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Rediscovery of the Sumatran Endemics *Onychogomphus rappardi* (Odonata: Gomphidae) and *Herona sumatrana sumatrana* (Lepidoptera: Nymphalidae), with Notes on Observations of Other Rare Butterflies and Moths from the North of Sumatra

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Abstract
Several rare insects were observed around Ketambe in the centre of the Leuser Ecosystem in July 2024. The main subjects discussed are the micromoth *Collinsa* sp. aff. *sphoraria* Swinhoe (supposedly new to science) and the rediscoveries of the dragonfly *Onychogomphus rappardi* Lieftinck, 1937 and the butterfly *Herona sumatrana sumatrana* Moore, 1881. Both *O. rappardi* and *H. sumatrana sumatrana* are Sumatran endemics. Other observations of several rare species are the butterflies *Arhopala athada athada* (Staudinger, 1889), *Deramas livens livens* Distant, 1886, *Jamides malaccanus celinus* (Fruhstorfer, 1916); and the moths *Corymica deducta* (Walker, 1866), *Speiredonia sandokana* Zilli & Holloway, 2005 and *Teulisna plagiata* Walker, 1862.

Keywords: butterflies, dragonflies, moths, rare, Sumatra.

Introduction

Northern Sumatra is famous for its Gunung Leuser National Park, part of the UNESCO World Heritage Site 'Tropical Rainforest Heritage of Sumatra' (UNESCO 2024). The area is relatively well researched, particularly because it is the habitat of the Sumatran Orangutan *Pongo abelii* (Ebsyar *et al*. 2023). Ketambe (Aceh Province) and Bukit Lawang (Sumatra Utara Province) are two ecotourist sites where Sumatran Orangutan can be encountered. In 1971, Herman Rijksen established the Ketambe Research Station, especially designated for the research of the orangutans. This research station was also frequented by other scientists, like taxonomists Willem de Wilde and Brigitta de Wilde-Duyfjes who in 1979 collected the material of what 30 years later appeared to be the orchid species *Calanthe leuseri* P.J.Cribb, 2009, an endemic of the Ketambe area (Clayton & Cribb 2013).

Based on the online platforms for public observations of species of all kinds of taxonomic groups, like iNaturalist (iNaturalist 2024), the phenomenon of what is called 'citizen science' is becoming more and more important in the field of the knowledge of the distribution of species. That knowledge is crucial for the protection of biodiversity – not only of well-known species like the Sumatran Orangutan, but especially of insects and arachnids (Rachman *et al*. 2024). This paper shows how easy it is to find - even during a short visit - insect species that were not previously known to the island of Sumatra or to rediscover endemic taxa which have not been recorded for 75 years or more.

In this paper, the rediscovery of the Sumatran endemics *Onychogomphus rappardi* (Odonata: Gomphidae) and *Herona sumatrana sumatrana* (Lepidoptera: Nymphalidae) is discussed, with notes on observations of other rare butterflies and moths from the Ketambe area.

Methods

The observations of the species discussed in this paper were made by the author in July 2024 during a visit to the the primary and secondary forests around the village of Ketambe, Aceh Province (Fig.1-3). In addition to these observations, the only other recent observation of the dragonfly *Onychogomphus rappardi*, made by C.W. Gan, is included in this paper.

