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# New larval host plants for three butterfly (Lepidoptera, Papilionoidea) species from Rahr region of West Bengal, India

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**ABSTRACT.** *Centranthera tranquebarica* (Spreng.) Merr. (Orobranchaceae) and *Mallotus repandus* (Rottler) Müll. Arg. (Euphorbiaceae) are reported as new host plants of *Junonia orithya* (Linnaeus, 1758) (Nymphalidae) and *Rapala manea* (Hewitson, 1863) (Lycaenidae) butterflies from Paschim Bardhaman district of West Bengal, India. *Schleichera oleosa* (Sapindaceae), a deciduous tree, is reported as new host plant of *Coladenia indrani* (Moore, [1866]) (Hesperiidae) from Bankura district of West Bengal, India. Defensive mechanism of *Junonia orithya* larva by rolling itself into a tight spiral is also observed.

**Key words:** host plant, Blue Pansy, Slate Flash, Tricolor Pied Flat, habitat conservation

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## INTRODUCTION

The distribution and abundance of herbivorous insects are controlled largely by the abundance of host plants (Knops et al., 1999). Meticulous study of larval host plants is integral to the knowledge and conservation of these insects (Bach, 1980; Faeth et al., 1981; Abdala-Roberts et al., 2015; Hancock et al., 2015; New et al., 2021), a major portion of which are butterflies and moths. It is also known that butterfly population density can reflect the differences in the quality of food resources among different habitats (Dennis et al., 2006). Though larval host plants of butterflies of Indian butterflies are documented for over a century (Davidson & Aitken, 1890; Davidson et al., 1896), many gaps still exist which are evident from the recent surge of publications about new host plants (Karmakar et al., 2018; Nitin et al., 2018; Naik & Mustak, 2020). The state of West Bengal in eastern India is home to varied biogeographic realms with Himalaya mountain ranges and its foothills known as Dooars in the north, with the deltaic plains of the Ganga river basin and mangrove forests in the south, and the Chhotanagpur plateau in the west (Rodgers & Panwar, 1988). The study of butterflies of the region (Moore, 1866) and the studies of their larval host plants (de Nicéville, 1885) started during the British colonial era. Several subsequent studies have enriched the knowledge of butterflies and their host plants, however there is a

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dearth of comprehensive checklists of butterflies and their host plants. Dasgupta (2010) listed 452 species of butterflies from West Bengal, but this list is far from being exhaustive. The authors conservatively estimate at least 700 species of butterflies from the state. Sengupta et al. (2014) listed 143 host plant species from Neora Valley National Park of Kalimpong district in the northeastern part of the state. Karmakar et al. (2018) listed 64 host plant species from the Eastern Himalayas, a bulk of which are from the northern part of West Bengal. Biswas et al. (2022) listed 54 larval host plants from Bongaon town (of North 24 Parganas district) in the Gangetic delta plains of southern West Bengal. While few recent works from West Bengal are adding to the present knowledge of larval host plants (Dey, 2020; Mukherjee, 2021; 2022), a comprehensive list of larval host plants is yet to be prepared from the state.

## MATERIAL AND METHODS

Opportunistic survey was initiated to search for the early stages of butterflies to recover the Eltonian shortfall. The first and second authors collected the early stages of the butterflies along with leaves or branches of the host plant to conduct the study. The larvae or the eggs were put into a clean dry cuboidal plastic container of 20 cm length, 10 cm breadth and 6 cm depth, and leaves of the host plant were regularly provided as food. Though *Rapala manea* was reared during the cool dry winter, *Coladenia indrani* and *Junonia orithya* were reared during the humid rainy season, which makes them prone to parasite attacks. The container containing early stage of *Coladenia indrani*, known to be notoriously susceptible to parasites, were opened and kept in clear sunshine for at least 15 minutes every alternate day to help the moisture dry. The frass (small balls of faecal matter) egested by the larvae were regularly cleaned from the container to minimise the chances of fungal infection. Paper towels were used to clean the frass from the container. After pupation, care was taken to avoid disturbance of the pupa. Once the pupa eclosed into the adult butterfly, the container was opened to let the butterfly dry its wings and eventually fly into the wild. Photographs of plants and of the various stages and events of the metamorphosis of the butterflies were captured using Nikon® D5300 camera and/or Samsung® J7 Max mobile phone camera. The host plants were identified using relevant scientific literature (Hooker, 1875, 1884, 1887).

