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Suman Bhowmik
Lepidoptera Conservation and Research Division, Wild Tripura Foundation, Dhaleshwar, Road No. 13, Agartala, Tripura, India

Sandip Malakar
Wild Tripura Foundation, Dhaleshwar, Road No. 13, Agartala, Tripura, India

Atanu Bora
Department of Zoology, Moran College, Moranhat, Assam, India

Corresponding Author:
Atanu Bora
Department of Zoology, Moran College, Moranhat, Assam, India

Rediscovery of *Ypthima watsoni* Moore, 1893 (Lepidoptera: Nymphalidae: Satyrinae) to India and new record to Tripura, North East, India

Suman Bhowmik, Sandip Malakar and Atanu Bora

Abstract
In this paper, the authors documented the rediscovery of Looped Threering *Ypthima watsoni* Moore, 1893 belonging to subfamily Satyrinae and family Nymphalidae of insect order Lepidoptera near Phuldungsei village in Jampui Hills, North Tripura district, India. The species has not been recorded for approximately 61 years since its last description from India. The first picture of the live butterfly from India is presented with taxonomic description, notes on habit and habitat and discussion on the present status of the species. The rediscovery is based on the survey carried out in Jampui Hillls of North Tripura district on 6 August 2019 at approximately 10.00hr. There is a sufficient gap of more than half century in updating the distribution records and hence claiming the rediscovery of this species for India is justified. This rediscovery is important in the context of updating the status and distribution of the butterfly fauna for Tripura, India.

Keywords: Rediscovery, looped threering, *Ypthima watsoni*, lepidoptera, jampui hills, Tripura

1. Introduction
The state of Tripura of northeastern India is situated in the western heart of Indo-Myanmar global hotspot [21, 27]. The forest of the state is mostly dominated by semi-evergreen to moist deciduous plants and secondary bamboo brakes [18]. Tripura has a rich biodiversity attributed to its geographical position in the Indo-Myanmar, Indo-Malayan and parts of Indo-China regions sharing a close proximity with Bangladesh. The state is bounded by Bangladesh on the north, west, south and southeast, whereas in the east, it shares a common boundary with Assam and Mizoram. The rich biodiversity of the state can be summarized by the occurrence of 1,583 plant species belonging to 862 genera in 193 families [7, 17], 90 species of mammals [14], 17 species of amphibians, 35 species of reptiles [19] and 300 species of birds [6, 3]. The butterflies of Tripura have never been focused properly and little is known about the availability and distribution of butterflies over the past few years.
The genus *Ypthima* Huebner, 1818 consists of 35 species in India, of which 23 species have been recorded in North-East India. Of these 23 species, 8 species have been represented under the common name 'Threering'. In north-east India, only 6 species of *Ypthima*, under common name 'Threering' have been recorded [29]. A review of the past literature of butterflies of Tripura showed no record of *Ypthima watsoni* [24, 20, 15, 16, 7, 23, 2]. In addition, review of literature on Indian butterflies showed no recent record of *Y. watsoni* since its last original description. Keeping this in mind, the present paper was made to describe the rediscovery of *Ypthima watsoni* to India and a new addition to butterfly fauna of Tripura, Northeast India.

2. Materials and methods
The authors are constantly surveying butterflies in different states of North-East India to document current populations, distributions and status of butterflies for the past five years. As part of his long-term monitoring and diversity inventory program, Suman Bhowmik conducted preliminary surveys at different locations of Jampui Hills from 5-7 August, 2019, sighting *Ypthima watsoni* near Phuldungsei village. Details of the present finding are provided in this paper.
While searching the literature for records of this species, the authors realized that it had not been reported for approximately 61 years since its last original description [5]. Moreover, nothing is known about its present distribution, habitat or current populations.

Therefore, we presented here a summary of the present finding, note on its habitat, first photograph of the live butterfly from India and discussion on its taxonomic status. While discussing the taxonomic status of the species, the authors have used original taxonomic description available on the past literatures [22, 10, 11, 12, 26, 5, 28].

3. Results & Discussion

3.1 Species Description and distinguishing characters

In this section, taxonomic status and identity of *Ypthima* listed under common name 'Threering' found in North-East India are discussed with special reference to the present rediscovery.

3.1.1 Looped Threering *Ypthima watsoni* var. *howarthi* Crantlie and Norman, 1959: Upperside dark olivescent-brown in both sexes but paler in female. Both wings upperside with a darker brown submarginal fascia followed by a slender marginal line. Upperside forewing with a large subapical ocellus, bipupilled with silvery-white, and encircled by discal brown fascia. Upper hindwing with a single moderately large subanal ocellus with angulated discal brown fascia.

