D. Murdoch.

WESTERN AUSTRALIAN NATIVE ORCHID STUDY & CONSERVATION GROUP (Inc)

SURVEY OF THE PTEROSTYLIS RUFA COMPLEX (ORCHIDACEAE) IN THE EASTERN WHEATBELT AND GOLDFIELD AREAS, SOUTH WEST LAND DIVISION OF WESTERN AUSTRALIA, OCTOBER 1993.

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MARCH 1995

Edited by: David L. Jones & Andrew P. Brown

ACKNOWLEDGMENTS

We particularly thank The Gordon Reid Foundation and The Australian Orchid Foundation for their respective grants of $3000.00 (a total of $6000.00), without which the expedition would not have been possible.

Additional funding was received from the research budget of David Jones, Research Scientist, Australian National Botanic Gardens. We thank both David and the National Botanic Gardens for this.

Thanks must also go to the Western Australian Department of Conservation and Land Management[1] for allowing us to hire (at cost) one of their fully equipped four wheel drive survey vehicles, saving a considerable amount of money. Also, the availability of radio communications in this vehicle allowed us to confidently travel to remote and seldom visited areas.

Botanical advice of a very high standard was provided by Andrew Brown and David Jones. Andrew Brown was able to identify the majority of the orchid taxa located during the expedition, and David Jones provided specialist advice regarding *Diuris* and *Pterostylis* (particularly for the *rufa* group).

Details of the taxonomy and distribution of the currently named taxa within the *rufa* group found in Western Australia, which appear in Appendix 4, were provided by David Jones and Mark Clements. The associated illustrations were drawn by David Jones. Many thanks to David and Mark for allowing this material to be published with this report.

We would also like to thank Hazel and John King and their family for generously welcoming the survey group into their home and property and leading us to some prime orchid locations.

Finally, we would like to thank the members of the Western Australian Native Orchid Study and Conservation Group (Inc), who donated two weeks of their time to participate in this survey. Without their eyes, arms and legs, we would not have been able to organise and undertake such a successful survey and many of the orchids found would have remained undiscovered for some time to come.

[1]Throughout this report, the Western Australian Department of Conservation and Land Management may also be referred to simply as CALM.

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1.0 SURVEY HIGHLIGHTS

★ 118 sites were surveyed during the 15 day trip.

★ Distance travelled during the survey exceeded 3000 kilometres.

★ All named members of the *Pterostylis rufa* group were located with the exception of *P. macrocalymma.*

★ In excess of 100 species of orchid were recorded during the survey, not including members of the *Pterostylis rufa* group.

★ 55 taxa related to *Pterostylis rufa* were recorded during the survey. The status of some of these taxa is uncertain as some were either in very early flower, or still in bud.

★ Around ten new taxa within the *Pterostylis rufa* complex were discovered.

★ Sufficient material was collected to clarify the status of around twenty previously recorded but currently undescribed taxa within the *rufa* complex. These had been previously represented by either a few or no collections in herbaria. This includes a number of Type collections.

★ The known range of *Pterostylis insectifera* was significantly extended.

★ The ranges of many known but currently undescribed taxa within the *Pterostylis rufa* complex were significantly extended. These taxa had been previously represented by either a few or no collections in herbaria.

★ Whilst in the Gibson area, north of Esperance, a previously unrecorded *Thelymitra* was discovered. This attractive, blue flowered sun orchid is most distinctive and is new to science.

★ At the granite outcrop on "Kings Park", a previously unrecorded *Diuris* related to *Diuris corymbosa* was discovered. This was subsequently recorded at three more locations north and north-east of the King's property.

★ In an area ranging from Peak Charles to Esperance and across to Ravensthorpe, a possible new subspecies of *Microtis media* was recorded in many locations.

★ The ranges of a number of other orchid taxa were significantly extended, including-

- *Caladenia caesarea*
- *Caladenia flava* subsp. *maculata* ms
- *Caladenia incrassata* ms
- *Cyanicula ashbyae* ms
- *Cyanicula fragrans* ms
- *Diuris concinna*
- *Diuris picta*
- *Eriochilus dilatatus* subsp. *multiflorus* ms
- *Microtis media* subsp. nov.
- *Microtis* sp. nov. (aff. *parviflora*)
- *Thelymitra* sp. nov. (aff. *macrophylla*)

★ At a large granite outcrop in Muncaster Road, a possible new subspecies of *Caladenia longicauda* related to *C. longicauda* subsp. *rigidula* ms was recorded.

★ A new species of *Macrozamia* was discovered just north of Watheroo.

★ *Prostranthera magnifica*, a species declared at that time as rare flora in Western Australia, was found to occur in good numbers in the Mount Jackson area. As a result of this expedition and its findings, this species is now known to be relatively safe and has been downgraded from Declared Rare Flora to Priority 4.

★ Several other Declared Rare species were also surveyed during the trip and information gained has proven an invaluable addition to the Declared Rare Flora Data Base maintained by CALM, enabling preparation of enhanced management programs for these species.

2.0 BACKGROUND

In Western Australia, the *rufa* complex is not well understood and is currently the subject of extensive research. It contains many undescribed taxa, some of which are rare and localised or believed to be threatened due to massive land clearing for Agriculture.

Although several taxa within the *rufa* complex were previously known to occur in Western Australia, none were named until 1989. At that time, Mark Clements and David Jones described seven new taxa for Western Australia.

Clements (1989) listed the eight species (the seven new species plus *Pterostylis pusilla*) as occurring in Western Australia as follows-

- *Pterostylis ciliata*
- *P. insectifera*
- *P. leptochila*
- *P. macrocalymma*
- *P. picta*
- *P. pusilla*
- *P. roensis*
- *P. spathulata*

Pterostylis pusilla is now known to be an eastern Australian species and does not occur in Western Australia. The taxon listed as *Pterostylis pusilla* by Clements (1989) is referred to as *P.* sp. nov. (aff. *pusilla*) in this report.

The remaining seven species are circumscribed and illustrated for the first time in Appendix 4 of this report, in a paper titled " **A Synopsis of the Named 'Rufa Group' of Pterostylis in Western Australia", D.L.Jones & M.A.Clements, Australian National Botanic Gardens, Box 1777, Canberra, A.C.T., Australia, 2601.**

Further survey work by David Jones, Mark Clements, Ron Heberle and others prior to this expedition had suggested that the *rufa* complex in Western Australia consisted of about thirty-five taxa. This expedition has enabled clarification of the status of several of these taxa and has resulted in the discovery of several previously unknown taxa. We now believe there to be at least forty-five members of the *Pterostylis rufa* complex in Western Australia.

Specimens collected during the survey have been lodged at the National Herbarium in Canberra where David Jones is processing and sorting them, prior to distribution to other herbaria. Specimens have also been lodged at the Western Australian Herbarium by Andrew Brown.

3.0 INTRODUCTION

During October, 1992, a coordinating committee consisting of Christopher French, Andrew Brown, Nye Evans and David Jones was established to plan and prepare an extensive survey of the *Pterostylis rufa* complex within the semi arid eastern Wheatbelt and Goldfields areas of the South West Land Division of Western Australia.

The coordinating committee established a survey schedule, collated information on known and likely locations for members of the *rufa* complex, and prepared a survey itinerary. Extensive planning was undertaken regarding the survey logistics including identification of transport requirements, camping equipment, essential supplies and safety equipment. A preliminary survey budget was also prepared.

Early in 1993, the Western Australian Native Orchid Study and Conservation Group (Inc) (WANOSCG) investigated the availability of funding from The Gordon Reid Foundation to allow it to undertake the survey. An application for $3000 was submitted during the Third Round of the 1993 Small Grants Program.

An application for an additional $3000 was submitted to The Australian Orchid Foundation, in the hope that sufficient funds could be arranged to allow the survey to proceed.

Both grants were approved during late September, 1993.

The survey encompassed inland areas where members of the *rufa* complex were believed to occur and investigated suitable habitats in both known orchid sites and in areas that had not been previously visited. The aim of the survey was to develop a better understanding of the degree of variation, distribution, abundance, ecology and biology of the complex for a forthcoming taxonomic revision of the group, thus allowing appropriate recommendations to be made to the Western Australian Department of Conservation And Land Management (CALM) and the Australian National Conservation Authority (ANCA) regarding the conservation status and measures required to ensure the future preservation of these unusual orchids.

The survey was conducted by a small, dedicated group of WANOSCG members as follows -

Andrew Brown of Perth
Greg Bussell of Margaret River
Nye Evans of Parkerville
Ron Foreman of Bunbury
Christopher French of Perth
Bill Jackson of Walpole
David Jones of Canberra
Joff Start of Walpole
Mathew Tiong of Perth

Andrew Brown is a Botanist in CALM's Threatened Species and Communities Unit and David Jones is a Research Scientist with the Centre for Plant Biodiversity Research, Australian National Botanic Gardens in Canberra. All other members of the survey group are private citizens with a keen interest in native orchids.

4.0 SURVEY ITINERARY

The survey group gathered in Perth on Saturday October 2, 1993, to complete final packing and preparations. Departing early on the following day, the group spent two weeks in the field, returning to Perth late on Sunday October 17.

The route followed by the group was as follows -

Day 1 -- Sunday, October 3.

The three four wheel drive vehicles left Perth and proceeded along the Northern Highway to the first stop at Stephen's Road, Bindoon, where the first member of the *rufa* complex was located (unfortunately, a plant that had aborted its flowering spike). Travelling north along the highway, we reached our second stop, some 11 km north of New Norcia. Here, several plants of *Pterostylis picta* were found in bud, growing in leaf litter under wandoo (*Eucalyptus wandoo*) along the roadside.

Our next stop was at the Piawonning Road turn-off, where we investigated a disused gravel dump. Members of the *rufa* complex had been reported here but we were unable to locate any plants. Continuing on, we stopped some 13 km north of Piawonning Road, where *Pterostylis picta* was located in bud, again growing in leaf litter under wandoo.

We continued on to the outskirts of Moora, where the first flowering members of the *rufa* complex were found with three taxa seen in abundance (*Pterostylis picta*, *P. spathulata* and a taxon closely related to *P. spathulata*). Continuing along the Midlands Road through Watheroo, we travelled towards Watheroo National Park. A short distance north of Watheroo an undescribed species of *Macrozamia* was discovered and a cone and fallen fruit were collected. Within Watheroo National Park, a single plant of *Cyanicula ashbyae* ms was located, extending the known range of this orchid by over 100 km.

Moving further north, we travelled along the Gunyidi - Wubin Road to where the first of around ten new taxa in the *rufa* complex was found growing in fair numbers. The first night's camp was made near here, alongside the railway line at Gunyidi.

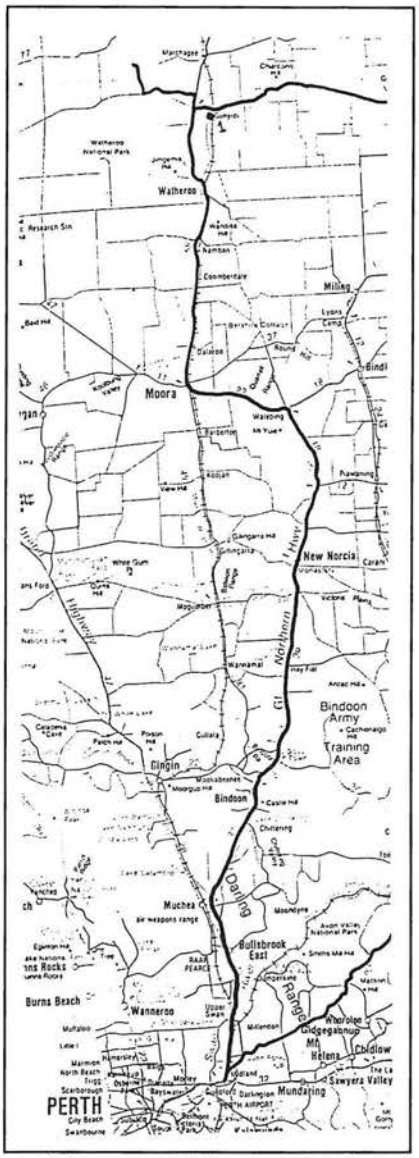

Figure 4.1: Itinerary Day 1

Day 2 -- Monday, October 4.

Day two found us travelling further north along the Midlands Road and the Marchagee track to Pinjarrega Lake Nature reserve where *Pterostylis picta*, *P. spathulata* and a taxon closely related to *P. spathulata* were located, along with *Caladenia cristata* (a species formerly declared as rare flora) and *C. flava* subsp. *maculata* ms (a considerable southern range extension for this subspecies).

We then drove back along the Gunyidi - Wubin Road towards Wubin, stopping along the way at the fringes of salt lakes and rocky breakaway areas, where more members of the *rufa* complex related to *Pterostylis picta* and *P. spathulata* were found, including the same species that had been located at the last stop on Day 1 on the Gunyidi - Wubin Road.

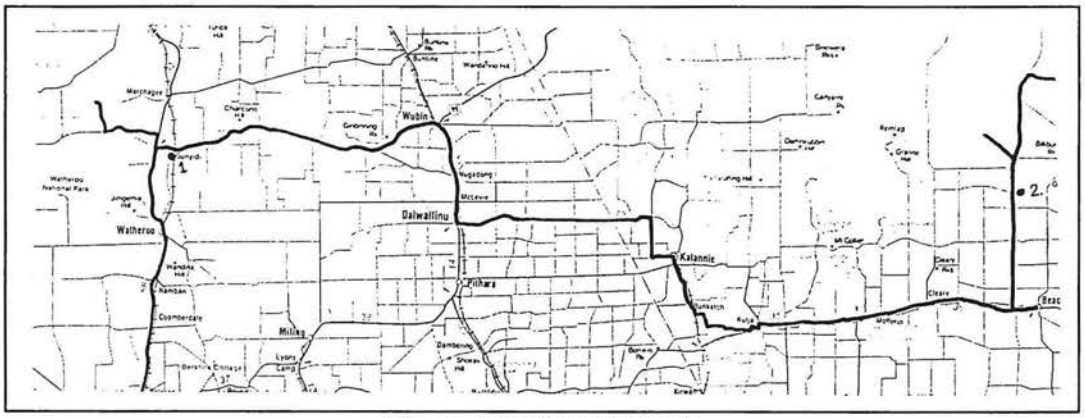

Figure 4.2: Itinerary Day 2

After a short stop at a sheoak (*Allocasuarina campestris*) thicket on the north side of Wubin, we proceeded south to Dalwallinu, where we refuelled the vehicles. We then headed east via Kalannie, Bunktech and Kulja to Beacon where we again topped up our fuel supplies. Three stops along this stretch all produced members of the *rufa* complex closely related to *Pterostylis spathulata*.

From Beacon, we proceeded North to "Kings Park", the property of Hazel and John King. Here we enjoyed a welcome barbecue dinner with Hazel, John, their family and friends, before bunking down for the night in their caravan, shed and shearers' quarters. Some group members spent the first of several nights sleeping under the stars as the weather was mild and pleasant.

Day 3 -- Tuesday, October 5.

An early start on day three saw a heavy workload on the King's shower before Hazel King led us on a tour of the granite outcrops and mallee woodland adjacent to the farm homestead. An undescribed species of *Diuris* was collected in very late flower from granite areas, while members of the *rufa* complex were located near the rock margins and in adjacent mallee woodlands.

Hazel and John King then took us to two locations on Stone Road, off of the Beacon - Bimbijy Road, before proceeding along the Beacon - Bimbijy Road to Tampu Well, a large granite outcrop. Here more of the same undescribed *Diuris* were located. We continued North towards Bimbijy, passing through the vermin proof fence. A planned side trip to Billiburning Rock was unfortunately cancelled as we had been unable to contact the property manager over whose lease we would have had to travel in order to reach the hill.

A lunch stop, 6 km north of the vermin proof fence, revealed two undescribed members of the *rufa* complex, one with small green flowers and one with small brown flowers.

After lunch we travelled east towards Karroun Hill. In an area approximately 17 km east of the Beacon - Bimbijy Road, several plants of an undescribed taxon that we had seen almost 200 km further west at Gunyidi were found.

Our next stop was at Karroun Hill, situated in the Karroun Hill Nature Reserve, where a large granite outcrop and the ruins of a farmhouse mark the location of a failed cattle lease that had been established during the early 1900's. Here we found a good population of *Diuris picta*, a range extension for this species, and more specimens of the undescribed *Diuris* from "Kings Park". The King Family parted company with us at this spot and we proceeded along narrow, overgrown tracks and across flat granite outcrops to reach our camping spot at a very large granite complex known as "Cliff Rock". This journey of around 40 km took us almost two hours to complete.

Day 4 -- Wednesday, October 6.

We broke camp on day four to find that two of the vehicles had flat tyres. After fitting spares, we spent some time exploring "Cliff Rock", but it proved to be disappointing from an orchid viewpoint with very few orchids being found. The track east from "Cliff Rock" swings around to the south and eventually joins up with the vermin proof fence. We made several stops along the track with most producing one or two members of the *rufa* complex. The King family rejoined us in this area, and at a location some 10 km from "Cliff Rock" we located two possibly new members of the *rufa* complex.

We travelled east along the vermin proof fence[2], stopping several times. At a sandstone breakaway we located a particularly interesting member of the *rufa* complex with very long, narrow lateral sepals.

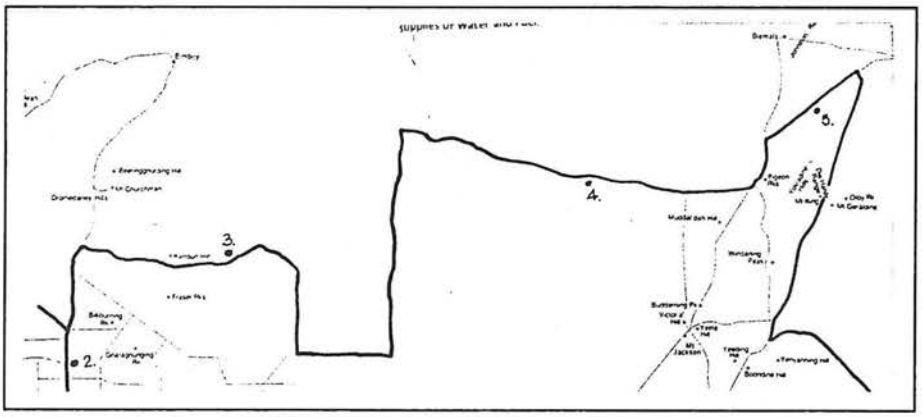

Figure 4.3: Itinerary Days 3 to 5

After passing through the north-south vermin proof fence, we turned north following the fence line for some 42 km before stopping at another large breakaway, where we located five different members of the *rufa* complex. At this point we turned east towards Pigeon Rocks, but as the track was extremely overgrown, we made very slow progress. After 15 km, the lead vehicle staked a tyre so we made camp for the night.

[2]A permit is required from the Western Australian Agriculture Protection Board for vehicle access to the maintenance tracks which serve the vermin proof fences.

Day 5 -- Thursday, October 7.

The track continued to be narrow and overgrown for the next 15 to 20 km, resulting in yet another staked tyre. In all, we made around ten stops before reaching Pigeon Rocks, covering a wide variety of habitats including mallee woodlands, breakaways, yellow sand-plain and granite outcrops. *Caladenia incrassata* ms was located in fruit at a large breakaway, resulting in a range extension of the species. On one of the granite outcrops we located *Microtis* sp. nov. (aff. *parviflora*), which was another range extension.

Pigeon Rocks were disappointing with only two orchid species found, both in very small numbers. The rock was obviously showing the effects of intensive cattle grazing.

Leaving Pigeon Rocks we headed north east for around 20 km before making camp for the night. The weather continued to be fine and warm allowing several group members to continue sleeping in the open air.

Day 6 -- Friday, October 8.

On day six, we continued heading north-east for a short distance until reaching the Evanston - Bullfinch Road. Here, we bade a final farewell to the King Family who returned to Beacon via Paynes Find. We turned south towards Mount Jackson, stopping twice before reaching the Die Hardy Ranges. We collected members of the *rufa* complex at both locations, as well as at the pass through the Ranges. Also seen at several locations were previously unrecorded populations of *Prostranthera magnifica*, a species at the time declared as rare flora.

Continuing south into Mount Jackson Station, we made a brief stop for lunch at Marda Tank, an area devoid of orchids, but containing a small population of *Prostranthera magnifica*. Turning east, along the base of a range of banded ironstone hills we searched at a point where the road was close enough to the hills to allow us a reasonably short climb to the top. Here we located four different members of the *rufa* complex before continuing east to the Helena and Aurora Range. From the range, we turned north to reach an area of yellow sand-plain where *Thelymitra sargentii* was found in early flower. Several members of the *rufa* complex were also found here.

After a short drive back to the range, we made camp for our sixth night in the bush.

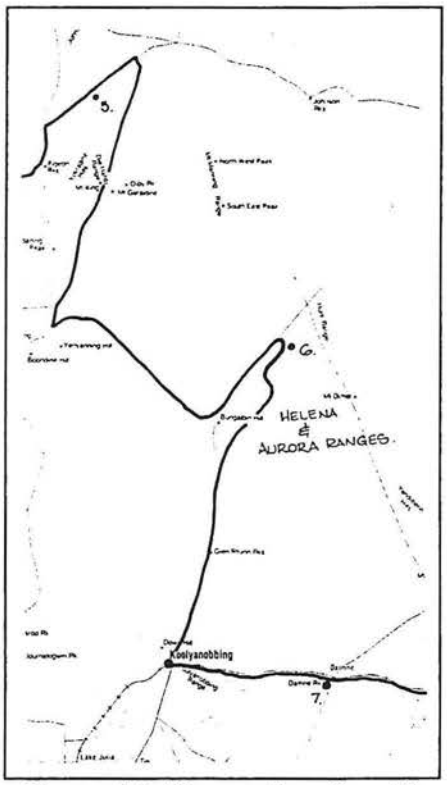

Figure 4.4: Itinerary Days 6 and 7

Day 7 -- Saturday, October 9.

We woke to another fine day to complete the first week of our survey. Although progress had been slower than we had anticipated, the rate of discovery of members of the *rufa* complex and other orchid species had been beyond our expectations.

The pass through the Helena and Aurora Range was steep and narrow with some washouts necessitating low range four wheel drive operation but all vehicles made it safely through. We travelled west along the southern side of the range, stopping at the base of one of the outlying hills, before climbing to the top on foot.

In a steep gully amongst the massive rocks, very green *Pterostylis* aff. *nana* rosettes were found still hanging on but unfortunately there was no sign of any flowers. Two different members of the *rufa* complex were found here, however.

The next stop was for lunch at Bungalbin Hill at the western end of the range, where once again several members of the *rufa* complex were seen. From here we drove south to the abandoned town site of Koolyanobbing. A quick drive through showed us that most of the town's houses and facilities had been salvaged so we turned east along the Trans Australia railway line to Lake Seabrook. Around the fringes of this large salt lake we located four different members of the *rufa* complex.

We camped for the night a short distance east of Lake Seabrook, in the vicinity of another salt lake.

Day 8 -- Sunday, October 10.

We commenced the second week of the survey by continuing east along the Trans Australia railway line before turning south to Mount Walter. Here four members of the *rufa* complex were found including an outlying population of *Pterostylis insectifera*, extending its range by approximately 150 km. A shrivelled up flower of *Caladenia* sp. (aff. *caesarea* ?) was also found which, if confirmed as that species, would also show a considerable range extension. A field trip is planned for the third quarter of 1996 to collect fresh material of this plant.

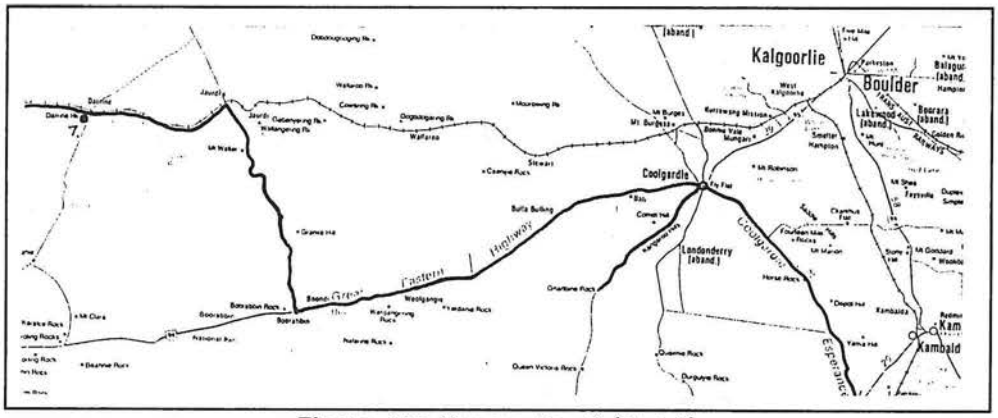

Figure 4.5: Itinerary Day 8 (Part 1)

Leaving Mount Walter, the group headed south to the Great Eastern Highway, and then east towards Coolgardie. We stopped at the "300 Mile Rock" and later at Gnarlbine Rock, south of Coolgardie. Both granite outcrops were very dry and the vegetation around them showed extreme signs of drought stress. However some members of the *rufa* complex were seen at each outcrop.

Travelling south towards Norseman, we stopped at the "50 Mile Rock", a large granite outcrop in much better condition than the previous two visited. Here, a collection of an undescribed species related to *Pterostylis ciliata* was made. A known but undescribed member of the *rufa* complex, was also seen here, extending its range.

We camped at the Norseman Caravan Park for the night, enjoying our first hot showers since Day 2 and taking the opportunity to wash some clothes and to be waited upon at the roadhouse cafe.

Day 9 -- Monday, October 11.

Cleaned and refreshed we retraced our steps for some 21 km north of Norseman, stopping at two locations, the first of which revealed the previously collected *Pterostylis* sp. nov. (aff. *ciliata*) again, while at the second, more specimens of *P. insectifera* were collected.

From here, we travelled south to Moir Rock, a large but again very dry, granite outcrop with three members of the *rufa* complex growing on it, and then on to Peak Charles. Although it is one of the largest granite outcrops in Western Australia, Peak Charles was particularly disappointing, as it is recovering poorly from a very hot wildfire which occurred during the summer of 1990/1991. Several flat granite rocks on the road from Peak Charles to Kumarl had also been severely affected by the same fire so we proceeded eastwards to the Coolgardie - Esperance Highway, stopping at two locations near Kumarl. *Pterostylis* sp. nov. (aff. *ciliata*) was seen at the first location and *P. insectifera* was found at the second.

From Kumarl, we headed south until we reached Swan Lagoon, where we camped for the night.

Day 10 -- Tuesday, October 12.

Waking to the sounds of abundant bird life, we broke camp and spent time investigating the Swan Lagoon area. Unfortunately, most of the orchids found were past their best. We did, however, find late flowering specimens of *Caladenia cruscula* ms and *C. brevisura* ms.

Stopping on the highway some 7 km north of Gibson, we found a large number of orchids including the rare *Diuris concinna*, a new location for this orchid. Also found here was an undescribed species related to *Diuris laxiflora*. *Diuris concinna* was found again at the old Gibson truck bay, along with what is undoubtedly a new *Thelymitra* species in full flower, related to *T. macrophylla*. It has small compact column tufts which are bright yellow in colour. Extensive collections were made of this orchid for the W.A. Herbarium and the National Herbarium. The same species was located at the next stop in Helm's Arboretum, along with good numbers of *Diuris concinna*.

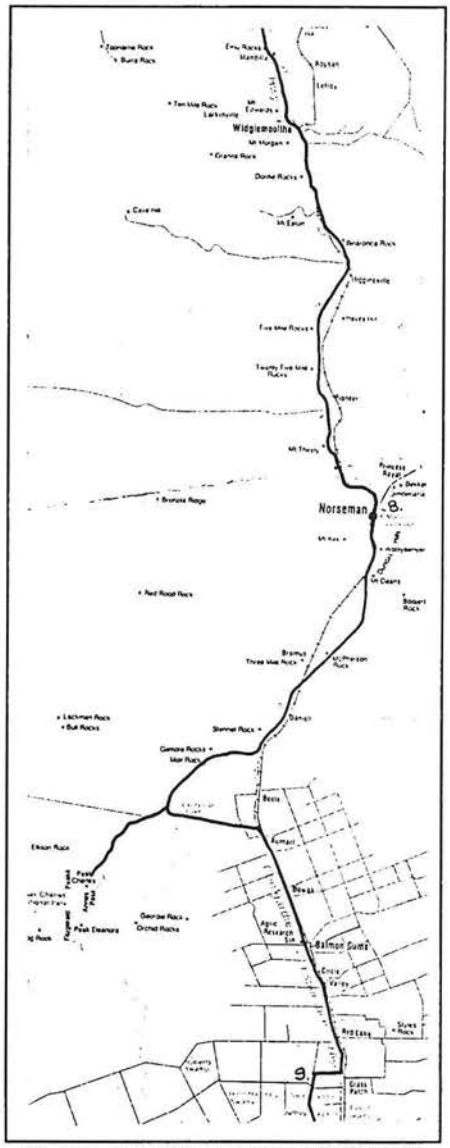

Figure 4.6: Itinerary Day 8 (Part 2) and Day 9

We reached Esperance at around midday and after replenishing our food supplies and arranging for vehicle tyres to be repaired, we separated into two groups for the afternoon. The first group spent the afternoon searching coastal heaths west of Esperance for *Prasophyllum odoratum*, collecting it at Eleven Mile Beach. The second group travelled east to Coolinup Nature Reserve to collect specimens of a rare *Macrozamia* known to occur there.

It was disappointing to see an active gravel dump at Coolinup Nature reserve, but despite this destruction, we did locate a small colony of a known but undescribed, small flowered *Diuris* with one plant in early flower.

A second location in the nature reserve where this orchid had been previously recorded failed to reveal any plants, however a possibly undescribed species of *Cyanicula* ms related to *C. gemmata* ms was collected. A further visit to this area is required to confirm this.

That night we treated ourselves to a Chinese meal and were joined by Don Voigt, a local orchid enthusiast and Honorary Member of WANOSCG.

Day 11 -- Wednesday, October 13.