***Study area.*** The study area encompasses the central part of the Rarh region of West Bengal, which includes the Paschim Bardhaman and Bankura districts. The undulating laterites along with the alluvial plains lying between the Chhotanagpur Plateau in the west and the Bhagirathi-Hooghly river in the east is called Rarh (Ghosh & Guchhait, 2019). The region is dissected by various rain-fed rivers like Ajoy, Damodar, Dwarakeshwar, and Silabati (Roy et al., 2022), which carry the eroded sediments from the Indian Peninsular Shield. Red laterite soil is typical of the region. Though vastly deforested, the natural vegetation of the region is fragmented dry deciduous forests interspersed with between agricultural fields and scrublands (Champion & Seth, 1968). According to Köppen-Geiger classification, tropical savannah climate prevails throughout the region (Beck et al., 2018). The mean daily maximum and minimum temperature in the region lie 32.6°C and 20°C respectively. May is the hottest month with temperatures known to soar up to 47.4°C, while in January temperature may plummet to around 6°C. June to September is the wet monsoon season which receives almost 80% of the rainfall, with July being the wettest month. The region receives an average rainfall of around 120 cm. Relative humidity varies between 75% and 95% in the monsoon season, while it drops in the range of 35% and 65% in the winter season (December to February) (Anonymous, 2008).

**Table 1.** Study sites at a glance, from where the butterfly species were collected and reared.

| Sites | Site Name | Latitude | Longitude | Habitat |
|---|---|---|---|---|
| **S1** | Madhaiganj | 23.6613°N | 87.3176°E | Grassland on forest edge |
| **S2** | Laudoha | 23.6605°N | 87.2988°E | Bushes near a pond outside of a village |
| **S3** | Kadma | 22.9881°N | 87.0055°E | Village |

## RESULTS

### *Taxonomic hierarchy*

**Class Insecta Linnaeus, 1758**

**Order Lepidoptera Linnaeus, 1758**

**Superfamily Papilionoidea Latreille, 1802**

**Family Nymphalidae Rafinesque, 1815**

**Genus *Junonia* Hübner, [1819]**

***Junonia orithya* (Linnaeus, 1758)**

**Common name:** Blue Pansy (Fig. 1) (Table 2)

***Biology.*** On 19th July 2020, the first author spotted a couple of spherical pale green eggs (Fig. 1B) beneath the young leaves of a *Centranthera tranquebarica* plant (Fig. 1A) at S1 (in a dry grassland on the edge of deciduous forest near Madhaiganj village). The 12 cm high herb was hardly distinguishable amongst the grasses, had it not been for the yellowish flowers, which bloom in the dusk and fall at daytime. Stems of the plant along with leaves were collected. Eggs hatched on 22nd July 2020 and the egg shell was eaten by the pale yellowish green larva (Fig. 1C), whose body was covered with many small-dark tubercles. Long dark setae emanated from the tubercles. The caterpillars turn into darker brown (Fig. 1D) in the successive instars, gradually turning blackish in the 6th (final) instar. The frons of the head capsule gradually turned into orange in the 4th instar, from initial black in the first and second instars. The larvae were found to feed exclusively on young leaves, with the younger instars feeding superficially on laminae of young leaves. The younger instars stayed on the underside of the leaves (Fig. 1C), while the later instars were found on shoots and leaf litter, and often fed at night. Dark brown pupa (Fig. 1G), pale brown ventrally and in the wing pads, formed on 12th August 2020. Whitish dorsal bands were present in the pupae near the cremaster and mid-abdomen. An adult male butterfly (Fig. 1H) eclosed from the pupa on 19th August 2020. A female adult emerged on the same day from the other collected egg. Both the eggs thus eclosed on 32nd day, after 7 days of pupation. All the eggs and larvae were observed on flowering individuals of the herb. Once the larva matures and stops feeding, it moves to sides of rocks or larger plants nearby in search of space to pupate. The reared larvae were also found to move away from the host shoot and to pupate on the wall of the plastic container. Pupa, which hangs free by cremaster, is formed always close to the ground. They are known to fly throughout the year in particularly dry and arid regions, such as uncultivated stony fields and roads (Wynter-Blyth, 1957) and are hence more common towards the western region of the Rarh, compared to the more humid fertile Gangetic plains in the east. Adult females are known to lay eggs in concealed positions on young shoots (van Son, 1979)

