



BULLETIN

*OF THE*

WESTERN AUSTRALIAN NATIVE ORCHID  
STUDY AND CONSERVATION GROUP  
(INC)

May 1998

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	Joan Greeve	
	Joani Eaton	
	John Eaton	
FIELD TRIP COORDINATOR	Stuart Harris	
LIBRARIAN	Bill Burton	
EDITOR	Noel Clarke	
AUDITOR	Ross Wilton	

### OBJECTIVES OF THE GROUP

- a) To promote interest in and preserve Western Australian indigenous orchids.
- b) To learn the best means of cultivation and do all things possible for the conservation of native orchids in their environment.
- c) To learn their habitats and keep records.
- d) To have field days and learn to recognise the different genera and species.
- e) To hold meetings for the exchange of knowledge and furthering of interest in Western Australian orchids.
- f) To affiliate with kindred organisations.
- g) To make rules of the Group's domestic affairs.
- h) To do all such other lawful things as are incidental to or conducive to the attainment of the above objectives.

*Note: The opinions expressed by contributors to this Bulletin are not specifically endorsed by this group,*

POSTAL ADDRESS OF GROUP: PO Box 323  
Vic Park 6979



**NEXT COMMITTEE MEETING**

Wednesday, 20 May 98 at 7.00 p.m.

**NEXT GENERAL MEETING**

Wednesday, 20 May 98 at 8.00 p.m.

**MEETING VENUE CHANGE**

Please note that the May and June meetings will be held at the Laboratory, Kings Park, near the glass houses.

**GUEST SPEAKER**

Deanna Rockish, topic "Understanding Banksia Woodlands".

**ANNUAL GROUP MEMBERSHIP FEES**

*The Groups financial year commences on 1 February, so all membership fees are now due. The Group membership fees are as follows:*  
Single Membership \$20.00 pa.  
Family Membership \$20.00 pa.  
*The digit after your name on the address label is the year for which you are financial and is updated to the last meeting. If you have paid since then please make the allowance.*

**FORTHCOMING MEETINGS**

May 20	General Meeting
June 7	Fieldtrip to Watheroo
June 17	General Meeting
July 15	General Meeting
August 19	General Meeting
September 16	General Meeting
October 21	General Meeting
November 18	General Meeting

**BULLETIN CONTRIBUTIONS**

Contributions are needed for every edition of the Bulletin. Articles should be sent to Noel Clarke. The article submission deadline for the next issue is 1 June 1998.

**SUPPER COST**

Each month our supper is generously donated by group members (per list on the back of the Bulletin), while the group supplies the tea, coffee, sugar and milk. To recoup some of the cost of these supplies, a modest fee of 50 cents applies. This can be left on the supper table and will be collected by the Treasurer at the end of the evening.

*Also please rinse out your cups when you have finished with them.*

**ORCHID TALK**

Have a computer? Connected to the Internet? Want to talk orchids? Give your Editor your E-mail address for publication.

Members connected to the Internet are: -

**HELP WANTED**

*Syd Gibbings, a past member, has donated three boxes of slides to our group. They are all marked with the old orchid names.*

*Volunteers are required to catalogue the collection. Please advise the secretary if you can assist.*

**FIELD TRIP Sunday 7 June**

Meet at Mogumber Hotel, on Moora-Bbondoon Rd, at 9 am. The trip is to see *Thelymitra apiculata*, *Caladenia drummondii* and *Pterostylis* species. Please advise Stuart Harris if you intend coming.

**FOR SALE**

Rufa Trip Report \$10.00.  
Caladenia flava Badges \$4.00 members, \$5.00 non-members.  
Name Badges \$8.50.  
Orchids of WA (2<sup>nd</sup> Ed) \$9.00.  
Orchids of SW Australia \$40.00.  
Car Stickers \$1.50.  
Pat Dundas Cards \$8.00.  
Bush Survival Kit \$4.00.

PROTECTION OF REMNANT NATIVE  
VEGETATION

**NOTICE OF INTENTION TO CLEAR**

In many areas of rural zoned land in southern Western Australia, there is now a general presumption (prohibition) by the Western Australian Government against clearing because of the desire to prevent loss of biodiversity and to prevent land degradation.

Consequently, the Government has recently put in place procedures which require that landholders who intend or would like to clear privately held land greater than 1 hectare in size need to submit a Notice of Intention to Clear. These Notices of Intention to Clear then go through a four-level evaluation process. This gives many parties an opportunity to comment upon, and possibly prevent, the proposal.