Wednesday morning found us heading firstly north to Gibson and then west via Boydells Road. At the first stop we had our first sighting on this survey of the once presumed rare, but now known to be much more common, *Pterostylis* sp. nov. (aff. *pusilla*). This species was previously known in Western Australia as *P. pusilla.*

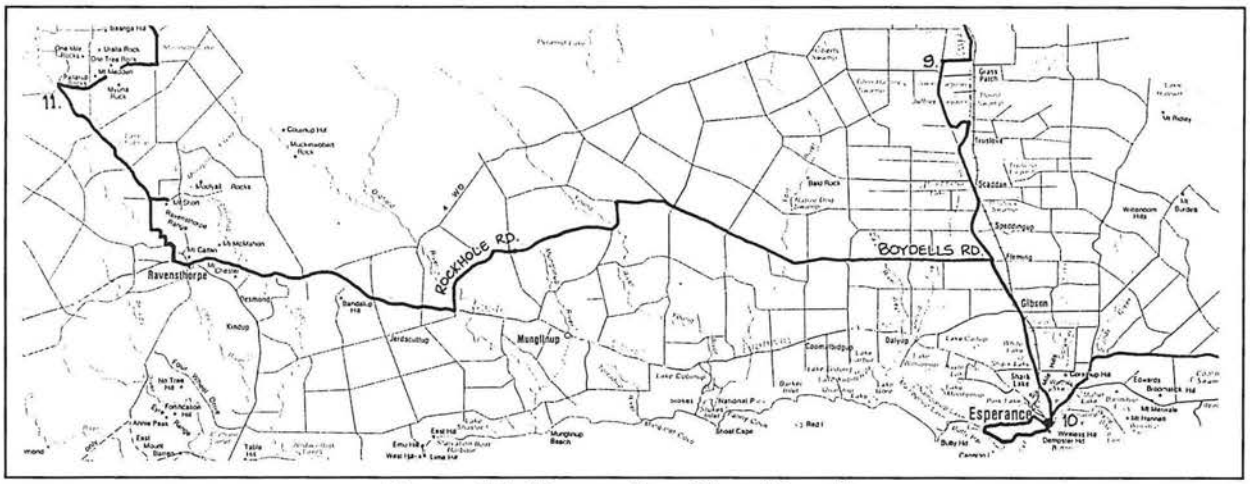

Figure 4.7: Itinerary Day 10 and Day 11

Turning into Cascades Road, we stopped at the Lort River Bridge where a collection was made of a possibly new member of the *rufa* complex which appears to be related to an undescribed species found on Lily McCarthy Rock near Varley . Here, we also collected another specimen of the *Cyanicula* ms found at Coolinup Nature Reserve.

On River Road, we stopped at a creek crossing where a large population of *Pterostylis* sp. nov. (aff. *pusilla*) was located, along with large numbers of *P. ciliata*. Proceeding into Oldfield Road, we stopped for lunch at another creek crossing, fringed with flat granite outcrops. Here were located a large variety of orchids including a rare species closely related to the Eastern Australian species, *Caladenia tentaculata*. This undescribed taxon, *Caladenia* sp. nov. (aff. *tentaculata*), is known from just a few scattered populations in Western Australia.

Travelling to a spot some 9 km east of Ravensthorpe, we searched moist areas along a creekline and the adjacent rocky hillsides to reveal *Pterostylis* sp. nov. (aff. *pusilla*), *P. ciliata* and large numbers of *P. leptochila* (many still in early bud).

After refuelling at Ravensthorpe, we headed north-west to Mount Short and then on to Pallarup Rocks, a large area of flat granite fringed with sheoak, where we camped for the night.

Day 12 -- Thursday, October 14.

In the morning, we investigated the granite rocks and run-off areas, locating many orchid species but most of them were past their best. However, many plants from the *Pterostylis rufa* complex were found in bud.

We travelled east along Muncaster Road until we reached a large granite outcrop fringed by sheoak. In a damp area within the sheoak, we found what is possibly a new subspecies of *Caladenia longicauda* related to *C. longicauda* subsp. *rigidula* ms Further study is required to clarify the status of this orchid. Also found here were leaves of *Eriochilus dilatatus* subsp. *multiflorus* ms, a subspecies not previously known from this area.

We continued travelling north, making several stops before reaching the Lake King - Norseman Road where we turned east to Lillian Stoke Rock in the Frank Hann National Park. Although this area looked very promising, it had very few orchids present, appearing to have been heavily grazed at some time in the past. The orchids found included leaves of *Eriochilus dilatatus* subsp. *undulatus* ms and an interesting hybrid between *Thelymitra campanulata* and *T.* aff. *macrophylla*.

Following lunch at the rock we travelled back to the Emu proof fence and drove north along the fence until reaching the road to Varley and Lily McCarthy Rock. At Lily McCarthy Rock a good collection of a known but undescribed member of the *rufa* complex was made. One specimen of a possibly undescribed member of the *rufa* complex along with *Diuris picta* and an undescribed member of the *D. laxiflora* complex were also collected.

Evening was approaching and dark, threatening thunderclouds were overhead as we travelled back to Varley and then north on the Southern Cross road. Stopping just short of the Hyden - Norseman Road, we camped for the night.

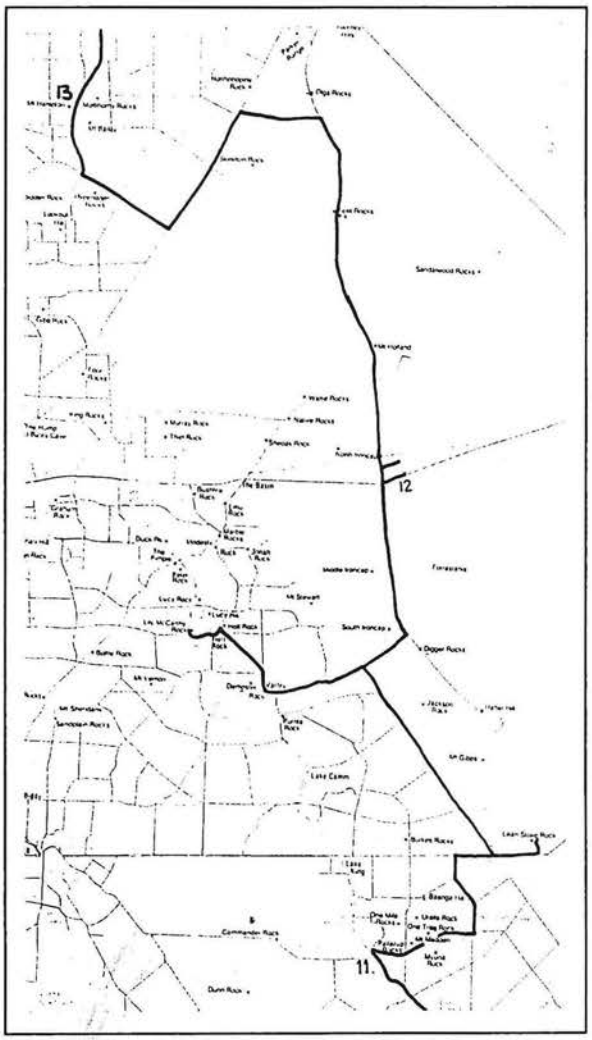

Figure 4.8: Itinerary Day 12 and Day 13

Day 13 -- Friday, October 15.

Thankfully the thuderstorm bypassed our camp and in the morning a search of the area surrounding our campsite revealed one early flowering plant of *Pterostylis insectifera*.

Although this orchid is known from the area, it had been poorly collected prior to this survey.

After breaking camp, we looked at two locations in the Lake Cronin area. In both locations we found large numbers of *Pterostylis roensis* in flower and lots of *P. insectifera* in bud.

After this, we travelled north to Mount Holland where *Pterostylis roensis* was quite common, and then continued on to Split Rocks. This was a promising area but unfortunately, few orchids were found.

We continued north towards Southern Cross and then headed west along Dunbar Road and south-west towards Hyden. Stopping at a detour around a flooded section of road, we collected a known but undescribed member of the *rufa* complex along with *Pterostylis spathulata. Pterostylis roensis* was also quite common.

As it was getting dark, we moved on to our overnight camping spot at Mount Hampton, a large granite outcrop fringed with sheoak.

Day 14 -- Saturday, October 16.

At Mount Hampton we found many different species of orchid, but once again they were few in number, so we continued on to Frog Rock. Here we found two undescribed species related to *Pterostylis spathulata*, along with *P. ciliata* and *P. roensis*.

On visiting Strawberry Rocks, we found they were very dry and the vegetation in poor condition so we moved on to Southern Cross and continued to a parking bay east of Ghooli on the Great Eastern Highway. We found several undescribed members of the *rufa* complex including one which had previously been found elsewhere but not recorded from this area.

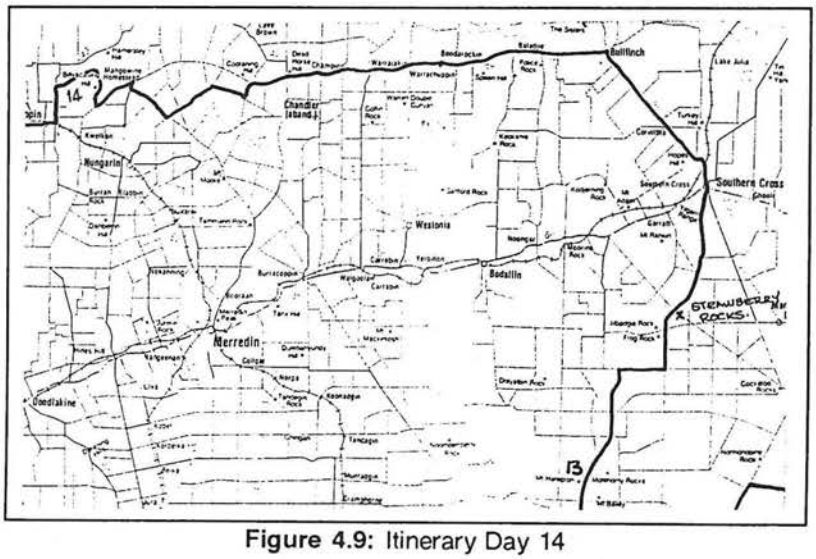

Figure 4.9: Itinerary Day 14

After refuelling and restocking supplies at Southern Cross, we travelled north on the Bullfinch road. A lunch stop in an area of mallee woodland revealed *Pterostylis roensis* and two undescribed species related to *P. spathulata.*

At a breakaway a little further north we found more *Pterostylis roensis*, along with *P. ciliata* and *P. insectifera* (once again a range extension for the latter species).

From Bullfinch we headed west towards Mukinbudin, stopping at the fringes of a salt lake where three members of the *Pterostylis rufa* complex were found, and again at Dead Horse Hill which had few orchid species present. Continuing west, we arrived at Billyacatting Rock, another very large granite outcrop, where we set up camp.

Day 15 -- Sunday, October 17.

Sunday, Day 15, was the last day of the survey. After looking at the area around the campsite, we moved further west around Billyacatting Rock to an area of tall wandoo woodland where we found the same undescribed member of the *Pterostylis rufa* complex that we had discovered at the end of Day 1 on the Gunyidi - Wubin Road. Travelling through Trayning towards Wyalkatchem, we stopped at a site some 17 km west of Trayning. Here, we found several plants of a previously known but undescribed member of the *Pterostylis rufa* complex, extending its range by over 150 km.

As we travelled back towards Perth we searched a number of areas around Goomalling which were unfortunately mostly weed infested and badly degraded. However, we were able to collect one specimen of *Pterostylis ciliata* from a weed infested area on the Wongan Hills Road.

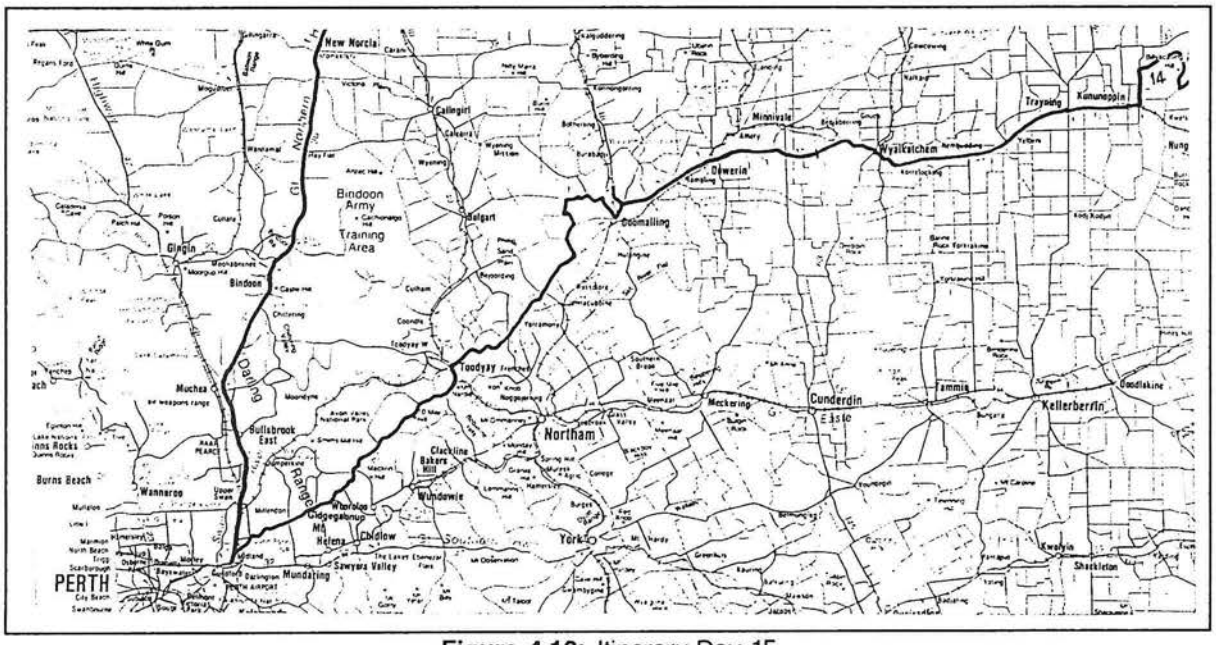

Figure 4.10: Itinerary Day 15

Our last stop for the trip was south-west of Toodyay where we collected a species related to *Pterostylis ciliata* from a population which was mostly in bud. This taxon had previously only been recorded from the York area.

We arrived back in Perth in the early evening and after unpacking and cleaning the vehicles, group members dispersed and began heading for home.

As can be seen from the survey diary, the route taken passed through a large proportion of the Western Goldfields region, an area where few previous orchid surveys had been conducted. The Survey also allowed the group to search for several endangered plant species (non-orchidaceous) known to occur in the area.

Around 200 collections were made, and following a preliminary estimate by David Jones, approximately thirty five members of the *rufa* complex have been identified. This includes 10 that are new to science.

5.0 SURVEY FUNDING AND COSTS

Funding for the survey came from four main sources, as follows -

- $3000.00 from the Gordon Reid Foundation, an initiative of the Lotteries Commission of Western Australia.
- $3000.00 from the Australian Orchid Foundation.
- Indirect funding from the Australian National Botanic Gardens via David Jones' research budget.
- Voluntary contributions of some of our food supplies, payment for the costs of meals in Norseman and Esperance, and free use of materials, equipment and labour from the survey participants. In addition, each survey member has contributed $150.00 (a total of $1350.00) to make up any shortfall in funds required to complete the interim and final reports and media announcements of the survey results.

The Gordon Reid Foundation is an initiative of the Lotteries Commission Of Western Australia. Initial contact was made with the Foundation in early 1993, but we had unfortunately missed the closing date for applications under the Small Grants Program. Following the announcement of the Third Funding Round during June 1993, we applied for a grant of $3000.00. Subsequently, in accordance with the normal grant approval process, we were advised that the success or failure of the application would be announced during late September, 1993.

As the survey was due to commence in the first week of October and because the preliminary budget indicated costs would be in excess of $8000.00, an application for funds was also sent to The Australian Orchid Foundation. This was also for an amount of $3000.00.

In September 1993, we received advice that both grants had been approved, leaving us with a shortfall of funds of around $2000.00, which survey group members agreed to make up.

Fortunately, the cost of hire vehicles for the survey was substantially reduced by two events. Firstly, one vehicle was provided by David Jones using funds from his research budget, a saving of around $1800.00. Secondly, CALM allowed Andrew Brown to hire a fully equipped four wheel drive vehicle (owned by CALM) on behalf of the group and at minimal cost. This resulted in cost reductions of around $800.00. Further cost reductions of around $900.00 were achieved as the hire of both of these vehicles included the cost of fuel.

The cost of David Jones' return air fare from Canberra to Perth, along with the freight costs for the equipment used to process orchid specimens collected during the trip, were also met by David's research budget.

All other members of the group individually funded their own travel costs to and from Perth, and volunteered their labour for the two weeks of the survey.

Both grants received were made to the Western Australian Native Orchid Study and Conservation Group (Inc) (WANOSCG) and all income and expenditure to date has been processed through the WANOSCG accounts. As such, the income and expenditure has been subject to audit by the WANOSCG auditor, during the audit of accounts for the years ended January 31, 1994 and January 31, 1995. Additional expenditure that has not yet been brought to account, will be subject to audit during the audit of accounts for the year ended January 31, 1996.

Statements of audited and as yet un-audited accounts for the survey appear below.

TABLE 5.1 - AUDITED EXPENSES

Item	Description Of Expense	Cost
1	Hire of four wheel drive vehicle from commercial hire car firm.	1814.40
2	Hire of fully equipped four wheel drive vehicle from CALM, inclusive of fuel costs.	1155.00
3	Tent and Air Mattress Hire. (Five Two man tents, one large tent, and ten air mattresses.)	430.00
4	Hire of Engel Car Fridge.	80.00
5	Hire of tables, chairs and cooking utensils.	50.00
6	Purchase of dry ice.	25.00
7	Fuel costs for one hire vehicle.	429.71
8	Food costs.	1080.27
9	Accommodation costs.	80.00
10	LPG gas mantles and glasses.	60.10
11	LPG gas.	9.35
12	Puncture repair costs.	70.00
13	Repairs to tent.	10.00
14	Duplication of colour slides to accompany report.	53.24
15	Printing of colour photographs for final report.	128.00
16	Postage costs.	2.65
TOTAL		5,477.72

In addition to the expenses detailed in Table 5.1, there are several expenses which have been incurred but have not yet been accounted for (and have not yet been audited). Also there are expenses still to be incurred. The main expense to come is the cost of preparing and printing the final report, and the costs associated with releasing the survey findings to the press. The latter requirement is an obligation incurred under the grant received from the Gordon Reid Foundation.

Both the unaudited expenses and estimated future expenses are detailed in the Table 5.2. Any expenses in excess of the two grants received, will be covered by money pledged by survey group participants.

TABLE 5.2 - UN-AUDITED AND ESTIMATED EXPENSES

Item	Description Of Expense	Cost
1	Purchase of colour slide film for orchid specimen photography.	274.36
2	Electronic scanning of slides for final report (Estimated).	387.00
3	Preparation and printing of final report (Estimated).	1000.00
4	Distribution of final report (Estimated).	60.00
5	Media release of final report (Estimated).	250.00
6	Postage costs.	9.50
TOTAL		1,980.86

6.0 ORCHID SPECIES FOUND DURING THE SURVEY

The data presented in the Appendix 1 detailing the locations visited during the survey, their habitat details and orchid species present been used to prepare Table 6.1 and Table 6.2.

Table 6.1 presents a summary of all of the orchid species found during the survey, other than those from the *Pterostylis rufa* complex, and the locations at which they were found. Also included are the page references from the most popular Australian native orchid reference books where photographs, sketches, botanical details and general descriptions of the orchid species can be found.

Table 6.2 presents a summary of all of the taxa from the *Pterostylis rufa* group which were found during the survey. Similar literature references are also provided.

A series of explanatory notes are presented following each table. In particular, these notes describe how the various taxa may be related to each other and how they may be related to named orchid species. Details are also provided where new taxa were found during the survey and where the known ranges of orchid species were extended.

TABLE 6.1: SPECIES OTHER THAN THOSE FROM THE *Pterostylis rufa* GROUP

(Including literature references)

Orchid Species	Locations	H & B Second Ed. (Ref 3)	H & B First Ed. (Ref 2)	Jones (Ref 4)
		(P) .. Photograph - (D) .. Description		
Caladenia arrecta ms	1	129	102	126
C. attingens subsp. *gracillima* ms	66 72 75 79 80 82 83 84 85 88 89 90 92	118		
C. brevisura ms	71 75 76 80 82 83 85	135		
C. sp. (aff. *caesarea*)	59			
C. cairnsiana	72 80 83	130	138	
C. cristata	9	132		
C. cruscula ms	71	69		
C. decora ms	73 74 76 77	110	110	
C. denticulata	1	55	80	
C. dimidia ms	95 104 106	50		
C. doutchiae	10 88 90 98 116	136	146	114

Orchid Species	Locations	H & B Second Ed. (Ref 3)	H & B First Ed. (Ref 2)	Jones (Ref 4)
		(P) .. Photograph - (D) .. Description		
C. drummondii	6	68	86	115
C. filifera	114	46	98	118
C. flava subsp. *flava* ms	2 7 8 65 76 80 82 83 88 92 104 116	147	160	99
C. flava subsp. *maculata* ms	9	148		
C. graminifolia	82	122	134	119
C. heberleana ms	76	95		
C. hirta subsp. *rosea* ms	21 105	141	166	121
C. incensa ms	33 39 40 49 105 106	51		
C. incrassata ms	38 49 53	134		
C. longicauda subsp. *borealis* ms	9	75		
C. longicauda subsp. *eminens* ms	83	82		
C. longicauda subsp. *longicauda* ms	87	80	62	124
C. longicauda subsp. *rigidula* ms	71	72		
C. longicauda subsp. nov. (aff. *rigidula* ms)	88			
C. marginata	72 76 77	150	154	102
C. microchila ms	62 63 64 65 70 85 102 105	49	78	
C. pachychila ms	102	131	140	
C. radialis	17	60	88	131
C. radialis x *C. roei*	17			
C. roei	7 9 10 16 17 19 23 25 27 30 39 40 65 87 88 104 106 108 111 112	137	148	133
C. saccharata	101 106 107	151	152	105
C. sigmoidea	31 53 54 65 70 83 87 88	62	84	
C. sp. nov. (aff. *tentaculata*)	83	115		
C. sp. nov. (aff. *tentaculata*) x *C. attingens* subsp. *gracillima* ms	83			
C. varians subsp. *varians* ms	72 83 87 88 92	33		

Orchid Species	Locations	H & B Second Ed. (Ref 3)	H & B First Ed. (Ref 2)	Jones (Ref 4)
		(P) .. Photograph - (D) .. Description		
Cyanicula amplexans ms	20 25 33 38 39 40 50 52 53 54 59	154	176	93[3]
C. ashbyae ms	7 112	160		
C. deformis ms	8 17 60	157	182	98
C. fragrans ms	17 24	161		
C. gemmata ms	92	158	180	99[4]
C. sp. nov. (aff. *gemmata* ms)	76 77 80 83			
Diuris sp. indeterminate (seed)	17 45 50 61 62 65 66 67 71 79 82 83 109 111 112 116 117 118			
D. concinna	72 73 74	410		
D. concinna x *D.* sp. nov. (aff. *laxiflora*)	72			
D. sp. nov. (aff. *corymbosa*)	88 104 106			
D. sp. nov. (aff. *corymbosa*) #1	17 20 23 25			
D. sp. nov. (aff. *laxiflora*)	74 76 77 80 95			
D. sp. nov. (aff. *laxiflora*) #1	72 73			
D. sp. nov. (aff. *laxiflora*) #2	95			
D. sp. nov. (aff. *magnifica*)	10			
D. sp. nov. (aff. *pulchella*)	77			
D. picta	23 95 104 106	400		
D. recurva	5 8	386		
D. sp. nov. (aff. *recurva*)	2 8	387		
D. sp. nov. (aff. *setacea*)	2			
D. sp. nov.	76			
Drakaea sp. indeterminate (seed)	76			
Drakonorchis drakeoides ms	10 17	194		
D. mesocera ms	17 20 25 26 40	193		
X Drakodenia ornata ms	10			

[3]As *Caladenia amplexans*

[4]As *Caladenia gemmata*

Orchid Species	Locations	H & B Second Ed. (Ref 3)	H & B First Ed. (Ref 2)	Jones (Ref 4)
		(P) .. Photograph - (D) .. Description		
Elythranthera brunonis	7 72 76 83 92 118	166	202	154
Eriochilus dilatatus subsp. nov.	7 77 79			
Eriochilus dilatatus subsp. *multiflorus* ms	2 83 87 88 113	180	352	159
E. dilatatus subsp. *undulatus* ms	92	182		
Genoplesium nigricans	68 70 71 75 79 81 89 90 94 96 97 101	292	266	277
Leporella fimbriata	72 76 77 88 92 104	176	186	163
Leptoceras menziesii	1 76 88	173	162	102
Lyperanthus nigricans	72 73 76 77 80 83 88	223[5]	344	166
L. serratus	76	219	346	167
Microtis sp. nov. (aff. *alba*)	72 76	282		
M. atrata	73	278	234	326
M. media subsp. nov.	23 66 67 72 73 74 76 77 79 80 82 83 87 88 92 102 104 106			
M. media subsp. *media*	60 61 62 65	283	236	
M. sp. nov. (aff. *parviflora*)	40 45 60 61 62 65 72	286		
Monadenia bracteata	65 72 73 74 76 88	321	244	415
Prasophyllum cyphochilum	88	300	278	251
P. odoratum	78	306	272	260
P. sp. nov. (aff. *parvifolium*)	76			
P. ringens	1 8 9 10 17 20 23 24 25 43 60 61 62 65 67 72 82 83 87 88 92 102 104 106 111 112 117	295	264	
P. sargentii	102	307	268	264
Pterostylis allantoidea	65 85	342	294	180
P. sp. nov. (aff. *aspera*)	75	339(D)		
P. sp. nov. (aff. *barbata*) #1	7	380		
P. sp. nov. (aff. *barbata*) #2	72	379		

[5]As *Burnettia nigricans*

Orchid Species	Locations	H & B Second Ed. (Ref 3)	H & B First Ed. (Ref 2)	Jones (Ref 4)
		(P) .. Photograph - (D) .. Description		
P. mutica	22 28 29 32 34 59 60 65 69 70 71 75 82 85 87 89 90 91 93 94 95 96 97 101 103 105 106	355		199
P. sp. (aff. *nana*)	1 13 16 21 29 34 39 47 49 50 51 53 60 62 63 69 70 101 106 107 113			
P. sp. nov. (aff. *nana*) #1	18 19 26 31 33 44 54 57 59 61 104 108	349	298	
P. sp. nov. (aff. *nana*) #2	77			
P. sp. nov. (aff. *nana*) #3	118	350		
P. recurva	1 65 72 77 80 81 83 84 85 87 88 104 106 116 118	354	302	205
P. sp. (aff. *sanguinea*)	1 2 9 65 66 72 79 80 81 84 85 87 88 89 90 93 95 99 104 118	359		
P. sargentii	7 30 32 62 65 67 70 88 95 97 98	364	314	209
P. scabra	1 112	340	292	209
P. turfosa	76 77	375		
Spiculaea ciliata	17 20 25 40 62 65 87 88 92 104 106	216	226	173
Thelymitra antennifera	1 17 20 23 24 40 60 65 72 73 74 76 80 83 87 88 92 95 102 104 106	252	20	287
T. azurea	72 86 90	258		289
T. benthamiana	2 72 76	242	28	289
T. campanulata	92 98	259	46	289
T. campanulata x *T.* sp. nov. (aff. *macrophylla*)	92			
T. crinita	76	261	52	291
T. flexuosa	10 72 76	250	16	294
T. x *macmillanii*	17 20 23 40 65 76 106		36	298
T. sp. (aff. *macrophylla*)	16 17 20 23 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 43 50 51 52 53 54 60 61 62 64 65 66 67 70 71 72 74 75 76 80 81 82 83 85 87 88 89 90 92 93 94 95 97 98 99 100 101 102 103 104 105 106 108 109	268 269	56	

Orchid Species	Locations	H & B Second Ed. (Ref 3)	H & B First Ed. (Ref 2)	Jones (Ref 4)
		(P) .. Photograph - (D) .. Description		
T. sp. nov. (aff. *macrophylla*) #1	73 74			
T. sp. nov. (aff. *pauciflora*)	1 25 31 65 66 72			
T. sargentii	51 76 102 107	247	24	303
T. spiralis	76	253	42	303
T. villosa	2 72 76	246	26	307

COMMENTS RELATED TO TABLE 6.1

1. *Caladenia.* sp. (aff. *caesarea*)

   One spent flowering plant of this taxon was located at Mt Walter. Inspection of the withered flower indicated this could well be a rare subspecies of *Caladenia caesarea* (possibly *C. caesarea* subsp. *transiens* ms). This would be an exciting range extension for this subspecies as it has never been collected this far north east before. However, a specimen of *Caladenia caesarea* was once exhibited in the Goldfields Wildflower Show. Speculation has been that this specimen must have been collected from the southern coastal region. Should the specimen located at Mt. Walter prove to be *Caladenia caesarea* then this species may well be present at other locations within the Goldfields area. Additional field trips are required to investigate this further, with one trip tentatively planned in 1995.

2. *Caladenia flava* subsp. *maculata* ms

   The discovery of populations of *Caladenia flava* subsp. *maculata* ms at Pinjarrega Lake Nature reserve is a southerly range extension for this subspecies.

3. *Caladenia incrassata* ms

   The discovery of *Caladenia incrassata* ms at two locations east of the emu proof fence has extended the known range of this species.

4. *Caladenia longicauda* subsp. nov. (aff. subsp. *rigidula* ms)

   Several plants of a what is possibly a new subspecies of *Caladenia longicauda* were located at a large granite outcrop in Muncaster Road. It appears to be related to *Caladenia longicauda* subsp. *rigidula* ms Further research is required to determine the status of this taxon.

5. *Cyanicula* sp. nov. (aff. *gemmata* ms)

At several locations in the Esperance region, a taxon related to *Cyanicula gemmata* ms was found. It appears to differ from *Cyanicula gemmata* ms in the size and density of the calli on the labellum.

6. *Diuris concinna*

Discovery of the poorly known and presumed rare *Diuris concinna* at two locations in the Gibson area in the second week of October resulted in a northerly range extension for the species. There is some conjecture that these plants may have actually been found at the beginning of the species flowering period as more populations were found over a month later by amateur orchid enthusiast, Fred Hort, during the second week of November, 1993. Should future field trips be carried out in November, then this species may prove to be more common than currently thought.

7. *Diuris* sp. nov. (aff. *corymbosa*) #1

Several plants of an undescribed and previously unrecorded *Diuris* closely related to *D. corymbosa* were located in run-off areas fringing granite outcrops on "King's Park" near Beacon. They had almost completed their flowering period as only the top few flowers were open on two or three plants. This taxon was subsequently discovered at three more granite outcrops north and north west of "King's Park"

8. *Eriochilus dilatata* subsp. *multiflorus* ms

Discoveries of this subspecies at Pallarup Rocks and at a large granite outcrop in Muncaster Road have resulted in range extensions.

