



Blues

(Lycaenidae)

9

Moth Butterfly

Liphyra brassolis Westwood, [1864]



Plate 127 Holmes Jungle, Darwin, NT
Photo: Tissa Ratnayake



Plate 128 Humpty Doo, NT
Photo: Alison Worsnop

Distribution

This species is represented in the study region by the subspecies *L. brassolis major* Rothschild, 1898. It has a disjunct distribution, occurring mainly in the higher rainfall areas (> 1,000 mm mean annual rainfall) of the Kimberley and the Top End. It has been recorded as far inland as the King Leopold Ranges at Mount Elizabeth Station 6 km north–north-east of Joint Hill, WA (G. Swann), and Nitmiluk National Park (Katherine Gorge), and further east at Groote Eylandt (Yedikba) (Tindale 1923), NT. It has also been recorded at Walker Creek 36 km east of Karumba, Qld, just outside the eastern boundary of the study region (Braby 2015d). The geographic range closely corresponds with the spatial distribution of its associated ant. The ant, however, also occurs in the eastern Kimberley; thus, further field surveys are required to determine whether *L. brassolis* occurs in the intervening areas of its known range in the Joseph Bonaparte Gulf region, particularly the area between the Ord and Victoria rivers. Outside the study region, *L. brassolis* occurs widely from Sikkim in northern India and South-East Asia, through mainland New Guinea and adjacent islands and north-eastern Australia to the Solomon Islands.

Habitat

Liphyra brassolis breeds in a wide range of habitats, wherever arboreal nests of the associated ant are established in the canopy of tall shrubs and trees. The ants are sensitive to fire and thus are more prevalent in wet and dry monsoon forests and riparian forest because these habitats are less prone to fire (Andersen et al. 2007a).

Attendant ant/larval food

Oecophylla smaragdina (Formicidae: Formicinae). The larvae are predacious on the immature stages of the Green Tree Ant (*O. smaragdina*) (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults occur throughout the year. They appear to show little seasonal variation in abundance, although they have been recorded more frequently in June and November, but this may be an artefact of small sample size. We have very few data on the occurrence of the immature stages and the breeding phenology is not well understood. Presumably, the species breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Small Ant-blue

Acrodipsas myrmecophila (Waterhouse & Lyell, 1913)



Plate 129 Canberra, ACT
Photo: M. F. Braby

Distribution

This species is known from the Top End of the study region, where it has been recorded only at Mt Burrell on Tipperary Station, NT (Dunn and Dunn 1991; Braby 2000). Its presence in the region was detected only as recently as 1981. The putative attendant ants (*Papyrius* spp.) are very widespread in the region, occurring in the Kimberley, Top End and western Gulf Country, from moist coastal areas to drier inland areas of the semi-arid zone (> 500 mm mean annual rainfall). Further field surveys are thus required to determine whether *A. myrmecophila* is equally widespread. Outside the study region, *A. myrmecophila* occurs sporadically from northern Queensland, through NSW and ACT to Victoria.

Habitat

The breeding habitat of *A. myrmecophila* has not been recorded in the study region. Adults have been collected in the canopy of trees in low open woodland on a hilltop. Presumably, the species breeds in savannah woodland where colonies of the putative associated ant are established.

Attendant ant/larval food

Not recorded in the study region; probably *Papyrius* spp. (Formicidae: Dolichoderinae). In eastern Australia, the larvae are predacious on the immature stages of *Papyrius* ants (Eastwood and Fraser 1999; Braby 2000).

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Adults have been collected only during the dry season (July and October) (Dunn and Dunn 1991; Braby 2000), but there are too few records ($n = 2$) to assess any seasonal changes in abundance.

Breeding status

This species is resident in the study region.

Conservation status

DD. The species *A. myrmecophila* has an extremely limited range in the study region (AOO is likely to be < 2,000 sq km, with spatial buffering of records providing a first approximation of 700 sq km). It is currently known from only one site, which lies entirely within a pastoral property that lacks adequate conservation management due to threats from the invasion and spread of grassy weeds (particularly gamba grass, *Andropogon gayanus*), inappropriate fire regimes, particularly an increase in fire frequency, and extensive clearing for cattle grazing of savannah woodland surrounding the hilltop (i.e. potential breeding habitat). Moreover, the species appears to be rare in that very few specimens have been collected, especially during the past two decades. However, the geographic range is incomplete due to the difficulties of detecting and sampling the taxon; breeding colonies are very localised and adults are small, highly seasonal and frequently fly in the canopy at the summit of steep hills. The spatial distribution of the putative attendant ant—based on records in the TERC and the occurrence of the Fiery Jewel (*Hypochrysops ignitus*), which is associated with the same ant—suggest *A. myrmecophila* may be very widespread. Thus, the taxon may qualify as LC rather than Near Threatened (NT) once adequate data are available. Sands and New (2002) also concluded that DD was the most appropriate Red List category for this species in the Northern Territory, in contrast with its threatened status elsewhere in Australia. Nevertheless, targeted field surveys (e.g. on hilltops) to clarify the extent of its distribution should be a priority for this species.

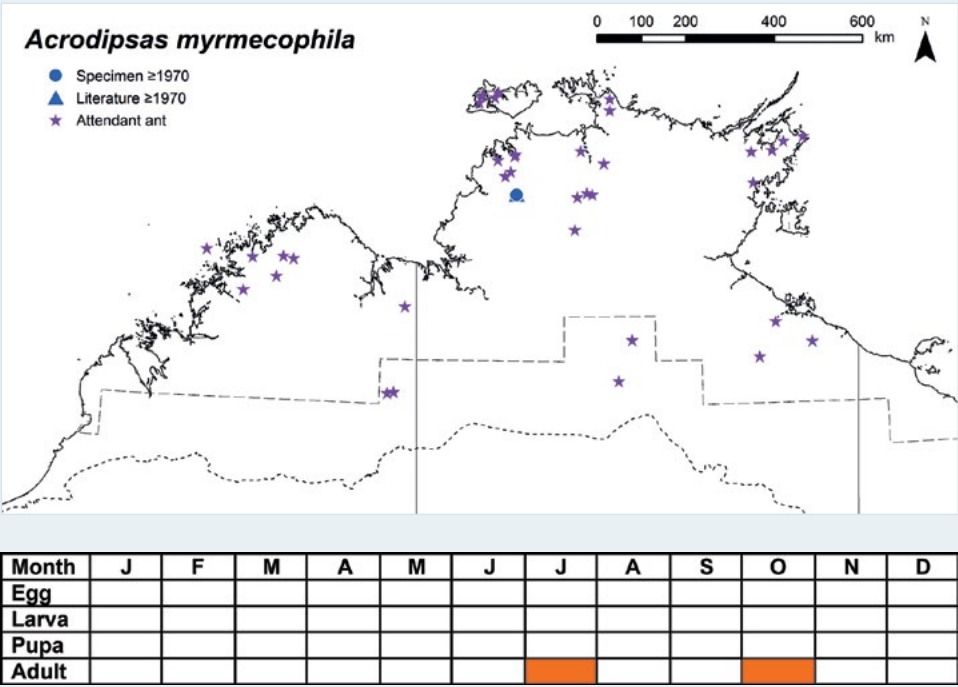
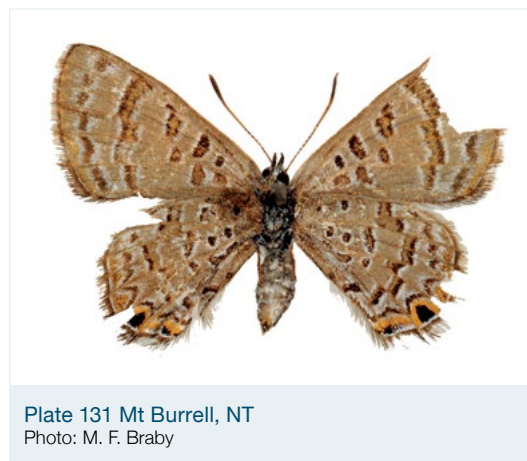


Photo: Litchfield National Park, NT, M.F. Braby

Northern Ant-blue

Acrodipsas decima Miller & Lane, 2004



Distribution

This species is endemic to the study region. It has been recorded only at Mt Burrell on Tipperary Station, NT. Its presence in the Top End was detected only as recently as 1991 (Miller and Lane 2004). Further field surveys are required to determine whether *A. decima* occurs elsewhere in the Top End.

Habitat

The breeding habitat of *A. decima* has not been recorded in the study region. Adults have been collected in the canopy of trees in low open woodland at the summit of a hill (Miller and Lane 2004). Presumably, the species breeds in savannah woodland and plains surrounding steep hills and mesas.

Attendant ant/larval food

Not recorded.

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Adults have been recorded sporadically during the wet season and early dry season (November–May), with most specimens collected in April and May (Miller and Lane 2004), but there are too few records ($n = 14$) to assess any seasonal changes in abundance.

Breeding status

This species is resident in the study region.

Conservation status

DD. The species *A. decima* appears to be a short-range endemic (AOO is likely to be $< 2,000$ sq km, with spatial buffering of records providing a first approximation of 700 sq km). It is currently known from only one site, which lies entirely within a pastoral property that lacks adequate conservation management due to threats from the invasion and spread of grassy weeds (particularly gamba grass, *Andropogon gayanus*), inappropriate fire regimes, particularly an increase in fire frequency, and extensive clearing for cattle grazing of savannah woodland surrounding the hilltop (i.e. potential breeding habitat). Moreover, it is rarely encountered and few specimens have been collected during the past decade. Thus, the taxon may qualify as Near Threatened (NT) once adequate data confirm its restricted AOO and limited number of locations. Currently, the geographic range is incomplete due to the difficulties of detecting and sampling the taxon: adults are small, seasonal and appear to fly in the canopy at the summit of steep hills. Targeted field surveys (e.g. on hilltops) to clarify the extent of its distribution and determine its critical habitat should be a high priority for this species.

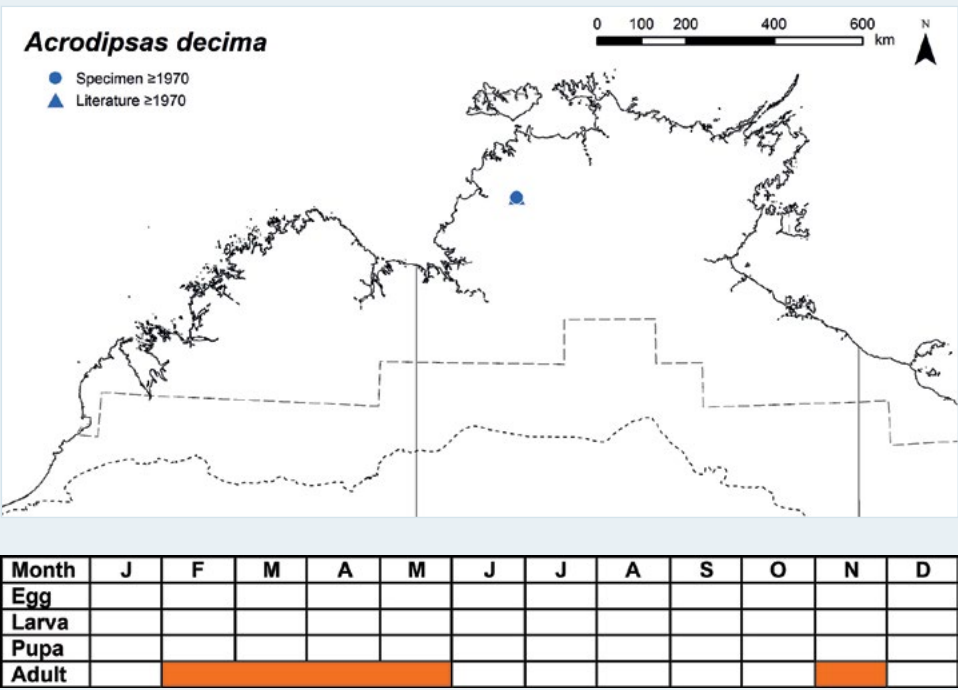


Photo: Mt Burrell, NT, M.F. Braby

Copper Jewel

Hypochrysops apelles (Fabricius, 1775)



Plate 132 Buffalo Creek, Leanyer Swamp, NT
Photo: M. F. Braby

Distribution

This species is represented by an undescribed subspecies, which is endemic to the study region. It occurs in the north of the Northern Territory, where it is restricted to coastal areas of the Top End, its presence in the region first reported by Common and Waterhouse (1981) based on a male specimen collected from Casuarina Beach near Darwin in 1973 by E. D. Edwards. More recently, it has been recorded further east near Maningrida, NT (Bisa 2013). The larval food plants occur very widely in coastal areas of the study region, suggesting the known geographic range of *H. apelles* may be incomplete and undersampled, possibly due to the difficulties of accessing the butterfly's habitat. Further field surveys are thus required to determine whether *H. apelles* occurs elsewhere, particularly in coastal areas of the Kimberley, north-eastern Arnhem Land and the western Gulf Country. Outside the study region, *H. apelles* occurs in the Aru Islands, mainland New Guinea and adjacent islands and north-eastern and eastern Australia.

Habitat

Hypochrysops apelles breeds mainly in the landward edge of mangroves where its main larval food plant (*Lumnitzera racemosa*) grows as a small tree in relatively high densities and colonies of the attendant ant are established. Breeding colonies are very localised within these habitats.

Larval food plants

Lumnitzera racemosa (Combretaceae), *Ceriops australis* (Rhizophoraceae). The main food plant is *L. racemosa* (Meyer 1996a; Eastwood et al. 2008), but occasionally *C. australis* is used during the early dry season when adult population numbers are higher (Braby 2011a).

Attendant ant

Crematogaster sp. (Formicidae: Myrmicinae). The larvae and pupae are constantly attended by numerous small black ants in an obligatory myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults have been recorded during most months of the year, but there are too few records ($n = 19$) to assess any seasonal changes in abundance. In general, adults and the immature stages (larvae) appear to be more numerous during the late wet season and early dry season (April and May) and are scarce in the late dry season. The immature stages have been recorded sporadically during the dry season (April–September). Presumably, the species breeds continuously throughout the year and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

Near Threatened (NT). Available data suggest the putative subspecies *H. apelles* ssp. 'Top End' is a short-range endemic (EOO = 4,320 sq km) and occurs in at least two conservation reserves: Casuarina Coastal Reserve and Djelk IPA. However, it may qualify for a threatened category in the near future because much of the intervening mangrove habitat between these two locations is not protected from coastal development impacts and therefore the butterfly populations may be at risk (Sands and New 2002), particularly in the Darwin area, where it is known only from a limited number of sites (Casuarina Coastal Reserve, Buffalo Creek, Channel Island and Palmerston). The population of *Hypochrysops apelles* ssp. 'Top End' is likely to be reduced in future based on a projected decline in the AOO and/or number of locations (criterion D2). Further field surveys to clarify its distribution and monitor its occupancy are required for this species.

Fiery Jewel

Hypochrysops ignitus (Leach, 1814)



Plate 133 Berry Springs, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *H. ignitus erythrina* (Waterhouse & Lyell, 1909), which is endemic to the study region. It has a wide but sporadic distribution, extending from the high rainfall areas of the Tiwi Islands (> 1,800 mm mean annual rainfall) to drier inland areas of the semi-arid zone (< 500 mm). It occurs mainly in the northern and eastern Kimberley and in the Top End, where it has been recorded as far inland as 98 km south-west of Katherine, NT (Braby 2000). However, it has also been recorded from remote areas further south, including Broome (Williams et al. 1992; Johnson and Valentine 2004) and the Edgar Ranges (Common 1981), WA, in the southern Kimberley; and from Doomadgee (Puccetti 1991) and Bentinck Island in the South Wellesley Islands, Qld (Daniels 2005), in the western Gulf Country. These populations have not been placed to subspecies, but are likely to be *H. ignitus erythrina*, based on geographic grounds (the type locality is Darwin) (Waterhouse and Lyell 1909; Sands 1986). The geographical range of *H. ignitus* broadly corresponds with the spatial distribution of its associated ant. Although the larval food plants are more widely distributed, the ant occurs mainly in areas with more than 500 mm mean annual rainfall. Further field surveys are required in the Kimberley, Northern Deserts and the Limmen Bight area in the Gulf of Carpentaria to determine whether *H. ignitus* occurs in the intervening areas between its known geographic range. Outside the study region, *H. ignitus* occurs in southern New

Guinea and throughout the coastal and near-coastal areas of north-eastern, eastern, south-eastern and south-western Australia.

Habitat

Hypochrysops ignitus breeds mainly in savannah woodland on a variety of substrates, but often loamy sand or sand, but also in the ecotone between savannah woodland and monsoon forest where the larval food plants grow as shrubs or saplings regenerating after fire and where colonies of the attendant ant are established. Breeding colonies of the butterfly are very localised within these habitats.

Larval food plants

Maranthos corymbosa (Chrysobalanaceae), *Glochidion apodogynum* (Phyllanthaceae), *Acacia leptocarpa*, *A. tumida* (Fabaceae), *Clerodendrum floribundum* (Lamiaceae), *Planchonia careya* (Lecythidaceae), *Brachychiton paradoxus* (Malvaceae), *Alphitonia excelsa* (Rhamnaceae), *Gardenia megasperma* (Rubiaceae), *Smilax australis* (Smilacaceae). The larvae feed on a wide range of plants, but they are frequently found on *Planchonia careya*. The record of *Brachychiton paradoxus* by Meyer (1996a) may well be *B. megaphyllum*, because these two species have been confused in the past (Franklin and Bate 2013).

Attendant ants

Papyrius spp. (*nitidus* species group) (Formicidae: Dolichoderinae). The larvae and pupae are constantly attended by numerous Coconut Ants (*Papyrius* spp.) in an obligatory myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults occur during most months of the year. They appear to show little seasonal variation in abundance, although they tend to be more numerous during the wet season (December–March). The immature stages have been recorded during all months except October, indicating that the species breeds throughout the year, during which several generations are completed.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Purple Oak-blue

Arhopala eupolis (Miskin, 1890)



Plate 134 Mary River, NT
Photo: Don Franklin

Distribution

This species is represented by the subspecies *A. eupolis asopus* Waterhouse & Lyell, 1914, which is endemic to the study region. It occurs in the Kimberley and throughout the Top End, extending from moist coastal areas to the semi-arid zone (c. 700 mm mean annual rainfall). Its southernmost limits include Windjana Gorge National Park, WA (Williams et al. 2006); and Keep River National Park (Jinimum Gorge), Beward Lagoon 20 km west of Hodgson Downs, and Limmen River Fishing Camp (S. Normand), NT. The geographical range of *A. eupolis* broadly corresponds with the spatial distribution of its associated ant. Although the larval food plants are more widely distributed, particularly in the Northern Deserts and western Gulf Country, the attendant ant is absent from these areas and is much more restricted in extent (Lokkers 1986). Outside the study region, *A. eupolis* occurs from the Kai and Aru islands, through mainland New Guinea and north-eastern Australia to the Louisiade Archipelago.

Habitat

Arhopala eupolis occurs in a variety of habitats, but breeds mainly in savannah woodland where the larval food plants grow as understorey trees or as saplings regenerating after fire and where arboreal nests of the attendant ant are established (Braby 2011a, 2015e). It also breeds in mixed woodland–monsoon forest associations and along the edges of riparian evergreen monsoon vine forest, particularly in drier inland areas.

Larval food plants

Buchanania obovata (Anacardiaceae), *Maranthes corymbosa* (Chrysobalanaceae), *Terminalia carpentariae*, *T. ferdinandiana* (Combretaceae), *Corymbia bella*, *Corymbia disjuncta*, *Eucalyptus miniata* (Myrtaceae), *Cupaniopsis anacardioides* (Sapindaceae); also **Syzygium aqueum* (Myrtaceae).

Attendant ant

Oecophylla smaragdina (Formicidae: Formicinae). The larvae and pupae are constantly attended by numerous Green Tree Ants (*O. smaragdina*) in an obligatory myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults occur throughout the year, but they are generally more abundant during the wet season (November–April). The immature stages have also been recorded over a similar period, as well as in the dry season (August). The larvae feed on the new soft leaf growth and the life cycle is completed relatively quickly, with no evidence of diapause in any of the life history stages. Presumably, the species breeds continuously throughout the year and several generations are completed annually by switching its food plants on a seasonal basis according to the availability of new foliage.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Shining Oak-blue

Arhopala micale Blanchard, [1848]



Plate 135 Holmes Jungle, Darwin, NT
Photo: Tissa Ratnayake



Plate 136 Kakadu National Park, NT
Photo: M. F. Braby

Distribution

This species is represented by an undescribed subspecies, which is endemic to the study region. It is restricted to the Top End, where it occurs mainly in the higher rainfall areas (> 800 mm mean annual rainfall). It has been recorded as far south as Bradshaw Field Training Area (Angalarri River catchment) (Archibald and Braby 2017), Beward Lagoon 20 km west of Hodgson Downs, and Limmen River Fishing Camp (S. Normand), NT. The geographical range of *A. micale* closely corresponds with the spatial distribution of its associated ant within the Top End. Although the larval food plants and attendant ant also occur widely in the Kimberley, searches have not detected *A. micale* in this area. Similarly, although the larval food plants are more widely distributed in the Northern Deserts and western Gulf Country, the ant is absent from these areas and is much more restricted in extent (Lokkers 1986). Outside the study region, *A. micale* occurs from Maluku, including the Kai and Aru islands, through mainland New Guinea and adjacent islands and north-eastern Australia to the Louisiade Archipelago.

