

Observations on the satyrine butterfly, *Heteronympha mirifica* (BUTLER, 1866) (Lepidoptera: Nymphalidae) feeding on the sap of *Eucalyptus grandis* (Myrtaceae), with a literature review of sap feeding among Australian butterflies

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Abstract. Observations are provided on several females of *Heteronympha mirifica* (BUTLER, 1866) (Lepidoptera: Nymphalidae) feeding on a small sap flow from an injury in the trunk of a young *Eucalyptus grandis* (Myrtaceae) in the Wollemi National Park, north-western Sydney, New South Wales during late March 2009. Available published and unpublished records of Australian Nymphalidae and Lycaenidae feeding from sap flow are reviewed and compared. Several behavioural strategies associated with sap feeding are suggested. Astonishing as it would seem, this may be the first record of adult foraging for this species.

Key words. *Heteronympha mirifica*, Lepidoptera, Nymphalidae, Australia, Australian Region, *Eucalyptus* sap flow, biological review, behavioural strategies.

Zusammenfassung. Die Weibchen von *Heteronympha mirifica* (BUTLER, 1866) (Lepidoptera: Nymphalidae) konnten mehrfach an einem kleinen Saftstrom einer Verletzung an der Rinde eines jungen *Eucalyptus grandis* (Myrtaceae) im Wollemi National Park, Nordwest-Sydney, New South Wales in späten März 2009 saftsaugend beobachtet werden. Es handelt sich um den Erstnachweis für diese Schmetterlingsart am Saftfluss. Verfügbare publizierte und unpublizierte Nachweise australischer Nymphalidae und Lycaenidae die ebenfalls an Saftflüssen beobachtet wurden, werden mitgeteilt.

Five females of *H. mirifica* were noted flying around the host tree but only three came to feed on the sap flow. One butterfly, in very good condition, stayed for the longest amount of time – over 20 minutes feeding at the sap and at only the point of flow origin (see Fig. 1). The three feeding butterflies were deliberately disturbed at least twice and did not return while TJH watched – after the last disturbance, the butterflies either left the area or flew into a nearby *Glochidion* tree. The primary author returned to the site within 20 minutes and apparently the same individuals had returned. At least one fly was also observed feeding on the sap flow. At one time it touched one of the butterflies, whereupon the butterfly simply jerked its wings and body alarming the fly which then left the feeding area. Later the primary author took several photographs of the butterflies feeding still at 1620 hrs AEST (one is produced as Fig. 1). The light was getting dim by this stage but managed to take a series of photographs which show at least two of the butterflies feeding close together at the sap flow. There were also several male *H. mirifica* in the vicinity but they were mainly flying about amongst herbage and shrubs closer to the ground and paid no attention to the sap flow. Later two female butterflies were disturbed but only one female remained feeding before time constraints and low visibility forced the primary author to abandon observations.

Introduction

The Wonder Brown, *Heteronympha mirifica* (BUTLER, 1866), occurs along the coast of south-eastern Queensland to eastern Victoria, where females are usually confined to moist gullies of rainforests (COMMON & WATERHOUSE 1972, 1981). Males bask during early mornings, but later in the day fly high in adjacent open areas of woodland and perch on the foliage of trees, at moderate heights to defend their territories (WATERHOUSE 1932, McCUBBIN 1971, COMMON & WATERHOUSE 1972, 1981, BRABY, 2000). When alarmed, females flick their wings forward revealing the bright cream patches on the fore-wings; whereupon they may take flight and ascend into the canopy (ATKINS 1994). In his review of the literature, BRABY (2000) provided no information on adult foraging for this species, suggesting a curious paucity of observations and making our report especially noteworthy.

On 26 March 2009, the primary author observed five females of *H. mirifica* imbibing the sap from a young tree of *Eucalyptus grandis* near Wheeny Creek, in the Wollemi National Park, west of Sydney, New South Wales (33°26'S, 150°42'E; time 1515–1710 hrs Eastern Australian Summer Time – DST; see Fig. 1). Hot conditions of about 32–35 °C and high relative humidity of 80–90 % prevailed.

