PERUNGA GRASSHOPPER

PERUNGA OCHRACEA

ACTION PLAN

PREAMBLE

The Perunga Grasshopper (*Perunga ochracea,* Sjöstedt, 1921) was declared an endangered species on 19 May 1997 (Instrument No. DI1997-89 under the *Nature Conservation Act 1980*). Under section 101 of the *Nature Conservation Act 2014*, the Conservator of Flora and Fauna is responsible for preparing a draft action plan for listed species. The first action plan for this species was prepared in 1999 (ACT Government 1999a). This revised edition supersedes the earlier edition. This action plan includes the ACT Native Grassland Conservation Strategy set out in schedule 1 to the 'Nature Conservation (Native Grassland) Action Plans 2017', to the extent it is relevant.

Measures proposed in this action plan complement those proposed in the action plans for Natural Temperate Grassland, Yellow Box/Red Gum Grassy Woodland, and component threatened species such as the Striped Legless Lizard (*Delma impar*), Grassland Earless Dragon (*Tympanocryptis pinguicolla*) and the Golden Sun Moth (*Synemon plana*).

CONSERVATION STATUS

Perunga ochracea is recognised as a threatened species in the following sources:

Australian Capital Territory

Vulnerable – Section 91 of the Nature Conservation Act 2014.

Special Protection Status Species - Section 109 of the *Nature Conservation Act 2014.*

CONSERVATION OBJECTIVES

The overall conservation objective of this plan is to maintain in the long term, viable, wild populations of *P. ochracea* as a component of the indigenous biological resources of the ACT and as a contribution to regional and national conservation of the species. This includes the need to maintain natural evolutionary processes.

Specific objectives of the action plan are to:

- Protect sites where the species is known to occur in the ACT from unintended impacts.
- Manage the species and its habitat to maintain the potential for evolutionary development in the wild.
- Enhance the long-term viability of populations through management of adjacent grassland to increase habitat area and connect populations.

SPECIES DESCRIPTION AND ECOLOGY

DESCRIPTION

The Perunga Grasshopper (*Perunga ochracea*) is the only described species in the genus *Perunga* (Orthoptera: Acrididae: Catantopinae – Spur-throated Grasshopppers), although the Australian National Insect Collection (ANIC) has specimens of an undescribed species (designated as *Perunga* sp. 1) known only from South Australia. *Perunga* belongs to the subtribe Apotropina of the tribe Catantopini (Rentz 1996). Members of the subtribe are characterised principally by the stout femur of the hind leg and the presence of an auditory tympanum on the anterior abdomen under the wings. In males, there is a furcula (a forked structure) near the tip of the abdomen.

Both sexes of *P. ochracea* are short-winged and flightless. The species is distinctive in having the pronotum (the dorsal surface of the first thoracic segment) wrinkled and slightly extended caudally.

There is a whitish dorsal streak extending from the keeled pronotum to the tip of the abdomen, and also a broad pale 'X' on the pronotum,

which is the most useful field identification characteristic. The wings are shorter than the length of the pronotum and have many raised longitudinal veins. Adult females range in length from 26–35 mm and adult males from 15–20 mm. Females bear very short, stout cerci (the pair of appendages at the apex of the abdomen) and the dorsal ovipositor valves are strongly recurved. Males possess simple, elongate cerci, each with a blunt, rounded tip which is slightly deflexed (illustrated in Rentz *et al.* 2003). The dorsal background colour of adults is variable, and may be tan, grey-brown, or dull or bright green. The proportions of each colour morph can vary from year to year with a tendency toward grey-brown in dry years and greenish in wet years (R.C. Lewis pers. comm. in ACT Government 1999a). The ventral surface of the body is yellow and the upper surface of the tarsi is usually bluish. A colour photograph is found in Rentz (1996), and Rentz *et al.* (2003) has photographs showing nymphs (instars 1 to 5) and diagnostic features of adults.

DISTRIBUTION

Perunga ochracea was first described from a collection from Wagga Wagga in NSW. The ANIC contains ACT collections from 1941 onwards, but the early collections have poor location data. The early (pre-1970) NSW collections are from Uranquinty near Wagga Wagga, Boorowa and nearby Galong, and in areas adjacent to the ACT, including Jeir, Murrumbateman, north-west of Hall, and Queanbeyan.

