New distribution records for some butterflies from the Gulf of Carpentaria, northern Queensland

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Abstract

The geographical distribution of the butterflies of the Gulf of Carpentaria, especially the southern section, is poorly known. In this note, new distribution records are provided for the Caper Gull (*Cepora perimale*), Eichhorn's Crow (*Euploea alcathoe eichhorni*), Chocolate Argus (*Junonia hedonia*), Moth Butterfly (*Liphyra brassolis*), Black-spotted Flash (*Hypolycaena phorbas*), Dark Ciliate-blue (*Anthene seltuttus*) and Samphire Blue (*Theclinesthes sulpitius*) from the Karumba-Normanton district in the southern Gulf of Carpentaria. In most cases these records bridge the apparent substantial gaps in geographical range between the 'Top End' of the Northern Territory and Cape York Peninsula of northern Queensland. Given that our knowledge of the Gulf Country is still relatively incomplete and the region is a frontier for field biology and biogeographical research, a basic inventory of butterflies and other insects of the region should be a high priority.

Introduction

The geographical distribution of the butterflies of the Gulf of Carpentaria is poorly known (Hancock & Monteith 2004; Daniels 2005; Franklin 2007). In fact, this vast region, stretching from the eastern coast of Gove Peninsula/north-eastern Arnhem Land in the 'Top End' of the Northern Territory to the western coast of Cape York Peninsula in northern Queensland, is perhaps among the least sampled areas of the continent for insects. The reasons for this are fourfold: (a) the region is remote with formidable distances involved in reaching the area from the main urban centres (cities) of Australia; (b) there are few access roads, especially to the coast; (c) the region is inaccessible for up to half of the year due to seasonal monsoon flooding during the wet season; and (d) much of the coast comprises extensive mangrove forests that can only be accessed by boat. However, knowledge of this area is crucial in terms of understanding broad spatial patterns of biodiversity and the historical biogeography of northern Australia (e.g. Bowman *et al.* 2010). In particular, the large body of seawater occupying the Gulf of Carpentaria and the adjacent mainland consisting of dry clay plains to the south (often referred to as

the Carpentarian Gap) has been hypothesised to comprise a biogeographical filter, functioning as a barrier for taxa which have disjunct distributions (including allopatric subspecies) in the Top End and Cape York Peninsula, and as a corridor or bridge for others that have more continuous distributions (see for example Braby (2008) for analysis of butterflies).

Biogeographical hypotheses such as these can be tested by integrating spatial data with population genetic studies using molecular tools, such as DNA sequence data from mitochondrial and other genes (e.g. see Jennings & Edwards 2005; Lee & Edwards 2008 for recent phylogeographical studies on birds across the Carpentarian Gap). Underpinning this broad research agenda, however, is the need for fine-scale spatial data of the organisms of interest. For a popular group such as butterflies, available information suggests that the geographical distribution of species from the Gulf of Carpentaria is very incomplete. Although several studies have documented the fauna of western Cape York Peninsula (i.e. the eastern section of the Gulf) (McCubbin 1972a, b; Monteith & Hancock 1977; Hancock & Monteith 2004; Daniels 2005; Hopkinson 2011) and the north-eastern areas of the Top End and its adjacent islands (i.e. the western section of the Gulf) (Tindale 1923; Fenner 1991; Braby 2014a), until relatively recently remarkably little had been published from the southern section of the Gulf of Carpentaria (Woodger 1990; Puccetti 1991; Daniels & Edwards 1998; Daniels 2005; Franklin 2007; Pierce 2008, 2012; Dunn 2013a, b, 2014a, b). As Franklin (2007) remarked perceptively "apparently isolated populations on either side of this barrier [Carpentarian Gap] for a large number of butterfly species … are apparent rather than real, reflecting little survey effort in the southern Gulf Country."

During the course of undertaking field studies in May 2013 concerning a recently discovered *Delias* butterfly from Karumba in the southern Gulf of Carpentaria (Daniels 2005, 2012; Braby 2014b), a number of other butterflies were recorded from the area. Comparison of these records with available synoptic distribution maps (e.g. Dunn & Dunn 1991; Braby 2000) and subsequent literature indicated that they filled apparently substantial gaps in geographical range, some by several hundreds of kilometres. Hence, these new distribution records are documented here. New records acquired for the Monarch (*Danaus plexippus*) from the region are excluded because these have been reported elsewhere (Braby 2014a). For completeness, a list of all the species recorded from the Karumba-Normanton district by the author in May 2013 is provided in Table 1.