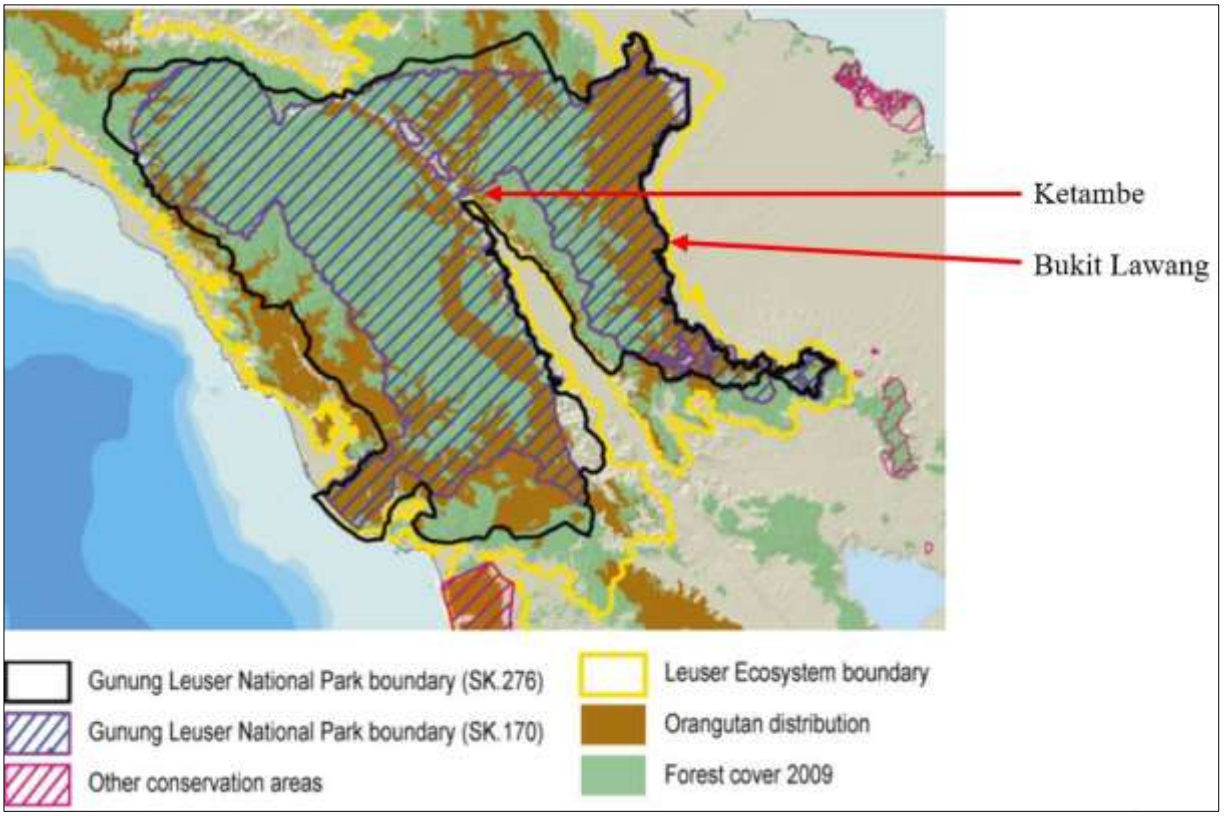

Figure 1. Gunung Leuser National Park (https://www.grida.no/resources/6401), with locations mentioned in the text.

Recent and historical data on thedistribution of the species discussed in this paper were collected using the websites www.iNaturalist.com (iNaturalist 2024) and Global Biodiversity Information Facility (GBIF 2024), complemented with literature cited in the text. The relatively new online platform Observation.org (https://observation.org) did not have any records of the species discussed.

Results and Discussion

The results will be discussed in four sections. Firstly an observation of a hitherto unknown moth species is presented, provisionally named *Collinsa* sp. aff. *sphoraria* Swinhoe (after the species it seems to be closest to). In the second section the rediscovery of *Onychogomphus rappardi* Lieftinck, 1937 and *Herona sumatrana sumatrana* Moore, 1881, both endemics of Sumatra, are discussed. In the third section other Lepidoptera species that are very rare in Indonesia and regionally (re)discovered in Sumatra are discussed: the butterflies *Arhopala athada athada* (Staudinger, 1889) and *Deramas livens livens*Distant, 1886, and the moth *Teulisna plagiata* Walker, 1862. In the last section, other Lepidoptera species that are very rare in Indonesia, although recently seen on Sumatra by others, are briefly discussed: the butterfly *Jamides malaccanus celinus* (Fruhstorfer, 1916), and the moths *Corymica deducta* (Walker, 1866), and *Speiredonia sandokana* Zilli & Holloway, 2005.

Figure 2. Map of the Ketambe area. The triangle is the location of *Collinsa* sp. aff. *sphoraria* and *Herona sumatrana sumatrana* (the location described in the text as east of the Blangkejeren-Kutacane road is a little further to the east). The hexagon is the location of *Onychogomphus rappardi*. Visible are the narrow corridor of primary forest north of the village of Ketambe, and Alas River with three tributaries (aerial photo from www.google.nl/maps).

Figure 3. Foothills of east Ketambe, close to the location of *Onychogomphus rappardi*, with plantations, secondary forest and – presumably – remnants of primary forest (Photograph: Dick Bal).

