

MOOJA DISCOVERY PACK
A Wildflower Society of WA (Inc.)
Bushland Conservation Fund Project

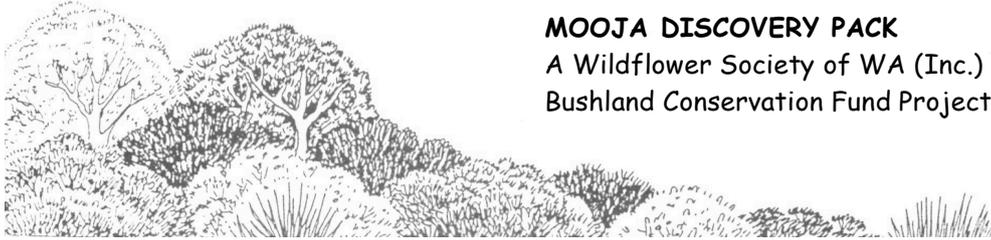
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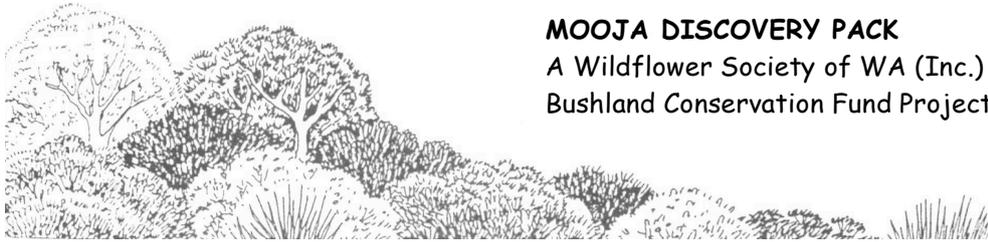
A flowering Mooja Tree, also called a WA Christmas Tree or *Nuytsia floribunda*.

Bronwen Keighery
November 2004



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1 MOOJA TREE HUNT



1.1 *Mooja Discovery Sheet 1*

Mooja Tree Hunts

Mooja, also known as the WA Christmas Tree or *Nuytsia floribunda* (scientific name) is only wild in the Southwest of Australia. As the name suggests it flowers around Christmas time. Mooja is a mistletoe and is the biggest mistletoe in the whole world. Kiss someone under a Mooja Tree this Christmas. Join one or both of the discovery hunts below to find wild Mooja Trees.

Wild Mooja Tree Hunt

Use Discovery Sheets 1a to f to select a tree near you. There are six trees described and located in six Perth cities – Subiaco, Joondalup, Armadale, South Perth, Canning and Melville. Use the location information to visit your Mooja.



The Great 2014 Mooja Tree Hunt

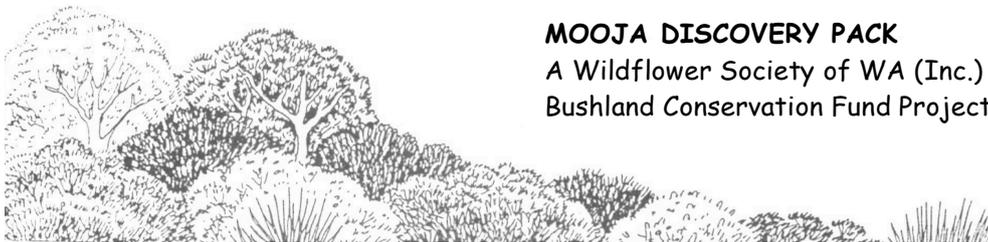
Twenty Mooja trees in the Perth area have been marked with a QR code that can be read by your smart phone. See how many you can find! This is a 30-day event, starting on the 15th November for 30 days. Register at the MUNZEE page on www.munzee.com. To download the Munzee app use the above QR code.

The first 20 people to find 10 of these Mooja Trees will be given a young Mooja tree and Mooja Information Pack. There is a mystery prize for the 10th person to find all 20 trees.



