



Skippers

(Hesperiidae)

6

Narrow-winged Awl

Badamia exclamationis (Fabricius, 1775)



Plate 14 Near Borroloola, NT
Photo: Deb Bisa

Distribution

This species is distributed widely throughout the study region. It is also recorded from remote areas offshore in the Timor Sea, including Ashmore Reef, WA (D. C. Binns). The breeding range is not well understood; the only documented breeding record is from the lower rainfall areas of the eastern Kimberley near Kununurra, WA (Meyer 1996a). Comparison of the geographic range with the spatial distribution of its known larval food plant indicates that *B. exclamationis* extends slightly further inland, with the food plant also widespread but restricted to coastal and near-coastal areas in which the mean annual rainfall is generally above 800 mm. It is not known whether other food plants are utilised throughout its broad range, but it is considered unlikely that *B. exclamationis* breeds in the drier inland areas (600–800 mm mean annual rainfall). Outside the study region, *B. exclamationis* occurs widely from India, southern China and South-East Asia, through mainland New Guinea and adjacent islands and north-eastern and eastern Australia to the Solomon Islands, New Caledonia and Fiji.

Habitat

Badamia exclamationis has been recorded breeding in riparian monsoon vine thicket in the eastern Kimberley (at Black Rock Falls track near Kununurra, WA), where the larval food plant grew in abundance as a small tree (C. E. Meyer, pers. comm.).

Larval food plant

Terminalia microcarpa (Combretaceae).

Seasonality

Adults are seasonal, being most abundant during the pre-monsoon 'build-up' (October and November) and then again during the wet season (January–March). They are generally absent during the dry season (May–September). The breeding phenology is poorly known; the immature stages have been found only in December (C. E. Meyer). *Badamia exclamationis* is a well-known migrant (Smithers 1978; Common and Waterhouse 1981), but few details have been reported for northern Australia. On several occasions in the Top End, migratory flights comprising small to moderate numbers have been observed between late January and early April, particularly in March and early April (Braby 2016b). In general, adults fly rapidly between mid morning and early afternoon in a northerly direction (with the direction of flight varying from north-west, north–north-east to east–north-east). The only exception to this general pattern was a southerly flight (south–south-west) recorded in late January 2011, which suggests the arrival of an immigrant population. The timing of these migrations probably varies depending on the season and the start of the monsoon rains.

Breeding status

This species appears to be a regular immigrant in the study region, breeding temporarily during the wet season and then vacating before the onset of the dry.

Conservation status

DD. The geographical extent of the breeding habitat of *B. exclamationis* is very poorly understood, and it is currently known from only one site, but it may be very restricted—for example, confined to the lower rainfall areas of the monsoon tropics. Targeted field surveys to clarify the extent of the breeding distribution, determine its critical habitat and identify key threatening processes are required for this species.

Broad-banded Awl

Hasora hurama (Butler, 1870)



Plate 15 Adelaide River crossing,
Arnhem Highway, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *H. hurama territorialis* Meyer, Weir & Brown, 2015, 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 (> 1,300 mm mean annual rainfall) in the coastal and near-coastal areas of the Top End. Its geographic range closely corresponds with the spatial distribution of its larval food plant. The food plant, however, is wider in extent, occurring slightly further north (Bathurst and Croker islands) and further east (Gove Peninsula, Groote Eylandt), suggesting *H. hurama* is likely to have a larger range than present records indicate. Further field surveys are thus required to determine whether *H. hurama* is present on the Tiwi Islands and on Gove Peninsula, NT. Outside the study region, *H. hurama* occurs from Maluku, through mainland New Guinea and adjacent islands and north-eastern Australia to the Bismarck Archipelago and the Solomon Islands.

Habitat

Hasora hurama breeds in the edge of mangroves and mixed mangrove–monsoon forest associations along the banks of rivers and estuaries in floodplains where the larval food plant grows as a vine (Meyer et al. 2015).

Larval food plant

Derris trifoliata (Fabaceae).

Seasonality

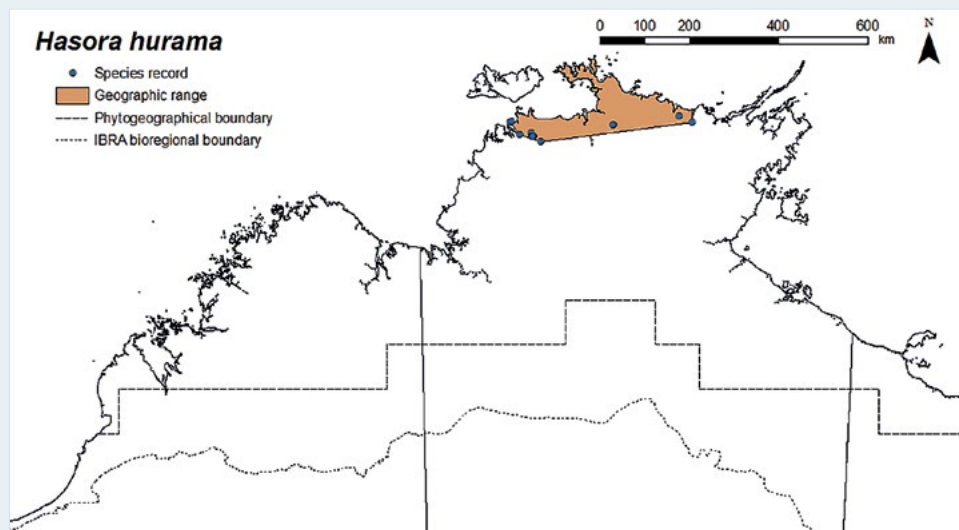
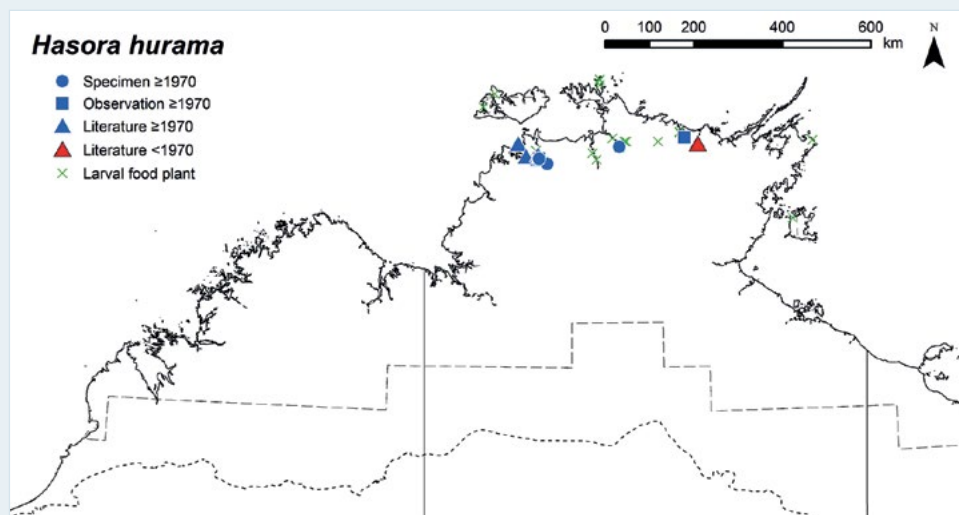
Adults have been recorded, or reared, during most months of the year, except August, but we have too few records ($n = 12$) to assess any seasonal changes in abundance. Similarly, the immature stages have been recorded throughout the year. The larvae feed on new leaf growth and the life cycle is completed relatively quickly (within a few weeks), with no evidence of diapause in any of the life history stages (Meyer et al. 2015). This fact, together with available phenological data, suggests *H. hurama* breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC. The subspecies *H. hurama territorialis* is a narrow-range endemic (geographic range = 28,050 sq km) and it occurs in several conservation reserves, including Fogg Dam Conservation Reserve, Djukbinj National Park, Kakadu National Park and Djelk IPA.

[illegible]

Chrome Awl

Hasora chromus (Cramer, [1780])



Plate 16 Wanguri, Darwin, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *H. chromus chromus* (Cramer, [1780]). It occurs at Broome (G. Swann) and the eastern Kimberley (Williams 2014) in Western Australia, and the Victoria River District and the northern coastal and near-coastal areas of the Top End. However, the natural distribution of the larval food plant has a much narrower range, restricted to the north-western corner of the Top End, where it extends no further east than Cobourg Peninsula and as far south as Hardies Creek, NT (10 km north of Marrakai Plains). The food plant is often cultivated as an ornamental tree in parks and roadside nature strips, and this most likely accounts for the wider distribution of *H. chromus*. Indeed, this is certainly the case in the Victoria River District (Timber Creek, NT) and Kimberley (Broome, WA), where *H. chromus* has been found breeding only on planted street trees. There is little historical data for *H. chromus* in the Northern Territory; it was first recorded from Darwin by Waterhouse and Lyell (1914), but there are few other published records before 1970. Thus, it is difficult to determine how the geographic range has expanded during the past century. However, it is noteworthy that most of the peripheral records outside the natural range of the food plant—that is, Arnhem Land (Mann River crossing, 2005; Maningrida, 2007), Gove Peninsula (Nhulunbuy, 2008), Victoria River District (Timber Creek, 2013), eastern Kimberley (Home Valley

Station, 2014) and western Kimberley (Broome, 2017)—are all within the past decade, suggesting the expansion may be recent. Moreover, the chronological records also suggest a progressive eastern expansion to Nhulunbuy and a similar south-western expansion to Broome. Outside the study region, *H. chromus* occurs widely from India, southern China and South-East Asia, through mainland New Guinea and adjacent islands and north-eastern Australia to Vanuatu, New Caledonia and Fiji.

Habitat

Hasora chromus breeds naturally in coastal semi-deciduous monsoon vine thicket where the larval food plant grows as a tree on sand dunes or low lateritic cliffs above the beach.

Larval food plant

Millettia pinnata (Fabaceae).

Seasonality

Adults have been recorded during most months of the year, but they appear to be more abundant during the ‘build-up’ and wet season, when humidity is higher (October–March). The immature stages occur throughout the year, whenever the food plant produces flushes of new foliage. The larvae, like *Hasora hurama*, feed on new leaf growth and the life cycle is completed relatively quickly (within a few weeks), with no evidence of diapause in any of the life history stages. This fact, together with available phenological data, suggests *H. chromus* breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC. Although the core area of the breeding range of *H. chromus* is narrowly restricted to the north-western corner of the Top End, its extent has now expanded well beyond this area.

Ornate Dusk-flat

Chaetocneme denitza (Hewitson, 1867)



Plate 17 Elcho Island, NT
Photo: Ian Morris



Plate 18 Palmerston, NT
Photo: M. F. Braby

Distribution

This species has a sporadic and possibly disjunct distribution in the study region. It has been recorded from the Kimberley in the Buccaneer Archipelago at Koolan Island in Yampi Sound (Koch and van Ingen 1969; McKenzie et al. 1995) and Drysdale River Station (J. E. and A. Koeyers), WA; and across the Top End, generally in the higher rainfall areas (> 900 mm mean annual rainfall, but mostly > 1,200 mm). The distribution of the known larval food plant is much more widespread than that of *C. denitza*; thus, further field surveys are required to determine whether *C. denitza* extends further south into the lower rainfall areas of the Top End. Outside the study region, *C. denitza* occurs in north-eastern and eastern Australia.

Habitat

Chaetocneme denitza breeds in savannah woodland where the larval food plant commonly grows as a shrub or small tree (Braby 2011a). Freshly emerged adults have been collected in riparian woodland/open forest, suggesting they may also breed in this habitat.

Larval food plants

Planchonia careya (Lecythidaceae). A number of other food plants have been recorded for the species in north-eastern Queensland (Braby 2016a), some of which may be used by *C. denitza* in northern Australia.

Seasonality

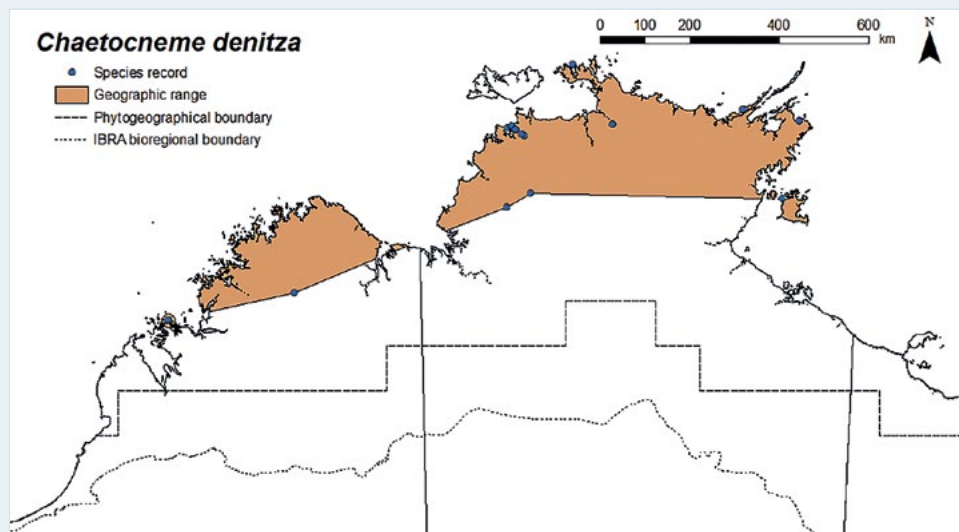
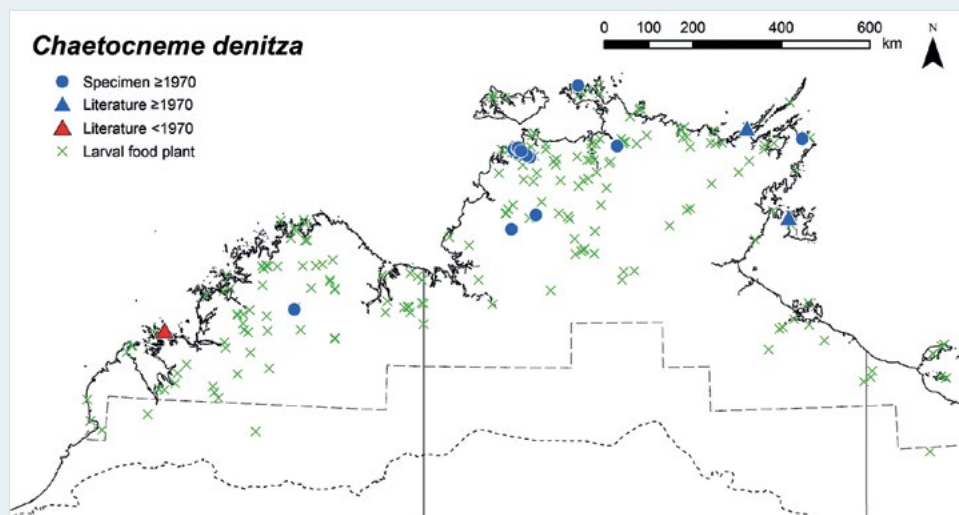
The seasonal abundance and breeding phenology of this rarely seen crepuscular species are not well understood. Adults have been recorded during most months of the year, but we have too few records ($n = 18$) to assess any seasonal changes in abundance. The immature stages have been recorded from February to May, but undoubtedly occur at other times of the year. Presumably, the species breeds continuously throughout the year, with at least two or three generations completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible][illegible]

Spotted Grass-skipper

Neohesperilla senta (Miskin, 1891)



Plate 19 Cardwell, Qld
Photo: M. F. Braby

Distribution

This species has a disjunct distribution in the study region. It has been recorded from the northern Kimberley and from the Northern Territory, where it is restricted to higher rainfall areas (> 1,200 mm mean annual rainfall) of the north-western corner of the Top End. In the Kimberley, it has been recorded at Kalumburu (Johnson 1993) and Drysdale River Station (S. Craswell), WA; and in the Top End, it extends from Darwin (Berrimah) north-east to Cobourgh Peninsula (27 km south-south-east of Black Point) and south-east to Eureka (Common and Waterhouse 1981), NT. The putative larval food plant (*Themeda triandra*) has a very broad distribution in northern Australia; if *N. senta* is found to use this species in the Kimberley and Top End then it may be more widespread in the study region than present records indicate. In particular, further field surveys in eastern Arnhem Land are required to determine whether *N. senta* is present in the eastern half of the Top End. Outside the study region, *N. senta* occurs in north-eastern Queensland.

Habitat

The breeding habitat of *N. senta* has not been recorded in the study region. Adults have been collected in savannah woodland and eucalypt woodland, often very locally in disturbed open grassy areas, and they undoubtedly breed in these habitats.

Larval food plants

Not recorded in the study region; probably *Themeda triandra* (Poaceae), which is the food plant in north-eastern Queensland (Braby 2000).

Seasonality

Adults are seasonal, occurring only during the wet season (December–March), but there are too few records ($n = 14$) to assess temporal changes in abundance. In general, adults tend to be more numerous and freshly emerged during January and February. The breeding phenology and seasonal history of the immature stages have not been recorded, but it is possible there is only a single generation annually.

Breeding status

This species is resident in the study region.

Conservation status

LC. Available data suggest the species *N. senta* has a restricted range in the study region within which it occurs in at least two conservation reserves, Litchfield National Park and Garig Gunak Barlu National Park. Despite its restricted occurrence, there are no known threats facing the taxon.