Discovery of a new species of the genus *Collinsa*

On 26 July 2024 a small but rather conspicuous moth was photographed (Fig. 4) north of Ketambe, between the Blangkejeren-Kutacane road (that crosses the Gunung Leuser National Park) and River Alas. The location, at around 3º41'32"N/97º39'07"E (the same as the triangle in Fig. 2), is part of a narrow corridor of primary rainforest at about 500 m above sea level (asl), connecting the forests on the higher mountains east and west of the road. The forest belongs to the hill dipterocarp forest type, with species like *Macaranga triloba*, *Parashorea lucida* and *Rubroshorea leprosula* (*pers obs.*).

The observation (iNaturalist 2024a) was submitted to two micromoth specialists via iNaturalist, Roger Kendrick and Terry Whitaker, with the suggestion that it was *Collinsa sphoraria* Swinhoe, 1892, a species from the Thyrididae family. They concluded, however, that it is a hitherto unknown 'morphospecies' closely related to that species. It is as yet undescribed and received therefore on iNaturalist the morphospecies code "GL *Collinsa* sp. near *sphoraria* (Sumatra)". For the purpose of reference in other publications, the more suitable name *Collinsa* sp. aff. *sphoraria* is chosen, indicating that the undescribed species has affinity to *Collinsa sphoraria* Swinhoe, 1892, a species that is distributed from India to Australia. The differences with the latter species are as follows: the apex is more extended, almost hook-like; the subapical oblique stripe and mid-termen blotch differ in straightness and shape, and the pattern colour of the main ground colour is a richer burgundy brown than the plainer orange brown of *Collinsa sphoraria*. The species is also closely related to an undescribed *Collinsa* species from Sumatra called '*Collinsa* sp. 11' on the website 'Pyralids of Borneo plus Thyridids' (http://pyralidsofborneo.org/index.php?collinsa-sp-11-plate-4-not-borneo). It is not unusual that Thyridid moths remain undescribed for a long time and have to be given provisional names. On the website 'Pyralids of Borneo plus Thyridids'295 morphotypes are included which remain to be described as new species.

Figure 4. *Collinsa* sp. aff. *sphoraria* Swinhoe, Gunung Leuser National Park, near Ketambe (Photograph: Dick Bal).

Rediscovery of two Sumatran endemic taxa

The first species to be discussed in this section is the dragonfly *Onychogomphus rappardi* Lieftinck, 1937, from the Gomphidae family. The species was first described in Lieftinck (1937) from a specimen of a male, collected by F.W. Rappard "over an exposed stream near Pagar Gunung, 550 m" (Lieftinck 1954), southeast from the city of Bengkulu (Bengkulu Province). The holotype is in Naturalis, Leiden, The Netherlands (GBIF 2024a). The species was previously – under different names – reported from Sanggaran Agung and from west of Bangko (Jambi Province) in 1914 and 1915 respectively, and from Takengon (in the centre of the Aceh Province) in 1929. These locations are shown with small squares in Fig. 5. Lieftinck (1954) also mentioned an observation "in the bed of a rocky forest brook on Mt. Dempo, 1.000 m", near Pagar Alam (Sumatra Selatan Province), presumably from 1936, because it is an observation not far from the location of the holotype. Dow *et al.* (2021) stated that the species was "known with certainty only from the holotype male from southwest Sumatra". Rory Dow assessed the status for the IUCN Red List in 2007 and wrote: "*Onychogomphus rappardi* is a very poorly known species. There have been very few records, and none in more than 50 years, but there has been almost no expert sampling on Sumatra over this period. Until more information becomes available it must be listed as Data Deficient" (Dow 2009). With "none in more than 50 years" he referred to Lieftinck (1954), but in that publication no later observations were mentioned than summed up before, so the last historical records are from 1936.