Underside dull whitish-cinereous marked with thick dark-brown striae. Underside forewing with a large sub-apical ocellus, broadly encircled with pale ochreous and submarginal brown fascia. Underside hindwing with a large apical ocellus, followed by a large subanal and a conjoined anal ocellus, each covered by a broad pale-ochreous ring and silvery-blue pupil. The anal ocellus is bipupilled [22]. In their taxonomic description of *Ypthima watsoni*, Cantile and Norman, 1959 [5] mentioned the formation of a loop by discal fascia with the submarginal fascia towards the dorsum on the upper and underside of forewing, which they considered is a feature of *Y. watsoni*.

The taxonomic diversity of Ypthima found in North-East India, listed under common name 'Threering' are [29] **-**

1. Common Threering *Ypthima asterope mahratta* Moore, 1884
2. Assam Threering *Ypthima fusca* Elwes & Edwards, 1893
3. Plain Threering *Ypthima lycus lycus* de Niceville, 1889
4. Newar Threering *Ypthima newara newara* Moore, 1875
5. Burmese Threering *Ypthima norma burmana* Evans, 1923
6. Looped Threering *Ypthima watsoni* var. *howarthi* Cantlie and Norman, 1959

Ypthima asterope can be identified by the underside hindwing with very smaller: Sub-apical, sub-tornal and tornal ocellus. The subtornal ocellus not conjoined with tornal one. *Ypthima fusca* has the underside hindwing similar to *Y. newara* but Cantile and Norman mentioned presence of a whitish post-discal band, which is prominent in *Y. fusca*.

Ypthima watsoni is most similar to *Y. lycus* and *Y. norma* but differ in position, arrangement and size of ocelli, and formation of a loop on upper and under forewing. The apical and sub-tornal ocellus of under hindwing in *Y. watsoni* is almost of the same size followed by a conjoined tornal ocellus which is unique to this species. In addition, the discal fascia forms a loop with the submarginal fascia towards the dorsum on the upper and underside of forewing, which Cantile and Norman, 1959 [5] considered a feature of *Y. watsoni*. Underside hindwing of *Y. lycus* has the sub-apical ocellus large similar to *Y. watsoni* but with a small sub-tornal ocellus and a separated bipupilled tornal ocellus unlike *Y. watsoni*. *Ypthima norma* has the sub-apical ocellus comparatively small with the sub-tornal ocellus almost double the size of the sub-apical ocellus unlike *Y. watsoni*. The tornal ocellus not conjoined with the sub-tornal one.

3.2 Taxonomic status of *Ypthima watsoni*

The taxonomic status of Y. watsoni has changed substantially since its original description by Moore, 1893 [22]. In its original description, Moore described *Ypthima watsoni* as *Pandima watsoni* on Lepidoptera Indica, volume II (1893-1896), page 89, plate 113, fig. 4. In the same year, Elwes and Edwards described *Pandima watsoni*, Moore, 1893 as *Ypthima watsoni* on their revision for the genus *Ypthima* with special reference to the characters afforded by the male genitalia published in the Transaction of the Entomological Society of London, page 47, species number 60, plate 1, fig. 25 [10].

After Elwes and Edwards, this species was described as *Ypthima watsoni* by many lepidopterists [30, 1, 4, 13, 9, 12] till Talbot, 1947 [26] who redescribed *watsoni* as a subspecies of *Ypthima pandocus* on page 323, species number 374 of The Fauna of British India, including Ceylon and Burma, volume II. Talbot in his description nullified all the old literature including the wet season form described by Moore, 1893 considering that *watsoni* is a subspecies of the species *Ypthima pandocus*. He further concluded that the dry season form of *Pandima watsoni* described by Moore and *Ypthima watsoni* described by Elwes and Edwards, 1893 belongs to a distinct species described by him on page 324 as *Ypthima akbar*. Cantile and Norman, 1959 [5] on their notes for the butterfly genus *Ypthima* published in Journal of the Bombay Natural History Society, volume 56, No. 1 described this species as *Ypthima watsoni* on page 66. They nullified the description of Talbot on *Ypthima pandocus watsoni* pointing out that the clasp of male genitalia of the species *pandocus* is quite different from that of the species *watsoni*. They further added that the clasp of *pandocus* described by Talbot on page 323 was actually belongs to the species *watsoni*. In their literature review, Cantlie and Norman [5] also mentioned the works of Elwes and Edwards [10], and concluded that Elwes and Edwards figured the clasp of *Y. pandocus* correctly following Talbot. Cantlie and Norman agreed to the point suggested by Talbot that the figure of clasp of *watsoni* presented by Elwes and Edwards belongs to *Ypthima akbar*. The name given meanwhile by Cantile and Norman was *Ypthima watsoni* var. *howarthi*, in acknowledgment of the help given by Mr. T. G. Howarth of the British Museum (Natural History) [5].

