



***Breynia retusa* (Phyllanthaceae): New Larval Host Plant for *Eurema andersonii* (Moore 1886) (Lepidoptera: Pieridae) from India**

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Abstract: The life cycle of *Eurema andersonii* from the oviposition to the emergence of adult completed on 27-28 days. During the present study *Eurema andersonii* completed its complete life cycle on *Breynia retusa*. therefore, *Breynia retusa* is reported here as a new larval host plant of *Eurema andersonii* from Arunachal Pradesh India.

Keywords: *Eurema andersonii*, *Breynia retusa*, Phyllanthaceae, Vijaynagar, Arunachal Pradesh

Eurema andersonii (Moore 1886) belongs to the Pieridae family and is commonly known as the One-spot Grass Yellow and is distributed in India (Southern India to Southern Maharashtra, Uttarakhand, Sikkim-Arunachal Pradesh, NE, Andaman Island), Bhutan, Myanmar, Sri Lanka (Kehimkar 2016) and Nepal (Van der Poel 2020). The genus *Eurema* Hubner, 1819 consists of approximately 70 species with different geographical distributions but to date, India has reported 7 species viz., *E. andersonii*, *E. blanda*, *E. brigitta*, *E. hecabe*, *E. laeta*, *E. nilgiriensis* and *E. simulatrix*. The species *E. andersonii* comprises three subspecies: *evansi*, *jordani* and *shimai*. The subspecies *E. a. jordani* Corbet & Pendlebury, 1932 is distributed from Uttarakhand to N.E. India, and West Bengal (Varshney & Smetacek 2015). Initially, *E. jordani* was recognised as a separate species, Jordan's Grass Yellow (Talbot 1939).

The previously reported larval host plants were *Ventilago goughii* (Yata and Gaonkar 1999, Nitin et al 2018) and *Ventilago maderaspatana* (Naik and Mustak 2020) which belongs to the family Rhamnaceae. However, *Breynia retusa* (Dennst.) Alston, which belongs to the family Phyllanthaceae, has not been previously reported elsewhere from India. The distribution and abundance of insects are significantly influenced by the availability and abundance of their host plants (Knops et al 1999). Therefore, understanding the intricate relationships between butterflies and their host plants will help in the development of targeted conservation strategies that nurture and protect these delicate miniature fluttering jewels.

MATERIAL AND METHODS

The survey was conducted over 2 years, from January 2021 to December 2022, in the remotest Eastern circle of Vijaynagar, Arunachal Pradesh, India (Fig. 1). The survey

was carried out in different habitats such as agricultural fields, roadside vegetation, human habitat areas, forest patches, vegetation near the riverbed and stream and inside the forest area where sun rays could pass. Observations of oviposition behaviour were conducted, where an adult female butterfly was observed depositing eggs under the surface of young and mature leaves of *Breynia retusa*. Eggs and host plants were subsequently collected for rearing in the laboratory to facilitate the examination of the entire life cycle. The photographic records were taken at each developmental stage, and documentation was done by a Canon EOS 80D camera equipped with a Tamron 90 mm macro lens. The emergence of an adult butterfly was identified (Kehimkar 2016).

RESULTS AND DISCUSSION

The three adult females of *Eurema andersonii* were observed depositing eggs singly under the surface of young leaves and shoots of *Breynia retusa* at village Mazgaon (27°13'37.59"N; 96°58'32.51"E) of Vijaynagar, Arunachal Pradesh on November 08, 2021. A few eggs were also observed under the surface of the mature leaves. The six eggs were collected and reared under laboratory conditions to document their life stages. The remaining eggs were reared on the larval host plant in the natural habitat. The collected eggs and eggs in the larval host plant hatched after 4-5 days. Newly hatched caterpillars started feeding on their eggshells as their first meal, later they began to feed on the tender leaf tissue except the veins. After moulting to third instars, all the caterpillars including the caterpillars that were left on their natural habitat died, as *Breynia retusa* is very tender and due to the extreme cold in the region caused all the leaves to shed from the host plants.