More recent NSW records are from Gundaroo, Queanbeyan and Bungendore (ANIC, ACT Government records). In the ACT, most records are from the northern lowland valleys, from the ACT border in the north to Tuggeranong in the south.

The southernmost ACT record is from the edge of Naas Road north of the junction of the Gudgenby and Naas rivers (R.C. Lewis pers. comm. in ACT Government 1999a). Some collection sites have since been developed for housing (Reid, Calwell, Gordon, O'Malley, Weetangera, and Mt Jerrabomberra in NSW).

Invertebrate surveys and opportunistic sightings during routine monitoring of other species from 1997 onwards have shown that *P. ochracea* occurs at apparently low densities at a number of ACT sites, mainly in native-dominated grasslands. This includes Mulanggari, Gungaderra, Crace, Mulligans Flat and Gooroyarroo nature reserves in Gungahlin, several sites in the Majura Valley, Jerrabomberra West Nature Reserve and other sites in the Jerrabomberra Valley, on Lawson Grasslands (Commonwealth land, formerly known as the Belconnen Naval Transmission Station), Lower Molonglo Nature Reserve, Red Hill Nature Reserve, and in the Murrumbidgee River Corridor in Tuggeranong.

Perunga ochracea appears to have a small range stretching 180 km east–west and 150 km north–south. However, the area of occupancy within much of this range is likely to be low because of the reduction in size or extinction of populations through habitat alteration and fragmentation. *Perunga ochracea* usually occurs at low densities and is mostly restricted to larger areas of remnant habitat. No population studies have been undertaken for *P. ochracea*, and so it is not possible to estimate population sizes.

The most up to date distribution data for this species is publicly available on the ACT Government's mapping portal (Visit the ACTmapi website).

HABITAT AND ECOLOGY

In the ACT, *P. ochracea* has been found in Natural Temperate Grassland dominated by Wallaby Grasses (*Rytidosperma* spp.), Speargrasses (*Austrostipa* spp.) or Kangaroo Grass (*Themeda triandra*), and in other native grasslands (Stephens 1998, ACT Government records).

The species sometimes occurs in open woodland areas with a grassy understorey, including the endangered Yellow Box/Red Gum Grassy Woodland community, as suggested by earlier collections from the Black Mountain and Mt Majura areas, and more recent records from woodland at Red Hill Nature Reserve and Queanbeyan Nature Reserve West (ACT Government records).

Field observations suggest that *P. ochracea* uses grass tussocks as shelter spaces, and Farrow (2012) described occupied habitat at two sites as containing vegetation mosaics with tall tussock grasses, shorter grasses and forbs, and bare ground. The species has been recorded in heavily grazed habitats, where the availability of dense grass tussocks was low (Stephens 1998,

ACT Government records). Stephens (1998) reported that in these instances the animals were found in or near grass tussocks, suggesting the need for these tussocks in the habitat.

Perunga ochracea is a cryptic grasshopper which is difficult to see unless first disturbed. When disturbed, the adult appears to actively seek shelter, jumping once or twice before burying itself into a grass tussock. It is a powerful jumper, covering distances of a metre or more. Nymphs hatch in late summer and autumn, and develop over the winter and early spring (Rentz 1996), with a first instar nymph recorded in late January (Stephens 1998). This life cycle is unusual compared with most other ACT grasshopper species which overwinter as eggs rather than nymphs. Adults of *P. ochracea* have been collected from late October to mid-February (ANIC specimens), and the life cycle is a single year. There are many more collections and records of adults than nymphs, which may mean that nymphs are more difficult to detect and identify.

Perunga ochracea is usually recorded as individuals or in low numbers (Stephens 1998, Farrow 2012, ACT Government records). This is the case for casual observations and targeted searches, and also for animals caught in pitfall traps, suggesting that *P. ochracea* is mostly sparsely distributed rather than just being difficult to detect. Population densities nevertheless vary among years and between sites (Farrow 2012, Rowell 2015).

There is little information on the diet of *P. ochracea*. It has been suggested the species has a dietary relationship with *Chrysocephalum* spp. (Rentz 1996), largely due to collection of the grasshopper at sites containing these forb species, particularly Common Everlasting Daisy (*Chrysocephalum apiculatum*). This plant occurs in native grasslands of varying quality and in open Box–Gum Woodland. Dietary analysis undertaken by Stephens (1998) of grasshoppers from ACT grasslands found that three more abundant grasshopper species in the same subfamily as *P. ochracea* (Catantopinae) showed a mixed forb-grass diet with a preference for forbs, while the six most abundant species in two other subfamilies collected (Acridinae, Oxyinae) showed a preference for a mixed forb-grass diet with grasses preferred over forbs.

