILACEA* HAMPSON, 1889 (LEPIDOPTERA: LYCAENIDAE) FROM WESTERN GHATS, KERALA, INDIA

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## A first complete documentation of the early stages of Hampson's Hedge Blue *Acytolepis lilacea lilacea* Hampson, 1889 (Lepidoptera: Lycaenidae) from Western Ghats, Kerala, India

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**Abstract:** This is the first complete documentation of the early stages of *Acytolepis lilacea lilacea*, the subspecies from southern India, with the first record of the larval host plant *Cycas circinalis*, and a comparison with the early stages of *Acytolepis puspa felderi* Toxopeus, 1927, a sympatric and similar species, highlighting the notable differences. The significant differences noted in the early stages of *Acytolepis lilacea lilacea* with that of *A. puspa* are the difference in ornamentation of eggs, more fluffy, blue shaded and less hairy larvae and more elongated pupae. No previous record of the early stages of any of the subspecies of *Acytolepis lilacea* Hampson, 1889 is available. Preliminary observations regarding the flight period and seasonal variations of *Acytolepis lilacea lilacea*, from Parambikulam Tiger Reserve, Kerala, India, are also presented.

**Keywords:** *Acytolepis lilacea lilacea*, *Cycas circinalis*, early stages, larval host plant, Parambikulam Tiger Reserve, Western Ghats.

*Acytolepis* Toxopeus, is a small genus of lycaenid butterflies under the *Lycaenopsis* group, represented by five species in the world, viz: *A. puspa* (Horsfield, 1828), *A. lilacea* (Hampson, 1889), *A. najara* (Fruhstorfer, 1910), *A. ripte* (Druce, 1895), and *A. samanga* (Fruhstorfer, 1910). The first two species are known from India and

the others are from the Indomalayan and Australasian realm. *Acytolepis lilacea*, Hampson, 1889 (Hampson's Hedge Blue or Lilac Hedge Blue) is a lesser known butterfly under the subfamily *Polyommata* of tribe *Polyommata* and has a recorded distribution in southern India, Sri Lanka, Myanmar, Vietnam, Laos, and Thailand. There are three subspecies of *Acytolepis lilacea* in the world. The distribution record of *A.l. lilacea*, Hampson, 1889 is from southern India, *A.l. moorie*, Toxopeus, 1926 is known from Sri Lanka, and *A.l. indochinensis*, Eliot & Kawazoe, 1983 is widely distributed in Laos, Vietnam, Myanmar, and Thailand.

*Acytolepis lilacea lilacea* was described by Hampson in 1889 from the southern slopes of Nilgiris (914m), Western Ghats, India as *Cynaris puspa* var. *lilacea*. After this, sometimes it was treated as a separate species (Bingham, 1907; Swinhoe, 1910; Evans 1932) and later as a subspecies of *Acytolepis puspa* (Cantlie 1963). But Eliot & Kawazoe (1983), after detailed work, confirmed its status as a separate species and also described a

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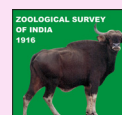
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new subspecies, *A.I. indochinensis* from Laos. The male genitalia of *A. lilacea* is of the same pattern as *A. puspa*, but one-third larger (Eliot & Kawazoe 1983). Males have a more rounded apex and termen than *A. puspa* and significantly, the series of post discal striae on the underside of the forewing is more regular. The subspecies *lilacea*, which flies in southern India, is distinguished from other subspecies by the male lacking whitish discal areas above on the forewing, the hindwing without whitish patches and edging to the marginal spots, and on underside the forewing postdiscal spot in space 9 is usually present (Eliot & Kawazoe 1983). This subspecies is uncommon and only recorded from very few places in southern India, mainly from Palni Hills, Nilgiris, and Coorg (Larsen 1987). Recently, the taxa has been reported from Neyyar Wildlife Sanctuary (WS) and Parambikulam Tiger Reserve (TR) of Kerala (Kunte et al. 2019). Gaonkar (1996) in his report on butterflies of Western Ghats also recorded the species from Kerala, Karnataka, and Tamil Nadu. The species is protected under Schedule II of the Indian Wildlife (Protection) Act, 1972. Recent work on the larval host plants of the butterflies of the Western Ghats by Nitin et al. (2018) has not listed any larval food plant for *A. lilacea*.

This species is probably often overlooked in its habitats with the sympatric, similar looking and quite common *Acytolepis puspa* (Common Hedge Blue). It

occurs with *A. puspa* in low land forests, penetrating the subtropical zone, but is very much scarcer. Nothing has been published so far, concerning the early stages of this species anywhere in the world. Here we present, for the first time, the early stages of *Acytolepis lilacea lilacea*, recorded from Parambikulam TR, Western Ghats, Kerala, India. The recorded early stages, larval feeding patterns and the recorded host plant show marked differences from those of *A. puspa*, and once again confirms the status of *A. lilacea* as a distinct species from *A. puspa*. We present here the images of egg, final instar larva, and pupa of both species for comparison (Image 3 & 4).

