



# Australian Entomological Society

## AES Conservation Committee Species Nomination

### Taxonomy

**Scientific name:** *Petasida ephippigera* White, 1845 (Orthoptera: Pyrgomorphidae)

**Common name:** Leichhardt's grasshopper

### Description

**Adult.** Whole body bright orange with scattered spots and more prominent areas of blue/black, particularly on the pronotum and wing tips.

Head pointed; cheek below eye with two blue/black lines; head above with a longitudinal blue/black line; antennae long with alternating orange and blue/black markings. Thorax with a slight keel down the middle; wrinkled; blue/green in colour with a large patch of orange on each side in front and a small spot of the same colour on edge of the produced part at base. Elytra orange with numerous black spots and black at the tip. Lower wings pale orange at base, clouded with black at the tip. Abdomen orange, slightly ringed with blue/green. Legs orange with three blue/black spots on outer edge of hind femur (White 1845).

Colours vary slightly between individuals and geographically, but specimens are always bright. Adult length varies between 3–5 cm. Females are more robust and stocky in appearance compared to the more slender males.

**Nymphs.** Final instar nymphs resemble adults in general colouration; brightly coloured orange with blue/black markings but with scattered spots of yellow; lacking wings. Smaller nymphs are orange/brown with yellow spots and only some black/blue marking. Body length 3.5–4 cm

**Similar species:** None. *Petasida ephippigera* is the most spectacular and strikingly coloured grasshopper in Australia. Its closest relative, *Scutillya verrucosa*, the only other representative of the tribe Petasidini, occurs only in southwest Western Australia and is more subtle in colour pattern (a much more yellow tinge) and lacks blue markings on the pronotum.



Adult *Petasida ephippigera* on its primary food plant *Pityrodia jamesii* (photo: M.F. Braby).

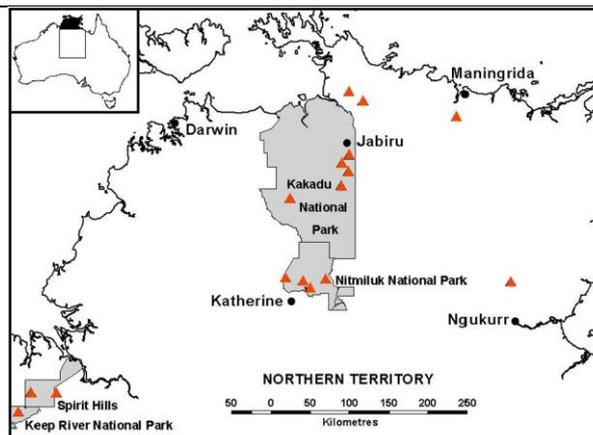


Nymph *Petasida ephippigera* on another food plant *Dampiera conospermoides* (photo: M.F. Braby).

## Distribution

**IBRA regions:** ARP (Arnhem Plateau), CEA (Central Arnhem), VIB (Victoria Bonaparte).

**Distribution:** Northern Territory—known locations include: (1) Keep River National Park (Lowe 1995, Wilson *et al.* 2003); (2) Victoria River region (Calaby and Key 1973); (3) Western Arnhem Land (Leichhardt 1847; Calaby and Key 1973), including Kakadu National Park (Calaby and Key 1973, Barrow 2009, Holbery 2011); (4) Central Arnhem Land (Calaby and Key 1973); (5) Katherine region including Nitmiluk National Park (Calaby and Key 1973, Wilson *et al.* 2003); (6) Gulf of Carpentaria, ca 80km north of Ngukurr (Wilson *et al.* 2003).



Distribution records of *Petasida ephippigera*. Modified from Wilson *et al.* 2003 and Barrow 2009.

**Extent of occurrence:** The current known range spans 600 km across the Northern Territory's 'Top End' and a latitudinal range of 450 km. The range extends from coastal areas to 300 km inland and all populations are associated with sandstone plateaux and escarpment country (Barrow 2009).