***Behaviour.*** When alarmed, the initial instars of the larvae have been found to fall down from the small plant into the dense grasses to conceal themselves. Another interesting defensive mechanism of rolling itself into a tight spiral, similar to various millipedes (Dettner, 2010) and pangolins has been noted. The host plant, a delicate small common medicinal parasitic herb (Mahendru et al., 2022) measuring within 15cm in height, is normally miscible among the grasses in semiaquatic sandy grasslands (Singh, 1997) and wastelands on wet laterite soil (Rao & Kumari, 2002), known to flower between August and October (Paria & Chattopadhyay, 2005), provides an ideal safety cover for the eggs and larvae. The adult butterfly flies mostly close to the grounds, and is known to camouflage itself by closing the wings. Apart from their larval host plants, the adult females often lay eggs on other plants close to their hosts and on rocks or stony paths nearby.

***Distribution.*** *Junonia orithya* is distributed through Australia (Butler, 1875), the Oriental region (south and south-east Asia), Middle-east (west Asia) and Africa (van Son, 1979). Widely distributed throughout India, it is absent only in high altitudinal territories such as Ladakh, and Sikkim (Kunte et al., 2022). In West Bengal, it is quite common in the western districts of Jhargram, Paschim Medinipur, Purba Medinipur, Purulia, Bankura, Paschim Bardhaman, Birbhum, while it is rarely sighted in the Gangetic plains of Hooghly, Nadia, Kolkata, North and South 24 Parganas (Kunte et al., 2022).


**Figure 1.** Host plant and life cycle of *Junonia orithya* (Linnaeus, 1758). **A.** The host plant, *Centranthera tranquebarica* with a flower; **B.** Eggs beneath leaves of *Centranthera tranquebarica*; **C.** First instar larva; **D.** Second instar larva feeding on leaves in its natural grassland habitat; **E.** Third instar larva; **F.** Fourth instar larva; **G.** Pupa; **H.** Underwing of a freshly eclosed *Junonia orithya*; **I.** Open wing of the freshly eclosed butterfly (*Photo 1A by S. Roy. All other photos by D. Banerjee*).

**Family Hesperiidae Latreille, 1809**

**Genus *Coladenia* Moore, 1881**

***Coladenia indrani* (Moore, 1865)**

**Common name:** Tricolor Pied Flat (Fig. 2) (Table 3)

***Biology.*** Groups of around 10–15 larvae were eventually spotted in seven *Schleichera oleosa* (Ceylon Oak) trees (heights of the trees ranging between 3 and about 20 metres) in various locations in and around the village. More larvae were further collected from Ceylon Oak trees of varying heights and one of them went into the pre-pupation stage on 16th July 2020. The pupa was formed on 17th July, and on 25th July 2020, an adult butterfly eclosed from the pupa (Fig. 2H). Unlike most butterfly larvae, this species feeds exclusively on mature green leaves (young leaves of the plant is being typically red – Fig. 2A).

**Table 2.** The host plants of *Junonia orithya* (Linnaeus, 1758) (only from south Asia)*.

| | Host Plant | Family Name | Reference |
|---|---|---|---|
| 1. | *Acanthus* sp. | Acanthaceae | Wynter-Blyth (1957) |
| 2. | *Barleria* sp. | Acanthaceae | Wynter-Blyth (1957) |
| 3. | *Barleria mysorensis* | Acanthaceae | Nitin et al. (2018) |
| 4 | *Evolvulus alsinoides* | Convolvulaceae | Deepika et al. (2014) |
| 5. | *Evolvulus nummularius* | Convolvulaceae | Mukherjee (2022) |
| 6. | *Hygrophila auriculata* | Acanthaceae | Wynter-Blyth (1957) |
| 7. | *Ipomoea batatas* | Convolvulaceae | Robinson et al. (2010) |
| 8. | *Justicia micrantha* | Acanthaceae | Robinson et al. (2010), Bhakare & Ogale (2018) |
| 9. | *Justicia neesi* | Acanthaceae | Wynter-Blyth (1957) |
| 10. | *Justicia procumbens* | Acanthaceae | Wynter-Blyth (1957) |
| 11. | *Lepidagathis keralensis* | Acanthaceae | Nitin et al. (2018) |
| 12. | *Lepidagathis prostrata* | Acanthaceae | Wynter-Blyth (1957) |
| 13. | *Mimosa pudica* | Fabaceae | Wynter-Blyth (1957) |
| 14. | *Misopates orontium* | Plantaginaceae | Wynter-Blyth (1957) |
| 15. | *Nelsonia canescens* | Acanthaceae | Nitin et al. (2018) |
| 16. | *Plectranthus scandens* | Lamiaceae | Robinson et al. (2010) |
| 17. | *Phyla nodiflora* | Verbenaceae | Deepika et al. (2014) |
| 18. | *Ruellia tuberosa* | Acanthaceae | Nitin et al. (2018) |
| 19. | *Sida rhombifolia* | Malvaceae | Bhakare & Ogale (2018) |