#### MATERIALS AND METHODS

During the annual butterfly survey held in Parambikulam TR, Palakkad District, Kerala in November 2018, we came across a female *A. lilacea* at Anappady area (Image 1), (10.443N & 76.813E) laying eggs on the tender leaves of *Cycas circinalis* (Cycadaceae). We collected the eggs, reared five caterpillars in air-tight transparent plastic containers by providing fresh leaves of the larval host plant. We photographed all relevant stages of the life history using a Canon 5D Mark III SLR Camera with a Canon 100mm macro lens and a Kenko 1.4X Teleconverter. We compared the images of the early stages with the relevant, previously recorded early stages of *A. puspa* by VKC. We analysed the images taken



Image 1. The study area, Anappady forest of Parmabikulam Tiger Reserve.



of the adult *A. lilacea lilacea* from the reserve during the months from October to January for seasonal variations and for ascertaining an approximate period of its flight in the reserve.

## OBSERVATIONS AND RESULTS

### Larval host plant

The female laid eggs on the tender leaves of *Cycas circinalis*, a gymnosperm, commonly known as the Queen Sago plant (Image 2), having a distribution in Indo-Malaysia and tropical eastern Africa. The only other butterfly species breeding on *Cycas circinalis* in the Western Ghats is *Chilades pandava* (Cycad Blue or Plains Cupid), and the larvae of both these species eat up the tender leaves and damage the plant considerably. We also searched the garden variety of *Cycas* – *Cycas revoluta*, which is commonly grown in the garden as an ornamental plant, for the early stages of *A. lilacea*, but did not encounter any. Well-wooded areas with an abundance of *Cycas circinalis* appear to be necessary for the survival of *A. lilacea* and this may be one of the reasons for its limited population and distribution compared to that of *A. puspa*. Whereas, *A. puspa* is widely distributed all over India and its larvae are known to feed on many plant species, namely, *Shorea roxburghii* (Dipterocarpaceae), *Cratoxylum cochinchinense* (Hypericaceae), *Moullava spicata*, *Paracalyx scariosus*, *Peltophorum pterocarpum*, *Xylia xylocarpa* (Fabaceae), *Hiptage benghalensis*, *H. madablota* (Malpighiaceae), *Bridelia retusa*, *B. stipularis* (Phyllanthaceae), *Lepisanthes tetraphylla*, *Schleichera trijuga*, and *S. oleosa* (Sapindaceae) (Nitin et al. 2018).

### Early stages

The eggs were laid on the underside of tender leaf blades of the host plant *Cycas circinalis*, mostly one on each blade. The eggs are white, button-shaped, with irregular tiny projections on the surface. They are similar to the eggs of *Chilades pandava* but quite different from that of *A. puspa*. We collected five eggs. Three eggs hatched on the fourth day and two on the fifth day. The newborn tiny caterpillars were light yellow with two rows of obscure white spots on the dorsum, divided by a longitudinal greenish-yellow line. Caterpillars live on the underside of the leaf blade, eating up the soft tissues leaving the cuticle. In advanced instars the colour of the caterpillar on the upperside acquired bluish-green to rich sky blue shades, while the front, rear and lateral sides remain yellow. The caterpillar had tiny tubercles on its body, each of which bears a light yellow hair. The density of these tiny hairs is less compared to the caterpillars of



Image 2. Queen Sago Plant *Cycas circinalis*. Leaves eaten up by *Acytolepis lilacea* larvae in inset.

*A. puspa*. The pupa was similar in shape to that of *A. puspa*, but more elongated. It had thin, tiny hairs all over, and two rows of black spots on the upper side. Many pupae were found decorated by black markings. The pupae were held by a body band. The pupa measured 10mm and the adult butterfly emerged eight days after pupation. The entire life cycle was completed in 32 days. The adult specimen was deposited at Zoological Survey of India, Western Ghat Regional Centre, Kozhikode (Reg. No. ZSI/WGRC/IR/IV.No. 12859).

Interestingly, we have not seen any ants attending to the caterpillars found in the field. Also, in the absence of tender leaves, the larvae were found to feed on semi-matured and matured leaves. Many pupae found in the field were either infected by parasites or damaged. This may be one of the reasons behind the restricted population of this species, even in its conducive habitats. Also, it was observed that the deeply coloured larvae found were those affected by parasites. Detailed studies have to be carried out on the rates of survival of the caterpillars with a special reference to the effect of parasites and other factors.





Image 3. Comparison of early stages of *Acytolepis lilacea lilacea* with that of *A. puspa felderi*: 1—egg of *A. lilacea* | 2–3—final instar larva of *A. lilacea* | 4–5—pupa of *A. lilacea* | 6—egg of *A. puspa* 7–8—final instar larva of *A. puspa* | 9–10—pupa of *A. puspa*. © Chandrasekharan VK.





Image 4. Early stages of *Acytolepis lilacea lilacea*. © Chandrasekharan VK.





Image 5. Adult images of *A. lilacea lilacea* taken from Parambikulam Tiger Reserve. © Chandrasekharan VK



### Seasonal variations and flight period

We made most of our observations in the Anappady area of Parambikulam TR. We have images of live field specimens (Image 5) of this butterfly from October to January and we also found new eggs, larvae, and pupae from November to the end of January. We saw this species even in May, but we were unable to get photographs. Analysing this, it is assumed that this species is multivoltine, having several broods in a year presumably starting from the post monsoon months up to the month of May. Markings are bold for the individuals seen in the months of October and November, whereas the markings are narrower in individuals that are seen in December and January. We presume that the former individuals represent a wet season form and the later a dry season form. Undoubtedly, we still lack the details on flight patterns, specific behaviour, and we suggest that future studies pay more attention to the details on the natural history of this lesser known species. Also, as Eliot & Kawazoe (1983) suggested, *A. lilacea* might have a wider distribution in India with its range extending up to the northeastern part of India.

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