A Mooja tree near Northcliffe (below left), and buds, flowers and leaves (below right). Photos by Bronwen Keighery. The painting used on this page is by Emily Pelloe in 1920. This painting (plate opposite page 70) is in her book on *Wildflowers of Western Australia*, published in 1920 by CJ DeGaris Publishing House.





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1.2 Mooja Discovery Sheet 1b

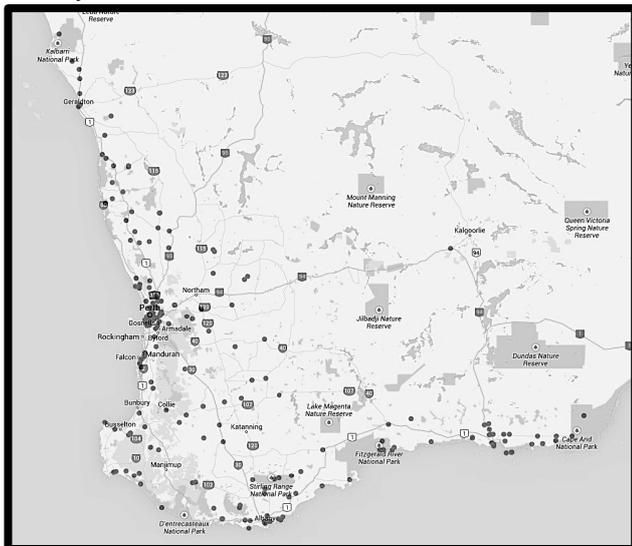
**Mooja,
 Christmas Tree
*Nuytsia
 floribunda***

B Appearance

Nuytsia is a small tree (up to 8m) with a short wide trunk with a grey patchy surface. This trunk is not true wood but a soft starchy material that is easily damaged. Leaves and stems are both a dull grey-green and similar in appearance. Branches are brittle and often drop. Plants initially grow as a spreading multistemmed shrub until one stem develops as a tree and begins to flower. New stems or suckers look like Asparagus spears. In windy areas and/or when the soil is shallow the 'tree' is about waist high.

C Where does it grow in the bush?

Nuytsia trees are found between Kalbarri and Cape Arid in most types of soil. The Kalgoorlie record is planted or incorrectly located. Investigations by the Society have found that trees outside bushland are unlikely to survive.



D Flowers

Large bunches of brilliant gold to orange sweetly scented flowers open between October and January. Flowers are grouped in threes on a single stalk and these are in larger groups that can be as long as 25 cm. Flowers last for several days.

A Aboriginal people dug the underground stems or rhizomes of Mooja. The rhizomes were peeled and the moist sweet centre was eaten. Europeans named the tree for its bunches of brilliant Christmas flowers. Another name is Cabbage Tree, as an axe went through the trunk as if it were a cabbage. Labillardiere first collected the Christmas Tree in 1792 in the Esperance area. The genus name *Nuytsia* is for Peter Van Nuyts a Dutch official on the Golden Seahorse. N 1627 this ship charted the south coast of WA from Walpole to South Australia, showing Australia was an island. The specific name *floribunda* is for *floris* (flower) and *abundus* (abounding in) in recognition of the large groups of flowers. Christmas Tree is a semi-parasite. The roots form rings around the roots of surrounding plants (host plants). Within the ring is a cutting guillotine-like structure that accesses the water and nutrient channels in the roots of the host.

E Pollination

Flowers offer nectar for birds, and nectar and pollen for insects. Bees (native and the Honey Bee), wasps, ants, beetles and butterflies, as well as honeyeaters are known to visit the flowers. Flowering in summer means they are a rare source of food.

