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The life cycle of *Catochrysops panormus* (Lycaenidae) in Sri Lanka

The lycaenid butterfly, *Catochrysops panormus* Felder, 1860 (the Silver Forget-Me-Not), is very rare and found in moist regions of Sri Lanka. Nevertheless, there are early records of the species from drier areas such as Haldummulla and Wellawaya (Ormiston, 1924). According to Woodhouse (1949) and d'Abrera (1998) the species has been recorded from 'wet patches in the low-country dry zone' in February and March, while it has also been recorded at high altitudes such as in Nuwara Eliya (~1900 m). The Sri Lankan population belongs to the nomino-typicale race (d'Abrera, 1998). Nevertheless, very little is known about the natural history of *C. panormus* except for short species accounts in monographs on butterflies of Sri Lanka by Ormiston (1924), Woodhouse (1949) and d'Abrera (1998).

Observations on *C. panormus* were carried out for more than one year starting from December 2012, in 'Katepola' village (6°42.38'N, 80°14.43'E; elevation 75 m; situated between Ayagama and Kirialla), Ratnapura District, Sabaragamuwa Province of Sri Lanka. Virtually all butterflies are closely associated with plants during all stages of their life cycles and therefore their occurrence depends heavily on the presence of host plants (Kunte, 2000). High populations of the host plant can be considered as the obvious reason for the abundance of this generally rare butterfly species in Katepola. Similarly, *Flemingia macrophylla* (Fabaceae) is not a very common plant, although it rapidly colonizes where the right conditions exist. In addition to the high seed production by the plant, the lesser usage of chemical fertilizers and pesticides in the area may have acted favorably for its abundance. However, *Pueraria phaseoloides* (Fabaceae), the first reported host plant for *C. panormus* (see Jayasinghe *et al*., 2014) is a small shrub which also grows in abundance in the Katepola study site. However, we could not observe a single instance of egg laying or early stages of *C. panormus* on *P. phaseoloides* during our field surveys. Interestingly, when both these plant species (*P. phaseoloides* and *F. macrophylla*) coexists female *C. panormus* butterflies were observed to evade *P. phaseoloides* selecting *F. macrophylla* for egg laying. This report presents some hitherto undescribed details on the aspects of the habitat, life cycle, immature stages and primary larval host plants of this little–known butterfly.

Further observations were carried out in Katepola and also in Kirikati-Oya area (6°44.36'N, 80°46.68'E, elevation 885 m) in the same district (Fig. 1). Katepola exists within the wet zone of the island while Kirikati-Oya occurs in the intermediate zone (Ashton *et al*., 1997). This study was conducted to record the behavior of adult *C. panormus* butterflies while opportunistically searching for immature stages to recognize their different immature stages and determine larval host plants, development, and the seasonality of breeding. All immature stages encountered in the field (eggs/larvae) were brought to the laboratory individually, along with their food plants to rear in captivity. The rearing containers were regularly cleared of larval excrement as well as post–feeding remnants of flower buds and shoots and then wiped with a dry cloth before the larvae were placed back in their respective containers with a fresh supply of host plant inflorescence. Observations and the data on measurements on larval stages were conducted regularly in captivity.

The mating behavior of *C. panormus* (Fig. 2A) occurred around 10 m from ground level. The egg laying behavior of *C. panormus* was initially observed on *F. macrophylla* in the Katepola study site. Subsequently the same species of food plant was recorded near Kirikati-Oya River. Both of these locations were

monitored for eggs and larvae of *C. panormus*. The immature stages of *C. panormus* could only be collected from the rubber cultivations and home gardens in the Katepola study site. More than 1000 adult butterfly individuals were also recorded from the Katepola area. Abundant populations of the host plant *F. macrophylla* were also observed in rubber plantations and home gardens in Katepola. This plant is being cultivated as a cover crop and fertilizing plant prior to rubber cultivation. In contrast, only isolated plants were observed in the Kirikati-Oya area, resulting in a total absence of the butterfly species.