The following acronyms refer to repositories where material has been lodged:

ANIC: Australian National Insect Collection, Canberra

DNA: Darwin North Australia Herbarium, Darwin

NTM: Museum and Art Gallery of the Northern Territory, Darwin

Table 1. List of species of butterflies recorded from the Karumba-Normanton district in the southern Gulf of Carpentaria, Queensland, 10–13 May 2013. Location numbers are as follows: 1 = Karumba (17.4866°S, 140.8377°E); 2 = Normanton (17.6693°S, 141.0776°E); 3 = Norman River 2.5 km WNW of Normanton (17.6581°S, 141.0591°E); 4 = Walker Creek, 36 km E of Karumba and 24 km NNE of Normanton (17.4719°S, 141.1794°E). Co-ordinates are in decimal degrees and datum WGS84.

Species	Location	Data source
Chequered Swallowtail (*Papilio demoleus sthenelus*)	1	observation
Clearwing Swallowtail (*Cressida cressida*)	1, 4	observation
Yellow Palm-dart (*Cephrenes trichopepla*)	1, 2	photograph
Lyell's Swift (*Pelopidas lyelli lyelli*)	3, 4	observation
Large Grass-yellow (*Eurema hecabe*)	1, 3, 4	netted and released
Lined Grass-yellow (*Eurema laeta sana*)	4	specimen (male collected)
Small Grass-yellow (*Eurema smilax*)	1	netted and released
Lemon Migrant (*Catopsilia pomona*)	1, 2	observation
Caper Gull (*Cepora perimale scyllara*)	4	specimen (2 males collected)
Scarlet Jezebel (*Delias argenthona argenthona*)*	4	observation
Swamp Tiger (*Danaus affinis affinis*)	1, 3, 4	observation
Lesser Wanderer (*Danaus petilia*)	1, 4	observation
Monarch (*Danaus plexippus*)	1, 4	specimen (male collected)
Eichhorn's Crow (*Euploea alcathoe eichhorni*)	4	specimen (3 males collected)
Common Crow (*Euploea corinna*)	1, 3, 4	netted and released
Two-brand Crow (*Euploea sylvester sylvester*)	4	specimen (both sexes collected)
Glasswing (*Acraea andromacha andromacha*)	1, 4	observation
Varied Eggfly (*Hypolimnas bolina nerina*)	1, 2, 3, 4	observation
Chocolate Argus (*Junonia hedonia zelima*)	2, 4	specimen (male collected)
Blue Argus (*Junonia orithya albicincta*)	1, 3, 4	specimen (male collected)
Meadow Argus (*Junonia villida villida*)	1, 3, 4	observation
Moth Butterfly (*Liphyra brassolis major*)	4	observation
Purple Oak-blue (*Arhopala eupolis eupolis*)	4	specimen (both sexes collected)
Black-spotted Flash (*Hypolycaena phorbas phorbas*)	4	observation
Dark Ciliate-blue (*Anthene seltuttus affinis*)	4	specimen (female collected)
Small Dusky-blue (*Candalides erinus erinus*)	1	netted and released
Wattle Blue (*Theclinesthes miskini miskini*)	1, 3	netted and released
Samphire Blue (*Theclinesthes sulpitius*)	1, 3	specimen (both sexes collected)
Spotted Grass-blue (*Zizeeria karsandra*)	1	observation
Common Grass-blue (*Zizina otis labradus*)	1	observation
Black-spotted Grass-blue (*Famegana alsulus alsulus*)	4	specimen (male collected)

* Subspecific status not determined, but presumed to be the nominate subspecies based on proximity to geographical distribution of *Delias argenthona argenthona* in Queensland.

Distribution records for new species

Caper Gull (*Cepora perimale scyllara*)

Three adults were recorded, of which two males were collected (voucher numbers: ANIC MFBC00873, ANIC MFBC00874) at Walker Creek, 36 km E of Karumba and 24 km NNE of Normanton (17.4719ºS, 141.1794ºE) in riparian paperbark forest with rainforest elements in the understorey on 12–13 May 2013. The nearest records of the Caper Gull from the Gulf are the Carpentaria Highway at October Creek crossing (Braby 2000), approximately 40 km W of Cape Crawford (D.C. Franklin & D. Bisa, pers. comm.), Sweers Island South Wellesley Group (Daniels 2005) and Lawn Hill National Park (Franklin 2007) to the west, and Weipa (Hancock & Monteith 2004; Daniels 2005) to the north-east.