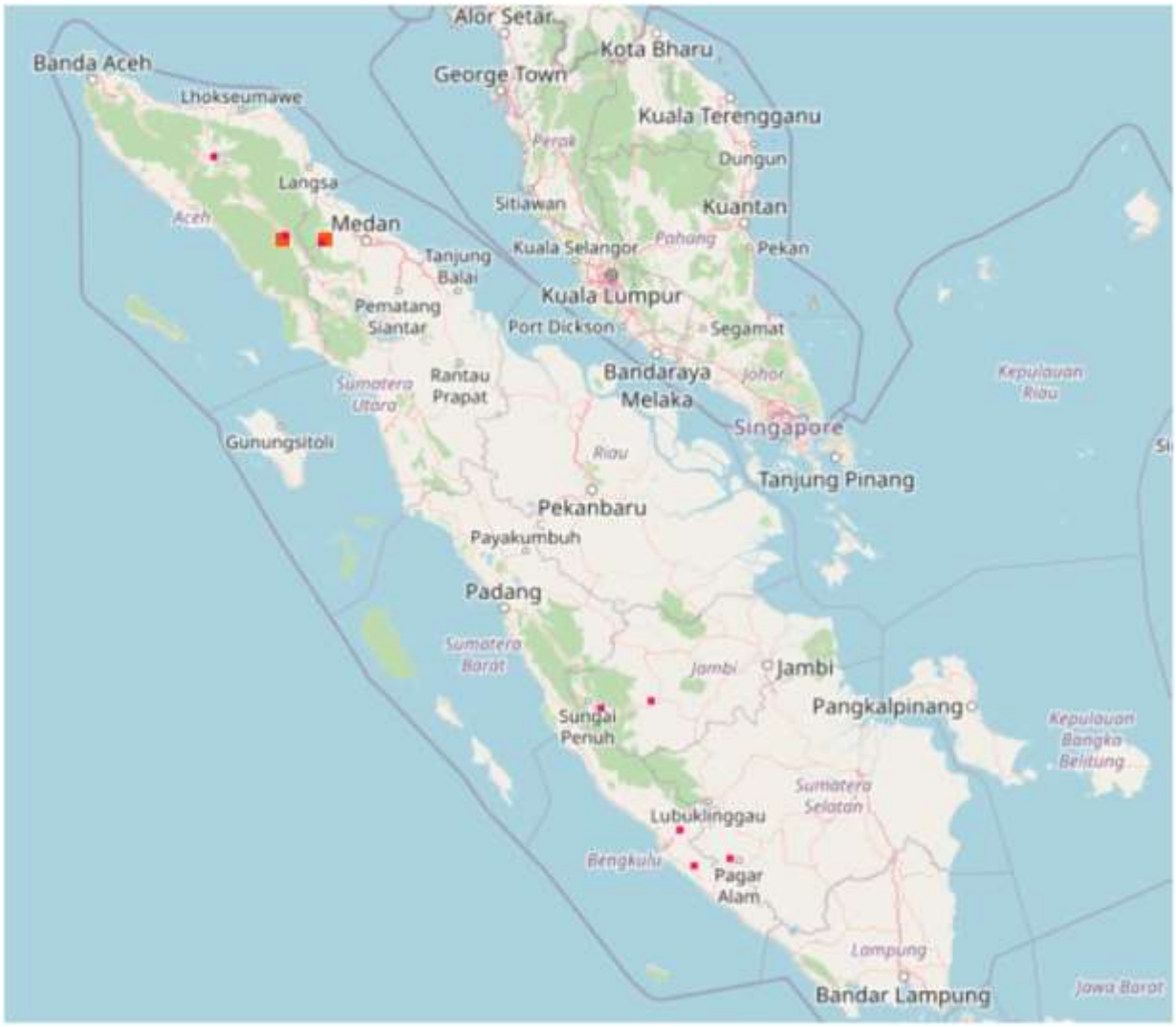

Figure 5. Map with the known locations of *Onychogomphus rappardi*; the small squares represent the historical records from GBIF, the large squares the recent records, all discussed in the text (iNaturalist 2024b).

Figure 6. *Onychogomphus rappardi* in secondary forest, Ketambe (Photograph: Dick Bal).

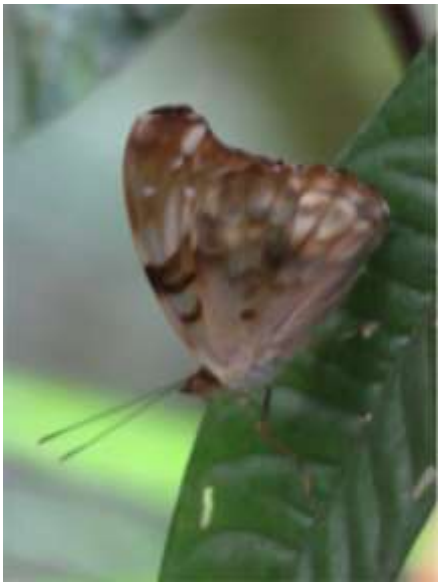

Figure 7. *Onychogomphus rappardi*, same individual as above (left). **Figure 8.** *Herona sumatrana sumatrana* (right), Gunung Leuser National Park, near Ketambe (Photographs: Dick Bal).