Only six individuals of *P. ochracea* could be examined, and all had consumed forbs other than *C. apiculatum,* despite this forb being present at the collection sites. *Perunga* sp. 1, from South Australia, has been recorded eating the flowers and leaves of several species of forbs, and in feeding trials it fed on the petals and flowers of Capeweed (*Arctotheca calendula*), Wild Geranium (*Erodium* spp.) and Common Everlasting (P. Birks pers. comm. in ACT Government 1999a).

Although no work has been done to identify predators of *P. ochracea*, parasitic wasps *Scelio* spp. in south-eastern Australia have been shown to regulate some populations of other acridid grasshoppers (Baker *et al.* 1996). Vertebrate predators such as birds may reduce population numbers, as shown in studies of grasshopper assemblages (e.g. Belovsky and Slade 1993). Wolf Spiders (*Lycosa godeffroyi*), which are abundant in ACT grasslands, often eat other large grasshopper species (A. Rowell, pers. obs.).

PREVIOUS AND CURRENT MANAGEMENT

The management history of sites containing *P. ochracea* varies. Most sites were not grazed by stock when the species was first recorded, but many have subsequently had a history of grazing which has often been light or intermittent, and most sites have not been pasture improved. Most *P. ochracea* sites are not now grazed by stock, and grass biomass reduction is mostly by kangaroo grazing of varying intensity, or occasional slashing on a few sites. Two of three records of *P. ochracea* at Gungaderra Nature Reserve were made in the slashed fire break around the edges of an otherwise moderately dense and weedy grassland (ACT Government records), and Farrow (2012) did not find *P. ochracea* at a number of known sites when grass growth was very dense.

THREATS

Perunga ochracea is a grassland specialist, being found only in areas of native grassland or grassy woodland. Loss or degradation of habitat is the major threat to *P. ochracea*. About 99% of Natural Temperate Grassland (a nationally critically endangered ecological community, *EPBC Act 1999*) in Australia has been destroyed or drastically altered since European settlement

(Kirkpatrick *et al.* 1995). About 5% or 1000 hectares of the original area of Natural Temperate Grassland in the ACT still exists in moderate to good condition (ACT Government 1997; 2005) and it is possible that as little as 3-4% of the original area of Yellow Box/Red Gum Grassy Woodland community in the ACT may remain in a relatively natural state (ACT Government 1999b). These native grasslands continue to be in demand for urban, industrial and infrastructure development as well as being vulnerable to alteration by weed invasion and agricultural practices.

Fragmentation and isolation of the remaining areas has resulted from the loss of extensive, contiguous areas of habitat. *Perunga ochracea* appears to occur in only some of the larger remnants of these grassland communities. Movement between habitat fragments or recolonisation after local extinctions is likely to be limited because adults of *P. ochracea* are flightless.This relative immobility also restricts gene flow between populations. Where the sex of *P. ochracea* was recorded in the ACT Government Wildlife Atlas, about 60% of the animals were females; about 60% of the ANIC collections were also females. Stephens (1998) noted that *P. ochracea* is often found as single animals, and that parthenogenesis is known to occur in some species of grasshoppers when they are at low densities and females are unable to find mates. Eggs and nymphs produced by parthenogenesis have high mortality. If parthenogenesis does occur in *P. ochracea*, this could cause problems if populations are fragmented and density is naturally low.

The invasion of native grasslands by exotic plant species changes the floristic composition of the grasslands. The effect of weed invasion on the habitat and food plants of *P. ochracea* has not been investigated, but is likely to be detrimental given the apparent preference of *P. ochraea* for grasslands composed of native plant species.

Optimal habitat requirements of *P. ochracea* are not known, but management that reduces grassland structure/patchiness or the amount of native forb cover is likely to be deleterious. The effect that predators may have in reducing population numbers is unknown, but a large slow-moving flightless grasshopper is likely to be more vulnerable to predation on overgrazed sites, where ground cover is low. The effect of fire on *P. ochracea* is also not known, but large scale autumn/winter burning may endanger nymphs.