Eichhorn's Crow (*Euploea alcathoe eichhorni*)

Three males were collected (voucher numbers: NTM I.008984, NTM I.008985, NTM I.008986) at Walker Creek, 36 km E of Karumba and 24 km NNE of Normanton (17.4719ºS, 141.1794ºE) in riparian paperbark forest with rainforest elements in the understorey on 12 May 2013. They were resting together with overwintering aggregations of Two-brand Crow (*Euploea sylvester sylvester*) and Common Crow (*Euploea corinna*). The subspecies *Euploea alcathoe eichhorni* was previously known only from coastal areas in the Wet Tropics and Cape York Peninsula, reaching its western most limits at Weipa (Daniels 2005) and Kowanyama (Hancock & Monteith 2004).

Chocolate Argus (*Junonia hedonia zelima*)

An adult was observed at Normanton (17.6693ºS, 141.0776ºE) on 10 May 2013, and a male (voucher number: ANIC MFBC00882) was collected at Walker Creek, 36 km E of Karumba and 24 km NNE of Normanton (17.4719ºS, 141.1794ºE) on 12 May 2013. The nearest records of the Chocolate Argus from the Gulf are October Creek crossing on the Carpentaria Hwy (Dunn & Dunn 1991) and Lorella Springs near Borroloola (Franklin 2007), to the west; and Weipa (Hancock & Monteith 2004; Daniels 2005) and Kowanyama (Hancock & Monteith 2004), to the north-east.

Moth Butterfly (*Liphyra brassolis major*)

An adult was recorded at Walker Creek, 36 km E of Karumba and 24 km NNE of Normanton (17.4719ºS, 141.1794ºE) on 12 May 2013. The individual was observed flying in the canopy during the late afternoon (16:45 EST), and it was readily distinguished by its powerful flight and large size, being larger than the Chocolate Argus (*Junonia hedonia*) but smaller than the Monarch (*Danaus plexippus*), other large similarly coloured brown butterflies that were also present at the site. The Moth Butterfly was previously recorded from the Gulf of Carpentaria only at Groote Eylandt (Tindale 1923).

Black-spotted Flash (*Hypolycaena phorbas phorbas*) (Figure 1)

Adults were recorded at Walker Creek, 36 km E of Karumba and 24 km NNE of Normanton (17.4719ºS, 141.1794ºE) in riparian paperbark forest with rainforest elements in the understorey on 12–13 May 2013. Males were observed during the late afternoon (16:15 EST) establishing territories in the canopy along the forest edge, where they perched on the foliage of trees in sunlit patches. A female was observed at close range during the morning perched on the foliage of a small tree, but it evaded capture. It flew with the Purple Oak-blue (*Arhopala eupolis eupolis*), of which a male and a female were netted and retained as vouchers. The nearest records of the Black-spotted Flash from the Gulf are Gove Peninsula and Groote Eylandt (Lambkin 2006) to the north-west; and Weipa (Hancock & Monteith 2004; Daniels 2005) and Kowanyama (Hancock & Monteith 2004) to the north-east.

Dark Ciliate-blue (*Anthene seltuttus affinis*)

A female (voucher number: ANIC MFBC00852) was collected on 13 May 2013 at Walker Creek, 36 km E of Karumba and 24 km NNE of Normanton (17.4719ºS, 141.1794ºE) in riparian paperbark forest with rainforest elements in the understorey. Males were also observed perched in the mid-canopy during the morning. The Dark Ciliate-blue was previously recorded from the Gulf only at Groote Eylandt (Tindale 1923) to the north-west; and Weipa (Daniels 2005), Mitchell River settlement (Braby 2000) and Kowanyama (Hancock & Monteith 2004), to the north-east.