The process starts by the landholder placing an advertisement in the Public Notices section of the



Saturday edition of "The West Australian" newspaper and in the main local newspaper. The advertisement indicates where the land is located. The Notice of Intention to Clear also requires that the landowner submit plans and maps of the area and its native vegetation to the Commissioner of Soil and Land Conservation.

The advertisement invites anyone to write to the Deputy Commissioner of Soil and Land Conservation (Agriculture WA, 3 Baron-Hay Court, South Perth 6151) registering their views or providing relevant information.

An invitation is hereby extended to all members of the WA Native Orchid Study and Conservation Group to keep an eye out for these Notices of Intention to Clear, to obtain information about the exact area under consideration, and to inform the Executive of any applications in areas that they know contains significant orchids. The Executive may then decide, in consultation with members familiar with the area, to lodge an objection or provide information to the Deputy Commissioner of Soil and Land Conservation. Members are also welcome to contact the Deputy Commissioner of Soil and Land Conservation directly.

For further information, contact Eddy Wajon on

### **WANOSCG GENERAL MEETING** **15 APRIL 1998**

#### **ATTENDANCE**

37 members and 3 visitors as per register.

#### **NEW MEMBERS**

Nil.

Visitors Majorie and Robin Moyle of Mundaring and Rebecca Evans were welcomed.

#### **MINUTES**

It was moved John Eaton/Eddie Wajon that the minutes of the General Meeting of 19<sup>th</sup> November be accepted. Carried.

#### **BUSINESS ARISING**

Eddy Wajon referred to his previous advise that land clearing applications must now be approved by EPA and be advertised in Saturday's West Australian newspaper, and brought to attention a notification in 'The Westaustralian' of April 4 to clear remnant vegetation in the Rosa Glen location east of Margaret River.

#### **CORRESPONDENCE**

As per correspondence list.

Attention was drawn to the Environmental Lecture Series 1998, free lecture by David

Suzuki on Wednesday 27 May at Winthrop Hall at 8 pm, entitled "Towards the Year 2000: Setting the Bottomline", also free lecture by Paul Gilding on Wednesday 19 August at the Octagon Theatre, entitled "Can Business Drive Environmental Change". Note - This is our meeting night for August.

#### **TREASURER'S REPORT**

Treasurer's Report circulated. No queries raised.

#### **FIELD TRIPS**

To Pinjarra this weekend as previously advised. Next field trip anticipated early June.

#### **PLANT TABLE**

No plants were presented.

#### **GENERAL BUSINESS**

Margaret & Ross Fox were thanked for their donation to our Group of a book entitled "Discover Australia - National Parks".

Conservation Council - Meeting was advised that Wayne Merritt is willing to continue as one of our two delegates, but replacement is sought for Don Manners, who wishes to step down. Eddie Wajon volunteered.

Ian Greeve said that a suggestion had been made recently that a collection of slides donated to the Group recently by Sid Gibbings (see previous meeting) should be made available to persons outside our Group, and urged that the donor's wishes be respected. The meeting agreed that the slides should remain within our Group.

There was some discussion about how these slides may be catalogued. Please advise the Secretary if you can assist.

Bill Jackson as Guest Speaker showed some slides of *Thelymitra variegata* and *T. spiralis* and pointed out colour variations in different geographical locations.

The President presented Bill with a club badge as our appreciation.

Two prizes for the raffle were provided by Mike Harper and were won by Phillip Sharp and Ross Wilton.

The supper was provided by Margaret Fox.

The meeting closed at 8.50 pm.

### **FIELD TRIP SUNDAY 19 APRIL TO PINJARRA by MIKE HARPER.**

As we pulled up at the meeting point we were greeted by a round of applause and gleeful people making writing signs. We knew we must be last! Twelve vehicles set off and Stuart Led us south then west to Nine Mile Lake Nature Reserve, our first stop.

We all fanned out but within about 60 seconds Noel cried out "I've found the first one". Very dodgy. We all surrounded a very nice



specimen of *Praecoxanthus aphyllus*. Now I knew what a real specimen looked like. The next 1 1/2 hours we spent locating about 20 plants, widely distributed. During this time 5 specimens of *Eriochilus dilatatus* ssp *dilatatus* were located but no *Leporella fimbriata*. We adjourned to Herron Point by Harvey Estuary for lunch. A lovely peaceful spot it

The following article was written before the name changes.