CHANGING CLIMATE

Climate change has the potential to affect *P. ochracea* at various life stages. Warmer year-round temperatures are predicted for south-eastern Australia by the end of the century, with fewer frosts, more hot days and warm spells, and declining rainfall (especially in winter). As an autumn-hatching grassland species, the nymphs of *P. ochracea* are adapted to low winter temperatures, and the adults mate and lay eggs before the hotter summer weather. A meta-analysis of studies that measured the ability of animals to deal with extremes of heat and cold found that terrestrial ectotherms such as lizards and insects have a limited ability to physiologically acclimate to higher temperatures, and species that are close to their heat tolerance limit will be most at risk from climate change (Gunderson and Stillman 2015). The limited mobility of *P. ochracea* also makes it less able to adapt by moving to accommodate habitat change. Maintaining high quality habitat might facilitate resilience of *P. ochracea* to changing rainfall and temperature regimes.

CONSERVATION ISSUES AND INTENDED MANAGEMENT ACTIONS

PROTECTION

The long-term conservation of *P. ochracea* depends on protecting its native grassland and grassy woodland habitat. The difficulty in surveying for *P. ochracea* means little information exists on population sizes at sites, and hence conservation priority for sites. However, as for most species, larger areas of habitat are more likely to contain larger populations, and due to genetic and other considerations, larger populations are more likely to be viable in the long term. All sites where *P. ochracea* is known to occur should be protected from unintended impacts, with formal protection given to (the generally larger) areas of native grassland habitat that are likely to remain viable and functional in the longer term. The protection of Natural Temperate Grassland and Yellow Box/Red Gum Grassy Woodland (both declared as endangered ecological

communities) and the protection of native grassland as habitat for other threatened species allows for significant and complementary conservation actions for *P. ochracea*.

The known *P. ochracea* populations in the ACT occur on Territory land (including nature reserve, urban open space and leasehold rural land) and Commonwealth land controlled and managed by the Department of Defence. The ACT Government will liaise with the Department of Defence to encourage continued protection and management of *P. ochracea* habitat on their land.

ENVIRONMENTAL OFFSET REQUIREMENTS

Environmental offset requirements for species and ecological communities in the ACT are outlined in the ACT Environmental Offsets Policy and associated documents such as the ACT Environmental Offsets Assessment Methodology and the Significant Species Database. In the Assessment Methodology and Database, some of the threatened species have special offset requirements to ensure appropriate protection. *Perunga ochracea* does not have any special offset requirements. *Perunga ochracea* is a species identified for ecosystem credits through its association with the Natural Temperate Grassland endangered ecological community.

SURVEY, MONITORING AND RESEARCH

The few surveys designed to search specifically for *P. ochracea* have not found large numbers even at known sites (Stephens 1998; ERM 2007; Farrow 2012). Most records are observations of single individuals and around half of the sites where *P. ochracea* has been recorded are from an observation of a single individual. The most frequent sightings have been at Canberra Airport where *P. ochracea* was recorded in five different years, all during monitoring and mapping of other threatened species and the grassland community. Most *P. ochracea* records in the ACT Government Wildlife Atlas are incidental observations made during vegetation and reptile surveys in native grassland, and there are often several years between sightings despite other surveys being undertaken at the same sites.

Perunga ochracea is small and cryptic and has proven difficult to survey. Stephens (1998) found *P. ochracea* was difficult to collect by standard sweep-netting methods, and recommended timed direct searching (flush counting) in spring and summer as the most effective method, albeit time consuming. Timed

Perunga Grasshopper (E. Cook)

direct searching involves flushing grasshoppers by slowly walking through a pre-determined survey area for a fixed time and stopping often to search grass tussocks. *Perunga ochracea* has been opportunistically detected in standard quadrats (20 x 20 m or 20 x 50 m) used for vegetation surveys (AECOM 2011; ERM 2011; Rowell 2015), suggesting survey for *P. ochracea* could be combined with vegetation surveys.

The results of past direct searches indicate that ten such quadrats might be necessary to detect a sparse *P. ochracea* population, while a dense population might be detected with one or two quadrats, and hence it might be possible to detect large changes in *P. ochracea* density at a site with a low number of quadrats. Farrow (2012) searched for *P. ochracea* in favourable habitat at known sites in December for one hour in a random way and concluded that using habitat as a surrogate for determining the distribution of the species was more practical than extensive direct searches.