Sword-brand Grass-skipper

Neohesperilla xiphiphora (Lower, 1911)



Plate 20 Mt Burrell, NT
Photo: M. F. Braby



Plate 21 Mt Burrell, NT
Photo: M. F. Braby

Distribution

This species occurs in the north of the Northern Territory of the study region. It has been recorded mainly from the higher rainfall areas (> 1,000 mm mean annual rainfall) of the north-western corner of the Top End, but it has also been recorded from Groote Eylandt (Common and Waterhouse 1981) and in the western Gulf Country, at Caranbirini Creek, NT (Dunn and Dunn 1991). Its geographic range corresponds well with the spatial distribution of its known and putative larval food plants. The food plants, however, are more widely distributed than *N. xiphiphora*, with records from the Victoria River District and Tiwi Islands. Further field surveys are thus required to determine whether *N. xiphiphora* is established in these areas, particularly the drier areas of the Victoria River District. Outside the study region, *N. xiphiphora* occurs in north-eastern Queensland.

Habitat

Neohesperilla xiphiphora breeds in savannah woodland and eucalypt woodland, particularly along the edges or bases of rocky outcrops, where the larval food plant grows as an annual grass in the open shaded understorey beneath eucalypt trees (Braby 2015e). Areas regenerating after dry season burns following wet season rains seem to be favoured for breeding. Males also congregate at the summit of steep hills, ridges and other landmarks, which are used as encounter sites to locate females for mating, but they do not breed in these habitats.

Larval food plants

Sorghum intrans (Poaceae); probably *Schizachyrium perplexum* (Poaceae), which is a food plant in north-eastern Queensland (Braby 2000).

Seasonality

Adults are seasonal, being most abundant during the wet season (December–March). The immature stages (eggs or larvae) have been recorded in February and March after the larval food plant has germinated and produced new soft leaf growth. The breeding phenology and seasonal history of the immature stages are not well understood, but it is possible there is only a single generation annually, with the final instar larvae remaining in diapause during the long dry season.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Narrow-brand Grass-skipper

Neohesperilla crocea (Miskin, 1889)



Plate 22 Endeavour Falls Tourist Park, Qld
Photo: Frank Pierce

Distribution

This species has a disjunct distribution, occurring in the northern Kimberley and north of the Northern Territory of the study region. It is restricted to the higher rainfall areas (> 1,000 mm mean annual rainfall), with most records from the north-western corner of the Top End, extending as far south as Nitmiluk National Park (Edith Falls), but it has also been recorded on Groote Eylandt (Tindale 1923). In the Kimberley, it has recently been recorded at Drysdale River Station, WA (S. Craswell). The putative larval food plants (*Chrysopogon aciculatus* and *Schizachyrium pachyarthon*) occur widely in northern Australia; if *N. crocea* is found to use these species in the Kimberley and Northern Territory then it may have a greater geographic range within the study region than present records indicate. In particular, further field surveys are required to determine whether *N. crocea* is present on the Wessel Islands and Gove Peninsula of north-eastern Arnhem Land. Outside the study region, *N. crocea* occurs in Papua New Guinea and north-eastern Queensland.

Habitat

The breeding habitat of *N. crocea* has not been recorded in the study region. Adults have been collected mainly in moister habitats than those of other species of *Neohesperilla*, including the edges of riparian forest and monsoon vine thicket, eucalypt woodland with a monsoon forest understorey and paperbark swampland, as well as savannah woodland, and no doubt they breed in these habitats.

Larval food plants

Not recorded in the study region; probably *Chrysopogon aciculatus* and *Schizachyrium pachyarthon* (Poaceae), which are the food plants in north-eastern Queensland (Braby 2000).

Seasonality

Adults are seasonal, being most abundant during the wet season (December–April), with an apparent peak in abundance in March. The flight season is somewhat protracted compared with other species of *Neohesperilla*, with adults also occurring in the early dry season (May–July). The breeding phenology and seasonal history of the immature stages have not been recorded, but it is possible only one or two generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Yellow Grass-skipper

Neohesperilla xanthomera (Meyrick & Lower, 1902)



Plate 23 Mt Burrell, NT
Photo: Frank Pierce

Distribution

This species occurs in the north of the Northern Territory of the study region. It is restricted to the higher rainfall areas (> 1,000 mm mean annual rainfall, but mostly > 1,200 mm) of the north-western corner of the Top End. It has been recorded as far south as Daly River and as far east as Maningrida, NT (Braby 2000). Further field surveys are required to determine whether *N. xanthomera* occurs in the eastern half of the Top End, particularly in eastern Arnhem Land and the Limmen Bight area in the Gulf of Carpentaria. Outside the study region, *N. xanthomera* occurs in north-eastern and eastern Australia.

Habitat

The breeding habitat of *N. xanthomera* has not been recorded in the study region. Adults have been collected mainly in savannah woodland and they undoubtedly breed in this habitat.

Larval food plants

Not recorded in the study region. The food plants in north-eastern Queensland comprise various native grasses (Poaceae).

Seasonality

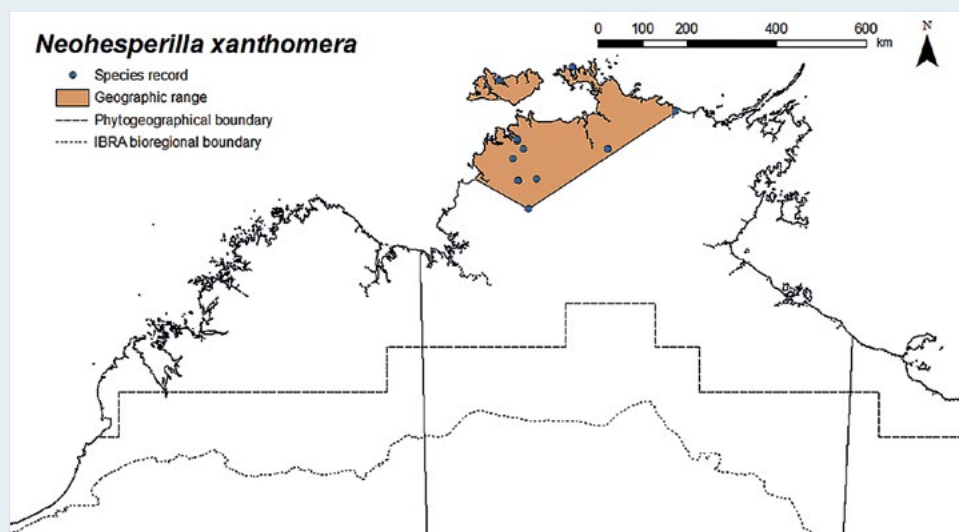
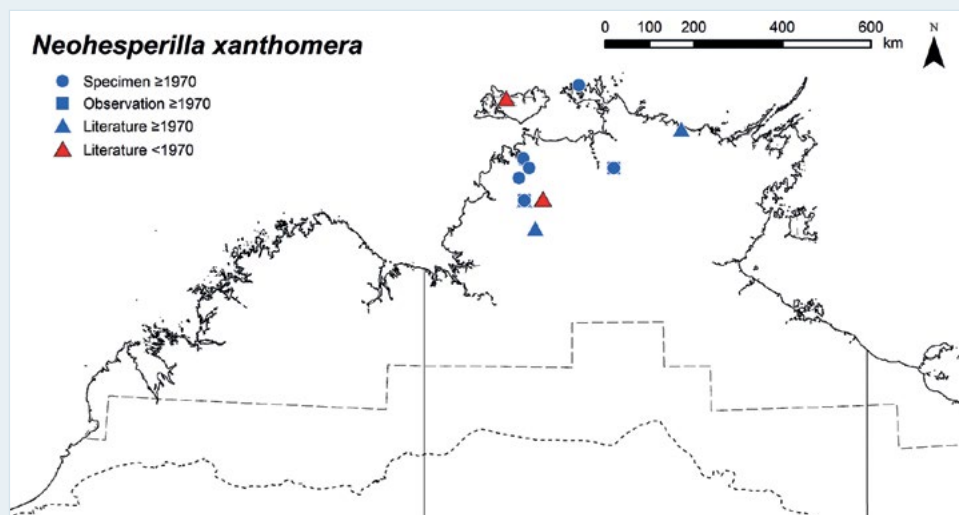
Adults are seasonal, occurring only during the 'build-up' and wet season (October–March). They appear to be particularly abundant and freshly emerged early in the season (October) following the first substantial wet season rains, but we have too few records (n = 19) to adequately assess seasonal changes in abundance. The breeding phenology and seasonal history of the immature stages have not been recorded, but it is possible only one or two generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC. Although the species *N. xanthomera* has a restricted range in the study region, there are no known threats facing the taxon.

[illegible]

Wide-brand Sedge-skipper

Hesperilla crypsigramma (Meyrick & Lower, 1902)



Plate 24 Mt Burrell, 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, its presence detected only as recently as 1989 (Field 1990a). It is restricted to the centre and north-western corner of the Top End, with all records from the higher rainfall areas (> 900 mm mean annual rainfall). The geographic range of *H. crypsigramma* closely corresponds with the spatial distribution of its larval food plant. The food plant, however, has a slightly wider range, occurring also on Melville Island, the Arnhem Land Plateau east of Jabiru and the Port Keats area (Macadam Range), NT. Further field surveys are thus required to determine whether *H. crypsigramma* also occurs in these areas. Outside the study region, *H. crypsigramma* occurs in north-eastern and eastern Australia.

Excluded data

The record from the western Gulf Country at Boodjamulla/Lawn Hill National Park, Qld (Daniels and Edwards 1998), is excluded. The record was based on '[a] single female taken at Holts Creek' (Daniels and Edwards 1998: 89), but most likely refers to *Hesperilla sexguttata*. Females of the two species are difficult to distinguish, and *Scleria sphacelata*—the larval food plant of *H. crypsigramma*—does not occur in the park or adjacent areas.

Habitat

Hesperilla crypsigramma breeds in eucalypt woodland and low open woodland on laterite or quartz–sandstone rocky outcrops, such as ridges and steep upper slopes and summits of hills, where the larval food plant grows as a sedge in high density.

Larval food plant

Scleria sphacelata (Cyperaceae).

Seasonality

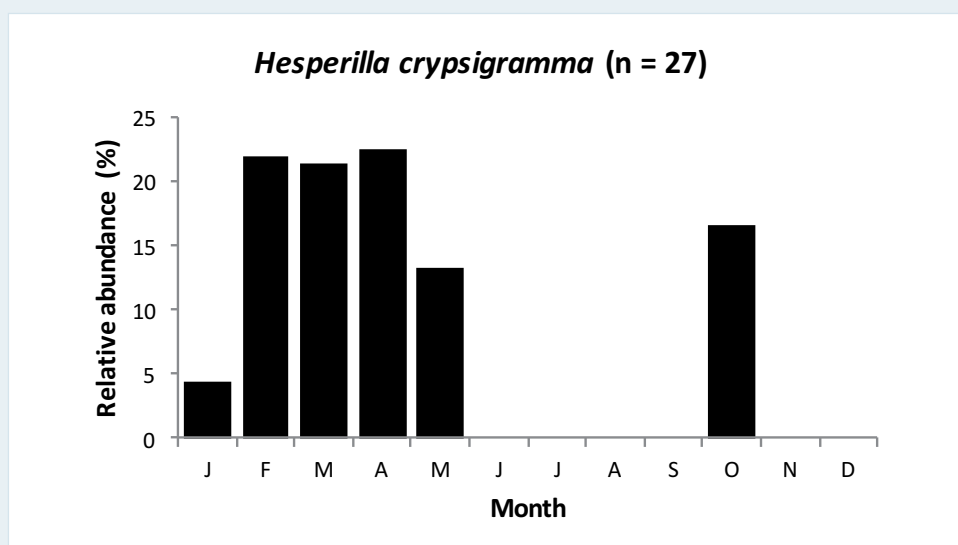
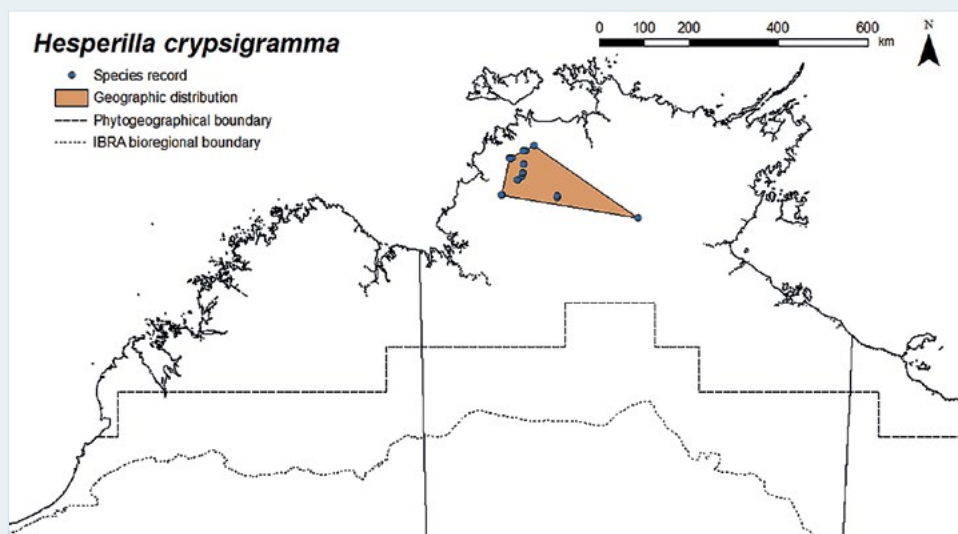
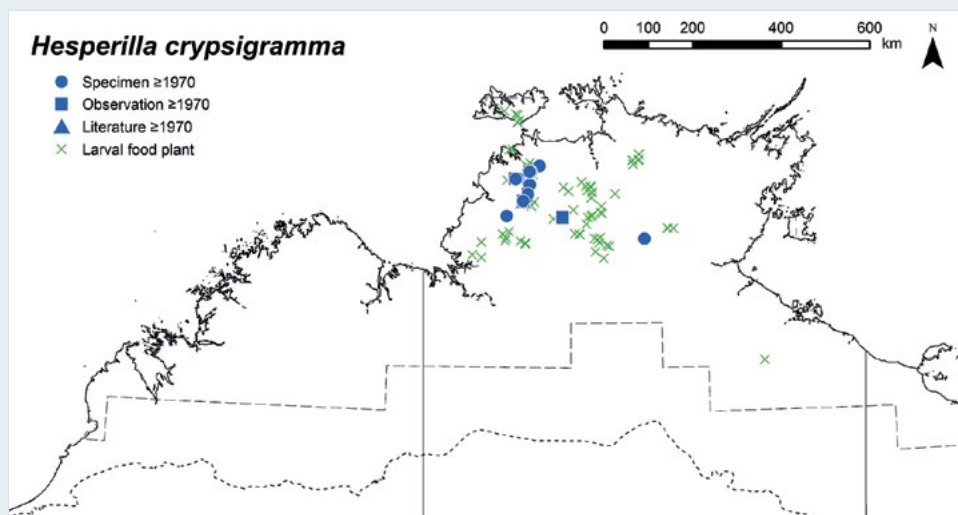
Adults are seasonal, occurring mainly in the warmer and wetter periods of October and again from February to April. The immature stages (eggs or pupae) have also been detected in these months, indicating that breeding occurs at the time when adults are most abundant. It is not clear whether the few records of adults during the intervening months (November–January) reflect a period of reduced activity or simply a lack of recording. The species appears to survive the dry season (May–September) in the larval stage. Presumably, at least two generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

DD. The putative subspecies *H. crypsigramma* ssp. 'Top End' is a narrow-range endemic (EOO = 20,980 sq km) and it occurs in several conservation reserves, including Litchfield National Park, Robin Falls and Fish River Station. However, the effect of inappropriate fire regimes requires further investigation. The immature stages are killed by fire and much of its habitat is subjected to landscape fire, with some areas of the range experiencing an increase in frequency of dry season burns, with short interfire intervals. The species may survive as larvae on sedges growing on steep rocky slopes/cliffs protected from fire or in unburnt patches. Presumably, the resulting adults from these larvae then recolonise food plants regenerating in burnt areas during the wet season. Although the larval food plant is currently listed as LC under the *TPWCA*, *H. crypsigramma* may qualify as Near Threatened (NT) once adequate data are available.



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												

Riverine Sedge-skipper

Hesperilla sexguttata Herrich-Schäffer, 1869



Plate 25 Kakadu National Park, NT
Photo: Kenji Nishida

Distribution

This species occurs widely in the study region, extending from the Kimberley through the Top End to the western Gulf Country and its offshore islands. The geographic range corresponds well with the spatial distribution of its larval food plant, indicating that *H. sexguttata* has been well sampled across the region. The food plant occurs on the Tiwi Islands, and further field surveys are required to determine whether *H. sexguttata* also occurs on Bathurst and Melville islands. Outside the study region, *H. sexguttata* occurs in north-eastern and eastern Australia.