## SEEDER/CLONAL CONCEPTS IN WESTERN AUSTRALIAN ORCHIDS

Kingsley Dixon, Kings Park and Botanical Garden

### Abstract

The orchid flora of Western Australia comprises over 300 taxa and is rich and varied. Temperate deciduous terrestrials species occur in the south west of Western Australia and tropical terrestrials and epiphytic species in the north of the state. In the southwest, five genera and over 85% of the species are endemic to the region. A detailed phenology of dry matter partitioning for the southwest species *Thelymitra fuscolutea* R. Br. Shows that growth and dry matter accumulation occurs during the cooler winter months with the most rapid rise in dry matter of the plant occurring in late winter to just before dormancy in late spring. Less than five percent of the non-remobilizable dry matter of the plant is accounted for in seed. The habitat establishment of a seedling terrestrial orchid depends on the presence of suitable fungal endophytes and other factors in the soil. Once established as a seedling a range of vegetative options have been developed by Western Australian orchids which enable exploitation of the niche. This paper reviews these options and their presence in the orchid flora of Western Australia.

### Introduction

Western Australia covers over 30% of the land mass of Australia and contains over one third of the flora of the continent. Twenty eight genera and 145 species of orchid including two epiphytic species (*Cymbidium canaliculatum* and *Dendrobium affine*) Were known for the state in 1985 (Green 1985). However with the current pace of taxonomic research this number probably exceeds 300 taxa (Dixon 1988). The terrestrial species have reached a zenith in the southwest of Western Australia, a region with a Mediterranean type climate – cool, moist winters and hot, dry summers (FIG. 1). For these species growth commences in the wetter winter to spring months (June to September) followed by senescence of above ground parts back to a dormant tuber(oid) by the beginning of summer (December). A number of species are heterantherous (flowering out of synchrony with leaf production) and flower before leaf emergence or immediately after leaf senescence. For the southwest only the native slipper orchid (*Cryptostylis ovata*) is evergreen. The tropical region in the north of Western Australia has two epiphytic and nine terrestrial species. In the southwest there are at least five genera and over 85% of the species which are endemic to this region. No species are shared between the tropical north and temperate southwest however the genus *Calochilus* has representative species in both regions. A broad 1500km region Covering the central portion of the State from Shark Bay to Broome is devoid of orchids. This region effectively isolates the tropical and temperate taxa

was too. So with bodies and minds refuelled we set off again in pursuit of *Leporella fimbriata*. While a few more specimens of *Praecoxanthus aphyllus* and *Eriochilus dilatatus* were found, none of the elusive *Leporella fimbriata* were located. They all must have still been in their burrows.

and includes Broome is devoid of orchids. This region effectively isolates the tropical and temperate taxa and includes the winter/summer rainfall line (Fig. 1).

Western Australian terrestrial orchids generally favour open woodland, heath or ephemeral wet sites adjacent to water courses or swamps. A number of genera grow in exposed sandy sites (*Paracaleana*, *Drakea*, *Leporella*) or on skeletal soils over exposed rock (*Thelymitra*, *Spiculaea*, *Diuris*). *Spiculaea ciliata* is a remarkable species restricted to moss swards and thin soil lenses on granite rocks where summer soil temperatures rise in excess of 60° C. *Epiblema grandiflorum*, *Microtis* species, *Prasophyllum* species and *Calochilus caeruleus* and *C. robertsonii* often grow and flower with the base of the plant and leaves in water for 1 – 3 months each year.

The growing season for terrestrial species is 4 – 5 months for tropical species and 5 – 8 months for southwest species depending on latitude – the lower the latitude the shorter the growing season (Dixon *et al.* 1988). Some vicarious species such as *Caladenia flava* which are found across the southwest begin flowering in early August in the northern populations concluding flowering in December in south coast populations. Pot studies under uniform conditions show that the variation in flowering time for this species appears to be genetic rather than environmentally induced.



Fig. 1. Western Australia showing the southwest region (including the mediterranean zone) and the Kimberley region. The line separating summer and winter rainy seasons is indicated.



## Phenology of growth and development in Western Australian Terrestrial orchids.

The phenology of growth and dry matter changes for a typical temperate terrestrial species (*Thelymitra fuscolutea* R. Br.) is shown in Fig. 2. Most southwest species have a similar phenology to *Thelymitra fuscolutea* and commence growth with the onset of cool, moist conditions usually in April to early May. Northern tropical species are "contraseasonal" and remain dormant till temperatures rise and soil wetting occurs during the summer monsoon which begins in late November to early December (Dixon *et al.* 1988).