Habitat

Arhopala micale breeds mainly in coastal monsoon vine thicket and evergreen monsoon vine forest associated with seepages or permanent freshwater streams where the larval food plants grow as understorey trees and where arboreal nests of the attendant ant are established.

Larval food plants

Calophyllum inophyllum (Clusiaceae), *Brachychiton diversifolius*, *Sterculia quadrifida* (Malvaceae), *Cupaniopsis anacardioides* (Sapindaceae).

Attendant ant

Oecophylla smaragdina (Formicidae: Formicinae). The larvae and pupae are constantly attended by numerous Green Tree Ants (*O. smaragdina*) in an obligatory myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults occur throughout the year, but they are generally more abundant during the dry season (April–July). The immature stages have been recorded more sporadically during the year. The larvae feed on the new soft leaf growth and the life cycle is completed relatively quickly, with no evidence of diapause in any of the life history stages. Presumably, the species breeds continuously throughout the year and several generations are completed annually by switching its food plants on a seasonal basis according to the availability of new foliage.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Silky Azure

Ogyris oroetes (Hewitson, 1862)



Plate 137 Calperum Station, SA
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *O. oroetes oroetes* (Hewitson, 1862). It has a wide but sporadic distribution in the Kimberley, Top End and western Gulf Country, where it occurs mainly in the lower rainfall areas (700–1,400 mm mean annual rainfall). It has been recorded mainly from inland areas in the eastern Kimberley and the western half of the Top End, but it has also been recorded as far west as Derby, WA (Waterhouse and Lyell 1914), and as far east as Borroloola, NT. The larval food plant is considerably more widespread than the known geographic range of *O. oroetes*, particularly in the Kimberley, Northern Deserts and western Gulf Country. Further field surveys are therefore required to determine whether *O. oroetes* occurs in the intervening areas between its known ranges. Outside the study region, *O. oroetes* occurs widely in eastern, central and southern Australia.

Habitat

Ogyris oroetes breeds in savannah woodland where the larval food plant grows as a mistletoe (parasitic shrub) on eucalypts, particularly *Corymbia* spp. (Braby 2011a). Males also briefly visit hilltops to locate females, but they do not breed in these habitats.

Larval food plant

Amyema bifurcata (Loranthaceae).

Attendant ant

Not recorded in the study region. In the arid zone of the Northern Territory outside the study region, larvae and pupae are occasionally attended by *Crematogaster* sp. (*longiceps* group) ants (Eastwood et al. 2008; Braby 2011a). Elsewhere, they are attended by a few ants from several genera in a facultative myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Adults have been recorded during most months of the year, but we have too few records ($n = 15$) to assess any seasonal changes in abundance. Preliminary observations suggest that adults, like *Ogyris amaryllis*, are more numerous in the second half of the year during the mid to late dry season and ‘build-up’ (July–December), but are scarce during the wet season and early dry season (January–June). We have few data on the incidence of the immature stages, with pupae recorded sporadically from February to July. Presumably, the species breeds continuously throughout the year and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC. Despite its wide, sporadic range, *O. oroetes* appears to be poorly represented in conservation reserves, and is currently known only from Keep River National Park.

Bright Purple Azure

Ogyris barnardi (Miskin, 1890)



Plate 138 Burra Range, Qld
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *O. barnardi barnardi* (Miskin, 1890). It is restricted to western Queensland in the Gulf Country, where it occurs in the semi-arid zone (400 mm mean annual rainfall), its presence in the region detected only as recently as 2011 (Dunn 2013). The larval food plant occurs slightly further west in the Northern Territory; however, targeted searches at several sites supporting suitable habitat (in September 2015) failed to detect *O. barnardi*. Outside the study region, *O. barnardi* occurs in the inland areas of Queensland, northern NSW and central southern South Australia.

Habitat

Ogyris barnardi breeds in *Acacia* low open woodland where the larval food plant grows as a mistletoe (parasitic shrub) on *Acacia georginae*.

Larval food plant

Amyema quandang (Loranthaceae).

Attendant ant

Not recorded in the study region. In Queensland, the larvae and pupae are attended by *Crematogaster* sp. ants in a facultative myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Adults have been recorded only during the warmer 'spring' months of the late dry season (September–November), but we have too few records ($n = 9$) to assess any seasonal changes in abundance.

Breeding status

This species is resident in the study region.

Conservation status

DD. The subspecies *O. barnardi barnardi* has a short range in the study region (EOO = 9,090 sq km). All known sites occur on roadsides and pastoral lands with inadequate protection or management, and are potentially threatened from habitat loss as a result of land clearing for cattle production and/or degradation from roadworks. That is, the population may be reduced in future based on a projected decline in the AOO and/or quality of its habitat. Thus, the taxon may qualify as NT once adequate data are available. Monitoring the extent and/or quality of the critical habitat and identification of the nature and extent of key threatening processes are required for this species.

Satin Azure

Ogyris amaryllis (Hewitson, 1862)



Plate 139 South-west of Charters Towers, Qld
Photo: M. F. Braby



Plate 140 South-west of Charters Towers, Qld
Photo: M. F. Braby

Distribution

This species is represented in the study region by the variable subspecies *O. amaryllis meridionalis* (Bethune-Baker, 1905). It has a very wide distribution, extending from moist coastal areas to drier inland areas of the semi-arid zone (< 400 mm mean annual rainfall), as well as the arid zone of central Australia beyond the southern boundary of the study region. Its geographic range broadly corresponds with the spatial distribution of its larval food plants. The food plants, however, are wider in extent, occurring also in the northern Kimberley, on the Tiwi Islands and Cobourg Peninsula, NT; thus, further field surveys are required to determine whether *O. amaryllis* occurs in these areas. Outside the study region, *O. amaryllis* occurs throughout most of the Australian continent.

Habitat

Ogyris amaryllis breeds in a variety of habitats, including coastal mangroves, savannah woodland, riparian woodland, eucalypt woodland with a hummock grass understorey and *Acacia* low open woodland where the larval food plants grow as mistletoes (parasitic shrubs) on various trees.

Larval food plants

Anyema benthamii, *A. quandang*, *A. sanguinea*, *A. thalassia*, *Diplatia grandibractea* (Loranthaceae).

Attendant ant

Crematogaster sp. (Formicidae: Myrmicinae). The larvae and pupae are occasionally attended by a few ants in a facultative myrmecophilous association (Meyer 1996a; Paton 2013; Braby 2015e).

Seasonality

Adults occur throughout the year, but, like *Ogyris oroetes*, they are more abundant during the second half of the year, particularly during the late dry season (August and September). The immature stages have also been recorded frequently during August and September. Presumably, the species breeds continuously throughout the year and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Orange-tipped Azure, Dodd's Azure

Ogyris iphis (Waterhouse & Lyell, 1914)



Plate 141 Cobourg Peninsula, NT
Photo: M. F. Braby



Plate 142 Cobourg Peninsula, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *O. iphis doddi* (Waterhouse & Lyell, 1914), which is endemic to the study region. It occurs in the north of the Northern Territory, where it is restricted to the higher rainfall areas (> 1,400 mm mean annual rainfall) of the north-western corner of the Top End. It has been recorded from only three locations: Darwin (Parap), Melville Island (Pularumpi) and Cobourg Peninsula (near Danger Point), NT (Braby 2000, 2015a; Woinarski et al. 2007b). The species was originally discovered at Darwin (Parap) in 1908–09 by F. P. and W. D. Dodd (Waterhouse and Lyell 1914; Dodd 1935a; Braby 2015a), who collected and reared a series of at least 14 specimens (five males, nine females in AM, ANIC, NMV, SAM, BMNH). Although the known larval food plant is very widely distributed throughout the study region, the extent of the attendant ant is much more restricted (based on records in the TERC and ANIC). However, the known geographic range of *O. iphis* is considerably smaller than the spatial distribution of its associated ant. The ant has also been recorded in the north-western Kimberley (Admiralty Gulf and Kalumburu), WA; Litchfield (Tolmer Falls and Lost City), Kakadu (Jim Jim Falls area) and Limmen (Butterfly Springs) national parks and from several sites on Gove Peninsula, NT. Further field surveys are thus required to determine whether *O. iphis* is present in the near-coastal areas of the north-western Kimberley and northern and north-eastern Arnhem Land (from Murgarella to Nhulunbuy and Birany Birany and Wandawuy homelands). In recent years, targeted

searches for *O. iphis* in the Darwin area (Meyer et al. 2006) and in the more inland areas at Robin Falls and Litchfield and Kakadu national parks have not detected the butterfly, which suggests *O. iphis* is absent from these areas. Outside the study region, *O. iphis* occurs in north-eastern Queensland.

Excluded data

Sands and New (2002) tentatively listed the species from the Mitchell Plateau, WA, and Mt Burrell, NT, based on possible sightings of adults, but given the difficulty of identifying adults in the field (the butterfly flies high and fast in the canopy) and potential confusion with other similar species, especially *Ogyris oroetes*, which regularly hilltops at Mt Burrell, these records need to be confirmed before they can be accepted.

Habitat

Ogyris iphis has been recorded breeding in near-coastal savannah woodland on a gently sloping laterite outcrop/breakaway on the edge of a plateau where a mature clump of the larval food plant grew as a mistletoe (parasitic shrub) on *Eucalyptus tetradonta* and where extensive colonies of the attendant ant were established (Braby 2015a, 2015e). The co-occurrence of the ant and mistletoe is very local or patchy in distribution. The ant has been recorded more frequently in coastal eucalypt woodland on loamy sand and sand, and the butterfly may well breed in this habitat.



Photo: Tolmer Falls, Litchfield National Park, NT, M.F. Braby

Larval food plant

Amyema sanguinea (Loranthaceae).

Attendant ant

Froggattella kirbii (Formicidae: Dolichoderinae). The larvae and pupae are constantly attended by numerous Froglet Ants (*F. kirbii*) in an obligatory myrmecophilous association (Braby 2015a, 2015e).

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Most adults have been recorded or reared during the second half of the year (July–December), but we have too few records ($n = 15$) to assess any seasonal changes in abundance. The immature stages have been recorded in the late dry season (August–October) and sporadically during the wet season (November–March). Presumably, the species breeds continuously throughout the year and several generations are completed annually.

Breeding status

This species is resident in the study region.

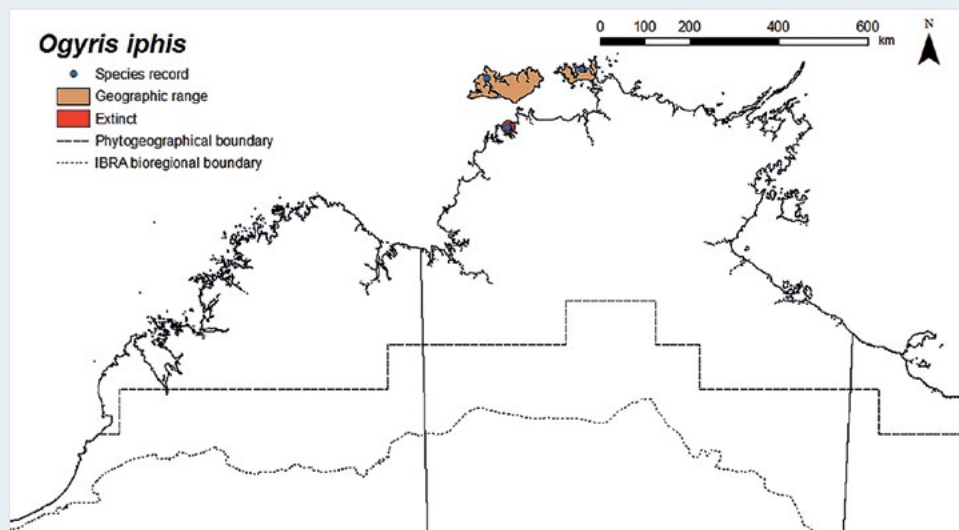
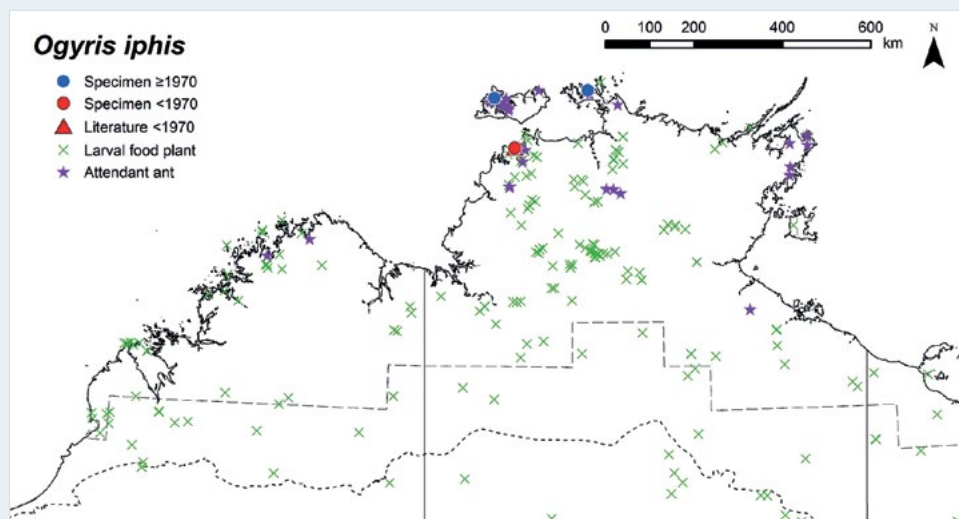
Conservation status

VU, B2ab(ii)(iii). The subspecies *O. iphis doddi* is currently listed as Endangered (EN) under the *TPWCA*. However, available data suggest VU is a more appropriate Red List category. The taxon is a short-range endemic (AOO is likely to be

< 2,000 sq km, with spatial buffering of extant records providing a first approximation of 1,400 sq km). Despite targeted searching, it is currently known from only two extant locations, one of which is in a conservation reserve (Garig Gunak Barlu National Park) (Braby 2015a). The population at Darwin (Parap) is no longer extant due to extensive urbanisation. Braby (2000) and Meyer et al. (2006) recorded a possible sighting at Bens Hill near Darwin in 1992, but the habitat surrounding this small hilltop has since been cleared for development. The population on the Tiwi Islands (Melville Island) has no doubt been severely compromised, if not eliminated, by extensive loss of its critical habitat for timber plantation, and there are similar threats facing Bathurst Island to develop potential breeding habitat for agriculture. Inappropriate fire regime is another threat because the mistletoe food plant is sensitive to frequent hot fires; *Amyema sanguinea* is variously killed by fire or it may resprout from haustorial tissue after being burnt (Start 2013). It is likely that *O. iphis* is now restricted to habitats that are infrequently burnt or in which fires are less intense and do not frequently scorch the canopy of the host trees (*Eucalyptus*, *Corymbia*) supporting mistletoe clumps. It is also suspected that the species does not tolerate habitat fragmentation and it may require relatively large intact landscapes to persist (Braby 2015a). Targeted field surveys to clarify the distribution and ecological requirements should be a high priority for this species.



Photo: Cobourg Peninsula, NT, M.F. Braby

[illegible][illegible]

Northern Purple Azure

Ogyris zosine (Hewitson, [1853])



Plate 143 Kakadu National Park, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *O. zosine zosine* (Hewitson, [1853]). It occurs very widely in the region, extending from moist coastal areas to drier inland areas of the semi-arid zone (< 500 mm mean annual rainfall), as well as the arid zone of central Australia beyond the southern boundary of the study region. Its southernmost limits include 100 km south of Broome and Fitzroy Crossing, WA (Field 1990b); Elliott, NT (Le Souëf 1971); and 45 km east–south-east of Camooweal, Qld. Its wide geographic range corresponds well with the spatial distribution of its larval food plants. The food plants, however, also occur on the Tiwi Islands; thus, further field surveys are required to determine whether *O. zosine* occurs on Bathurst and Melville islands, NT. Outside the study region, *O. zosine* occurs throughout most of the northern half of Australia, as well as in the semi-arid areas of southern Western Australia.

Habitat

Ogyris zosine breeds locally in savannah woodland, eucalypt heathy woodland, eucalypt open woodland and *Acacia* low open woodland on various substrates where the larval food plants grow as mistletoes (parasitic shrubs) on a range of trees, including *Corymbia*, *Eucalyptus*, *Acacia* and *Alstonia*, and where subterranean nests of the attendant ant are established (Weir et al. 2011; Braby 2011a, 2015e). The co-occurrence of the ant and mistletoe is very local or patchy in distribution.

Larval food plants

Amyema benthamii, *A. bifurcata*, *A. miquelii*, *A. sanguinea*, *A. villiflora*, *Decaisnina signata*, *Diplatia grandibractea* (Loranthaceae).

Attendant ants

Camponotus oetkeri, *Camponotus* sp. (*crozieri* group), *Camponotus* sp. (*humilior* group), *Camponotus* sp. (*novae-hollandiae* group) (Formicidae: Formicinae). The larvae and pupae are constantly attended by numerous Sugar Ants (*Camponotus* spp.) in an obligatory myrmecophilous association (Braby 2011a; Weir et al. 2011). Very occasionally the immature stages may be associated with *Iridomyrmex pallidus* ants in disturbed suburban areas (Weir et al. 2011), although the nature of this association has not been established.

Seasonality

Adults occur throughout the year. They appear to show little seasonal variation in abundance, although they tend to be more numerous during the second half of the year, particularly during the mid to late dry season (July–October). The immature stages have been recorded during most months of the year, especially during the dry season, indicating that the species breeds continuously. Presumably, several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC. In some areas of the range, inappropriate fire regimes, particularly frequent burning and/or intense landscape fires, are a threat because the mistletoe food plants are highly susceptible to fire.

Amethyst Hairstreak

Jalmenus icilius Hewitson, [1865]



Distribution

This species is restricted to the Northern Deserts and western Gulf Country, where it occurs in the semi-arid and arid zones (< 400 mm mean annual rainfall) in the far south-eastern corner of the study region. It has been recorded 30 km south-east of Barkly Homestead Roadhouse, NT (Braby 2000), and from two locations just outside the southern and eastern boundaries: 120 km east of Argadargada Station, NT (J. Archibald), and 59 km (by road) north-north-east of Burke & Wills Roadhouse, Qld (Dunn 2016). The spatial distribution of the larval food plants is substantially more widespread in the semi-arid zone; thus, further field surveys are required to determine whether *J. icilius* is similarly more widespread than present records indicate. Outside the study region, *J. icilius* occurs widely in the arid and semi-arid areas of central, south-western and south-eastern Australia.

Material from the western Gulf Country (Dunn 2016) is provisionally placed here pending further taxonomic investigation of this population. The specimens are rather distinct and may prove to be *J. daemeli* Semper, 1879 or a species allied to it.

Habitat

The breeding habitat of *J. icilius* has been recorded only from semi-arid and arid areas just outside the study region, where the species is associated with shrubs of the larval food plants growing in open grassland with scattered shrubs or in mixed open woodland, and where colonies of the attendant ant are established.

Larval food plants

Acacia aneura, *A. tetragonophylla*, *Senna artemisioides* (Fabaceae).

Attendant ants

Iridomyrmex chasei, *Iridomyrmex* sp. (*rufoniger* group) (Formicidae: Dolichoderinae). The larvae and pupae are constantly attended by numerous small black ants in an obligatory myrmecophilous association.

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Adults have been recorded in 'autumn' (March and April) and again in 'spring' (October). In central Australia, they have also been commonly recorded in September (Field 1990a; Grund 2005); however, they have also been collected at other times of the year (for example, in January and February), possibly depending on rainfall. Presumably, the species completes several generations annually and the eggs remain in diapause during the cooler winter months or possibly during prolonged dry periods.

Breeding status

This species is resident in the study region.

Conservation status

LC. Although the species *J. icilius* has a narrow range in the study region (EOO = 22,530 sq km), there are no known threats facing the taxon. However, it is currently not known from any conservation reserves.