It was observed that it often goes to an indefinite period of pupation on being disturbed or intimidated (S. Kalesh pers. comm.) and care was taken to minimise disturbance of the leaf cell (where the larva, and subsequently the pupa nests) during pupal stage. The host plant is a common medium-sized deciduous tree in low hill forests and in the plains of India and South-East Asia. Known to flower between February and March and to bear fruits between April and August, in West Bengal, it is known to be commonly distributed in the districts of Bankura, Bardhaman and Purulia (Chandra, 1997). All the observations of the larvae are during the post-fruiting stage of the plant, when neither flowers nor fruits could be found. An individual was first spotted in the Kadma village (S3) on 28 July 2019 and subsequently again on 24 September 2019. Larva from amature *Schleichera oleosa* tree was first observed and collected by the second author on 12 June 2020 at 18:00 hrs in the evening in his village. The pupa was found to be infected by some unidentified fungi.

***Behaviour.*** Larvae of most skippers live in a cell formed from a curled-over leaf (Wynter-Blyth, 1957), and *Coladenia indrani* is no exception. The early instar of the larva cuts out a circular piece from the middle of a mature leaf and turns it over onto the top of the leaf, forming a concave cell with a wide base, where it rests, coming out only to feed. In the first two instars, it keeps on feeding the leaves and shields itself by covering within the leaf (Fig. 2F). Larvae become intermittently dormant during their feeding period. The pre-pupation and pupal stages of development take place in the safe haven of that cell.

***Distribution.*** *Coladenia indrani* is distributed across most of South and Southeast Asia including India, Nepal, Bhutan, Myanmar (van Gasse, 2021), Thailand, Laos, Vietnam and south China (Inayoshi, 2022). In India, it is a common species in the foothills of Himalaya, found from Jammu & Kashmir in the west to Assam, Arunachal Pradesh, Manipur and Mizoram in the east. In peninsular India, it is occasionally encountered in West Bengal (western part), Odisha, Chhattisgarh, Madhya Pradesh, Maharashtra (eastern part) and Tamil Nadu. It is also frequently sighted in the Western Ghats (Kunte et al., 2022). In the state of West Bengal, it is common in the northern region of Dooars covering the districts of Alipurduar, Jalpaiguri, Kalimpong and Darjeeling. It is however, occasionally sighted in the western districts of Bankura, Purulia, Jhargram, and Paschim Medinipur. It is very rare in the Gangetic plains (Kunte et al., 2022).