Adult butterflies fed some four metres above ground level on a tree measuring about 20 metres height, with a diameter at breast height of about 25 cm. The primary author estimated the tree to be approximately 10–20 years old. It was situated in a wet sclerophyll forest with cheese tree *Glochidion ferdinandii* (Euphorbiaceae), Black Wood *Acacia melanoxylon* (Mimosaceae), Turpentine, *Syncarpia glomulifera* (Myrtaceae) and several others (see Fig. 2).

Discussion

Previous records of Australian butterflies feeding from tree sap

Sap feeding in south-eastern Australian butterflies appears to be an uncommon event, but more regularly observed amongst butterflies of the Nymphalidae and Lycaenidae, particularly the thecline



Fig. 1. Two females of *Heteronympha mirifica* (BUTLER, 1866) feeding from the sap exuding from the trunk of a young *Eucalyptus grandis* (Myrtaceae) in the Wollemi National Park, north-west of Richmond, New South Wales during late March 2009.

Fig. 2. Habitat in the Wollemi National Park, New South Wales, Australia where the observations on *Heteronympha mirifica* were undertaken in March, 2009. (Photos: T.J. HAWKESWOOD).

genus *Ogyris*. COMMON & WATERHOUSE (1972, 1981) briefly noted that only two species of Australian butterflies were at that time known to be attracted to lures; *Polyura sempronius* (FABRICIUS, 1793) (listed as *P. pyrrhus* (L.)) is known to be attracted to rotten fruit or sap exuding from trees and that attraction can be heightened by adding wine to the sap; *Vanessa itea* (FABRICIUS, 1775) is sometimes attracted to sap flows on *Eucalyptus* and other trees. Brunet (1977) recorded a single female of *Heteronympha merope* (FABRICIUS, 1775) feeding with congregating *P. sempronius* at a sap flow from *Polygala myrtifolia* (Polygalaceae) in South Australia. HAWKESWOOD (1980) observed three Nymphalidae feeding from a sap flow from *Eucalyptus gummifera* (Myrtaceae) at Glenbrook, New South Wales. DUNN (1984) recorded several male *Heteronympha merope* feeding from the sap from the trunk of *Acacia mearnsii* (Mimosaceae) at Shelley Beach near Lake Tyers in Victoria. For Lycaenidae, VALENTINE (1982) recorded individuals of both sexes of *Ogyris genoveva gela* (WATERHOUSE, 1941) (Lycaenidae) from Victoria feeding at the sap-flow from *Eucalyptus bridgesiana* (Myrtaceae). Similarly, DOUGLAS (1995) observed four females of *O. genoveva* feeding at sap-flows of one or more unidentified trees in western Victoria. Disappointingly, little biological data was detailed, but the wing-wear of the females was graded as “slight to medium” (DOUGLAS 1995). DUNN & KITCHING (1994) reported that red, frothy sap, seen freshly exuding from the trunk of one large *Angophora* tree (almost certainly *A. costata*, Myrtaceae), had attracted numerous

adults of *O. amaryllis* HEWITSON, 1862 all feeding simultaneously during spring near Leyburn. They acknowledged that R. EASTWOOD had personally communicated that *Ogyris aenone* WATERHOUSE, 1902 and other *Ogyris* spp. (Lycaenidae) were similarly attracted to sap of this tree species, at the same site in southern Queensland. There is also a report for a polyommatine lycaenid in Victoria. DUNN (2002) observed a female *Candalides consimilis* WATERHOUSE, 1942 feeding on an ornamental *Callistemon* sp. (Myrtaceae) “at what resembled scar tissue, possibly exuding sap at the base of a calyx on the same shrub.”