Black-spotted Flash

Hypolycaena phorbas (Fabricius, 1793)



Plate 145 Black Point, Cobourg Peninsula, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *H. phorbas phorbas* (Fabricius, 1793). It has a disjunct distribution, occurring in the western and northern Kimberley and throughout the Top End. It occurs mainly in the higher rainfall areas (> 1,000 mm mean annual rainfall), but it has been recorded in drier areas receiving an average annual rainfall of 800 mm. Its southernmost limits include Pasco Island, WA (Lambkin 2006); and Manbulloo Station 10 km west of Katherine (A. Carlson), and Ngukurr (S. Normand), NT. The species also occurs in the Gulf of Carpentaria at Walker Creek 36 km east of Karumba, Qld, just outside the eastern boundary of the study region (Braby 2015d). The geographical range of *H. phorbas* broadly corresponds with the spatial distribution of its associated ant, especially within the Top End. Although the larval food plants are widely distributed throughout the region, the attendant ant is absent from most of the Northern Deserts and western Gulf Country and is much more restricted in extent (Lokkers 1986). The species has not been recorded from the Tiwi Islands despite the presence of the attendant ant and larval food plants; thus, further field surveys are required to determine whether *H. phorbas* is present on Bathurst and Melville islands, NT. Outside the study region, *H. phorbas* occurs in mainland New Guinea and adjacent islands, north-eastern Australia and the Bismarck Archipelago.

Previously, the name *H. phorbas ingura* Tindale, 1923 was applied to populations in northern Australia as a subspecies endemic to the region, but Lambkin (2006) concluded that *H. phorbas ingura* did not differ from the nominate subspecies from the northern Torres Strait Islands, Qld.

Habitat

Hypolycaena phorbas breeds in a variety of habitats, including semi-deciduous monsoon vine thicket and mixed eucalypt woodland and riparian woodland with rainforest elements in the understorey, where the larval food plants grow and arboreal nests of the attendant ant are established. The food plants are usually tall shrubs or small trees in the understorey, but are sometimes vines (*Smilax australis*) or mistletoes (*Decasynina signata*).

Larval food plants

Clerodendrum floribundum (Lamiaceae), *Planchonia careya* (Lecythidaceae), *Decasynina signata* (Loranthaceae), *Breynia cernua* (Phyllanthaceae), *Smilax australis* (Smilacaceae). The larvae feed on several food plants, but they are frequently found on *C. floribundum*.

Attendant ant

Oecophylla smaragdina (Formicidae: Formicinae). The larvae and pupae are constantly attended by numerous Green Tree Ants (*O. smaragdina*) in an obligatory myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults occur during most months of the year, but they are most abundant during the wet season and early dry season (January–May), and are very scarce during the late dry season (August–October). The immature stages have been recorded during the wet season and early dry season (November–May), when population numbers are higher. Presumably, the species breeds continuously throughout the year and several generations are completed annually given there is no evidence of diapause in any of the life history stages.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Princess Flash

Deudorix smilis Hewitson, [1863]



Plate 146 Lee Point, Casuarina Coastal Reserve, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *D. smilis dalyensis* (Le Souëf & Tindale, 1970), which is endemic to the study region. *Deudorix smilis* does not occur elsewhere in Australia. It occurs mainly in the western half of the Top End, where it is restricted to the higher rainfall areas (> 900 mm mean annual rainfall, but mainly > 1,200 mm). It has been recorded as far south as Daly River (Ooloo Crossing) (Le Souëf and Tindale 1970; Hutchinson 1978) and as far east as Wongalara Wildlife Sanctuary (Echo Gorge) (Braby 2012a), NT. Although the larval food plant is considerably more widespread, extending into the drier areas of the Northern Deserts and the Kimberley, targeted searches in these areas have not detected *D. smilis*. However, the plant does occur in northern and north-eastern Arnhem Land and Groote Eylandt, NT, where the rainfall and habitat are potentially more suitable. Further surveys are therefore required in the eastern half of the Top End and nearby islands to determine whether *D. smilis* is present in these areas. Outside the study region, *D. smilis* occurs from the Andaman Islands, Burma (Myanmar) and the Malay Peninsula to Indonesia, including Maluku.

Habitat

Deudorix smilis breeds in semi-deciduous monsoon vine thicket on coastal sand dunes and lateritic cliffs above the beach, on inland sandstone hills or rocky outcrops, in the edges of evergreen monsoon vine forest associated with permanent freshwater

streams or in the ecotone between monsoon forest and eucalypt woodland where the larval food plant grows as a tall deciduous shrub or small tree up to 6 m high (Braby 2016c). Adults also fly in open woodland and males congregate on hilltops to locate females, but they do not breed in these habitats.

Larval food plant

Strychnos lucida (Loganiaceae).

Attendant ant

Crematogaster sp. 3 (Group A) (Formicidae: Myrmicinae). The larvae and pupae are usually not attended by ants, but very occasionally the pupae are attended by a small number of black and tan ants (Eastwood et al. 2008; Braby 2016c).

Seasonality

Adults occur during most months of the year, but they are most abundant during the mid dry season (May–July), with a peak in abundance in June. The fruits of the larval food plant are generally seasonal, being more numerous during the early to mid dry season, and it is during this period that the immature stages of the butterfly are abundant. However, the immature stages have also been found on young (green) and ripe (orange) fruits sporadically at other times of the year, including during the ‘build-up’ and wet season (October–April). Presumably, the species breeds continuously throughout the year and several generations are completed annually given there is no evidence of diapause in any of the life history stages.

Breeding status

This species is resident in the study region.

Conservation status

LC. The subspecies *D. smilis dalyensis* has a restricted range within which it occurs in several conservation reserves, including Casuarina Coastal Reserve, Black Jungle Conservation Reserve, Mary River National Park, Garig Gunak Barlu National Park, Kakadu National Park and Wongalara Wildlife Sanctuary, NT. It is currently not threatened, but it may be susceptible to habitat loss and fragmentation because it appears to depend on relatively large patches of monsoon forest and/or a network of smaller interconnected patches of monsoon forest embedded within the savannah matrix (Braby 2016c).

Sword-tail Flash

Bindahara phocides (Fabricius, 1793)



Plate 147 Rollingstone, Qld
Photo: M. F. Braby

Distribution

This species is known only from an observation made in the Gulf of Carpentaria at Limmen National Park (Nathan River Ranger Station), NT, where a specimen was collected and released in January 2009 (M. Kessner). The species has not previously been recorded from the study region, but presumably it is the subspecies *B. phocides yurgama* Couchman, 1965, which occurs in north-eastern Queensland. The putative larval food plant (*Salacia chinensis*) occurs along the northern coastline of the Top End, some 400 km further north of where the specimen was captured. Outside the study region, *B. phocides* occurs widely from India and South-East Asia, through mainland New Guinea and adjacent islands and north-eastern Australia to the Bismarck Archipelago and the Solomon Islands.

Habitat

The breeding habitat of *B. phocides* has not been recorded in the study region. The specimen was recorded in a residential garden (rangers' quarters) surrounded by natural dry woodland in which the mean annual rainfall is about 700 mm; however, the putative larval food plant (*Salacia chinensis*) grows as a vine in coastal semi-deciduous monsoon vine thicket close to the beach in the higher rainfall areas (> 1,300 mm mean annual rainfall).

Larval food plants

Not recorded in the study region; probably *Salacia chinensis* (Celastraceae), which is a larval food plant in north-eastern Queensland (Braby 2000).

Attendant ant

Not recorded in the study region. In Queensland, the larvae and pupae are not attended by ants (Eastwood and Fraser 1999; Braby 2000).

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. The adult was recorded during the wet season (January).

Breeding status

The breeding status of *B. phocides* is uncertain. It may well be resident in the Top End, but the specimen observed at Nathan River was possibly a vagrant from coastal areas further north. The specimen captured was, however, in relatively good condition, with the long hindwing tails intact (M. Kessner, pers. comm.), suggesting it may have bred locally.

Conservation status

DD. The distribution and critical habitat of the species *B. phocides* are poorly known. Targeted field surveys in coastal areas extending from the Wessell Islands and Gove Peninsula to Limmen Bight in the Gulf of Carpentaria are required to determine whether the species is established with permanent breeding populations.

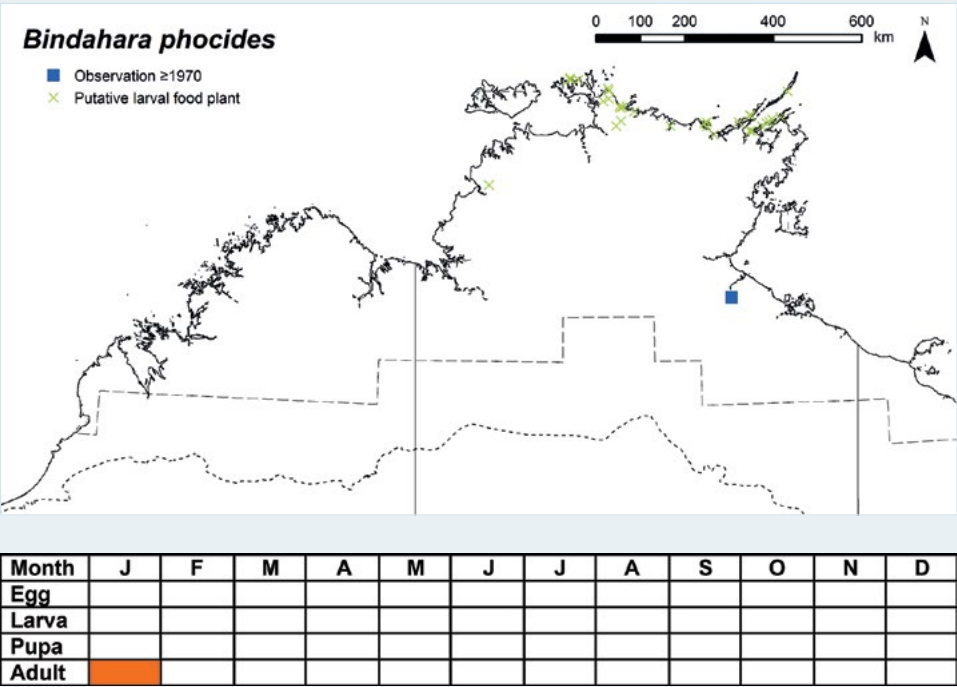


Photo: Boodjamulla/Lawn Hill National Park, Qld, M.F. Braby

Trident Pencil-blue, Northern Pencil-blue

Candalides margarita (Semper, 1879)



Plate 148 Wanguri, Darwin, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *C. margarita gilberti* Waterhouse, 1903, which is endemic to the study region. It occurs widely in the Kimberley and Top End and more sporadically in the western Gulf Country, extending from moist coastal areas of high rainfall (> 1,700 mm mean annual rainfall) to drier inland areas of the semi-arid zone (500–700 mm). Its southernmost limits include Napier Range Pass, WA; Judbarra/Gregory National Park, Savannah Way 75 km west–north-west of the NT/Qld border, and Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998; Franklin 2007). The geographical range corresponds well with the spatial distribution of its larval food plants. Although the plants extend further inland, it is considered unlikely that *C. margarita* breeds in these areas. Outside the study region, *C. margarita* occurs in the Aru Islands, mainland New Guinea and north-eastern and eastern Australia.

Habitat

Candalides margarita breeds in savannah woodland and patches of evergreen monsoon vine forest and semi-deciduous monsoon vine thicket where the larval food plants grow as mistletoes (parasitic shrubs) on various trees (Dodd 1935d; Samson and Wilson 1995; Braby 2008b, 2015e). In Darwin, NT, it also occurs in suburban parks and gardens where the food plant (*Decaisnina signata*) frequently parasitises *Alstonia actinophylla* and *Planchonia careya*. Males readily congregate on hilltops to locate females, but they do not breed in these habitats.

Larval food plants

Anyema miquelii, *A. sanguinea*, *A. villiflora*, *Decaisnina signata*, *Decaisnina triflora*, *Dendrophthoe glabrescens*, *Dendrophthoe odontocalyx* (Loranthaceae).

Attendant ant

Crematogaster sp. (Formicidae: Myrmicinae). The larvae and pupae are usually not attended by ants, but very occasionally the larvae are attended by a few ants (Samson and Wilson 1995; Meyer 1996a; Braby 2008b).

Seasonality

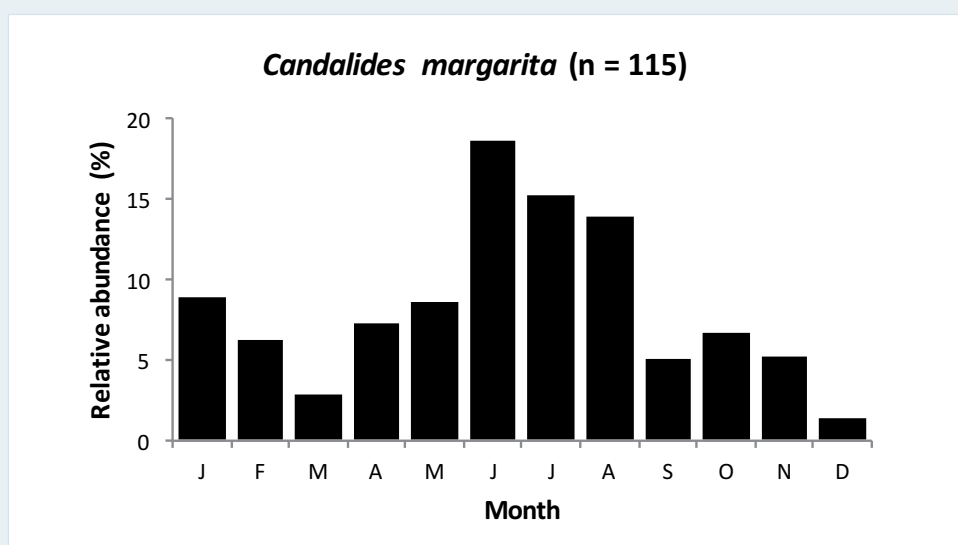
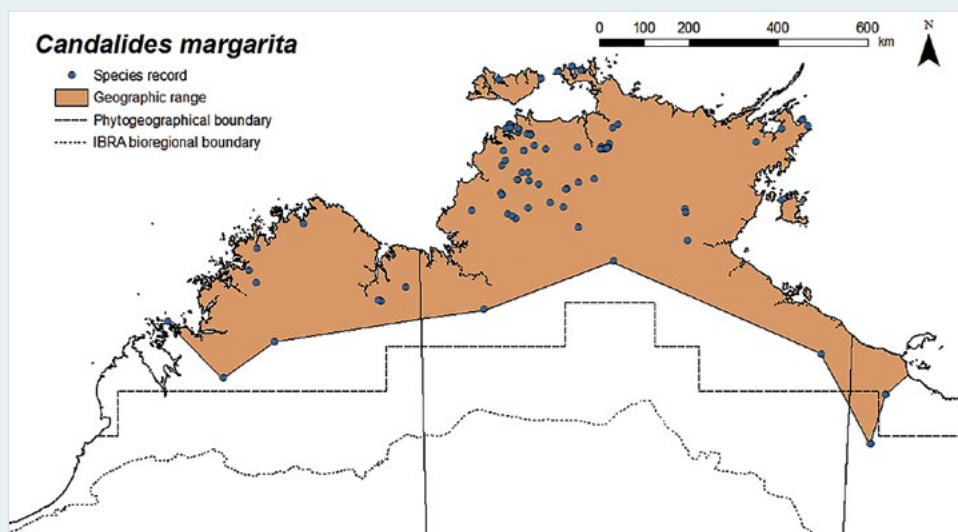
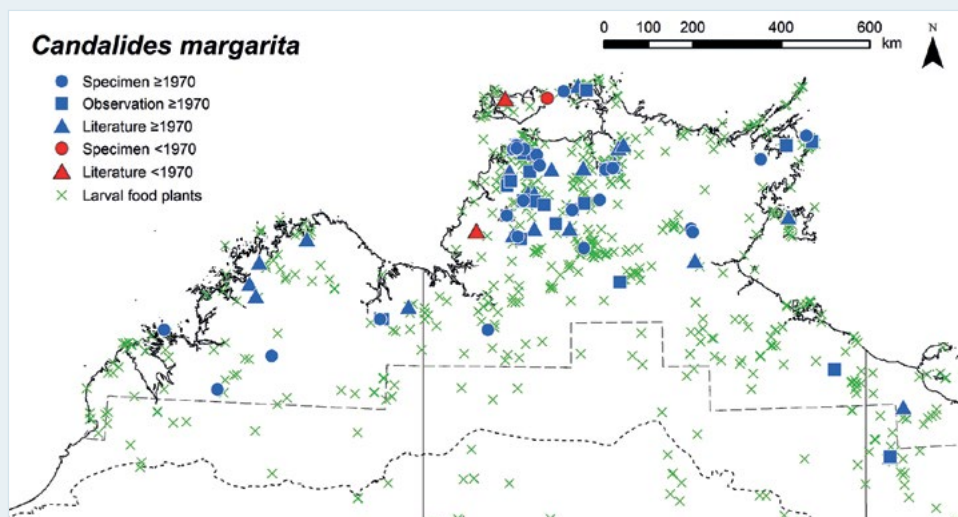
Adults occur throughout the year, but they are most abundant during the mid dry season (June–August), although they may be locally common at other times of the year. The immature stages have been recorded in each month of the year and the life cycle is completed relatively quickly (approximately one month), indicating that breeding occurs continuously and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible]

Twin Dusky-blue

Candalides geminus E. D. Edwards & Kerr, 1978



Plate 149 Kakadu National Park, NT
Photo: M. F. Braby



Plate 150 Kakadu National Park, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *C. geminus gagadju* Braby, 2017, which is endemic to the study region. It occurs in the Top End, its presence in the region first reported by Kikkawa and Monteith (1980) based on a small series of specimens collected in 1979. Examination of material in the ANIC, however, indicated that it was detected seven years earlier, in October 1972, based on a pair collected from western Arnhem Land by I. F. B. Common, E. D. Edwards and M. S. Upton (Braby 2017). It has a patchy and restricted distribution, occurring in Litchfield National Park and on the Arnhem Land Plateau, where it has been recorded at Kakadu and Nitmiluk (Katherine Gorge) national parks and Wongalara Wildlife Sanctuary, NT (Braby 2012a). Although the larval food plants are very widely distributed throughout the study region, *C. geminus* is confined to areas where the plants grow on sandstone in the higher rainfall areas (> 900 mm mean annual rainfall). Outside the study region, *C. geminus* occurs sporadically in north-eastern and eastern Australia.

Habitat

Candalides geminus breeds in eucalypt heathy woodland and open woodland with a spinifex understorey on rocky sandstone escarpments and plateaus where the larval food plants grow as scrambling parasitic vines in the understorey (Braby 2011a, 2017).

Larval food plants

Cassytha filiformis, *C. capillaris* (Lauraceae). The usual food plant is *C. filiformis*, but *C. capillaris* is also used where it is present (Braby 2011a).

Attendant ant

The larvae and pupae are not attended by ants.