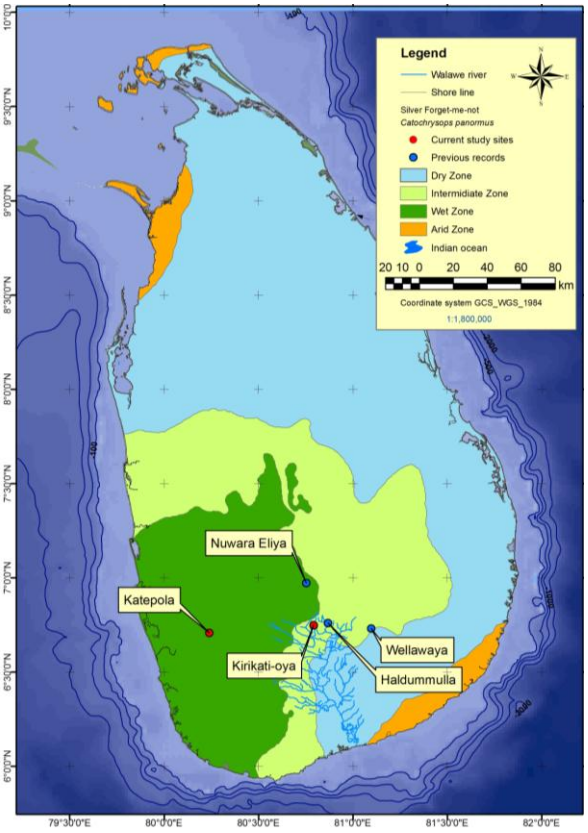

Figure 1: Map of Sri Lanka showing the previous records (blue) and current study sites (red) of *Catochrysops panormus.*

All oviposition activity involved the deposition of a single egg laid on the dorsal surface of tender flower buds (Fig. 2B). The egg was then pushed down into the flower bud. The first and second instars were found inside the flower buds. The third instar emerges from the flower bud. Third, fourth and final instars were observed feeding on flower buds and mature flowers while resting on stalks of the inflorescence and fruits. Third instars (Fig. 2C) are light green with very small off-white hairs on the body and an off-white longitudinal band is present on the mid-dorsum. The mid-dorsal band is usually divided to a square matrix delimited by green veins. The length of the third instar averaged 3.4mm ±0.1mm (*n*=12). Fourth instars (Fig. 2D) are green-brown with a dull brown mid-dorsal line along the mid-dorsum and having two white-brown stripes along the dull brown mid-dorsal line. The white-brown stripes turn in to dull greenish white color in final instar larvae (Fig. 2E). The length of the fourth instar averaged 6.0mm ±0.1mm (*n*=08). The final instars are brown-green (Fig. 3A), turning dull green as a pre pupa (Fig. 3B). The final instar averaged 10.0 mm (range 9.8–10.2 mm, *n*=08). The pupae (Fig. 3C) are brown with dark brown and black spots and a black line on the upper side. The dark brown of fresh pupae gradually turned into a dull black-brown with age. The pupae averaged 6.8mm in length (range 6.5–7.1mm, *n*=08) and 3.6mm in width (range 3.4–3.8 mm, *n*=08).

Development time of *C. panormus* was completed in 23–29 days. The time period from egg laying to the third instar period was 08–10 days. The 3rd instar developed into the 4th instar within 2–3 days, the 4th instar developed into the final instar after 4–5 days. The final instar developed into the pupal stage within 2 days. The pupal period varied from 7–9 days.

A new host plant, *F. macrophylla* (Fig. 3D) (Jayasinghe *et al.* 2014) was recorded for *C. panormus*. This plant was thought to be very rare and/or considered as 'Possibly Extinct' in the national list of threatened species (MOE, 2012). It grows as a bush up to 1–1.5m in height, with leaves divided into three leaflets (Fig. 3E), bears a purple pink inflorescence (Fig. 4A) and a light green, oval shaped fruit (seed vessel) (Fig. 4B). Flowers can be observed during mid-November to the end of March. Flowers are used by *C. panormus* adults for nectar-feeding (Fig. 4C). According to the observations made around Katepola during 2013, the population of *C. panormus* was prominent from mid November to the end of March. A larger population of more than 600 individuals was recorded during that time period in Katepola. *F. macrophylla* flowers were also blooming within that time period therefore it may be the reason for the abundant population of *C. panormus* at that time.

