

**FIRST RECORD AND OCCURRENCE OF *ACRAEA TERPSICORE* (LINNAEUS, 1758) (LEPIDOPTERA: NYMPHALIDAE) IN MALAYSIAN BORNEO**

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**ABSTRACT**

The Tawny Coster, *Acraea terpsicore* (Linnaeus, 1758) (Lepidoptera: Nymphalidae) is recorded from Malaysian Borneo for the first time based on three specimens collected in Samarahan, southwestern Sarawak on 15th March 2013. Originally distributed in India and Sri Lanka, *A. terpsicore* is now known to have expanded its geographical range southwards to Southeast Asia and Australia over the last three decades. However, prior to 2013, there was no record of its occurrence on Borneo. Preliminary results of our field tracking and observations of the species in Malaysian Borneo within the last three years indicated that this species has recently become established in western Borneo and expanded its area of distribution from Samarahan 200 km northwards to Sri Aman.

Field observations of this butterfly and distribution map of the species on Borneo based on field visits from 2013-2016 are presented. This common Oriental butterfly species may expand its range of distribution further northwards to North Borneo.

**Keywords:** *Acraea terpsicore*, new record, range expansion, West Sarawak, Borneo.

## ABSTRAK

*Acraea terpsicore* (Linnaeus, 1758) (Lepidoptera: Nymphalidae) direkod untuk pertama kalinya di Borneo berdasarkan tiga spesimen yang diperolehi di Samarahan, barat-daya Sarawak pada 15 Mac 2013. *A. terpsicore* yang mempunyai taburan asal di India dan Sri Lanka, kini diketahui telah menyebarkan julat taburan geografinya ke selatan ke Asia Tenggara dan Australia sejak tiga dekad lalu. Walau bagaimanapun, sebelum tahun 2013, spesies ini tidak pernah direkod kehadirannya di Borneo. Hasil awal kajian penjejakan di lapangan dan pemerhatian spesies ini di Borneo selama tiga tahun lepas menunjukkan bahawa spesies ini telah bertapak di bahagian barat Borneo dan telah menyebarkan dari Samarahan ke 200 km ke utara ke arah Sri Aman. Pencerapan di lapangan dan peta taburan spesies ini di Borneo hasil kajian lapangan dari tahun 2013-2016 di sertakan di sini. Adalah dijangkakan bahawa spesies Oriental ini boleh seterusnya menyebarkan taburannya ke Utara Borneo.

**Kata kunci:** *Acraea terpsicore*, rekod baharu, julat pengembangan, Sarawak Timur; Borneo

## INTRODUCTION

*Acraea terpsicore* (Linnaeus, 1758) (Lepidoptera: Nymphalidae), commonly known as the Tawny Coster is a common Oriental species, originally found in India and Sri Lanka (Kumara et al. 2011). This small leathery winged butterfly

inhabits grasslands as well as scrub habitats (Kunte, 2000; Larsen, 2005). Over the last three decades, it has expanded its geographical range of distribution further southwards and occurrences had been reported in Southeast Asia and Australia (Matsumoto *et al.*, 2012; Braby *et al.*, 2013). Matsumoto *et al.* (2012) reported *A. terpsicore* from Indonesia and adjacent areas while Braby *et al.* (2013) documented its establishment in South-East Asia (Indonesian islands south of Malay Peninsula, and Timor) and Australia for the first time. Fig. 1 shows the known distribution of *A. terpsicore* in South-East Asia (south of Thailand) and north-western Australia according to Braby *et al.* (2013). Its occurrence in northern Peninsular Malaysia was first reported in 1992 (Arshad *et al.*, 1996) and in Singapore in 2006 (Khew, 2008). This species extended its distribution further south into Indonesia excluding Indonesian Borneo (Matsumoto *et al.*, 2012) and Timor and Australia in 2013 (Braby *et al.*, 2013).

Borneo is separated from Peninsular Malaysia and Singapore, at the southern tip of the Asian continental landmass, to its west by about 600 km of the South China Sea (Singh, 2012). Prior to 2013, there was no record of the occurrence of *A. terpsicore* in Malaysian Borneo. The discovery of *A. terpsicore* in West Sarawak indicates that this species has expanded its range into Borneo (Fig. 3) approximately seven years after reported from Singapore in 2006. The aim of this article is to report the first occurrence of *A. terpsicore* in West Sarawak, Malaysian Borneo as well as to present our observations of the species on its hostplant, *Passiflora foetida* in West Sarawak.