Habitat

Hesperilla sexguttata usually breeds in paperbark swampland, mixed riparian paperbark woodland along creeks and riverine paperbark tall woodland, often with rainforest elements in the understorey or adjacent to monsoon forest, where the larval food plant grows as a sedge. In the drier inland areas, the breeding habitat consists of riverine corridors in which the food plant grows on sandy banks and riverbeds that are inundated during wet season floods. Males also fly in open rocky areas on the summit of steep hills, which are used as encounter sites to locate females for mating, but they do not breed in this habitat.

Larval food plant

Cyperus javanicus (Cyperaceae).

Seasonality

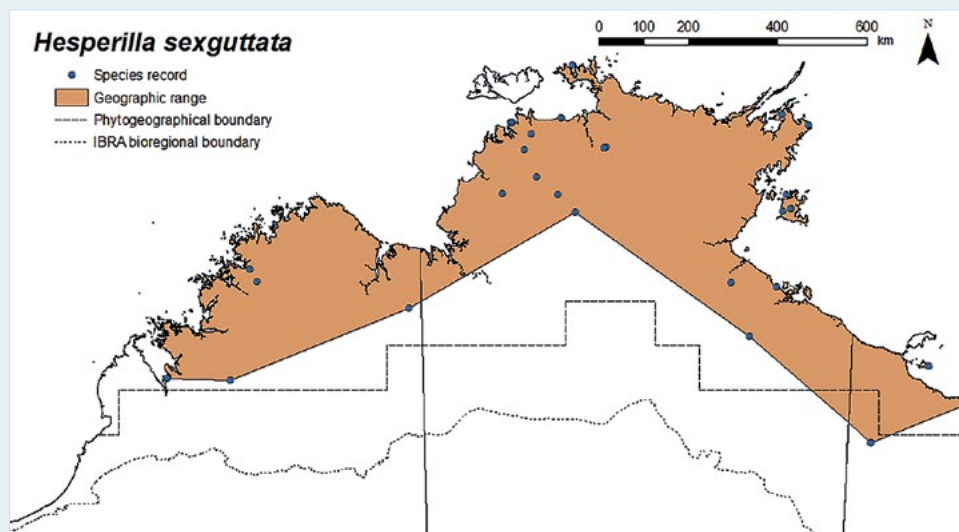
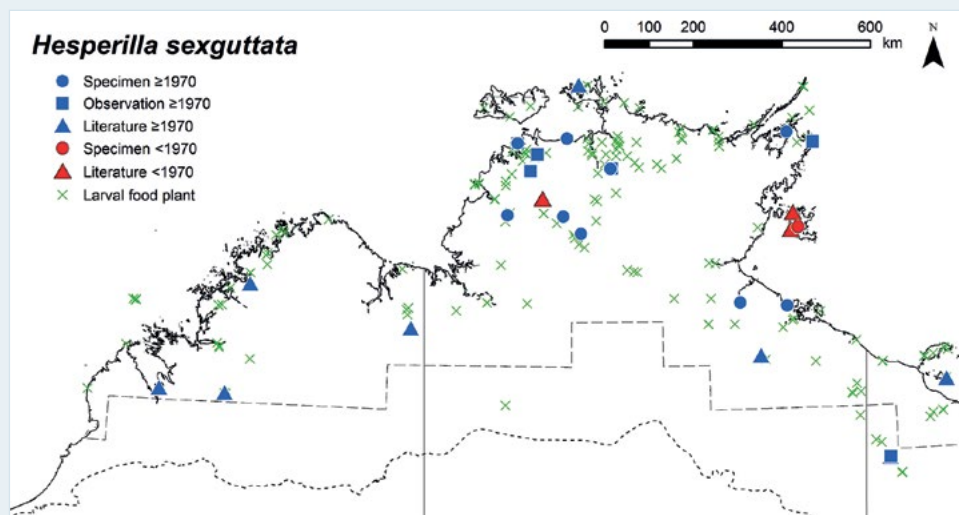
Adults have been recorded during most months of the year, but we have too few records ($n = 17$) to assess any seasonal changes in abundance. The immature stages have been recorded mainly from May to October, indicating that the species breeds during the dry season. However, it is very likely *H. sexguttata* breeds continuously throughout the year; the lack of data during the wet season (November–February) is probably because the breeding habitats are frequently inaccessible at that time of year.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible]

Spinifex Sand-skipper

Proeidosia polysema (Lower, 1908)



Plate 26 Curtin Springs, NT
Photo: M. F. Braby

Distribution

This species occurs very widely in the study region. The northernmost limit is in the Noonamah–Berry Springs area, approximately 28 km south-east of Darwin, NT (Braby and Westaway 2016). The broad geographic range corresponds with the spatial distribution of its larval food plants (*Triodia* spp.). However, there are few records of *P. polysema* from the southern Kimberley and Great Sandy Desert, WA, and none from the Tiwi Islands, northern coastal areas and north-eastern Arnhem Land, despite the presence of the food plants. Further field surveys are therefore required to determine whether *P. polysema* occurs in these areas. Outside the study region, *P. polysema* occurs widely in the semi-arid and arid zones of central Australia and in northern and central Queensland.

Habitat

Proeidosia polysema breeds mainly in eucalypt open woodland with a hummock/tussock grass understorey on sand and dry rocky sandstone, favouring shallow gullies, hill-slopes and escarpments where the larval food plants grow as perennial ‘soft’ resinous spinifex tussock-forming grasses (Braby 2015e). It also occurs in low open woodland on sandstone pavements and hummock grassland on sand dunes, but near Darwin it breeds in eucalypt open woodland on sandy soil derived from laterite (Braby and Westaway 2016).

Larval food plants

Triodia bitextura, *T. microstachya*, *T. pungens* (Poaceae). The main food plants are *T. bitextura* and *T. microstachya*, but *T. pungens* is used in the drier inland areas of lower rainfall (< 900 mm mean annual rainfall).

Seasonality

Adults are seasonal, occurring only during the wet season (November–April), but there are too few records ($n = 19$) to assess temporal changes in abundance. There are limited data on the phenology of the immature stages, and the number of generations completed annually is not known. The long dry season is passed in the larval stage—usually the final instar larva, which may remain in diapause inside its shelter for many months.

Breeding status

This species is resident in the study region.

Conservation status

LC. Although the species *P. polysema* has a very wide geographical range, the effect of inappropriate fire regimes requires further investigation. The immature stages are killed by fire and much of its habitat is subjected to landscape fire, with some areas of the range experiencing an increase in the frequency of dry season burns. The species may survive as larvae on grasses growing on steep rocky slopes/cliffs protected from fire or in unburnt patches. Presumably, the resulting adults from these larvae then recolonise food plants regenerating in burnt areas during the wet season.

Northern Iris-skipper

Mesodina gracillima E. D. Edwards, 1987



Plate 27 Marrakai Road, NT
Photo: M. F. Braby



Plate 28 Marrakai Road, NT
Photo: M. F. Braby

Distribution

This species is endemic to the study region. It is restricted to the north of the Northern Territory, where it occurs in the higher rainfall areas (> 1,200 mm mean annual rainfall) of the Top End. Its geographic range closely corresponds with the spatial distribution of its larval food plant. The food plant, however, has a slightly broader range, extending further south to the Katherine district, including Nitmiluk (Katherine Gorge) National Park, NT. Further field surveys are therefore required to determine whether *M. gracillima* occurs in this area.

Habitat

Mesodina gracillima breeds in eucalypt woodland and open woodland with a sparse understorey of grasses and herbs, including the larval food plant, which grows on well-drained sandy soils, often on gently sloping terrain or ridges (Edwards 1987).

Larval food plant

Patersonia macrantha (Iridaceae).

Seasonality

Adults have been recorded during most months of the year. They appear to be more abundant towards the end of the wet season (February and March), but we have too few records ($n = 17$) to adequately assess any seasonal changes in abundance. The immature stages have also been recorded during most months of the year, particularly during the late wet season and

early to mid dry season (February–August). Larval development is protracted, but it is not certain how many generations are completed annually. It is likely *M. gracillima* breeds continuously throughout the year, except perhaps in the late dry season, when the food plants may become stressed from lack of water.

Breeding status

This species is resident in the study region.

Conservation status

LC. The species *M. gracillima* has a restricted range within which it occurs in several conservation reserves, including Garig Gunak Barlu National Park, Kakadu National Park and Djelk IPA. However, the effect of inappropriate fire regimes as a potential threat requires further investigation (Young 2005). The immature stages are killed by fire and much of its habitat is subjected to landscape fire, with some areas of the range experiencing an increase in the frequency of dry season burns. Presumably, some larvae survive on clumps growing in unburnt patches and the resulting adults then recolonise food plants regenerating in burnt areas during the wet season. It is not clear what the long-term effects of increased fire frequency are for the species and its larval food plant. The larval food plant is currently listed as LC under the *TPWCA*. Monitoring of the abundance or occupancy of the butterfly and its food plant is required to clarify the effect of short interfire intervals as a key threatening process.

Orange Swift

Parnara amalia (Semper, [1879])



Plate 29 Lake Mitchell, north of Mareeba, Qld
Photo: Frank Pierce



Plate 30 Lake Mitchell, north of Mareeba, Qld
Photo: Frank Pierce

Distribution

This species occurs in the north of the Northern Territory of the study region. It is restricted to the north-western corner of the Top End, where it occurs in the higher rainfall areas (generally > 1,300 mm mean annual rainfall). It extends from Darwin south to the Daly River crossing (Ooloo crossing) (Hutchinson 1978) and east to Cooper Creek (Oenpelli–Murganella Road crossing) (Dunn and Dunn 1991), NT. Further field surveys are required to determine whether *P. amalia* occurs in the eastern half of the Top End, particularly in north-eastern Arnhem Land. Outside the study region, *P. amalia* occurs in mainland New Guinea and eastern Australia.

Habitat

The breeding habitat of *P. amalia* has not been recorded in the study region. Adults have been collected in a wide range of habitats, but they are generally more prevalent in paperbark swamp in juxtaposition to monsoon forest or mangroves. Presumably, the species breeds in this habitat and other moist low-lying areas.

Larval food plants

**Oryza sativa* (Poaceae). The native food plant has not been recorded in the study region, but larvae have been reared on cultivated rice at Humpty Doo (C. S. Li) and Tortilla Flats (C. Wilson).

Seasonality

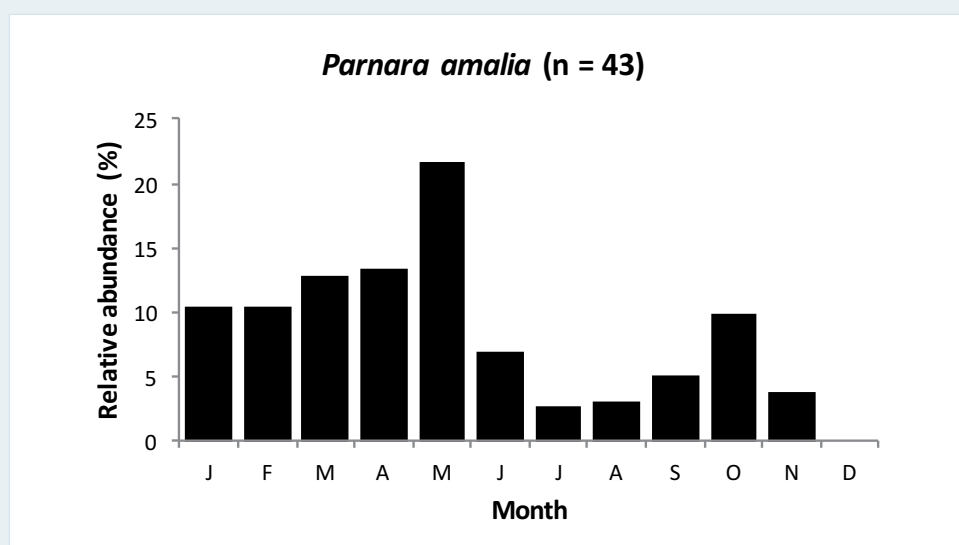
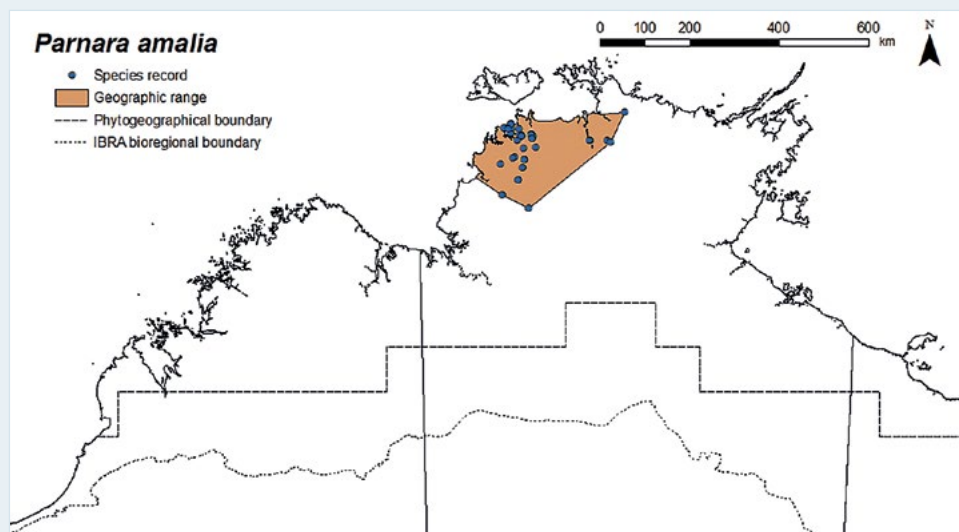
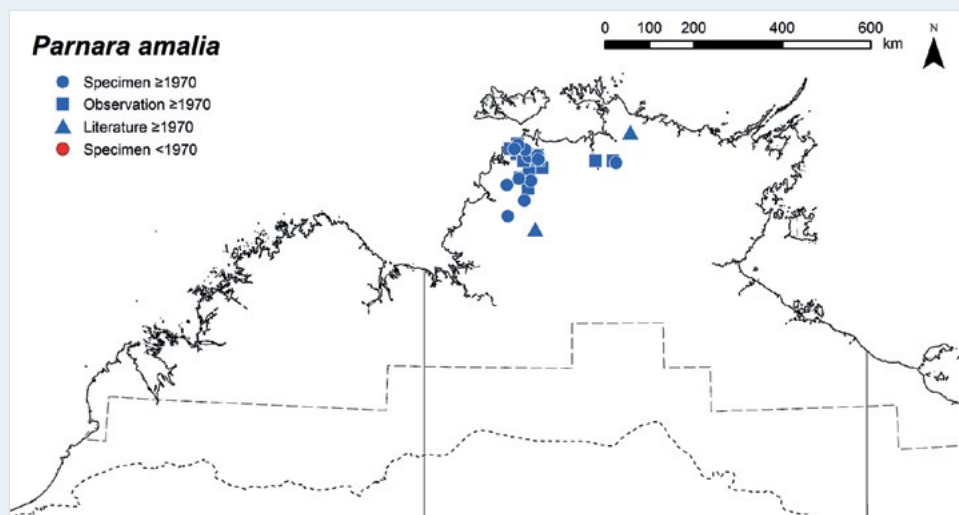
Adults occur throughout the year, but they are most abundant during the wet season and early dry season, particularly in May following good wet seasons of average or above average rainfall. The breeding phenology and seasonal history of the immature stages have not been recorded, but it is likely the species breeds throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC. The species *P. amalia* has a restricted range in the study region within which it occurs in several conservation reserves, including Howard Springs Nature Reserve, Fogg Dam Conservation Reserve, Litchfield National Park and Kakadu National Park. 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												

[illegible]

Rice Swift

Borbo cinnara (Wallace, 1866)



Plate 31 Christmas Island, WA
Photo: Frank Pierce



Plate 32 Christmas Island, WA
Photo: Frank Pierce

Distribution

This species occurs in the north of the Northern Territory of the study region, where it is restricted to the north-western corner of the Top End. Historically, it was recorded from Darwin, Berry Springs and Adelaide River, NT. However, we are not aware of any additional records since it was first collected in 1948 by F. M. Angel and F. E. Parsons (Angel 1951)—a period of 70 years. Further field surveys are thus required to determine whether the species is still extant in the region. The putative larval food plant (*Rottboellia cochinchinensis*) occurs in the northern coastal areas of the Top End. Outside the study region, *B. cinnara* occurs widely from India, southern China and South-East Asia, through mainland New Guinea and adjacent islands and north-eastern Australia to the Solomon Islands, Vanuatu and New Caledonia.

Habitat

The breeding habitat of *B. cinnara* has not been recorded in the study region. Sands and New (2002) suggested the species was likely to breed in wetland habitats.

Larval food plants

Not recorded in the study region; possibly *Rottboellia cochinchinensis* (Poaceae), which is the food plant in the Torres Strait Islands, Qld (Braby 2000).

Seasonality

The seasonal abundance and breeding phenology of this species are not well understood. Adults have been recorded in April and May, but there are too few records ($n = 4$) to assess any seasonal changes in abundance.