The present observation supports the hypothesis that *F. macrophylla* is the primary larval food plant of *C. panormus*, while *P. phaseoloides* as recorded previously could be used as an alternative where the primary food plant is absent. Furthermore, the original description of *P. phaseoloides* as a food plant for *C. panormus* could be an error, or the move to this newly recorded food plant could be an evolutionary adaptation caused by the rarity of the previously better known host plant. Further supporting our proposal of *F. macrophylla* to be the primary larval food plant of *C. panormus*, the temporal variation with high populations of the butterfly from the end of November to end of March in the study area correlated with the flowering season of *F. macrophylla*. Additionally, the reason for the rarity of this butterfly species could be the rarity of the essential larval host plant. Butterflies were also noticed to show a clustered population structure around the areas where the host plant was abundant. According to Van der Poorten and Van der Poorten (2013) the knowledge of immature stages and larval food plants are essential for proper conservation planning for butterflies, hence this communication should prove useful in formulation of a conservation strategy for this rare butterfly.

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Literature cited

Ashton, M., C. V. S. Gunathilake, N. De Zoysa, M. D. Dassanayake, N. Gunatilake, and S. Wijesundara, 1997. A field guide to the common trees and shrubs of Sri Lanka. Wildlife Heritage Trust of Sri Lanka, Colombo: 2–5.

d'Abrera, B., 1998. The butterflies of Ceylon. Wildlife Heritage Trust (WHT), Colombo, Sri Lanka: 184.

Jayasinghe, H. D., S. S. Rajapaksha and C. de Alwis, 2014. A compilation and analysis of food plants utilization of Sri Lankan butterfly larvae (Papilionoidea). *Taprobanica*, 6: 110–131.

Kunte, K., & Gadgil, M. (2000). India, a Lifescape: Butterflies of Peninsular India. Universities Press: 13.

MOE, 2012. *The National Red List 2012 of Sri Lanka: Conservation Status of the Fauna and Flora*. Ministry of Environment, Colombo, Sri Lanka: 264.

Ormiston, W., 1924.The butterflies of Ceylon. Published by H.W. Cave & Co., Colombo: 60.

Van der Poorten, G., 2012. The Taxonomy and Conservation Status of the Butterflies of Sri Lanka. *In*: The National Red List 2012 of Sri Lanka; Conservation Status of the Fauna and Flora. Weerakoon, D.K. & S. Wijesundara (Eds.), Ministry of Environment, Colombo, Sri Lanka: 26–41.

Van der Poorten, G. and N. Van der Poorten, 2013. New and revised descriptions of the immature stages of some butterflies in Sri Lanka and their larval food plants (Lepidoptera: Lycaenidae). Part 1: Polyommatinae and Theclinae, in part. *The Journal of Research on the Lepidoptera*, 46: 25–49.

Woodhouse, L. G. O., 1949. The butterfly fauna of Ceylon, second complete edition. The Colombo Apothecaries' Co. Ltd., Colombo: 115–116.