F Fruit

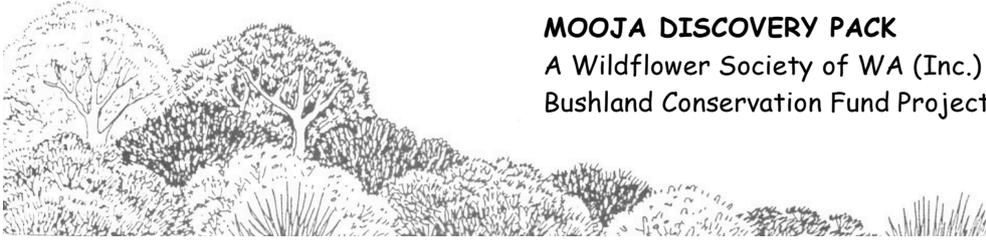
Not all flowers develop into the dry three winged fruit. In the best seasons about 50% of the flowers are pollinated and develop as fruit. Fruit are ready to leave the tree when they dry within a one to three months of flowering. The fruit are dispersed naturally by the wind.

G Growing Christmas Tree

Seeds take 10 or more days to germinate. There is a single seed in each fruit. Seedlings are strange in that there are three or more seed leaves (cotyledons). When seedlings are as big as those illustrated they should be planted with a host plant. Any host plant will do, even couch and chickweed.

H Other interesting notes

Nuytsia is the largest of all the mistletoes in the world. People come from around the world to see *Nuytsia* at Christmas time. *Nuytsia* has spreading near-surface roots that are easily disturbed; the loss of these roots in cultivated areas generally kills the tree. *Nuytsia* trees generally survive fire. Suckers often sprout from the underground stems and can appear at a distance from the parent plant. Over time these distant suckers separate from the original plant and will form what appears to be a new tree.

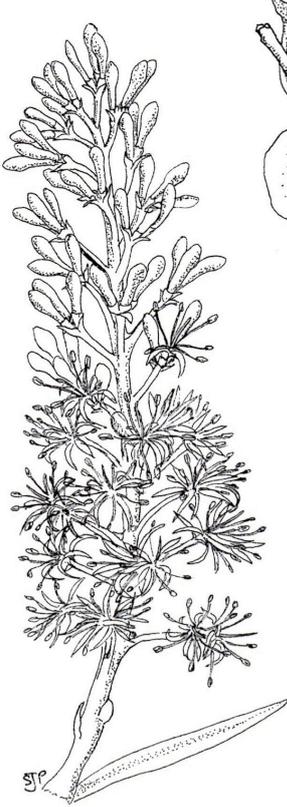


1.3 Mooja Discovery Sheet 1c

Drawings by Sue Patrick, Margaret Pieroni (tree) and Greg Keighery (seedling).

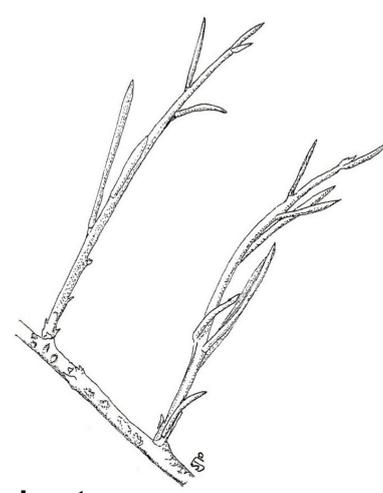
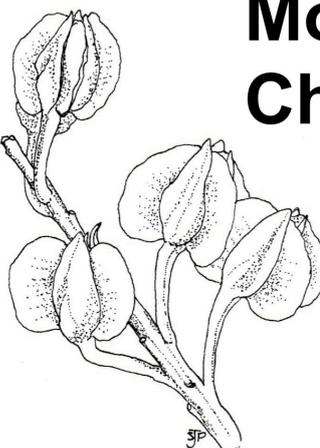
Mooja, Christmas Tree

