REPORT ON PILBARA RARE SUN-MOTH SURVEY – SEPTEMBER 2011

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Introduction:

As part of work being undertaken by Dr Matthew Williams and myself on the genetic relationships of Western Australia's diverse Castniidae (Sun-moth) fauna, a survey was undertaken in September 2011 to try and obtain fresh specimens of some little-known species which occur in the Pilbara and Gascoyne region of WA.

On this survey, the main target species was the rare cryptic sun-moth, *Synemon brontias*. The original type specimens, held in the British Museum of Natural History, were collected "*on the plain*" near Carnarvon on 26th October 1886. One other old specimen, also in the British Museum of Natural History, has a locality label "Sherlock River" but lacks any further information.

Since then one specimen, which possibly belongs to this species, was obtained by Tony Tomlinson at Cape Range National Park in October 1994. Tony Tomlinson has not seen the sun-moth at Cape Range again. The most recent WA record of *Synemon brontias* is from Juna Downs Station in the Pilbara, where a single specimen was caught in a Malaise Trap set for a period of five consecutive days between 23rd and 28th September 2005.

Strategy:

Two sun-moth species are known to occur in the Pilbara and Gascoyne areas of Western Australia, *Synemon brontias* and *Synemon austera*. Two other autumn-flying species, *Synemon* sp. nov. *"Roper River"* and *Synemon wulwulam* have been recorded further north in the Kimberley. The known larval food-plant for *Synemon austera* and *Synemon* sp. nov. *"Roper River"* is the deep-rooted rhizome ribbon grass *Chrysopogon fallax*. This grass is also a likely larval food-plant for *S. brontias*. (E.D. Edwards, CSIRO, *pers. comm.*). Searches for *S. brontias* were therefore focused on areas where this grass was known to occur in the Pilbara and Gascoyne regions. Using location data from DEC's "*Florabase*", sites were selected along a route from Meekatharra to Newman, Juna Downs Station, Karijini National Park, Tom Price, Nanutarra, Minilya River and Carnarvon. Plans to visit Gascoyne Junction and Murchison Roadhouse were thwarted due to unfavourable overcast conditions at the time. The timing of our visit to Juna Downs Station and Karijini National Park (23rd to 25th September 2011) coincided exactly with the time that the most recent *S. brontias* specimen was captured at Juna Downs Station in September 2005.

Survey Results:

21st September 2011: Wanneroo to Meekatharra.

Searches for *Chrysopogon fallax* grass near Meekatharra were unsuccessful, and no sun-moths were seen.

22nd September 2011: Meekatharra to Newman.
Populations of native ribbon grass *Chrysopogon fallax* were located with other grasses along two shallow dry watercourses near the town of Newman. However, searches for sun-moths in these locations were unsuccessful.

23rd September 2011: Newman to Juna Downs Station - Karijini National Park.
At Juna Downs Station the exact site where the 2005 *S. brontias* specimen had been collected was located. (Part of the original Malaise Trap framework was still standing). The site was an alluvial plain alongside a shallow creek line with Mulga woodland over open grasses including very sparse dry *Chrysopogon fallax*. The area was somewhat degraded having been grazed by cattle. At 11:05 hours an adult *S. brontias* was observed flying close to the ground in a very open area with sparse small tussocks of dry *Chrysopogon fallax* (22° 52' 29.0" S. 118° 31' 52.9"E.). This was the only observation despite continued searching in the surrounding area for several hours. In the late afternoon drove to the Karijini National Park HQ; overnight accommodation at Cunningham House.

24th September 2011: Juna Downs Station and Karijini National Park.
Early morning returned to Juna Downs Station to search for adult *S. brontias*. No sun-moths were seen at the original site or in other floodway areas where *Chrysopogon fallax* was present. Returned to Karijini National Park in the afternoon where three suitable-looking sites were located with *Chrysopogon fallax* growing on red loam soil along floodways and shallow seasonal drainage lines.

25th September 2011: Karijini National Park.
Searched *Chrysopogon fallax* sites in Karijini National Park for adult sun-moths but none were observed. *Chrysopogon fallax* grass tussocks were then excavated and examined for signs of *S. brontias* larvae or pupae. At one site, 2 km south of the Karijini National Park HQ, (22° 35' 52.7" S. 118° 27' 02.8" E.) numerous sun-moth larvae at different stages of development were found within in the grass's deep-rooted rhizomes. The larvae were collected along with the food-plant and transported alive back to Perth. Photographs were taken of the general habitat with *Chrysopogon fallax* food-plants, and a larva within the grass root rhizomes. (Figs 1-2). Interestingly meat ants *Iridomyrmex purpureus* were abundant at this site.

26th September 2011: Karijini to Tom Price, Nanutarra and Carnarvon.
A really excellent *Chrysopogon fallax* site was located on the road between Tom Price and Nanutarra. However no adult sun-moths were seen or larvae found in *Chrysopogon fallax* root rhizomes excavated at this site.

27th September 2011: Carnarvon.
The plain south of Carnarvon was investigated for *Chrysopogon fallax* or other native grasses which might be suitable *S. brontias* larval food-plants. None were located. The site north-east of Carnarvon where *Synemon austera* was located in October 2010 was also visited. This sun-moth was not seen flying in September 2011.

28th September 2011: Carnarvon to Geraldton.
En route from Carnarvon to Geraldton, *Synemon catocaloides* was recorded in *Ecdeiocolea monostachya* sedgeland ca 100 km north of Northampton (27° 28' 18.3" S. 114° 42' 23.9" E). This is probably the northernmost population of this south-west

sun-moth species. Searches for other sun-moths at Howatharra Nature Reserve near Geraldton were unsuccessful.