Direct survey for *P. ochracea* might be worthwhile as part of assessing the effect of grassland management (controlled burning, wildfires, firebreak slashing, extensive weed control or stock grazing), particularly if undertaken as part of an experimental design (treatment and control quadrats) which should also provide a better understanding of the habitat requirements of the species.

Because surveys aimed solely at finding additional populations appear to be impractical (Farrow 2012), discovery of new populations is likely to be through surveys for other plant and animal species or from opportunistic observations from naturalists and other interested persons. Determining and monitoring population sizes of *P. ochracea* at known sites is likely to face similar challenges to survey for the species. Monitoring the vegetation structure, condition and floristic composition of larger remnants of native-dominated grasslands and grassy woodlands as part of broader condition monitoring of these communities will assist in detecting habitat changes (such as weed invasion) at the key sites where *P. ochracea* occurs.

There have been relatively few records of *P. ochracea* in the ACT region and hence little is known about distribution and abundance of the species within sites, or its ecology and biology.

Priority areas for research to assist conservation of the species include:

- improved knowledge of distribution and abundance
- micro-habitat requirements
- diet
- dispersal abilities
- soil requirements for oviposition site selection
- effects of various grassland management practices, particularly grazing
- possible competition with other forb-feeding grasshoppers, particularly those which are known to have high population numbers, e.g. *Phaulacridium vittatum*
- the effect of predators on *P. ochracea* populations
- nymphal survival requirements.

The management history of sites containing *P. ochracea* varies. Most sites were not grazed by stock when the species was first recorded, but many have subsequently had a history of grazing which has often been light or intermittent, and most sites have not been pasture improved. Most *P. ochracea* sites are not now grazed by stock, and grass biomass reduction is mostly by kangaroo grazing of varying intensity, or occasional slashing on a few sites. Two of three records of *P. ochracea* at Gungaderra Nature Reserve were made in the slashed fire break around the edges of an otherwise moderately dense and weedy grassland (ACT Government records). Farrow (2012) did not find *P. ochracea* at a number of known sites when grass growth was very dense.

MANAGEMENT

Perunga ochracea is known to be a specialist of native grasslands, though detailed habitat requirements are not well understood. Recorded sightings of *P. ochracea* suggest a preference for shorter grass and avoidance of tall, dense swards, though sightings might be biased if the species is more visible in shorter grass. The use of forb species as food plants suggests the need for openings (inter-tussock spaces) in the grassland for these forb species to grow.

In addition, many grasshopper species require open areas in which to bask and for females to lay their eggs (Urarov 1977). Fire can be important in creating gaps in Kangaroo Grass (*Themeda triandra*) grasslands, allowing the establishment of a number of forb species (Morgan 1998), which may be *P. ochracea* food plants. However, the effect of fire on adults and overwintering nymphs needs to be determined if extensive burning is to be used to manage grasslands in which they occur. The effect of grass slashing on *P. ochracea* (through direct mortality) is not known, though the species has persisted on Canberra Airport which is regularly slashed. Grass biomass/structure management by grazing (native or introduced herbivores) is likely to cause the least impact to the species from direct mortality.

Dennis *et al.* (1998) found that arthropod diversity and abundance in grazed grasslands was positively associated with floristic diversity and structural heterogeneity, and declined with grazing intensity, and that the reduction of arthropods with increased grazing intensity was buffered in grasslands with substantial patches of tussock.

Recent analysis of kangaroo density and vegetation condition at many ACT grassy sites showed increased floristic diversity in moderately grazed grasslands due to the reduction in biomass of more competitive plant species (Armstrong 2013).

Higher abundance and diversity of grassland beetles have been found to be associated with low to moderate kangaroo densities (Barton *et al.* 2011), and maintaining a mix of moderate and high grass height within reserves has been recommended for the conservation of reptile diversity (Howland *et al.* 2014). While the relationship between kangaroo grazing and the quality of *P. ochracea* habitat has not been determined, the apparent need of *P. ochracea* for structural variety suggests that low to moderate kangaroo grazing may also favour the species.

Results from a grassland enhancement trial at Canberra International Airport suggest that a sparse *P. ochracea* population can respond strongly to improved conditions. The trial area initially contained native-dominated grassland with few native forbs. Eight 20 x 20 m quadrats (0.32 ha) were monitored in spring 2011 before the trial began, and again in 2012 and 2013 after the vegetation treatments.