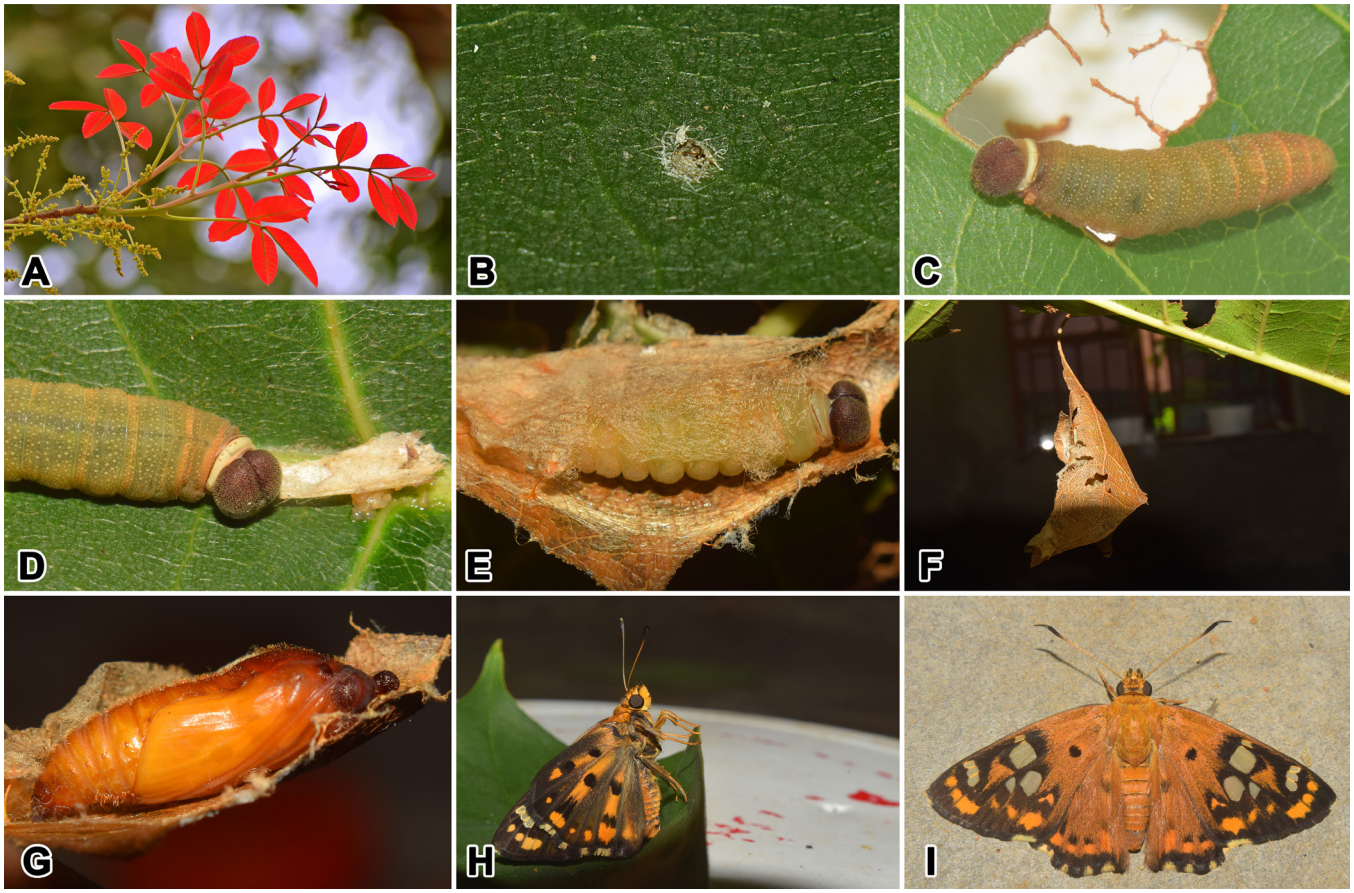


**Figure 2.** Host plant and life cycle of *Coladenia indrani* (Moore, 1865). **A.** Inflorescence and characteristic young red leaves of the host plant, *Schleichera oleosa*; **B.** Empty egg shell on host plant; **C.** Larva feeding on mature green leaf; **D.** Male larva feeding on the exoskeleton after moulting; **E.** Pupating; **F.** Leaf shelter of a larva; **G.** Pupa; **H.** Underwing of a freshly eclosed Butterfly; **I.** Open wing of the freshly eclosed butterfly (*All photos by A. Singhamahapatra*).

**Table 3.** The host plants of *Coladenia indrani* (Moore, 1865).

| | Host Plant | Family Name | Reference |
|---|---|---|---|
| **1.** | *Bauhinia racemosa* | Fabaceae | Nitin et al. (2018) |
| **2.** | *Bixa orellana* | Bixaceae | Bhakare & Ogale (2018) |
| **3.** | *Bridelia retusa* | Phyllanthaceae | Kalia et al. (1999); Kalesh & Prakash (2015) |
| **4.** | *Bridelia stipularis* | Phyllanthaceae | Bhakare & Ogale (2018) |
| **5.** | *Dalbergia latifolia* | Fabaceae | Kalia et al. (1998) |
| **6.** | *Dendrolobium triangulare* | Fabaceae | Nitin et al. (2018) |
| **7.** | *Desmodium* sp. | Fabaceae | Wynter-Blyth (1957) |
| **8.** | *Grewia nervosa* | Malvaceae | Swinhoe (1913); Bell (1923) |
| **9.** | *Hibiscus tiliaceus* | Malvaceae | Nitin et al. (2018) |
| **10.** | *Mallotus philippensis* | Euphorbiaceae | Bell (1923); Wynter-Blyth (1957) |
| **11.** | *Sterculia urens* | Malvaceae | Nitin et al. (2018) |
| **12.** | *Terminalia elliptica* | Combretaceae | Nitin et al. (2018) |
| **13.** | *Thespesia populnea* | Malvaceae | Kalesh & Prakash (2015); Nitin et al. (2018) |
| **14.** | *Triumfetta rhomboidea* | Malvaceae | Nitin et al. (2018) |
| **15.** | *Xylia xylocarpa* | Fabaceae | Davidson et al. (1897); Bell (1923) |