9. *Pterostylis* sp. (aff. *nana*)

Spent plants of several *Pterostylis* clearly related to *P. nana* were recorded at a large number of locations. Where it was known that a plant was definitely one of the many known but currently undescribed members of the *Pterostylis* aff. *nana* complex (either because it had been growing in a known location or because the condition of the spent plant was good enough for a positive identification to be made), it has been listed separately in the location table above. If a positive identification was not possible, it has been grouped under a general heading of *Pterostylis* sp. (aff. *nana*). It is likely that many plants listed in this grouping are the common "Hairy Wheatbelt" (*Page 349, H & B, ref. 2*) form of *Pterostylis* aff. *nana*.

10. *Pterostylis* sp. nov. (aff. *nana*) #1

The taxon listed under this heading has been identified as the "Hairy Wheatbelt" (*Page 349, H & B, ref. 2*) form of *Pterostylis* sp. (aff. *nana*).

11. *Pterostylis* sp. nov. (aff. *nana*) #2

The taxon listed under this heading was located in a single population and has been identified as a known but undescribed member of the *Pterostylis nana* complex which has been found in very few other locations to date.

12. *Pterostylis* sp. nov. (aff. *nana*) #3

The taxon listed under this heading was located in a single population and has been identified as a known but undescribed member of the *Pterostylis nana* complex described as the "Slender Snail Orchid" (*Page 350, H & B, ref. 2*) which is common throughout the Darling Range and coastal plain from Perth to Albany and in the Stirling Ranges. This collection resulted in a northerly range extension for the species.

13. *Pterostylis* sp. (aff. *sanguinea*)

There is considerable research underway at present regarding the status of taxa within the *Pterostylis sanguinea* and *P. vittata* groups in Western Australia. It is likely that those listed under this heading consisted of several different but closely related taxa.

14. *Thelymitra* x *macmillanii*

In Western Australia this taxon is a hybrid between *Thelymitra antennifera* and members of the *T.* aff. *macrophylla* complex. Although it has a wide distribution in the South West Land Division, it is relatively rare. It was interesting to note that in the arid Goldfields area covered by this survey, this hybrid was found at most locations where *Thelymitra antennifera* and *T.* sp. (aff. *macrophylla*) were present. This suggests that parent plants may have a common pollinator or there may be several different pollinators competing for a limited number of flowering plants. Alternatively, it may be that the arid area weather patterns result in longer periods of warm to hot weather during which the parent flowers remain open for longer periods allowing greater access time for pollinators.

15. *Thelymitra* sp. (aff. *macrophylla*)

More research is required to determine the status of many taxa within the *Thelymitra macrophylla* complex in Western Australia. There are several identifiable species within this complex, but the observed variations in plant morphology and habitat suggest that there may be other separable species present also. Research is hampered by the large number of taxa within the complex and by the fact that flowers are often only open for short periods (they need warm and humid conditions to flower freely). The majority of the taxa related to *Thelymitra macrophylla* recorded in the Goldfields and wheatbelt areas visited during this survey were the "Granite Sun Orchid" (*Page 268, H & B, ref. 2*) while most of those recorded in the Esperance area were the "Scented Sun Orchid" (*Page 269, H & B, ref. 2*).

16. *Thelymitra* sp. nov. (aff. *macrophylla*) #1

This previously unrecorded *Thelymitra* was discovered at two locations in the Gibson area, north of Esperance. It is a blue flowered *Thelymitra* related to *T. macrophylla* but with small, compact, bright yellow column tufts. Extensive herbarium collections were made of this new species.

TABLE 6.2: SPECIES FROM THE *Pterostylis rufa* GROUP

(Including literature references)

Orchid Species	Locations	H & B Second Ed. (Ref 3)	H & B First Ed. (Ref 2)	Jones (Ref 4)
		(P) .. Photograph - (D) .. Description		
P. ciliata	82 85 106 109 115	369	306 (Plate 4)	628
P. sp. nov. (aff. *ciliata*)	63 69 70 98			
P. sp. nov. (aff. *ciliata*) #1	62 65 81			
P. sp. nov. (aff. *ciliata*) #2	81			
P. sp. nov. (aff. *ciliata*) #3	118			
P. insectifera	27 59 64 70 94 96 97 109 110	373(D)		630
P. leptochila	85	370(D)		631
P. picta	2 5 6 9 18 31	371	304	633
P. sp. nov. (aff. *picta*)	22 26 27 34 35 36 38 47 52 53 57 60			
P. sp. nov. (aff. *picta*) #1	21			
P. sp. nov. (aff. *picta*) #2	21			
P. sp. nov. (aff. *picta*) #3	27 30			
P. sp. nov. (aff. *picta*) #4	33			
P. sp. nov. (aff. *picta*) #5	34 36			
P. sp. nov. (aff. *picta*) #6	44 47 50 51 52 53 54 55 56 57 58 59 60 62			
P. sp. nov. (aff. *pusilla*)	79 82 85	365	316	
P. roensis	60 61 63 64 65 67 69 70 71 87 93 94 95 96 97 98 100 101 103 104 106 107 108 109 110	370(P) 373(P) 368(D)		634
P. sp. nov. (aff. *roensis*)	59 103			
P. sp. nov. (aff. *rufa*)	1 4 31 41 42 47 52 57 79 88 94 95 98 102 107 113 115 117			
P. sp. nov. (aff. *rufa*) #1	21 36 37 38 39 40 42 43 44 46 47			
P. sp. nov. (aff. *rufa*) #2	33			
P. sp. nov. (aff. *rufa*) #3	38			
P. sp. nov. (aff. *rufa*) #4	40			

Orchid Species	Locations	H & B Second Ed. (Ref 3)	H & B First Ed. (Ref 2)	Jones (Ref 4)
		(P) .. Photograph - (D) .. Description		
P. sp. nov. (aff. *rufa*) #5	46			
P. sp. nov. (aff. *rufa*) #6	48			
P. sp. nov. (aff. *rufa*) #7	48			
P. sp. nov. (aff. *rufa*) #8	49			
P. sp. nov. (aff. *rufa*) #9	49			
P. sp. nov. (aff. *rufa*) #10	50			
P. sp. nov. (aff. *rufa*) #11	50			
P. sp. nov. (aff. *rufa*) #12	54			
P. sp. nov. (aff. *rufa*) #13	62 65 103 113			
P. sp. nov. (aff. *rufa*) #14	107			
P. spathulata	5	367		634
P. sp. nov. (aff. *spathulata*)	5 9 10 12 15 22 33 51 52 58 59 60 61 103 106			
P. sp. nov. (aff. *spathulata*) #1	8 9 11 12 13 14 22 112			
P. sp. nov. (aff. *spathulata*) #2	9 14 16 17 18 19 20 21 22			
P. sp. nov. (aff. *spathulata*) #3	16 17 18 19 23			
P. sp. nov. (aff. *spathulata*) #4	23			
P. sp. nov. (aff. *spathulata*) #5	25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 50 100			
P. sp. nov. (aff. *spathulata*) #6	27			
P. sp. nov. (aff. *spathulata*) #7	27 32 35 36 37 51			
P. sp. nov. (aff. *spathulata*) #8	28			
P. sp. nov. (aff. *spathulata*) #9	33 34			
P. sp. nov. (aff. *spathulata*) #10	36 37			
P. sp. nov. (aff. *spathulata*) #11	38			
P. sp. nov. (aff. *spathulata*) #12	38 40			
P. sp. nov. (aff. *spathulata*) #13	43			
P. sp. nov. (aff. *spathulata*) #14	43			
P. sp. nov. (aff. *spathulata*) #15	54 57			
P. sp. nov. (aff. *spathulata*) #16	95			
P. sp. nov. (aff. *spathulata*) #17	80			

Orchid Species	Locations	H & B Second Ed. (Ref 3)	H & B First Ed. (Ref 2)	Jones (Ref 4)
		(P) .. Photograph - (D) .. Description		
P. sp. nov. (aff. *spathulata*) #18	107			
P. sp. nov. (aff. *spathulata*) #19	108 110			
P. sp. nov. (aff. *spathulata*) #20	108 112			

COMMENTS RELATED TO TABLE 6.2.

1. *Pterostylis* sp. nov. (aff. *ciliata*)

   Taxa listed under this group are closely related to *Pterostylis ciliata*. Numerous herbarium specimens were collected during the survey and detailed study of these continues.

2. *Pterostylis* sp. nov. (aff. *ciliata*) #1

   The taxon listed under this group has been identified as a known but undescribed member of the *Pterostylis ciliata* complex. Populations found at Moir Rock and Cascades Road have resulted in range extensions for this species.

3. *Pterostylis* sp. nov. (aff. *ciliata*) #3

   The taxon listed under this group has been identified as a known but undescribed member of the *Pterostylis ciliata* complex. It has been previously recorded at Cut Hill, York. The population identified south west of Toodyay during the survey has extended the range of this species.

4. *Pterostylis* sp. (aff. *picta*)

   Taxa listed under this group are closely related to *Pterostylis picta*. Numerous herbarium specimens were collected during the survey and detailed study of these continues.

5. *Pterostylis* sp. nov. (aff. *picta*) #3

   Two populations of this taxon were found but unfortunately all plants were still in bud. There is some speculation that this taxon may be more closely related to *Pterostylis insectifera* than to *P. picta* but further study is required to confirm this.

6. *Pterostylis* sp. nov. (aff. *picta*) #5

Two populations of this taxon were found, one with plants in bud, the other with plants in very early flower. There is some speculation that this taxon may be more closely related to *Pterostylis insectifera* than to *P. picta* but further study is required to confirm this.

7. *Pterostylis* sp. nov. (aff. *pusilla*)

This taxon has long been grouped with the closely related eastern Australian species, *Pterostylis pusilla.* It is a short, small flowered species which is difficult to distinguish from the leaf litter through which it often grows. It has previously been declared as rare and endangered in Western Australia but, although uncommon, is now believed to be reasonably widespread.

8. *Pterostylis* sp. (aff. *roensis*)

Taxa listed under this group are closely related to *Pterostylis roensis.* Several herbarium specimens were collected during the survey and detailed study of these continues.

9. *Pterostylis* sp. (aff. *rufa*)

Taxa listed under this group are related to *Pterostylis rufa* but are not readily placed in one of the known complexes of species related to *P. rufa* in Western Australia. Numerous herbarium specimens were collected during the survey and detailed study of these continues.

10. *Pterostylis* sp. nov. (aff. *rufa*) #3

This previously unrecorded *Pterostylis* was found along the track between Pigeon Rocks and the vermin proof fence. It is a member of a group of *Pterostylis* taxa which are not readily associated with any of the named species within the *P. rufa* complex in Western Australia. Several other previously unrecorded taxa were found during the survey which appear closely related to this species.

11. *Pterostylis* sp. nov. (aff. *rufa*) #4

The taxon listed in this group appears closely related to the previously unrecorded taxon listed as *Pterostylis* sp. nov. (aff. *rufa*) #3.

12. *Pterostylis* sp. nov. (aff. *rufa*) #8

The taxon listed in this group appears closely related to the previously unrecorded taxon listed as *Pterostylis* sp. nov. (aff. *rufa*) #3.

13. *Pterostylis* sp. nov. (aff. *rufa*) #9

The taxon listed in this group appears closely related to the previously unrecorded taxon listed as *Pterostylis* sp. nov. (aff. *rufa*) #3.

14. *Pterostylis* sp. nov. (aff. *rufa*) #10

The taxon listed in this group appears closely related to the previously unrecorded taxon listed as *Pterostylis* sp. nov. (aff. *rufa*) #3.

15. *Pterostylis* sp. nov. (aff. *rufa*) #11

The taxon listed in this group appears closely related to the previously unrecorded taxon listed as *Pterostylis* sp. nov. (aff. *rufa*) #3.

16. *Pterostylis* sp. nov. (aff. *rufa*) #12

The taxon listed in this group appears closely related to the previously unrecorded taxon listed as *Pterostylis* sp. nov. (aff. *rufa*) #3.

17. *Pterostylis* sp. nov. (aff. *rufa*) #13

The taxon listed under this group is an undescribed member of the *Pterostylis rufa* complex that had been previously recorded at Moir Rock, several locations east of Lake Grace and north of Lake King and north of Hyden. On this survey, the taxon was also found on a granite outcrop between Norseman and Coolgardie and in the road verge between Trayning and Wyalkatchem. Both of these locations resulted in extensive range extensions for this species.

18. *Pterostylis* sp. nov. (aff. *rufa*) #14

The taxon listed under this group is an undescribed but previously recorded member of the *Pterostylis rufa* complex.

19. *Pterostylis* sp. (aff. *spathulata*)

Taxa listed under this group are closely related to *Pterostylis spathulata*. Numerous herbarium specimens were collected during the survey and detailed study of these continues.

20. *Pterostylis* sp. nov. (aff. *spathulata*) #1

The taxon listed under this group is an undescribed and previously unrecorded member of the *Pterostylis spathulata* complex in Western Australia. It was found on Day 1 of the survey near Gunyidi, with subsequent discoveries extending its range to the Karroun Hill Nature Reserve and Billyacatting Rock. In October 1994, a large population of this orchid was discovered north west of Eneabba resulting in a further range extension.

21. *Pterostylis* sp. nov. (aff. *spathulata*) #2

The taxon listed under this group is an undescribed but previously recorded member of the *Pterostylis spathulata* complex. This species was found at several locations during the survey, extending its known range.

22. *Pterostylis* sp. nov. (aff. *spathulata*) #3

The taxon listed under this group is an undescribed but previously recorded member of the *Pterostylis spathulata* complex. This species was found at several locations during the survey, extending its known range.

23. *Pterostylis* sp. nov. (aff. *spathulata*) #4

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) #2.

24. *Pterostylis* sp. nov. (aff. *spathulata*) #5

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) #3.

25. *Pterostylis* sp. nov. (aff. *spathulata*) #8

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) #3.

26. *Pterostylis* sp. nov. (aff. *spathulata*) #9

The taxon listed under this group is a distinctive, small flowered species, closely related to *Pterostylis spathulata*.

27. *Pterostylis* sp. nov. (aff. *spathulata*) #11

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) #3.

28. *Pterostylis* sp. nov. (aff. *spathulata*) #11

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) #3.

29. *Pterostylis* sp. nov. (aff. *spathulata*) #14

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) #3.

30. *Pterostylis* sp. nov. (aff. *spathulata*) #15

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) #2.

31. *Pterostylis* sp. nov. (aff. *spathulata*) # 16

The taxon listed in this group is a previously recorded but undescribed species that is related to *Pterostylis spathulata*. It has distinctive, dark striped sepals.

32. *Pterostylis* sp. nov. (aff. *spathulata*) # 17

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) # 16.

33. *Pterostylis* sp. nov. (aff. *spathulata*) # 18

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) # 2.

34. *Pterostylis* sp. nov. (aff. *spathulata*) # 19

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) # 3.

35. *Pterostylis* sp. nov. (aff. *spathulata*) # 20

The taxon listed in this group appears closely related to the previously recorded but undescribed taxon listed as *Pterostylis* sp. nov. (aff. *spathulata*) # 3.

7.0 ANALYSIS OF SURVEY RESULTS

A brief analysis of the survey results has been undertaken. The total number of orchid species recorded at each location, along with the corresponding number of taxa from the *Pterostylis rufa* complex, is presented in Appendix 2. This is also broken down into the corresponding day of the survey.

The data in Appendix 2 has been averaged on a daily basis and this is presented in Appendix 3 as -

- Daily average of the number of orchid species found per location.
- Daily average of the number of taxa from the *Pterostylis rufa* group found per location.
- Number of locations visited per day.
- Number of locations visited per day at which taxa from the *Pterostylis rufa* group were found.
- The average number of taxa from the *Pterostylis rufa* group found per location when they were found to be present (ie ignoring locations where there were no taxa from the *P. rufa* group found).

This data has been further presented in graphical form in Figures 7.2 to 7.4.

A diagram showing the mean average rainfall for Western Australia is also presented as Figure 7.1. The survey itinerary has been cross referenced to this rainfall distribution map to produce Table 7.1, showing the average annual rainfall range for the areas travelled through each day.

Some attempt has been made to relate the rainfall patterns to the observed orchid species and their abundance. No attempt has been made however, to relate other habitat details (in particular, soil types) to the orchid species observed.

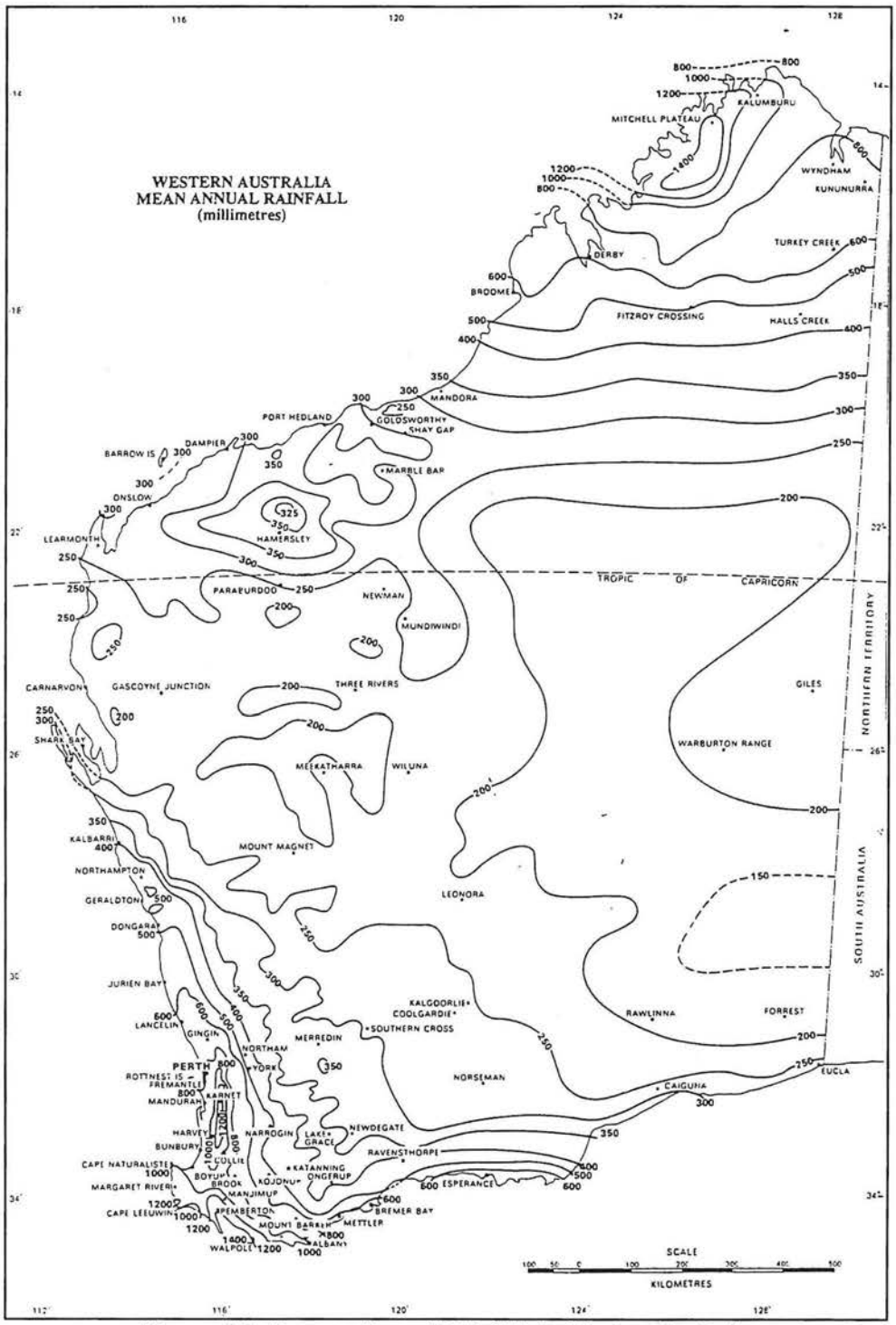

Figure 7.1: Average Annual Rainfall For Western Australia

TABLE 7.1: SUMMARY OF AVERAGE ANNUAL RAINFALL DISTRIBUTION

FOR THE AREAS SURVEYED

DAY #	ANNUAL RAINFALL DISTRIBUTION
1	Commencing at Perth, annual rainfall is in excess of 800 mm per year. Moving towards the north, average rainfall steadily reduces to below 500 mm per year.
2	The majority of Day 2 was spent between Watheroo and Wubin. In this region average rainfall ranges between 500 and 300 mm per year.
3	Just north of Beacon, the average rainfall is just in excess of 300 mm per year. Travelling further north, the average rainfall reduces to 250 to 300 mm per year.
4	Average rainfall in the region ranges between 250 and 300 mm per year.
5	Average rainfall in the region ranges between 250 and 300 mm per year.
6	Average rainfall in the region ranges between 250 and 300 mm per year.
7	Average rainfall in the region ranges between 250 and 300 mm per year.
8	Average rainfall in the region ranges between 250 and 300 mm per year.
9	The majority of Day 9 was spent in areas with average rainfall in the range 250 to 300 mm per year. The campsite at Swan Lagoon has an average rainfall of around 375 mm per year.
10	Travelling south to Esperance on Day 10, the average rainfall per year steadily increased to in excess of 600 mm per year.
11	Average rainfall in the region ranges between 600 and 400 mm per year.
12	Average rainfall in the region ranges between 350 and 300 mm per year.
13	Average rainfall in the region ranges between 300 and 350 mm per year.
14	Average rainfall in the region ranges between 300 and 350 mm per year.
15	Travelling south west towards Perth, the average rainfall steadily increases from 350 to in excess of 800 mm per year.

As can be seen from this table, the majority of first day was spent in areas of relatively high rainfall. Similarly, most of Day 2 was spent in areas where the average rainfall is in excess of 300 mm per year. In these areas, *Pterostylis picta* was prominent, while *P. spathulata* and related taxa began to become more common.

From Day 3 to Day 9, the survey passed through arid areas of the Goldfields, with average annual rainfall between 250 and 300 mm. In these areas, several different members of the *P. rufa* complex were common, particularly *P.* aff. *spathulata*, *P.* aff. *rufa* and *P. insectifera*.

During Days 10 to 12, the survey group travelled mainly through areas of high average rainfall. In these areas, a large variety of orchid species were recorded and the largest numbers of different species were noted. On these days, the most common members of the *Pterostylis rufa* group were *P. insectifera*, *P.* aff. *pusilla* and *P. ciliata* and related taxa.

Day 13 and Day 14 were spent in areas with average annual rainfall ranging between 300 and 350 mm. Once again, on these days a relatively larger number of orchid species were recorded. This may be due to a slightly higher average annual rainfall than is recorded in those areas visited between days 3 to 9, but is probably a result of the habitats visited which largely consisted of granite rock water runoff areas. The predominant members of the *Pterostylis rufa* group recorded on these two days were *P. insectifera*, *P. roensis* and taxa related to *P. spathulata*.

On the last day of the survey, the group travelled a long distance back to Perth through areas of increasing average annual rainfall. Unfortunately, most of the areas visited were badly degraded and weed infested, resulting in low numbers of orchid species being recorded.

7.1 GRAPHICAL PRESENTATION OF RESULTS

Figure 7.2 presents a comparison between the average number of orchid species (including members of the *Pterostylis rufa* group) found at each location each day and the corresponding average number of taxa from the *P. rufa* group.

On a daily basis, the average number of taxa from the *Pterostylis rufa* complex recorded at each of the locations visited typically ranged between one and two, with only Day 10 failing to produce many *P. rufa* taxa. Fewer members of the *Pterostylis rufa* complex were recorded on days when the survey group was passing through areas of relatively high rainfall (ie. in excess of 350 mm average annual rainfall), however the largest number and variety of other orchid species were seen on those days (ie Days 1, 2, 10, 11 and 12).

Within the arid areas of the Goldfields where the average rainfall ranges between 250 and 300 mm per year, by far the largest number of taxa from the *Pterostylis rufa* were recorded. On these days, there was an average of two to three different *Pterostylis rufa* group taxa at each location visited. Also on these days, there were few other orchid species recorded. Not surprisingly, the results were reasonably consistent over these days.

Most of the second week of the survey was spent in areas of high average rainfall or concentrated on granite outcrop water runoff areas. This is reflected by the larger average numbers of orchid species recorded at each location on a daily basis.

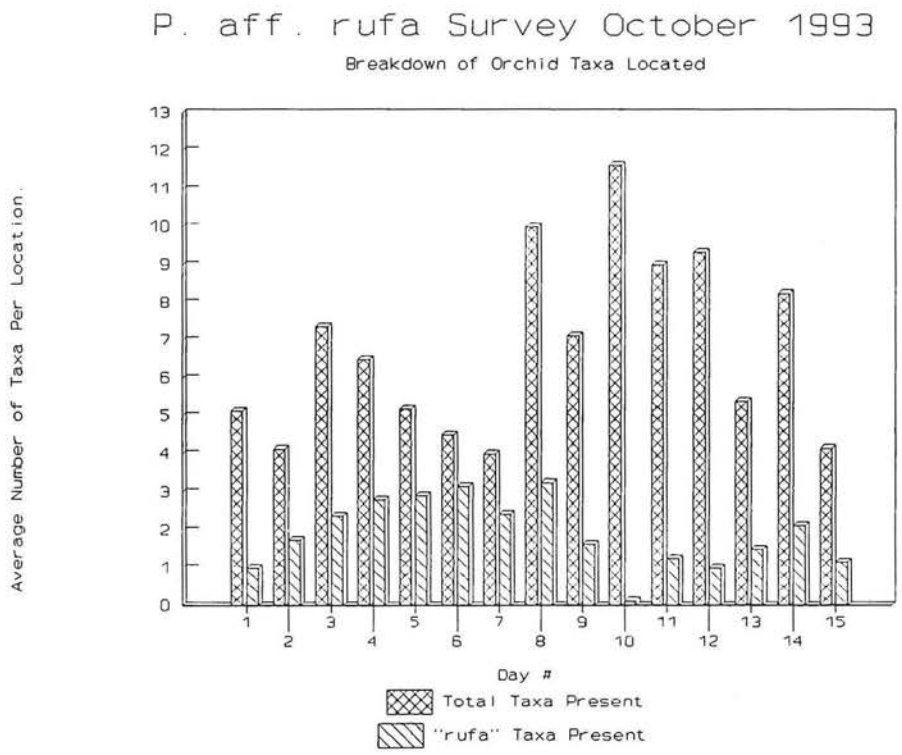

Figure 7.2: Daily Average Orchid Taxa Per Location

Figure 7.3 shows the number of different members of the *Pterostylis rufa* complex located as a percentage of the total number of different orchid species seen on a daily basis.

This graph indicates that taxa in the *Pterostylis rufa* complex predominated in the arid areas, where the average ranged from around 20 to 40 percent. Once again, Day 10, which was spent in the highest average annual rainfall area, showed the smallest percentage of *Pterostylis rufa* taxa (due to the larger number of different orchid species seen overall).

Interestingly, on days 13 to 15, which were mainly spent in average annual rainfall areas of 300 to 350 mm, approximately 20% (one in five) of the orchid species recorded were from the *Pterostylis rufa* group.

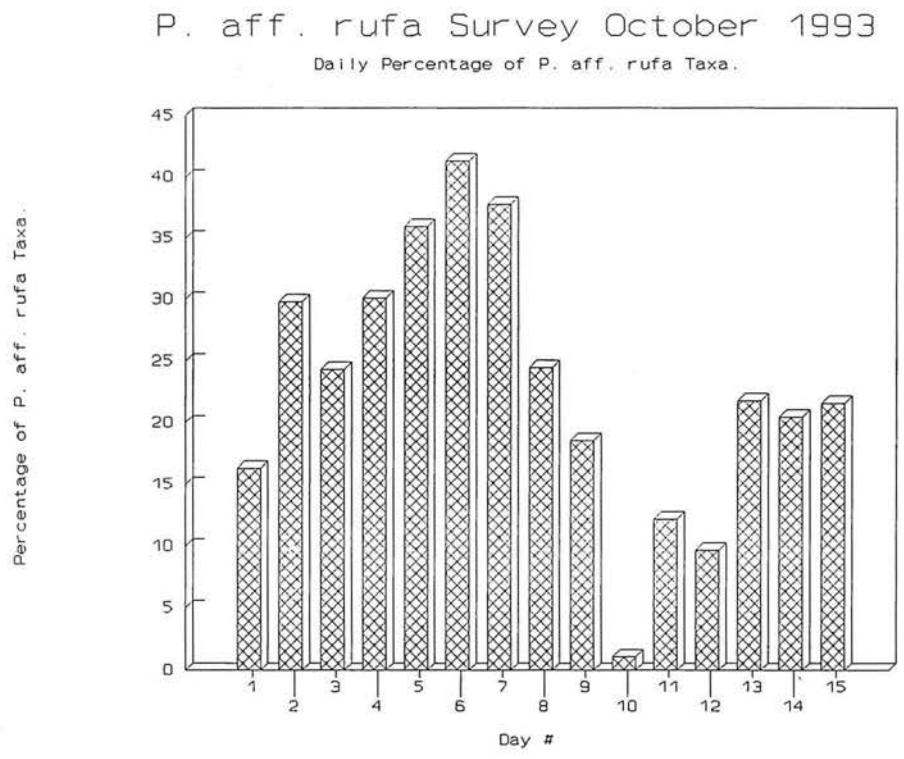

Figure 7.3: *P.* aff. *rufa* Taxa as a Percentage of Total.

Figure 7.4 shows the number of different members of the *Pterostylis rufa* complex that were seen on a daily basis as a percentage of the total number recorded.

This shows a similar trend to the preceding figures in that the majority of sightings were made in the first week in the arid areas of the Goldfields. Once again, few *Pterostylis rufa* taxa were seen on Day 10, in the high rainfall areas, while good recordings were made on days 13 and 14 in the 300 to 350 mm average annual rainfall areas.