Breeding status

Borbo cinnara does not appear to have become permanently established in the study region. Adults of *B. cinnara* resemble those of *B. impar* and *Pelopidas lyelli* and thus it may have been overlooked. However, at the time of its discovery in the Northern Territory, Angel (1951: 13) remarked that *B. cinnara* 'was more plentiful than the preceding species' (*Borbo impar lavinia*), which suggests the species was breeding locally. Currently, *B. impar* is seasonally abundant in the study region, whereas *B. cinnara* now appears to be absent. Angel's early observations were made before attempts to develop the rice industry in the Top End in the late 1950s to early 1960s (cultivated rice, *Oryza sativa*, is a common larval food plant in South-East Asia), which indicates that the subsequent collapse of the rice industry does not account for the disappearance of this species. It is therefore possible that *B. cinnara* is a vagrant or a rare immigrant from South-East Asia, occasionally colonising the region and breeding temporarily during favourable conditions.

Conservation status

NA.

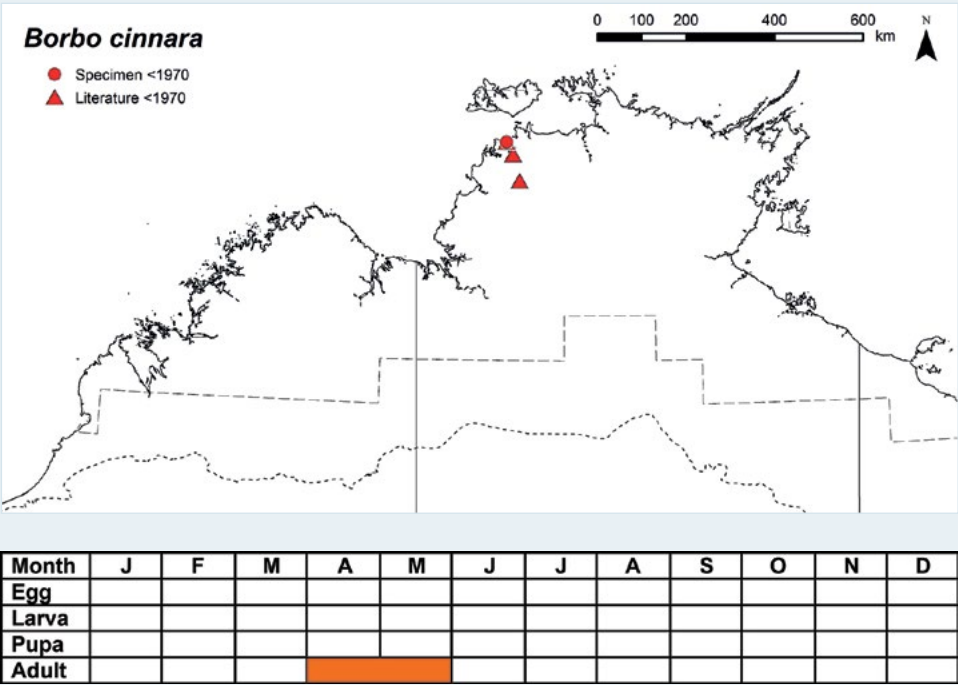


Photo: Piccaninny, Bungle Bungles, WA, M.F. Braby

Yellow Swift

Borbo impar (Mabille, 1883)



Plate 33 Wanguri, Darwin, NT
Photo: M. F. Braby



Plate 34 Fogg Dam, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *B. impar lavinia* (Waterhouse 1932), 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 (> 1,300 mm mean annual rainfall) of the north-western corner of the Top End and also on Groote Eylandt, NT (Dunn and Dunn 1991). The geographic range closely corresponds with the spatial distribution of its preferred native larval food plant (*Hymenachne acutigluma*). The food plant, however, has a broader range, occurring in coastal areas near Port Keats (Palumpa Billabong) and in north-eastern Arnhem Land (Arafura Swamp, Goromuru River floodplain), NT. Further field surveys are thus required to determine whether *B. impar* also occurs in these areas. Outside the study region, *B. impar* occurs from Maluku, through mainland New Guinea and adjacent islands and the Torres Strait Islands, Qld, to the Solomon Islands and New Caledonia.

Habitat

Borbo impar breeds mainly in floodplain wetlands and swamps where the native larval food plant (*Hymenachne acutigluma*) grows as a grass in standing water (Braby 2011a). It also breeds along the edges of monsoon forest where the introduced food plants *Cenchrus pedicellatus* and *Megathyrsus maximus* grow as tall grassy weeds, particularly in urban or disturbed areas.

Larval food plants

Hymenachne acutigluma, *Whiteochloa airoides* (Poaceae); also **Cenchrus pedicellatus*, **Megathyrsus maximus*, **Oryza sativa*, **Zea mays* (Poaceae).

The main native food plant appears to be *H. acutigluma* (Braby 2011a), but the species also breeds seasonally on introduced *C. pedicellatus* and *M. maximus* (Meyer 1996a, 1997b).

Seasonality

Adults occur throughout the year, but they are most abundant towards the end of the wet season (March and April). Few adults have been recorded during the mid to late dry season (June–September). The immature stages have been recorded from February to June and during the ‘build-up’ (October and November), and are not known to undergo diapause during the dry season. Larvae and pupae are particularly abundant in February–April, when the invasive annual mission grass (*Cenchrus pedicellatus*) germinates and produces new leaf growth following the monsoon rains. Presumably, the species breeds throughout the year on the perennial grasses and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC. The subspecies *B. impar lavinia* is a narrow-range endemic (geographic range = 35,360 sq km) and it occurs in several conservation reserves, including Charles Darwin National Park, Black Jungle Conservation Reserve, Fogg Dam Conservation Reserve, Manton Dam Recreation Area and Kakadu National Park. Despite its restricted occurrence, there are no known threats facing the taxon.

Lyell's Swift

Pelopidas lyelli (Rothschild, 1915)



Plate 35 Atherton, Qld
Photo: Don Franklin

Distribution

This species is represented in the study region by the subspecies *P. lyelli lyelli* (Rothschild, 1915). It occurs widely throughout the region, extending from the Kimberley, through the Top End and Northern Deserts to the western Gulf Country. Its geographic range closely corresponds with the spatial distribution of its native larval food plants, indicating that *P. lyelli* has been well sampled in the region. Outside the study region, *P. lyelli* occurs from Maluku, through mainland New Guinea and adjacent islands and north-eastern and eastern Australia to the Solomon Islands and Vanuatu.

Previous records of the dingy swift, *Pelopidas agna* (Moore, 1866), refer to this species (see Braby 2012b).

Habitat

Pelopidas lyelli occurs in a wide range of habitats, but it breeds mainly in riparian habitats, including woodland, open forest and the edges of mixed monsoon forest along seasonal creeks and riverbanks where the native larval food plants grow as dense perennial grasses in moist open areas (Braby 2015e).

Larval food plants

Chrysopogon elongatus, *Eriachne triodioides*, *Mnesithea rottboellioides* (Poaceae); also **Cenchrus pedicellatus*, **Megathyrsus maximus*, **Oryza sativa* (Poaceae).

Seasonality

Adults occur throughout the year and, like *Parnara amalia* and *Borbo impar*, they are most abundant during the late wet season and early dry season (April and May) after the monsoon rains have fallen and the larval food plants are green and luxuriant. The immature stages have been recorded sporadically from January to June, and are not known to undergo diapause during the dry season. Presumably, the species breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Large Yellow Grass-dart

Taractrocera anisomorpha (Lower, 1911)



Plate 36 Standley Chasm, West MacDonnell Ranges, NT
Photo: M. F. Braby

Distribution

This species occurs widely in the study region, extending from moist coastal areas to drier inland areas of the semi-arid zone. Most records are from areas that receive above 600 mm mean annual rainfall, but it has also been recorded from Tennant Creek (< 400 mm) (Waterhouse and Lyell 1914) and the arid zone of central Australia beyond the southern boundary of the study region. The distribution of the native larval food plant is considerably broader than the geographic range of *T. anisomorpha*, occurring throughout northern Australia, especially in semi-arid areas. *Taractrocera anisomorpha* has a similar geographic range to the closely related *Taractrocera ina*; however, there are no records of *T. anisomorpha* from eastern Arnhem Land, the Limmen Bight area in the Gulf of Carpentaria or western Queensland in the Gulf Country, despite the presence of *T. ina* in these areas, suggesting it may have been overlooked. Further field surveys are thus required to determine whether *T. anisomorpha* occurs in these areas and to clarify the extent to which it occurs in the drier inland areas of the study region. Outside the study region, *T. anisomorpha* occurs in the Lesser Sunda Islands, the Pilbara of Western Australia, the southern Northern Territory and northern and eastern Queensland.

Habitat

The breeding habitat of *T. anisomorpha* has been recorded only from the arid zone just outside the study region, where the species is found associated with tussocks of the native larval food plant growing along dry watercourses and sand banks of rivers in central Australia (Atkins 1991). Elsewhere, adults have been collected in savannah woodland, often near creeks, and they undoubtedly breed in this habitat.

Larval food plants

Eulalia aurea (Poaceae); also **Sorghum bicolor* (Poaceae).

Seasonality

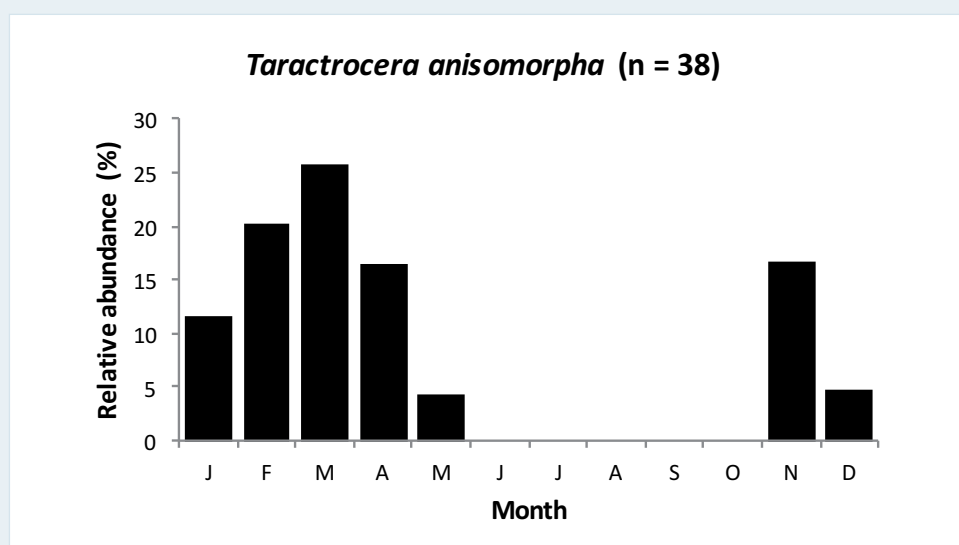
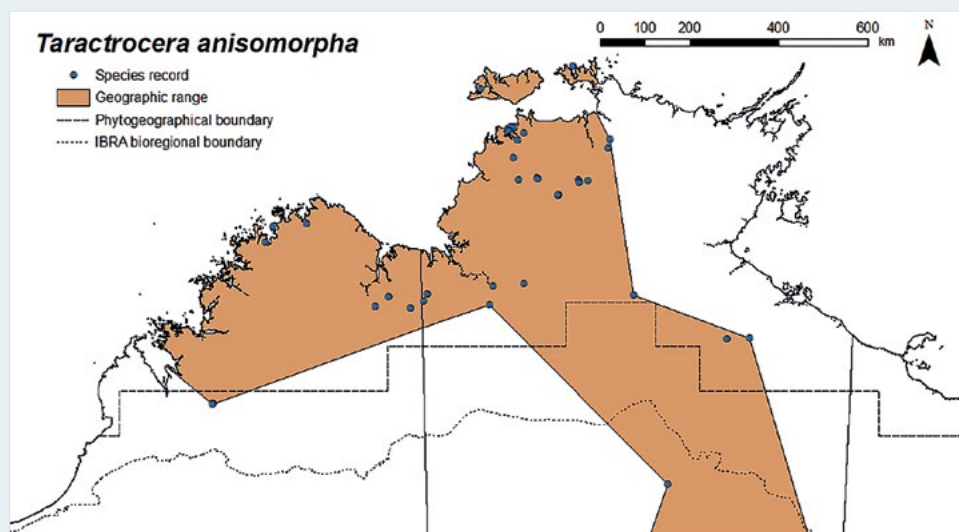
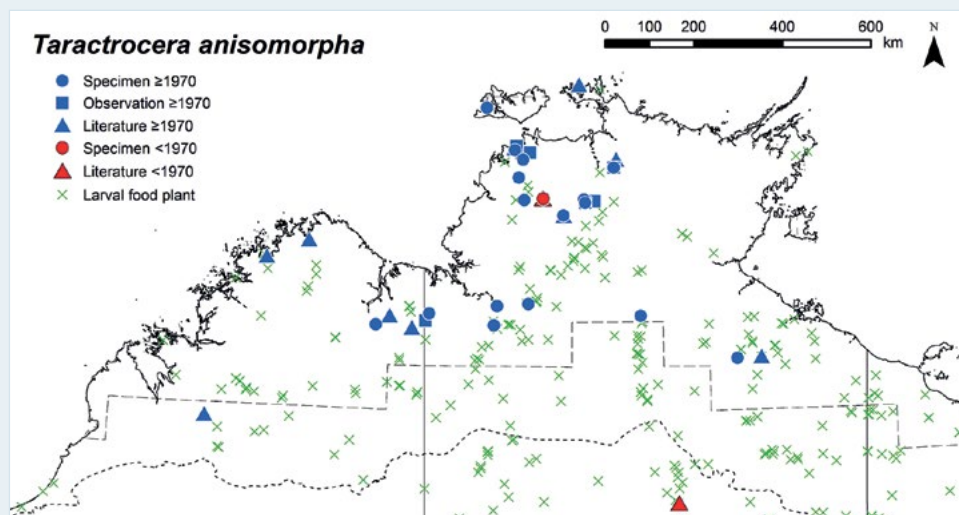
Adults are seasonal, occurring only during the wet season and early dry season (November–May), with a peak in abundance in March. The breeding phenology and seasonal history of the immature stages have not been recorded, but it is possible there are only one or two generations annually. Presumably, the species remains in larval diapause for long periods (possibly up to nine months) during the drier months, as has been recorded elsewhere in Australia (Atkins 1991).

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible]

No-brand Grass-dart

Taractrocera ina Waterhouse, 1932



Plate 37 Dundee Beach, NT
Photo: M. F. Braby

Distribution

This species occurs widely in the study region. It occurs in the northern Kimberley and throughout much of the Northern Territory, where it extends to the arid zone of central Australia beyond the southern boundary of the study region. It has a similar geographic range to the closely related *Taractrocera anisomorpha*, although there are fewer records from the Kimberley and Northern Deserts. The spatial distribution of one of its main larval food plants (*Cymbopogon procerus*) suggests *T. ina* may be more widespread in semi-arid areas of the southern Kimberley and Great Sandy and Tanami deserts; thus, further field surveys are required to determine whether *T. ina* is established in these areas. Outside the study region, *T. ina* occurs in mainland New Guinea and central and eastern Australia.

Habitat

Taractrocera ina breeds in savannah woodland and mixed monsoon vine thicket, favouring open or disturbed areas with a grassy understorey, where the native and introduced larval food plants grow as annual or perennial grasses (Braby 2011a, 2015e).

Larval food plants

Cymbopogon procerus, *Sorghum macrospermum*, *Sorghum* sp. (Poaceae); also **Cenchrus pedicellatus*, **Cymbopogon citratus*, **Megathyrsus maximus* (Poaceae); possibly *Sacciolepis indica* (Poaceae).

Seasonality

Adults are seasonal, occurring mainly during the warmer months, when humidity is higher, with a peak in abundance in the mid wet season (January). They are generally absent during the cooler dry season (May–August). The immature stages (larvae or pupae) have been recorded from January to May, during which several generations are completed. However, as the dry season progresses and the food plants dry out or decline in quality, the final instar larvae stop feeding and remain in diapause inside their tubular shelters for up to six months. Presumably, the larvae pupate and emerge as adults a few weeks later in response to the first pre-monsoon storms towards the end of the dry season and start of the wet season (September–November or December).

Breeding status

This species is resident in the study region.

Conservation status

LC.

River-sand Grass-dart

Taractrocera dolon (Plötze, 1884)



Plate 38 Mt Burrell, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *T. dolon diomedes* Waterhouse, 1933, which is endemic to the study region. It has a disjunct distribution, occurring in the northern and western Kimberley at Middle Osborn Island and Samson Inlet, WA (J. E. and A. Koeyers); and the Top End, where it has been recorded mostly from the higher rainfall areas in the north-western corner (> 1,000 mm mean annual rainfall). It also occurs on the Wessel Islands (Rimbija Island) in the north-east (Dunn and Dunn 1991) and extends into drier areas of lower rainfall (< 800 mm), where it has been recorded as far south as Coolibah Station and Leila Creek, NT (Dunn and Dunn 1991). It has not been recorded from the Tiwi Islands, Cobourgh Peninsula or Groote Eylandt; thus, further field surveys are required to determine whether *T. dolon* is present in these areas. Outside the study region, *T. dolon* occurs in eastern Australia and Tagula Island in the Louisiade Archipelago.

Habitat

The breeding habitat of *T. dolon* has not been recorded in the study region. Adults have been collected mainly in savannah woodland and riparian woodland, favouring open disturbed areas with patches of bare ground, and no doubt they breed on native grasses in these habitats.