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PLATE 7

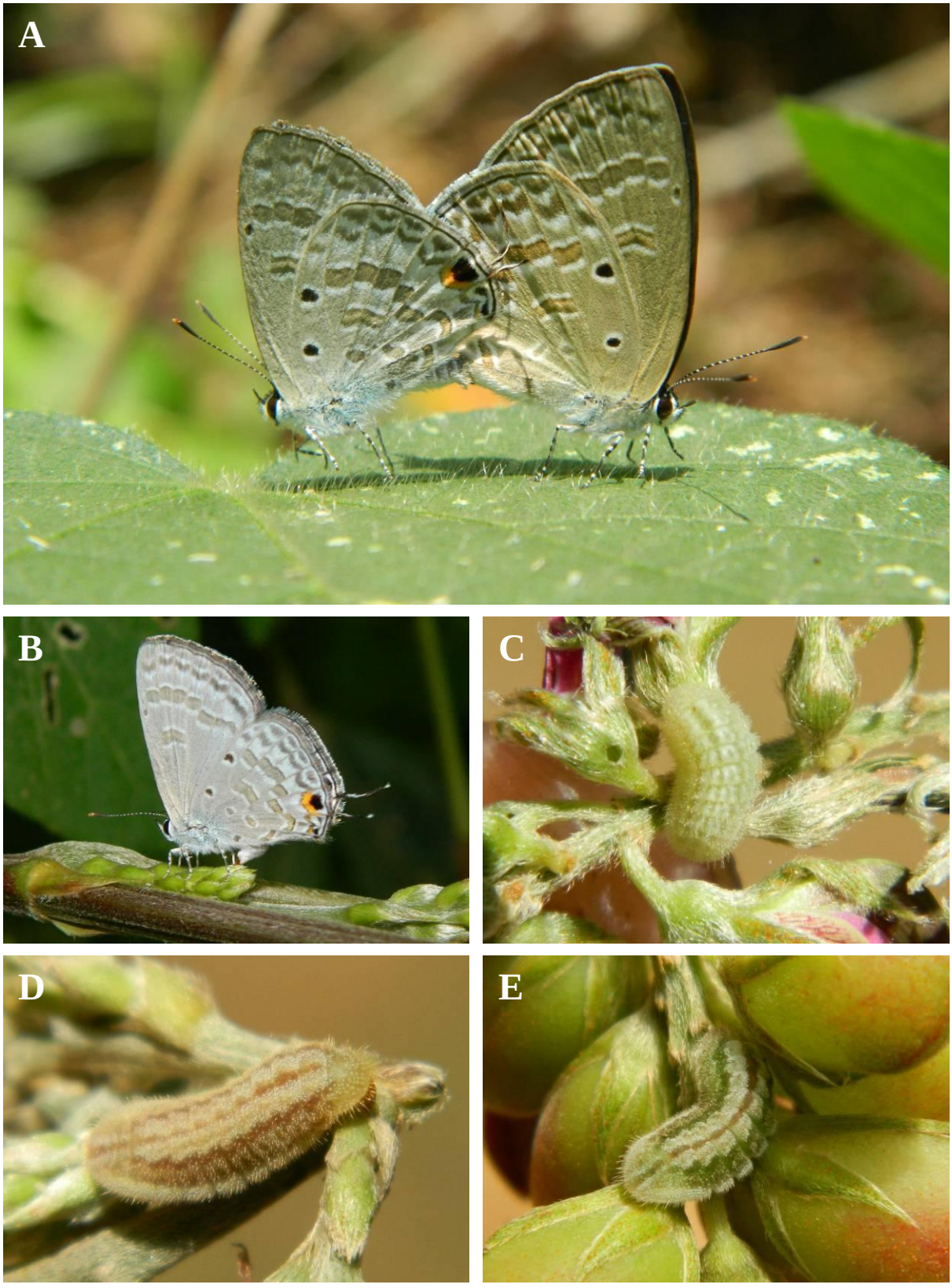

Figure 2: Stages of the life cycle of *Catochrysops panormus*, the Silver Forget-Me-Not: (**A**) mating pair; (**B**) egg laying; (**C**) third instar; (**D**) fourth instar, green-brown phase; (**E**) fourth instar, dull green phase.

PLATE 8

Figure 3: Stages of the life cycle of *Catochrysops panormus*, the Silver Forget-Me-Not: (**A**) final instar, brown-green phase; (**B**) final instar, dull green phase; (**C**) side view of pupa. The newly recorded host plant (**D**) *Flemingia macrophylla* (**E**) leaflets.