### Family Lycaenidae Leach, 1815

### Genus *Rapala* Moore, 1881

### *Rapala manea* (Hewitson, 1863)

**Common name:** Slate Flash (Fig. 3) (Table 4)

***Biology.*** A larva was observed and collected by the first author on 17th December 2020 on *Mallotus repandus* from a bush beside a pond near the crematorium in Laudoha village (S2). Ovate-triangular leaves of the woody climber was an important key to its identification (Hooker, 1887; Balakrishnan & Chakrabarty, 2007). The around 4m long climbing shrub, having characteristic thorns on its trunk, was blooming with racemose inflorescence. The larva was provided with young shoots from the host plant until it went into pre-pupation on 25th December 2020. Early instars of the larva bore into flowers or buds (Fig. 3C) and fed on the softer parts from inside. The colour and cryptic markings of the larvae are variable and depends on the background colour (van der Poorten & van der Poorten, 2016). They were regularly attended by *Crematogaster* ants. The pupa was eventually formed on 28th December 2020. The adult finally eclosed after around 25 days of pupal period on 21st January 2021. A couple of spherical, pale greenish white eggs (Fig. 3B) were also later collected by the author by moving the buds apart, within which the eggs were concealed. Though the larvae later emerged from those eggs, however, they could not be traced later, indicating escape or predation. All the larvae were found during winter (November to January), which is the flowering season of the shrub in the region.