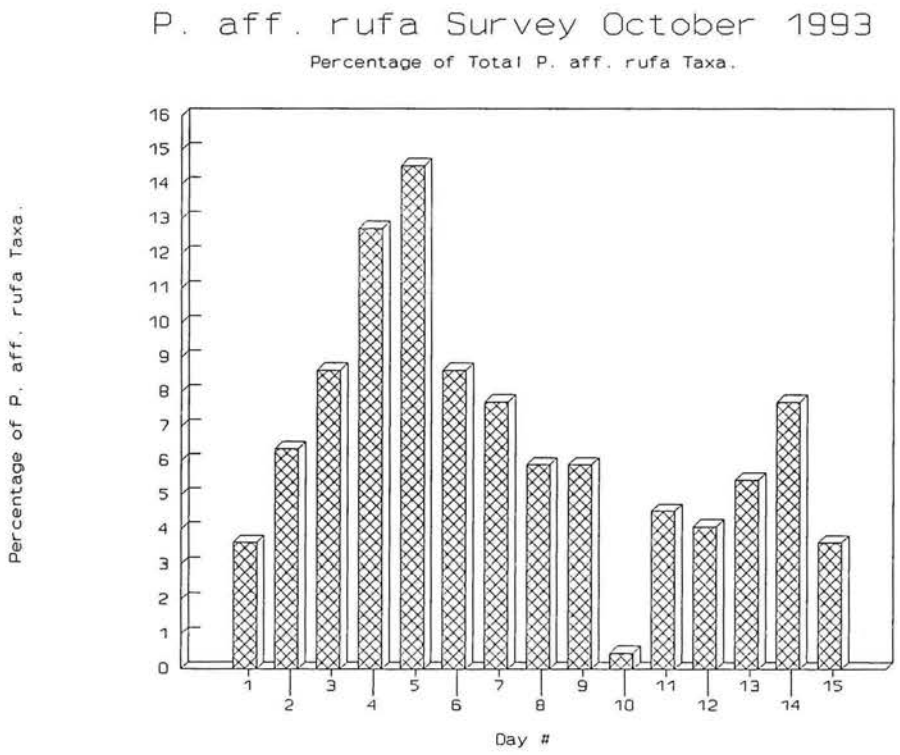

Figure 7.4: Daily Percentage of Total *P.* aff. *rufa* Taxa.

7.2 DISTRIBUTION MAPS FOR SELECTED SPECIES

The following four Distribution maps have been prepared to illustrate the ranges within which some of the members of the *Pterostylis rufa* complex were found on the survey. New locations for the selected taxa, along with some of the previously recorded locations are presented.

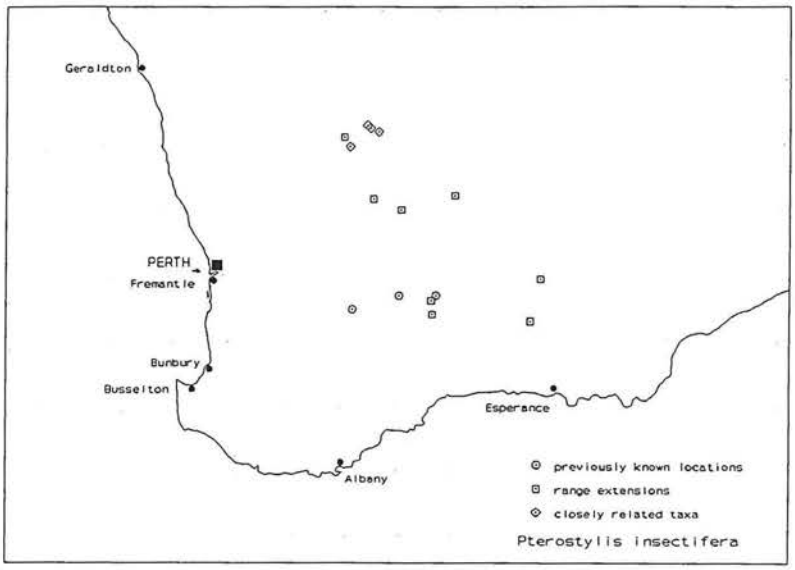

Figure 7.5: *Pterostylis insectifera*

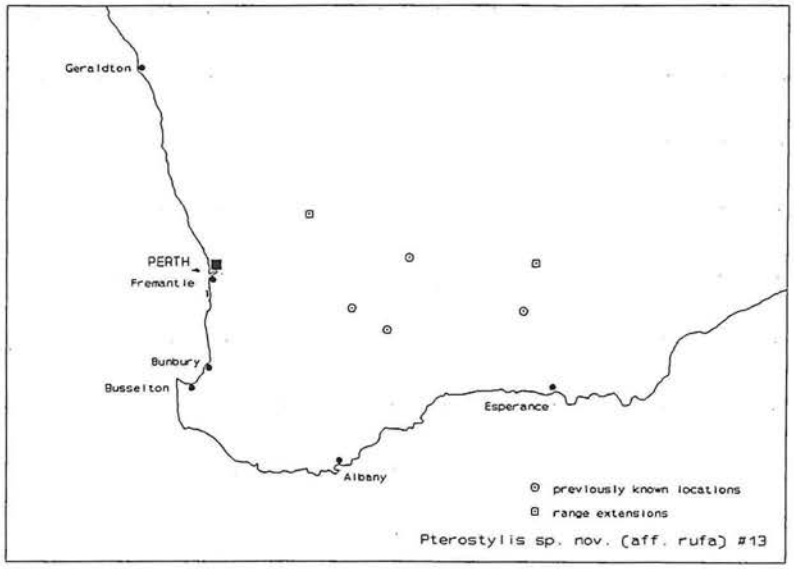

Figure 7.6: *Pterostylis* sp. nov. (aff. *rufa*) # 13

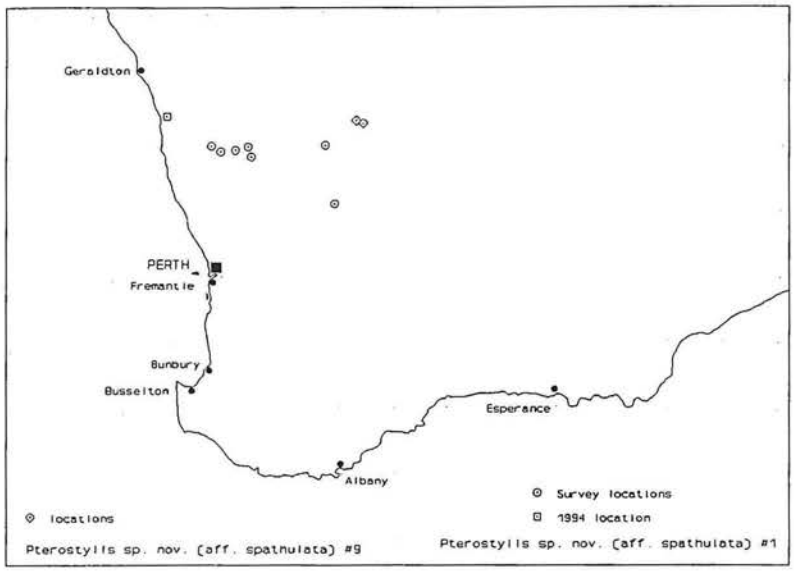

Figure 7.7: *Pterostylis* sp. nov. (aff. *spathulata*) #1
Pterostylis sp. nov. (aff. *spathulata*) #9

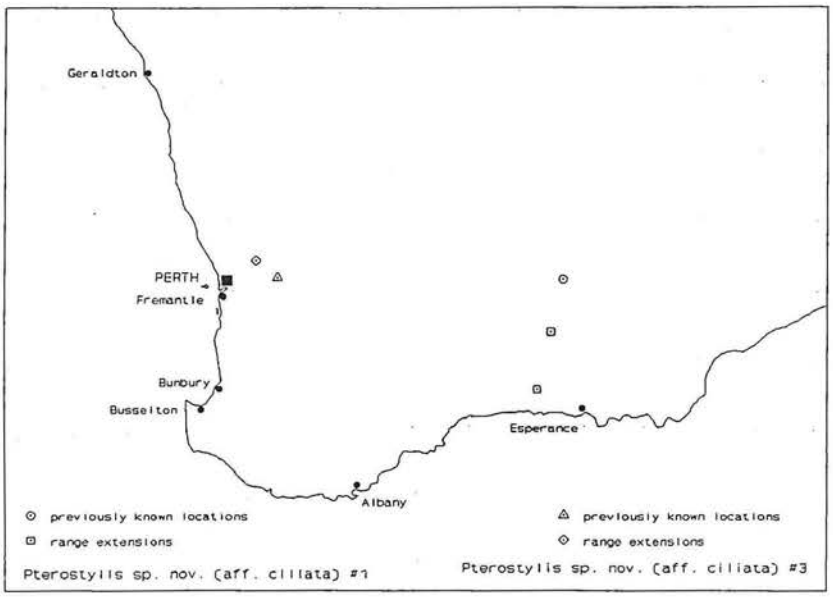

Figure 7.8: *Pterostylis* sp. nov. (aff. *ciliata*) #1
Pterostylis sp. nov. (aff. *ciliata*) #3

Figure 7.5

This Distribution Map shows some of the previously recorded sites for *Pterostylis insectifera*, along with the new locations discovered during the survey. At several survey locations there were plants in early flower as well as some still in bud that are believed to be related to *Pterostylis insectifera*. These locations are also recorded on the distribution map. As can be seen from figure 7.5, the range of *Pterostylis insectifera* was extended considerably as a result of the survey.

Figure 7.6

Pterostylis sp. nov. (aff. *rufa*) #13 is a distinctive, undescribed species. Prior to the survey, it was known from a few locations between Hyden, Lake Grace and Lake King and from Moir Rock. New populations were discovered between Norseman and Coolgardie (on a granite outcrop) and between Trayning and Wyalkatchem (in the road verge), resulting in a considerable range extensions.

Figure 7.7

Pterostylis sp. nov. (aff. *spathulata*) #1 was the first of several previously unrecorded taxa to be discovered on the survey. It was found on Day 1 of the survey near Gunyidi, with subsequent discoveries extending its range to the Karroun Hill Nature Reserve and Billyacatting Rock. In October 1994, a large population of this orchid was discovered north west of Eneabba resulting in a further range extension.

Pterostylis sp. nov. (aff. *spathulata*) #9 is a distinctive, small flowered taxon related to *P. spathulata*. It is one of several new taxa related to *Pterostylis spathulata* that were discovered during the survey.

Figure 7.8

Pterostylis sp. nov. (aff. *ciliata*) #1 is an undescribed taxon which had been previously recorded at a granite outcrop between Norseman and Coolgardie. Subsequent discovery of locations at near Moir Rock and West of Gibson have resulted in range extensions.

Pterostylis sp. nov. (aff. *ciliata*) #3 is an undescribed taxon which had been previously recorded near York. The discovery of this taxon south west of Toodyay has resulted in a range extension.

8.0 SELECTED SURVEY PHOTOGRAPHS

8.1 GENERAL PHOTOGRAPHS

Plate 1: Members of the Survey Group on the Day of Departure

Rear: Bill Jackson, Ron Foreman, Nye Evans, Chris French, Mat Tiong, David Jones.

Front: Greg Bussell, Andrew Brown, Joff Start.

Plate 2: Survey vehicles at Pinjarrega Lake Nature Reserve

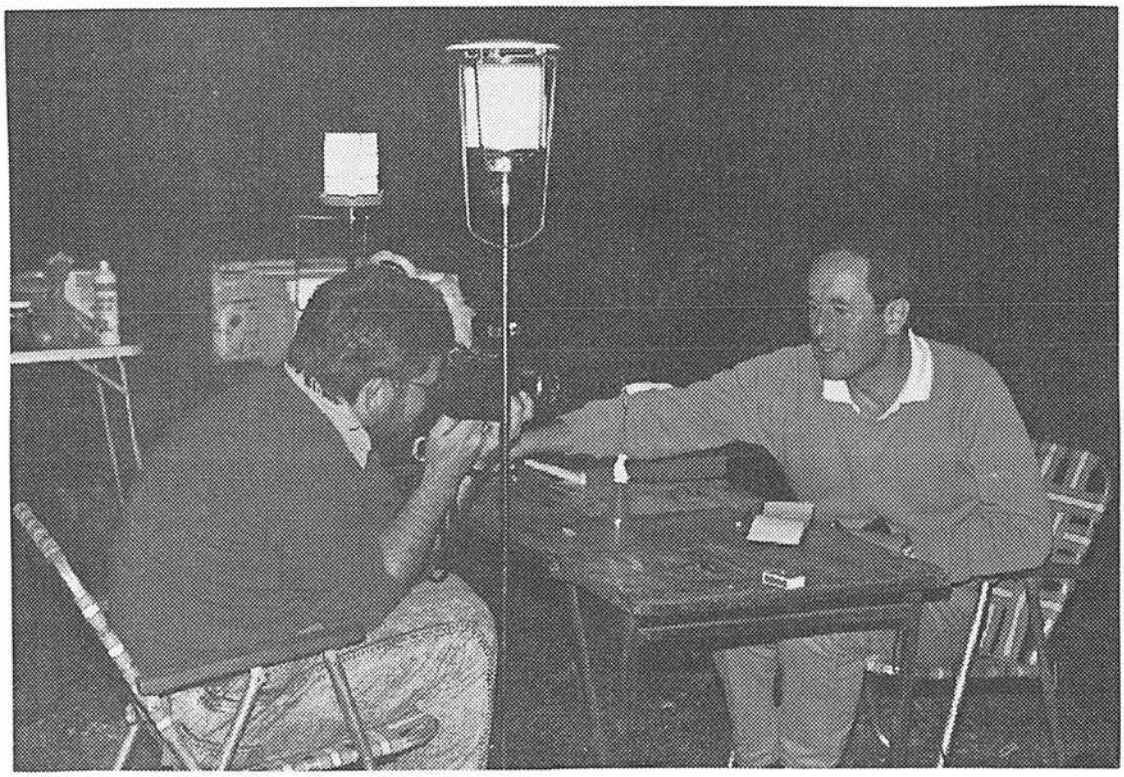

Plate 3: Chris French and Nye Evans Photographing the Day's Collections

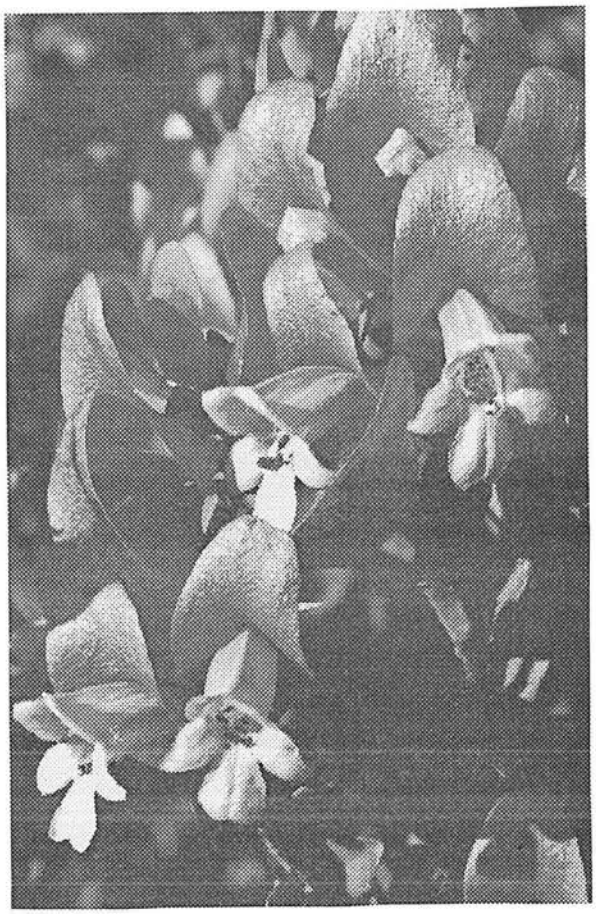

Plate 4: *Prostranthera magnifica* .. Cliff Hill

Plate 5: Along the Vermin Proof Fence .. Day 4

Plate 6: Along the Road(?) to Pigeon Rocks

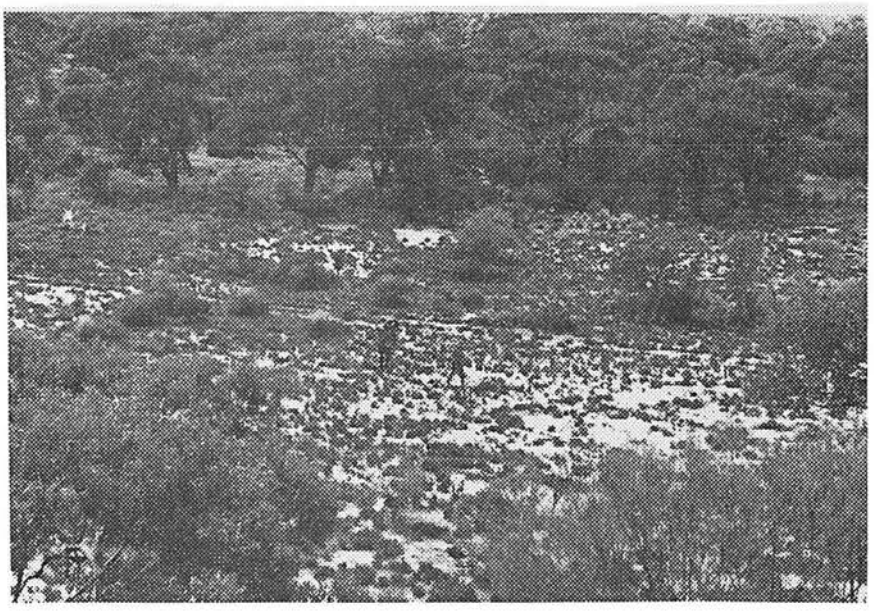

Plate 7: Searching Below a Breakaway along the Road to Pigeon Rocks

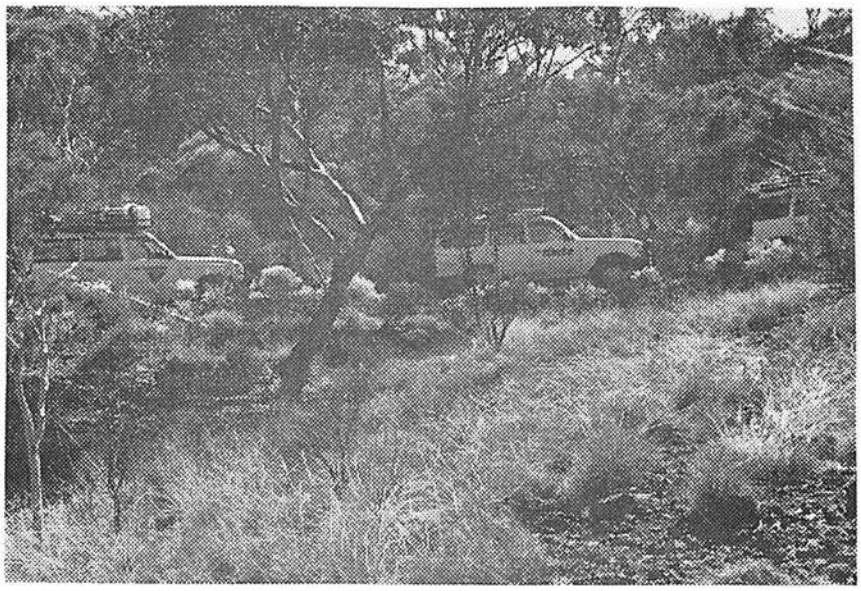

Plate 8: Helena and Aurora Range

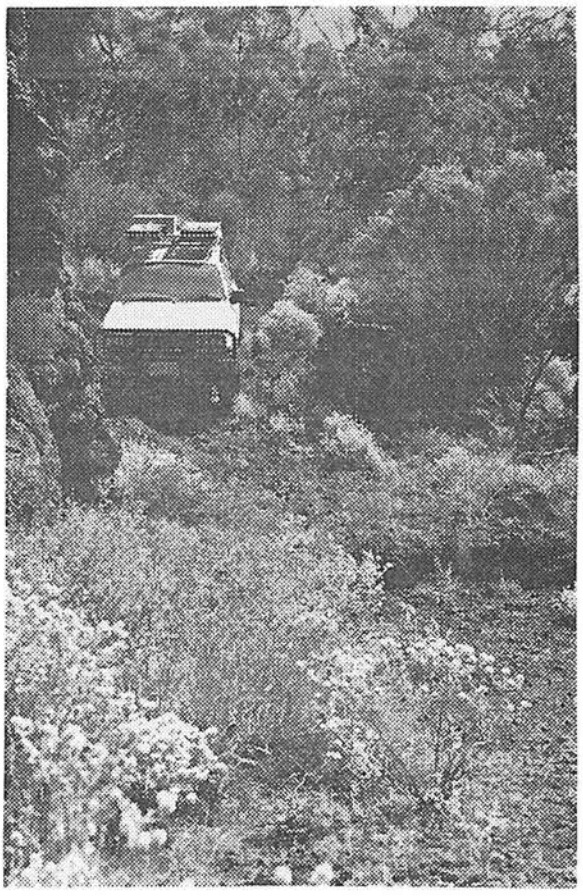

Plate 9: 4WD Pass Through Helena and Aurora Range

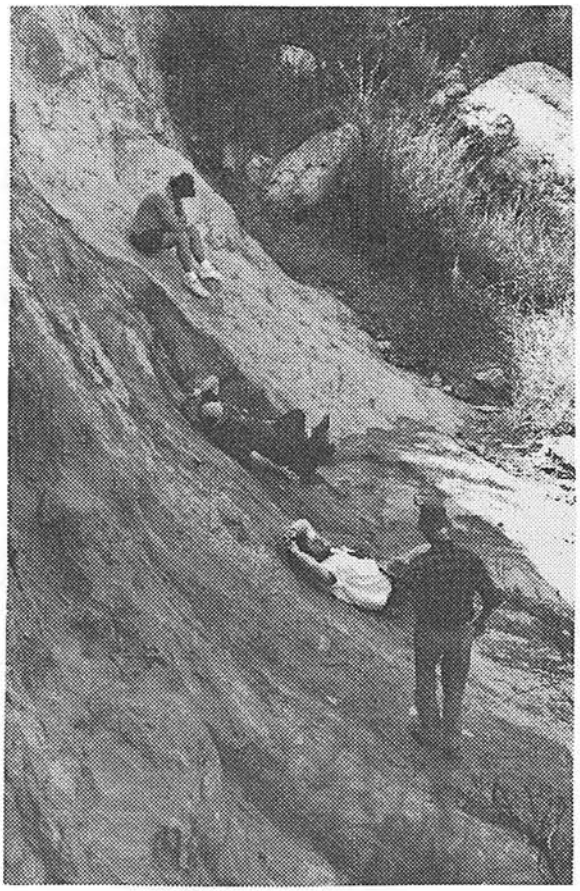

Plate 10: Resting in Disappointment at Peak Charles.

Plate 11: Nye Evans and Bill Jackson Photographing Orchids at Kumarl Road

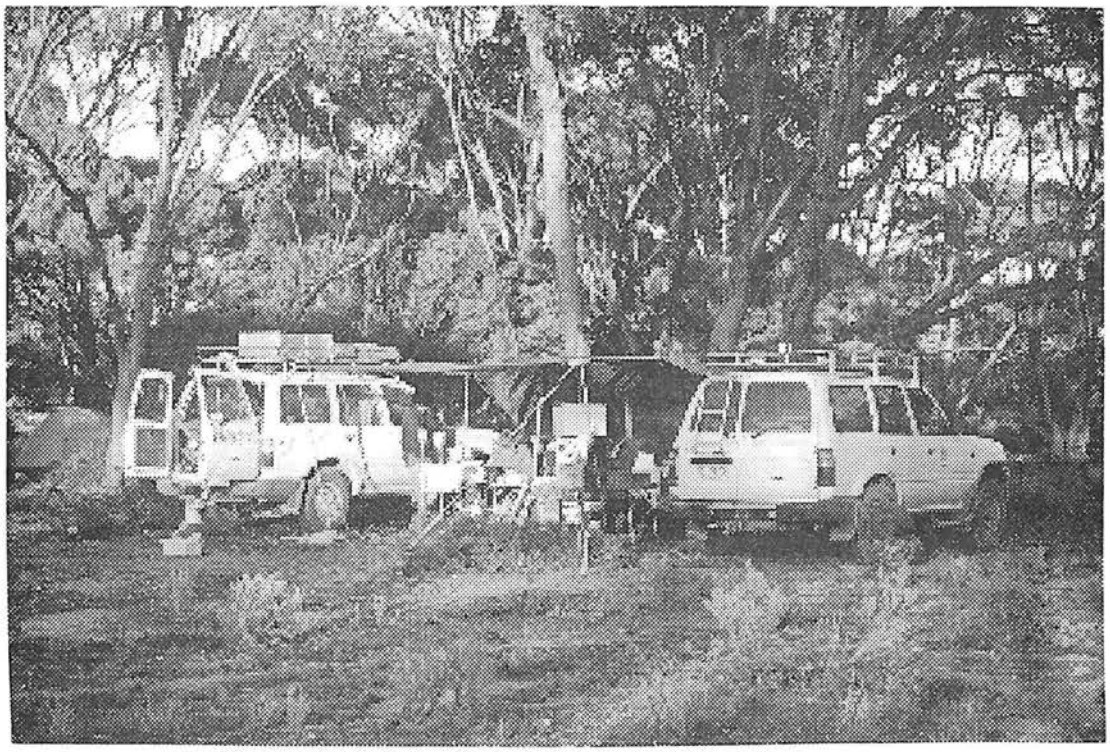

Plate 12: Campsite at Lake Cronin Nature Reserve

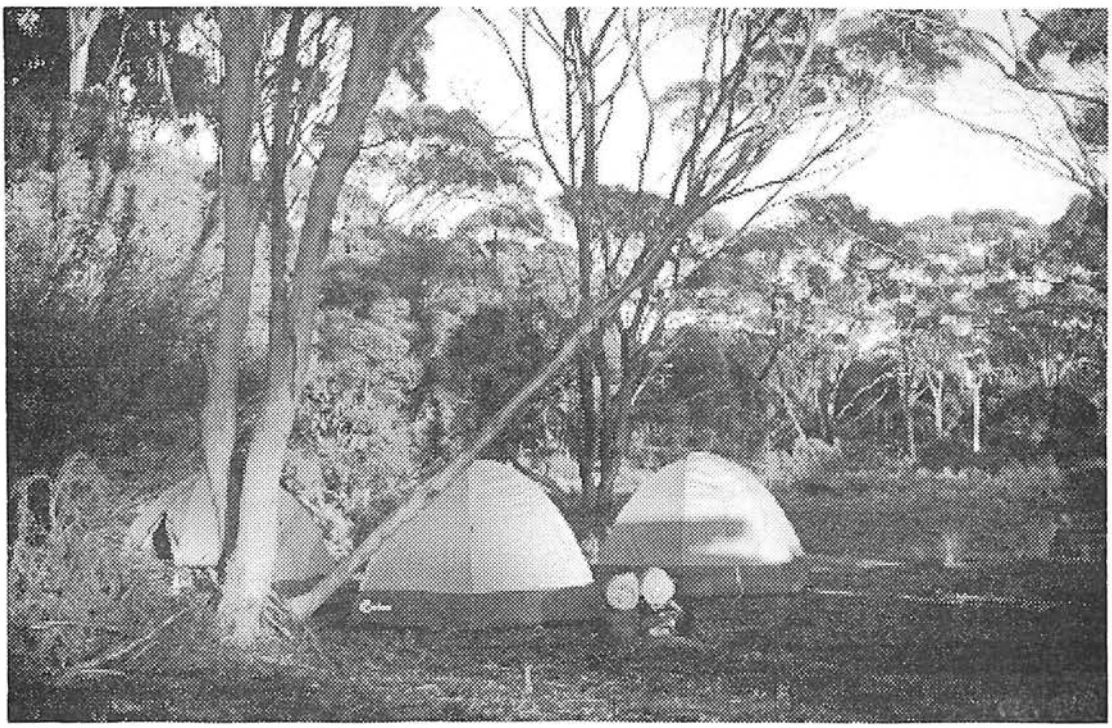

Plate 13: Campsite at Lake Cronin Nature Reserve

8.2 NAMED *Pterostylis rufa* GROUP SPECIES IN WESTERN AUSTRALIA

Plate 14: *Pterostylis ciliata*

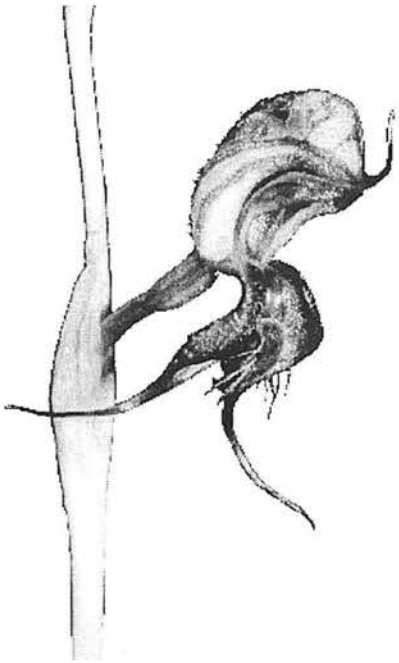

Plate 15: *Pterostylis insectifera*

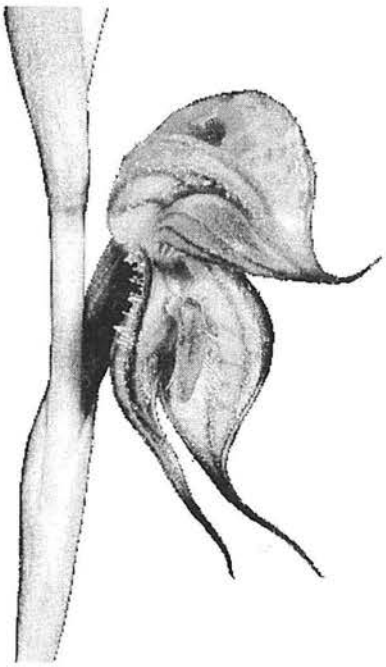

Plate 16: *Pterostylis leptochila*

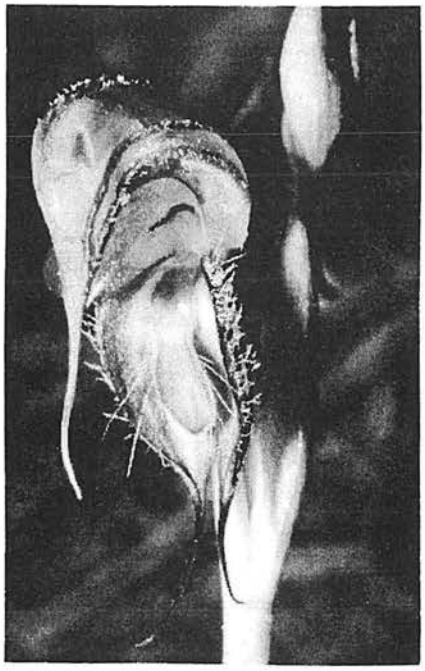

Plate 17: *Pterostylis macrocalymma*

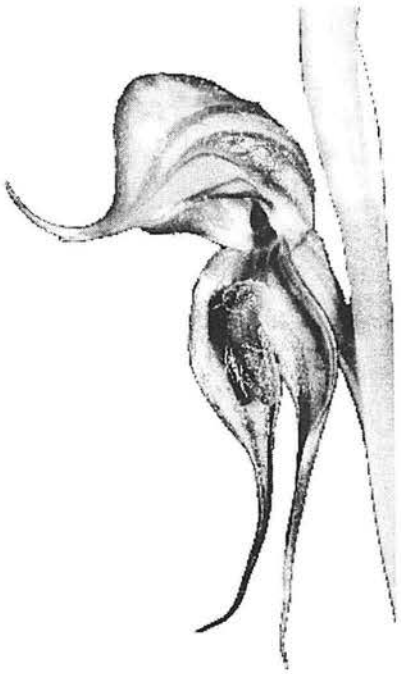

Plate 18: *Pterostylis picta*

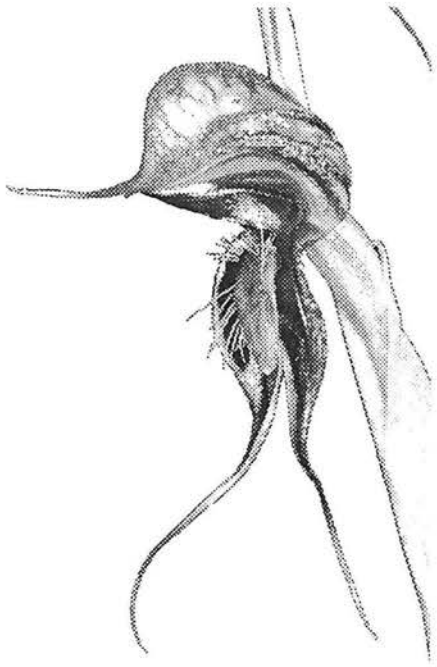

Plate 19: *Pterostylis roensis*

Plate 20: *Pterostylis spathulata*

8.3 UNDESCRIBED *Pterostylis rufa* GROUP SPECIES IN WESTERN AUSTRALIA

Plate 21: *Pterostylis* sp. nov.
(aff. *pusilla*)