Many terrestrial species flower while in full leaf which for southwest species is from July to November (Fig. 3). Eleven genera commence flowering without leaves or at various stages of leaf expansion or senescence (Table 1). Four genera are 'leafless' or saprophytic and have more or less obligate mycorrhizal symbioses. The leafless spider orchid (*Caladenia aphylla*) is unusual in not producing a leaf in the same season as its inflorescence. In this species the green inflorescence stem may provide the photosynthetic needs of the plant for the year in which flowering occurs. *Spiculaea ciliata* is the only orchid species to flower on exposed rocky outcrops during the early summer when leaf and tuber are dormant. This species uses its seasonally persistent fleshy inflorescence stalk to provide water and nutrients to the flowers and developing seed capsules. Some species are known not to emerge above soil every season. In *Caladenia* species and *Leporella fimbriata* where the phenomenon is known to occur tubers may be replaced and/or a root system develop without leaves or developed leaves or flowers being produced in that season.

Table 1. Western Australian terrestrial orchid species which produce flowers at times other than at full leaf development. T indicates species from tropical habitats.

### A. Flowering without Adult

#### Leaves Present

*Caladenia aphylla* (no leaves for year of flowering)  
*Genoplesium nigricans* (small filiform leaf at time of flowering)  
*Nervilia holochila* (T)

#### B. Flowering With Undeveloped Leaf

*Caladenia drummondii*  
*Eriochilus dilatatus*  
*Leporella fimbriata*

#### C. Leaves Senescing at Time of Flowering

*Thelymitra nuda* and related species

*Caladenia corynephora*  
*Pterostylis 'rufa' group*  
 (some species in this group have fully senesced leaves at time of flowering)

#### D. Leaves Fully Senesced at Time of Flowering

*Spiculaea ciliata*

#### E. Saprotrophic Orchids

*Gastrodia sesamoides*  
*Rhizanthella gardneri*  
*Didymoplexis pallens* (T)  
*Dipodium stenochilum*

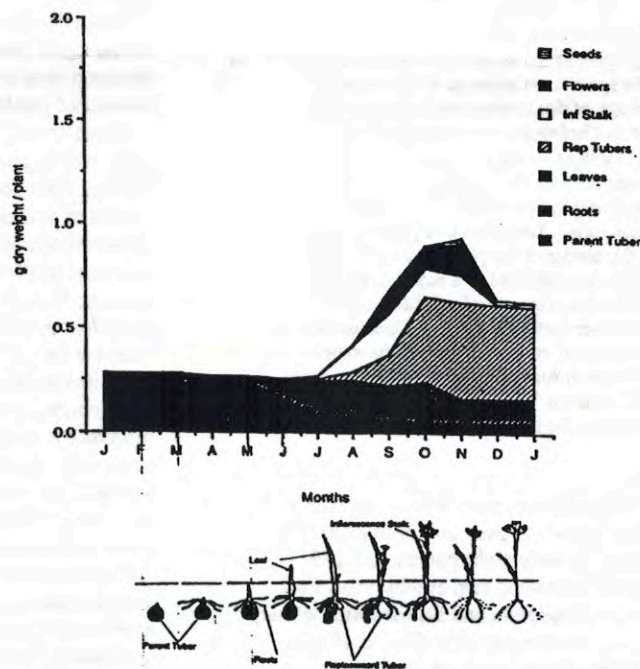


Fig. 2. Phenology of growth and dry matter partitioning in the south west Western Australian terrestrial orchid *Thelymitra fuscolutea*.

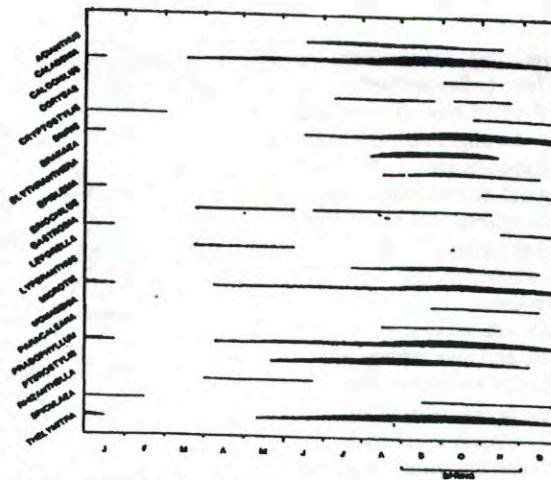


Fig. 3. Flowering periods for terrestrial orchid genera of the south west of Western Australia.



### Phenology of Growth and Dry Matter Partitioning

The following terms are useful for describing the various phenophases of terrestrial orchid growth (adapted from Pate and Dixon 1982):

**Parent Tuber** – storage organ responsible for dormancy.

**Replacement Tuber** – storage organ which replaces the parent tuber, usually on an annual basis.

**Daughter Tuber(s)** – storage tuber(s) with the capacity of independent growth, usually in the next growing season and produced in addition to the single replacement tuber.