Nuytsia floribunda



winged fruits

flowers are in branches and clustered in threes



shoots and leaves

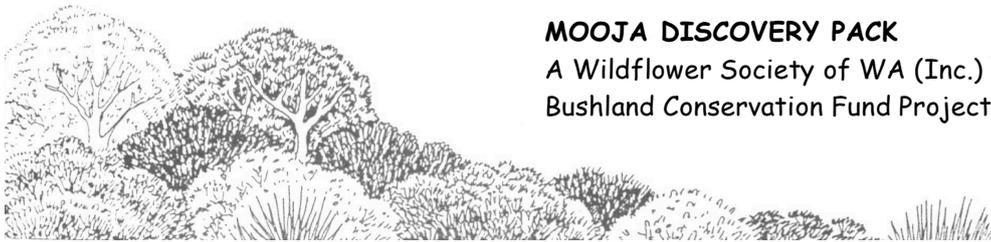


cotyledon or seed leaf

seedling with three cotyledons



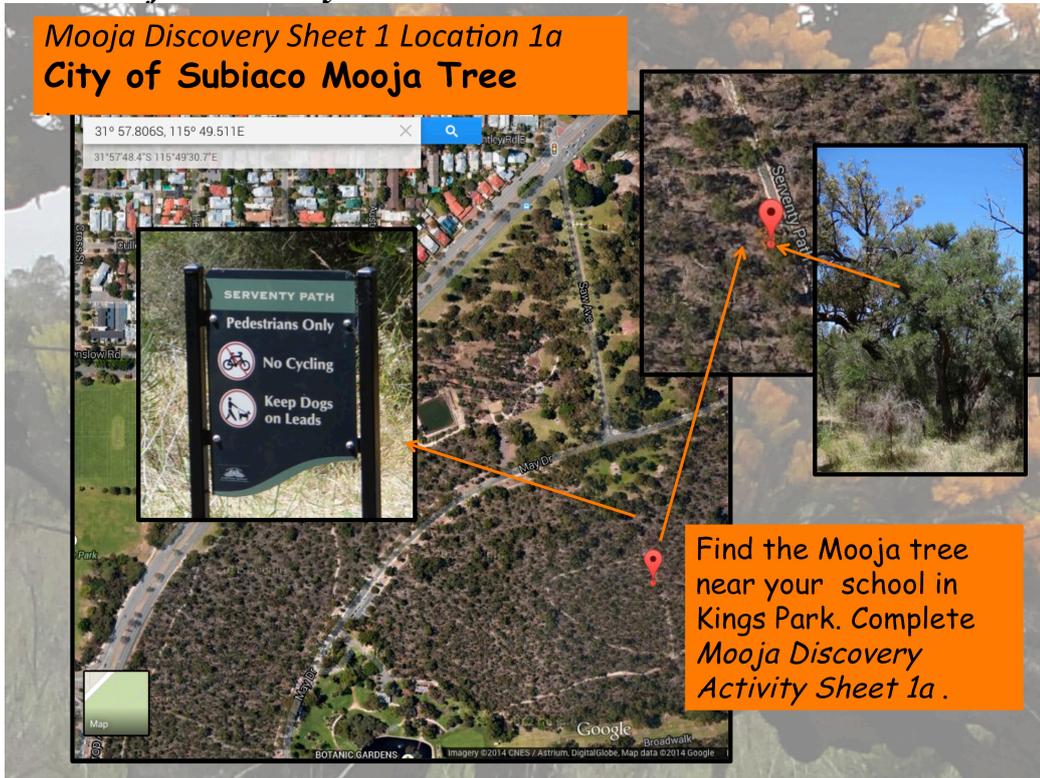
tree



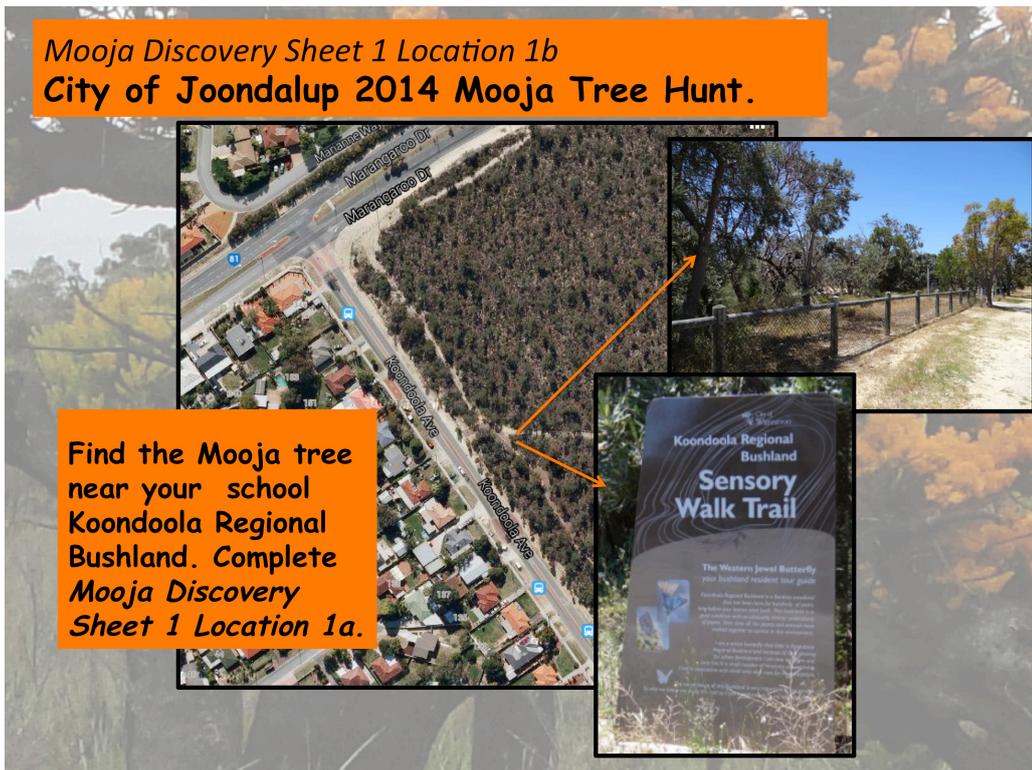
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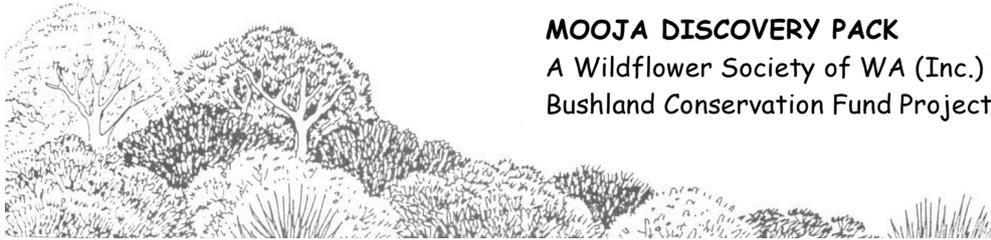
1.4 Mooja Discovery Sheet 1 Location 1a and 1b

**Mooja Discovery Sheet 1 Location 1a
City of Subiaco Mooja Tree**



**Mooja Discovery Sheet 1 Location 1b
City of Joondalup 2014 Mooja Tree Hunt.**





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1.5 Mooja Discovery Sheet 1 Location 1c and 1d

**Mooja Discovery Sheet 1 Location 1c
 City of Armadale 2014 Mooja Tree Hunt**

**Lambert Lane
 Nature Reserve**

Find the Mooja Tree near your school in Lambert Lane Nature Reserve. Complete Mooja Discovery Sheet 1 Location 1a.