To confirm the new larval host plant for *Eurema*

andersonii, a repeat rearing of the life cycle was performed to ensure the accuracy of host plant identification and facilitate a more comprehensive understanding of the life history of *Eurema andersonii*. A subsequent observation on 24 August 2022, at Buddhamandir (27°12'36.02" N and 96°59'38.13" E), revealed a single adult *E. andersonii* engaged in oviposition on the upper surface of the young leaves of *Breynia retusa*. Three freshly laid eggs were collected to monitor different stages under laboratory conditions. Hatching of larvae occurred 4-5 days after oviposition. On 29 August 2022, all three collected eggs were successfully hatched and commenced feeding on their eggshells as a first nutrient source before transitioning to leaf tissue consumption. On 8 September 2022, the larvae ceased feeding and searched for suitable pupation sites. On 9 September 2022, the larvae decreased in length and subsequently secured themselves to a substrate via silk-like threads before entering the pupal stage. On 19 September 2022, the pupae became translucent, indicating imminent adult emergence. On 20 September, 2022, an adult *Eurema andersonii* emerged at 08:00 hours, dried its wings and achieved flight readiness by 10:30 hours. The life cycle from the oviposition to the emergence of adult took 27 to 28 days. Photographic documentation of various life stages conducted throughout the rearing process (Plate 1). The comprehensive review of the literature revealed that the Phyllanthaceae family had not been previously documented as a larval host plant for *Eurema andersonii*. Therefore, this study report *Breynia retusa* (Phyllanthaceae) as a new larval host plant for *Eurema andersonii* from Vijaynagar, Arunachal Pradesh, India (Plate 2).

Breynia retusa (Dennst.) Alston is a compact shrub, reaching heights of 1-2 m, with spreading branches and elliptical leaves measuring 1.25-2.5 cm in length. The small

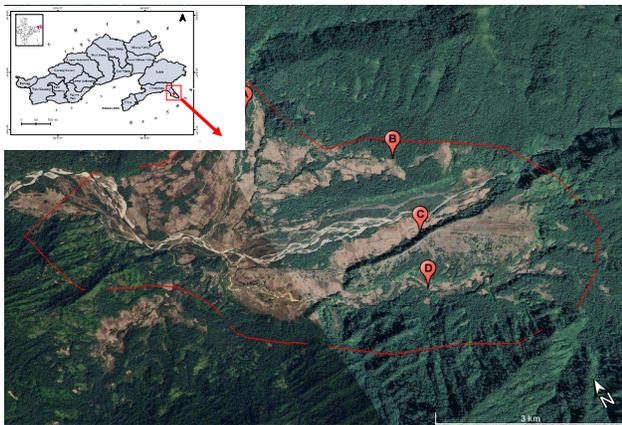
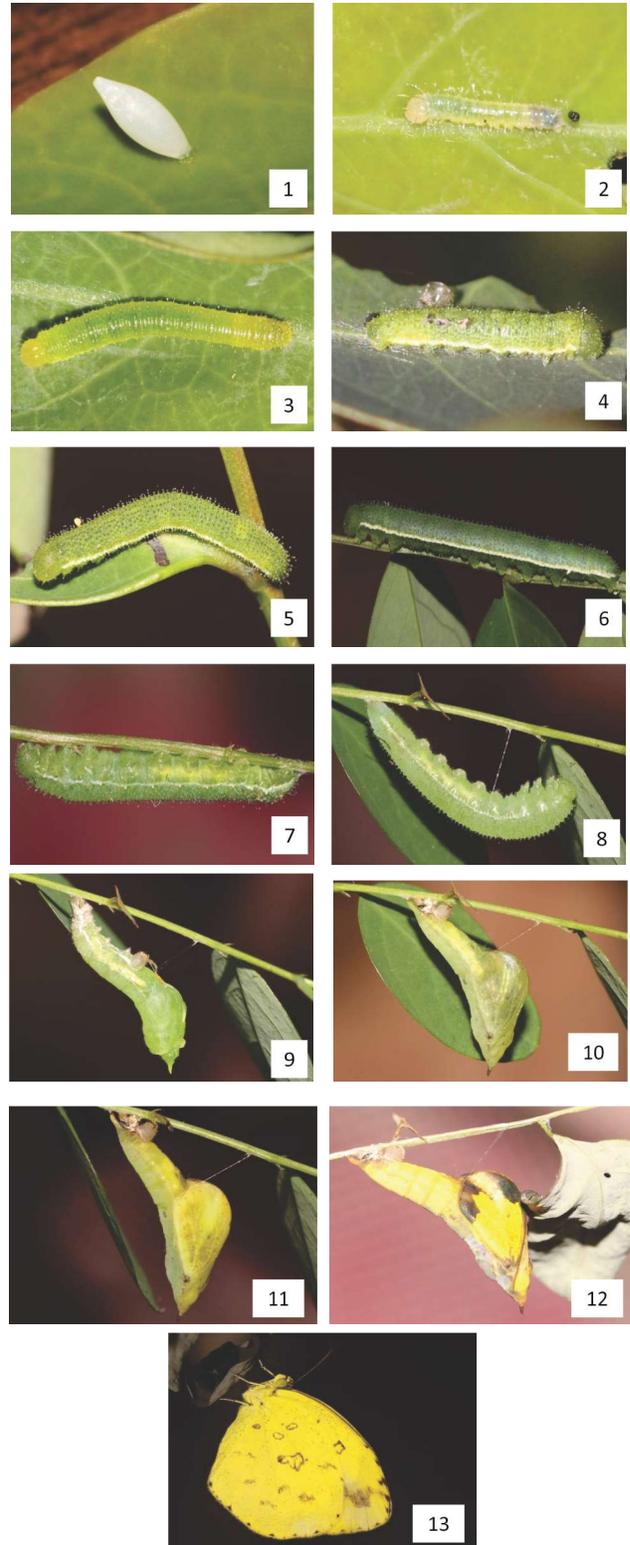