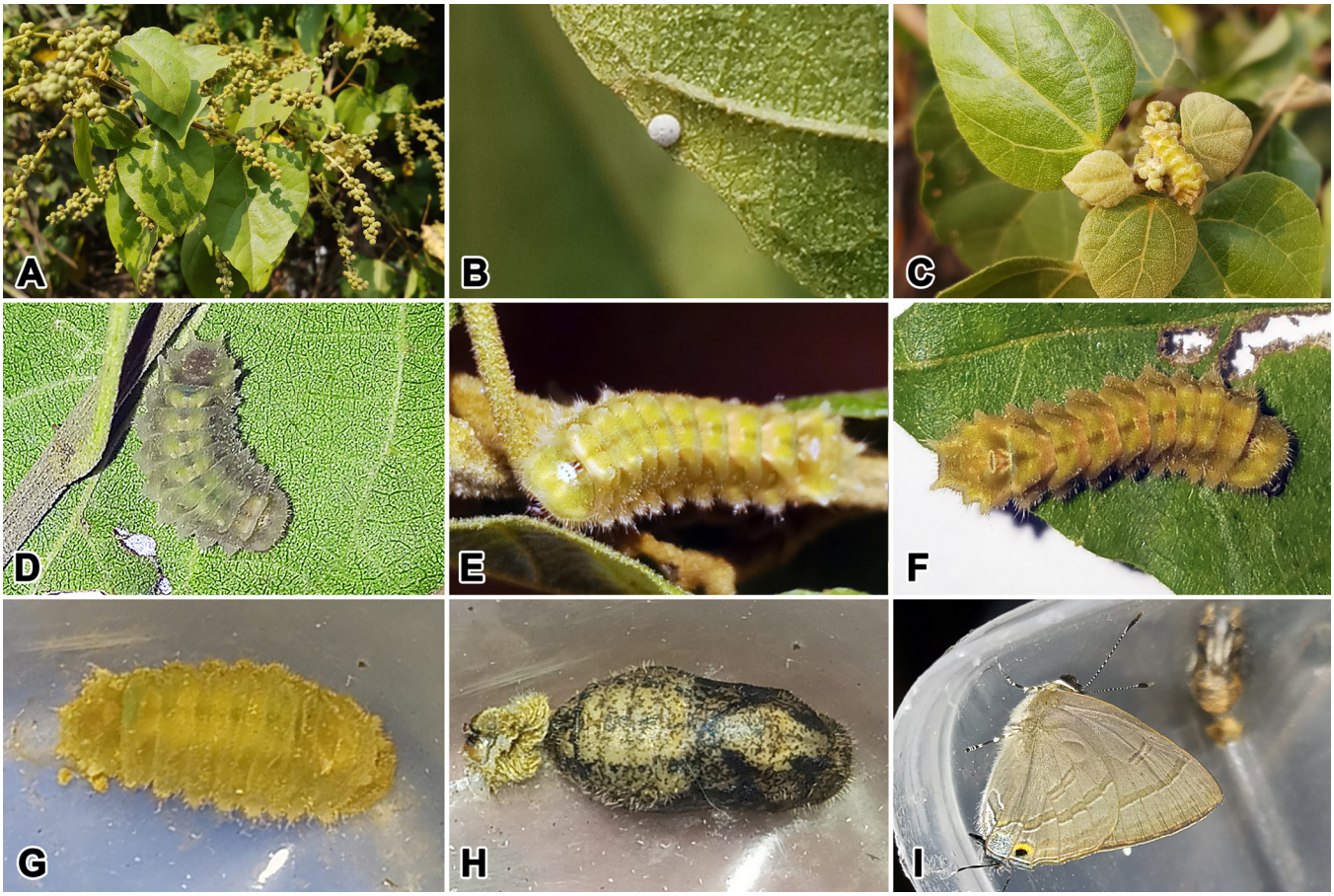


**Figure 3.** Host plant and life cycle of *Rapala manea* (Hewitson, 1863). **A.** Fruits and leaves of the host plant, *Mallotus repandus*; **B.** Freshly laid egg; **C.** Early instar of larva, camouflaged resting on bud; **D.** Second instar of larva; **E.** Third instar of larva, feeding; **F.** Fourth instar of larva; **G.** Pupating larva; **H.** Pupa; **I.** Closed wing of the freshly eclosed butterfly (All photos by *D. Banerjee*).

**Table 4.** The host plants of *Rapala manea* (Hewitson, 1863).

| | Host Plant | Family Name | References |
|---|---|---|---|
| 1. | *Acacia caesia* | Fabaceae | Wynter-Blyth (1957) |
| 2. | *Acacia megaladena* | Fabaceae | Wynter-Blyth (1957) |
| 3. | *Acacia pennata* | Fabaceae | Wynter-Blyth (1957) |
| 4. | *Antidesma acidum* | Phyllanthaceae | Wynter-Blyth (1957) |
| 5. | *Antidesma ghaesembilla* | Phyllanthaceae | Wynter-Blyth (1957) |
| 6. | *Averrhoa bilimbi* | Oxalidaceae | Nitin et al. (2018) |
| 7. | *Camellia sinensis* | Theaceae | Wynter-Blyth (1957) |
| 8. | *Clerodendrum infortunatum* | Lamiaceae | Nitin et al. (2018) |
| 9. | *Combretum indicum* | Combretaceae | Wynter-Blyth (1957) |
| 10. | *Ixora* sp. | Rubiaceae | Kunte et al. (2022) |
| 11. | *Lantana camara* | Verbenaceae | Nitin et al. (2018) |
| 12. | *Lepisanthes tetraphylla* | Sapindaceae | van der Poorten & van der Poorten (2016); Nitin et al. (2018) |
| 13. | *Litchi chinensis* | Sapindaceae | Mukherjee (2021) |
| 14. | *Mangifera indica* | Anacardiaceae | Robinson et al. (2010) |
| 15. | *Mimosa diplotricha* | Fabaceae | Nitin et al. (2018) |
| 16. | *Saraca asoca* | Fabaceae | Nitin et al. (2018) |
| 17. | *Senegalia torta* | Fabaceae | Wynter-Blyth (1957) |
| 18. | *Senna tora* | Fabaceae | Naik & Mustak (2020) |
| 19. | *Sorbaria sorbifolia* | Rosaceae | Wynter-Blyth (1957) |
| 20. | *Syzygium* sp. | Myrtaceae | Bhakare & Ogale (2018) |
| 21. | *Urena lobata* | Malvaceae | Nitin et al. (2018) |
| 22. | *Ziziphus* spp. | Rhamnaceae | Wynter-Blyth (1957) |

***Behaviour.*** The early instars of the larva camouflage themselves by resting on the buds and axils of the inflorescence (Fig. 3C), coming to the leaves only to change instar (Fig. 3E). Like most Lycaenid larvae, they too have strong mutualistic association with ants. This host plant is also known as a larval food plant of *Mahathala ameria* (Robinson et al., 2010; Kunte et al. 2022), which is also found in this region. However, the first author noticed, the larvae of *Mahathala ameria* rolls them within the leaves of the plant, and are found in plant individuals, not during the flowering periods. Thus, though *Rapala manea* and *Mahathala ameria* share the same host plant, they live in different niches. Larvae were found to rest on axils of the flowers well camouflaged (Fig. 3E) and comes to leaves only to change instar.