The first observation after 86 years was made by C.W. Gan at Bohorok River in Bukit Lawang (Sumatra Utara Province), at 3º33'N/98º07'E (iNaturalist 2024c). The observation dates from 28 December 2022, but the species was not recognized on iNaturalist until 12 June 2024. The dragonfly was encountered along a trail parallel to the clear, fast-flowing river with sand banks, moss-covered rocks and tangled roots, providing ample perching and foraging sites for dragonflies. This river winds through tropical rainforest on steep hills. The trail was shaded and relatively quiet, with a mix of dappled sunlight filtering through the forest canopy (C.W. Gan, *pers. comm.*).

The second observation was made by the author on 26 July 2024 in a patch of secondary forest between plantations at the edge of Ketambe, just outside Gunung Leuser National Park, at 3º40'31"N/ 97º39'47"E (iNaturalist 2024d). The dragonfly could be approached very easily when it perched above a very small stream along a path going uphill (Fig. 6 and 7). The situation resembles that of Bukit Lawang, also in being near the fast flowing, relatively large Alas River and a smaller tributary (both less than 200 m away).

Although there has been no research on the ecology of this species, it seems likely that *Onychogomphus rappardi*, like other species from this genus, is a species of fast flowing, small to medium large rivers with rocks. It prefers hilly, forested landscapes and has been seen resting in semi-shade not too far from the river.

The second species to be discussed in this section is *Herona sumatrana sumatrana* Moore, 1881, from the Nymphalidae family. The species was first described in Moore (1881) from a specimen collected (at an unknown date) in the Sultanate of Deli, which is nowadays part of North Sumatra Province. That sultanate comprised of two parts: the surroundings of Medan and the surroundings of Tebing Tinggi. After the publication of the species description, the nominate subspecies was collected only in 1949-1950 (as far as can be reconstructed with sources on the internet), in the same region: in Lauttador, east of Tebing Tinggi, at about 100 m asl, with 11 specimens from Natural History Museums in Rotterdam and Leiden, The Netherlands (GBIF 2024b). Note that the specimens in Naturalis with code ZMA.INS.5167009 and ZMA.INS.5167010 are from a species of the Pieridae family and were erroneously made part of the list of preserved specimens on GBIF; the georeferenced location of these specimens on the GBIF map (southern part of Sumatra) is to be ignored.

The nominate subspecies is endemic to Sumatra (Iqbal *et al.* 2021). There are seven other subspecies (Iqbal *et al.* 2021; Savela 2024): *schoenbergi* Staudinger, 1890 from Borneo, *djarang* Fruhstorfer, 1893 from Nias, *pringondani* Fruhstorfer, 1893 from Jawa, *dusuntua* Corbet, 1937 from Peninsular Malaysia, *pahala* Corbet, 1942 from Sabang and Weh Island, *attenuatus* Tsukada, 1991 from Nasi, and *artifex* Tsukada, 1991 from Pagai. The most recent known observations are from 1992 on Borneo (ssp. *schoenbergi*) and Jawa (ssp. *pringondani*), and from 1984 in Peninsular Malaysia (ssp. *dusuntua*) (GBIF 2024). No record is known from Sumatra since 1949 (M. Iqbal, *pers. comm.*).

The author photographed *Herona sumatrana sumatrana* on 26 July 2024 (Fig. 8; iNaturalist 2024e), north of Ketambe, between the Blangkejeren-Kutacane road and River Alas. The location (see the triangle in Fig. 2), at around 3º41'32"N/97º39'07"E. As yet, no details about the ecology of this species are known. It seems obvious, however, that the habitat of *H. sumatrana sumatrana* at the east coast of Sumatra Utara Province, where this species was found in the 19th century (Moore, 1881) and 1949-1950 (see above), must have been different to the hill dipterocarp forest type of Ketambe.