Samphire Blue (*Theclinesthes sulpitius*) (Figure 2)

Three adults (voucher numbers: NTM I.008966, NTM I.008967, NTM I.008968) were collected from Karumba (17.4867ºS, 140.8377ºE) on 10 & 12 May 2013, and a larger series (voucher numbers: ANIC MFBC00864, MFBC00865) was collected at the Norman River, 2.5 km WNW of Normanton (17.6581ºS, 141.0591ºE) on 11 May 2013. At both locations, adults were recorded in saltmarsh habitat adjacent to the Norman River where they associated with the larval food plant, the samphire *Tecticornia indica* (Amaranthaceae) (voucher number: DNA M.F. Braby 145), by repeatedly flying around and alighting on the plant. Eggs were located on the succulent stems of the food plant. This new material confirms the recent observations of Pierce (2008, 2010, 2011), who photographed the species at Karumba but did not voucher specimens. The nearest records of the Samphire Blue from the Gulf of Carpentaria are Bing Bong near Borroloola (Braby 2014a) and Weipa (Dunn & Dunn 1991).

Figures 1–2. Adult butterflies from the Gulf of Carpentaria: **1.** Black-spotted Flash (*Hypolycaena phorbas*); **2.** Samphire Blue (*Theclinesthes sulpitius*). (Michael Braby) ►


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Discussion

At least 14 species of butterflies have previously been recorded from Karumba (Woodger 1990; Dunn & Dunn 1991; Daniels 2005; Pierce 2008; Dunn 2014a, b), and only two of these – Orchard Swallowtail (*Papilio aegeus*) and Mangrove Jezebel (*Delias aestiva*) – were not recorded during my brief visit to the area. Thus, the list of 31 species reported in Table 1, together with records published in the scientific literature, brings the total number of butterfly species recorded from the Karumba-Normanton district to 33.

The new records from the southern Gulf of Carpentaria for six of the seven species discussed above (namely Caper Gull, Chocolate Argus, Moth Butterfly, Black-spotted Flash, Dark Ciliate Blue and Samphire Blue) fill substantial gaps in the geographical range when one compares available synoptic distribution maps for these species (e.g. Dunn & Dunn 1991; Braby 2000). When these new records are compared and integrated with other recent published records for these species (Hancock & Monteith 2004; Daniels 2005; Franklin 2007; Braby 2014a), it is apparent that some butterflies are distributed continuously across the southern and western Gulf of Carpentaria, particularly Caper Gull and Chocolate Argus. The seventh species, Eichhorn's Crow, comprises a subspecies restricted to northern Queensland.

Of particular interest is the recording of three lycaenid butterflies (Moth Butterfly, Black-spotted Flash, Dark Ciliate Blue) plus Purple Oak-blue, all of which have their immature stages (larvae and pupae) obligatorily associated with the Green Tree Ant (also known as the Weaver Ant) (*Oecophylla smaragdina*). This is a keystone species, having a significant role in ecosystem functioning and forming multiple interactions with other species. Lokkers (1986) showed that this ant is distributed widely across the Australian monsoon tropics, including the Gulf Country. His climatic modelling based on two key environmental parameters (mean annual rainfall and average minimum temperature), together with the occurrence of the forest-woodland vegetation required by this arboreal ant, suggested that the Green Tree Ant was more or less continuously distributed in the Gulf of Carpentaria although restricted narrowly to coastal areas in the southern section. In contrast, available distribution maps for Moth Butterfly, Black-spotted Flash and Dark Ciliate Blue show a substantial gap in geographical range across the Gulf between the Northern Territory (north-eastern Arnhem Land of the Top End) and northern Queensland (western coast of Cape York Peninsula) (Dunn & Dunn 1991; Braby 2000). Given the dependency of these butterflies on the Green Tree Ant, and the distribution of this ant, it is therefore highly likely that these lycaenids also have a continuous distribution in the Gulf Country. Indeed, the presence of colonies of this ubiquitous keystone ant in the Australian monsoon tropics should be used as a cue to search for this guild of butterflies (which also includes species of oak-blues), rather than relying on larval host plant associations as a proxy for biological survey.

The Gulf Country remains a frontier for field biology and biogeographical research. The recent discovery of a new butterfly taxon (Daniels 2012) for a relatively well-known group of insects, together with new spatial data for many species, highlights the fact that our knowledge of the region is still incomplete. A basic inventory of butterflies and other insects of the region should be a high priority.

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Addendum

A recent article by Dunn (2015) lists the Dingy Bush-brown (*Mycalesis perseus*) at Walker Creek crossing based on observations made in October 2012, which is an additional record for the Karumba-Normanton district. The author also records the Chocolate Argus (*Junonia hedonia*). Dunn K.L. (2015) New distribution records for nymphalid butterflies (Lepidoptera: Nymphalidae) in Queensland. *Metamorphosis Australia. Magazine of the Butterfly and Other Invertebrates Club* 76, 18-34.