Behaviour of butterflies associated with sap-feeding

HAWKESWOOD (1980) observed two specimens of *Vanessa itea*, one male of *Polyura sempronius*, two females of *Heteronympha merope merope* and one specimen of *Geitoneura klugii* (GUERIN-MENEVILLE, 1831) feeding simultaneously on the dark red-brown sap which had exuded from the trunk of a *Eucalyptus gummifera* tree about 30 cm from the ground; when disturbed, the specimens of *V. itea* closely circled the tree-trunk several times, reaching a height of some 2.5 metres before rapidly flying to about 10 metres and disappearing amongst the canopy; one *V. itea* returned to feed about four minutes later; the individual of *P. sempronius*, when disturbed, rapidly flew at a height of two to three metres over the shrub vegetation before disappearing and did not return; the specimen of *H. merope* and *G. klugii* merely circled the tree several times when disturbed,

before resting on the ground nearby for a period and afterwards returning to feed; when these two species were disturbed again, they repeated this behaviour. HAWKESWOOD (1980) thereby noted three strategies (referred by HAWKESWOOD as “syndromes”) which may relate to escape behaviour exhibited by these butterflies: rapid and directly flight by *Polyura*; fast tree-trunk circling followed by rapid upward flight by *Vanessa*; slow tree-trunk circling followed by resting in a camouflaged state in the shade of bushes by *Geitoneura* and *Heteronympha*.

DUNN (1984) noted that up to five *H. merope* were observed feeding at any one time; when disturbed the butterflies scattered, the majority of which returned to the sap flow almost immediately; one specimen was removed from the sap flow and released about six metres distant – it appeared to fly randomly about in the adjacent scrub before fluttering towards the tree and within two metres of the trunk, upon which it rapidly changed direction flying straight to the sap flow; specimens of *H. merope* were observed to approach the tree from all directions.

Other previously unpublished records

The secondary author has over the decades, conducted many butterfly observations in Churchill Park, near Dandenong, Victoria. These observations have included only four incidences of sap feeding among nymphalines and satyrine butterflies, evidently rarely seen foraging behaviour relative to innumerable examples of flower feeding, by various butterflies, in the park. The four occurrences

are documented for the first time: On 23 May 2002, in mid afternoon, at 1400 hrs AEST, a large female of *Geitoneura acantha* (DONOVAN, 1805) (Satyrinae) honed into sap. The female, in worn condition, flew and landed, with wings closed and head downward, on a fork situated in filtered sunlight, about three metres up, on the trunk of an old *Acacia mearnsii* (Mimosaceae). The female appeared to be feeding at fresh yellow sap, exuding from beneath the bark. Temperature at the time of feeding was 17 °C. At this same locality, in Victoria, an adult of *Vanessa itea* was seen feeding at sap of *Acacia mearnsii* on 3 November 2001 during warm sunny weather. The adult fed during late morning, at 1155 hrs (AEST), 2.3m above ground on the trunk in shade, with head directed downwards. Later on 19 November 2001 in mid afternoon, at 1440 hrs (AEST), a solitary male of *Heteronympha merope* and an adult of *Vanessa itea* were observed to feed at flowing sap on the trunk of *Acacia mearnsii*. Both adults had settled vertically aligned, the male of *H. merope* faced head downwards, but the adult of *V. itea*, on this occasion, was positioned head upwards.

Final comments on *Heteronympha* adult behaviour

Heteronympha mirifica feeding on sap from a *Eucalyptus* species appears to be a previously unrecorded behaviour in this species. Its behaviour is similar to that observed in the related *H. merope* by HAWKESWOOD (1980) and DUNN (1984) although there are some differences. Some females of *H. mirifica* did not return to feed after disturbance and were

observed resting in a nearby *Glochidion* tree. The youngest female (based on wing condition) spent longer at the sap flow favouring the position where the flow originated (see Fig. 1) where perhaps the sap was less viscid. The females approached the tree from varied directions but landed precisely on the sap flow area. DUNN (1984) noted that *H. merope* males in Victoria returned to the sap flow almost immediately after disturbance but this was not observed by HAWKESWOOD (1980) for the females of *H. merope* at Glenbrook or the females of *H. mirifica* at Wollemi National Park. HAWKESWOOD (1980) noted that the female *H. merope* circled the tree-trunk several times before resting in the shade on the ground under nearby bushes; *H. mirifica* reported here, flew directly from the tree-trunk when disturbed either flying away from the site or alighting in a nearby *Glochidion* tree.

The time spent feeding may be related to the measure of satiation among the individual butterflies. The older adults may have fed extensively before the young female encounter the sap flow. There may be differences in feeding behaviours between males and females of *Heteronympha*.

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