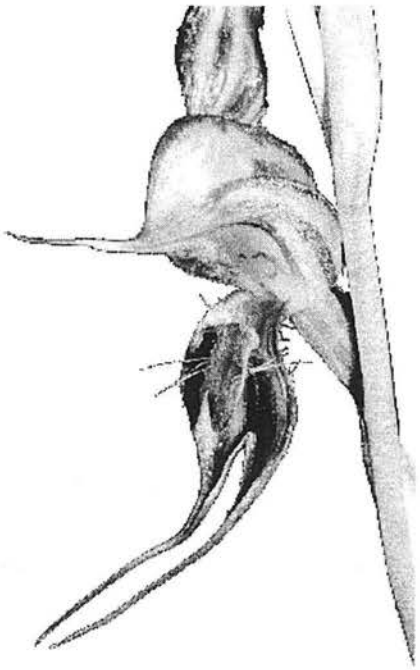

Plate 22: *Pterostylis* sp. nov.
(aff. *picta*)

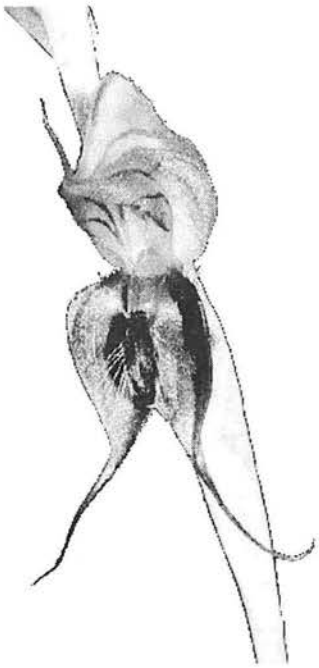

Plate 23: *Pterostylis* sp. nov.
(aff. *rufa*)

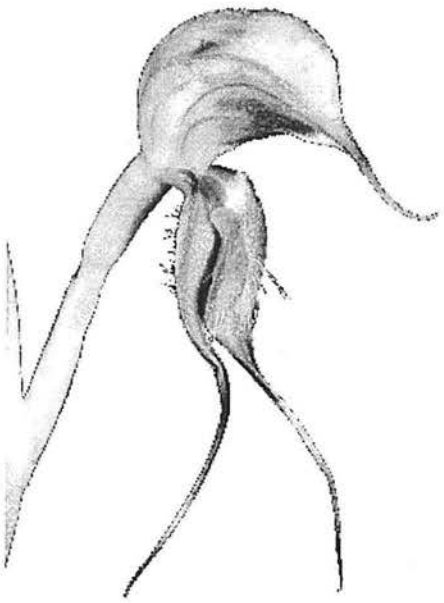

Plate 24: *Pterostylis* sp. nov.
(aff. *rufa*)

Plate 25: *Pterostylis* sp. nov.
(aff. *rufa*)

Plate 26: *Pterostylis* sp. nov.
(aff. *spathulata*)

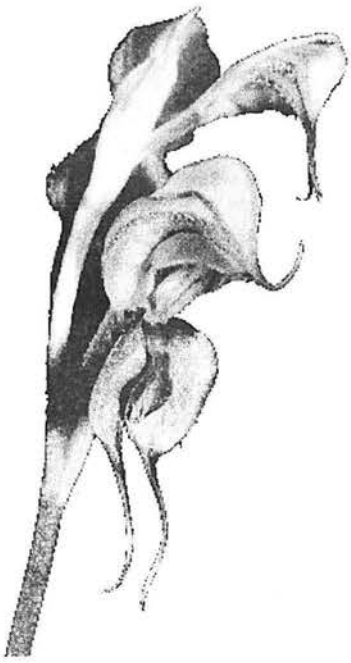

Plate 27: *Pterostylis* sp. nov.
(aff. *spathulata*)

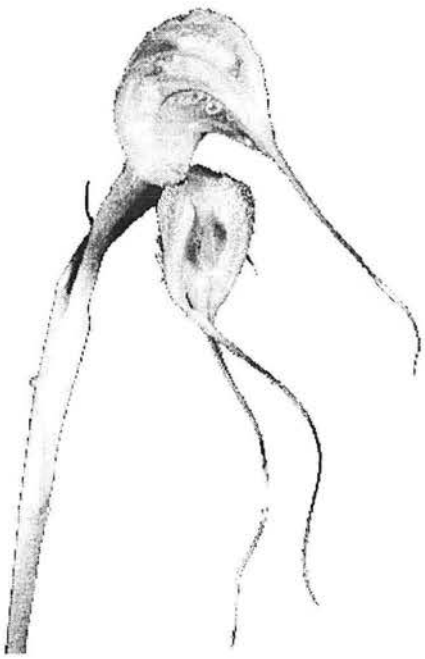

Plate 28: *Pterostylis* sp. nov.
(aff. *spathulata*)

9.0 REFERENCES

1. Australian Orchid Foundation 1989, *Catalogue Of Australian Orchidaceae* by Clements, M.A., Australian Orchid Research, vol 1, ed Jones, D.L., Australian Orchid Foundation, Essendon, Victoria with cooperation from Reed Books Pty. Ltd., Frenchs Forest, N.S.W.

2. Hoffman, N., Brown, A. 1984, *Orchids of South-West Australia*, University of Western Australia Press, Nedlands, Western Australia.

3. Hoffman, N., Brown, A. 1992, *Orchids of South-West Australia*, 2nd edn, University of Western Australia Press, Nedlands, Western Australia.

4. Jones, D.L., 1988, *Native Orchids of Australia*, Reed Books Pty. Ltd., Frenchs Forest, N.S.W.

APPENDIX 1: LOCATIONS VISITED

(Including Habitat Details and Orchid Species Found)

Day 1 - Sunday, October 3.

Location 1: Stephens Road, Bindoon.
Habitat details: Open *Eucalyptus wandoo* woodland over open low scrub and dense herbs. Lateritic loam.
Orchid species present:
Caladenia denticulata
C. arrecta ms (seed) (DLJ 12065)
Leptoceras menziesii (leaf)
Prasophyllum ringens
Pterostylis aff. *nana* (seed)
P. aff. *rufa* (rosette)
P. recurva (seed)
P. sp. nov. (aff. *sanguinea*) (seed)
P. scabra (seed)
Thelymitra sp. nov. (aff. *pauciflora*)
T. antennifera

Location 2: Great Northern Highway, North of New Norcia.
Habitat details: Open *Eucalyptus wandoo* and *E. loxophleba* woodland over low shrubs and dense introduced grasses. Lateritic loam.
Orchid species present:
Pterostylis picta (bud) (DLJ 12067)

Location 3: Corner of Piawaning Road and Great Northern Highway.
Habitat details: Scattered *Eucalyptus wandoo* over *E. loxophleba* and *Acacia acuminata* over low annuals and herbs. Margins of old gravel pit.
Orchid species present:
Caladenia flava subsp. *flava* ms
Diuris sp. nov. (aff. *setacea*) (bud)
D. sp. nov. (aff. *recurva*) (seed) (DLJ 12070)
Eriochilus dilatatus subsp. *multiflorus* ms (seed)
Pterostylis sp. nov. (aff. *sanguinea*) (seed)
Thelymitra benthamiana (bud)
T. villosa (DLJ 12069)

Location 4: Great Northern Highway, north of Piawaning Road.
Habitat details: Open *Eucalyptus wandoo* woodland over scattered low shrubs. Lateritic loam.
Orchid species present:
Pterostylis aff. *rufa* (bud)

Location 5: Moora Town Limits.
Habitat details: Open *Eucalyptus salmnophloia, E. wandoo, E. loxophleba* woodland over scattered sometimes dense *Melaleuca* over sparse low shrubs. Clay soil.
Orchid species present:
Diuris recurva (seed)
Pterostylis picta (DLJ 12072)
P. spathulata (DLJ 12071)
P. sp. nov. (aff. *spathulata*) (DLJ 12073)

Location 6: Corner of Eagle Hill Road and Midland Road.
Habitat details: Open *Eucalyptus wandoo, E. loxophleba* woodland over scattered shrubs. Area very weedy. Clay soil.
Orchid species present:
Pterostylis picta
Caladenia drummondii (seed)

Location 7: Eagle Hill Road west of Midlands Road , Watheroo National Park.

Habitat details: Dense mallee woodland over scattered low shrubs. Rocky brown loam.

Orchid species present:

Caladenia roei
C. flava subsp. *flava* ms
C. sp. (seed)
Cyanicula ashbyae ms (APB 1051)
Eriochilus dilatatus subsp. nov. (seed)
Elythranthera brunonis
Pterostylis sp. nov. (aff. *barbata*) #1 (seed)
P. sargentii (seed)

Location 8: Gunyidi - Wubin Road.

Habitat details: *Eucalyptus loxophleba*, *Acacia acuminata* over *Dodonaea* over dense low annuals and herbs. Brown clay-loam.

Orchid species present:

Caladenia flava subsp. *flava* (seed)
C. hirta (seed)
Cyanicula deformis ms (seed)
Diuris recurva (seed)
D. sp. nov. (aff. *recurva*) (seed)
Prasophyllum ringens
Pterostylis sp. nov. (aff. *spathulata*) #1

Day 2 -- Monday, October 4.

Location 9: Pinjarrega Lake Nature Reserve.

Habitat details: Scattered *Eucalyptus loxophleba* over tall *Melaleuca* and *Acacia*. Sandy-clay soil.

Orchid species present:

Caladenia cristata (DLJ 12082)
C. flava subsp. *maculata* ms (DLJ 12084)
C. longicauda subsp. *borealis* ms (DLJ 12081)
C. roei (DLJ 12083)
Prasophyllum ringens
Pterostylis picta (DLJ 12080)
P. aff. *sanguinea* (seed)
P. sp. nov. (aff. *spathulata*) #1 (DLJ 12079)
P. sp. nov. (aff. *spathulata*) #2 (DLJ 12078)
P. sp. nov. (aff. *spathulata*)

Location 10: Gunyidi - Wubin Road.

Habitat details: Sandy rise to small salt lake. Shrubland of *Melaleuca*, *Acacia* and *Hakea* spp.

Orchid species present:

Caladenia doutchiae (DLJ 12087)
C. flava (seed)
C. roei
Diuris sp. nov. (aff. *magnifica*) (DLJ 12088)
Drakonorchis drakeoides ms
X Drakodenia ornata ms (DLJ 12087A)
Prasophyllum ringens
Pterostylis sp. nov. (aff. *spathulata*) (DLJ 12086)
Thelymitra flexuosa (seed)

Location 11: Gunyidi - Wubin Road.

Habitat details: Rocky rise above salt lake. *Eucalyptus loxophleba* woodland over open shrubland of *Dodonaea*, *Melaleuca cordata*. Rocky red loam.

Orchid species present:

Pterostylis sp. nov. (aff. *spathulata*) #1 (DLJ 12089)

Location 12: Gunyidi - Wubin Road.

Habitat details: Rocky rise above salt lake. Open *Eucalyptus loxophleba* woodland over scattered *Dodonaea* and *Melaleuca cordata*. Rocky red loam.

Orchid species present:

Pterostylis sp. nov. (aff. *spathulata*) (DLJ 12091)
P. sp. nov. (aff. *spathulata*) #1 (DLJ 12090)

Location 13: North side of Wubin townsite.
Habitat details: Open woodland.
Orchid species present:
Caladenia sp. (seed)
Pterostylis aff. *nana* (seed)
P. sp. nov. (aff. *spathulata*) #1 (DLJ 12092)

Location 14: Wubin - Dalwallinu Road
Habitat details: Open *Eucalyptus loxophleba* woodland. Sandy loam.
Orchid species present:
Pterostylis sp. nov. (aff. *spathulata*) #1 (DLJ 12094)
P. sp. nov. (aff. *spathulata*) #2

Location 15: Kalannie - Bunktech Road.
Habitat details:
Orchid species present:
Pterostylis sp. nov. (aff. *spathulata*)

Location 16: Mollerin - Beacon Road, east of Samphire Road.
Habitat details: Dense *Acacia* shrubland. Sandy-loam over laterite.
Orchid species present:
Caladenia roei (seed)
Pterostylis aff. *nana* (seed)
P. sp. nov. (aff. *spathulata*) #2 (DLJ 12096)
P. sp. nov. (aff. *spathulata*) #3 (DLJ 12097)
Thelymitra aff. *macrophylla*

Day 3 -- Tuesday, October 5.

Location 17: 'KINGS PARK', Property of Hazel and John King.
Habitat details: Low granite complex. Orchids found in shallow soils associated with *Acacia acuminata*, *Allocasuarina campestris*, *Thryptomene australis* and *Borya spherocephala*, and in fringing mallee woodland. Moist granitic loam.
Orchid species present:
Caladenia radialis
C. radialis x *C. roei*
C. roei
Cyanicula deformis ms(seed)
C. fragrans ms (APB 1052A / DLJ 12098)
Diuris sp. nov. (aff. *corymbosa*) #1 (DLJ 12100)
D. sp. (seed)
Drakonorchis drakeoides ms
D. mesocera ms
Prasophyllum ringens
Pterostylis sp. nov. (aff. *spathulata*) #2 (DLJ 12099)
P. sp. nov. (aff. *spathulata*) #3
Spiculaea ciliata (bud)
Thelymitra antennifera
T. aff. *macrophylla*
T. x *macmillanii*

Location 18: Stone Road, off Beacon - Bimbijy Road.
Habitat details: Tall *Acacia, Hakea* shrubland with emergent *Eucalyptus loxophleba*. Brown sandy soil.
Orchid species present:
Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. picta
P. sp. nov. (aff. *spathulata*) #2
P. sp. nov. (aff. *spathulata*) #3

Location 19: Opposite Pothole dam, Stone Road.
Habitat details: Tall *Acacia, Hakea* shrubland with emergent *Eucalyptus loxophleba* over dense introduced weeds. Brown sandy soil.
Orchid species present:
Caladenia roei
Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. sp. nov. (aff. *spathulata*) #2 (DLJ 12101 / DLJ 12102)
P. sp. nov. (aff. *spathulata*) #3

Location 20: Tampu Well, Beacon - Bimbijy Road.

Habitat details: Low granitic dome. Orchids found in shallow soils associated with *Acacia acuminata*, *Allocasuarina campestris*, *Thryptomene australis* and *Borya spherocephala*. Granitic loam, still moist in places.

Orchid species present:

Caladenia sp. (seed)
Cyanicula amplexans ms (DLJ 12104)
Diuris sp. nov. (aff. *corymbosa*) #1
Drakonorchis mesocera ms (DLJ 12103)
Prasophyllum ringens
Pterostylis sp. nov. (aff. *spathulata*) #2
Spiculaea ciliata (bud)
Thelymitra antennifera
T. x *macmillanii*
T. aff. *macrophylla* (DLJ 12105)

Location 21: Beacon - Bimbijy Road, north of the vermin proof fence.

Habitat details: *Eucalyptus loxophleba* woodland fringed by *Acacia* shrubland. Rich red loam.

Orchid species present:

Caladenia hirta subsp. *rosea* ms (seed)
Pterostylis. aff. *nana* (seed)
P. sp. nov. (aff. *picta*) #1 (DLJ 12106)
P. sp. nov. (aff. *picta*) #2 (DLJ 12107)
P. sp. nov. (aff. *rufa*) #1
P. sp. nov. (aff. *spathulata*) #2 (DLJ 12108A / DLJ 12108)

Location 22: Karroun Hill track.

Habitat details: *Eucalyptus loxophleba* over scattered shrubs. Rich red clay-loam.

Orchid species present:

Pterostylis. mutica (seed)
P. sp. nov. (aff. *picta*) (DLJ 12113)
P. sp. nov. (aff. *spathulata*) #1 (DLJ 12112)
P. sp. nov. (aff. *spathulata*) (DLJ 12110)
P. sp. nov. (aff. *spathulata*) (DLJ 12111)
P. sp. nov. (aff. *spathulata*) #2 (DLJ 12114)

Location 23: Karroun Hill.

Habitat details: Large granite complex with damp creek running off to the south. *Acacia acuminata*, *Thryptomene australis* and *Borya spherocephala* in shallow soil on rock. Granitic loam, still moist in places.

Orchid species present:

Caladenia roei
Diuris sp. nov. (aff. *corymbosa*) #1
D. picta (APB 1053 / DLJ 12115)
Microtis aff. *media* (APB 1054)
Prasophyllum ringens
Pterostylis sp. nov. (aff. *spathulata*) #4 (DLJ 12116)
P. sp. nov. (aff. *spathulata*) #3 (DLJ 12118)
Thelymitra antennifera
T. aff. *macrophylla*
T. x macmillanii

Location 24: Karroun Hill - Cliff Hill track.

Habitat details: *Acacia acuminata, A. denticulosa* (DLJ 12122), *Thryptomene australis* . Granitic loam.

Orchid species present:

Cyanicula fragrans ms (DLJ 12123)
Prasophyllum ringens
Thelymitra antennifera

Day 4 -- Wednesday, October 6.

Location 25: Cliff Hill

Habitat details: Large granite outcrop with *Thryptomene australis, Acacia denticulosa, Prostranthera magnifica* (DLJ 12124) and *Eucalyptus crucis subsp. lanceolata* (DLJ 12125) growing in shallow soil pockets. Granitic loam.

Orchid species present:

Caladenia roei (DLJ 12126)
Cyanicula amplexans ms (DLJ 12128)
Diuris sp. nov. (aff. *corymbosa*) #1

Drakonorchis mesocera ms
Prasophyllum ringens (seed)
Pterostylis sp. nov. (aff. *spathulata*) #5 (DLJ 12127)
Spiculaea ciliata (bud)
Thelymitra aff. *macrophylla* (seed)
T. sp. nov. (aff. *pauciflora*) (bud)

Location 26: East of Cliff Hill
Habitat details: *Eucalyptus loxophleba* woodland. Sandy loam.
Orchid species present:
Drakonorchis mesocera ms (DLJ 12131)
Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. sp. nov. (aff. *picta*) (DLJ 12130)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12129)
Thelymitra aff. *macrophylla* (seed)

Location 27: East of Cliff Hill
Habitat details: *Eucalyptus salmnophloia, E.loxophleba* woodland. Rich brown sandy loam.

Orchid species present:
Caladenia roei
C. sp. (seed)
Pterostylis insectifera
P. sp. nov. (aff. *picta*) (DLJ 12136)
P. sp. nov. (aff. *picta*) #3 (bud) (DLJ 12132)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12133)
P. sp. nov. (aff. *spathulata*) #6 (DLJ 12134)
P. sp. nov. (aff. *spathulata*) #7 (DLJ 12135)
Thelymitra aff. *macrophylla* (seed)

Location 28: East of Cliff Hill
Habitat details: *Melaleuca* shrubland over dense low annuals. Brown sandy clay.
Orchid species present:
Pterostylis mutica (seed) (DLJ 12138)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12137)
P. sp. nov. (aff. *spathulata*) #8 (DLJ 12139)
Thelymitra aff. *macrophylla*

Location 29: East of Cliff Hill
Habitat details: *Eucalyptus salmnophloia* over scattered low shrubs. Brown sandy-clay.
Orchid species present:
Pterostylis mutica (seed)
P. aff. *nana* (seed)
P. sp. nov. (aff. *spathulata*) #5
Thelymitra aff. *macrophylla* (seed)

Location 30: Emu proof fence, east of track running north to Cliff Hill.
Habitat details: Open *Eucalyptus wandoo*, gimlet woodland over *Daviesia, Melaleuca*. Light brown sandy-clay.
Orchid species present:
Caladenia roei (seed)
Pterostylis sp. nov. (aff. *picta*) #3 (bud) (DLJ 12141)
P. sargentii (seed)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12140)
Thelymitra aff. *macrophylla*

Location 31: Emu proof fence, east of track running north to Cliff Hill.
Habitat details: Top of small hill. *Eucalyptus wandoo* over *Melaleuca, Dodonaea* and sparse low annuals. Rocky clay soil.
Orchid species present:
Caladenia sigmoidea (seed)
Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. sp. nov. (aff. *picta*) (DLJ 12143)
P. aff. *rufa* (bud)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12142)
Thelymitra aff. *macrophylla*
T. pauciflora (DLJ 12142A)

Location 32: Emu proof fence, east of road to Cliff Rock.
Habitat details: Small breakaway with *Eucalyptus wandoo* over tall *Melaleuca* at base and dense shrubland on top. Rocky clay soil.

Orchid species present:

Pterostylis mutica (seed) (DLJ 12146)
Pterostylis aff. *mutica* (tall)
P. sargentii (seed)
P. sp. nov. (aff. *spathulata*) #7 (DLJ 12145)
P. sp. nov. (aff. *spathulata*) #5
Thelymitra aff. *macrophylla*

Location 33: Breakaway on track to Pigeon Rocks, near vermin proof fence.

Habitat details: Shrubland of *Dodonaea,* Acacia and *Bayera.* Rocky soil.

Orchid species present:

Caladenia incensa ms (seed)
Cyanicula amplexans ms (seed)
Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. sp. nov. (aff. *picta*) #4 (DLJ 12148)
P. sp. nov. (aff. *rufa*) #2 (bud) (DLJ 12151)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12147)
P. sp. nov. (aff. *spathulata*) #9 (DLJ 12150)
P. sp. nov. (aff. *spathulata*) (DLJ 12149)
Thelymitra aff. *macrophylla*

Location 34: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: *Eucalyptus wandoo* woodland, fringing yellow sandplain. Sandy-clay soil.

Orchid species present:

Pterostylis mutica (seed)
P. aff. *nana* (seed)
P. sp. nov. (aff. *picta*) (DLJ 12154)
P. sp. nov. (aff. *picta*) #5 (bud) (DLJ 12153)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12152)
P. sp. nov. (aff. *spathulata*) #9 (DLJ 12155)
Thelymitra aff. *macrophylla*

Day 5 -- Thursday, October 7.

Location 35: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Open *Eucalyptus loxophleba* woodland over scattered shrubs and dense low annuals. Red loam soil.

Orchid species present:

Pterostylis sp. nov. (aff. *picta*) (DLJ 12157)
P. sp. nov. (aff. *spathulata*) #7 (DLJ 12156)
P. sp. nov. (aff. *spathulata*) #5
Thelymitra aff. *macrophylla*

Location 36: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Open *Eucalyptus loxophleba* woodland over scattered shrubs and dense low annuals. Red loam soil.

Orchid species present:

Pterostylis sp. nov. (aff. *picta*) (DLJ 12159)
P. sp. nov. (aff. *picta*) #5 (DLJ 12161)
P. sp. nov. (aff. *rufa*) #1
P. sp. nov. (aff. *spathulata*) #7
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12160)
P. sp. nov. (aff. *spathulata*) #10 (DLJ 12162)
Thelymitra aff. *macrophylla*

Location 37: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Dense *Acacia aneura* tall shrubland over scarce annuals. Yellow sandy soil.

Orchid species present:

Pterostylis sp. nov. (aff. *rufa*) #1 (DLJ 12165)
P. sp. nov. (aff. *spathulata*) #7
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12164)
P. sp. nov. (aff. *spathulata*) #10 (DLJ 12163)
Thelymitra aff. *macrophylla*

Location 38: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Large breakaway with low shrubland of *Thryptomene, Hakea* and *Acacia* in shallow soil pockets. Very rocky soil.

Orchid species present:

Caladenia incrassata ms (seed)
Cyanicula amplexans ms (seed)

Pterostylis sp. nov. (aff. *picta*) (DLJ 12167)
P. sp. nov. (aff. *rufa*) #1 (DLJ 12168)
P. sp. nov. (aff. *rufa*) #3 (DLJ 12169)
P. sp. nov. (aff. *spathulata*) #11 (DLJ 12172)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12170)
P. sp. nov. (aff. *spathulata*) #12 (DLJ 12171)
Thelymitra aff. *macrophylla*

Location 39: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Low granite outcrop with *Kunzea pulchella*, *Thryptomene australis Acacia* in shallow soil pockets and dense tall *Acacia* in surrounding deeper soils. Granitic loam.

Orchid species present:

Caladenia incensa ms (seed)
C. roei (seed)
Cyanicula amplexans ms (seed)
Pterostylis aff. *nana* (seed)
P. sp. nov. (aff. *rufa*) #1 (DLJ 12174 / DLJ 12174A)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12173)
Thelymitra aff. *macrophylla* (seed)

Location 40: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Large granite outcrop with several shallow pools of water surrounded by open *Acacia* shrubland. Dense annuals in places. Granitic loam.

Orchid species present:

Caladenia incensa ms (seed)
C. roei
Cyanicula amplexans ms
Drakonorchis mesocera ms (seed)
Microtis sp. nov. (aff. *parviflora*) (DLJ 12175)
Pterostylis sp. nov. (aff. *rufa*) #1 (DLJ 12176)
P. sp. nov. (aff. *rufa*) #4 (DLJ 12179)
P. sp. nov. (aff. *spathulata*) #12
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12177)
Spiculaea ciliata
Thelymitra antennifera
T. aff. *macrophylla* (seed)
T. x macmillanii

Location 41: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Dense shrubland with emergent scattered mallee over yellow sand.

Orchid species present:

Pterostylis aff. *rufa* (bud) (DLJ 12183)

Location 42: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Small Breakaway

Orchid species present:

Pterostylis sp. nov. (aff. *rufa*)
P. sp. nov. (aff. *rufa*) #1

Location 43: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Flat granite outcrop with scattered low shrub thickets in shallow soil pockets. Granitic loam.

Orchid species present:

Prasophyllum ringens
Pterostylis sp. nov. (aff. *rufa*) #1 (DLJ 12185)
P. sp. nov. (aff. *spathulata*) #13 (DLJ 12186)
P. sp. nov. (aff. *spathulata*) #14
Thelymitra aff. *macrophylla* (seed)

Location 44: Track to Pigeon Rocks, east of vermin proof fence.

Habitat details: Open mallee woodland with scattered tall shrubs. Red sand.

Orchid species present:

Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. sp. nov. (aff. *rufa*) #1 (DLJ 12188)

Location 45: Pigeon Rocks
Habitat details: Large granite outcrop with scattered low *Thryptomene* in shallow soil pockets. Very weedy and a great deal of damage done by stock. Granitic loam.
Orchid species present:
Diuris sp. (seed)
Microtis sp. nov. (aff. *parviflora*) (DLJ 12189)

Day 6 -- Friday, October 8.

Location 46: Evanston - Bullfinch Road, north of the Die Hardy Range.
Habitat details: Lateritic rise with dense shrubland of *Acacia, Leptospermum* and *Allocasuarina campestris* over sparse low annuals. Massive lateritic loam.
Orchid species present:
Pterostylis sp. nov. (aff. *picta*) #6 (DLJ 12192)
P. sp. nov. (aff. *rufa*) #1 (DLJ 12193)
P. sp. nov. (aff. *rufa*) #5
(DLJ 12196 / DLJ 12197)

Location 47: Evanston - Bullfinch Road, north of the Die Hardy Range
Habitat details: Slope to banded ironstone hill. Open *Eucalyptus loxophleba* over *Acacia aneura*, *A.* sp and *Dodonaea*. Very rocky soil.
Orchid species present:
Pterostylis aff. *nana* (seed)
P. sp. nov. (aff. *picta*) (DLJ 12201)
P. sp. nov. (aff. *picta*) #6 (DLJ 12202)
P. sp. nov. (aff. *rufa*) #1
P. sp. nov. (aff. *rufa*)
P. sp. nov. (aff. *rufa*)

Location 48: Evanston - Bullfinch Road, pass through the Die Hardy Range.
Habitat details: Banded ironstone hills. *Acacia* shrubland with occasional emergent *Eucalyptus loxophleba*. Rocky loam.
Orchid species present:
Pterostylis sp. nov. (aff. *rufa*) #6 (DLJ 12203)
P. sp. nov. (aff. *rufa*) #7 (DLJ 12204)

Location 49: Marda Rockhole near Marda tank east of the Evanston - Bullfinch Road, south of the Die Hardy Range
Habitat details: Flat rocky top to breakaway. Scattered low *Dodonaea*, *Thryptomene australis* in shallow soil pockets.
Orchid species present:
Caladenia incensa ms (seed)
C. incrassata ms (seed)
Pterostylis aff. *nana* (seed)
P. sp. nov. (aff. *rufa*) #8 (DLJ 12207)
P. sp. nov. (aff. *rufa*) #9 (DLJ 12206)

Location 50: West of the Helena and Aurora Ranges
Habitat details: Small range of banded ironstone hills with dense tall *Acacia, Dodonaea* shrubland on southern slopes and open salmon gum woodland below.
Orchid species present:
Cyanicula amplexans ms (seed)
Diuris sp. (seed) (DLJ 12213)
Pterostylis aff. *nana* (seed)
P. sp. nov. (aff. *picta*) #6 (DLJ 12212)
P. sp. nov. (aff. *rufa*) #10 (DLJ 12209)
P. sp. nov. (aff. *rufa*) #11 (DLJ 12208)
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12210)
Thelymitra aff. *macrophylla* (seed)

Location 51: North east of the Helena and Aurora Ranges
Habitat details: Yellow sand plain.
Orchid species present:
Pterostylis aff. *nana* (seed)

P. sp. nov. (aff. *picta*) #6
P. sp. nov. (aff. *spathulata*) #7 (DLJ 12215)
P. sp. nov. (aff. *spathulata*) (DLJ 12216)
Thelymitra aff. *macrophylla* (seed)
T. sargentii (bud) (APB 1065)

Day 7 -- Saturday, October 9.

