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Seed Notes

for Western Australia

No. 1 Introduction

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Successive issues will cover information on a range of genera including *Adenanthos*, *Grevillea*, *Banksia*, *Dryandra*, *Lambertia*, *Darwinia*, *Verticordia*, *Chamelaucium*, *Eremophila*, *Hibbertia*, *Acacia*, *Daviesia* and *Eucalyptus*.

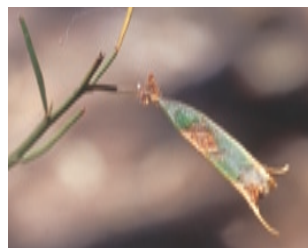


Department of Environment and Conservation

Our environment, our future

Seeds and their importance

Seeds are fertilised, mature ovules—the result of sexual reproduction in plants. Not all plants produce seeds, but those that do often rely on these seeds to replicate themselves over successive seasons and years. Seeds are of immense biological and economic importance. They contain high protein, starch and oil reserves that help in the early stages of growth and development in a plant. These reserves are what make many cereals and legumes major food sources for a large proportion of the world's inhabitants.



Insect damage on an *Acacia* pod.
Photo – Anne Cochrane

Rice, barley, wheat and maize are all seeds. How many loaves of bread, cobs of corn or bowls of rice do you eat in a week? In addition, many of our native animals rely on fruits and their seeds as a primary food source. For example, the

diet of many parrots consists predominantly of seed from native plants such as *Banksia*, *Dryandra* and *Eucalyptus*. There are also many seed-eating mammals (for example, native mice) and insects.

Fruits and seeds

Fruits are the protective coating around the seed. They come in all shapes and sizes. Nuts, capsules, achenes, follicles, drupes and legumes are all different types of fruit. Fruits may be hairy, smooth or corrugated and often oddly shaped. Some fruits are hard and woody (like the bull banksia cone, *Banksia grandis* or the honky nut, *Eucalyptus calophylla*), soft and fleshy (like an emu bush, *Eremophila* sp. or the bush tomato, *Solanum* sp.), papery thin like everlastings (*Helipterum* spp. and *Waitzia* spp.) or retained within old flowers, like the featherflowers (*Verticordia* spp.).

The *Eucalyptus* and some species of *Acacia* may take a year before the fruit is properly formed and seed is ripe. These plants are often long-lived woody perennials. Others have seed and fruits that mature very fast like the everlastings and other small annual species. These types of plants need to develop

quickly as they are reliant on germinating, flowering and fruiting within one year before they die. These annuals are unlikely to have very large or very woody fruits. And some perennial plants produce very few, if any, fruits and may be reliant on resprouting for regeneration, rather than on seeding.



A range of fruit shapes and sizes. Photos – Anne Cochrane

A BURNING ISSUE

You may have wondered why some seeds have large woody protective outer coatings or fruit? In the Mediterranean environment of the south-west of Western Australia, hard woody fruits can be an adaptive response to frequent fires. Many plants invest considerable resources (especially in relation to time) in developing these protective coverings and the size of the outer fruit is often very large in relation to the small seed held within the fruit. Fruits from the genus *Banksia* or the woody pear, *Xylomelum*, have thick woody cones or follicles that protect the seed from fire and may take up to a year to mature. Many of these plants only release their seed from their fruit after fire. Other woody-fruited plants that often release their seed after fire include *Hakea* and *Dryandra*. A number of genera are known as fire weeds and regenerate profusely after fire. Their seeds are generally very hard coated and crack from the heat of the fire, enabling them to take up moisture and germinate. Many of the peas fall into this category, as well as the acacias.



The woody-fruited *Hakea aculeata*, well protected from fire.
Photo – Anne Cochrane



Fire may cause seed from plants, such as peas, to regenerate.
Photo – Anne Cochrane

Bush tucker

Some seeds constitute 'bush tucker' for Indigenous people and some of these are valuable sources of food for the new gourmet food industry. The seeds of some wattles (*Acacia* spp.) can be ground and made into bread, infused to make a coffee-like drink or cooked whole as a legume. Some fruits such as the quandong (*Santalum acuminatum*) have a flesh that can be made into jams and pies.