**Current Stem Tuber** – applied to rhizome-like storage organs which extend annually and survive for more than one year (e.g. *Rhizanthella gardneri*, *Gastro sesamoides*).

**Old Tuber** – storage organ usually of root origin which survives for more than one growing season.

**New tuber** – current seasons' addition of storage tissues.

**Stolonoid** – elongated structure which subtends a replacement or daughter tuber and is used for horizontal spread or depth adjustment particularly in seedlings.

**Inflorescence Stalk** – structure sometimes with storage capacity which connects flowers to the leaf or leaf rosette.

\* The term tuberoid (Dressler 1981) can also be used to describe the ovoid storage organ of root-stem origin found on many deciduous orchids.

The phenology of dry matter partitioning (Fig. 2) indicates tuber sprouting (associated with a drop in temperature for non-tropical species) and emptying of the stored nutrients in the parent tuber results firstly in the production of roots and young (usually underground), presumably non-photosynthesising leaves. New photosynthesis or root derived nutrient uptake probably occurs

May to early June. Many terrestrial species arrest leaf development at the soil surface until sufficient rain has occurred to sustain leaf expansion. Rapid increases in overall dry matter occur following soil wetting until August to mid-October. During this period leaf expansion and replacement tuber filling are major sinks for photosynthate. By the onset of plant dormancy in early November seed production has advanced and accounts for 5% of the vital, non-remobilizable dry matter of the plant. Of interest is the low root to shoot ratio (from 1:3 to 1:20) of the plant during the growing season. This may indicate the significant nutritional benefits afforded the plant by the mycorrhiza associated with the plant. The very low root: shoot ratios (<1:25) for *Caladenia*, *Eriochilus*, *Pterostylis*, *Gastrodia* and *Rhizanthella* are evidence of the importance of mycorrhizal mediated uptake of nutrients. To more fully understand the importance of fungal symbiosis in the growth and development of terrestrial orchids methods will need to be developed which can assess the capacity of mycorrhiza to transfer nutrients to the plant. This information will provide indicators of the way in which phenophases vary to accommodate alteration in symbiont abundance and activity in the soil.

**Factors influencing orchid distribution and abundance.** Little is known of the factors influencing which site will be preferred or favourable for orchid establishment, growth and flowering. However it is clear that successful establishment of orchid seedlings require the presence in soil of an appropriate fungal symbiont. Thus the sites in which seedling orchids grow may be a reflection of the distribution of an appropriate fungal symbiont. For achlorophyllous orchids the fungal requirement for germination and growth may be absolute and remain the

for the life of the plant. The fully subterranean species *Rhizanthella gardneri* has a tripartite association involving orchid: fungus: roots of the shrub *Melaleuca uncinata* (Warcup 1985; Dixon and Pate 1988; Dixon *et al.* 1991). Thus the distribution of the orchid is intimately linked to the distribution of fungus and *Melaleuca*.

To be continued.

### GLOSSARY OF TERMS

**Achlorophyllous** – Lacking chlorophyll.

**Adventitious** – Accidental; found in unusual places; secondary.

**Anastomosis** – Study in the variations in hyphal network structure, which varies between fungal types, as a means of identification.

**Endophyte** – Bacterium, fungi, alga or other plant living inside the body cells of another organism.

**Hypha** – Tubular filament which forms a branching network and is the basic structural unit of orchid fungal associates.

**Morphology** – The form and structure of an organism.

**Mycorrhiza** – A symbiotic association between plant roots and certain fungi, in which hyphae penetrate between the cells or invade the cells, and which are essential for optimum growth and development of many plant forms.

**Obligate** – Limited to one mode of life or action.

**Phenology** – Recording and study of periodical biological events.

**Saprophytic and Saprotrophic** – Plant gaining nourishment directly from dead or decaying organic matter.

**Senescence** – Advancing eventually leading to death.

**Symbiosis** – Close and usually obligatory association of two organisms of different species living together, not necessarily to their mutual benefit.

**Sympatric** – Inhabiting the same or overlapping geographical areas.

**Sympodial** – A series of branches extending on each other to give a singular appearance.

	SUPPER ROSTER	RAFFLE ROSTER
MAY	Donna Wajon	Kate Ward
JUNE	Nancy Clarke	G & V Brockman
JULY	Del Haywood	Noel Clarke
AUGUST		Ross Fox
SEPTEMBER		Don Manners
OCTOBER		Bill Jackson
NOVEMBER		Ross & Eva Smith

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FORTHCOMING FIELD TRIPS  
Sunday 7 June to Watheroo