Location 52: Pass through the Helena and Aurora Ranges.
Habitat details: Rocky slopes of hills in open *Eucalyptus* woodland over *Triodia.* Very rocky soil.
Orchid species present:
Cyanicula amplexans ms (seed)
Pterostylis sp. nov. (aff. *picta*)
P. sp. nov. (aff. *picta*) #6 (DLJ 12220)
P. sp. nov. (aff. *rufa*) (bud) (DLJ 12226)
P. sp. nov. (aff. *spathulata*) (DLJ 12225)
Thelymitra aff. *macrophylla* (seed)

Location 53: West side of Helena and Aurora Ranges. Outlying hill, just north of Bungalbin Hill.
Habitat details: Open *Eucalyptus* woodland at base with dense shrubland upslope. Rocky soil.
Orchid species present:
Caladenia incrassata ms (seed)
C. sigmoidea (seed)
Cyanicula amplexans ms (DLJ 12232)
Pterostylis aff. *nana* (seed)
P. sp. nov. (aff. *picta*)
P. sp. nov. (aff. *picta*) #6 (DLJ 12229)
Thelymitra aff. *macrophylla* (seed)

Location 54: Bungalbin Hill.
Habitat details: Open *Eucalyptus* woodland at base with dense shrubland upslope. Rocky soil.
Orchid species present:
Cyanicula amplexans ms
C. sigmoidea (seed)
Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. sp. nov. (aff. *picta*) #6 (DLJ 12234)
P. sp. nov. (aff. *rufa*) #12 (DLJ 12235)
P. sp. nov. (aff. *spathulata*) #15 (DLJ 12236)
Thelymitra aff. *macrophylla* (seed)

Location 55: South of Bungalbin Hill
Habitat details: Red sandplain with very open tall woodland of *Eucalyptus salmnophylla* over scattered shrubs. Red sand.
Orchid species present:
Pterostylis sp. nov. (aff. *picta*) #6 (DLJ 12237)

Location 56: Alongside Trans Australia Railway Line, north of Lake Seabrook.
Habitat details: Open woodland over *Acacia* shrubland. Sandy soil.
Orchid species present:
Pterostylis sp. nov. (aff. *picta*) #6 (DLJ 12238)

Location 57: North side of Lake Seabrook.
Habitat details: Small breakaway near fringe of saltlake. Open woodland over scattered shrubs.
Orchid species present:
Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. sp. nov. (aff. *picta*) (DLJ 12241)
P. sp. nov. (aff. *picta*) #6 (DLJ 12240)
P. sp. nov. (aff. *rufa*) (DLJ 12242)
P. sp. nov. (aff. *spathulata*) #15 (DLJ 12239)

Location 58: North side of salt lake west of Jaudi Station.
Habitat details: Open woodland and shrubland on fringe of saltlake. Sandy clay soil.
Orchid species present:
Pterostylis sp. nov. (aff. *picta*) #6
P. sp. nov. (aff. *spathulata*) (DLJ 12243)

Day 8 -- Sunday, October 10.

Location 59: Mount Walter.
Habitat details: Quartzite hill with slopes covered in a dense shrubland of *Acacia*, *Allocasuarina campestris* and emergent *Eucalyptus* downslope. Very rocky soil.

Orchid species present:

Caladenia sp. (aff. *caesarea*) (seed)
Cyanicula amplexans ms (seed)
Pterostylis insectifera (DLJ 12244)
P. mutica (seed)
P. sp. nov. (aff. *nana*) #1 (seed)
P. sp. nov. (aff. *picta*) #6
P. sp. nov. (aff. *roensis*) (DLJ 12246)
P. sp. nov. (aff. *spathulata*) (DLJ 12248)
Thelymitra aff. *macrophylla* (seed)

Location 60: Great Eastern Highway. 300 Mile rock.
Habitat details: Large granite outcrop fringed with an open *Eucalyptus salmnophylla, E. loxophleba* woodland over scattered sometimes dense shrubs. Pale sandy-clay soil.

Orchid species present:

Cyanicula deformis ms (seed)
Microtis media subsp. *media* (DLJ 12256)
M. sp. nov. (aff. *parviflora*) (DLJ 12255)
Prasophyllum ringens
Pterostylis mutica (seed)
P. aff. *nana* (seed)
P. sp. nov. (aff. *picta*) #6 (DLJ 12254)
P. sp. nov. (aff. *picta*) (DLJ 12258)
P. roensis
P. sp. nov. (aff. *spathulata*) (DLJ 12257)
Thelymitra antennifera (seed)
T. aff. *macrophylla* (seed)

Location 61: Gnarlibine Rock
Habitat details: Granite outcrop with fringing thickets of *Acacia acuminata* over dense introduced grasses. Granitic loam.

Orchid species present:

Diuris sp. (seed)
Microtis media subsp. *media*
M. sp. nov. (aff. *parviflora*)
Prasophyllum ringens (seed)
Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. roensis
P. sp. nov. (aff. *spathulata*) (DLJ 12261)
Thelymitra aff. *macrophylla* (seed)

Location 62: 50 Mile Rock. Coolgardie - Norseman Road.
Habitat details: Large granite outcrop surrounded by a shrubland *Acacia acuminata* and *Eucalyptus* woodland beyond. Orchids found under small thickets of *Thryptomene australis* in shallow soils over granite. Granitic loam.

Orchid species present:

Caladenia microchila ms (seed)
Diuris sp. (seed)
Microtis media subsp. *media*
M. sp. nov. (aff. *parviflora*)
Prasophyllum ringens
Pterostylis sp. nov. (aff. *ciliata*) #1
P. aff. *nana* (seed)
P. sp. nov. (aff. *picta*) #6 (DLJ 12265)
P. sp. nov. (aff. *rufa*) #13 (DLJ 12264)
P. sargentii (seed)
Spiculaea ciliata
Thelymitra aff. *macrophylla*

Day 9 -- Monday, October 11.

Location 63: Coolgardie - Norseman Road, north of Norseman

Habitat details: Rock hill slopes with shrubland of *Acacia acuminata* over *Dodonaea, Eremophila* and *Triodia*. Very rocky soil.

Orchid species present:

Caladenia microchila ms (seed)
Pterostylis aff. *nana* (seed)
P. sp. nov. (aff. *ciliata*) (DLJ 12267)
P. roensis (DLJ 12266)

Location 64: Coolgardie - Norseman Road, north of Norseman

Habitat details: Rocky hill slops with emergent *Eucalyptus* over shrubland of *Acacia acuminata, Allocasuarina campestris, Dodonaea, Eremophila* and *Triodia*. Very rocky soil.

Orchid species present:

Caladenia microchila ms (seed)
Pterostylis insectifera (DLJ 12271)
P. roensis (DLJ 12269)
Thelymitra aff. *macrophylla*

Location 65: Moirs Rock.

Habitat details: Large granite outcrop. Orchids found in shallow pockets under *Thryptomene australis, Calothamnus graniticus* and *Acacia* sp. Granitic loam.

Orchid species present:

Caladenia flava subsp. *flava* ms (APB 1071)
C. microchila ms (seed)
C. roei (seed)
C. sigmoidea (seed)
Diuris sp. (seed)
Microtis media subsp. *media* (DLJ 12278 / APB 1070)
M. sp. nov. (aff. *parviflora*) (APB 1069)
Monadenia bracteata
Prasophyllum ringens (seed)
Pterostylis allantoidea (DLJ 12274)
P. sp. nov. (aff. *ciliata*) #1 (DLJ 12276)
P. mutica (seed)
P. recurva (seed)
P. roensis (DLJ 12277)
P. sp. nov. (aff. *rufa*) #13 (DLJ 12275)
P. sp. nov. (aff. *sanguinea*) (seed)
P. sargentii
Spiculaea ciliata
Thelymitra antennifera (seed)
T. aff. *macrophylla*
T. x macmillanii
T. sp. nov. (aff. *pauciflora*)

Location 66: Peak Charles.

Habitat details: Very large granite hill with regenerating open woodland and dense shrubland (from wildfire four years previously). Granitic loam.

Orchid species present:

Caladenia attingens subsp. *gracillima* ms (APB 1070A)
Diuris sp. (seed)
Microtis sp. nov. (aff. *media*)
Pterostylis sp. nov. (aff. *sanguinea*) (seed)
Thelymitra aff. *macrophylla*
T. sp. nov. (aff. *pauciflora*)

Location 67: Norseman - Lake King Road, near Kumarl Road.

Habitat details: Low granite outcrops with dense shrubland of *Acacia lasiocarpa* in moist soils around base and thickets of *Thryptomene australis* in shallow soil pockets on rock. Granitic loam.

Orchid species present:

Diuris sp. (seed)
Microtis aff. *media*
Prasophyllum ringens (seed)
Pterostylis roensis (DLJ 12279)
P. sargentii
Thelymitra aff. *macrophylla*

Location 68: Kumarl - Lake King Road
Habitat details:
Orchid species present:
Genoplesium nigricans (seed)

Location 69: Kumarl Siding, Norseman - Esperance Road.
Habitat details: Open *Eucalyptus* woodland over tall *Melaleuca, Acacia* shrubland. Pale clay-loam soil.
Orchid species present:
Pterostylis sp. nov. (aff. *ciliata*) (DLJ 12281)
P. mutica (seed)
P. aff. *nana* (seed)
P. roensis (DLJ 12282)

Location 70: Kumarl Road
Habitat details: Open *Eucalyptus* woodland over tall *Melaleuca* and *Acacia*. Pale sandy-clay soil.
Orchid species present:
Caladenia microchila ms (seed)
C. sigmoidea (seed)
Genoplesium nigricans (seed)
Pterostylis sp. nov. (aff. *ciliata*) (DLJ 12284)
P. insectifera (DLJ 12286)
P. mutica (seed)
P. aff. *nana* (seed)
P. roensis
P. sargentii (seed)
Thelymitra aff. *macrophylla*

Day 10 -- Tuesday, October 12.

Location 71: Swan Lagoon.
Habitat details: *Eucalyptus occidentalis* woodland over *Allocasuarina* and mallee *Eucalyptus*. Sandy-clay soil.
Orchid species present:
Caladenia brevisura ms (DLJ 12287 / APB 1071A)
C. cruscula ms (DLJ 12288)
C. longicauda subsp. *rigidula* ms
Diuris sp. (seed)
Genoplesium nigricans (seed)
Microtis aff. *media*
Pterostylis mutica (seed)
P. roensis (DLJ 12289)
Thelymitra aff. *macrophylla*

Location 72: North of Gibson, Norseman - Esperance Road.
Habitat details: Swampy flat with dense low heath of *Dryandra, Lambertia* and *Allocasuarina*. Sedges in wetter areas and becoming saline. Wet clay soil.
Orchid species present:
Caladenia attingens subsp. *gracillima* ms (DLJ 12296 / APB 1072)
C. cairnsiana
C. marginata (DLJ 12297A)
C. varians subsp. *varians* ms
Diuris concinna (DLJ 12294)
D. sp. nov. (aff. *laxiflora*) #1 (DLJ 12293)
D. concinna x *D.* sp. nov. (aff. *laxiflora*) (DLJ 12297)
Elythranthera brunonis
Leporella fimbriata (leaf)
Lyperanthus nigricans (leaf)
Microtis media subsp. nov.
M. sp. nov. (aff. *alba*)
Monadenia bracteata
Prasophyllum ringens
Pterostylis sp. nov. (aff. *barbata*) #2 (seed)
P. recurva (seed)
P. sp. nov. (aff. *sanguinea*) (seed)
Thelymitra antennifera
T. azurea (bud)
T. benthamiana (bud)
T. flexuosa (seed)
T. aff. *macrophylla*
T. aff. *pauciflora*
T. villosa

Location 73: Gibson Truck Bay.
Habitat details: Low winter-wet swampy area with dense shrubland of *Allocasuarina, Hakea, Melaleuca* and *Lambertia.* Gravelly clay soil.
Orchid species present:
Caladenia decora ms (DLJ 12298)
Diuris concinna
D. sp. nov. (aff. *laxiflora*) #1 (APB 1074)
Lyperanthus nigricans (leaf)
Microtis media subsp. nov.
M. atrata (DLJ 12299)
Monadenia bracteata
Thelymitra antennifera
T. sp. nov. (aff. *macrophylla*) (APB 1073)

Location 74: Helm's Arboretum.
Habitat details: Arboretum of various tree species not native to the area over scattered low shrubs and introduced grasses. Sandy-clay soil.
Orchid species present:
Caladenia decora ms
Diuris concinna (DLJ 12301)
D. sp. nov. (aff. *laxiflora*)
Microtis media subsp. nov.
Monadenia bracteata
Thelymitra antennifera
T. sp. nov. (aff. *macrophylla*)
T. aff. *macrophylla*

Location 75: Norseman - Esperance Road, north of Swan Lagoon Road.
Habitat details:
Orchid species present:
Caladenia brevisura ms
C. attingens subsp. *gracillima* ms
Genoplesium nigricans (seed)
Pterostylis sp. nov. (aff. *aspera*) (seed)
P. mutica (seed)
Thelymitra aff. *macrophylla*

Location 76: Coolinup Nature Reserve.
Habitat details:
Orchid species present:
Caladenia brevisura ms (seed)
C. decora ms
C. flava subsp. *flava* ms
C. heberleana ms
C. marginata
Cyanicula sp. nov. (aff. *gemmata*) ms (APB 1075)
Diuris sp. nov. (aff. *laxiflora*)
D. sp. (DLJ 12303)
Drakaea sp. (seed)
Elythranthera brunonis
Leporella fimbriata (leaf)
Leptoceras menziesii
Lyperanthus nigricans
Lyperanthus serratus (DLJ 12304)
Microtis media subsp. nov.
M. sp. nov. (aff. *alba*) (DLJ 12302)
Monadenia bracteata
Prasophyllum sp. nov. (aff. *parvifolium*) (seed)
Pterostylis turfosa (seed)
Thelymitra antennifera
T. benthamiana (bud)
T. crinita
T. flexuosa (seed)
T. aff. *macrophylla* (seed)
T. x macmillanii
T. spiralis (seed)
T. villosa

Location 77: Hill 50
Habitat details: Granite outcrop.
Orchid species present:
Caladenia decora ms
C. marginata (DLJ 12307)
Cyanicula sp. nov. (aff. *gemmata*) ms
Diuris sp. nov. (aff. *laxiflora*)
D. sp. nov. (aff. *pulchella*) (seed)
Eriochilus sp. (seed)
Leporella fimbriata (leaf)
Lyperanthus nigricans
Microtis sp.
Pterostylis sp. nov. (aff. *nana*) #2 (seed)
P. recurva (seed)
P. turfosa

Location 78: Eleven Mile Beach, Esperance.
Habitat details: Dense low coastal heath. Calcareous sand over limestone.
Orchid species present:
Prasophyllum odoratum (DLJ 12309)

Day 11 -- Wednesday, October 13.

Location 79: Boydells Road.
Habitat details: Mallee woodland over dense *Melaleuca* thickets on rise above saline creek. Clay soil.
Orchid species present:
Caladenia attingens subsp. *gracillima* ms (APB 1076)
Diuris sp. (seed)
Eriochilus dilatatus subsp. sp. ms (APB 1077)
Genoplesium nigricans (seed)
Microtis media subsp. nov.
Pterostylis sp. nov. (aff. *pusilla*)
P. sp. nov. (aff. *rufa*) (bud)
P. sp. nov. (aff. *sanguinea*) (seed)

Location 80: Lort River Crossing, Cascades Road.
Habitat details: Mallee *Eucalyptus* woodland over dense shrubland. Clay soil.
Orchid species present:
Caladenia attingens subsp. *gracillima* ms
C. brevisura ms (DLJ 12314 / APB 1077A)
C. cairnsiana
C. flava subsp. *flava* ms (seed)
C. longicauda subsp. nov. (seed)
C. sp. (bud)
Cyanicula sp. nov. (aff. *gemmata*) ms
Diuris sp. nov. (aff. *laxiflora*) (seed)
Lyperanthus nigricans
Microtis media subsp. nov.
Pterostylis recurva (seed)
P. sp. nov. (aff. *sanguinea*) (seed)
P. sp. nov. (aff. *spathulata*) #17
Thelymitra antennifera
T. aff. *macrophylla*

Location 81: Cascades Road.
Habitat details: Yate (*Eucalyptus platypus*) thickets along road verge. Clay soil.
Orchid species present:
Genoplesium nigricans (seed)
Pterostylis sp. nov. (aff. *ciliata*) #1
P. sp. nov. (aff. *ciliata*) #2 (DLJ 12319)
P. recurva (seed)
P. sp. nov. (aff. *sanguinea*) (seed)
Thelymitra aff. *macrophylla* (bud)

Location 82: River Road creek crossing.
Habitat details: *Eucalyptus platypus* over *Melaleuca* to 2 m high. Rocky-clay soil.
Orchid species present:
Caladenia attingens subsp. *gracillima* ms
C. brevisura ms (DLJ 12325)
C. flava subsp. *flava* ms
C. graminifolia (seed)
Diuris sp. (seed)
Microtis media subsp. nov.
Prasophyllum ringens
Pterostylis ciliata (DLJ 12322 / APB 1078)
Pterostylis mutica (seed)
Pterostylis sp. nov. (aff. *pusilla*) (APB 1079)
Thelymitra aff. *macrophylla* (bud)

Location 83: Young River Crossing, Oldfields Road.
Habitat details: Low granite surrounded by *Acacia lasiocarpa*, *Allocasuarina huegelii* over *Thryptomene* and low sedges. Brown rocky soil.
Orchid species present:
Caladenia attingens subsp. *gracillima* ms (APB 1081)
C. brevisura ms (APB 1082)
C. cairnsiana
C. flava subsp. *flava* ms
C. longicauda subsp. *eminens* ms
C. sigmoidea
C. sp. nov. (aff. *tentaculata*) (seed) (APB 1080)

C. sp. nov. (aff. *tentaculata*) x *C. attingens* subsp. *gracillima* ms
C. varians subsp. *varians* ms
Cyanicula sp. nov. (aff. *gemmata*) ms (DLJ 12327)
Diuris sp. (seed)
Elythranthera brunonis
Eriochilus dilatatus subsp. *multiflorus* ms (seed)
Lyperanthus nigricans
Microtis media subsp. nov.
Prasophyllum ringens
Pterostylis recurva (seed)
Thelymitra antennifera
T. aff. *macrophylla*

Location 84: Rawlison Road.
Habitat details: *Acacia lasiocarpa, Allocasuarina huegelii* over *Thryptomene* and low sedges. Brown rocky soil.
Orchid species present:
Caladenia attingens subsp. *gracillima* ms
Pterostylis recurva (seed)
P. sp. nov. (aff. *sanguinea*) (seed)

Location 85: South Coast Highway east of Ravensthorpe.
Habitat details: Small seasonal creek between rocky hills. Occasional tall *Eucalyptus occidentalis* over *Melaleuca* thickets and introduced grasses.
Orchid species present:
Caladenia. attingens subsp. *gracillima* ms
C. brevisura ms
C. microchila m.s (seed)
Pterostylis allantoidea (DLJ 12330)
P. ciliata
P. leptochila (DLJ 12329)
P. mutica (seed)
P. sp. nov. (aff. *pusilla*)
P. recurva (seed)
P. sp. nov. (aff. *sanguinea*) (seed)
Thelymitra aff. *macrophylla* (seed)

Location 86: Mount Short.
Habitat details: Disturbed (gravel extraction) mallee woodland and *Lambertia* shrubland. Lateritic loam.
Orchid species present:
Thelymitra azurea (DLJ 12333)

Day 12 -- Thursday, October 14.

Location 87: Pallarup Rocks.
Habitat details: Granite outcrops with fringing sheoak thickets. Sandy soil.
Orchid species present:
Caladenia longicauda subsp. *longicauda* ms (DLJ 12334)
C. roei
C. sigmoidea (seed)
C. varians subsp. *varians* ms (seed)
Eriochilus dilatatus subsp. *multiflorus* ms (seed)
Microtis media subsp. nov.
Prasophyllum ringens
Pterostylis mutica (seed)
P. recurva (seed)
P. roensis (bud)
P. sp. nov. (aff. *sanguinea*) (seed)
Spiculaea ciliata (bud)
Thelymitra antennifera
T. aff. *macrophylla* (bud)

Location 88: Mt Madden Nature Reserve, Muncaster Road.
Habitat details:
Orchid species present:
Caladenia attingens subsp. *gracillima* ms
C. doutchiae
C. flava subsp. *flava* ms (DLJ 12340)
C. longicauda subsp. nov. (aff. *rigidula* ms) (DLJ 12336 / APB 1088)
C. roei
C. sigmoidea (seed)
C. varians subsp. *varians* ms (DLJ 12338)
Diuris aff. *corymbosa* (seed)
Eriochilus dilatatus subsp. *multiflorus* ms (seed)
Leporella fimbriata
Leptoceras menziesii (DLJ 12337)

Lyperanthus nigricans
Microtis media subsp. nov.
Monadenia bracteata (bud)
Prasophyllum cyphochilum
P. ringens
Pterostylis recurva (seed)
P. aff. *rufa* (bud)
P. sp. nov. (aff. *sanguinea*) (seed)
P. sargentii
Spiculaea ciliata (bud)
Thelymitra antennifera
T. aff. *macrophylla*

Location 89: Muncaster Road.
Habitat details: Mallee woodland.
Orchid species present:
Caladenia attingens subsp. *gracillima* ms
Genoplesium nigricans (seed)
Pterostylis mutica (seed)
P. sp. nov. (aff. *sanguinea*) (seed)
Thelymitra aff. *macrophylla* (bud)

Location 90: Muncaster Road.
Habitat details: Mallee woodland. Sandy soil.
Orchid species present:
Caladenia attingens subsp. *gracillima* ms
C. doutchiae (DLJ 12341)
Genoplesium nigricans (seed)
Pterostylis mutica (seed)
P. sp. nov. (aff. *sanguinea*) (seed)
Thelymitra azurea (DLJ 12343)
T. aff. *macrophylla*

Location 91: Lake King - Norseman Road
Habitat details: Gimlet woodland. Sandy-clay soil.
Orchid species present:
Pterostylis mutica (seed)

Location 92: Lillian Stoke Rock, Frank Hann National Park.
Habitat details: Series of large granite outcrops with *Allocasuarina huegelii* in deeper soils and thickets of *Thryptomene australis* in shallow soil pockets. Granitic loam.
Orchid species present:
Caladenia attingens subsp. *gracillima* ms
C. flava subsp. *flava* ms
C. varians subsp. *varians* ms
Cyanicula gemmata (DLJ 12346)
Elythranthera brunonis
Eriochilus dilatatus subsp. *undulatus* ms (leaf) (DLJ 12347)
Leporella fimbriata (leaf)
Microtis media subsp. nov.
Prasophyllum ringens (DLJ 12347)
Spiculaea ciliata (bud)
Thelymitra antennifera
T. campanulata (DLJ 12348)
T. campanulata x *T.* aff. *macrophylla* (DLJ 12349)
T. aff. *macrophylla*

Location 93: Vermin Proof Fence, north of Lake King - Norseman Road.
Habitat details: Low hill with dense mallet woodland over *Dodonaea* and *Olearia axillaris*. Red-brown loam soil.
Orchid species present:
Pterostylis mutica (seed)
P. roensis
P. sp. nov. (aff. *sanguinea*) (seed)
Thelymitra aff. *macrophylla*

Location 94: Vermin Proof Fence, north of Lake King - Norseman Road.
Habitat details: Mallet woodland over *Dodonaea* and *Olearia axillaris*. Red-brown loam soil.
Orchid species present:
Genoplesium nigricans (seed)
Pterostylis insectifera (bud)
P. mutica (seed)
P. roensis (DLJ 12350)

P. aff. *rufa* (bud)
Thelymitra aff. *macrophylla*

Location 95: Lily McCarthy Rock.
Habitat details: Large granite dome surrounded by *Eucalyptus wandoo* woodland. Grey clay soil. Also shallow soils on rock.
Orchid species present:
Caladenia dimidia (seed)
C. varians subsp. nov. ms(seed)
Diuris sp. nov. (aff. *laxiflora*) #2 (seed)
D. sp. nov. (aff. *laxiflora*)
D. picta (DLJ 12352)
Pterostylis mutica (seed)
P. roensis (bud)
P. sp. nov. (aff. *rufa*) (bud)
P. sp. nov. (aff. *sanguinea*) (seed)
P. sargentii
P. sp. nov. (aff. *spathulata*) #16
Thelymitra antennifera
T. aff. *macrophylla*

Day 13 -- Friday, October 15.

Location 96: South of Lake Cronin.
Habitat details: Tall open woodland of *Eucalyptus salmnophylla* over *E. loxophleba* and scattered low shrubs. Grey clay soil.
Orchid species present:
Genoplesium nigricans (seed)
Pterostylis insectifera
P. mutica (seed)
P. roensis

Location 97: Hyden - Norseman Road, south of Lake Cronin.
Habitat details: Open *Eucalyptus* woodland. Brown rocky quartzite soil.
Orchid species present:
Genoplesium nigricans (seed)
Pterostylis insectifera (DLJ 12356)
P. mutica (seed)
P. roensis (DLJ 12357)
P. sargentii (seed)
Thelymitra aff. *macrophylla*

Location 98: Lake Cronin Nature Reserve, north side of Lake Cronin.
Habitat details: *Eucalyptus occidentalis* open woodland over scattered shrubs and introduced grasses. Sandy-clay soil.
Orchid species present:
Caladenia doutchiae
Pterostylis sp. nov. (aff. *ciliata*) (DLJ 12361)
P. roensis
P. sp. nov. (aff. *rufa*) (bud)
P. sargentii (seed)
Thelymitra campanulata (DLJ 12359)
T. aff. *macrophylla* (DLJ 12362)

Location 99: Road to Southern Cross, north of Lake Cronin Nature Reserve.
Habitat details: Tall shrubland.
Orchid species present:
Pterostylis sp. nov. (aff. *sanguinea*) (seed)
Thelymitra aff. *macrophylla*

Location 100: Road to Southern Cross, north of Lake Cronin Nature Reserve.
Habitat details: Open woodland over dense shrubland of *Melaleuca* and *Acacia*. Rocky soil.
Orchid species present:

Pterostylis roensis
P. sp. nov. (aff. *spathulata*) #5 (DLJ 12364)
Thelymitra aff. *macrophylla*

Location 101: Mount Holland.
Habitat details: Banded ironstone hill with tall *Eucalyptus salmnophylla* woodland on lower slopes and dense shrubland on upper slopes. Rocky soil.

Orchid species present:

Caladenia saccharata (seed)
Genoplesium nigricans (seed)
Pterostylis mutica (seed)
P. aff. *nana* (seed)
P. roensis (DLJ 12366)
Thelymitra aff. *macrophylla*

Location 102: Split Rocks.
Habitat details: Granite outcrop.
Orchid species present:

Caladenia pachychila ms (seed)
C. microchila ms (seed)
Microtis media subsp. nov.
Prasophyllum ringens
P. sargentii
Pterostylis aff. *rufa* (bud)
Thelymitra antennifera
T. aff. *macrophylla*
T. sargentii (bud)

Location 103: Hyden - Southern Cross Road, south of Cramphorne Road.
Habitat details: Low breakaway with open *Eucalyptus* woodland on lower slopes and dense shrubland on top. Rocky loam soil.
Orchid species present:

Pterostylis mutica (seed)
P. roensis (DLJ 12369)
P. sp. nov. (aff. *roensis*)
P. sp. nov. (aff. *rufa*) #13 (DLJ 12373)
P. sp. nov. (aff. *spathulata*) (DLJ 12374)
Thelymitra aff. *macrophylla*

Day 14 -- Saturday, October 16.

Location 104: Mount Hampton.
Habitat details: Granite outcrop surrounded with dense thickets of *Allocasuarina huegelii* and *Leptospermum*. Most orchids found under *Thryptomene australis* in shallow soil pockets on rock. Pale granitic loam.
Orchid species present:

Caladenia dimidia ms (seed)
C. flava subsp. *flava* ms (DLJ 12377)
C. roei
Diuris aff. *corymbosa* (seed)
D. picta (DLJ 12375)
Leporella fimbriata (seed)
Microtis media subsp. nov.
Prasophyllum ringens
P. sp. nov. (aff. *nana*) #1 (seed)
P. recurva (seed)
P. roensis
P. sp. nov. (aff. *sanguinea*) (seed)
Spiculaea ciliata (bud)
Thelymitra antennifera
T. aff. *macrophylla*

Location 105: North of Mount Hampton.
Habitat details: Tall open woodland. Sandy-clay soil.
Orchid species present:

Caladenia hirta subsp. *rosea* ms (seed)
C. incensa ms (seed)
C. microchila ms (seed)
Pterostylis mutica (seed)
Thelymitra aff. *macrophylla*

Location 106: Frog Rock.
Habitat details: Large granite dome. Orchids found under *Thryptomene australis* in shallow soil pockets. Granitic loam.
Orchid species present:

Caladenia dimidia ms (seed)
C. incensa ms (seed)
C. roei (seed)
C. saccharata (seed)
C. sp. (seed)
Diuris aff. *corymbosa* (seed)
D. picta (DLJ 12378)
Microtis media subsp. nov.
Prasophyllum ringens
Pterostylis ciliata (DLJ 12382)
P. mutica (seed)

P. aff. *nana* (seed)
P. recurva (seed)
P. roensis (DLJ 12383)
P. sp. nov. (aff. *spathulata*) (DLJ 12380)
Spiculaea ciliata (bud)
Thelymitra antennifera
T. aff. *macrophylla*
T. x macmillanii

Location 107: Great Eastern Highway, Parking Bay east of Ghooli.
Habitat details: Yellow sandplain. Dense tall shrubland of *Acacia* spp. Deep yellow sand.
Orchid species present:
Caladenia saccharata (seed)
Pterostylis aff. *nana* (seed)
P. roensis
P. sp. nov. (aff. *rufa*) #14 (DLJ 12385)
P. aff. *rufa* (bud)
P. sp. nov. (aff. *spathulata*) #18 (DLJ 12384)
Thelymitra sargentii

Location 108: Southern Cross - Bullfinch Road.
Habitat details: *Eucalyptus loxophleba*, *Acacia acuminata* woodland over low shrubs and *Borya*. Brown loamy soil.
Orchid species present:
Caladenia roei (seed)
C. varians subsp. nov. ms (seed)
Pterostylis sp. nov. (aff. *nana*) #1 (seed)
P. roensis
P. sp. nov. (aff. *spathulata*) #19
P. sp. nov. (aff. *spathulata*) #20 (DLJ 12386)
Thelymitra aff. *macrophylla*

Location 109: Southern Cross - Bullfinch Road.
Habitat details: Large system of breakaways. Tall open *Eucalyptus* woodland. Rocky soil.
Orchid species present:
Caladenia sp. (seed)
Diuris sp. (seed)
Pterostylis ciliata (DLJ 12390)
P. insectifera
P. roensis (DLJ 12389)
Thelymitra aff. *macrophylla* (seed)

Location 110: Bullfinch - Mukinbudin Road
Habitat details: Salt lake system fringed with open scattered shrubs and occasional tall *Eucalyptus longicornis*. Brown sandy soil.
Orchid species present:
Caladenia sp. (seed)
Pterostylis insectifera
P. roensis (DLJ 12392)
P. sp. nov. (aff. *spathulata*) #19 (DLJ 12391)

Location 111: Dead Horse Hill.
Habitat details: Dense tall shrubland. Rocky soil.
Orchid species present:
Caladenia roei (seed)
Diuris sp. (seed)
Prasophyllum ringens (seed)

Day 15 -- Sunday, October 17.