Larval food plants

Not recorded in the study region. The food plants in Queensland consist of various grasses (Poaceae), the identity of which have not been documented (Braby 2000).

Seasonality

Adults are seasonal, being most abundant during the wet season (January–April). Very few adults have been recorded during the long dry season (May–October), and none has been recorded during the cooler winter months (June–August). A few adults have been collected after pre-monsoon storms in the early wet season (November and December). The breeding phenology and seasonal history of the immature stages have not been recorded, but it is possible only one or two generations are completed annually. Presumably, the species remains in larval diapause during the dry season.

Breeding status

This species is resident in the study region.

Conservation status

LC.

Rock Grass-dart

Taractrocera ilia Waterhouse, 1932



Plate 39 Kakadu National Park, NT
Photo: M. F. Braby



Plate 40 Kakadu National Park, NT
Photo: M. F. Braby

Distribution

This species is endemic to the study region. It is known only from the Top End, where it is restricted to western Arnhem Land. The known and putative larval food plants (*Micraria* spp.) are all restricted to the sandstone plateau of Arnhem Land, and their spatial distribution corresponds with the geographic range of *T. ilia*. The food plants, however, are more widely distributed, extending further south to the Katherine Gorge area, NT, and further east to the edge of the sandstone plateau—a remote area that is difficult to access. It is very likely *T. ilia* also occurs in these areas.

Excluded data

Historical records from Melville Island and Darwin based on two specimens in the SAM (Waterhouse 1932) are erroneous (Braby and Zwick 2015).

Habitat

Taractrocera ilia breeds in open sandstone pavements where the larval food plants grow as prostrate, dense mat-forming or hummock ‘resurrection’ grasses on gravelly rock scree, shallow depressions, seepage depressions and moist seepages at the base of rock overhangs (Braby and Zwick 2015).

Larval food plants

Micraria adamsii, *M. compacta*, *M. multinervia*, *M. spinifera*, *M. tenuis* (Poaceae); probably *Micraria dentata*, *M. inserta*, *M. pungens*, *M. subspicata*, *M. viscidula*.

Seasonality

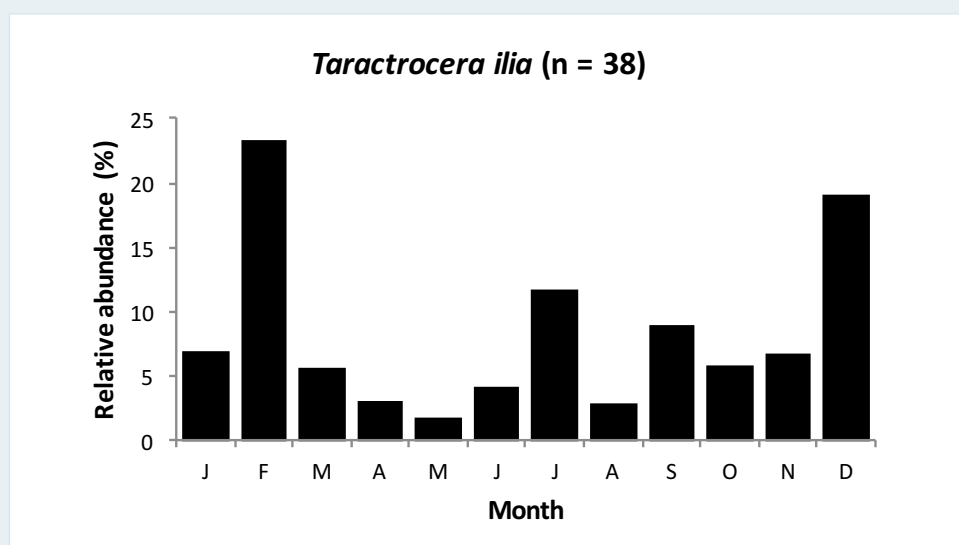
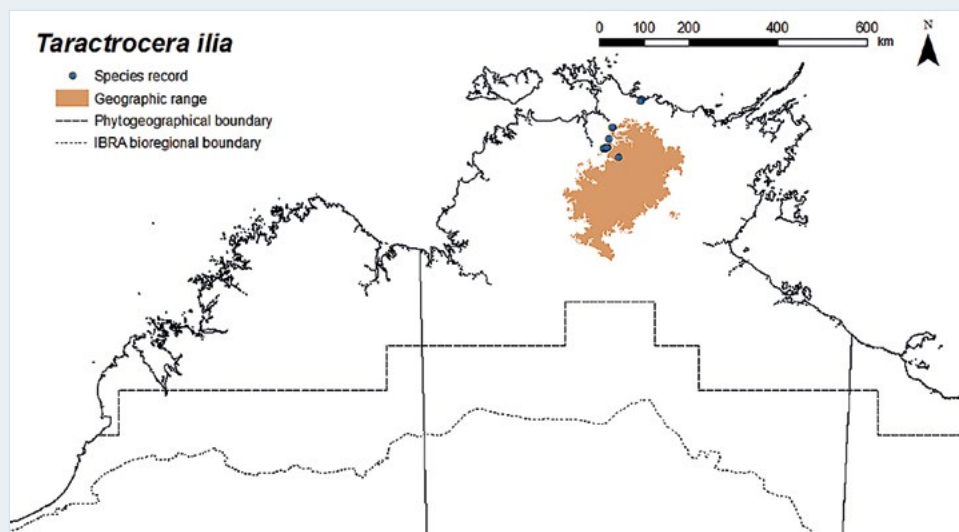
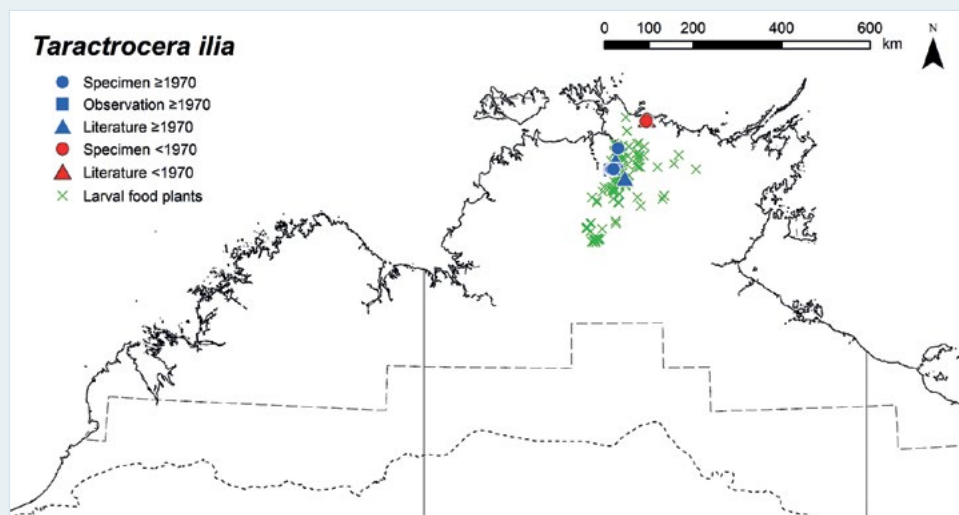
Adults occur throughout the year, but they are most abundant during the wet season (particularly in February), when the food plants rehydrate, are green and produce new leaf growth. During the dry season—or during hot, dry periods between the monsoon troughs—the plants typically desiccate, are brown and stop growing. Despite the desiccated condition of the food plants during the dry season, breeding occurs throughout the year, but during the dry season the larvae remain in diapause inside their silken shelters, usually as final instar larvae (for up to six months) or as first instar larvae (at least for a month towards the end of the dry season).

Breeding status

This species is resident in the study region.

Conservation status

LC. The species *T. ilia* is a narrow-range endemic and its entire range occurs within two conservation reserves: Kakadu National Park and Warddeken IPA. 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												

Sandstone Grass-dart

Taractrocera psammopetra Braby, 2015



Plate 41 Spirit Hills, Keep River National Park, NT
Photo: M. F. Braby



Plate 42 Spirit Hills, Keep River National Park, NT
Photo: M. F. Braby

Distribution

This species is endemic to the study region. It was described only as recently as 2015, five years after it was first discovered, in 2010. It has a disjunct distribution, occurring in the Kimberley and in western Arnhem Land in the Top End. It is less common and has a much smaller extent in the north of the Northern Territory, where it occurs sympatrically with *Taractrocera ilia*. In Western Australia, it occurs in the higher rainfall areas of the northern Kimberley (> 1,200 mm mean annual rainfall), as well as in semi-arid areas of the eastern Kimberley (c. 700 mm). The known and putative larval food plants (*Micraira* spp.), however, are more widely distributed, extending as far south as the Bungle Bungle Range (Purnululu National Park) and King Leopold Ranges, WA. Further field surveys are thus required to determine whether *T. psammopetra* occurs in the southern Kimberley.

Habitat

Taractrocera psammopetra breeds in open sandstone pavements, typically in shallow depressions or moist seepages on sandstone plateaus or on skeletal soils adjacent to watercourses, or on rock ledges of sandstone cliffs, where the larval food plants grow as prostrate, dense mat-forming or hummock 'resurrection' grasses (Braby and Zwick 2015).

Larval food plants

Micraira brevis, *M. lazaridis*, *M. spiciforma*, *Micraira* sp. 'Purnululu' (Poaceae); probably *Micraira dunlopia*. The food plant for the population in western Arnhem Land in the Top End has not been determined.

Seasonality

Adults are seasonal, occurring only during the wet season (November–February), but there are too few records ($n = 12$) to assess temporal changes in abundance. No adults have been recorded during the dry season despite targeted searches in April, May and August. The immature stages (eggs and pupae) have been recorded in February, when the food plants rehydrate, are green and produce new leaf growth. During the long dry season, the plants desiccate, are brown and stop growing, and the larvae remain in diapause as final instars inside their silken shelters. Presumably, only one or possibly two generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC. Despite the wide geographical range of *T. psammopetra*, the available data suggest it has a disjunct distribution with a limited AOO. The species occurs in several conservation reserves, including Mitchell River National Park, El Questro Wilderness Park, Keep River National Park (Spirit Hills extension) and Kakadu National Park. Despite its restricted occurrence, there are no known threats facing the taxon.

Narrow-brand Grass-dart

Ocybadistes flavovittatus (Latrielle, [1824])



Plate 43 Mornington Wildlife Sanctuary, WA
Photo: M. F. Braby



Plate 44 Mornington Wildlife Sanctuary, WA
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *O. flavovittatus vesta* (Waterhouse, 1932), which is endemic to the study region. It has a broad distribution, occurring 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 the central Kimberley (Mornington Wildlife Sanctuary, WA) and western Gulf Country, at Cape Crawford and McArthur River Homestead, NT (Common and Waterhouse 1981; Braby 2000), and Doomadgee, Qld (Puccetti 1991). Outside the study region, *O. flavovittatus* occurs in mainland New Guinea and adjacent islands and widely in eastern Australia.

Habitat

Ocybadistes flavovittatus has been recorded breeding in riparian woodland in the Kimberley (at Annie Creek, Mornington Wildlife Sanctuary), where the introduced larval food plant grew as an extensive hummock over the ground in a localised, damp open area with some shade provided by overstorey trees (Braby 2015e). Elsewhere, adults have been collected in a wide variety of habitats, including savannah woodland, paperbark woodland, paperbark open forest and mixed monsoon forest, but usually along or adjacent to riparian areas such as perennial creeks. Presumably, the species breeds in all of these habitats.

Larval food plants

**Cynodon dactylon* (Poaceae). The native food plants have not been recorded in the study region, but in eastern Australia they consist of various grasses (Poaceae), the identity of which have not been documented (Braby 2000).

Seasonality

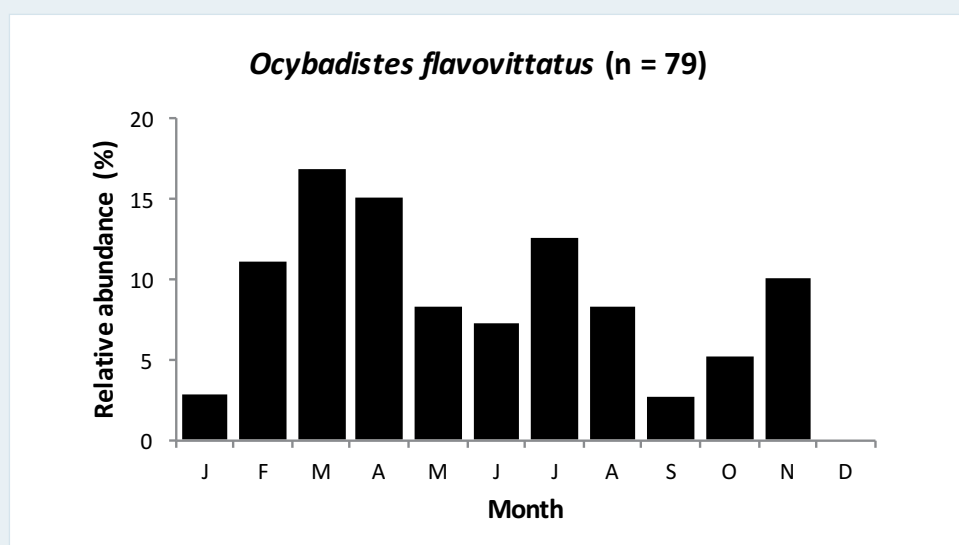
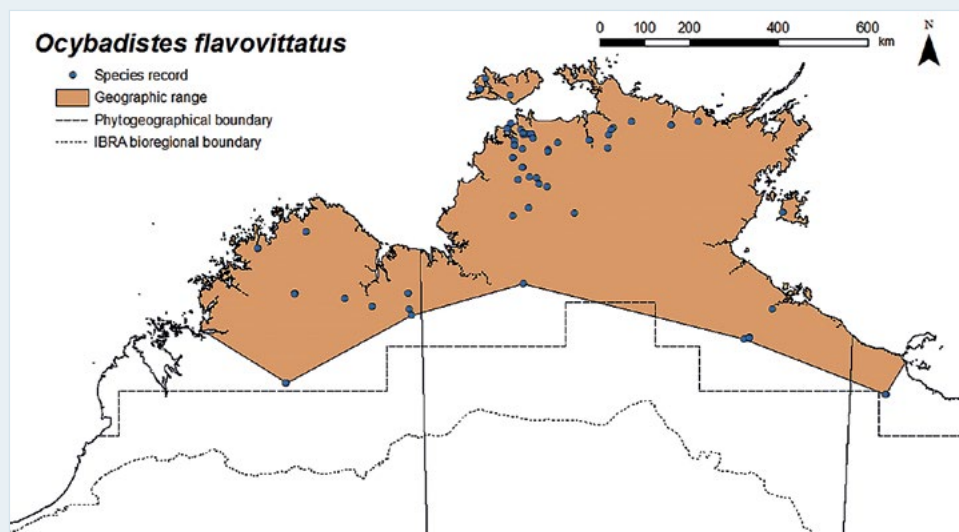
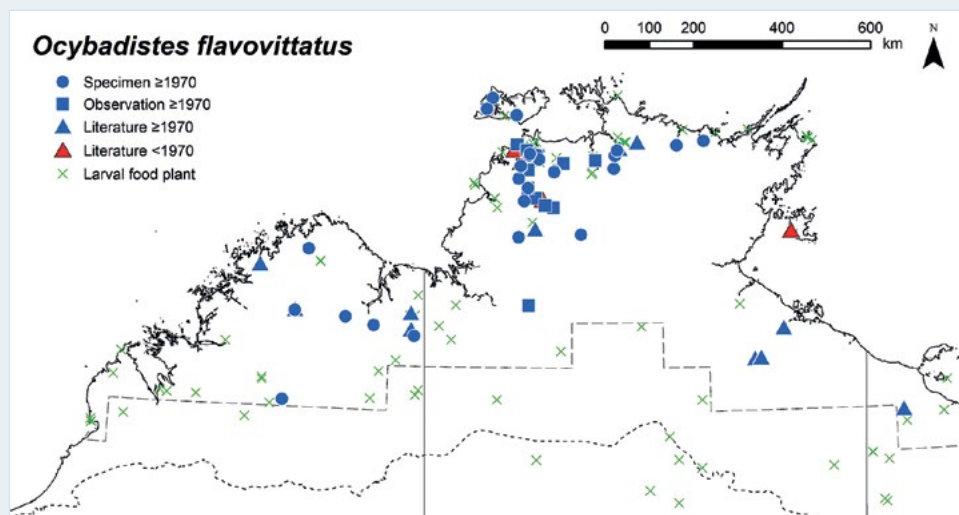
Adults occur throughout the year, but they appear to be more abundant from the late wet season (March and April) to the mid dry season (July). We have few data on the phenology of the immature stages (eggs and larvae), which have been recorded in August. Presumably, the species breeds continuously throughout the year and several generations are completed annually.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible]

Green Grass-dart

Ocybadistes walkeri Heron, 1894



Plate 45 Holmes Jungle, NT
Photo: Tissa Ratnayake

Distribution

This species is represented by the subspecies *O. walkeri olivia* Waterhouse, 1933, which is endemic to the study region. It is restricted mainly to the Top End (> 800 mm mean annual rainfall), reaching its southern limits at Victoria River Roadhouse and Mataranka, NT. It has also been recorded in the eastern Kimberley, based on a historical male specimen from Wyndham, WA, and a more recent observation at Keep River National Park (Cockatoo Lagoon), NT. The extent to which the species occurs in the Kimberley requires further scrutiny. It often occurs together with the closely related *Ocybadistes flavovittatus*, but it does not extend as far inland as that species. The putative native larval food plant (*Imperata cylindrica*) occurs widely in northern Australia. Outside the study region, *O. walkeri* occurs from the Lesser Sunda Islands, through mainland New Guinea and adjacent islands to eastern and south-eastern Australia.