Seasonality

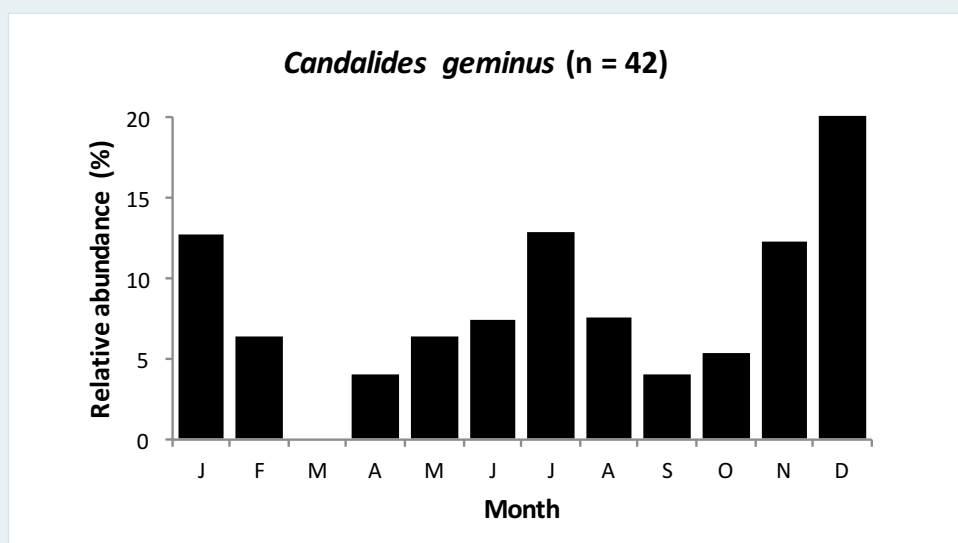
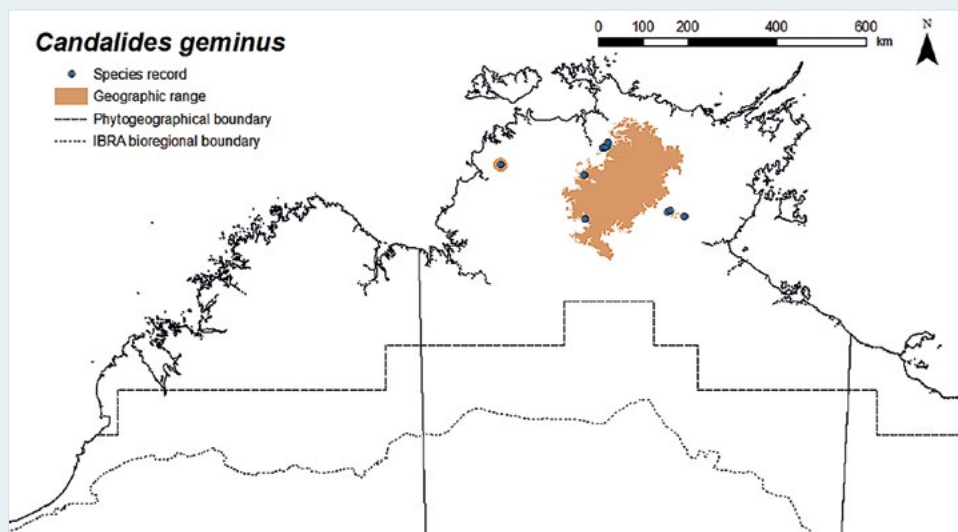
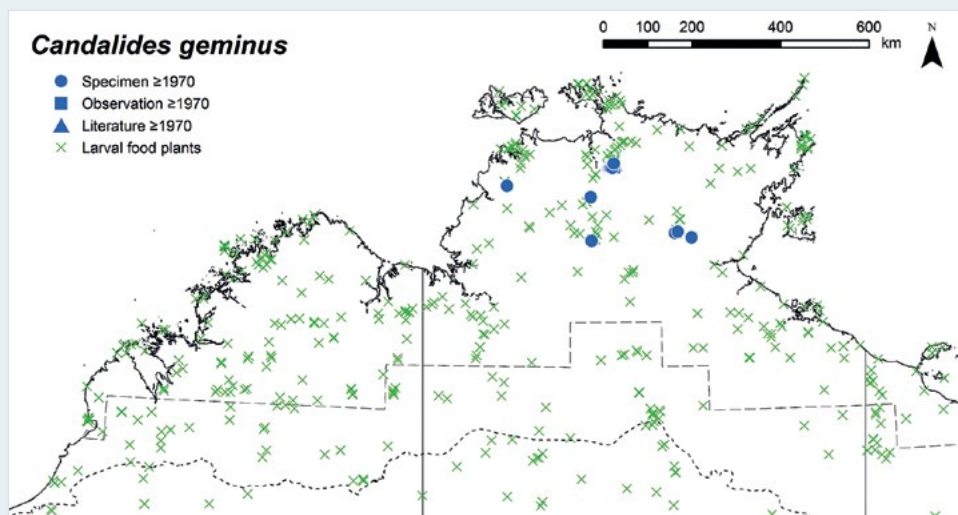
Adults have been recorded during most months of the year, but they appear to be more abundant during the wet season (November–January) and again in the mid dry season (July). The immature stages have been recorded during most months of the year, except March, and the life cycle is completed relatively quickly (approximately one month), indicating that breeding occurs continuously and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC. The subspecies *C. geminus gagadju* is a narrow range endemic (geographic range = 39,940 sq km) and occurs in at least three conservation reserves: Litchfield and Kakadu national parks and Wongalara Wildlife Sanctuary. Despite its restricted occurrence, there are no known threats facing the taxon.



Month	J	F	M	A	M	J	J	A	S	O	N	D
Egg												
Larva												
Pupa												
Adult												

Small Dusky-blue

Candalides erinus (Fabricius, 1775)

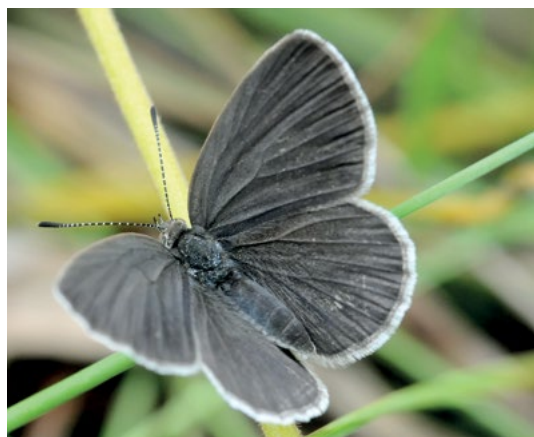


Plate 151 Kakadu National Park, NT
Photo: M. F. Braby



Plate 152 Kakadu National Park, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *C. erinus erinus* (Fabricius, 1775). It occurs very widely in the Kimberley, Top End, Northern Deserts and western Gulf Country, extending from moist coastal areas to the lower rainfall areas of the semi-arid zone (< 500 mm mean annual rainfall). In the inland it has been recorded as far south as the Edgar Ranges (Common 1981) and Landrigan Creek crossing (Williams et al. 2006), WA; 50 km south-south-east of Elliott, NT; and Boodjamulla/Lawn Hill National Park (Daniels and Edwards 1998) and Rotary Lookout 2 km west of Cloncurry (Dunn 2017a), Qld. The geographical range corresponds well with the spatial distribution of its larval food plants, which are similarly widespread. Outside the study region, *C. erinus* occurs in the Pilbara of Western Australia and in north-eastern and eastern Australia.

Habitat

Candalides erinus breeds in a variety of habitats, including savannah woodland on various substrates, eucalypt woodland with rainforest elements in the understorey, the ecotone between evergreen monsoon vine forest and eucalypt woodland, semi-deciduous monsoon vine thicket, paperbark woodland and paperbark-pandanus swamppland, where the larval food plants grow as scrambling parasitic vines in the understorey.

Larval food plants

Cassytha filiformis, *C. capillaris* (Lauraceae).

Attendant ant

Iridomyrmex sp. (*mattirolai* group) (Formicidae: Dolichoderinae). The larvae and pupae are usually not attended by ants, but very occasionally the larvae are attended by a few small black ants (Braby 2011a).

Seasonality

Adults occur throughout the year, but they are most abundant during the first half of the year, particularly during the mid dry season (May–July), and are very scarce during the late dry season and early wet season (September–December). The immature stages have been recorded during most months of the year, being particularly prevalent during the wet season and early dry season (February–May), when adults are most numerous. The life cycle is completed relatively quickly (approximately one month), indicating that breeding occurs continuously and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Spotted Dusky-blue

Candalides delospila (Waterhouse, 1903)



Plate 153 Judbarra/Gregory National Park, NT
Photo: M. F. Braby

Distribution

This species occurs widely in the lower rainfall areas of the study region, south of latitude 14°S (350–900 mm mean annual rainfall). Its northernmost limits are Queen Island in the western Kimberley, WA (Waterhouse 1938); and Bradshaw Field Training Area (Fitzmaurice River catchment) (Archibald and Braby 2017) and Wongalara Wildlife Sanctuary (12 km south of the homestead) (Braby 2012a) in the Top End, NT. The geographic range broadly corresponds with the spatial distribution of its larval food plant. Although the food plant extends further north into higher rainfall areas of the Top End, targeted searches in this area have not detected *C. delospila*. Outside the study region, *C. delospila* occurs well into the drier inland areas of the arid zone just beyond the southern boundary, where it has been recorded as far south as Pipingarry Station Road 30 km south-east of Port Hedland, Whim Creek (Johnson and Valentine 2004) and Balgo Hills (Braby 2000), WA; Newhaven (Australian Wildlife Conservancy property) 300 km west-north-west of Alice Springs, NT, where males were observed hilltopping on several occasions in July–August 2017 (P. Gilmour); and Johnson Creek 70 km north-west of Mt Isa, Mary Kathleen 55 km east of Mt Isa (Braby 2000), 9 km south east by east of Burke & Wills Roadhouse and Rotary Lookout near Cloncurry (Dunn 2017a), Qld. It also extends further east in the inland areas of northern Queensland.

Habitat

Candalides delospila breeds in savannah woodland and eucalypt low open woodland with a hummock (spinifex) grass understorey and hummock grassland on loamy sand, sandstone escarpments, plateaus and platforms, where the larval food plant grows as a fine scrambling parasitic vine over clumps of spinifex (*Triodia*) and other grasses (Braby 2011a).

Larval food plant

Cassytha capillaris (Lauraceae).

Attendant ant

Iridomyrmex sp. (*gracilis* group) (Formicidae: Dolichoderinae). The larvae and pupae are usually not attended by ants, but very occasionally the larvae are attended by a few small black ants (Braby 2011a).

Seasonality

The seasonal occurrence of adults, breeding phenology and seasonal history of the immature stages are not well understood. Adults have been recorded sporadically from January to October, with apparent peaks in abundance in March, July and August, but none has been recorded during the late dry season (November and December), when conditions are typically very hot. Similarly, the immature stages have been recorded sporadically from February to September. The life cycle is completed relatively quickly (approximately seven weeks), but it is not known whether the species undergoes pupal diapause. Presumably, the seasonal pattern is similar to *Candalides erinus*, in which adults are most abundant during the first half of the year, with a possible peak during the mid dry season (July), during which several generations are completed, but it remains to be established whether the species breeds during the late dry season.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Spotted Opal

Nesolycaena urumelia (Tindale, 1922)



Plate 154 Kakadu National Park, NT
Photo: M. F. Braby

Distribution

This species is endemic to the study region. It occurs widely in the Top End and western Gulf Country, generally in the higher rainfall areas (> 800 mm mean annual rainfall), although it has been recorded in the semi-arid zone in western Queensland (c. 500 mm). Its southernmost limits include Spirit Hills (42 km north-east of Keep River National Park ranger station) and McArthur River Homestead (Edwards 1980), NT; and Boodjamulla/Lawn Hill National Park, Qld (Braby 1996; Daniels and Edwards 1998). The geographic range corresponds well with the spatial distribution of its larval food plants in the Northern Territory. Although the food plants extend to the Kimberley, the species is replaced with *Nesolycaena caesia* in northern Western Australia. However, *N. urumelia* does not appear to have been recorded from the Tiwi Islands despite the presence of the larval food plants; thus, further field surveys are required to determine whether *N. urumelia* is established on Bathurst and Melville islands, NT.

Habitat

Nesolycaena urumelia breeds in eucalypt heathy woodland and open woodland on sandstone outcrops, escarpments, plateaus and breakaways or scree slopes below cliffs and in mixed riparian woodland along sandstone gorges where the larval food plants grow as shrubs on sand or loamy sand (Edwards 1980; Braby 2011a, 2015e). It also breeds in coastal eucalypt heathy woodland on white sand and lowland sandsheets.

Larval food plants

Boronia lanceolata, *B. lanuginosa*, *B. laxa*, *B. wilsonii* (Rutaceae). The main food plants are *B. lanceolata* and *B. lanuginosa* (Edwards 1980; Meyer 1996a; Braby 2000, 2011a); however, larvae also feed on *B. laxa* in western Arnhem Land (Braby 2011a) and *B. wilsonii* at Spirit Hills, NT (Braby 2015e).

Attendant ant

Polyrhachis gab (Formicidae: Formicinae), *Monomorium* sp. 8 (*carinatum* group) (Formicidae: Myrmicinae). The larvae and pupae are usually not attended by ants, but very occasionally the larvae are attended by a few ants (Edwards 1980; Meyer 1996a; Eastwood et al. 2008).

Seasonality

Adults occur during most months of the year, but they are generally most abundant during the wet season (January–April) after average or above average rainfall, with a peak in abundance in April. Their numbers diminish as the dry season progresses, and they are scarce towards the end of the dry season (August–October). The immature stages (eggs or larvae) have been recorded during most months of the year except during the late dry season (August–October). Pupae from larvae reared in April or May remain in diapause for up to six months or more during the dry season (Edwards 1980; M. F. Braby, unpublished data). These observations suggest breeding is seasonal and restricted largely to the wet season and early dry season, during which several generations are completed.

Breeding status

This species is resident in the study region.

Conservation status

LC. Although the species *N. urumelia* has a wide geographical range, some areas are potentially threatened by inappropriate fire regimes. Sands and New (2002) suggested the species and/or its larval food plants are sensitive to too frequent burning of sandstone plant communities, and this may be a threatening process in some areas of the range such as the Arnhem Land Plateau (see also Russell-Smith et al. 1998, 2002). The food plants are obligate seeders and, if the fire regime is too frequent, with short interfire intervals (every one to two years), there may be little or no recruitment. That is, in some areas of the range, the population



Photo: Nourlangie Rock, Kakadu National Park, NT, M.F. Braby

of *N. urumelia* may be reduced in future based on a projected decline in the AOO and/or quality of its habitat. Although two of the larval food plants (*B. lanceolata*, *B. lanuginosa*) are currently listed as Least Concern (LC), the two other species (*B. laxa*, *B. wilsonii*) are listed as Near Threatened (NT) under the *TPWCA*. Thus, *N. urumelia* may qualify as Near Threatened (NT) in future. Monitoring of the abundance or occupancy of the butterfly and its food plants is required to clarify the effect of fire as a key threatening process. The fire regime on the sandstone plateau–breakaway country needs to be carefully managed (e.g. at least more than five years) to ensure the food plants have sufficient time to mature, flower and set seed.



Photo: Nourlangie Rock, Kakadu National Park, NT, M.F. Braby

Kimberley Opal

Nesolycaena caesia d'Apice & Miller, 1992



Plate 155 Kalumburu, WA
Photo: M. F. Braby

Distribution

This species is endemic to the study region. It was described only as recently as 1992, two years after it was first discovered, in June 1990 (d'Apice and Miller 1992). It is restricted to northern Western Australia, where it has been recorded in the higher rainfall areas of the northern Kimberley at and near Kalumburu (d'Apice and Miller 1992) and on Jar and Steep Head islands (J. E. and A. Koeys), and in the lower rainfall areas of the eastern Kimberley (El Questro Wilderness Park, WA) (Meyer 1996c). Its main larval food plant (*Boronia wilsonii*) is substantially more widespread, particularly in the western Kimberley south-west to King Sound; thus, further field surveys are required to determine whether *N. caesia* is established in this area.

Habitat

Nesolycaena caesia breeds in eucalypt heathy low woodland on sandstone outcrops, ridges and breakaways where the larval food plants grow as small shrubs on sandy soil (d'Apice and Miller 1992; Meyer et al. 2013).

Larval food plants

Boronia kalumburuensis, *B. wilsonii* (Rutaceae). The main food plant is *B. wilsonii* (d'Apice and Miller 1992; Grund and Hunt 2001; Meyer et al. 2013).

Attendant ant

Iridomyrmex sp. (Formicidae: Dolichoderinae). The larvae and pupae are usually not attended by ants, but very occasionally the larvae are attended by a few ants (Eastwood and Fraser 1999; Meyer et al. 2013).

Seasonality

Adults have been recorded during most months of the year (November–July), but there are too few records ($n = 15$) to assess any seasonal changes in abundance. In general, they have been noted to be more numerous during the wet season (January–April) (Meyer et al. 2013; J. E. and A. Koeys, pers. comm.). The breeding phenology and seasonal history of the immature stages are not well understood. The immature stages (eggs or larvae) have been recorded in November and from March to July. The pupal stage is known to remain in diapause for up to eight months during the dry season (Braby 2000). Presumably, the life cycle strategy is similar to *Nesolycaena urumelia* in which breeding is seasonal and restricted to the wet season and early dry season, during which several generations are completed, and adults are scarce or absent during the late dry season (August–October).

Breeding status

This species is resident in the study region.

Conservation status

DD. The species *N. caesia* is a short-range endemic (EOO = 9,170 sq km). It currently lacks adequate protection because most sites occur outside conservation reserves, although it does occur in the Uunguu IPA. However, it may be impacted by inappropriate fire regimes. The larval food plants are obligate seeders and if the fire regime on sandstone plant communities is too frequent, with short interfire intervals (every one–two years), there may be little or no recruitment. That is, the population of *N. caesia* may be reduced in future based on a projected decline in the AOO and/or quality of its habitat. Thus, the taxon may qualify as Near Threatened (NT) once adequate data are available. Monitoring of the abundance and occupancy of the butterfly and its food plants is required to clarify the effect of fire frequency as a key threatening process.

Pale Ciliate-blue

Anthene lycaenoides (C. Felder, 1860)



Plate 156 Herberton, Qld
Photo: Don Franklin

Distribution

This species is represented in the study region by the subspecies *A. lycaenoides godeffroyi* (Semper, [1879]). It occurs in the northern and eastern Kimberley and more widely in the Top End. It extends from moist coastal areas to drier inland areas of the semi-arid zone (c. 700 mm mean annual rainfall), where it has been recorded as far south as El Questro Wilderness Park (El Questro Gorge and Pentecost River crossing), WA (Braby 2012b); and Timber Creek, NT. The larval food plants are considerably more widespread in the Kimberley, the eastern half of the Top End and western Gulf Country, as well as on the Tiwi Islands and Groote Eylandt, NT. The spatial distribution of the larval food plants, together with the occurrence of the butterfly in the lower rainfall areas of the study region, suggests the geographic range of *A. lycaenoides* is incomplete. Further field surveys are thus required to determine whether *A. lycaenoides* occurs in the western Kimberley, Bathurst and Melville islands, NT, the Limmen Bight area in the Gulf of Carpentaria and the western Gulf Country. Outside the study region, *A. lycaenoides* occurs in Maluku, including the Kai Islands, mainland New Guinea and adjacent islands and north-eastern Australia.

Habitat

Anthene lycaenoides breeds mainly in monsoon forest, including riparian evergreen monsoon vine forest along permanent freshwater streams, semi-deciduous monsoon vine thicket and riparian paperbark open forest with rainforest elements in the understorey, where the larval food plants usually grow as small trees. It also occurs in suburban parks and gardens where the food plants are propagated as ornamental trees.

Larval food plants

Millettia pinnata, *Senna surattensis* (Fabaceae), *Flagellaria indica* (Flagellariaceae), *Barringtonia acutangula* (Lecythidaceae), *Bridelia tomentosa* (Phyllanthaceae), *Cupaniopsis anacardioides* (Sapindaceae).

Attendant ants

Crematogaster spp. (Formicidae: Myrmicinae). The larvae and pupae are usually not attended by ants, but very occasionally the larvae are attended by a few ants (Meyer 1996a).

Seasonality

Adults occur during most months of the year, but the patterns of their seasonal changes in abundance are not entirely clear. Adults are rarely observed in large numbers. Our limited data suggest they are more numerous during the late dry season, wet season and early dry season, with a possible peak in abundance in April and May, but are scarce during the mid dry season (June–August). The breeding phenology is not well understood. The larvae feed on flower buds and flowers, and the immature stages have been recorded sporadically during the wet season (December–April) and also in July. Presumably, the species breeds continuously throughout the year and several generations are completed annually by switching its food plants on a seasonal basis.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Dark Ciliate-blue

Anthene seltuttus (Röber, 1886)



Plate 157 Beatrice Hill, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *A. seltuttus affinis* (Waterhouse & R. E. Turner, 1905). It is restricted to the Top End, where it occurs mainly in the higher rainfall areas (> 800 mm mean annual rainfall, but generally > 900 mm). Its southernmost extent includes Katherine (Angel 1951), Roper River and Groote Eylandt (Tindale 1923), NT. The species also occurs in the Gulf of Carpentaria at Walker Creek 36 km east of Karumba, Qld, just outside the eastern boundary of the study region (Braby 2015d). The geographical range of *A. seltuttus* closely corresponds with the spatial distribution of its associated ant within the Top End. Although the larval food plants and attendant ant also occur widely in the Kimberley, searches have not detected *A. seltuttus* in this area. Similarly, although the larval food plants are more widely distributed in the Northern Deserts and the western Gulf Country, the ant is absent from these areas and is much more restricted in extent (Lokkers 1986). Outside the study region, *A. seltuttus* occurs from Maluku, including the Kai and Aru islands, through mainland New Guinea and adjacent islands and north-eastern Australia to the Louisiade Archipelago.

Habitat

Anthene seltuttus breeds mainly in the edges of semi-deciduous monsoon vine thicket, in both coastal and inland areas, and in mixed riparian open forest with rainforest elements in the understorey where the larval food plants (*Millettia pinnata* and *Cupaniopsis anacardioides*) grow as understorey trees and where arboreal nests of the attendant ant are established. It also breeds in the ecotone between savannah woodland and monsoon forest where saplings of an alternative food plant (*Corymbia disjuncta*) grow (Braby 2015e).

Larval food plants

Millettia pinnata (Fabaceae), *Corymbia disjuncta* (Myrtaceae), *Cupaniopsis anacardioides* (Sapindaceae); also **Delonix regia* (Fabaceae), **Litchi chinensis* (Sapindaceae).