## MATERIALS AND METHODS

An annual rapid survey of insects in Samarahan, West Sarawak and its vicinity has been conducted since 1995. During our survey for the year 2013, we discovered *A. terpsicore* in Samarahan for the first time on 15th March 2013 and this record is substantiated

with data of past annual surveys of insects in Samarahan, which confirms its first occurrence.

Since our first sighting and collecting of this species, we had been monitoring and tracking its occurrence in West and North Sarawak and Sabah in northern Borneo for the past three years. Subsequent site visits were conducted monthly from 2013 until March 2016 in West and North Sarawak and the locations where its populations were found were recorded and mapped using ArcMap10.4. Field observations of the butterfly were also recorded. Other occurrence sites as reported in published scientific literature from Kalimantan, Indonesian Borneo were also compiled.

## RESULTS AND DISCUSSION

*A. terpsicore* was first recorded on 15th March 2013 from Taman Desa Ilmu in Samarahan (Table 1). We found this species thriving well on its hostplant, the Stinking Passionfruit, *Passiflora foetida* (Passifloraceae), which is a fast-growing plant, commonly found in wasteland, disturbed areas and by the roadsides (Fig. 2A). In Samarahan, *P. foetida* is commonly found growing on housing fences of human inhabitations, as well as abandoned open areas. In both South-East Asia and northern Australia, open areas that are highly modified such as suburban roadsides, cultivated region, and also disturbed grassland are the preferred habitat for *A. terpsicore* (Braby et al., 2013).

*A. terpsicore* is an easily recognizable species due to its its bright tawny-red, distinctive shaped fore and hindwings, and feeble flight. It resembles no other butterfly species in Borneo. Its presence is hence, rarely passed unnoticed. The adult male is brighter in colour as compared to the dull coloured female (Fig. 2B). The wing span is about 50-65 mm with the forewings broad, long and rounded at the apex.

We observed that the adult female *A. terpsicore* usually deposited a cluster of eggs on the leaves of its hostplant. Fig. 2C shows a female ovipositing and depositing the eggs in a batch of more than 20 eggs on the upper surface of a leave of *P. foetida*. On other leaves of the same plant, we observed a colony of first instar larvae (Fig. 2D), which are normally gregarious before they moved on singly to feed on the other leaves. The first instar larvae hatched from the eggs after 3-4 days and they consumed the egg shell before moving to the leaves where they feed gregariously.

A fully grown fifth instar larva is reddish-brown and black in colour while the head is reddish in colour (Fig. 2E). A number of branched spines are prominent on the body segments of the larva. The pupa is striking in colour, mostly white with prominent black lines, as well as spots and red markings (Fig. 2F).

A complete metamorphosis of *A. terpsicore* consists of six larval instars. Besides Passifloraceae, Violaceae, and Cucurbitaceae have been reported as the major larval food plants for *A. terpsicore* (Braby et al., 2013).

Our record is the first one for Western Borneo and contemporaneously, the first for Malaysian Borneo. This thereby, significantly extends the known distribution range of *A. terpsicore* into Borneo apart from Australia and the other Indonesian Islands as reported by Braby et al. (2013).

The discovery of *A. terpsicore* in Borneo indicates that this species has recently expanded its range into Borneo (Fig. 3). Prior to 2013, there was no sighting or collecting of this species during our regular annual survey of insects in Samarahan and other parts of Sarawak. According to Braby et al. (2013), the range expansion of this species is believed to be possibly driven by habitat modifications and climate change.

Field tracking of the populations indicated that this species is currently thriving well in southwestern Borneo on *P. foetida* found near human habitations and open wasteland. We also found that currently, this species has not reached the northern part of Borneo but other than West Sarawak, we noted that *A. terpsicore* has been reported from various localities in Kalimantan Borneo.

Table 1 shows the local distributions of *A. terpsicore* in West Sarawak and West Kalimantan Borneo. This species was reported from Mandor Landak Regency, Pontianak (West Kalimantan) in 2014 (Florida et al., 2015), a year after we sighted its occurrence in West Sarawak. Fig. 3 shows a map of the known distribution of the species in West Sarawak based on first sighting during our site visits in 2013-2016.