Entrance

32° 10.842S, 116° 00.491E
 32°10'50.5"S 116°00'29.5"E

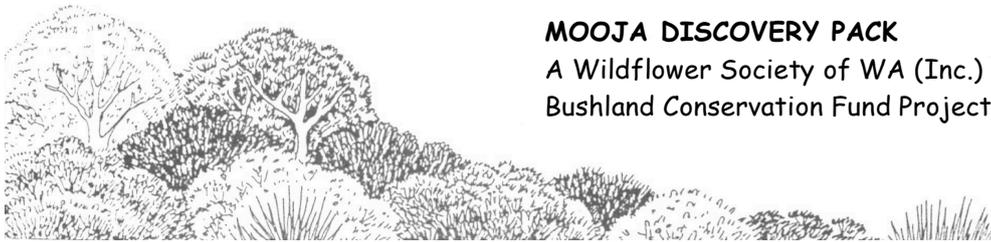
**Mooja Discovery Sheet 1 Location 1d
 City of South Perth 2014 Mooja Tree Hunt**

Mount Henry Spit

Find the Mooja Tree near your school on the Mount Henry Spit. Complete Mooja Discovery Sheet 1 Location 1a.

Enter Mount Henry Bridge walkway from the Mt Henry Bridge Reserve

32° 01.803S, 115°51.596E
 32°01'48.2"S 115°51'35.8"E



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1.6 Mooja Discovery Sheet 1 Location 1e and 1f

**Mooja Discovery Sheet 1 Location 1e
City of Canning 2014 Mooja Tree Hunt**

32° 00.188S, 115°57.828E
32°00'11.3"S
115°57'49.7"E
-32.003133, 115.963800

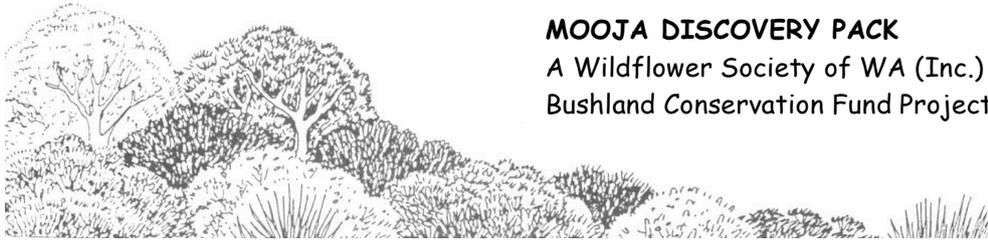
Find the Mooja Tree near your school in Luyer Street opposite number 37. Complete Mooja Discovery Sheet 1 Location 1a.

**Mooja Discovery Sheet 1 Location 1f
City of Melville 2014 Mooja Tree Hunt**

32° 01.855S, 115° 49.720E
32°01'51.3"S
115°49'43.2"E
-32.030917, 115.828667

Find the Mooja Tree near your school in Wireless Hill Park by 20th November. Complete Mooja Discovery Sheet 1 Location 1a.

Entrance



1.7 Mooja Discovery Activity Sheet 1a

Wild Mooja Tree Hunt

Select a *Mooja Discovery Sheet 1 Location 1a to 1f* for the bushland area you would like to explore to discover a wild Mooja Tree and *Mooja Discovery Sheets 1a to c* to get some facts about Mooja.

Locate the bushland area and the wild Mooja Tree using a map-searching tool such as Google Maps.

Hint: The key to finding the location is the latitude and longitude *Mooja Discovery Sheet 1 Location*.

Find the best way to get your bushland area, arrange to visit the bushland.

Find the wild Mooja Tree. Take a photograph and record some information about this tree and the bushland around it.

DATE _____ **TIME** _____

OBSERVER'S NAME _____ **email** _____

SCHOOL _____ **email** _____

How tall is your Mooja Tree?

My Mooja Tree is about _____ **m tall.**

How many trunks does your Mooja Tree have? Circle the correct number. Hint: Some Mooja Trees have several trunks that are connected under the ground by special stems. These special underground stems often produce shrubby growths as well.