Location 112: Billyacatting Rock.
Habitat details: Massive granite outcrop with *Hakea petiolaris, Calothamnus quadrifidus, H. sp., Santalum acuminatum* and *Borya spherocephala* in soil pockets. Granitic loam.
Orchid species present:
Caladenia roei (seed)
Cyanicula ashbyae ms (DLJ 12395 / APB 1088A)
Diuris sp. (seed)
Prasophyllum ringens
Pterostylis scabra (seed)
P. sp. nov. (aff. *spathulata*) #20
P sp. nov. (aff. *spathulata*) #1 (DLJ 12394)

Location 113: Trayning - Wyalkatchem Road.

Habitat details: Open mallee woodland over Melaleuca cordata and other low scattered shrubs and scarce annuals. Grey sandy-clay soil.

Orchid species present:

Caladenia sp. (seed)
Eriochilus dilatatus subsp. *multiflorus* ms (seed)
Pterostylis aff. *nana* (seed)
P. sp. nov. (aff. *rufa*) #13 (DLJ 12396)
P. aff. *rufa* (bud)

Location 114: Parking Bay, Wyalkatchem - Goomalling Road.

Habitat details:

Orchid species present:

Caladenia filifera (seed)

Location 115: Wongan Hills Road 'T'-junction with Dowering - Goomalling Road.

Habitat details: Tall open *Eucalyptus wandoo, E. loxophleba* woodland over scattered low shrubs and dense introduced grasses. Sandy-clay soil.

Orchid species present:

Pterostylis ciliata
P. aff. *rufa* (bud)

Location 116: Mortlock River crossing, Mortlock Road.

Habitat details: Open *Eucalyptus loxophleba* woodland over scattered low shrubs and dense introduced grasses. Margins of river saline. Pale sandy-clay soil.

Orchid species present:

Caladenia doutchiae
C. flava subsp. *flava* ms (seed)
Diuris sp. (seed)
Pterostylis recurva (seed)

Location 117: Mortlock River bridge, Goomalling - Toodyay Road.

Habitat details: Scattered *Callitris* over low shrubs and dense introduced grasses. Margins of river saline. Pale sandy-clay soil.

Orchid species present:

Caladenia sp. (seed)
Diuris sp. (seed)
Prasophyllum ringens (seed)
Pterostylis aff. *rufa* (bud)

Location 118: Toodyay Road, south west of Toodyay.

Habitat details: *Eucalyptus wandoo, E. marginata* over *Allocasuarina fraseriana* and low shrubs. Lateritic loam.

Orchid species present:

Diuris sp. (seed)
Elythranthera brunonis
Pterostylis sp. nov. (aff. *ciliata*) #3
P. sp. nov. (aff. *nana*) #3 (seed)
P. recurva (seed)
P. sp. nov. (aff. *sanguinea*) (seed)

APPENDIX 2: BREAKDOWN OF SURVEY RECORDS BY LOCATION

TABLE A2.1: NUMBER OF ORCHID TAXA RECORDED AT EACH LOCATION

Day #	Date	Location #	Total Orchid Taxa Recorded (Including *P.* aff. *rufa*)	*P.* aff. *rufa* Taxa Recorded
1	03-Oct-93	1	11	1
		2	1	1
		3	7	0
		4	1	1
		5	4	3
		6	2	1
		7	8	0
		8	7	1
2	04-Oct-93	9	10	4
		10	9	1
		11	1	1
		12	2	2
		13	3	1
		14	2	2
		5	1	1
		16	5	2
3	05-Oct-93	17	16	2
		18	4	3
		19	4	2
		20	10	1
		21	6	4
		22	6	5
		23	10	2
		24	3	0
4	06-Oct-93	25	9	1
		26	5	2
		27	9	6
		28	4	2

Day #	Date	Location #	Total Orchid Taxa Recorded (Including *P.* aff. *rufa*)	*P.* aff. *rufa* Taxa Recorded
		29	4	1
		30	5	2
		31	7	3
		32	6	2
		33	9	5
		34	7	4
5	07-Oct-93	35	4	3
		36	7	6
		37	5	4
		38	9	6
		39	7	2
		40	13	4
		41	1	1
		42	2	2
		43	5	3
		44	2	1
		45	2	0
6	08-Oct-93	46	3	3
		47	6	5
		48	2	2
		49	5	2
		50	8	4
		51	6	3
7	09-Oct-93	52	6	4
		53	7	2
		54	8	3
		55	1	1
		56	1	1
		57	5	4
		58	2	2
8	10-Oct-93	59	9	4

Day #	Date	Location #	Total Orchid Taxa Recorded (Including *P.* aff. *rufa*)	*P.* aff. *rufa* Taxa Recorded
		60	12	4
		61	8	2
		62	12	3
9	11-Oct-93	63	4	2
		64	4	2
		65	22	3
		66	6	0
		67	6	1
		68	1	0
		69	4	2
		70	10	3
10	12-Oct-93	71	9	1
		72	24	0
		73	9	0
		74	8	0
		75	6	0
		76	27	0
		77	12	0
		78	1	0
11	13-Oct-93	79	8	2
		80	15	1
		81	6	2
		82	11	2
		83	19	0
		84	3	0
		85	11	3
		86	1	0
12	14-Oct-93	87	14	1
		88	23	1
		89	5	0
		90	7	0

Day #	Date	Location #	Total Orchid Taxa Recorded (Including *P.* aff. *rufa*)	*P.* aff. *rufa* Taxa Recorded
		91	1	0
		92	14	0
		93	4	1
		94	6	3
		95	13	3
13	15-Oct-93	96	4	1
		97	6	1
		98	7	2
		99	2	0
		100	3	2
		101	6	1
		102	9	1
		103	6	4
14	16-Oct-93	104	15	1
		105	5	0
		106	19	3
		107	7	4
		108	7	3
		109	6	3
		110	4	3
		111	3	0
15	17-Oct-93	112	7	2
		113	5	2
		114	1	0
		115	2	2
		116	4	0
		117	4	1
		118	6	1

APPENDIX 3: DAILY BREAKDOWN OF SURVEY RECORDS

TABLE A3.1: DAILY ANALYSIS OF ORCHID TAXA RECORDED

Day #	Daily Average Orchid Taxa per Location.	Daily Average *P.* aff. *rufa* Taxa per Location.	Number of Locations	Number of Locations with *P.* aff. *rufa* Taxa Present.	Average *P.* aff. *rufa* taxa at each Location When Present.
1	5.1	1.0	8	6	1.3
2	4.1	1.8	8	8	1.8
3	7.4	2.4	8	7	2.7
4	6.5	2.8	10	10	2.8
5	5.2	2.9	11	10	3.2
6	4.5	3.2	6	6	3.2
7	4.0	2.4	7	7	2.4
8	10.0	3.3	4	4	3.3
9	7.1	1.6	8	6	2.2
10	11.6	0.1	8	1	1.0
11	9.0	1.3	8	5	2.0
12	9.3	1.0	9	5	1.8
13	5.4	1.5	8	7	1.7
14	8.3	2.1	8	6	2.8
15	4.1	1.1	7	5	1.6
TOTAL	6.7	1.9	118	93	2.4

APPENDIX 4: A SYNOPSIS OF THE NAMED 'RUFA GROUP' OF PTEROSTYLIS IN WESTERN AUSTRALIA

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A Synopsis of the Named 'Rufa Group' of Pterostylis in Western Australia

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The *rufa* group of *Pterostylis* is one of the most interesting and yet complex groups of orchids in Australia. It has evolved to an amazing degree with many species being able to survive the rigours of unreliable low rainfall in semi-arid inland areas. They occupy a range of habitats and in Western Australia are particularly prominent on granite outcrops, ironstone breakaways and jump-ups, scrub fringing salt lakes, mallee communities and woodland. Some species are widespread and grow in a variety of habitats whereas others are more restricted and may only be found in a certain habitat or particular geological formations. In some habitats, granite outcrops for example, it is not uncommon for one to several species to grow in close proximity. To date seven species of the rufa group have been described from Western Australia. These species are circumscribed and illustrated here for the first time. New taxa will be described in forthcoming papers.

1. Pterostylis ciliata *M. A. Clements & D. L. Jones*, Aust. Orch. Res. 1: 120 (1989).

Illustrations: N. Hoffman & A. Brown, Orchids of South-west Australia 369 (1992).

Tuberous terrestrial herb. *Leaves* ovate to ovate-lanceolate, 25-35 mm x 7-10 mm, 4-8 in a radical rosette, usually senescent at flowering. *Inflorescence* 10-22 cm tall, slender, with 2-4 ensheathing, lanceolate sterile bracts. *Floral bracts* ovate-lanceolate, 5-15 mm x 2-5 mm, acuminate. *Pedicels* 8-15 mm long, slender. *Ovary* 4-6 mm long. *Flowers* 2-8, porrect, brown, green or a mixture of the two, not prominently striate, with numerous transparent cilia on the galea and lateral sepals; galea gibbous at the base, flat to curved in the middle, decurved suddenly to the apex; petal flanges touching and closing off the base of galea. *Dorsal sepal* 9-12 mm long, cucullate, obliquely erect, abruptly decurved in distal third, apical point 8-10 mm long, filiform-acuminate, straight or upcurved. *Lateral sepals* deflexed; fused part 8-10 mm x 8-9 mm, shallowly concave, the margins incurved and with numerous transparent cilia 1-2 mm long; sinus narrow, divergent, free points 10-16 mm long, filamentous, deflexed or curved forwards, from nearly parallel to widely divergent, 8-20 mm apart at the tips. *Petals* ovate-lanceolate, 7-12 mm x 2-3 mm, falcate, acuminate, anterior margin transparent, dorsal margin brown or green, ciliate, proximal part of ventral margin minutely ciliate, proximal flange well developed. *Labellum* highly irritable on a curved claw 2-3 mm long; lamina oblong-ovate to oblong-elliptical, 4-5 mm x 1.9-2.1 mm, green to brown, slightly constricted in proximal quarter, narrowed in distal quarter to a moderately broad, obtuse apex; lateral margins beset with numerous short, fine transparent cilia and 6-10 pairs of spreading white setae c. 3 mm long; underside with a narrow central channel extending nearly to the apex. *Column* 10-13 mm long, curved. *Column wings* c. 2.5 mm x 2 mm, more or less rectangular, anterior margins ciliate. *Stigma* narrowly scutiform, c. 4.5 mm x 3 mm, upper margins irregular. *Anther* c. 1.3 mm long, obtuse. *Pollinia* clavate, c. 1.8 mm long, yellow. *Capsule* obovoid, 5-8 mm x 3-4 mm. **Figure 1.**

Distribution and Habitat: Endemic to south-western Western Australia (Toodyay to Stirling Ranges and extending to the east of Ravensthorpe). It grows in a range of habitats including Wandoo woodland (often with a very sparse understorey), under Yate gums in stony clay loams, less commonly under mallee and on laterite breakaways and jump-ups.

Flowering Period: September to November.

Notes: *Pterostylis ciliata* is a slender species with relatively small flowers which are commonly green to greenish-brown but which may be wholly brown. The flowers are among the hairiest of the group in Western Australia with minute cilia being prominent on the galea, petal margins and the fused part of the lateral sepals.

Conservation Status: Widespread, relatively common in some areas and conserved in reserves.

Etymology: Derived from the Latin *ciliatus*, bearing cilia, in reference to the very prominent cilia on various parts of the flower.

2. Pterostylis insectifera *M. A. Clements*, Aust. Orch. Res. 1: 123 (1989).

Solitary tuberous terrestrial herb. *Leaves* narrowly obovate to narrowly elliptical, 18-40 mm x 8-12 mm, 5-12 in a radical rosette, usually senescent at flowering. *Inflorescence* 20-35 cm tall, slender, with 2 or 3 closely ensheathing, ovate-lanceolate, acuminate sterile bracts. *Floral bracts* ovate-lanceolate, 12-20 mm x 3-5 mm, acuminate. *Pedicels* 7-20 mm long. *Ovary* 5-6 mm long, often upcurved. *Flowers* 2-14, evenly spaced, semi-erect to erect, translucent white with green and dark brown to blackish stripes and markings; galea gibbous at the base, curved in the middle, decurved suddenly to the apex; petal flanges touching and closing off the base of galea. *Dorsal sepal* 10-13 mm long, cucullate, obliquely erect, abruptly decurved in distal third, apical point 6-7 mm long, filiform-acuminate to filiform, upcurved. *Lateral sepals* deflexed, recurved strongly towards the ovary, white with greenish or dark brown to blackish markings; fused part 9-10 mm x 7-9 mm, c. 2.5 mm across in the basal third then suddenly expanded, shallowly to deeply concave, the margins incurved and with a few white cilia c. 1 mm long; sinus narrow, widely divergent; free points 10-16 mm long, filamentous, parallel or divergent, curved forwards, 2-8 mm apart at the tips. *Petals* lanceolate, 11-13 mm x 2-2.5 mm, falcate, acuminate, transparent with two dark lines near the base, dorsal ridge strongly ciliate, proximal flange well developed. *Labellum* highly irritable on a claw c. 2-3 mm long; lamina oblong-ovate to oblong-elliptical, 4-5 mm x c. 2 mm, dark brown, moderately thick, straight, constricted in proximal third, widest near middle, narrowed to an elongate, obtuse apex; lateral margins beset with numerous short, fine cilia and 4-6 pairs of prominent, white, spreading setae 1-3 mm long; basal lobe slightly raised, finely ciliate and with 2-3 pairs of white setae c. 1.5 mm long; underside with a deep, narrow central channel extending nearly to the apex. *Column* 10-12.5 mm long, curved. *Column wings* c. 2.5 mm x 2 mm, more or less rectangular, anterior margins ciliate. *Stigma* narrowly scutiform, c. 5 mm x 3 mm, the upper margins irregular. *Anther* c. 1.6 mm long, with a short rostrum. *Pollinia* oblong-clavate, c. 1.8 mm long, yellow. *Capsule* obovoid, 7-10 mm x 3-4 mm, often curved. **Figure 2.**

Distribution and Habitat: Endemic to south-western Western Australia (north of Beacon to Salmon Gums and south of Lake Cronin). Grows in a range of habitats including low scrub fringing salt lakes, Salmon Gum woodland in clay soils, quartzite hills, shallow clay depressions over sheet-limestone in Mallee woodland growing under *Melaleuca* species.

Flowering Period: September to November.

Notes: *Pterostylis insectifera* is a very distinctive species that has no obvious affinities with any other western species of the rufa group. It can be distinguished by its semi-erect flowers held on long pedicels and slender curved ovaries. The

flowers have a whitish galea and unusual dark leaden colouration in the lateral sepals. The lateral sepals also tend to reflex back towards the ovary with the tips often curved forwards in a distinct hook and the lateral margins with a constriction towards the base. The labellum is relatively small and thick and has up to 10 pairs of very prominent marginal setae and often also the basal ones are prominent.

Conservation Status: Widespread and conserved.

Etymology: Derived from the Latin *insectiferus*, insect-bearing, in reference to the insect-like labellum.

3. Pterostylis leptochila *M. A. Clements & D. L. Jones*, Aust. Orch. Res. 1: 123 (1989).

Solitary tuberous terrestrial herb. *Leaves* elliptical to ovate-lanceolate, 18-35 mm x 7-12 mm, 6-10 in a radical rosette, usually senescent at flowering. *Inflorescence* 15-25 cm tall, moderately stout, with 2-4 closely ensheathing, ovate-lanceolate, acute sterile bracts. *Floral bracts* ovate-lanceolate, 14-20 mm x 3-5 mm, acuminate. *Pedicels* 7-15 mm long. *Ovary* 7-8 mm long. *Flowers* 2-7, translucent with green suffusions and fine green or brown stripes and markings, chequered in the lateral sepals, porrect to semi-nodding; galea gibbous at the base, curved evenly in the middle, decurved suddenly to the apex; petal flanges widely separated and not closing off the base of galea. *Dorsal sepal* 14-17 mm long, cucullate, obliquely erect, abruptly decurved in distal third, apical point 5-7 mm long, filiform-acuminate, upcurved. *Lateral sepals* deflexed, transparent with distinct green or brown chequered markings; fused part 8-11 mm x 7-8 mm, flat or very shallowly concave, the margins slightly incurved and with a few white cilia c. 0.5 mm long; sinus narrow, divergent; free points 10-15 mm long, filamentous, divergent, decurved or incurved, c. 4-10 mm apart at the tips. *Petals* lanceolate, 12-15 x 2.5-3.5 mm, falcate, long-acuminate, transparent with greenish or brownish markings and lines, dorsal ridge with a few cilia, proximal flange well developed. *Labellum* highly irritable on a claw c. 2.5-3 mm long; lamina narrowly oblong-elliptical, 5-6 mm x 1.7-2 mm, moderately thick, upcurved towards the apex, constricted in proximal third, widest near middle, narrowed to an elongate, obtuse apex; lateral margins beset with numerous short, fine cilia and 4-8 pairs of white, spreading setae c. 1.5-2.5 mm long; basal lobe hardly raised, finely ciliate and with 2-4 pairs of white setae c. 1 mm long; underside with a narrow, deep central channel extending nearly to the apex. *Column* 13-15 mm long, curved. *Column wings* c. 3 mm x 2 mm, more or less rectangular, anterior margins ciliate. *Stigma* narrowly scutiform, c. 7 mm x 2 mm, upper margins slightly irregular. *Anther* c. 2 mm long, with a short rostrum. *Pollinia* c. 1.6 mm long, clavate, yellow. *Capsule* obovoid, 6-8 mm x 3-4 mm. **Figure 3**.

Distribution and Habitat: Endemic to south-western Western Australia (Ravensthorpe district and Jerramungup to south of Hyden). It grows in disparate habitats such as sheltered situations under low bushes near a small stream and in exposed positions on low rocky hills, growing among leaf litter. Plants have also been found growing under low mallee.

Flowering Period: September to November.

Notes: *Pterostylis leptochila* is generally similar to the widespread species *P. picta* but differs in having semi-nodding flowers with a larger galea and a much narrower labellum.

Conservation Status: Of restricted distribution and apparently not conserved.

Etymology: Derived from the Greek *leptos*, narrow, slender and *cheilos*, a lip, in reference to the very narrow labellum.

4. Pterostylis macrocalymma *M. A. Clements & D. L. Jones*, Aust. Orch. Res. 1: 124, f. 6 E-G (1989).

Illustrations: N. Hoffman & A. Brown, Orchids of South-west Australia 366 (1992).

Solitary tuberous terrestrial herb. *Leaves* 2-6 cm x 8-16 mm, oblong to oblong-elliptical, petiolate, apiculate, 6-10 in a radical rosette, usually senescent at flowering. *Inflorescence* 6-25 cm tall, stout, with 3-5 closely ensheathing, imbricate, ovate-lanceolate, acuminate, sterile bracts. *Floral bracts* ovate-lanceolate, 14-35 mm x 5-9 mm, acuminate. *Pedicels* 12-24 mm long. *Ovary* 7-10 mm long, often curved. *Flowers* 2-10, crowded, semi-nodding to nodding, transparent heavily marked with dark red-brown stripes and suffusions, ciliate on most parts; galea gibbous at the base then extending in a strong curve, much inflated, suddenly decurved near the apex; petal flanges widely separated and not closing off the base of galea. *Dorsal sepal* 16-21 mm long, cucullate, obliquely erect, curved throughout, decurved in distal half, apical point 8-18 mm long, filiform to acuminate, decurved. *Lateral sepals* deflexed, strongly marked with red-brown; fused part 10-12 mm x 10-12 mm, deeply concave, the margins incurved and with numerous white cilia c. 1 mm long; sinus narrow, segments widely divergent; free points 20-25 mm long, filamentous, divergent, curved forwards, 10-16 mm apart at the tips. *Petals* ovate-lanceolate, 13-15 mm x 4-4.5 mm, acuminate, transparent with 2 dark lines near the base, dorsal ridge strongly ciliate, proximal flange poorly developed. *Labellum* highly irritable on a claw c. 2.5 mm long; lamina obovate-spathulate, 7-8.5 mm x 3.5-4 mm, dark brown, moderately thick, constricted in proximal third, widest above the middle, tapered to a broadly obtuse apex; lateral margins beset with siliceous cells and numerous short, white cilia especially towards the apex, 5-8 pairs of prominent, white, spreading setae c. 4 mm long; basal lobe hardly developed, finely ciliate and entire or with 1-3 pairs of white setae c. 1 mm long; underside with a prominent, deep, central channel, extending nearly to the apex. *Column* c. 20 mm long, curved. *Column wings* c. 5 mm x 3 mm, more or less rectangular, anterior margins ciliate. *Stigma* elliptical, 7-8 mm x 2-2.5 mm. *Anther* c. 2.5 mm long, obtuse. *Pollinia* c. 2.3 mm long, oblong-clavate, yellow. *Capsule* obovoid, 10-14 mm x 5-5.5 mm. **Figure 4.**

Distribution and Habitat: Endemic to the Murchison District of south-western Western Australia. It grows in shallow stony loam under low scrub (*Acacia tetragonophylla*, *Dodonaea* sp., etc.), less commonly in red sand under *Callitris*.

Flowering Period: August and September.

Notes: *Pterostylis macrocalymma* has affinities with *P. spathulata* but is recognised by the very stout habit, the much larger flowers crowded in the raceme, with the flowers having a large, inflated galea and a larger spathulate labellum.

Conservation Status: Uncommon to rare and perhaps threatened by weed invasion and human activities.

Etymology: Derived from the Greek, *macros*, large or long and *calymma*, head covering or hood; in reference to the large galea of this species.

5. Pterostylis picta *M. A. Clements*, Aust. Orch. Res. 1: 125 (1989).

Illustrations: N. Hoffman & A. Brown, Orchids of South-west Australia 371 (1992).

Tuberous terrestrial herb. *Leaves* 15-45 mm x 7-20 mm, obovate to oblong-obovate, acute, 6-12 in a radical rosette, usually senescent at flowering. *Inflorescence* 15-50 cm tall, slender, with 3-5 closely ensheathing, ovate-lanceolate, sterile bracts. *Floral bracts* ovate-lanceolate, 10-30 x 6-8 mm, acuminate.

Pedicels 8-30 mm long. *Ovary* 7-9 mm long. *Flowers* 1-12, porrect, transparent with broad green and brown stripes and a prominent chequered pattern on the lateral sepals; galea gibbous at the base, shallowly curved in the middle, decurved suddenly to the apex; petal flanges not touching but nearly closing off the base of galea. *Dorsal sepal* 10-15 mm long, cucullate, obliquely erect, abruptly decurved in distal third; apical point 6-7 mm long, filiform-acuminate, upcurved. *Lateral sepals* deflexed, with 3-4 distinct longitudinal marks and cross-chequered patterns; fused part 7-10 mm x 7-9 mm, shallowly concave, the margins slightly incurved and sparsely ciliate; sinus narrow, the segments divergent, free points 10-13 mm long, filamentous, decurved strongly, c. 6-10 mm apart at the tips. *Petals* ovate-lanceolate, 12-15 mm x 3-4 mm, falcate, semi-transparent with 2-3 longitudinal markings, dorsal ridge prominently ciliate, anterior margin with a few short cilia, proximal flange well developed. *Labellum* highly irritable on a claw c. 2 mm long; lamina narrowly oblong-ovate, 5-6 mm x 2-2.5 mm, brown, thick and fleshy, constricted in proximal quarter, widest at the base and near the middle, tapered to an obtuse apex; lateral margins beset with numerous short, fine cilia and 6-9 pairs of white spreading setae c. 3 mm long; basal lobe enlarged, finely ciliate and with 2-4 pairs of white setae c. 1.5 mm long. *Column* c. 11-13 mm long, curved. *Column wings* c. 4 mm x 3 mm, more or less rectangular, anterior margins ciliate. *Stigma* broadly scutiform, 6 mm x 3 mm. *Anther* c. 2 mm long, obtuse. *Pollinia* c. 2 mm long, oblong-clavate, yellow. *Capsule* narrowly obovoid, 8-10 mm x 4-5 mm. **Figure 5.**

Distribution and Habitat: Widespread throughout south-western Western Australia (Moora to Jerramungup). It grows in a wide range of habitats including Wandoo woodland, sheoak woodland, mallee scrub and ironstone breakaways.

Flowering Period: September to November.

Notes: *Pterostylis picta* is a distinctive species with strikingly marked flowers, these being basically translucent white with strong green (rarely brown) stripes in the galea and prominent chequering in the lateral sepals. The labellum is very thick and fleshy and broad when compared with its closest congener, *P. leptochila.*

Conservation Status: Common, widespread and conserved.

Etymology: Derived from the Latin *pictus*, coloured, painted, an allusion to the markings on the flower.

6. Pterostylis roensis *M. A. Clements & D. L. Jones*, Aust. Orch. Res. 1: 126 (1989).

Illustrations: N. Hoffman & A. Brown, Orchids of South-west Australia 370 (as *P. roensis*) & 373 (as *P. insectifera*).

Tuberous terrestrial herb. *Leaves* narrowly ovate-lanceolate, 15-45 mm x 5-18 mm, 6-11 in a radical rosette, petiolate, usually senescent at flowering. *Inflorescence* 13-30 cm tall, slender, with 3-5 closely ensheathing, ovate-lanceolate, sterile bracts. *Floral bracts* ovate-lanceolate, 1.3-2 cm x 3-5 mm, acuminate. *Pedicels* 8-18 mm long. *Ovary* 5-8 mm long. *Flowers* 3-10, porrect, translucent white heavily suffused with dark green to brown or black striations and suffusions, often shiny; galea gibbous at the base, flat or shallowly curved in the middle, decurved suddenly to the apex; petal flanges nearly touching but not completely closing off the base of galea. *Dorsal sepal* 10-14 mm long, cucullate, obliquely erect, abruptly decurved in distal third, apical point 3-5 mm long, filiform-acuminate, decurved to upcurved. *Lateral sepals* deflexed to recurved, dark-brown; fused part 7-9 mm x 6-9 mm, flat, thin-textured, the margins slightly incurved, glabrous or with a few short cilia; sinus narrow, the segments divergent, free points 6-10 mm long, filamentous, deflexed, divergent, 4-10 mm apart at the tips.

Petals ovate, 10-12 mm x c. 3 mm, falcate, long-acuminate, partially translucent to brown, with a dark brown line along the proximal margin, central ridge ciliate, dorsal margins glabrous, or ciliate, proximal flange well developed. *Labellum* highly irritable on a claw c. 2 mm long; lamina narrowly ovate-oblong, 4-5.5 mm x 2 mm, dark brown to almost black, thick and fleshy, slightly constricted in basal quarter, widest below the middle; tapered to an obtuse apex; lateral margins beset with numerous short, fine cilia and 7-11 pairs of white, spreading setae c. 2 mm long; basal lobe raised and fleshy, finely ciliate and with 3-5 pairs of setae c. 1.5 mm long; underside with a narrow, deep central groove. *Column* c. 13 mm long, curved. *Column wings* c. 3.5 x 2 mm, more or less rectangular, anterior margins ciliate. *Stigma* scutiform, 5-6 mm x 2 mm, upper margins irregular. *Anther* c. 2 mm long, with a short rostrum. *Pollinia* c. 2 mm long, clavate, yellow. *Capsule* obovoid, 8-11 mm x 3-5 mm. **Figure 6.**

Distribution and Habitat: Endemic to south-western Western Australia (Bullfinch to Balladonia and across to Katanning). It grows in a wide range of habitats particularly in tall open woodland, mallee shrubland, low scrub around salt lakes and claypans and around granite outcrops.

Flowering Period: September to November.

Notes: *Pterostylis roensis* is a distinctive species which has a slender habit, generally small, narrow, mostly glabrous flowers which are often shiny and are commonly very dark brown or blackish in colour (rarely green) and have few prominent markings. The labellum is also proportionally large compared to the size of the flower.

Conservation Status: Locally common, widespread and conserved.

Etymology: Named for the Roe botanical district in Western Australia where this species is widespread and common.

7. Pterostylis spathulata *M. A. Clements*, Aust. Orch. Res. 1: 127 (1989).

Illustrations: N. Hoffman & A. Brown, Orchids of South-west Australia 367 (1992).

Tuberous terrestrial herb. *Leaves* narrowly elliptical to narrowly ovate, 20-45 mm x 7-14 mm, 6-10 in a radical rosette, usually senescent at flowering. *Inflorescence* 15-35 cm tall, moderately stout, with 2-6 loosely ensheathing, ovate-lanceolate, sterile bracts. *Floral bracts* ovate-lanceolate, 7-24 mm long, acuminate. *Pedicels* 1-3 cm long, slender. *Ovary* 5-6 mm long. *Flowers* 2-12, semi-nodding, translucent with dark brown suffusions and markings; galea mainly translucent, gibbous at the base, shallowly curved in the middle, decurved suddenly to the apex; petal flanges nearly touching and partially closing off the base of galea. *Dorsal sepal* 10-14 mm long, cucullate, abruptly decurved in distal third, apical point 8-11 mm long, filiform-acuminate, decurved. *Lateral sepals* deflexed, heavily suffused with brown; fused part 15-18 mm x 7-9 mm, concave, the margins incurved and with numerous white cilia c. 1 mm long; sinus very narrow, hardly divergent, free points 18-22 mm long, filamentous, obliquely decurved to upcurved with the tips often embracing the point of the dorsal sepal, 2-8 mm apart at the tips. *Petals* narrowly ovate, falcate, 12-14 mm x 2.5-3.5 mm, transparent with a short, basal stripe, acuminate, dorsal ridge with a few, short cilia, proximal flange poorly developed, ciliate. *Labellum* highly irritable on a claw c. 2 mm long; lamina broadly spathulate, 4.5-5.5 mm x 3-3.5 mm, red-brown, thin, prominently constricted in proximal quarter, broadest above the middle, tapered to a truncate apex; lateral margins beset with numerous, short, fine cilia and 6-8 pairs of fine, white, spreading, setae c. 3 mm long; basal lobe hardly raised, finely ciliate, lacking setae; underside with a narrow, central channel extending to the apex. *Column* 13-15 mm long, curved.