Half the quadrats were treated, which involved machine removal of impacted thatch, cutting and removing slashed material several times over two years, and planting of native forbs. The results of the treatment were a sharp but temporary increase in bare ground and *Chrysocephalum apiculatum* cover, a sustained decrease in litter, and higher native forb cover after two years. No *P. ochracea* were seen in any of the quadrats in spring 2011 or 2012, but in 2013, 29 *P. ochracea* were recorded in the treated quadrats and five in the controls which were adjacent to them. The increase in *P. ochracea* numbers was found to be confined to the treated area and adjacent control plots by monitoring eight more distant quadrats on untreated parts of the airport. No *P. ochracea* were found in these distant untreated areas in 2013, despite being occasionally recorded there in previous years. The vegetation changes associated with the trial apparently created preferred habitat for *P. ochracea*, possibly by increasing food availability and/or creating more favourable egg-laying sites.

The trial also showed that the effects of habitat changes on *P. ochracea* may need to be monitored over at least three seasons (Rowell 2015).

Until detailed habitat requirements of *P. ochracea* are known, management should aim to maintain native grassland habitat in good condition (such as controlling weeds) with inter-tussock spaces to promote native forb growth. Managing for a heterogeneous sward (patchy mosaic of short, moderate and long grass) within sites is likely to be an appropriate goal for native grasslands where a range of grassland fauna occur, including *P. ochracea*.

IMPLEMENTATION

Implementation of this action plan and the ACT Native Grassland Conservation Strategy will require:

- Land planning and land management areas of the ACT Government to take into account the conservation of threatened species.
- Allocation of adequate resources to undertake the actions specified in the strategy and action plans.

- Liaison with other jurisdictions (particularly NSW) and other land holders (Commonwealth Government and Canberra Airport) with responsibility for the conservation of a threatened species or community.
- Collaboration with universities, CSIRO, Australian National Botanic Gardens, and other research institutions to facilitate and undertake required research.
- Collaboration with non-government organisations, such as Greening Australia, to undertake on-ground actions.
- Engagement with the community, where relevant, to assist with monitoring and other on-ground actions, and to help raise community awareness of conservation issues.

OBJECTIVES, ACTIONS AND INDICATORS

Table 1 Objectives, Actions and Indicators

Objective	Action	Indicator
1. Protect native grassland sites where the species occurs from unintended impacts (unintended impacts are those not already considered through an environmental assessment or other statutory process).	Ensure native grassland sites on Territory-owned land where the species occurs are protected from unintended impacts. Encourage other jurisdictions to protect sites where the species occurs on their lands from unintended impacts.	All native grassland habitat is protected from unintended impacts by appropriate measures.
	Maintain a database of sightings of the species, and if available, record habitat information.	Records of sightings are maintained and used to determine the distribution of the species in the ACT.
	Identify other sites where the species occurs by maintaining alertness to the possible presence of the species while conducting vegetation surveys in suitable habitat.	Vegetation surveys in suitable habitat also aim to detect the species.
2. Manage the species and its habitat to maintain the potential for evolutionary development in the wild.	Monitor the effects of management actions at a representative set of sites where the species is known to occur.	Management actions are recorded.
	Manage habitat to maintain its suitablilty for the species, including implementing an appropriate grazing / slashing / burning regime (recognising current imperfect knowledge).	Habitat is managed appropriately (indicated by maintenance of an appropriate sward structure and herbage mass). Potential threats (e.g. weeds) are avoided or managed.

Objective	Action	Indicator
3. Enhance the long-term viability of populations through management of adjacent grassland to increase habitat area and connect populations.	Manage grassland adjacent to the species' habitat to increase habitat area or habitat connectivity.	Grassland adjacent to or linking habitat is managed to improve suitability for the species (indicated by an appropriate sward structure and plant species composition).
4. Improved understanding of the species' ecology, habitat and threats.	Undertake or facilitate research on habitat requirements, techniques to manage habitat, and aspects of ecology directly relevant to conservation of the species.	Research undertaken and reported and where appropriate applied to the conservation management of the species.
5. Promote a greater awareness of, and strengthen stakeholder and community engagement in, the conservation of the species.	Undertake or facilitate stakeholder and community engagement and awareness activities.	Engagement and awareness activities undertaken and reported.

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COMMUNICATIONS

Mr P.R. Birks undertook feeding trials on the only other species in the genus, the South Australian *Perunga* sp 1.

Mr R.C. Lewis surveyed grasshoppers in the ACT from 1974-1980.

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