Excluded data

Yeates (1990) listed this species from the northern Kimberley based on one male and three females collected at Kalumburu Mission on 4–6 May 1989. However, examination of this material in the Western Australian Department of Agriculture collection (WADA) indicated that all were misidentified and were in fact *Ocybadistes flavovittatus*, a species known to occur in the northern Kimberley. Thus, the record of *O. walkeri* is excluded from the northern Kimberley.

Habitat

The natural breeding habitat of *O. walkeri* has not been recorded in the study region. The species breeds commonly in urban areas where the naturalised larval food plants thrive, typically in well-watered lawns in suburban parks and gardens (Braby 2015e). Elsewhere, adults have been collected in a wide variety of habitats, including savannah woodland, paperbark swampland, woodland and open forest and mixed woodland–monsoon forest associations, usually along or adjacent to riparian areas such as perennial creeks and rivers. They also occur in moist open grassy areas within or along the edge of semi-deciduous monsoon vine thicket and evergreen monsoon vine forest. Presumably, the species breeds in all of these habitats.

Larval food plants

**Axonopus compressus*, **Melinis repens* (Poaceae). The native food plants have not been recorded in the study region, but in eastern Australia they consist of various grasses, including *Imperata cylindrica* (Poaceae) (Braby 2000).

Seasonality

Adults occur throughout the year, but they appear to be more abundant in the mid dry season (June and July) and least numerous in the late dry season (September and October). We have few data on the phenology of the immature stages, with eggs recorded in March and August. 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.

White-margined Grass-dart

Ocybadistes hypomeloma Lower, 1911



Plate 46 West of Paluma, Qld
Photo: Frank Pierce

Distribution

This species occurs in the Kimberley and western half of the Top End, with more sporadic occurrences in the western Gulf Country. It extends from the higher rainfall areas at Darwin to drier inland areas of the semi-arid zone (< 700 mm mean annual rainfall), where it has been recorded as far inland as El Questro Wilderness Park (Amalia Gorge, El Questro Gorge), WA (Braby 2012b). In the western Gulf Country, it has been recorded at McArthur River Homestead, NT (Common and Waterhouse 1981), and Boodjamulla/Lawn Hill National Park (Lawn Hill Gorge), Qld (Daniels and Edwards 1998). The putative larval food plants (*Ischaemum australe* and *Themeda triandra*) occur widely in northern Australia. Further field surveys are thus required to determine the geographic range of *O. hypomeloma* more precisely, particularly whether it occurs in the eastern half of the Top End and coastal areas of the Gulf of Carpentaria. Outside the study region, *O. hypomeloma* occurs in the Pilbara of Western Australia and widely in eastern Australia.

The subspecific status has not been determined with certainty: it may be *O. hypomeloma vaga* (Waterhouse, 1932), otherwise known only from the Torres Strait islands, or an undescribed subspecies.

Habitat

The breeding habitat of *O. hypomeloma* has not been recorded in the study region. Adults have been collected mainly in savannah woodland and they undoubtedly breed on native grasses in this habitat.

Larval food plants

Not recorded in the study region; probably *Ischaemum australe* and *Themeda triandra* (Poaceae), which are the food plants in eastern Australia (Braby 2000).

Seasonality

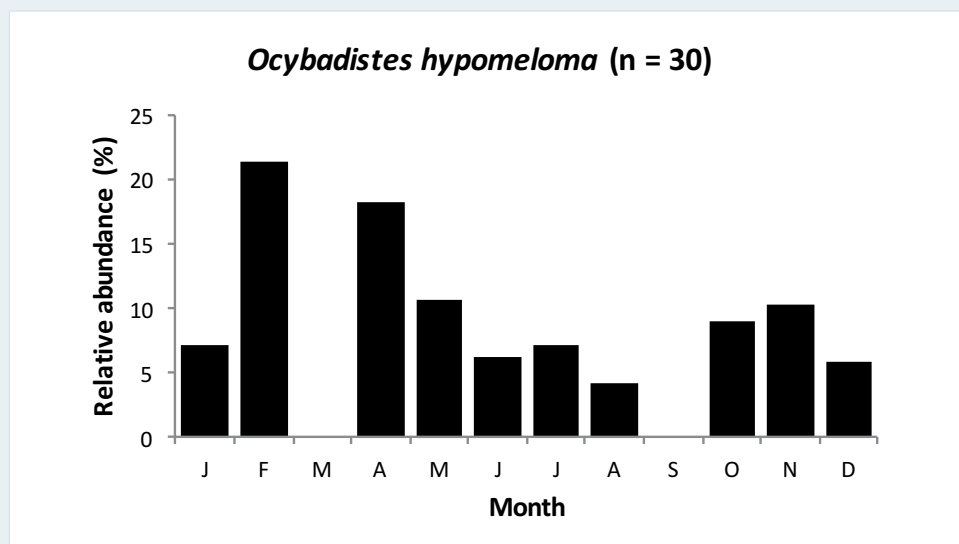
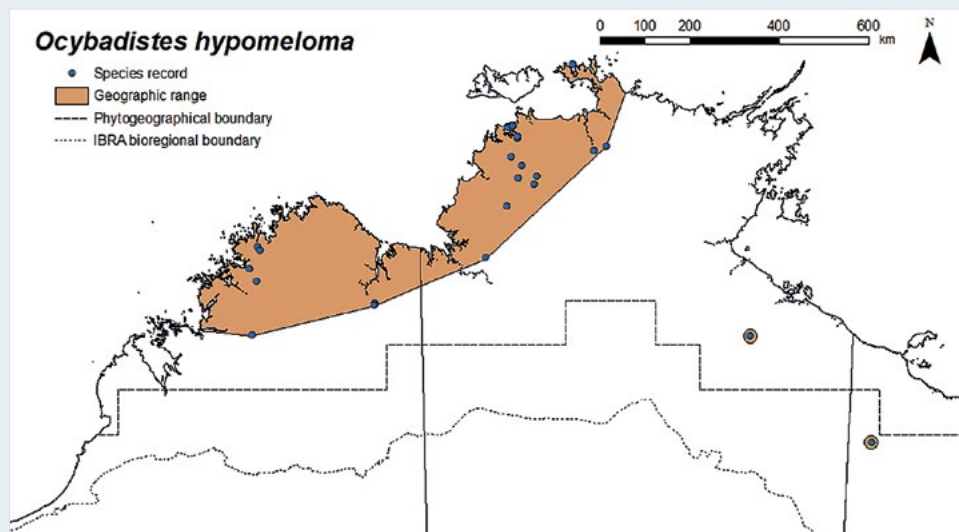
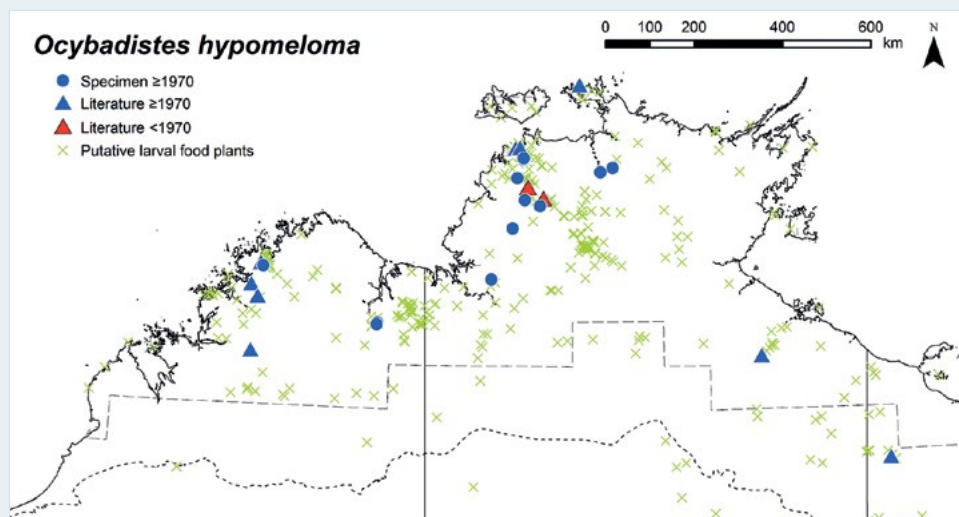
Adults have been recorded sporadically throughout the year, with most records in the wet season (February and April). The breeding phenology and seasonal history of the immature stages have not been recorded, but presumably the species breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible]

Wide-brand Grass-dart

Suniana sunias (C. Felder, 1860)



Plate 47 Mary River Reserve, NT
Photo: M. F. Braby



Plate 48 Marrakai Road, NT
Photo: M. F. Braby

Distribution

This species is represented by the subspecies *S. sunias sauda* Waterhouse, 1937, which is endemic to the study region. It is restricted to the north of the Northern Territory, where it occurs in the higher rainfall areas (> 1,000 mm mean annual rainfall). Most records are from the north-western corner of the Top End, where it extends as far south-east as Nitmiluk (Katherine Gorge) National Park (Sweetwater Pool), but it has been recorded from Groote Eylandt in the Gulf of Carpentaria (Tindale 1923). It has not been recorded from the Tiwi Islands, Cobourg Peninsula or north-eastern Arnhem Land; thus, further field surveys are required to determine whether *S. sunias* is present in these northern areas. Outside the study region, *S. sunias* occurs from Maluku and the Lesser Sunda Islands, through mainland New Guinea and adjacent islands and north-eastern and eastern Australia to the Solomon Islands.

Excluded data

Dunn (1985) listed this species from the eastern Kimberley, but Braby (2000: 212) cast doubt over this record, noting that '[a] single female collected at "Wyndham, WA" by J. C. Le Souëf (Dunn 1985) has not been traced, but one male each of *Ocybadistes walkeri* and *Suniana lascivia* are similarly labelled'. K. L. Dunn (pers. comm.) has subsequently advised that the specimen referred to was almost certainly the male *S. lascivia*, contributing to the mistaken identification.

Habitat

The breeding habitat of *S. sunias* has not been recorded in the study region. Adults have been collected only in the grassy edges of riparian evergreen monsoon vine forest along creeks or the banks of rivers with permanent water, and in light gaps comprising grassy patches within coastal semi-deciduous monsoon vine thicket, and no doubt they breed in these habitats.

Larval food plants

**Megathyrsus maximus* (Poaceae). The native food plants have not been recorded in the study region, but undoubtedly consist of native grasses (Poaceae).

Seasonality

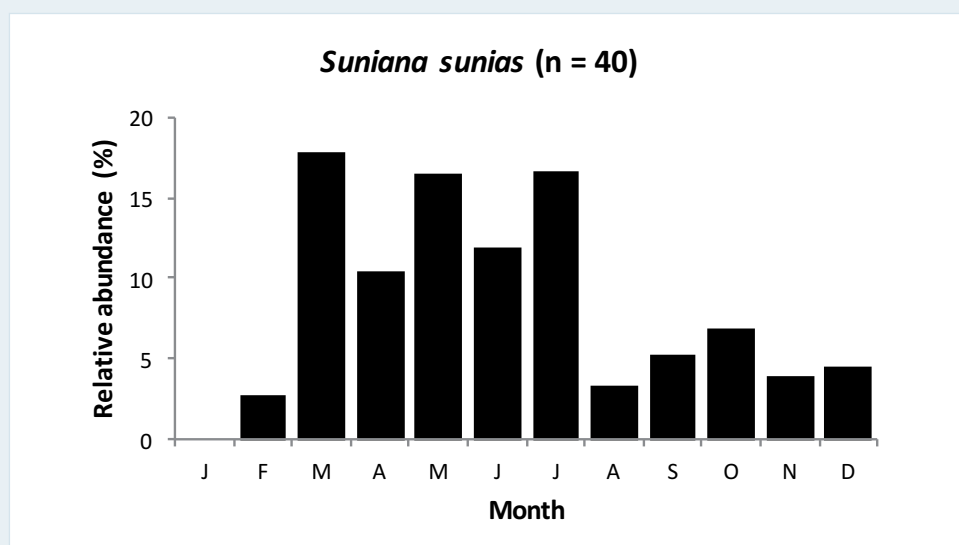
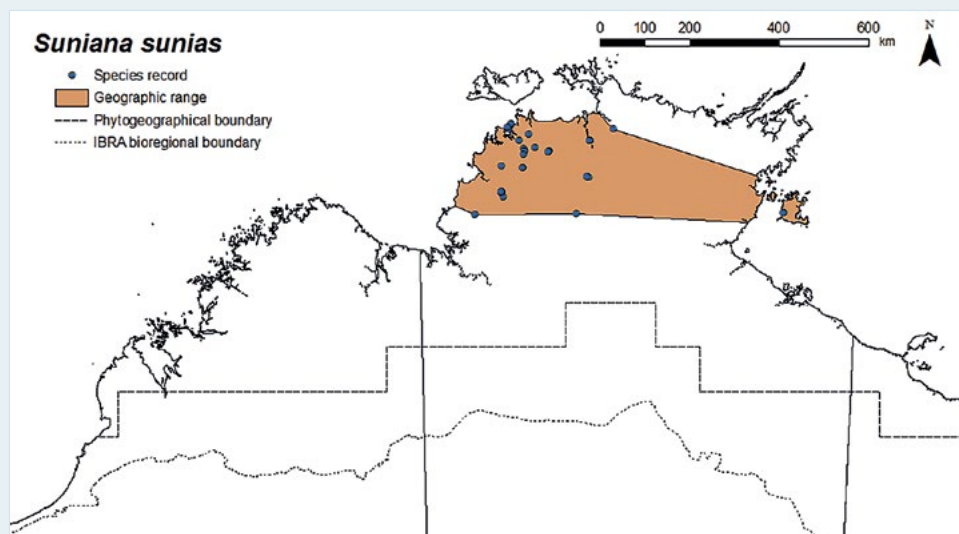
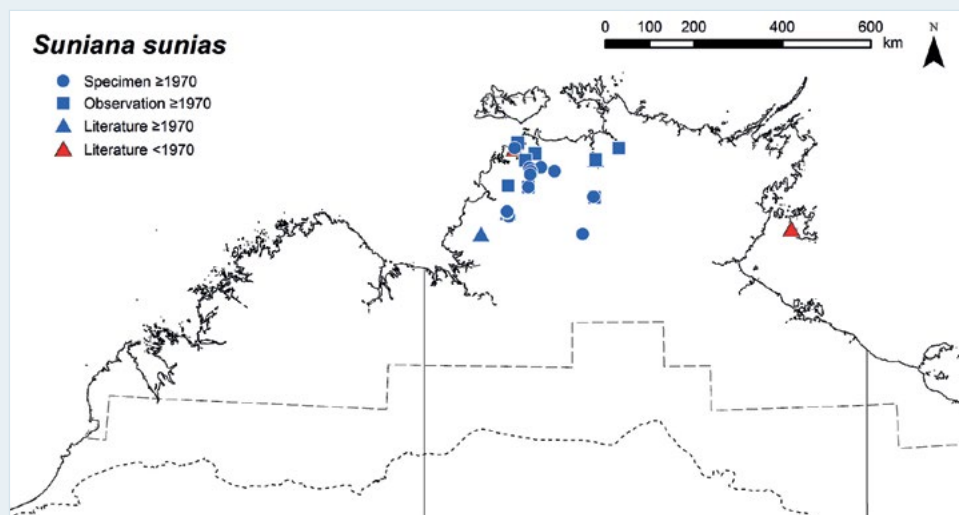
Adults have been recorded during most months of the year, but they are more abundant from the late wet season to the mid dry season (March–July). The breeding phenology and seasonal history of the immature stages have not been recorded, but it is likely the species breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible]

Dark Grass-dart

Suniana lascivia (Rosenstock, 1885)



Plate 49 Wanguri, Darwin, NT
Photo: M. F. Braby

Distribution

This species is represented by two subspecies: *S. lascivia larrakia* L. E. Couchman, 1951 and *S. lascivia lasus* Waterhouse, 1937, both of which are endemic to the study region. The latter subspecies is restricted to Bathurst Island, NT, but *S. lascivia larrakia* is much more widespread, occurring in the Kimberley and Top End, with more sporadic occurrences in the western Gulf Country. *S. lascivia larrakia* extends from moist coastal areas to drier inland areas of the semi-arid zone (c. 700 mm mean annual rainfall). The subspecies *S. lascivia lasus* was previously known only from three historical specimens (Waterhouse 1937a); however, it was rediscovered at Bathurst Island in March 2009 (D. A. Young). The geographical range of *S. lascivia* broadly corresponds with the spatial distribution of its two native larval food plants. The food plants, however, have a slightly wider extent, occurring also on Dampier Peninsula, WA, and in western Queensland in the Gulf Country. Further field surveys are therefore required to determine whether *S. lascivia* is present in these areas, particularly in the Limmen Bight area and elsewhere in the Gulf of Carpentaria. Further field surveys are also required to determine whether the subspecies *S. lascivia lasus* occurs on Melville Island, NT. Outside the study region, *S. lascivia* occurs in Timor, mainland New Guinea and adjacent islands and throughout eastern Australia.