Fig. 1. Maps of Vijaynagar (District Changlang) Arunachal Pradesh: A-Mazgaon; B-Buddhamandir; C-Daragaon; D-Daowdi

Plate 1. 1- Egg; 2-1st instar caterpillar; 3- 2nd instar caterpillar; 4- 3rd instar caterpillar; 5- 4th instar caterpillar; 6- 5th instar caterpillar; 7- prepupatory caterpillar; 8- prepupatory caterpillar spins a silk pad and silk girdle; 9- Pupation; 10- Pupa; 11- Pupa become translucent for enclosed; 12- Mature pupa; 13- Newly enclosed *Eurema andersonii* (Moore 1886)

Table 1. Details of the sampling sites of the host plant in Vijaynagar, Arunachal Pradesh

Site	Village	Latitude (N)	Longitude (E)	Altitude (m)
A	Mazgaon	27°13'37.59"N	96°58'32.51"E	1242 m
B	Buddhamandir	27°12'36.02"N	96°59'38.13"E	1296 m
C	Daragaon	27°11'51.80"N	96°59'29.99"E	1216 m
D	Daowdi	27°11'23.41"N	96°59'17.68"E	1220 m

**Plate 2.** 1, 2 -Plant of *Breynia retusa* (Phyllanthaceae); 3- Flowers of *Breynia retusa*

flowers are axillary and borne on thin pedicels, with males in the lower axils and females in the upper axils and the male flowers are pale yellowish. The fruit is depressed-globose and approximately 13-17 mm in diameter (Bhagyasri et al 2017). It is distributed in India, Bhutan, China, Malaysia, Cambodia, Laos, Vietnam, Thailand, Nepal (Kumar and Balakrishnan 1996) and Bangladesh (Bhagyasri et al 2017). In the present study, *Breynia retusa* was predominantly documented near water sources, thriving within areas of fragmented shrub vegetation (Table 1).

AUTHOR'S CONTRIBUTION

RL analysed the data and performed the experiments. RG contributed to larval host plant identification. RU

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conducted species identification and verification. RA provided overall guidance and supervision. All the authors reviewed, edited, and approved the final manuscript.

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