PLATE 9

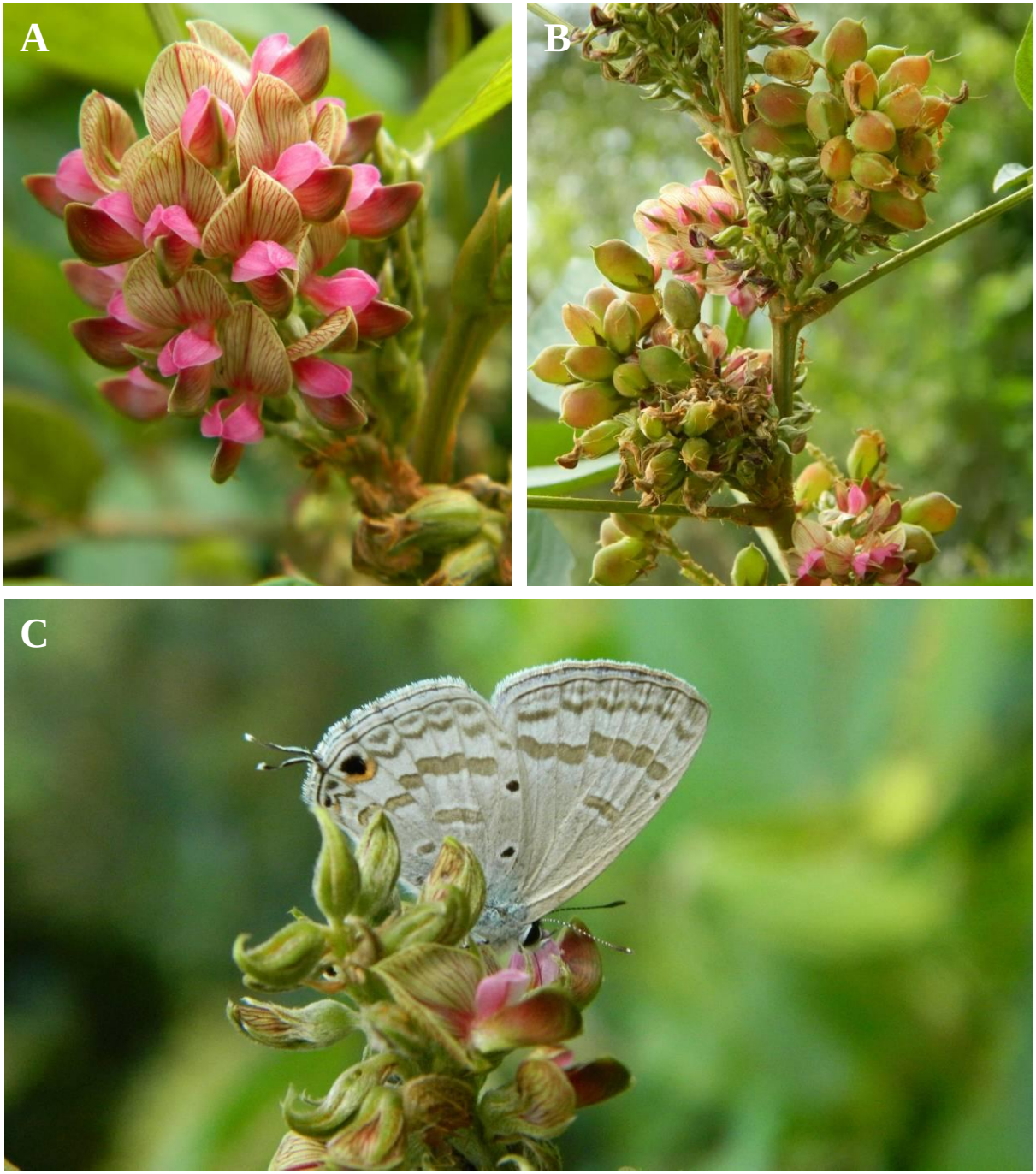

Figure 4: The newly recorded host plant, *Flemingia macrophylla* (**A**) inflorescence; (**B**) fruit (seed vessel)*;* (**C**) nectar-feeding by *C. panormus* on *F. macrophylla*.