Habitat

Suniana lascivia occurs in a variety of habitats, but it breeds mainly in swampy and riparian areas, including paperbark–pandanus swampland adjacent to evergreen monsoon vine forest and the edges of mixed riparian woodland or open forest with rainforest elements in the understorey where the native larval food plants grow as perennial grasses in abundance in the more open areas (Braby 2011a, 2015e). In the drier inland areas, the breeding habitats are confined to perennial creeks along gorges.

Larval food plants

Ischaemum australe, *Imperata cylindrica* (Poaceae); also **Megathyrsus maximus* (Poaceae).

Seasonality

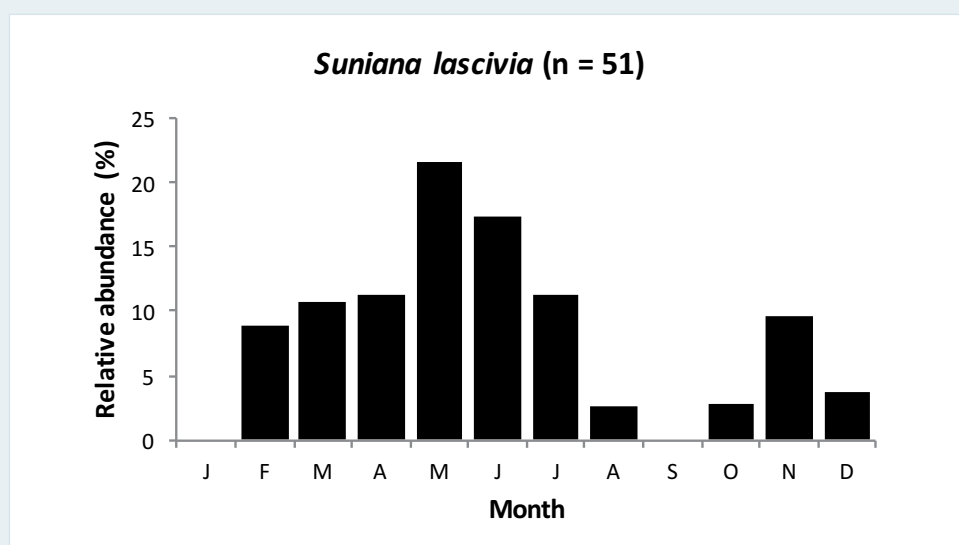
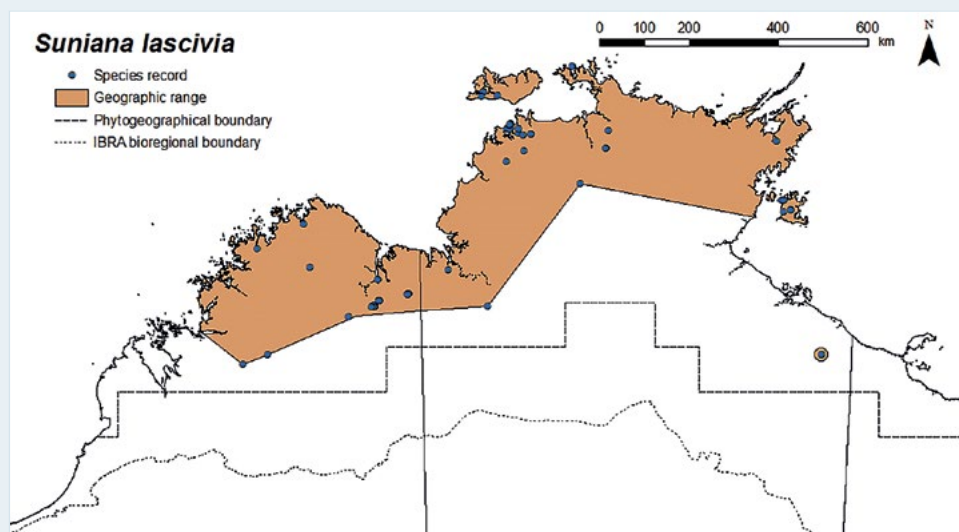
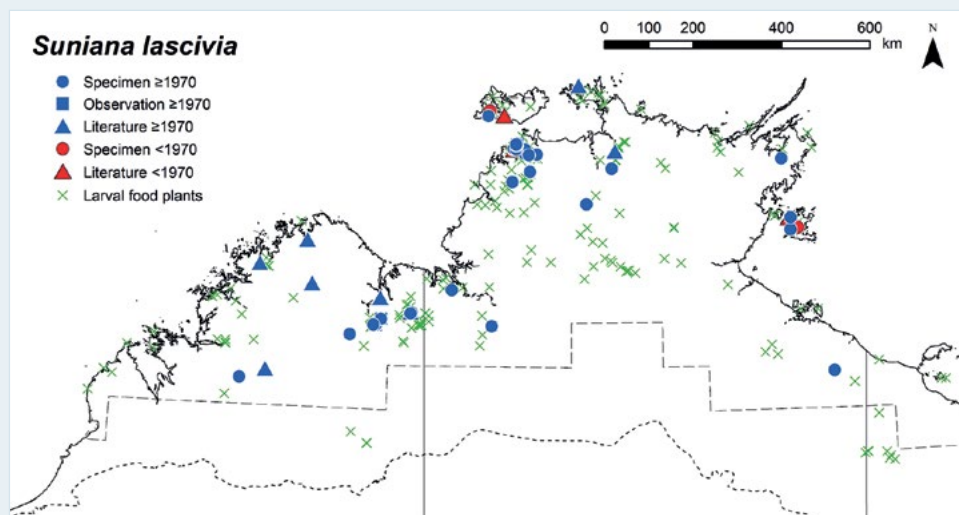
Adults have been recorded during most months of the year, but they are more abundant from the late wet season to the mid dry season (March–July). The apparent peak in abundance in May is a sampling bias due to targeted surveys in the eastern Kimberley (eight of 13 records for May are all from El Questro Wilderness Park in 2011). The immature stages have been recorded sporadically during the year, with no evidence of diapause in any of the life history stages. Presumably, the species breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

Suniana lascivia larrakia: LC. *Suniana lascivia lasus*: DD. The subspecies *S. lascivia lasus* is 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), and is currently known only from one extant location where it occurs on private Aboriginal land in which it has an uncertain future due to potential development. Thus, the taxon may qualify as Near Threatened (NT) once adequate data are available. Targeted field surveys to determine the extent of its distribution, critical habitat and key threatening processes on the Tiwi Islands should be a high priority for this subspecies.

[illegible]

Pale-orange Darter

Telicota colon (Fabricius, 1775)



Plate 50 Adelaide River crossing,
Arnhem Highway, NT
Photo: Deb Bisa

Distribution

This species is represented in the study region by the subspecies *T. colon argea* (Plötz, 1883). It occurs widely in the region, from the Kimberley, through the Top End to the western Gulf Country, extending from moist coastal areas to drier inland areas of the semi-arid zone (c. 700 mm mean annual rainfall). The geographical range corresponds well with the spatial distribution of the three known native larval food plants. The food plants, however, are more widely distributed, occurring also on Dampier Peninsula and the southern Kimberley, WA; Groote Eylandt, NT; and western Queensland in the Gulf Country. It is likely *T. colon* occurs in most of these areas and further field surveys are thus required to confirm this. Outside the study region, *T. colon* occurs widely from India and South-East Asia, through mainland New Guinea and north-eastern and eastern Australia to the Solomon Islands. It also occurs in the Pilbara of Western Australia.

Habitat

Telicota colon occurs in a wide range of habitats, but it breeds mainly in open areas where the larval food plants commonly grow, including savannah woodland, mixed paperbark swampland and the edges of evergreen monsoon vine forest (Braby 2011a, 2015e). In the drier inland areas, the breeding habitats are confined to gorges with permanent water and other riparian areas, such as woodland along perennial creeks and the edges of open forest with rainforest elements in the understorey along riverbanks.

Larval food plants

Imperata cylindrica, *Ischaemum australe*, *Mnesithea rottboellioides* (Poaceae); also **Oryza sativa*, **Paspalum scrobiculatum*, **Andropogon gayanus* (Poaceae).

Seasonality

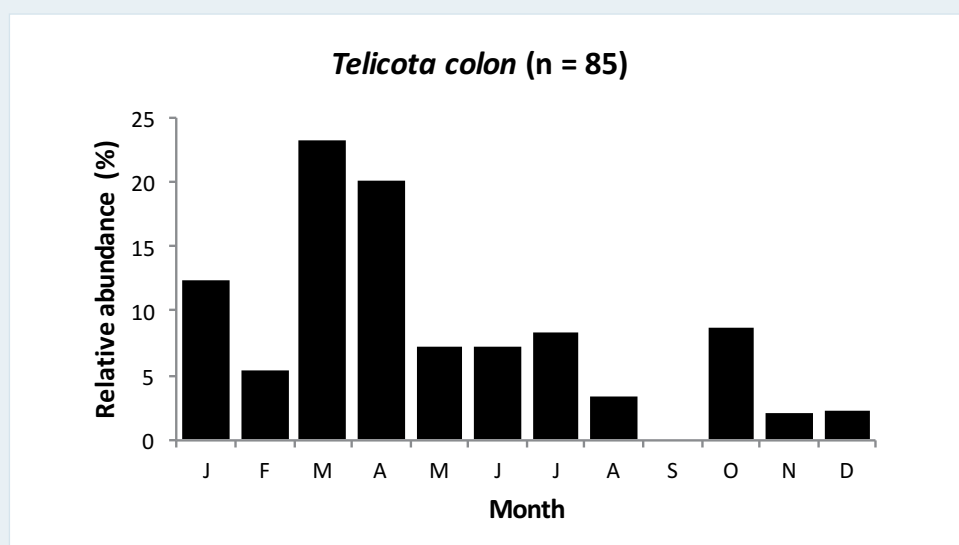
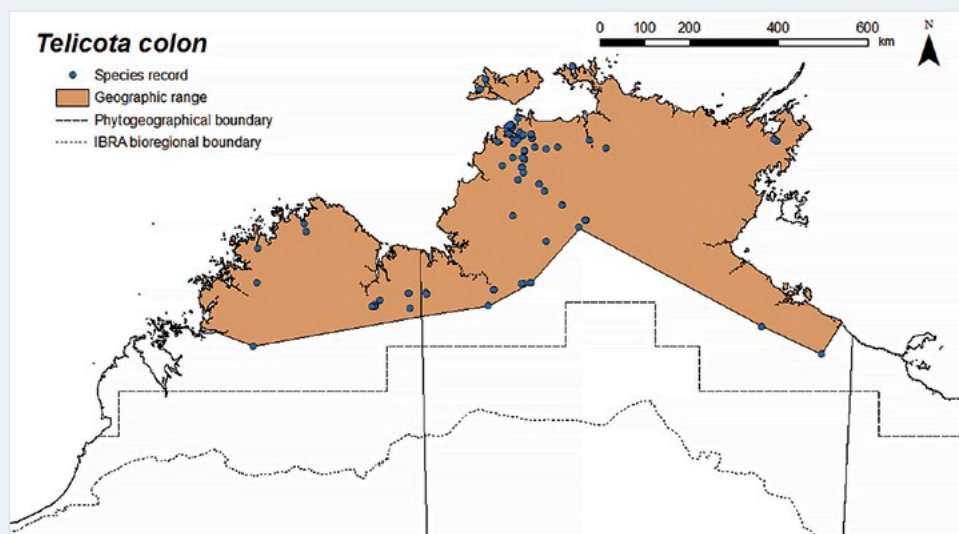
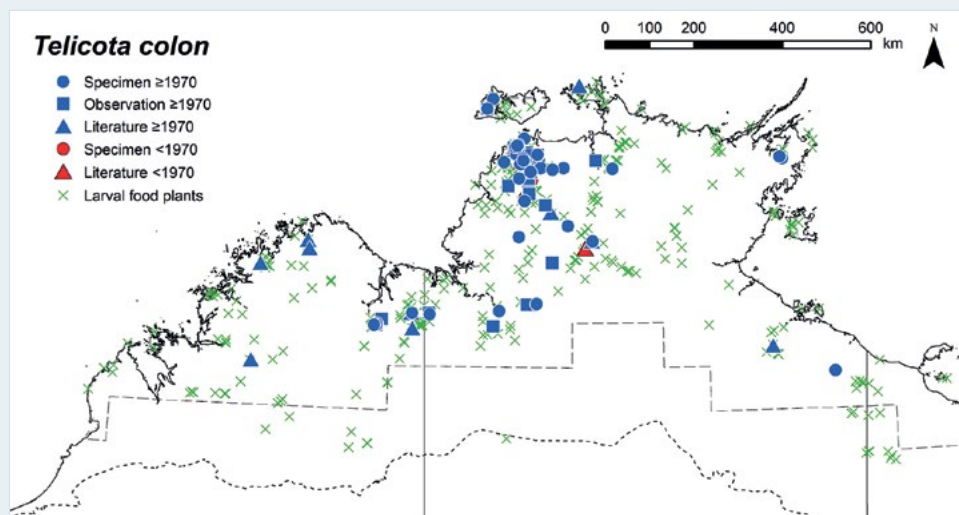
Adults occur during most months of the year, but they are more abundant during the late wet season (March and April). The immature stages have been recorded in January and from March to August, but undoubtedly occur at other times of the year. Presumably, the species breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC.



Bright-orange Darter

Telicota augias (Linnaeus, 1763)



Plate 51 Dundee Beach, NT
Photo: M. F. Braby



Plate 52 Dundee Beach, NT
Photo: M. F. Braby

Distribution

This species is represented in the study region by the subspecies *T. augias krefftii* (W. J. Macleay, 1866). It occurs widely in the Kimberley and Top End and does not intrude into the drier inland areas to any great extent (mainly > 800 mm mean annual rainfall). The geographical range closely corresponds with the spatial distribution of its larval food plant, indicating that *T. augias* has been well sampled in the region. The larval food plant, however, extends further south to the western Gulf Country at Limmen National Park (Nathan River Station) and Sir Edward Pellew Group (Vanderlin Island), NT. Further field surveys are therefore required to determine whether *T. augias* also occurs in these coastal and near-coastal areas. Outside the study region, *T. augias* occurs in South-East Asia, mainland New Guinea and north-eastern Australia.

Previous records of *Telicota ancilla baudina* Evans, 1949 refer to this species (Braby 2012b).

Habitat

Telicota augias breeds in a variety of wet and dry monsoon forests, including evergreen monsoon vine forest associated with permanent water, coastal semi-deciduous monsoon vine thicket and mixed woodland with rainforest elements in the understorey associated with sandstone cliffs, creeks and gorges, where the larval food plant grows into the canopy as a tall scrambling vine.

Larval food plant

Flagellaria indica (Flagellariaceae).