**Land tenure:** The distribution of *P. ephippigera* falls largely within National Parks (Kakadu, Nitmiluk and Keep River), as well as in Indigenous Protected Areas (Djelk). No sightings have been recorded in the Victoria River District since 1856 (Calaby and Key 1973), despite the opening up of the area to pastoralism, tourism and other uses and the establishment of Gregory National Park (Barrow 2009).

## Biology

*Petasida ephippigera* is a long-lived grasshopper species (adult life is over 113 days) that appears to have an annual life cycle. After repeated copulations females lay their eggs in the soil (Lowe 1995). Nymphs begin to emerge in the early dry season (early May), within a fortnight of the deaths of the last adults of the previous season. The nymphs are well camouflaged against the foliage of their typical food plant, *Pityrodia jamesii*. They are most commonly found on small *Pityrodia* plants or the lowest branches of larger plants. Nymphs grow slowly over the coming months until a rise in temperature around August prompts growth spurts, with the first adults appearing in November and most having reached maturity by December. Mating begins soon after the adults appear and continues until the last adults die, usually by April (Barrow 2009).

Dispersal abilities of *P. ephippigera* are poorly understood. Adults appear reluctant to take to flight when disturbed, though they have been observed flying for distances greater than 100 m. Males are more likely to travel than females, especially in the middle wet-season, where sightings have been recorded up to a kilometre away from the nearest known host plants. Females are rarely observed flying (Barrow 2009).

## Ecology

*Petasida ehippigera* generally feeds exclusively on foliage of *Pityrodia* (Lamiaceae), but only seven of the sixteen species of *Pityrodia* known in the Northern Territory have been recorded as hosts (*P. jamesii*, *P. lanceolata*, *P. lanuginosa*, *P. puberula*, *P. pungens*, *P. spenceri* and *P. ternifolia*; Barrow 2009). Preference for any one species of *Pityrodia* varies with location but is mostly a reflection of host species availability (Wilson *et al.* 2003). *Petasida ehippigera* occasionally feeds on other species of plants and it has been reared in captivity on *Prostanthera cuneata* (Lamiaceae) (Calaby and Key 1973). Adults have been observed on other genera of plants (e.g. *Dampiera* and *Goodenia*; Goodeniaceae), for example, nymphs have been recorded feeding on *Dampiera conospermoides* at Gubara, Kakadu NP (M.F. Braby, unpublished data), but such records often consist of solitary individuals or are in close proximity to *Pityrodia* plants (Key 1985, Wilson *et al.* 2003).

The bright colouration of adult *P. ehippigera* is strongly aposematic (Key 1985). Adults are highly conspicuous, often rest on top branches of their host plants, and are hardly deterred by oncoming observers. Yet no vertebrates are known to prey on them. If disturbed adults slowly relocate to opposing sides of the branch or simply drop to the ground (Barrow 2009). *Petasida ehippigera* is not known to be toxic, but likely derives a bitter-tasting chemical from its host plant (Rentz 1996, Fletcher *et al.* 2000). Mantids have been observed eating adult *P. ehippigera* without dismay (Barrow 2009), and other large predatory invertebrates, such as spiders, may do so too.

## Critical habitat

The dependence of *P. ehippigera* on its specific food plants renders the occurrence of *Pityrodia* species the most important limiting factor of the distribution of *P. ehippigera*. The biology and distribution of *Pityrodia* are poorly known, but its occurrence appears to be highly fragmented both at local and regional scales. *Pityrodia* species are confined to sandstone habitats, associated with large rocks and boulders. Local patch sizes are small, only 20–100 m, and become weaker in areas of open vegetation and with shallow, sandy soils. Its sandstone heath habitat suggests that *Pityrodia* is subject to fire regimes of intermediate frequency and some patchiness (Barrow 2009).