Attendant ant

Oecophylla smaragdina (Formicidae: Formicinae). The larvae and pupae are constantly attended by numerous Green Tree Ants (*O. smaragdina*) in an obligatory myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults occur throughout the year, but they are generally more abundant during the wet season (November–April). The breeding phenology is not well understood. The larvae feed on new soft leaves, and the immature stages have been recorded during the second half of the year (August–December) and also in April. Presumably, the species breeds continuously throughout the year and several generations are completed annually by switching its larval food plants on a seasonal basis.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Mauve Line-blue

Petrelaea tombugensis (Röber, [1886])



Plate 158 Carson River crossing, WA
Photo: M. F. Braby



Plate 159 Carson River crossing, WA
Photo: M. F. Braby

Distribution

This species is known from only two locations within the study region: in the northern Kimberley on the Carson River crossing 18 km south–south-east of Kalumburu, WA, based on six specimens collected in May 2015 (Braby 2015b); and in the Top End at Black Point on Cobourg Peninsula, NT, based on two males collected in January 1977 (Common and Waterhouse 1981; Braby 2015b). The putative larval food plants (*Terminalia* spp.) have a disjunct distribution that largely corresponds with the known geographic range of *P. tombugensis*; *Terminalia muelleri* is known only from the northern Kimberley (Vansittart Bay, WA) and Cobourg Peninsula (Coral Bay, NT), whereas *T. catappa* is known further east on the Wessell Islands and Gove Peninsula, NT. Further field surveys are thus required to determine whether *P. tombugensis* is present in north-eastern Arnhem Land. Outside the study region, *P. tombugensis* occurs from the Andaman Islands and Maluku, through mainland New Guinea and north-eastern Australia to New Britain and the Solomon Islands.

Habitat

The breeding habitat of *P. tombugensis* has not been recorded in the study region. Adults have been collected in coastal semi-deciduous monsoon vine thicket and riparian evergreen monsoon vine forest (Braby 2015b)—habitats in which the species no doubt breeds.

Larval food plants

Not recorded in the study region; probably *Terminalia catappa* and *T. muelleri* (Combretaceae), which are larval food plants in northern Queensland (Samson and Lambkin 2003; Hopkinson and Bourne 2018).

Attendant ant

Not recorded in the study region. In north-eastern Queensland, the larvae and pupae are not attended by ants (Samson and Lambkin 2003; Hopkinson and Bourne 2018).

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Adults have been recorded only during the wet season (January) and early dry season (May), but there are too few records ($n = 3$) to assess any seasonal changes in abundance. In northern Queensland, the larvae feed on flowers of the food plant; adults are seasonal and present only from September to May, which broadly coincides with the flowering period of *Terminalia catappa* and *T. muelleri*, which extends from the ‘build-up’ through the wet season to the start of the dry season (October–May) (Müller et al. 1998; Samson and Lambkin 2003; Hopkinson and Bourne 2018). Presumably, the breeding phenology of *P. tombugensis* in northern Australia is similar to that in northern Queensland. However, it is not known how the species survives the dry season (June–September).

White-banded Line-blue

Nacaduba kurava (Moore, [1858])



Plate 160 Marrakai Road, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *N. kurava felsina* Waterhouse & Lyell, 1914, which is endemic to the study region. It occurs in the north of the Northern Territory, where it is restricted to the higher rainfall areas of the north-western corner of the Top End (> 800 mm mean annual rainfall, but generally > 900 mm). The geographic range broadly corresponds with the spatial distribution of its known larval food plant. The food plant, however, extends further east to Kakadu National Park (East Alligator River), NT; thus, further field surveys are required to determine whether *N. kurava* occurs in the vicinity of western Arnhem Land. Specimens of *N. kurava* have been collected from several locations where the food plant is absent, including Bullocky Point in Darwin (Braby 2014a) and further inland at Katherine (Common and Waterhouse 1981) and Mataranka (Dunn and Dunn 1991), NT, indicating that alternative (as yet unreported) food plants are used at these locations. Outside the study region, *N. kurava* occurs widely from India, Japan and South-East Asia, through mainland New Guinea and north-eastern Australia to the Bismarck Archipelago.

Habitat

Nacaduba kurava breeds mainly in riparian evergreen monsoon vine forest associated with permanent freshwater streams where the known larval food plant grows as a rambling woody vine (Meyer 1996b). Adults have also been recorded in semi-deciduous monsoon vine thicket on laterite in coastal areas and on limestone outcrops in inland areas, where they no doubt breed on alternative food plants.

Larval food plants

Embelia curvinervia (Primulaceae). The recorded food plant is the vine *E. curvinervia* (Meyer 1996b); however, Common and Waterhouse (1981: 550) reported an additional species, noting at Katherine that a female 'was reared from a larva feeding on the young foliage of a rain-forest tree growing on the bank of the Katherine River'. The identity of this second food plant has not been determined.

Attendant ant

The larvae and pupae are not attended by ants.

Seasonality

Adults occur throughout the year, and they appear to be more numerous during the second half (July–December, and January), but there are too few records ($n = 27$) to assess any seasonal changes in abundance. The larvae feed on new leaf growth and flowers. We have recorded the immature stages during the early dry season (April–July), although Meyer (1996b: 74) noted that the 'larvae occur throughout the year but are numerous from May to July'. Presumably, the species breeds throughout the year and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC. The subspecies *N. kurava felsina* is a narrow-range endemic (EOO = 25,250 sq km) and occurs in at least one conservation reserve (Fish River Station). Despite its restricted occurrence and poor level of protection, there are no known threats facing the taxon. The larval food plant is currently listed as Least Concern (LC) under the *TPWCA*.

Two-spotted Line-blue

Nacaduba biocellata (C. & R. Felder, 1865)



Plate 161 Nhulunbuy, NT
Photo: M. F. Braby



Plate 162 Wongalara Wildlife Sanctuary, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *N. biocellata biocellata* (C. & R. Felder, 1865). It occurs very widely in the region and also extends into the arid zone of central Australia beyond the southern boundary of the study region. It is generally more prevalent in the low rainfall areas of the semi-arid zone. The geographic range corresponds well with the spatial distribution of its larval food plants, which are similarly widespread. Interestingly, both the butterfly and its known food plants are absent from the Tiwi Islands, NT. Outside the study region, *N. biocellata* occurs in the Lesser Sunda Islands and throughout Australia, Vanuatu and New Caledonia.

Habitat

Nacaduba biocellata breeds in savannah woodland and open woodland where the larval food plants grow as small trees (Braby 2015e).

Larval food plants

Acacia plectocarpa, *A. torulosa*, *A. tumida* (Fabaceae). The immature stages and male mate-location behaviour have been recorded associated with at least three species of *Acacia* (Braby 2015e), but presumably *N. biocellata* utilises a much wider range of *Acacia* spp. than currently recorded (Dunn 2017c).

Attendant ant

Not recorded in the study region. Elsewhere, the larvae and pupae are usually not attended by ants, but very occasionally they are attended by a few ants (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults have been recorded during most months of the year, but they are most abundant during the mid and early dry seasons (May–August), with a pronounced peak in abundance in July, and are generally rare or absent in most years during the ‘build-up’ and wet season (October–April). The breeding phenology and seasonal history of the immature stages are not well understood. Larvae have been collected and reared on flowers of the larval food plant in May. There are no published records of migration of the species, but it is strongly suspected that populations are highly mobile and can disperse considerable distances (F. Douglas, pers. comm.). Presumably, *N. biocellata* colonises much of the study region—or at least the higher rainfall areas of the region—on a seasonal basis; breeding is limited to the dry season, when their larval food plants are in flower, and it then vacates much of the region or contracts to the arid zone during the hot humid months. The few records during the wet season possibly represent vagrants or temporary local breeding populations in some years.

Breeding status

Nacaduba biocellata appears to be a regular immigrant in the study region, breeding temporarily during the dry season and then vacating the region or contracting to the drier inland areas before the onset of the wet.

Conservation status

LC.

Purple Line-blue

Prosotas dubiosa (Semper, [1879])



Plate 163 Gunn Point, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *P. dubiosa dubiosa* (Semper, [1879]). It occurs in the Kimberley, Top End and western Gulf Country, extending from moist coastal areas to drier inland areas of the semi-arid zone (c. 700 mm mean annual rainfall). Its southern limits include Broome (Common and Waterhouse 1981) and Lake Argyle (Dunn 1980), WA; and Jasper Gorge about 58 km south-west of Victoria River Roadhouse (Franklin et al. 2005) and Bessie Spring (Dunn and Dunn 1991), NT. It has also been recorded further east in the Gulf of Carpentaria at Walker Creek 36 km east of Karumba, Qld, just outside the eastern boundary of the study region (Dunn 2017c). Comparison of the geographic range with the spatial distribution of its larval food plants indicates that the known food plants are absent from much of the range of *P. dubiosa* in the Kimberley, indicating that other (as yet unreported) food plants are used in this area. Outside the study region, *P. dubiosa* occurs widely from India and South-East Asia, through mainland New Guinea and adjacent islands and north-eastern and eastern Australia to the Solomon Islands.

Habitat

Prosotas dubiosa breeds in a wide variety of habitats, including semi-deciduous monsoon vine thicket, the edges of riparian evergreen monsoon vine forest, savannah woodland and eucalypt heathy woodland, where the larval food plants usually grow as tall shrubs or small trees (Braby 2011a, 2015e).

Larval food plants

Semecarpus australiensis (Anacardiaceae), *Acacia auriculiformis*, *A. scopulorum*, *Millettia pinnata* (Fabaceae), *Cupaniopsis anacardioides* (Sapindaceae); also **Dalbergia sissoo* (Fabaceae).

Attendant ant

The larvae and pupae are not attended by ants.

Seasonality

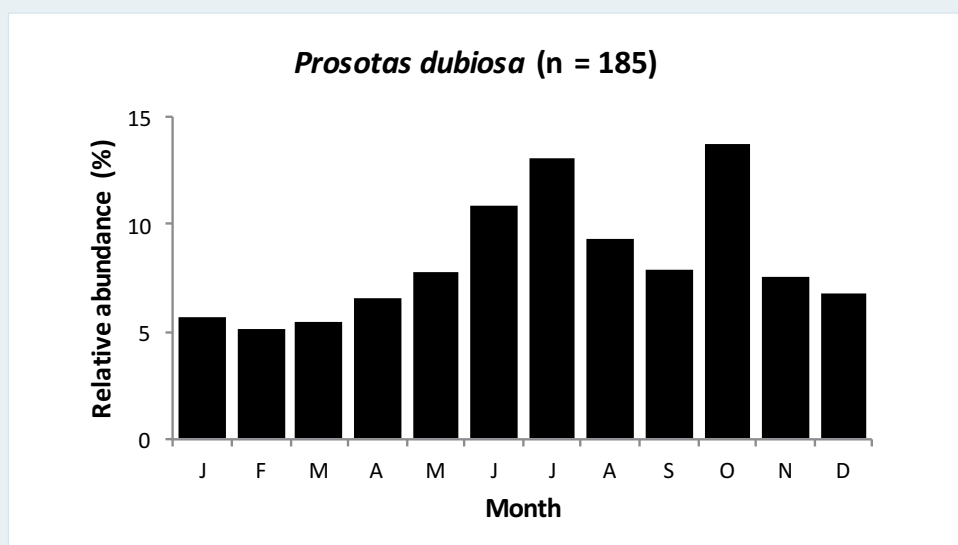
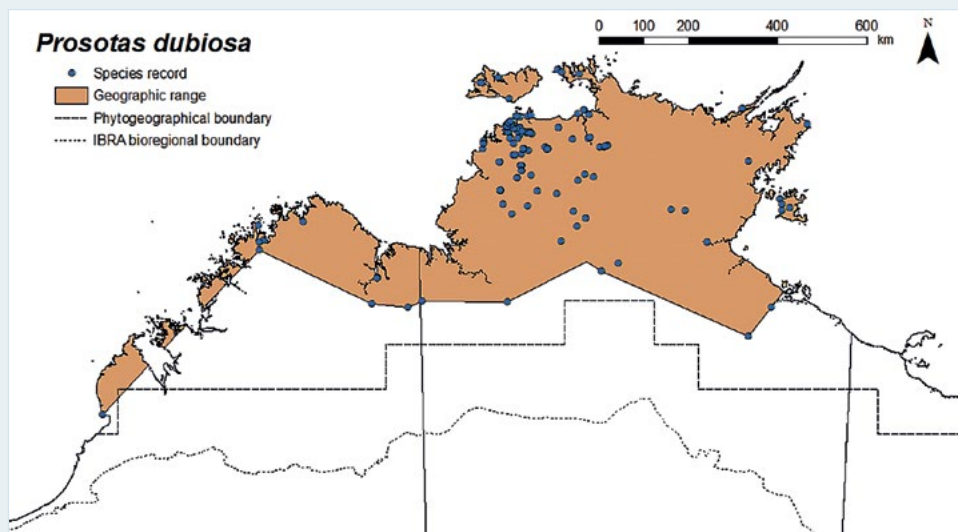
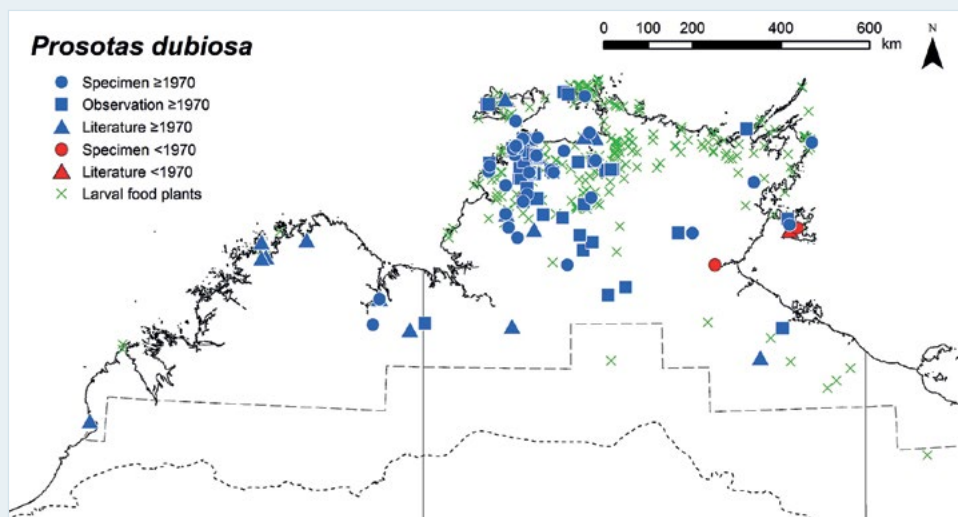
Adults occur throughout the year, but they are generally more abundant during the mid to late dry season (June–October), with peaks in abundance in July and October, but they may also be locally abundant at other times of the year (e.g. April), depending on the seasonal availability of flower buds. The immature stages have been recorded sporadically from April to December, but undoubtedly occur at other times of the year. Presumably, *P. dubiosa* breeds continuously throughout the year and several generations are completed annually by switching its food plants on a seasonal basis according to the flowering period of each species.

Breeding status

This species is resident in the study region.

Conservation status

LC.



Month	J	F	M	A	M	J	J	A	S	O	N	D
Egg												
Larva												
Pupa												
Adult												

Speckled Line-blue

Catopyrops florinda (Butler, 1877)



Plate 164 Kununurra, WA
Photo: Mark Golding



Plate 165 Wanguri, Darwin, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *C. florinda estrella* (Waterhouse & Lyell, 1914). It occurs very widely in the region, from the Kimberley, through the Top End and Northern Deserts to the western Gulf Country, extending from moist coastal areas to drier inland areas of the semi-arid zone (c. 500 mm mean annual rainfall). It has been recorded as far south as the Edgar Ranges (Common 1981) and Halls Creek (Grund and Hunt 2001), WA; Newcastle Waters, NT (Braby 2000); and Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998). It has also been recorded at Walker Creek 36 km east of Karumba, Qld, just outside the eastern boundary of the study region (Dunn 2017d). The geographic range corresponds well with the spatial distribution of its larval food plants, indicating that *C. florinda* has been well sampled in the region. Outside the study region, *C. florinda* occurs from Timor, through mainland New Guinea and north-eastern and eastern Australia to New Britain and New Caledonia.

Habitat

Catopyrops florinda breeds in a variety of habitats, including semi-deciduous monsoon vine thicket, savannah woodland, eucalypt open woodland on rocky outcrops and along rocky seasonal gullies, and mixed riparian woodland with rainforest elements along riverbanks or gorges in the drier inland areas, where the larval food plants grow as shrubs (Braby 2011a).

Larval food plants

Mallotus nesophilus (Euphorbiaceae), *Dodonaea hispidula* (Sapindaceae). The immature stages are found frequently on *D. hispidula* (Braby 2011a).

Attendant ant

The larvae and pupae are not attended by ants.

Seasonality

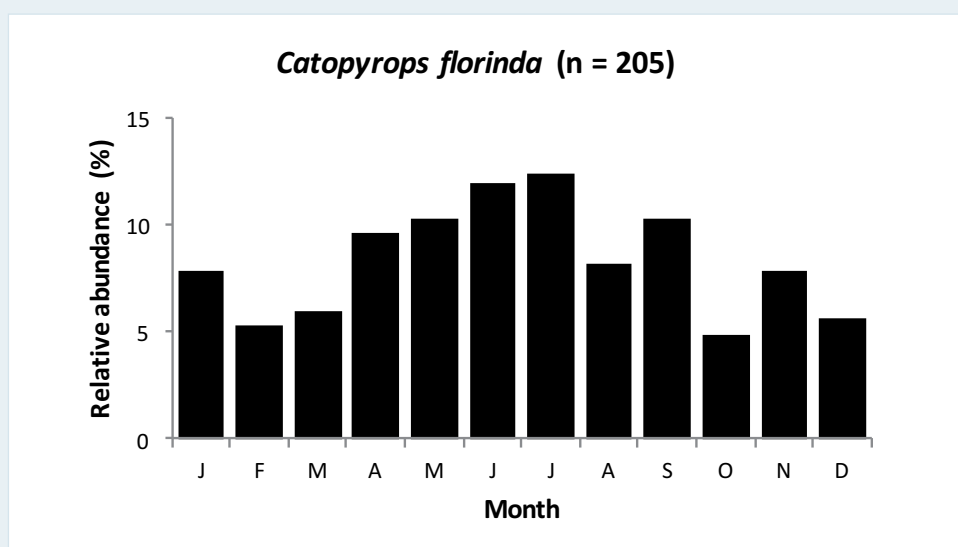
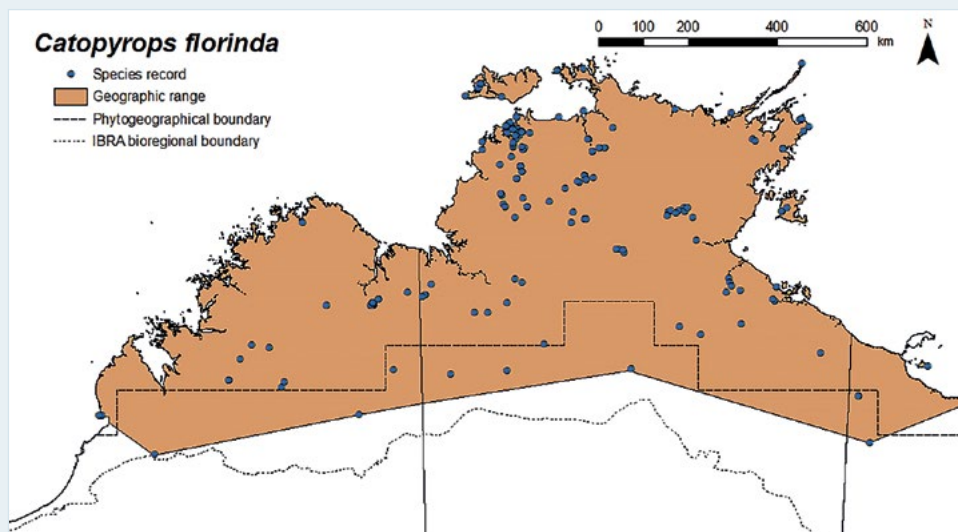
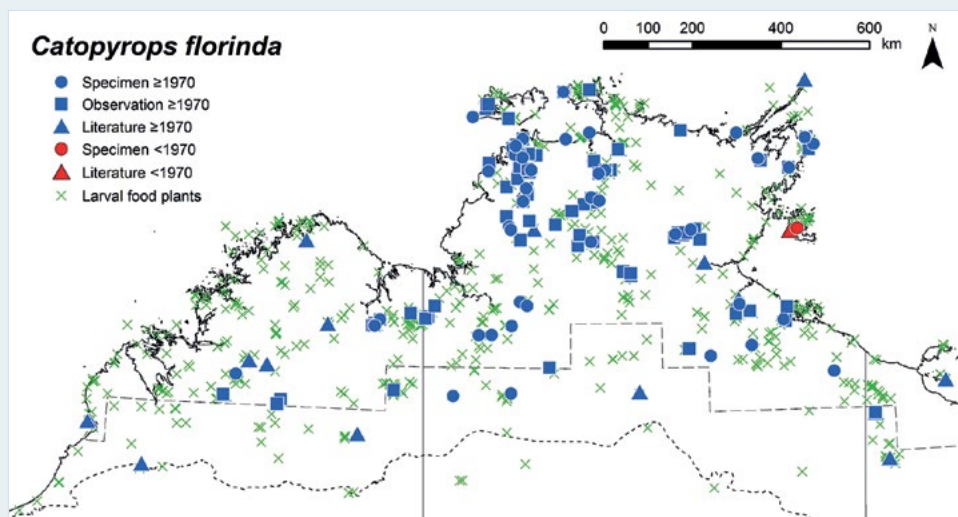
Adults occur throughout the year, but they are most abundant during the dry season (April–September). The immature stages have been recorded sporadically from February to October, but no doubt also occur at other times. Presumably, the species breeds continuously throughout the year and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC.