Seasonality

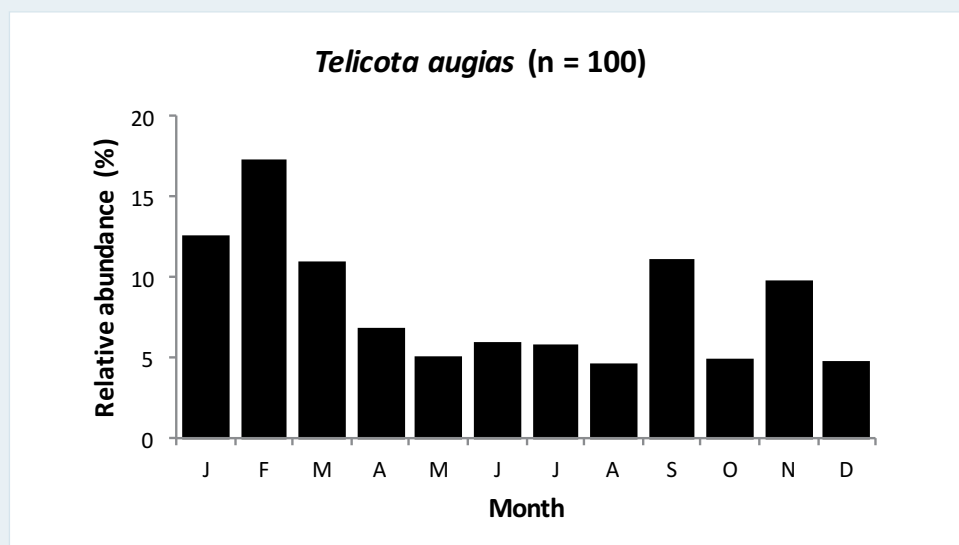
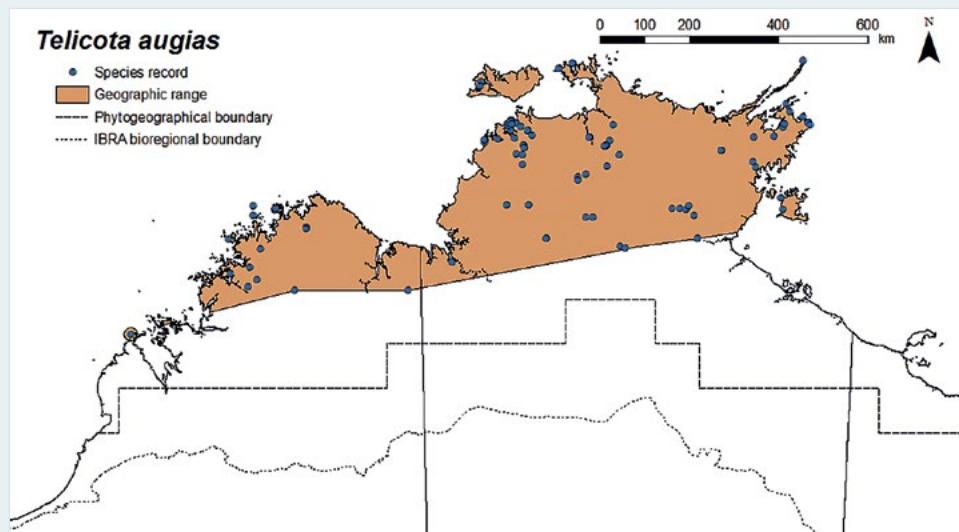
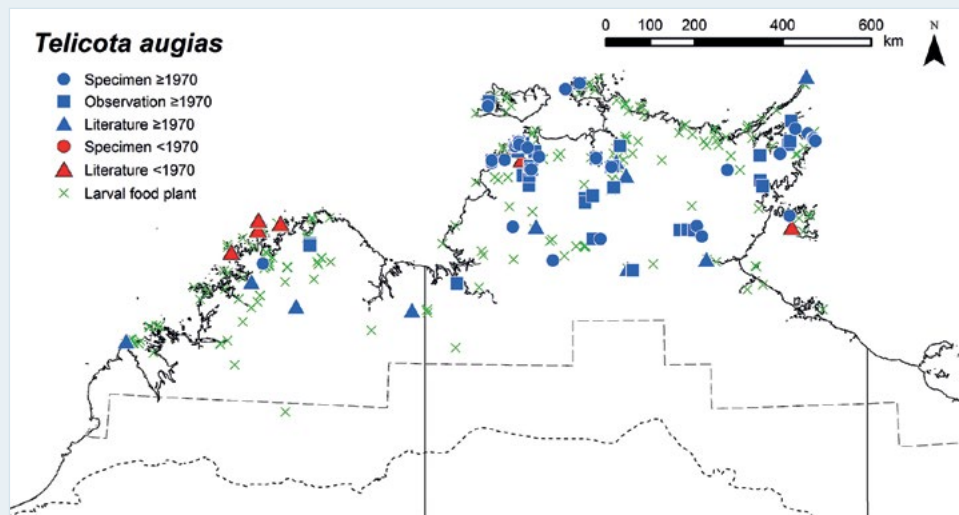
Adults occur throughout the year, but they are more abundant during the mid wet season (February). The immature stages have been recorded during most months of the year, with no evidence of diapause in any of the life history stages. Presumably, the species breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible]

Orange Palm-dart

Cephrenes augiades (C. Felder, 1860)



Plate 53 Brisbane, Qld
Photo: M. F. Braby

Distribution

This species is represented by an undescribed subspecies, which is endemic to the study region. Its presence in the Northern Territory was detected only as recently as 1991 (Braby 2000). It is restricted to the northern half of the Top End, where it occurs in the higher rainfall areas (> 1,200 mm mean annual rainfall). Its distribution extends from Darwin and Litchfield National Park (Wangi Falls) to Gove Peninsula (Koolatong River, Balma outstation and Rocky Bay). The geographic range of *C. augiades* is closely tied to the spatial distribution of its two native larval food plants. The food plants, however, have a slightly wider extent, occurring near the Joseph Bonaparte Gulf (e.g. Fitzmaurice River area). Further field surveys are therefore required to determine whether *C. augiades* also occurs in this area. Outside the study region, *C. augiades* occurs from Indonesia, through mainland New Guinea and adjacent islands and north-eastern and eastern Australia to New Britain and the Solomon Islands.

Habitat

Cephrenes augiades breeds mainly in evergreen monsoon vine forest associated with springs and permanent streams where the native larval food plants grow as palms (Braby 2011a). In the Darwin area, it also occurs in suburban parks and gardens where the primary food plant (*Carpentaria acuminata*) and ornamental palms have been established.

Larval food plants

Carpentaria acuminata, *Livistona benthamii* (Arecaceae). The main food plant is *C. acuminata* (Braby 2011a). Dunn (2009) listed *Livistona* sp. as the food plant near Cahills Crossing on the East Alligator River, and this record refers to *L. benthamii*. It may also utilise ornamental palms in suburban areas.

Seasonality

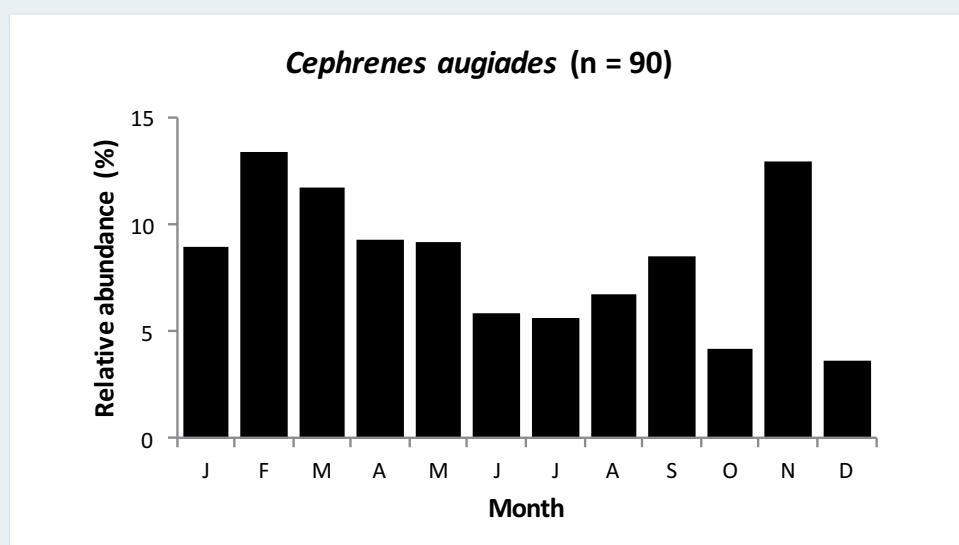
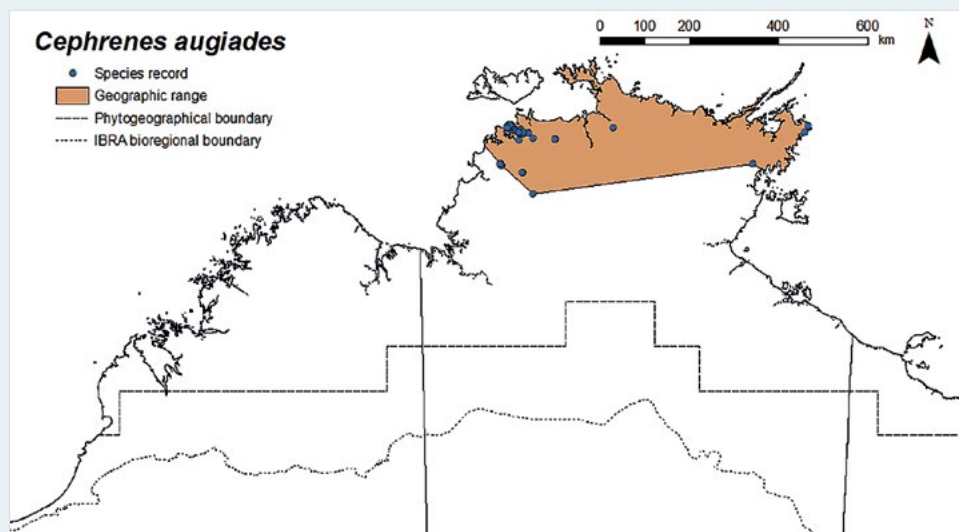
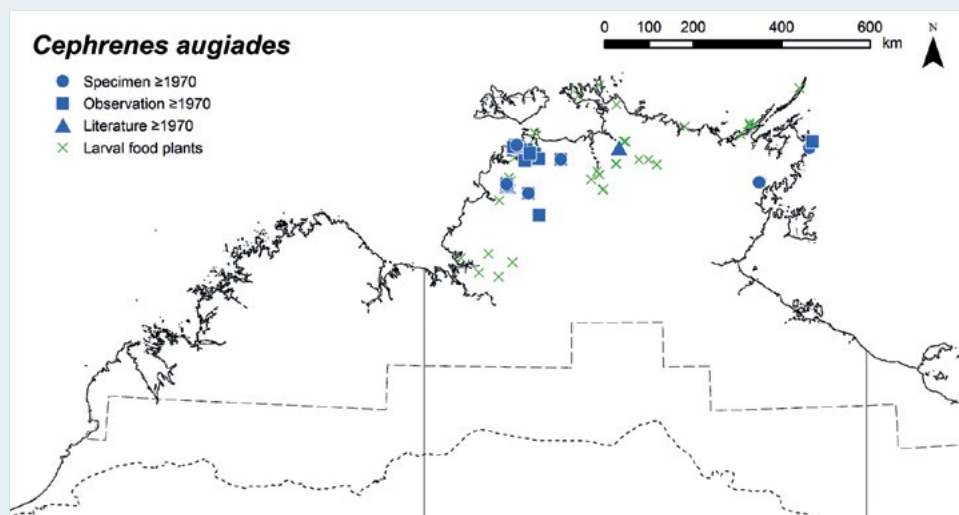
Adults occur throughout the year, but they are more abundant during the wet season and early dry season (November–May). The immature stages have been recorded sporadically throughout the year; they may be particularly numerous in the late wet season. Presumably, the species breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC. The putative subspecies *C. augiades* ssp. ‘Top End’ has a restricted range within which it occurs in several conservation reserves, including Litchfield National Park, Mary River National Park, Kakadu National Park, Laynhapuy IPA and several smaller reserves close to Darwin. Despite its restricted occurrence, there are no known threats facing the taxon.

[illegible]

Yellow Palm-dart

Cephrenes trichopepla (Lower, 1908)



Plate 54 Holmes Jungle, Darwin, NT
Photo: M. F. Braby



Plate 55 El Questro Wilderness Park, WA
Photo: M. F. Braby

Distribution

This species occurs widely throughout the study region, extending further inland into the lower rainfall areas of the semi-arid zone (c. 600 mm mean annual rainfall) than *Cephrenes augiades*. Its geographic range corresponds well with the spatial distribution of its larval food plants, although records of *C. trichopepla* from the western Gulf Country are sparse. The species reaches its westernmost limit in the western Kimberley at Broome, WA (Dunn 1980; Common and Waterhouse 1981), which lies outside the range extent of its known native food plants. Further field surveys are required to determine the extent to which the species occurs in the Limmen Bight area and elsewhere in the Gulf Country. Outside the study region, *C. trichopepla* occurs naturally in Queensland and New South Wales.

Habitat

Cephrenes trichopepla breeds mainly in savannah woodland where the larval food plants grow as palms (Braby 2011a, 2015e). In the drier areas, breeding populations are restricted to riparian evergreen monsoon vine forest or mixed woodland–monsoon forest along gorges with permanent water. It also occurs in suburban parks and gardens where ornamental palms have been established.

Larval food plants

Livistona benthamii, *L. humilis*, *L. inermis*, *L. lorophylla*, *L. nasmophila*, *L. rigida*, *L. victoriae* (Arecaceae). The main food plants are *L. humilis* and *L. inermis* in the Top End, but it uses *L. lorophylla*, *L. nasmophila* and *L. victoriae* in the Kimberley (Braby 2011a, 2015e). The food plant is *L. rigida* at Mataranka, NT, and in the western Gulf Country at Boodjamulla/Lawn Hill National Park, Qld. The species also exploits several ornamental palms propagated in suburban parks and gardens (Dunn 2015b).

Seasonality

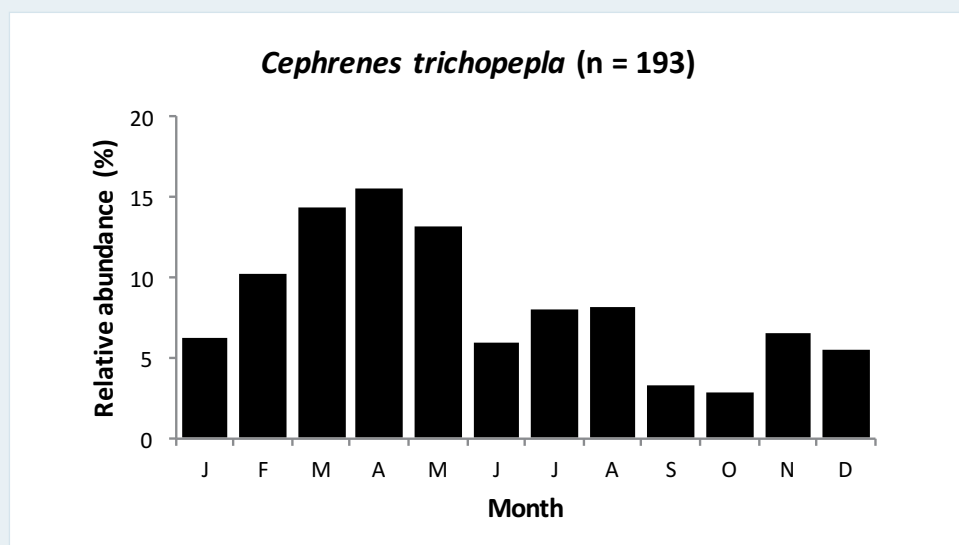
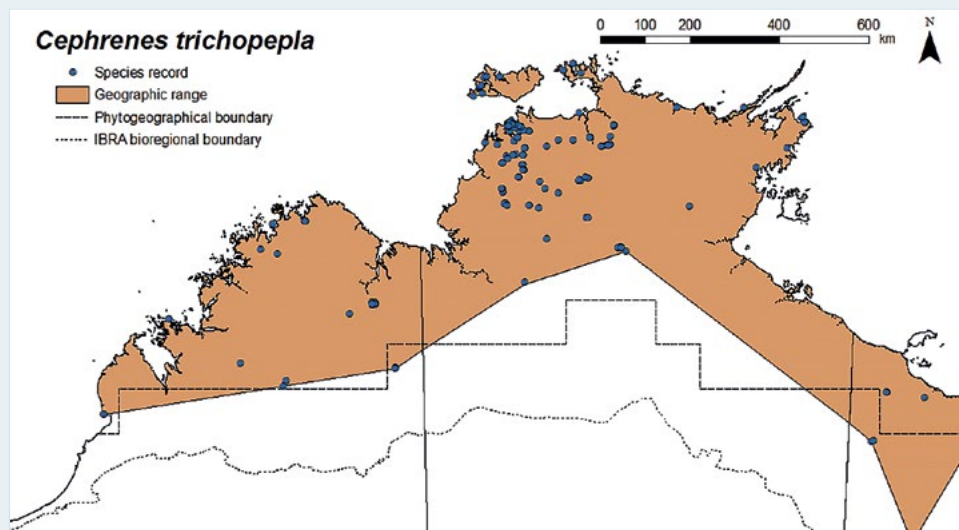
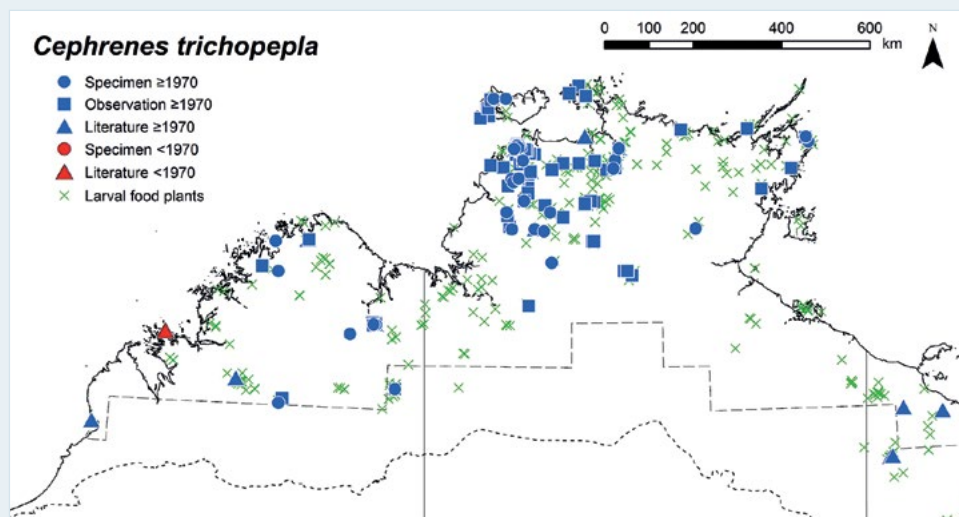
Adults occur throughout the year, but they are more abundant during the late wet season and early dry season (March–May). The immature stages have been recorded in all months, except January, with no evidence of diapause in any of the life history stages, suggesting the species breeds continuously throughout the year.

Breeding status

This species is resident in the study region.

Conservation status

LC.

[illegible]

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.