## Key threatening processes

**Evidence of decline:** *Petasida ehippigera* has not been recorded in the Victoria River District for over 160 years (Calaby and Key 1973) and is suspected to be extinct in that area. Several recent local extinctions of *P. ehippigera* are also reported; some known populations in Katherine Gorge and in Kakadu National Park (Koongarra Saddle and East Alligator River) have not been observed in the last 10–20 years despite targeted survey efforts (Lowe 1995, Barrow 2009).

**Threats:** Populations of *P. ehippigera* are highly fragmented with limited opportunities for genetic exchange. Changes to fire regimes from traditional Aboriginal to contemporary

burning methods (fires of greater frequency and intensity) coupled with higher fuel load (especially due to growing density of invasive gamba grass, *Andropogon gayanus*) are known to be detrimental to populations of grasshoppers (Barrow 2009). The impact of fire on *P. ephippigera* is both through direct mortality (especially of nymphs) and through decimation of their patchy host plants (Lowe 1995). Adults are more capable of fleeing fires (through flight) but are not always able to reach other suitable *Pityrodia* habitat. Buried in the soil, eggs are more likely to survive fire events and emerging nymphs can persist as long as their host plant has recovered (Lowe 1995). As such, fires pose the greatest threat to *P. ephippigera* if they occur between July, when all eggs have hatched, to December, before nymphs have reached adulthood. This period overlaps with the period of most burning under both contemporary and Aboriginal fire regimes (Barrow 2009).

### **Community engagement and conservation management**

**Community engagement:** Kakadu National Park (Parks Australia), and Nitmiluk and Keep River National Parks (Parks and Wildlife Commission of the Northern Territory Government).

**Conservation management and actions:** The primary recovery actions for *P. ephippigera* include: (1) field surveys to locate additional patches of *Pityrodia* that may support populations of *P. ephippigera* not yet known; (2) to create a pattern of low intensity early dry-season burning to reduce the frequency of late, intense, large fires, allow survival of nymphs and prevent decimation of whole *Pityrodia* patches; and (3) monitoring of extant populations to determine if populations are in decline.

### **Conservation status**

**International (IUCN Red List):** not listed.

**National (EPBC):** not listed.

**State:** Northern Territory: not listed.

### **Proposed conservation status evaluation**

We recommend that *P. ephippigera* be considered nationally as **Near Threatened** according to IUCN Red List Criteria. That is, the taxon does not qualify for Critically Endangered, Endangered or Vulnerable on available evidence, but it is likely to qualify for a threatened category if there is further decline in the EOO, extent and/or quality of its habitat or in the number of subpopulations or locations through inappropriate fire regimes.

### **Scientific and/or social value**

*Petasida ephippigera* is of great cultural significance to the Aboriginal people of the Kakadu and Katherine regions. This species is a sign of the changing seasons, as large nymphs become more noticeable in October when the 'build-up' begins and adults emerging with the first rains of the monsoon season. Kundjeyhmi speakers call them 'Alyurr'—children of the Namarrkon lightning man. Dreamtime stories dictate that during the 'build-up' the Alyurr summon their father, Namarrkon, who answers with lightning and rain. The lightning man is a powerful creation ancestor and is depicted in rock art throughout western Arnhem Land (Chaloupka 1993).

*Petasida ephippigera* is also a tourism icon because of its spectacular colouration. It regularly features on tourism flyers and campaigns and has appeared on two Australian postage stamps. It has a high profile as a flagship species for Kakadu and Nitmiluk National Parks and is a source of attraction to nature enthusiasts who can observe a few of the known accessible populations via guided tours (Barrow 2009).

Its vernacular name, Leichhardt's Grasshopper, was given for the explorer Ludwig Leichhardt, who documented large numbers of *P. ephippigera* on his travels through the Northern Territory in 1845. In his journals, dated 17 November 1845, he noted: "Whilst on this expedition, we observed a great number of grasshoppers of a bright brick colour dotted with blue: the posterior part of the corselet and the wings were blue; it was two inches long, and its antennae three quarters of an inch." (University of Sydney 2002).

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