A range of seeds can be used as bush tucker.
Photo – Anne Cochrane



Wasp pollinating *Eucalyptus ficifolia*.
Photo – Babs and Bert Wells/DEC

Pollination

Plants generally require a pollinator to visit their flowers before seed can be formed. The pollinator may be a bird, a mammal or an insect, but can also simply be the wind. Some plants have evolved flower colour and structure to attract particular pollinators.

Shapes and sizes



A range of seed shapes and sizes.
Photos – Anne Cochrane



Seed dispersal

Once fruits are formed and reach maturity, plants rely on various mechanisms for dispersing them. Animals, wind and water may act as vehicles for dispersal. Australia has many plant species that are dispersed by ants. These species mainly occur in fire-prone environments on infertile soils. Look out for trails of ants dragging seeds to their nest or seedlings emerging from an ant's nest after fire.



Seedlings germinating in an ant nest.
Photo – Anne Cochrane



Acacia pods can explode on hot days, dispersing seed.
Photo – Anne Cochrane



Weed seed going for a free ride.
Photo – Simone Cunneen

Many birds and mammals eat the fleshy fruits of plants and take these to new places before the seed are released in their droppings. This natural process is thought to help with germination of the seed in its new home. Next time you are out in the bush have a look for signs of emus and see if you can identify the fruits they have been eating.



Seed lodged within emu dung.
Photo – Anne Cochrane

Some fruits are naturally explosive, such as the peas (*Daviesia* and *Acacia* spp.). On a hot day you can often hear the pods exploding and if you are quick you may see their seeds flying many metres into the distance.

Other plants, especially many of those in the family Myrtaceae (*Eucalyptus*, *Kunzea* and *Melaleuca*) have fruits with a valve that open when ripe. After ripening the seed then gently falls to the ground. This is often termed a 'seed rain'.

There are also many light-weighted fruits and seed that are reliant on the wind for dispersal. Some of our most notorious weeds are dispersed in this way (dandelions, cape weed and some grasses). Other fruits and seed hitch a ride on mammal fur and our woollen socks are also carriers of seed. Next time you walk through the bush, have a look at what seed you are dispersing.



Everlasting daisy seed are dispersed by wind.
Photo – Anne Cochrane



Recently burst open Acacia pod.
Photo – Anne Cochrane



Seed pods of *Acacia tetragonophylla*.
Photo – Babs and Bert Wells/DEC

Conservation of seeds



The conservation of seed is very important as a means of protecting our natural heritage. Loss of biological diversity is perhaps the most serious environmental problem facing Western Australia. Much of our flora in the species-rich heathlands and on the coastal plains is considered susceptible to the dieback disease *Phytophthora cinnamomi*. In the wheatbelt, dryland salinity poses an additional and almost insurmountable threat. Weed invasion, habitat fragmentation through past and continued clearing of native vegetation, mining and inappropriate fire regimes also threaten the integrity of our plant communities. Collections of seed stored for the short to long term helps prevent the extinction of native plant species. A variety of seed species can be used for bushland regeneration or restoration of degraded landscapes. Seed of individual species can be used in reintroduction and recovery into managed environments when required. This is of vital importance to the maintenance of genetic diversity. Seed can be used



Dieback disease is a major threat to many native species in the south-west of Western Australia.



Salinity threatens survival of many native plant communities. Photo – Val English

for the establishment of seed orchards from which further seed collections can be sourced, thereby reducing the pressure on wild populations. Seed and seedlings material can also be used in

scientific research into seed biology, conservation genetics and disease susceptibility, providing information that will assist in our efforts towards on ground conservation and management.

Seed Notes for Western Australia



These **Seed Notes** aim to provide information on seed identification, collection, biology and germination for a wide range of seed types for Western Australian native species.



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Concept by Grazyna Paczkowska.

Designed by DEC's Graphic Design Section.

The **Seed Notes** are available from www.naturebase.net



Above: Matchstick banksia (Banksia cuneata). Photo – Babs and Bert Wells/DEC. Above right: Mt Lesueur grevillea (Grevillea batrachioides). Photo – Sue Patrick. Both plants have a critically endangered status.



Seed Notes

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