29th September 2011: Geraldton to Mullewa, Wubin and Perth.
No sun-moths were seen between Geraldton and Perth.

Discussion:

The fact that only one adult *S. brontias* was seen flying at the inland Juna Downs site on 23rd September 2011, suggests that both this and the 2005 specimen were late-flying individuals. At Juna Downs the peak flying time for *S. brontias* may well be late August or early September. This conclusion is supported by the fact that larvae but no pupae were located at nearby Karijini National Park. Had this visit been early rather than late in the flying season, then one might have expected to find pupae as well as larvae in the grass rootstocks. The fact that larvae of differing sizes were present in the grass root rhizomes indicates that immature stages may take several years to develop depending on local weather conditions.

The *S. brontias* habitat at Juna Downs Station is very similar to the habitat where larvae were found at Karijini National Park. Both sites were adjacent to open Mulga woodland along shallow seasonal floodways, with scattered tussocks of *Chrysopogon fallax* surrounded by open areas of red loamy soil (Fig 1). This combination of widely scattered tussock grass with open flight areas for the adults may be important for the sun-moth.

Suitable-looking populations of *Chrysopogon fallax* were also located at a number of other sites. These included areas on Juna Downs Station, and floodways on Banjima Road in Karijini National Park. A really excellent-looking site (Fig 3) was also located on the Nanutarra – Munjina Road (22° 26' 04.6" S. 115° 57' 17.6" E.) about 49 km east of the North West Coastal Highway intersection. A number of *Chrysopogon fallax* localities recorded on the DEC "*Florabase*" could not be accessed due to road closures by various Pilbara mining companies.

Ongoing Research:
Small and mid-sized larvae collected at Karijini National Park have been preserved in KAA solution. They are available for morphological study and genetic analysis. The analysis of these specimens is given a high priority to a) confirm that they are indeed sun-moths, and b) to establish whether the species differs from *Synemon austera* which we obtained from Carnarvon in October 2010. (The presumption of course is that the larvae from Karijini are indeed *Synemon brontias*).

The larger mature larvae have been kept alive within their *Chrysopogon fallax* grass root rhizomes. They will be monitored to see if they can be reared to adults in captivity.

Voucher *Chrysopogon fallax* specimens have also been collected and pressed for the WA Herbarium Collection, and additional photographs are available for "*Florabase*".

Further Pilbara field work:
Funds will be required for future sun-moth fieldwork in the Pilbara.

Figure 1: Karijini National Park - Mulga woodland over scattered dry *Chrysopogon fallax* grass tussocks. Sun-moth larvae were located here in the deep-rooted grass rhizomes. Note the open flight areas between the grass tussocks.

Figure 2: A large sun-moth larva located within the root rhizomes of *Chrysopogon fallax*.

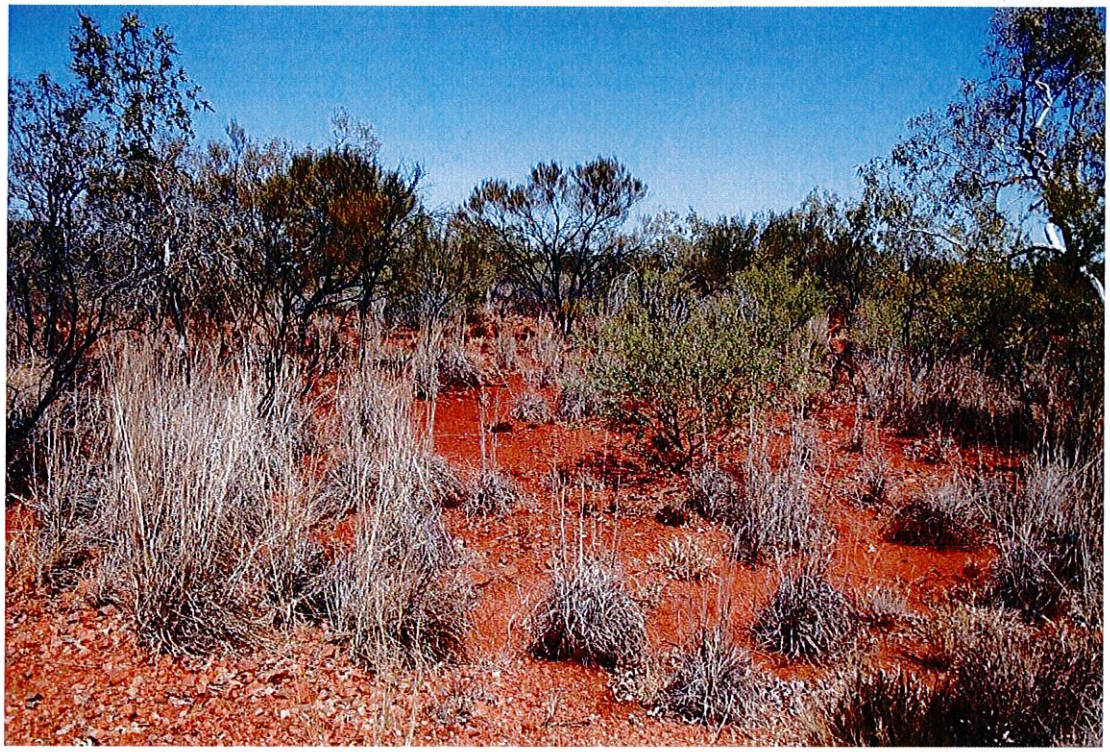

Figure 3: Suitable looking dry *Chrysopogon fallax* grass tussock growing alongside the Nanutarra – Munjina Road about 49 km east of the North West Coastal Highway intersection.

Figure 4: Typical ribbon grass *Chrysopogon fallax* still green due to under-surface moisture.