My Mooja Tree has **1 2 3 4 more than 4** **trunks**

Does your Mooja Tree have leaves, buds, flowers or fruit (seeds)? You might not get all of these on your tree at one time, visit again and record the date when you see the other plant parts.

My Mooja Tree has
Leaves (Date _____ **), the leaves are coloured** _____

Buds (Date _____ **), the buds are coloured** _____

Flowers (Date _____ **), the flowers are coloured** _____

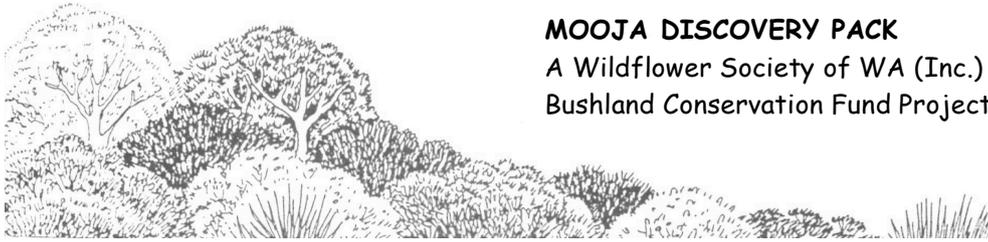
Fruit (Date _____ **), the fruit are coloured** _____

Sit quietly and watch your tree. Are any animals getting food or shelter from your tree?

My Mooja Tree has:
insect visitors _____

bird visitors _____

no animal visitors other than me.



1.8 Mooja Discovery Activity Sheet 1b

What's a Mooja Tree?

Before you start you need Mooja Discovery Sheets 1a,b&c. If you can find a wild Mooja tree look at that too.
You will need coloured pencils and a pen.

LEAVES

Draw a picture of a Mooja leaf below.

ROOTS

Draw a root with an haustoria.

FLOWERS

Draw a picture of a Mooja flower below.
Draw an arrow to point to the place you would find nectar.

FRUIT

Draw a fruit to show the three wings.

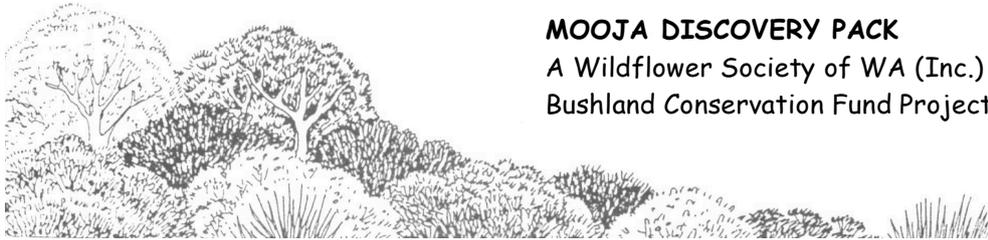
Why do you think your fruit has wings?

TRUNK

Hug your Mooja Tree. If it is too big get as many friends as you need to help. How many hugs did your tree need.

BARK

Mooja's bark is like _____.
Draw some bark.



2 GROWING A MOOJA TREE

2.1 *Mooja Discovery Sheet 2*

Growing a Mooja Tree from a seed.

Before you start you will need some current seasons Mooja Seeds, a 500ml plastic drink bottle, scissors, waterproof pen, label, well draining soil, a saucer, water AND Mooja Discovery Sheets 2a, b and c, as well as Mooja Discovery Activity Sheet 2a and 2b - My baby Mooja Tree Album.*

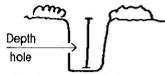
YOU MUST GET PERMISSION FROM THE OWNER OR MANAGER OF THE TREE TO COLLECT THE SEED