Month	J	F	M	A	M	J	J	A	S	O	N	D
Egg				Yellow					Yellow			
Larva		Green							Green			
Pupa		Blue								Blue		
Adult	Orange											

Glistening Line-blue

Sahulana scintillata (T. P. Lucas, 1889)



Plate 166 Mary River Reserve, NT
Photo: M. F. Braby

Distribution

This species occurs in the north of the Northern Territory, where it is restricted to the higher rainfall areas of the Top End (> 1,200 mm mean annual rainfall, but mostly > 1,400 mm). It appears to be rare, known only from seven locations (Meyer et al. 2006; Franklin et al. 2007a; Braby 2014a). It has been recorded from Darwin to the Mary River crossing (Arnhem Highway) and further east, on the Koolatong River crossing (Gapuwiyak–Balma Track) (Braby 2014a), NT. The putative larval food plants (*Acacia aulacocarpa* and *Cupaniopsis anacardioides*) occur more widely in the Top End; thus, further field surveys are required to determine more precisely the southern extent of *S. scintillata*. Outside the study region, *S. scintillata* occurs in mainland New Guinea and north-eastern and eastern Australia.

Habitat

The breeding habitat of *S. scintillata* has not been recorded in the study region. Adults have been collected mostly in riparian forest, riparian woodland or riparian paperbark open woodland (Braby 2014a), but they have also been recorded from coastal areas adjacent to mangroves or semi-deciduous monsoon vine thicket (Meyer et al. 2006; Franklin et al. 2007a). Adults have been observed feeding at flowers of *Melaleuca*, *Lophostemon* and *Calytrix*.

Larval food plants

Not recorded in the study region; possibly *Acacia aulacocarpa* (Fabaceae) and *Cupaniopsis anacardioides* (Sapindaceae), which are two larval food plants in eastern Australia (Braby 2000, 2016a).

Attendant ant

Not recorded in the study region. In Queensland, the larvae and pupae are not attended by ants (Eastwood and Fraser 1999; Braby 2000).

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Adults are seasonal, occurring only in the dry season (June–September), but there are too few records ($n = 12$) to assess temporal changes in abundance. Most records are from June and July. In Queensland, the larvae feed on the flower buds and flowers of their food plants. Presumably, the seasonal appearance of *S. scintillata* in northern Australia is tightly synchronised with the flowering period of its larval food plant(s). However, it is not clear how the species survives the wet season.

Breeding status

This species is resident in the study region.

Conservation status

LC. The species *S. scintillata* has a restricted range in the study region within which it occurs in several conservation reserves, including Casuarina Coastal Reserve, Djukbinj National Park and Mary River National Park. Despite its restricted occurrence, there are no known threats facing the taxon. Further investigations are needed to determine the ecological requirements of this species.

Samphire Blue

Theclinessthes sulpitius (Miskin, 1890)



Plate 167 Near Palmerston, NT
Photo: M. F. Braby

Distribution

This species occurs sporadically in coastal areas of the Kimberley, Top End and western Gulf Country of the study region, its presence detected only as recently as 1991 (Meyer and Wilson 1995). It has been recorded from six widely dispersed locations: Broome (Peters 2006; Williams et al. 2006; Braby 2012b) and Wyndham (Braby 2000; Williams et al. 2006), WA; the Darwin area (Shoal Bay, Elizabeth River, Cox Peninsula) (Meyer and Wilson 1995), from Maningrida to Mililingimbi (Bisa 2013), Groote Eylandt (D. Webb) and Bing Bong 48 km north of Borroloola (Braby 2012b), NT; as well as Karumba–Normanton, Qld (Pierce 2008, 2010, 2011; Braby 2015d), just outside the eastern boundary of the region. The larval food plants are distributed more or less continuously between the known locations; thus, further field studies are required in the intervening areas to determine whether *T. sulpitius* occurs throughout the coastal areas of the study region, particularly in the Kimberley. Outside the study region, *T. sulpitius* occurs in the Torres Strait Islands, Qld, and widely along the eastern Australian coast.

The published records of *Theclinessthes serpentatus* (Herrich-Schäffer, 1869) for Broome (Peters 2006) and Karumba (Pierce 2008, 2010) are erroneous and refer to *T. sulpitius* (see Braby 2012b, 2015d).

Habitat

Theclinessthes sulpitius breeds in estuarine saltmarsh where the larval food plants grow as samphires in the intertidal zone of rivers and creeks (Meyer and Wilson 1995; Braby 2011a, 2014a, 2015d).

Larval food plants

Tecticornia australasica, *T. halocnemoides*, *T. indica* (Amaranthaceae).

Attendant ant

The larvae and pupae are usually not attended by ants, but very occasionally the larvae are attended by a few small black ants of a species yet to be determined (Meyer and Wilson 1995).

Seasonality

Adults have been recorded mainly in the dry season (April–August), as well as in the mid wet season (December and January), but there are too few records to assess any seasonal changes in abundance. We have observed adults to be locally abundant during the mid dry season (June–August). The immature stages (eggs or larvae) have been recorded sporadically from December to June. Presumably, the species breeds continuously throughout the year and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC. Although the species *T. sulpitius* has a wide geographical range in the study region, it is known to occur in only one conservation reserve (Djelk IPA).

Wattle Blue

Theclinessthes miskini (T. P. Lucas, 1889)



Plate 168 Mt Burrell, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *T. miskini miskini* (T. P. Lucas, 1889). It occurs almost throughout the entire region, from moist coastal areas to drier inland areas of the semi-arid zone; it also extends into the arid zone of central Australia beyond the southern boundary of the study region. The geographic range corresponds with the spatial distribution of its larval food plants, which are similarly very widespread. Outside the study region, *T. miskini* occurs from the Lesser Sunda Islands, Tanimbar and the Kai and Aru islands, through mainland New Guinea and adjacent islands to the Admiralty Islands, the Bismarck Archipelago and the D'Entrecasteaux and Goodenough islands. It also occurs throughout the Australian continent.

Habitat

Theclinessthes miskini breeds mainly in savannah woodland, open woodland and riparian woodland, favouring open disturbed areas where the larval food plants grow as pioneer shrubs, seedlings or saplings regenerating after fire, flood or unnatural events such as roadside earthworks (Braby 2011a, 2015e). It also breeds in the edges of monsoon forest.

Larval food plants

Acacia auriculiformis, *A. difficilis*, *A. holosericea*, *A. platycarpa*, *Cathormion umbellatum*, *Sesbania cannabina* (Fabaceae), *Corymbia bella*, *Corymbia disjuncta*, *Corymbia ferruginea* (Myrtaceae), *Santalum lanceolatum* (Santalaceae), *Atalaya hemiglauca*, *Atalaya variifolia* (Sapindaceae).

Attendant ants

Iridomyrmex reburrus, *I. sanguineus*, *Iridomyrmex* sp. (*anceps* group), *Iridomyrmex* sp. (*gracilis* group), *Iridomyrmex* sp. (*mattirolai* group), *Iridomyrmex* sp. near *minor*, *I. pallidus* (Formicidae: Dolichoderinae), *Camponotus* sp. (*crozieri* group), *Camponotus* sp. (*denticulatus* group), *Camponotus* sp. (*novaeollandiae* group) (Formicidae: Formicinae). The larvae and pupae are usually attended by varying numbers of ants representing several genera, including Meat Ants (*Iridomyrmex* spp.), small black ants (*Iridomyrmex* spp.) and Sugar Ants (*Camponotus* spp.), in a facultative myrmecophilous association (Braby 2011a, 2015e).

Seasonality

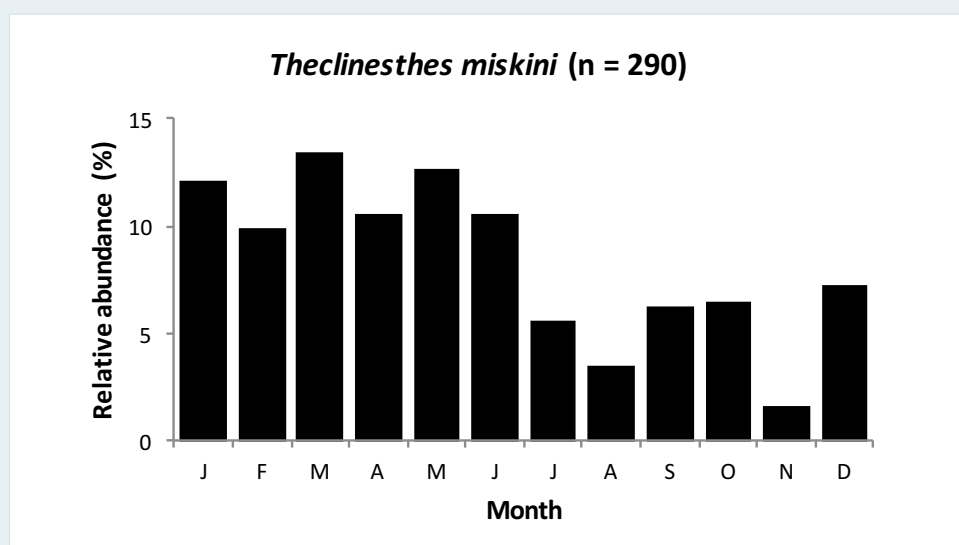
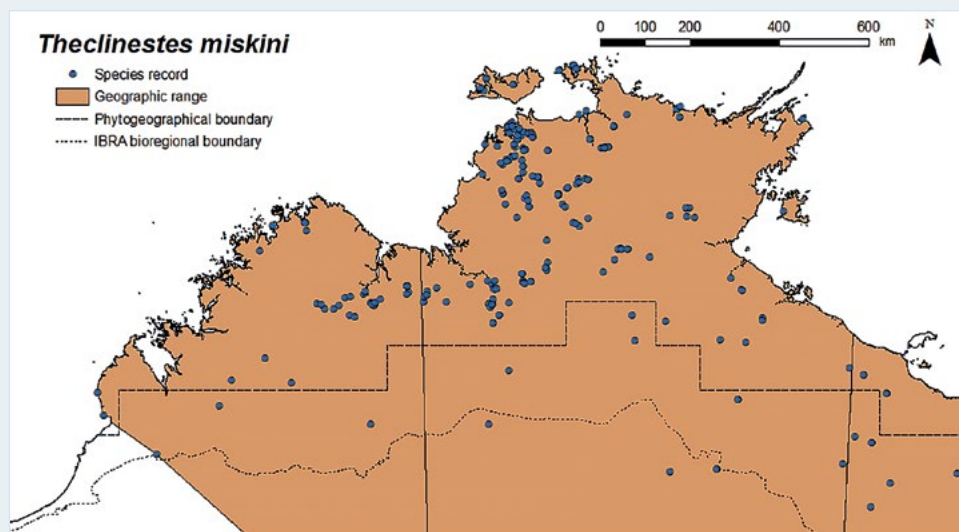
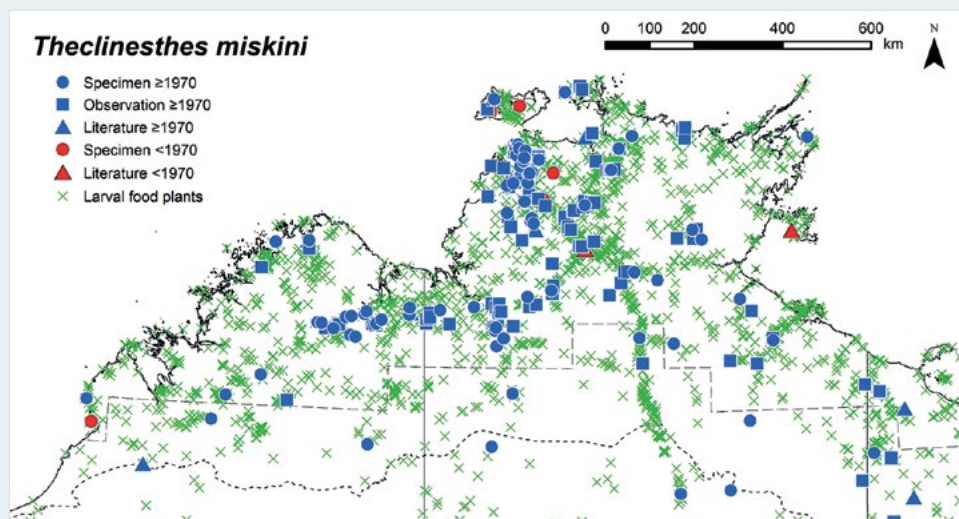
Adults occur throughout the year, but they are most abundant during the first half (January–June), which coincides with the wet season and early dry season, although they may be locally abundant at other times. The immature stages have been recorded during most months of the year, but are observed more frequently during the wet season (December–April), when adults are abundant. The young larvae feed on the new soft leaf growth of the food plants. Presumably, the species breeds continuously throughout the year and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC.



Bitter-bush Blue

Theclinessthes albocinctus (Waterhouse, 1903)

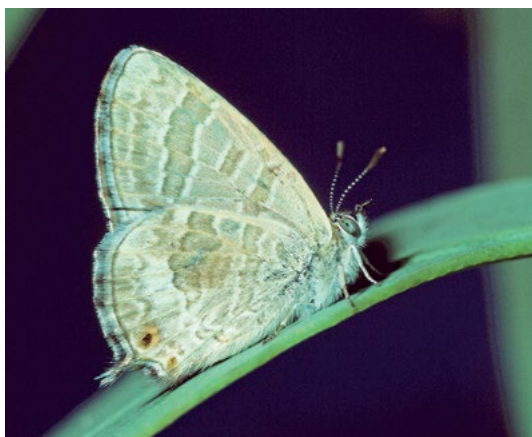


Plate 169 Wyperfeld National Park, Vic
Photo: M. F. Braby

Distribution

This species is known only from the low rainfall areas of the south-western Kimberley of the study region. It has been recorded at Cable Beach, Broome, WA (Grund 1998; Johnson and Valentine 2004), its presence detected only as recently as 1997. The larval food plant occurs further east in drier inland areas of the semi-arid zone; thus, further field surveys are required to determine whether *T. albocinctus* occurs in these areas, particularly in the southern and eastern Kimberley. Grund (1996) reported the possible presence of the species at Geikie Gorge National Park and Ord River Gorge, WA, based on putative eggs on vouchered herbarium specimens; however, subsequent searches along the Fitzroy River at Geikie Gorge did not detect the butterfly (Grund 1998). Outside the study region, *T. albocinctus* occurs mainly in arid and semi-arid areas of western, central and southern Australia.

Habitat

Theclinessthes albocinctus breeds in low open shrubland on the landward side of coastal sand dunes where the larval food plant grows as a shrub up to 2 m high.

Larval food plant

Adriana tomentosa (Euphorbiaceae).

Attendant ant

Not recorded in the study region. Elsewhere, the larvae and pupae are usually attended by a few ants representing several genera, in a facultative myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Adults have been recorded in the late dry season (September and October). Grund (1998: 67) noted that the larval food plants 'were generally infested with the early stages of *T. albocincta*', but provided few details.

Breeding status

This species is resident in the study region.

Conservation status

DD. The species *T. albocinctus* appears to have a limited range in the study region (AOO is likely to be < 2,000 sq km, with spatial buffering of records providing a first approximation of 700 sq km), and is currently known from only one location, which lacks adequate conservation protection and management. Thus, it may qualify as Near Threatened (NT) once adequate data are available because of its restricted AOO and limited number of locations. Targeted field surveys to clarify the extent of its distribution and identify key threatening processes should be a high priority for this species.

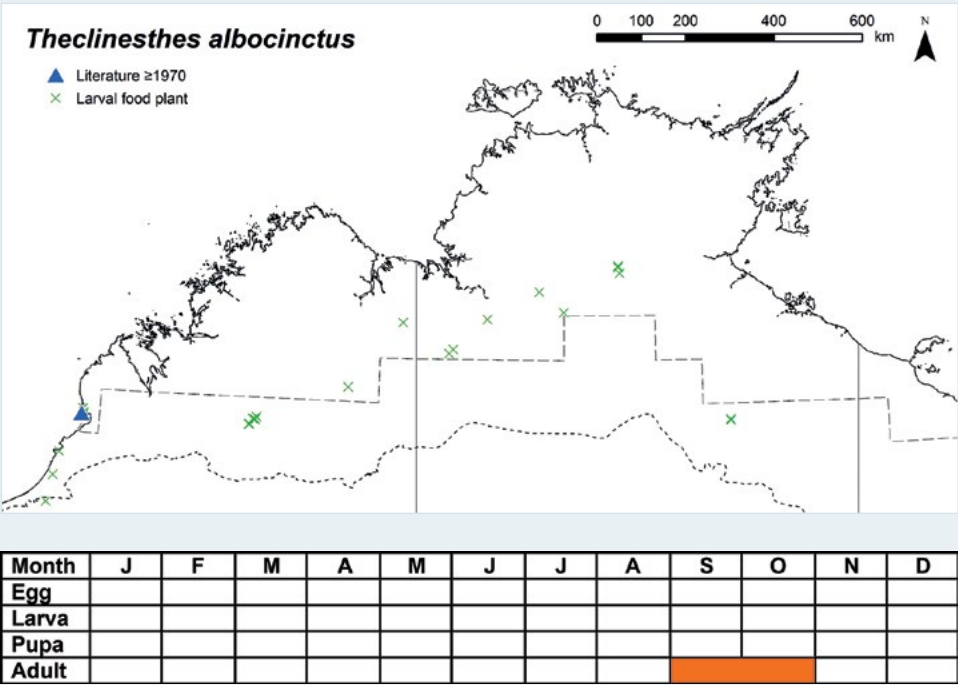


Photo: Mornington Wildlife Sanctuary, WA, M.F. Braby

Purple Cerulean

Jamides phaseli (Mathew, 1889)



Plate 170 Cairns, Qld
Photo: M. F. Braby

Distribution

This species occurs widely in the Kimberley, Top End and western Gulf Country of the study region. It extends from moist coastal areas to drier inland areas of the semi-arid zone (500 mm mean annual rainfall), reaching its southernmost limits at Broome (Grund 1998; Peters 2006, 2008) and Halls Creek (Grund and Hunt 2001), WA; and Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998). The geographic range corresponds well with the spatial distribution of its larval food plants. The food plants, however, also occur on the Tiwi Islands and in the drier areas of the Northern Deserts; thus, further surveys are required to determine whether *J. phaseli* occurs in these areas. Outside the study region, *J. phaseli* occurs in the Torres Strait Islands, Qld, and north-eastern and eastern Australia.

Habitat

Jamides phaseli breeds in a variety of habitats, including savannah woodland and open woodland on rocky sandstone country, where several of the larval food plants (*Bossiaea*, *Cajanus*, *Tephrosia*) grow as understorey shrubs, and coastal sand dunes where an alternative food plant (*Canavalia rosea*) grows as a trailing prostrate creeper (Braby 2011a, 2015e). It also occurs in the edges of semi-deciduous monsoon vine thicket and suburban parks and nature strips, where it commonly breeds on trees of *Millettia pinnata*.

Larval food plants

Bossiaea bossiaeioides, *Canavalia rosea*, *Cajanus aromaticus*, *Millettia pinnata*, *Sesbania simpliciuscula*, *Tephrosia spechtii* (Fabaceae).

Attendant ant

The larvae and pupae are not attended by ants.

Seasonality

Adults occur throughout the year, but they are most abundant during the wet season and early dry season (February–June), depending on the local and seasonal availability of their larval food plants. The immature stages have been recorded mostly from February to May, when adults are abundant, but also in the late dry season (September and October). The larvae feed on the flower buds and new leaf growth of their food plants. Presumably, *J. phaseli* breeds continuously throughout the year and several generations are completed annually by switching its food plants on a seasonal basis according to the flowering period of each species.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Pale Pea-blue

Catochrysops panormus (C. Felder, 1860)



Plate 171 Herberton, Qld
Photo: Don Franklin

Distribution

This species is represented in the study region by the subspecies *C. panormus platissa* (Herrich-Schäffer, 1869). It occurs widely in the Kimberley, Top End, Northern Deserts and western Gulf Country, extending from moist coastal areas to drier inland areas of the semi-arid zone (500 mm mean annual rainfall). It reaches its southernmost limits at Broome (Peters 2006) and Halls Creek (Grund and Hunt 2001), WA; Newcastle Creek near Newcastle Waters, NT (Dunn and Dunn 1991); and Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998). The geographic range corresponds well with the spatial distribution of its larval food plants. The food plants, however, also occur on the Tiwi Islands; thus, further surveys are required to determine whether *C. panormus* is present on Bathurst and Melville islands, NT. Outside the study region, *C. panormus* occurs widely from India and South-East Asia, through mainland New Guinea and adjacent islands and north-eastern and eastern Australia to the Solomon Islands, the Loyalty Islands and Vanuatu.