Column wings c. 4 mm x 3 mm, more or less rectangular, anterior margins ciliate. *Stigma* scutiform, 6-7 mm x 3 mm, upper margins slightly irregular. *Anther* c. 1.8 mm long, with a short rostrum. *Pollinia* c. 2.2 mm long, oblong-clavate, yellow. *Capsule* obovoid, 6-8 mm x 4-5.5 mm. **Figure 7.**

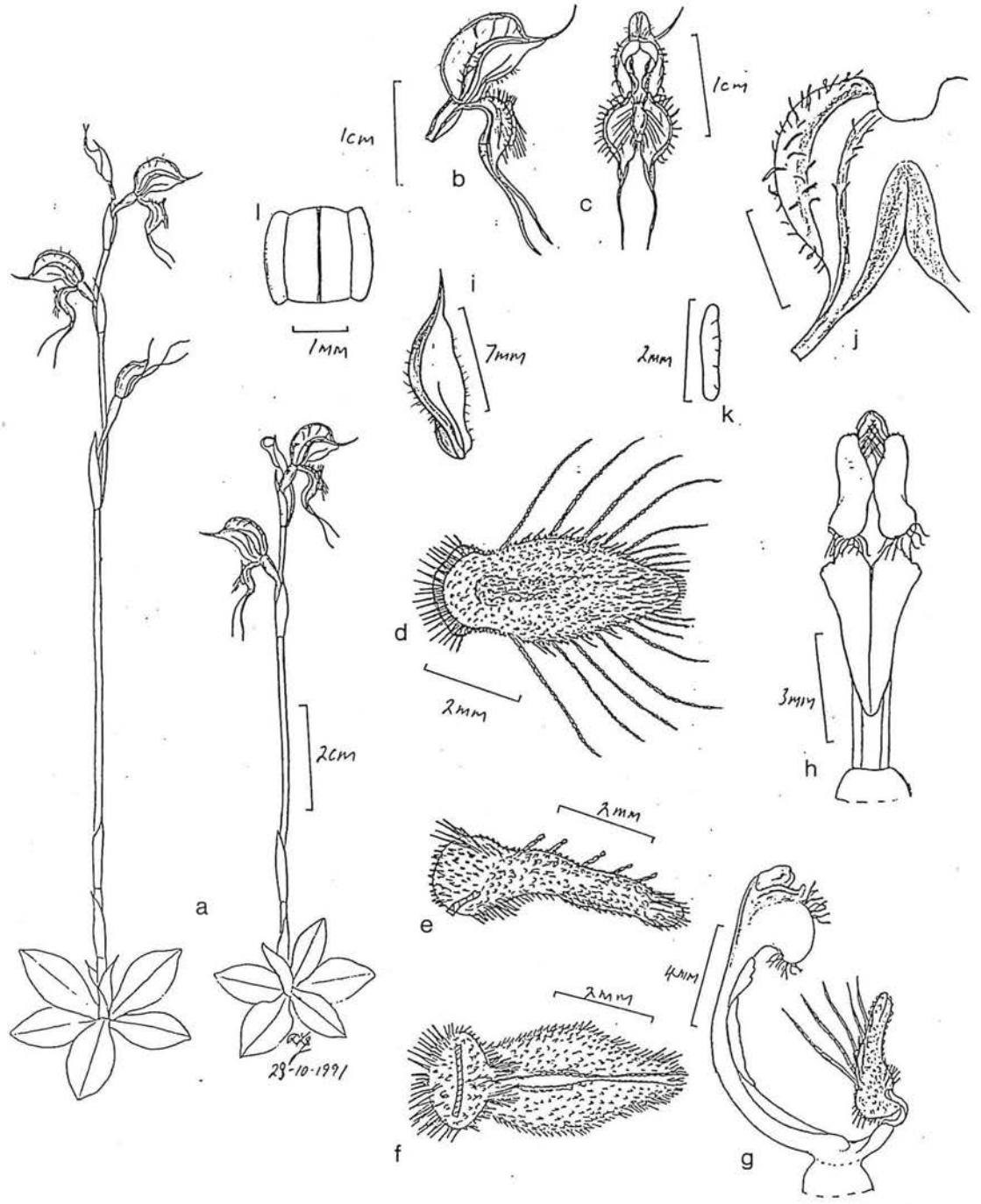
Distribution and Habitat: Endemic to south-western south-western Western Australia (Moora to Beacon). It grows in Salmon Gum woodland and Yate woodland in clay soils, usually with a sparse shrubby understorey.

Flowering Period: September to November.

Notes: *Pterostylis spathulata* has affinities with *P. macrocalymma* but is a taller, more slender plant with smaller, duller coloured flowers. The flowers have a narrower galea and a smaller labellum.

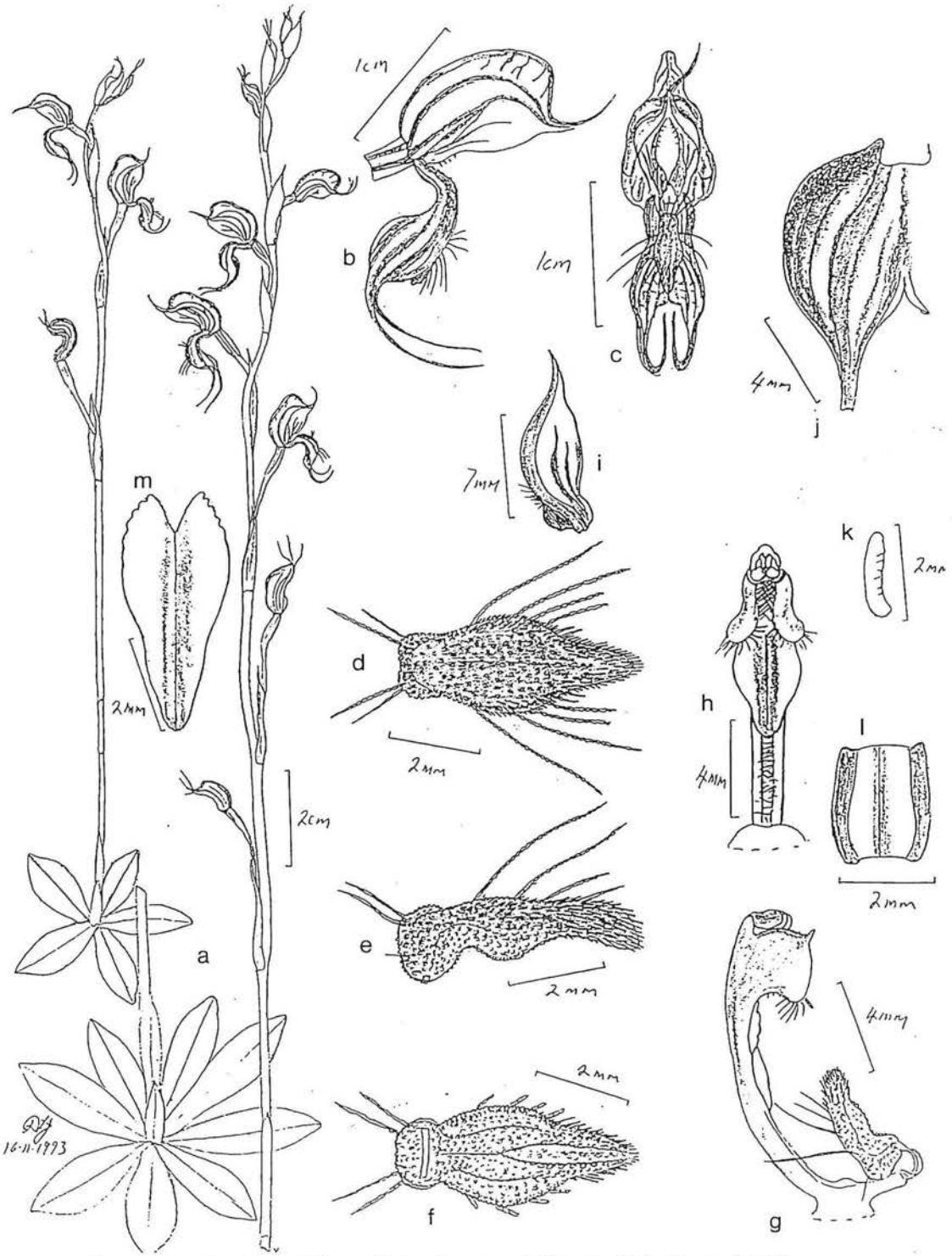
Conservation Status: Of restricted distribution, locally common but not conserved.

Etymology: Derived from the Latin *spathulatus*, spathulate, spoon-shaped, in reference to the labellum shape.



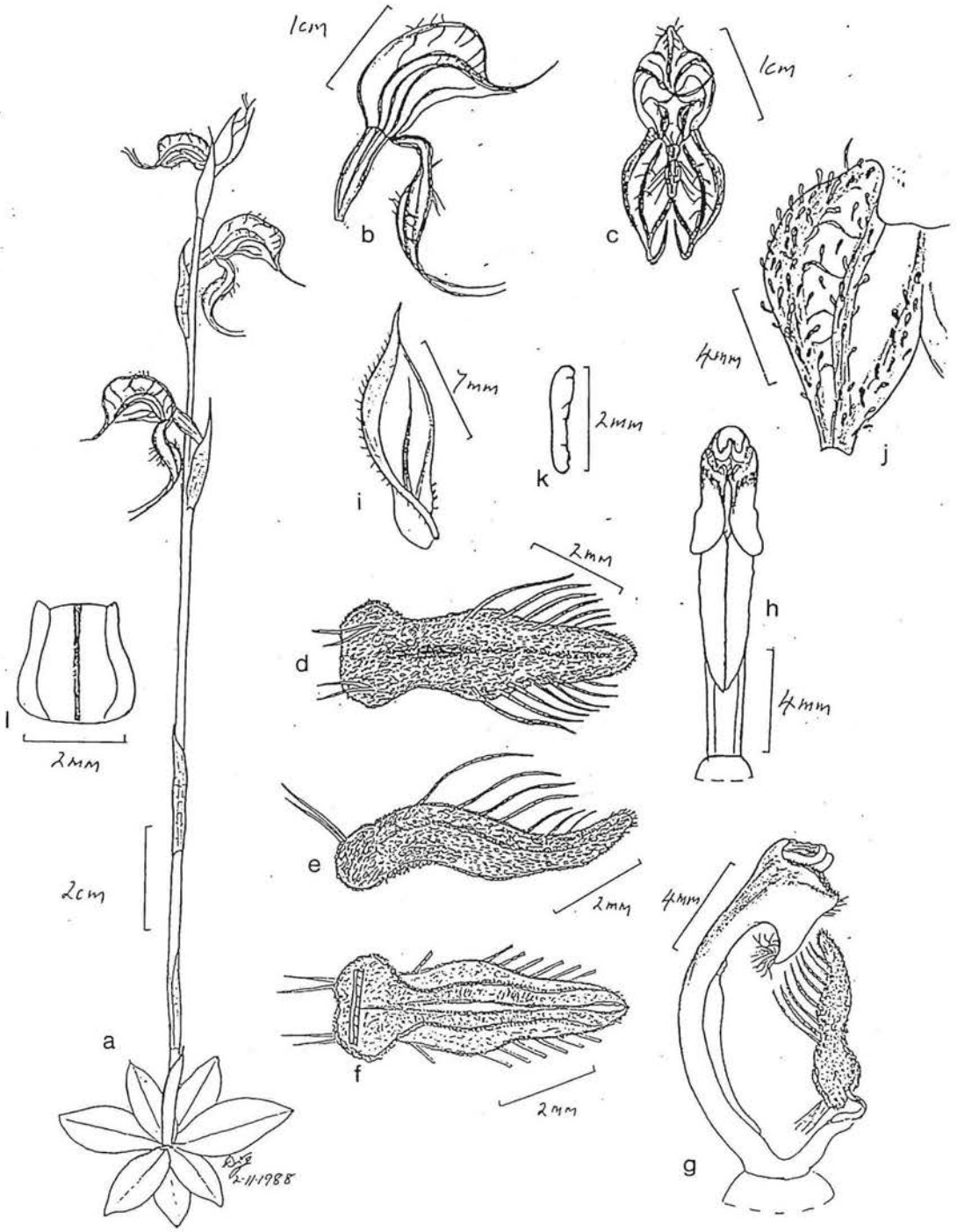
1 **Pterostylis ciliata** (Brookton Hghy, Darling district, D.L.Jones 3095 & M.A.Clements). a.- plant habit. b.- flower from side. c.- flower from front. d.- labellum from above. e. labellum from side. f.- labellum from beneath. g.- column and labellum from side. h.- column from front. i.- petal. j.- lateral sepals from rear. k.- pollinium. l.- labellum hinge.

Figure 1: *Pterostylis ciliata*



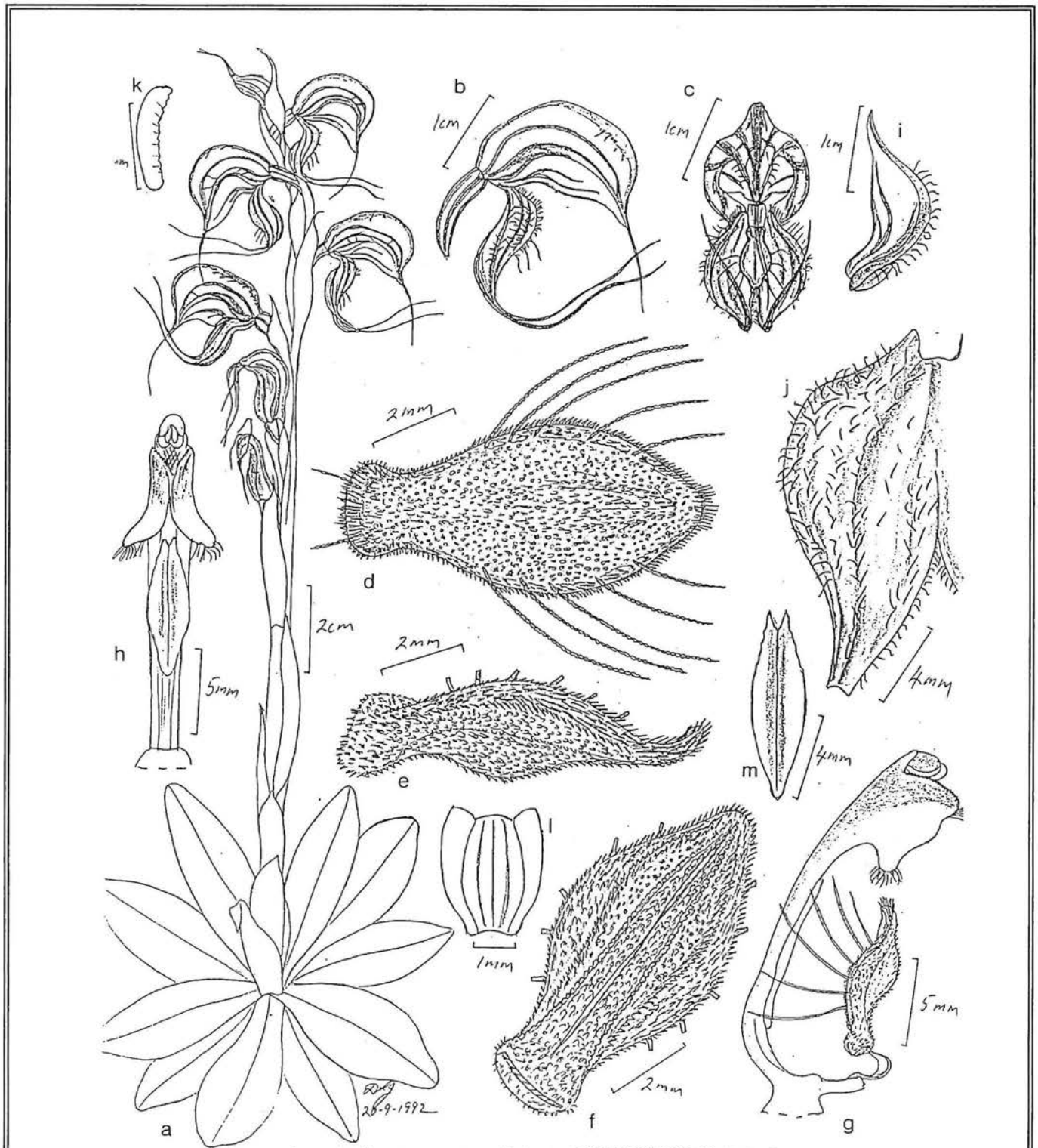
2 **Pterostylis insectifera** (Lake Cronin, C.French (D.L.Jones 12574). a.- plant habit. b.- flower from side. c.- flower from front. d.- labellum from above. e. labellum from side. f.- labellum from beneath. g.- column and labellum from side. h.- column from front. i.- petal. j.- lateral sepals from rear. k.- pollinium. l.- labellum hinge. m.- stigma.

Figure 2: *Pterostylis insectifera*



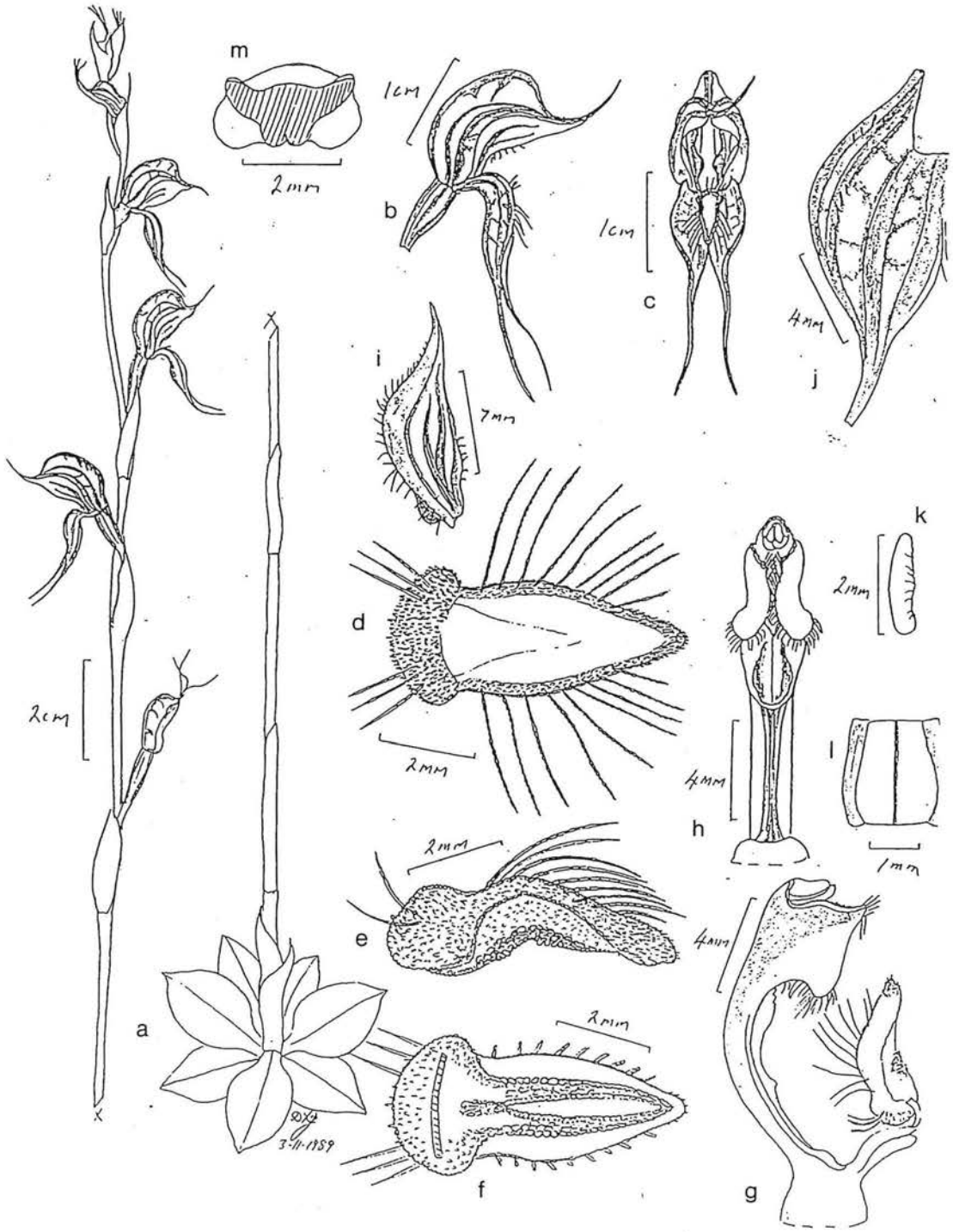
3 **Pterostylis leptochila** (Ravensthorpe, D.L.Jones 3386 & M.A.Clements). a.- plant habit. b.- flower from side. c.- flower from front. d.- labellum from above. e. labellum from side. f.- labellum from beneath. g.- column and labellum from side. h.- column from front. i.- petal. j.- lateral sepals from rear. k.- pollinium. l.- labellum hinge.

Figure 3: *Pterostylis leptochila*



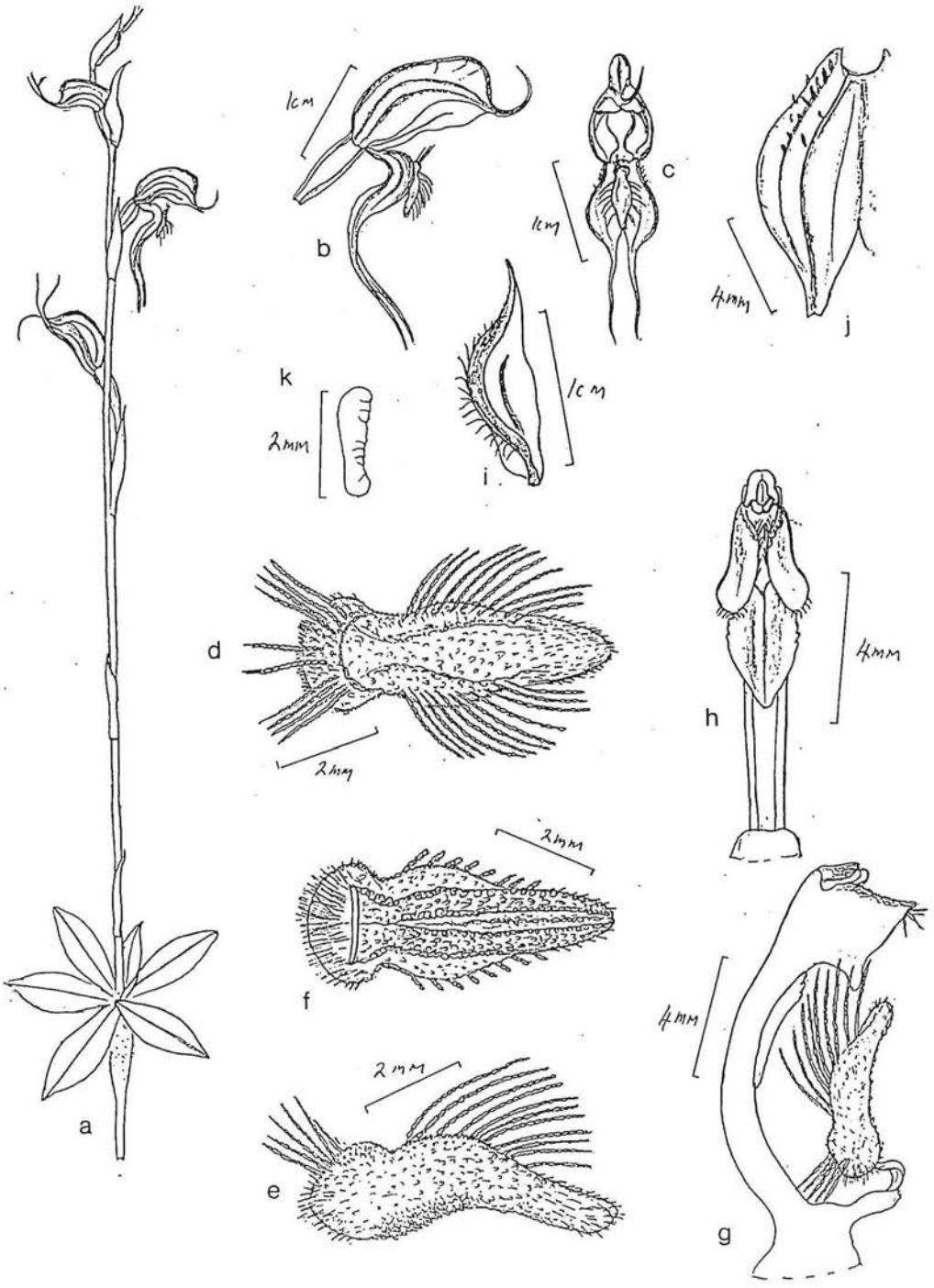
4 **Pterostylis macrocalymma** (Murchison River, A.P.Brown (D.L.Jones 10145). a.- plant habit. b.- flower from side. c.- flower from front. d.- labellum from above. e. labellum from side. f.- labellum from beneath. g.- column and labellum from side. h.- column from front. i.- petal. j.- lateral sepals from rear. k.- pollinium. l.- labellum hinge. m.- stigma.

Figure 4: *Pterostylis macrocalymma*



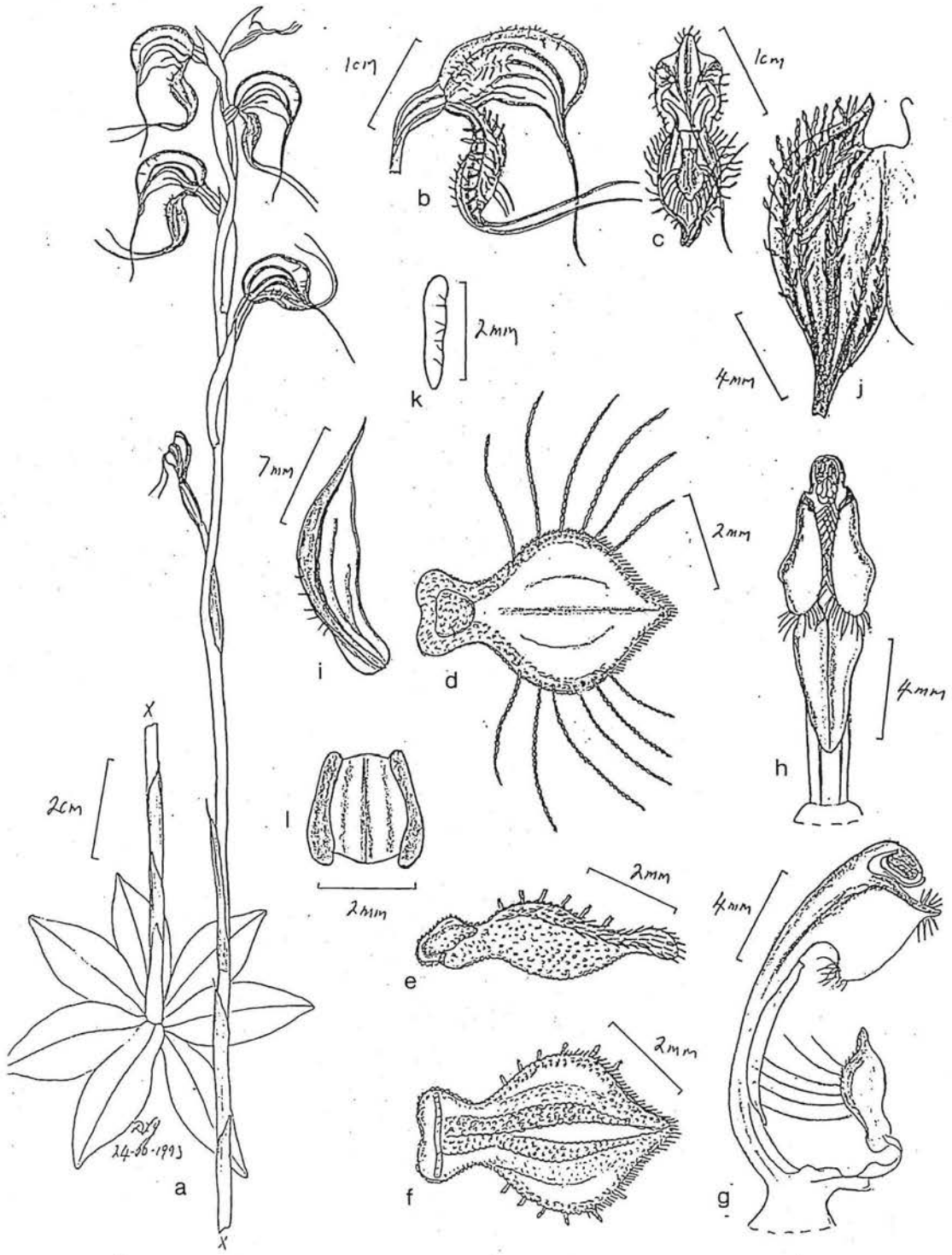
5 **Pterostylis picta** (Moora, W. Merritt). a.- plant habit. b.- flower from side. c.- flower from front. d.- labellum from above. e. labellum from side. f.- labellum from beneath. g.- column and labellum from side. h.- column from front. i.- petal. j.- lateral sepals from rear. k.- pollinium. l.- labellum hinge. m.- cross-section of labellum.

Figure 5: *Pterostylis picta*



6 **Pterostylis roensis** (Mt Heyward, M.A.Clements 1850). a.- plant habit. b.- flower from side. c.- flower from front. d.- labellum from above. e. labellum from side. f.- labellum from beneath. g.- column and labellum from side. h.- column from front. i.- petal. j.- lateral sepals from rear. k.- pollinium.

Figure 6: *Pterostylis roensis*



7 **Pterostylis spathulata** (Moora, D.L.Jones 12073). a.- plant habit. b.- flower from side. c.- flower from front. d.- labellum from above. e. labellum from side. f.- labellum from beneath. g.- column and labellum from side. h.- column from front. i.- petal. j.- lateral sepals from rear. k.- pollinium. l.- labellum hinge.

Figure 7: *Pterostylis spathulata*