3.3 Historical records and status of *Ypthima watsoni*

Moore, 1893-1896 [22] in his original description provided notes on historic records and distribution of *Ypthima watsoni*. Specimens of the wet-season brood were taken by Signor Leonardo Fea at Palon, in Pegu, during August, and others at Bhamo in November. In Major C.H.E Adamson's Collection were examples from Kindat in Chindwin, taken in November, 1891, and others from Pyoumyoung in the Shan States, taken in July. Dr. N. Manders recorded this species (Tropical Entomological Society 1890, 519), under *Ypthima newara*, five specimens of both sexes taken in the wet and dry seasons, in the Shan States, one of which was taken in April on the Yatsouk Expedition. Watson took examples of the dry-season

brood at Toungoo in January and March, 1891. Dr. J. Anderson took specimens in Burma during the Yunan Expedition. The species is historically known to occur in Manipur and the holotype and paratype of the species were collected by Cantile and Norman on 26 September, 1957 from Sebong, Manipur, India [25]. Cantile and Norman collected all dry season forms of *watsoni* from November till February, with one in March. The wet season form has been collected throughout the period April to October indicating availability of several broods.

3.4 Present sighting with locality and habitat information

Ypthima watsoni var. *howarthi* was rediscovered on 6 August, 2019 based on a photographic documentation by Suman Bhowmik during a preliminary survey at Jampui Hills. Jampui Hills is a hill range located in North Tripura district in the north eastern part of the Indian state of Tripura. The hill range stretch from North to South bordering the state of Mizoram in the east with Betlingchhip (approximately 930 meters) is the highest point in Tripura. There are 10 small villages in Jampui Hills, from North to South are – Vaisam, Hmawngchuan, Hmunpui, Tlaksih, Vanghmun, Betlingchhip, Bangla Zion, Tlangsang, Sabual and Phuldungsei, where the species *Ypthima watsoni* var. *howarthi* was recorded.

Fig 1-2: *Ypthima watsoni* var. *howarthi* Crantlie and Norman, 1959. A, upperside view; B, underside view.

The village Phuldungsei has the geographical coordinates of 23° 49’ 0” North latitudes and 92° 16’ 0’’ East longitudes. It shares an altitude of approximately 800 meters above mean sea level. The village serves as a gateway between Tripura and Mizoram being part of the national highway connecting the two states via Betlingchhip.

There is no present information on the habit and habitat of this species for India; however Suman Bhowmik sighted one individual on the rocky hills along roadsides near Phuldungsei village of Jampui Hills which was photographed on the grasses growing over rocky surface. The road connecting the village Phuldungsei is accompanied by hill patches on one side and hill slopes on the other side. The area is covered by mixed vegetation type ranging from small herbaceous bushes and plants to large trees.

Fig 3: Map showing locality where *Ypthima watsoni* var. *howarthi* was sighted and photographed near Phuldungsei village on 06 August, 2019.

3.5 Revision of distributional range of *Ypthima watsoni* var. *howarthi:*

The present record of *Ypthima watsoni* var. *howarthi* revised the distribution of this species in the past literature of Indian Lepidoptera, extending the distribution range from Manipur to Tripura in North-East India.

4. Conclusion

In India butterflies are legally protected under various schedules of the Indian Wildlife Protection Act, 1972. The protection of various species (except scheduled species) is mostly confined to protected areas like National Parks,

Wildlife Sanctuaries and other areas under legal protection of State's Forest Department. However, some unique and interesting species are still distributed in small villages and human inhabitant areas either due to availability of food and nectar resources or occurrence of larval host plants. Since the present rediscovery of *Ypthima watsoni* var. *howarthi* is recorded in a small village in Jampui Hills, this indicates the importance of protecting the village landscapes of the state. Therefore the authors would like to conclude and suggests that legal protection in terms of community awareness or participation should be introduced in villages and areas outside protected areas of the state in order to save and conserve the unique biodiversity of Tripura as a whole.

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