We are currently studying the biology, feeding preferences and spatial distribution of this species in Borneo. Being an exotic species, it is interesting to study its establishment in Borneo, and its potential role as an invasive species by studying its feeding preferences on local plants related to *P. foetida*.

Local butterfly species monitoring effort in Borneo is very much lacking. We cannot underestimate the importance of regular local butterfly species monitoring because only through such an effort do we know the status of our butterfly species and the arrival of new range-expanding species or any other introduced invasive species.

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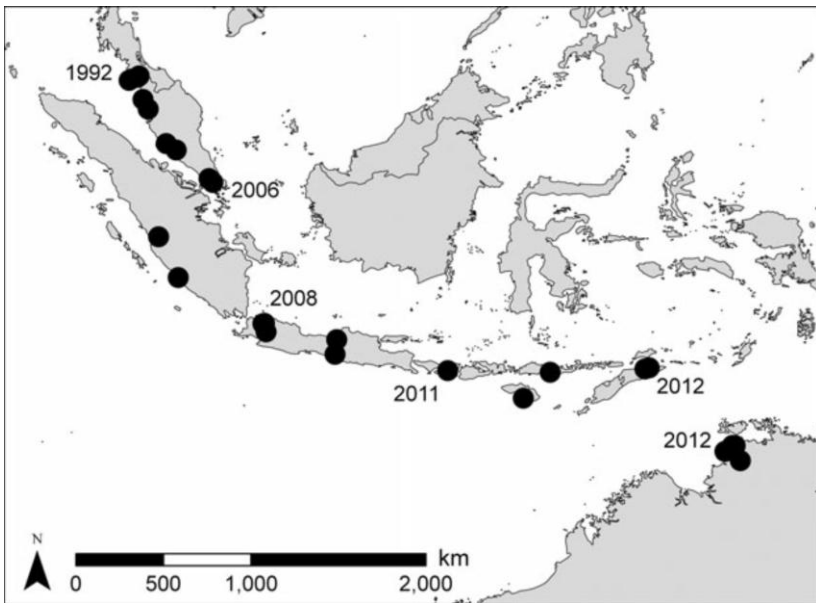


Figure 1 Distribution of *Acraea terpsicore* in South-East Asia (south of Thailand) and north-western Australia according to Braby et al. (2013)