***Distribution.*** *Rapala manea* is distributed throughout most of the Oriental region (south and south-east Asia), except Taiwan. Within Indian subcontinent, it is distributed throughout excepting the arid regions. In Gangetic plains and western plateau region (and in the Himalayan foothills) of West Bengal too, the adult butterfly is a common visitor often encountered singly perching or nectaring on flowers of bushes.

## DISCUSSION

The findings of the new host plants of these three species, two of which are rather very common (and also their host plants) in the region, point out the massive Eltonian shortfall (Hortal et al., 2015). *Junonia orithya*, commonly found in the grasslands of the western region of West Bengal is rare in the Gangetic alluvial deltaic plains. This can be partially attributed to the presence of red laterite soil which is congenial to the growth of this rather inconspicuous host plant *Centranthera tranquebarica*. Interestingly, both the early stages of *Junonia orithya* and *Rapala manea* are observed during the flowering period of the hosts, which coincides with the development of young shoots and leaves. In contrast, the egg-laying and larvae of *Coladenia indrani* were observed on mature leaves (well past the fruiting season of the host), as

was known previously. *Coladenia* genus, being part of the early *Tagiadini* lineage, is known to feed on dicots (Shen et al., 2022), and *Coladenia indrani* is no exception. While its newly reported host plant *Schleichera oleosa* is presumably dicotyledonous, it adds the family Sapindaceae to the known host families of *Coladenia indrani*. Extensive fieldwork, surveys and observations of interactions between butterflies and their host plants are needed to understand their co-evolution, seasonality, abundance and population to bridge the massive Eltonian shortfall.

## AUTHOR'S CONTRIBUTION

The authors confirm their contribution in the paper as follows: D. Banerjee: Observing, rearing and photographing *Junonia orithya* and *Rapala manea* through their lifecycles and recording the behavioural data; A. Singhamahapatra: Observing, rearing and photographing the larvae of *Coladenia indrani* into its adult stage; S. Roy: Literature review and drafting the manuscript. All authors read and approved the final version of the manuscript.

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## AVAILABILITY OF DATA AND MATERIAL

Not applicable.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

## CONSENT FOR PUBLICATION

Not applicable.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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# گیاهان میزبان جدید برای سه گونه پروانه روزپرواز (Lepidoptera, Papilionidea) از منطقه راهر بنگال غربی، هند

**دیودولال بنرجی[1]، آنیروده سِنگ‌هموه‌پاترا[2] و شوبهجیت رائی[3*]**

۱ بالجوری، پاسچیم، و موسسه طبیعت و حیات وحش دورگاپور، باردامن، بنگال غربی، هند
۲ کادما، بانکورا، بنگال غربی، هند.
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**چکیـده:** دو گونه گیاهی شامل *Centranthera tranquebarica* (Spreng.) Merr. (خانواده Orobranchaceae) و *Mallotus repandus* (Rottler) Müll. Arg. (خانواده Euphorbiaceae) برای اولین بار به عنوان میزبان پروانه‌های روز پرواز *Junonia orithya* (Linnaeus, 1758) (خانواده Nymphalidae) و *Rapala manea* (Hewitson, 1863) (خانواده Lycaenidae) از منطقه پاسچیم باردامان واقع در بنگال غربی، هند گزارش شدند. درخت خزان‌کننده *Schleichera oleosa* (خانواده Sapindaceae) برای اولین بار به عنوان میزبان پروانهٔ روزپرواز *Coladenia indrani* (Moore, [1866]) (خانواده Hesperiidae) از منطقه بانکورا واقع در بنگال غربی هند گزارش شد. مکانیسم دفاعی لارو پروانه از طریق حرکت مارپیچی فشرده به دور خود نیز مشاهده گردید.

**واژگـان کلیدی:** گیاه میزبان، بنفشه‌آبی، بارقه تخته‌سنگی، بال‌مسطح سه‌رنگ، حفاظت زیستگاه