Habitat

Catochrysops panormus breeds mainly in savannah woodland and open woodland where the larval food plants grow as shrubs, often in open rocky areas (Braby 2011a, 2015e).

Larval food plants

Cajanus aromaticus, *C. pubescens*, *Flemingia lineata*, *Sesbania simpliciuscula* (Fabaceae).

Attendant ant

The larvae and pupae are not attended by ants.

Seasonality

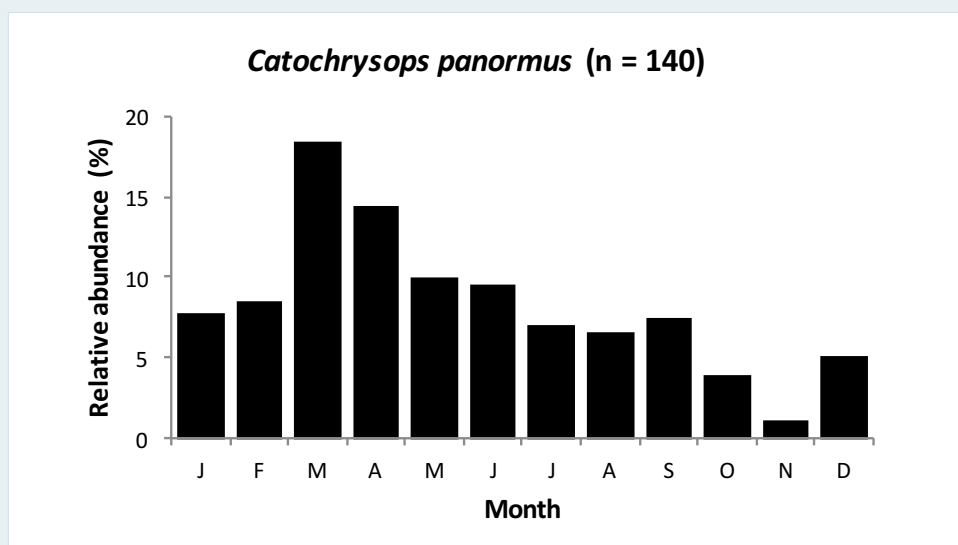
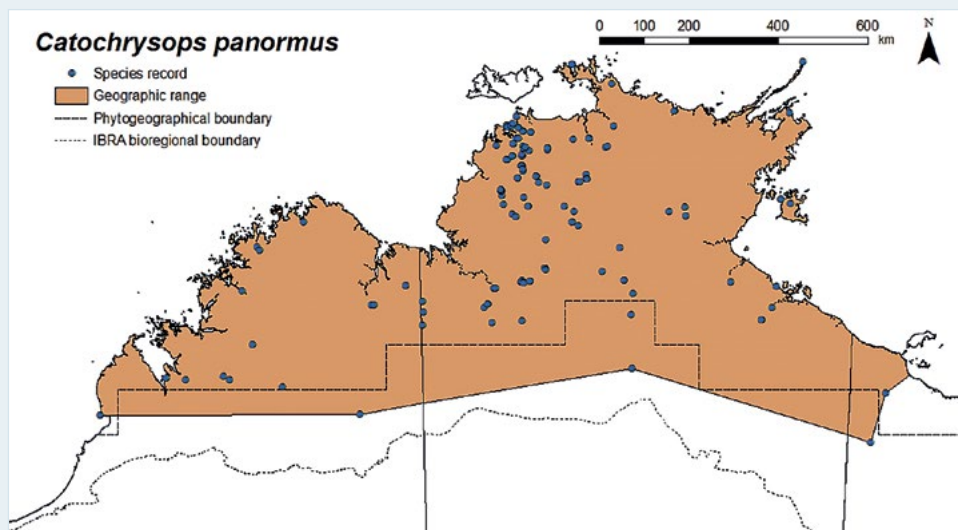
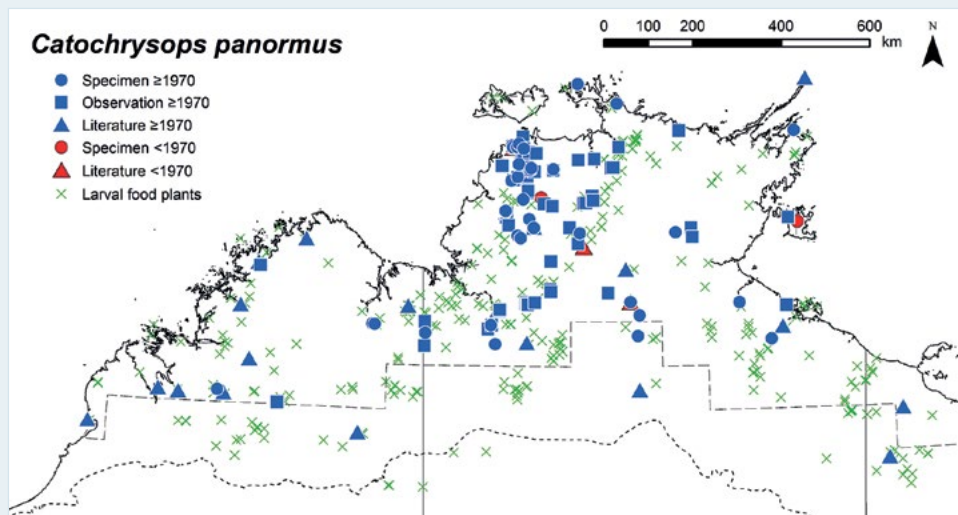
Adults occur throughout the year, but they are generally more abundant during the late wet season (February–April), with a peak in abundance in March. Their numbers appear to diminish as the dry season progresses, and they are very scarce at the start of the wet season. We have limited data on the phenology of the immature stages, which have been recorded in the mid wet season and mid dry season. The larvae feed on the flower buds and flowers of their larval food plants. Presumably, *C. panormus* breeds continuously throughout the year and several generations are completed annually by switching its food plants on a seasonal basis according to the flowering period of each species.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible][illegible]

Long-tailed Pea-blue

Lampides boeticus (Linnaeus, 1767)

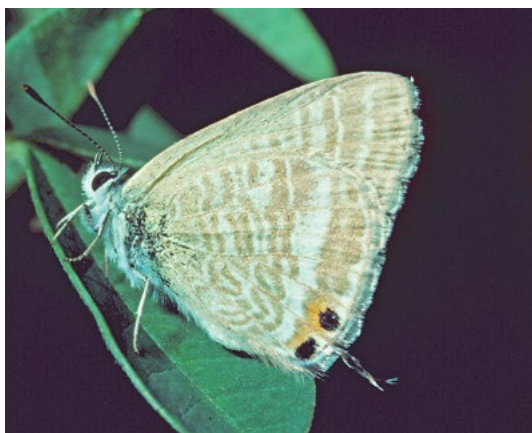


Plate 172 Hervey Range, Qld
Photo: M. F. Braby

Distribution

This species occurs very widely in the study region. It also extends into the arid zone of central Australia beyond the southern boundary of the study region. The species is more prevalent in the low rainfall areas of the semi-arid zone. There are very few records from the Top End north of latitude 13°S (Waterhouse and Lyell 1914; Le Souëf 1971; Franklin et al. 2005; Meyer et al. 2006). The geographic range broadly corresponds with the spatial distribution of the known larval food plants. Outside the study region, *L. boeticus* occurs very widely from Western Europe, Africa and South-East Asia, through mainland New Guinea to the islands of the South Pacific. It also occurs throughout the Australian continent.

Habitat

The breeding habitat and larval food plants of *L. boeticus* are not well documented from the study region. Grund (1998) recorded the species breeding in the Kimberley (on *Crotalaria* spp.) at Broome and El Questro Wilderness Park, WA. At Mornington Wildlife Sanctuary, WA, it was recorded breeding in open grassland (E. P. Williams, pers. comm.). Adults are usually encountered in savannah woodland and riparian woodland, often in open disturbed areas, and presumably they breed in these habitats.

Larval food plants

Crotalaria cunninghamii, *C. novae-hollandiae* (Fabaceae). In Queensland, the larvae feed on a wide range of legumes (Braby 2000). Presumably, the number of species of food plants utilised is much larger than present records indicate.

Attendant ant

Froggattella sp. (Formicidae: Dolichoderinae). The larvae are usually attended by a few small black ants in a facultative myrmecophilous association (Grund 1998).

Seasonality

Adults have been recorded during most months of the year, but they are most abundant during the dry season (July–October), with a pronounced peak in abundance in July. They are rare or absent during the wet season (November–April) in most years. The breeding phenology and seasonal history of the immature stages are not well understood. In the Kimberley, Grund (1998) noted that the immature stages were recorded in October, but provided few details. The species is migratory (Smithers 1985; Braby 2000) and adults are capable of dispersing considerable distances. Presumably, *L. boeticus* colonises much of the study region—or at least the higher rainfall areas of the study region—on a seasonal basis; breeding is limited to the mid to late dry season, and it then vacates much of the region or contracts to the arid zone during the hot humid months. The few records during the wet season possibly represent vagrants or temporary local breeding populations in some years.

Breeding status

Lampides boeticus appears to be a regular immigrant in the study region, breeding temporarily during the dry season and then vacating the region or contracting to the drier inland areas before the onset of the wet.

Conservation status

LC.

Spotted Grass-blue

Zizeeria karsandra (Moore, 1865)



Plate 173 Cobourg Peninsula, NT
Photo: M. F. Braby



Plate 174 Cobourg Peninsula, NT
Photo: M. F. Braby

Distribution

This species occurs very widely in the study region, extending from moist coastal areas to drier inland areas of the semi-arid zone (< 500 mm mean annual rainfall). It has been recorded as far south as Broome and Mary River Pool, approximately 100 km southwest of Halls Creek, WA (Williams et al. 2006); Elliott, NT, and Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998). It also occurs in the Davenport Ranges, NT (Pierce 2008), just outside the southern boundary of the study region. The geographic range corresponds well with the spatial distribution of its known and putative (*Glinus* spp.) larval food plants. The food plants also occur on the Tiwi Islands; thus, further surveys are required to determine whether *Z. karsandra* occurs on Bathurst and Melville islands, NT. Outside the study region, *Z. karsandra* occurs widely from northern Africa, northern Arabia and South-East Asia to the Torres Strait Islands, Qld, and central, north-eastern and eastern Australia.

Habitat

Zizeeria karsandra breeds in beach scrubland on sand dunes and sand above the high-tide mark in coastal areas, and in open woodland in the more inland areas, favouring open disturbed areas where the larval food plants grow as prostrate herbs (Braby 2011a). It also occurs in open sandy areas along riverbanks and dry river beds in the more inland areas, where the species undoubtedly breeds on alternative food plants (*Glinus* spp.).

Larval food plants

Tribulopsis bicolor, *Tribulus cistoides* (Zygophyllaceae); probably *Glinus lotoides* and *G. oppositifolius* (Molluginaceae), which are two food plants in eastern Australia (Braby 2000). *Tribulus cistoides* is the main food plant in coastal areas (Braby 2011a).

Attendant ant

The larvae and pupae are not attended by ants.

Seasonality

Adults occur throughout the year, but they are generally more abundant during the wet season (December–April), although they may be locally abundant at other times such as the mid dry season. The immature stages have been recorded sporadically during both the wet and the dry seasons. The larval food plants have varying life history strategies: *Tribulus cistoides* is a short-lived perennial that is seasonally dependent on rainfall, whereas *Tribulopsis bicolor* and *Glinus* spp. are annuals, although *G. lotoides* may also be a short-lived perennial. It is not clear how *Z. karsandra* survives the late dry season, when their food plants are frequently not available. Presumably, the species breeds continuously throughout the year by dispersing and tracking the local availability of their food plants over a very wide area.

Breeding status

This species is resident in the study region, but populations appear to be nomadic and are possibly temporary in many areas.

Conservation status

LC.

Common Grass-blue

Zizina otis (Fabricius, 1787)



Plate 175 Paluma, Qld
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *Z. otis labradus* (Godart, [1824]). It occurs very widely in the region, extending from moist coastal areas to drier inland areas of the semi-arid zone (< 400 mm mean annual rainfall), as well as the arid zone of central Australia beyond the southern boundary of the study region. It has been recorded as far south as 160 km north-west of Rabbit Flat, WA (Pierce 2008); 7 km north-north-east of Helen Springs Homestead, NT; and Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998). Outside the study region, *Z. otis* occurs widely from India, Japan and South-East Asia, through mainland New Guinea and adjacent islands to New Caledonia, Vanuatu, Fiji, Samoa and New Zealand. It also occurs throughout the Australian continent.

Habitat

The natural breeding habitat of *Z. otis* has not been recorded in the study region, but adults occur in a very wide range of habitats in which they no doubt breed. They also occur in suburban parks and gardens, where they breed on an introduced larval food plant.

Larval food plants

**Desmodium triflorum* (Fabaceae). The native food plants have not been recorded in the study region, but elsewhere the food plants include a wide range of native and introduced low-spreading legumes (Braby 2000).

Attendant ant

Not recorded in the study region. Elsewhere, the larvae are usually attended by a few ants representing several genera in a facultative myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults occur throughout the year, but they are most abundant during the wet season and early dry season (January–June), with a peak in abundance in May, and scarce during the remainder of the year, particularly during the late dry season and ‘build-up’ (August–November). We have few data on the phenology of the immature stages. Presumably, *Z. otis* breeds continuously from at least the early wet season to the mid dry season and several generations are completed annually. However, it is not clear how the species survives the late dry season.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Black-spotted Grass-blue

Famegana alsulus (Herrich-Schäffer, 1869)



Plate 176 Buntine Highway, NT
Photo: Deb Bisa

Distribution

This species is represented in the study region by the subspecies *F. alsulus alsulus* (Herrich-Schäffer, 1869). It occurs very widely in the study region, extending from moist coastal areas to drier inland areas of the semi-arid zone (500 mm mean annual rainfall), as well as the arid zone of central Australia beyond the southern boundary of the study region. It has been recorded as far south as the Edgar Ranges (Common 1981) and Old Halls Creek (Williams et al. 2006), WA; Devils Marbles, NT (Dunn 1980); and Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998). It has also been recorded at Terry Smith Lookout 80 km north–north-west of Cloncurry, Qld, just outside the south-eastern corner of the study region (Dunn 2017b). The geographic range corresponds well with the spatial distribution of its larval food plants, indicating that *F. alsulus* has been well sampled in the region. Outside the study region, *F. alsulus* occurs in southern China, Taiwan and the Philippines, and from central and eastern Australia to Vanuatu, Fiji, Samoa and Tonga. It also occurs in the Pilbara of Western Australia.

Habitat

Famegana alsulus breeds in savannah woodland where the main larval food plants (*Vigna* spp.) typically grow as seasonal perennial herbaceous twiners (vines) in the grassy understorey (Braby 2011a, 2015e). It also breeds in riparian open woodland and open sandy areas along riverbanks in the more inland areas.

Larval food plants

Tephrosia sp., *Vigna lanceolata*, *V. radiata*, *V. vexillata* (Fabaceae); also **Macropodium atropurpureum* (Fabaceae). The usual larval food plants are *Vigna* spp., but at Leichhardt Falls in the Gulf of Carpentaria, Qld, a female was observed ovipositing several eggs on the flower buds of a *Tephrosia* sp. growing as a small shrub in dry river sand. This species may prove to be *T. remotiflora*; adults have been observed attracted to the flowers of this species at nearby Boodjamulla/Lawn Hill National Park, Qld (Dunn 2017b).

Attendant ant

Not recorded in the study region. Elsewhere, the larvae are usually attended by a few ants representing several genera, in a facultative myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

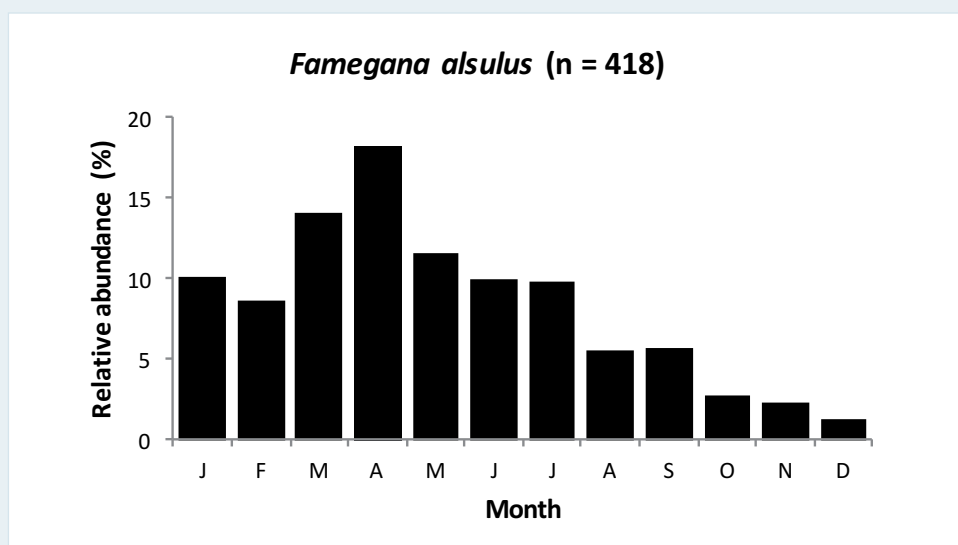
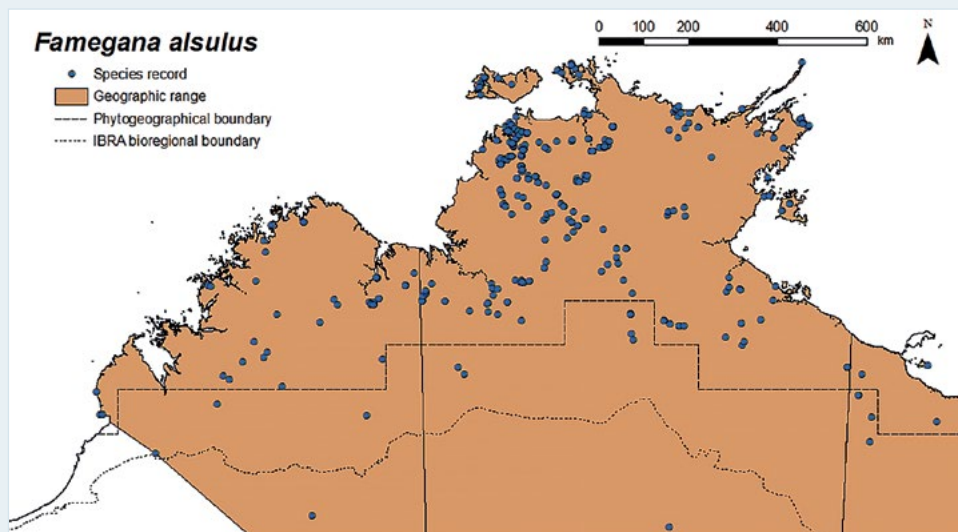
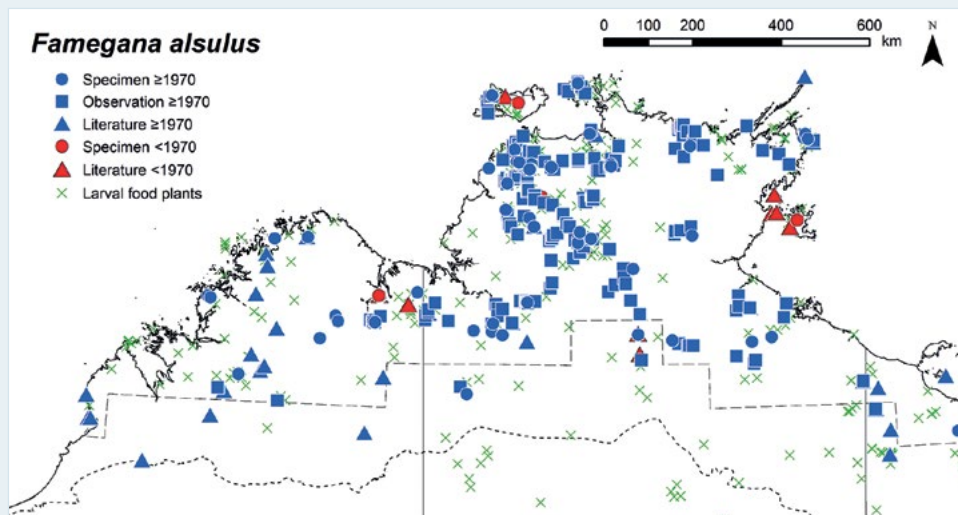
Adults occur throughout the year, but they are most abundant during the late wet season (March and April), when immense numbers of males may be observed puddling at damp sand near creeks. Their numbers diminish as the dry season progresses, and they are very scarce during the ‘build-up’ at the start of the wet season. However, in some areas, they may be locally abundant during the dry season depending on the availability of flower buds and flowers of their larval food plants. The immature stages (eggs or larvae) have been recorded frequently from March to May, when adults are most abundant, but also in September. The main larval food plants (*Vigna* spp.) are seasonal perennials that lose their aerial stems and leaves during the dry season; they regenerate from tuberous roots (i.e. facultative basal resprouters) depending on rainfall/moisture and post fire. Presumably, *F. alsulus* breeds continuously throughout much of the year and several generations are completed annually, but it is not clear how the species survives the late dry season, when the food plants are frequently not available.