Species that are very rare in Indonesia, now (re)discovered on Sumatra

In this section, the observations are presented of three species that are very rare in Indonesia and have not - or at least not recently - been reported for Sumatra. The butterfly *Arhopala athada* (Staudinger, 1889), from the Lycaenidae family, is a species from mainland Southeast Asia, Indonesia and the Philippines. In Indonesia the nominate ssp. *athada* is presenton Sumatra, Kalimantan and Jawa (Iqbal *et al.* 2021). On iNaturalist and GBIF only observations from mainland Southeast Asia can be found. For Indonesia, on GBIF not even historical records can be found. A historical source of observations in Indonesia is Evans (1957): from Sumatra three males are mentioned (no location or date). No record is known from Sumatra since that publication (M. Iqbal, *pers. comm.*). *Arhopala athada athada* was photographed by the author on 24 July 2024 (Fig. 9A; iNaturalist 2024f), north of Ketambe, east of the Blangkejeren-Kutacane road. The location (east of - but close to - the triangle in Fig. 2), at around 3º41'32"N/97º39'07"E, consisted of the hill dipterocarp forest type.

The butterfly *Deramas livens* Distant, 1886, also from the Lycaenidae family, is a species from mainland Southeast Asia and Indonesia. In Indonesia the nominate ssp. *livens* is reported from Sumatra and Kalimantan (Iqbal *et al.* 2021). Based on iNaturalist and GBIF, recent observations are only known from mainland Southeast Asia. There are two records from Indonesia in 1983 that can be found on GBIF under the name *Deramas livena* Distant, 1886, without an exact location. A record without a date, under the name *Deramas livena livescens* Fruhstorfer, 1897, which is a synonym of ssp. *livens*, can be found on GBIF, with the location 'Bali'; Fruhstorfer described this taxon from the "Bai von Palabuan" on Jawa (Fruhstorfer, 1897). In De Nicéville & Martin (1895) two males are mentioned (under the synonym *Zarona pharygoides*) from "Bekantschan" (without a date). This has to be Bekancan, situated

northwest of Berastagi in North Sumatra Province, according to the description of this place on p. 359 of this publication and because two males from "northeast Sumatra" were mentioned in Fruhstorfer (1917), under *Poritia livens livens*, with reference to this publication. No record is known from Sumatra since these publications (M. Iqbal, *pers. comm.*), which means that there are no published observations on Sumatra in the last 130 years. *Deramas livens livens* was photographed on 25 July 2024 (Fig. 9B; iNaturalist 2024g) north of Ketambe, east of the Blangkejeren-Kutacane road, in the forest near what is known as the 'base camp', at the bank of a small river, further east from the location of *Arhopala athada athada*. Ketambe is less than 100 km away from Bekancan and both locations belong now to the eastern part of Gunung Leuser National Park, so these areas are still connected.

The moth *Teulisna plagiata* Walker, 1862, from the Arctiidae family, was described from a specimen from Sarawak (Malaysia). It looks more or less like *Teulisna karena* Černý, 2009, which is known from Sumatra with one published observation (GBIF 2024c), but that species misses the black apical spots. On iNaturalist and GBIF, *Teulisna plagiata* has hitherto only been recorded on the island of Borneo, mostly in Malaysia (Sabah and Sarawak), but also on one location in east Kalimantan – which seems to be the only record in Indonesia. The author photographed *Teulisna plagiata* on 26 July 2024 (Fig. 9C; iNaturalist 2024h) north of Ketambe, between the Blangkejeren-Kutacane road and Alas River. The location (see the triangle in Fig. 2), at around 3º41'32"N/97º39'07"E, was the same as described in the first section.

Figure 9. Butterflies and moths from Gunung Leuser National Park, near Ketambe: **A.** *Arhopala athada athada*, B. *Deramas livens livens*, and **C.** *Teulisna plagiata* (Photographs A and C: Dick Bal, B: Henriëtte Bal-Dieleman).