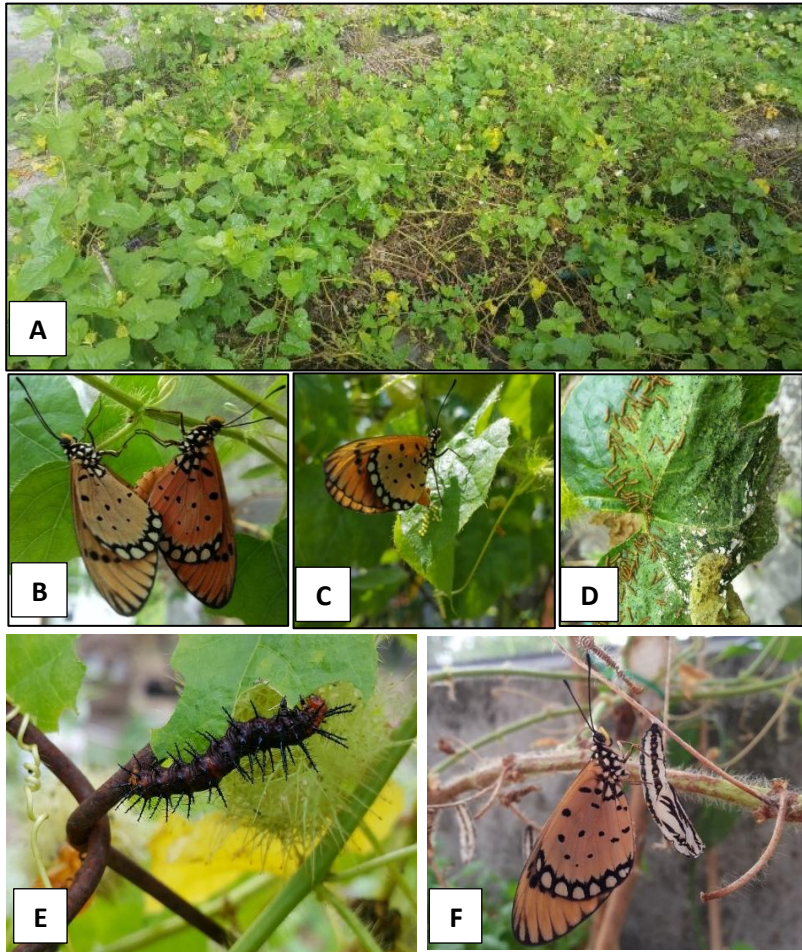


Figure 2 *Acraea terpsicore* (Linnaeus, 1758). A, the hostplant, *Passiflora foetida*, (Passifloraceae); B, a female and male, mating; C, a female ovipositing; D, a cluster of first instar larvae; E, a close-up of a fifth instar larva; F, an adult after emerging from the pupa.

Table 1 The known locations of *A. terpsicore* in Borneo based on first sightings during site visits in 2013-2016 and published records from literature.

Site	Location	Latitude	Longitude	Date of Visit
Desa Ilmu	Sarawak, Kota Samarahan	01°27'10. 498"N	110°27'26. 83"E	15 March 2013
Taman Samariang Aman	Sarawak, Samariang	01°36'29. 881"N	110°19'35. 883"E	17 November 2013
Taman Cahaya Damai	Sarawak, Samariang	01°37'44. 968"N	110°20'13. 827"E	16 November 2013
Kampung Semera	Sarawak, Asajaya	01°32'58. 031"N	110°40'14. 891"E	11 January 2014
Kampung Petai	Sarawak, Sri Aman	01°19'60" N	111°40.0"E	14 March 2014
Banjarmasin	South Kalimantan, Indonesia	03°19'6.98 4"S	114°35'39. 762"E	13 June 2014
Mandor Landak Regency	West Kalimantan, Indonesia	0°19'4.77 8"N	109°25'33. 281"E	Oct 2014
Taman BDC	Sarawak, Kuching	01°30'34. 164"N	110°21'34. 149"E	5 May 2015
Jalan Stampin Barat 4	Sarawak, Kuching	01°30'54. 037"N	110°20'46. 286"E	5 May 2015
Jalan Muara Tabuan 2a3C	Sarawak, Kuching	1°31'29.4 74"N	110°23'45. 249"E	8 August 2015
Mount Besar	South Kalimantan, Indonesia	02°42'39" S	115°37'32. 999"E	12 January 2015
Rancan Recreational Park	Sarawak, Serian	01°8'52.0 48"N	110°40'14.8 91"E	14 May 2016

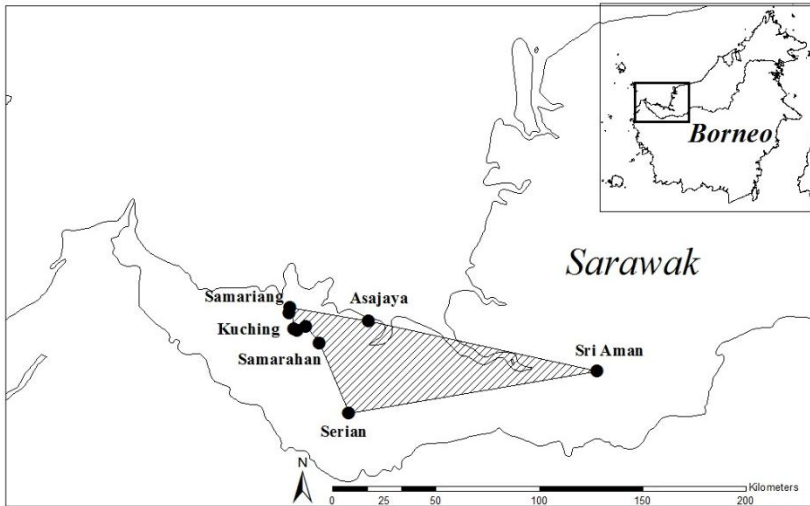


Figure 3 Distribution range of *Acraea terpsicore* on Borneo based on records of first sightings from various localities in West Sarawak, Borneo.