Breeding status

This species is resident in the study region.

Conservation status

LC.



Month	J	F	M	A	M	J	J	A	S	O	N	D
Egg												
Larva												
Pupa												
Adult												

Month	J	F	M	A	M	J	J	A	S	O	N	D
Egg												
Larva												
Pupa												
Adult												

Dainty Grass-blue

Zizula hylax (Fabricius, 1775)



Plate 177 Kakadu National Park, NT
Photo: Ian Morris

Distribution

This species is represented in the study region by the subspecies *Z. hylax attenuata* (T. P. Lucas, 1890). Le Souëf (1971) first reported its presence in the region, detecting the species at Darwin, NT, in 1971. It occurs in the Kimberley, Top End and western Gulf Country, extending from moist coastal areas to drier inland areas of the semi-arid zone (< 700 mm mean annual rainfall). It has been recorded as far south as Windjana Gorge National Park, WA (Pierce 2010); Judbarra/Gregory National Park (Humbert River crossing) (J. Archibald) and Limmen National Park (Pandanus Creek crossing), NT; and Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998). The geographic range corresponds well with the spatial distribution of its putative larval food plant (*Hygrophila angustifolia*), although the food plant extends slightly further inland. Outside the study region, *Z. hylax* occurs widely from Africa, India and South-East Asia, through mainland New Guinea and north-eastern and eastern Australia to the Solomon Islands and Vanuatu. It also occurs in the Pilbara of Western Australia and the arid zone of central Australia.

Habitat

The breeding habitat of *Z. hylax* has not been recorded in the study region. Adults usually occur in pandanus swamps and swampy areas adjacent to spring-fed monsoon forest or within riparian woodland/forest where the putative larval food plant grows as an annual herb, but they have also been recorded in grassy areas and savannah woodland well away from water, where they probably breed on alternative food plants.

Larval food plants

Not recorded in the study region; probably *Hygrophila angustifolia* (Acanthaceae), which is a food plant in Queensland (Braby 2000).

Attendant ant

Not recorded in the study region. Elsewhere, the larvae and pupae are usually not attended by ants, but very occasionally the larvae are attended by a few small black ants (Eastwood and Fraser 1999; Braby 2000).

Seasonality

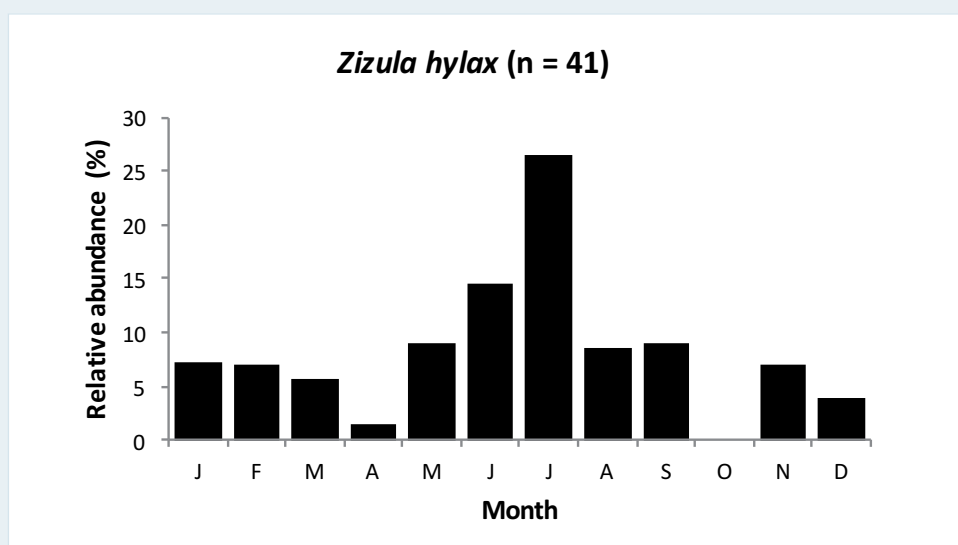
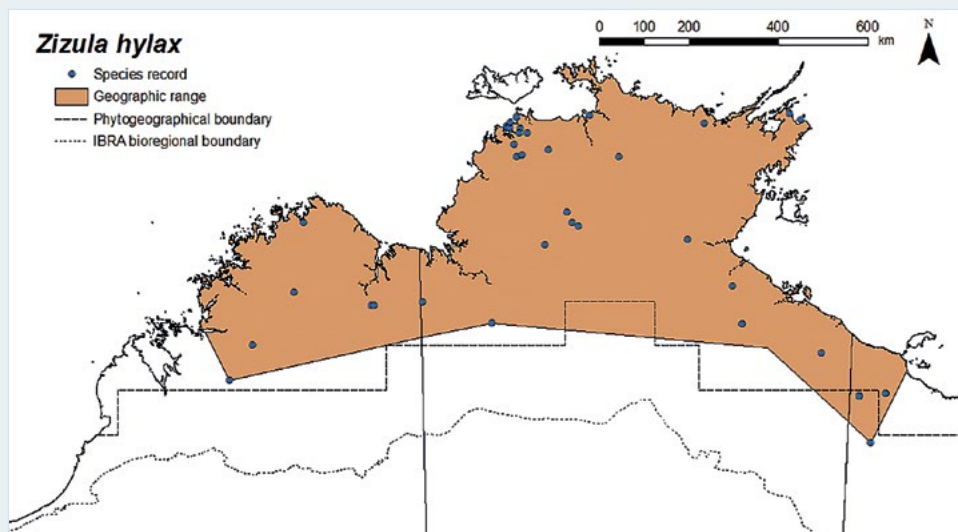
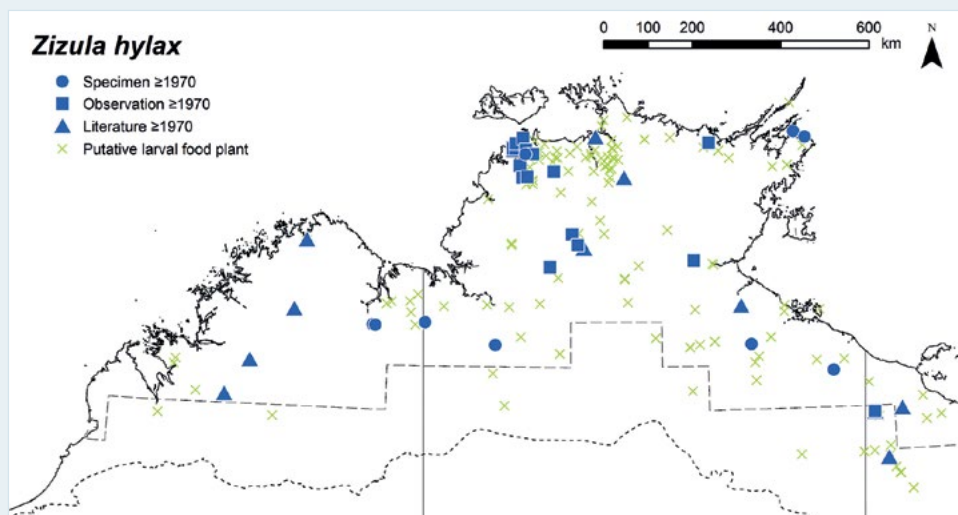
Adults have been recorded during most months of the year. Our field observations, together with the limited number of monthly records available, suggest they are more abundant during the mid dry season (May–August), with a peak in abundance in July. The breeding phenology and seasonal history of the immature stages have not been recorded. Larvae are known to feed on the young fruits of the putative larval food plant, which germinates during the wet season and is available only during the late wet season and early dry season; it then withers and dies off in the mid to late dry season. Presumably, *Z. hylax* breeds from at least the mid wet season to the early dry season and one or more generations are completed annually. However, it is not clear how the species survives the late dry season and early wet season.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible]

Month	J	F	M	A	M	J	J	A	S	O	N	D
Egg												
Larva												
Pupa												
Adult												

Orange-tipped Pea-blue

Everes lacturnus (Godart, [1824])



Plate 178 Fish River Station, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *E. lacturnus australis* Couchman, 1962. It has a disjunct distribution, occurring in the northern Kimberley (Johnson 1993) and more widely in the Top End. It is restricted to the higher rainfall areas (mostly > 1,000 mm mean annual rainfall), reaching its southernmost limit at Katherine (Angel 1951) and easternmost limits on Gove Peninsula and Groote Eylandt (Tindale 1923), NT. The geographic range closely corresponds with the spatial distribution of the putative larval food plant (*Desmodium heterocarpon*). The food plant, however, also occurs further south-west in the western Kimberley and on the Tiwi Islands and Sir Edward Pellew Group, NT; thus, further field surveys are required to determine whether *E. lacturnus* occurs in these areas. Outside the study region, *E. lacturnus* occurs widely from India, southern China and South-East Asia, through mainland New Guinea and adjacent islands and north-eastern and eastern Australia to New Britain and the Solomon Islands.

Habitat

The breeding habitat of *E. lacturnus* has not been recorded in the study region. Adults are usually found in riparian areas along permanent freshwater creeks or streams, where they typically occur in damp open areas or grassy swampy areas along the edge of evergreen monsoon vine forest or within mixed *Lophostemon*–*Melaleuca* woodland or in open forest adjacent to monsoon forest.

Larval food plants

Not recorded in the study region; probably *Desmodium heterocarpon* (Fabaceae), which is the food plant in eastern Queensland (Braby 2000).

Attendant ant

Not recorded in the study region. Elsewhere, the larvae and pupae are usually not attended by ants, but very occasionally the larvae are attended by a few small ants (Eastwood and Fraser 1999; Braby 2000).

Seasonality

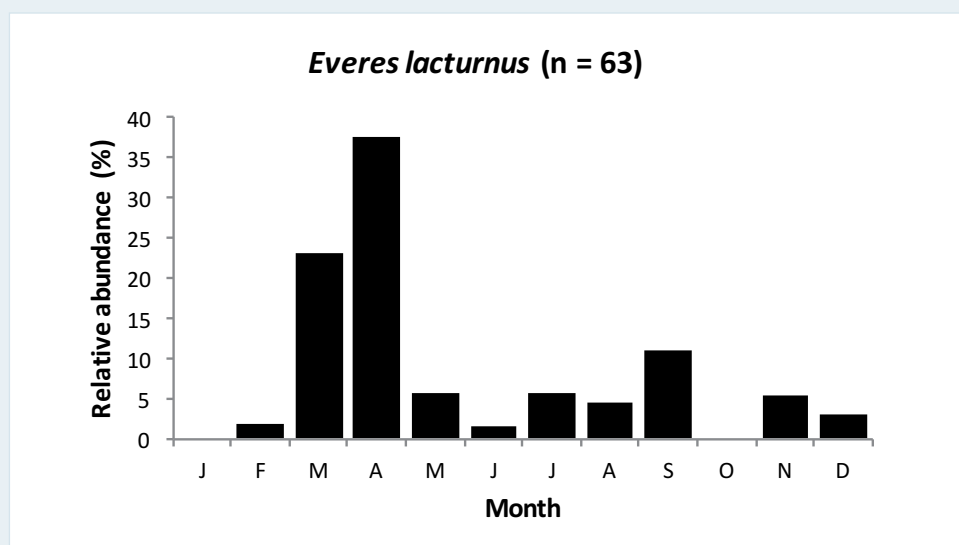
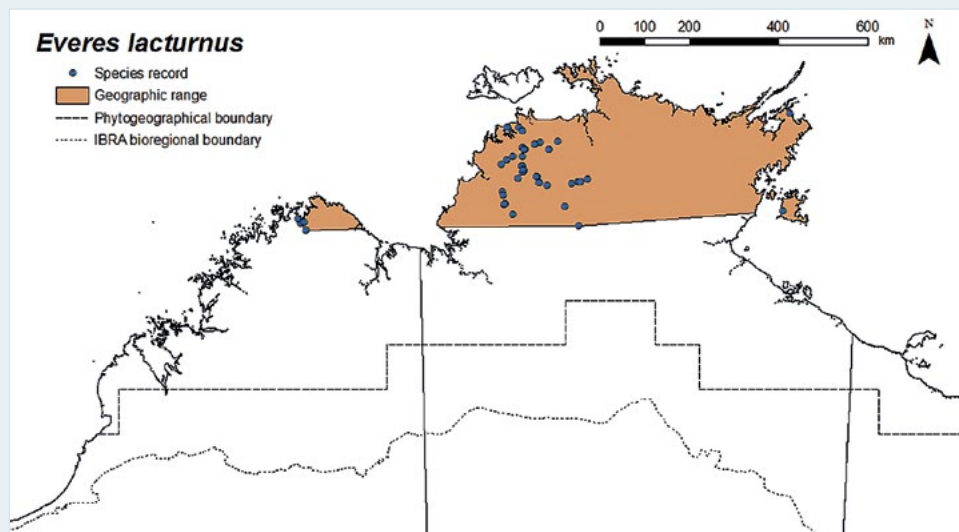
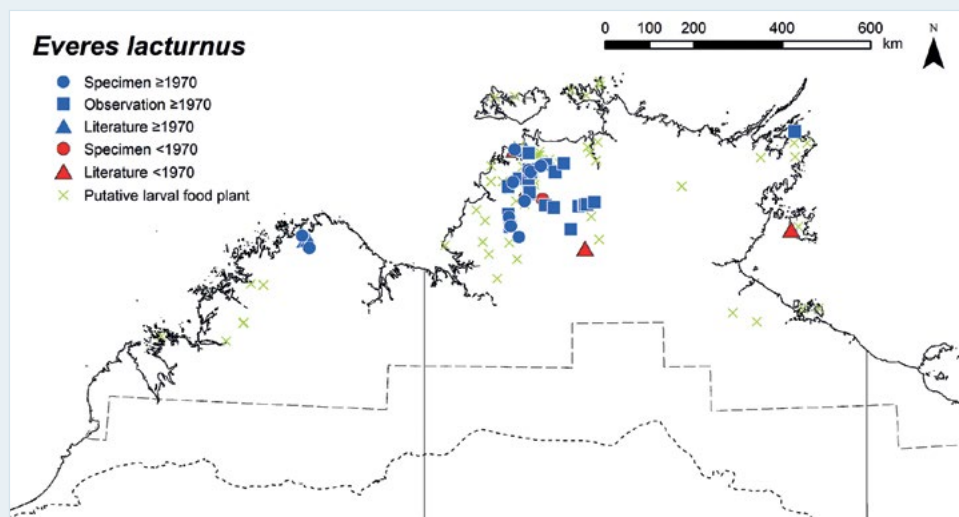
Adults have been recorded during most months of the year, but they are most abundant during the late wet season (March and April) and scarce during the dry season. The breeding phenology and seasonal history of the immature stages have not been recorded. The putative larval food plant is a seasonal perennial herb that is facultatively deciduous, losing its leaves during the dry season when water-stressed and resprouting from rootstock during the wet season or post fire. It is not clear how *E. lacturnus* survives the dry season and early wet season, when the plant is frequently not available. Presumably, the species remains in larval diapause, similar to populations in eastern Queensland (Samson 1991).

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible][illegible]

Spotted Pea-blue

Euchrysops cnejus (Fabricius, 1798)



Plate 179 Berry Springs, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *E. cnejus cnidus* Waterhouse & Lyell, 1914. It occurs very widely in the Kimberley, Top End and western Gulf Country, extending from moist coastal areas to drier inland areas of the semi-arid zone (500 mm mean annual rainfall). It has been recorded as far inland as Halls Creek, WA (Grund and Hunt 2001); Daly Waters, NT (A. Allwood and T. Weir); and Boodjamulla/Lawn Hill National Park (Daniels and Edwards 1998) and Lake Moondarra (Dunn 2017d), Qld, as well as Corella River crossing 45 km west by south of Cloncurry, Qld, just outside the south-eastern corner of the study region. The geographic range is broadly similar to the spatial distribution of its larval food plants, although the food plants extend further inland to the arid zone. Outside the study region, *E. cnejus* occurs widely from India and South-East Asia, through mainland New Guinea and adjacent islands and north-eastern and eastern Australia to the Bismarck Archipelago and Samoa.

Habitat

Euchrysops cnejus breeds mainly in savannah woodland where the native larval food plants (*Vigna* spp.) typically grow as seasonal perennial herbaceous twiners (vines) in the grassy understorey (Braby 2011a, 2015e). It also breeds in paperbark

swamps and in open disturbed areas where the introduced food plants (*Macroptilium* spp.) grow in abundance in the ground layer.

Larval food plants

Vigna lanceolata, *V. marina*, *V. radiata*, *V. vexillata* (Fabaceae); also **Macroptilium atropurpureum*, **M. lathyroides*, **Vigna unguiculata* (Fabaceae).

Attendant ant

Not recorded in the study region. Elsewhere, the larvae are usually attended by a few ants representing several genera in a facultative myrmecophilous association (Eastwood and Fraser 1999; Braby 2000).

Seasonality

Adults occur throughout the year, but they are most abundant during the late wet season and early dry season (March–June), with a peak in abundance in April and May, and least abundant during the late dry season (September–November). The immature stages have been recorded sporadically from January to August. The larvae feed on the flower buds and young pods of the larval food plants. The native food plants (*Vigna* spp.) are seasonal perennials that lose their aerial stems and leaves during the dry season; they regenerate from tuberous roots (i.e. facultative basal resprouters) depending on rainfall/moisture and post fire. Presumably, *E. cnejus* breeds continuously from at least the mid wet season to the mid dry season and several generations are completed annually. However, it is not clear how the species survives the dry season, when its larval food plants are frequently not available.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Jewelled Grass-blue

Freyeria putli (Kollar, [1844])



Plate 180 Kununurra, WA
Photo: Mark Golding

Distribution

This species is represented in the study region by the subspecies *F. putli putli* (Kollar, [1844]). It occurs very widely in the Kimberley, Top End, Northern Deserts and western Gulf Country. It extends from moist coastal areas to the semi-arid zone (< 500 mm mean annual rainfall), where it has been recorded as far south as Derby (Warham 1957) and Halls Creek (Grund and Hunt 2001), WA; 7 km north-north-east of Helen Springs Homestead near Renner Springs, NT; and Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998). The geographic range broadly corresponds with the spatial distribution of its larval food plants, although the food plants extend further inland to the arid zone. The food plants also occur on the Tiwi Islands; thus, further surveys are required to determine whether *F. putli* is present on Bathurst and Melville islands, NT. Outside the study region, *F. putli* occurs widely from Nepal, India and South-East Asia, through mainland New Guinea to north-eastern and eastern Australia.

Habitat

Freyeria putli breeds in savannah woodland, favouring open disturbed areas where the main larval food plant grows as an annual herb (Braby 2015e).

Larval food plants

Flemingia lineata, *Indigofera linifolia* (Fabaceae). The main food plant appears to be *I. linifolia* (Braby 2015e).

Attendant ant

Iridomyrmex sp. (1 *anceps* group), *Ochetellus* sp. near *glaber* (Formicidae: Dolichoderinae), *Polyrhachis schenkii* (Formicidae: Formicinae). The larvae are usually attended by a few ants representing several genera in a facultative myrmecophilous association (Meyer 1996a; Braby 2015e).

Seasonality

Adults have been recorded during most months of the year, but they are most abundant during the late wet season and early dry season (March–May). They are generally absent or very scarce during the late dry season (August–November). We have recorded the immature stages in March and April, when adults are abundant, but undoubtedly they occur throughout the wet season and early dry season. The main larval food plant is a seasonal herb with an annual lifespan; the plants die off during the dry season and then reproduce from seed after rainfall. Presumably, *F. putli* breeds continuously from at least the mid wet season to the early dry season and several generations are completed annually. However, it is not clear how the species survives the late dry season, when the main food plant is not available; it is possible the immature stages enter diapause or it switches to an alternative food plant, such as *Flemingia lineata*, which is a small perennial shrub that maintains its foliage throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC.

This text is taken from *Atlas of Butterflies and Diurnal Moths in the Monsoon Tropics of Northern Australia*, by M.F. Braby, D.C. Franklin, D.E. Bisa, M.R. Williams, A.A.E. Williams, C.L. Bishop and R.A.M. Coppen, published 2018 by ANU Press, The Australian National University, Canberra, Australia.