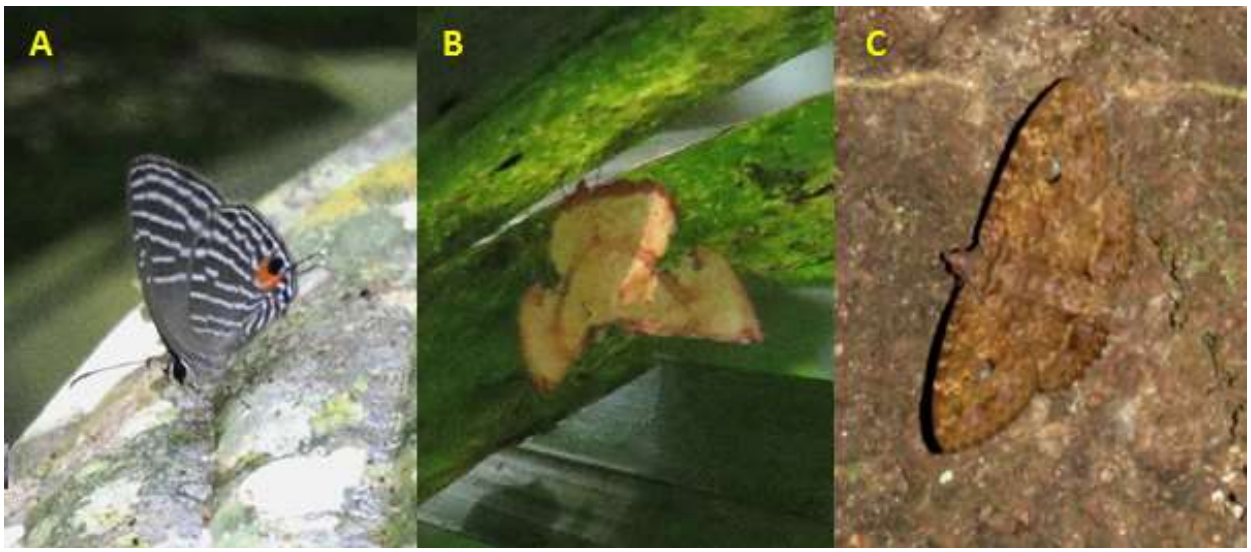

Figure 10. Butterflies and moths from Gunung Leuser National Park, near Ketambe: **A.** *Jamides malaccanus celinus*, **B.** *Corymica deducta*, and **C.** *Speiredonia sandokana* (Photographs: Dick Bal).

Notes on other species that are very rare in Indonesia

The butterfly *Jamides malaccanus* (Röber, 1886), from the Lycaenidae family, is a species from south-Thailand, Peninsular Malaysia and Indonesia. This species has one subspecies on Sumatra, *J. malaccanus celinus* (Fruhstorfer, 1916), an endemic subspecies of the island (Iqbal *et al.* 2021). The specimen in GBIF from Padang (GBIF 2024d) which has been identified as *Jamides malaccanus saturatus* (Snellen) is probably *Jamides parasaturata* (Fruhstorfer, 1916), that was also seen in the Bengkulu Province, because the male lacks the black submarginal spots on the upper hindwing of *Jamides malaccanus*; furthermore subspecies *saturatus* is a Javan endemic. On iNaturalist, there are two records of *Jamides malaccanus* [*celinus*] present for Sumatra, both from Bukit Lawang in 2022. The author photographed this species on 24 July 2024 (Fig. 10A; iNaturalist 2024i), north of Ketambe, east of the Blangkejeren-Kutacane road, which is some 50 km southeast from Bukit Lawang.

The moth *Corymica deducta* (Walker, 1866), from the Geometridae family, is a species that occurs from India eastwards to Japan and southwards to Indonesia. Historical and recent records for Indonesia are scarce, although this species can be easily recognized. The species was collected in 2000 in the hills north of Parapat (North Sumatra Province) and south of Padang (West Sumatra Province). The author photographed this species (Fig. 10B; iNaturalist 2024j) on the same day and location as *Jamides malaccanus celinus*.

The moth *Speiredonia sandokana* Zilli & Holloway, 2005, from the Erebidae family, is a species that was described from specimens collected around Toba Lake, North Sumatra Province (1981-1985). Other specimens are known from the island of Borneo (Malaysia and Brunei Darussalam) and recent observations on iNaturalist come from Peninsular Malaysia and Singapore. The author photographed this species on 25 July 2024 (Fig. 10C; iNaturalist 2024k), also north of Ketambe, east of the Blangkejeren-Kutacane road.

The observations discussed in this paper are important records of rare species insects in Sumatra. It should be emphasized, though, that a species that seems to be very rare, could have been just overlooked by scientists and both locals and tourists who take the trouble to post observations on internet platforms. But for the species discussed in this paper, it is clear that they benefit from the presence of a large stretch of rainforest in and around the Gunung Leuser National Park. Rainforest ecosystems are globally threatened by logging, draining, burning and other human activities. Thus it is important that both scientists and the general public document the value of this incredibly biodiverse ecosystem.

Acknowledgments

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