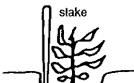
1. Find a pot OR make a pot from a recycled 500 ml plastic bottle by cutting off the top and making holes in the bottom. Stick a label on the pot with tree seed name and the date it was planted.
2. Fill your pot with well draining soil, shake and water the soil to settle it to about 2cm from the top.
3. Put one seed on its side on top of the soil and gently push a wing into the soil. Place your plant on a saucer water your plant until water fills the saucer.
4. Put your pot in a sunny (winter) or lightly shaded (summer) place and when the water in the saucer dries, water again in the same way. Check there are no slugs, caterpillars or snails around.
5. When your seedling is 10cm tall find a bigger pot and plant it with a native grass, or a native seedling shrub or tree. The Mooja seedling needs another plant to feed from so it can grow.
6. When the Mooja Tree is about a year old you need to plant it in the ground. Find a place where it is protected while young and can be nurtured for the next 100 years. Follow the Instructions below for planting a seedling Gum Tree (from the *Gum Tree Pack* written by Bronwen Keighery and illustrated by Margaret Pieroni and Bronwen. Available in pdf from the Wildflower Society).

PLANTING YOUR BABY GUM TREE IN THE GROUND OR A POT

You will need a SPADE, a STAKE and your BABY GUM TREE.

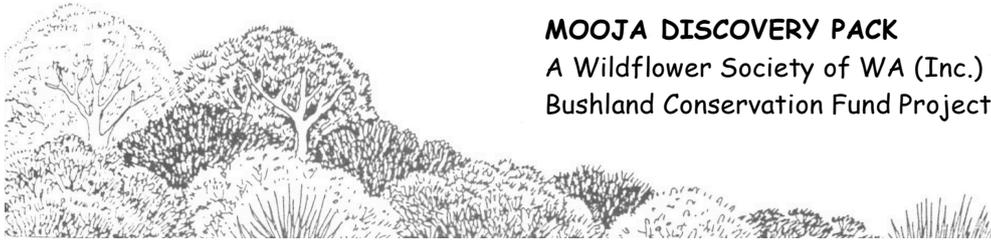
1. Look back to ACTIVITY 2 to see how big your gum tree grows. Carefully choose a place to plant your tree, remembering how big it will grow.
2. Dig a hole as shown in the pictures. Put a sturdy stake in the hole away from where you are to place the tree.



3. To remove your tree from the carton, carefully lie the carton on its side with the carton join on top. Cut or peel the carton apart at the join.
4. Lift the baby tree with ALL ITS SOIL out of the carton and place it in the hole. Fill the hole with soil so that there is a dip around the tree that can be carefully filled with water. DO NOT tie the tree to a stake.


5. Water your tree daily for the first two weeks and weekly for the next six months.

If you are planting your baby gum tree in a bigger pot, follow Step 3 to remove the tree from the carton. Then lift the baby tree with all its soil out of the carton and place it in the pot. Fill the pot with soil and water gently.

7. Visit your tree regularly. The tree will first grow as a many-stemmed shrub, after some years one of these stems will enlarge to form a trunk. In about 20 years this tree will flower!



Mooja Discovery Sheet 2a

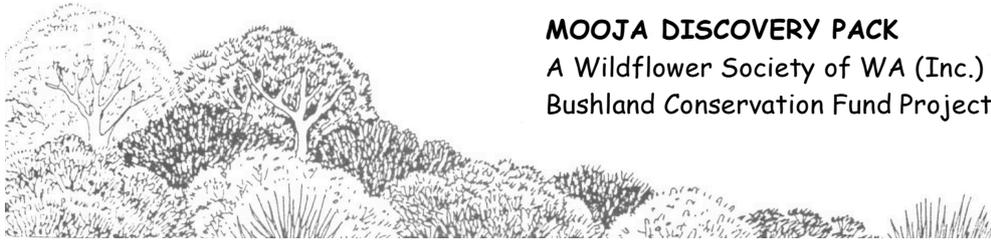
Mooja fruit and seed.

single fruit

The fruit has three wings.
 The seed is located in the centre of the fruit.
 Grid = 1cm

Old flower stalk, supporting the fruit. This needs to be removed before planting the fruit

A small branch of winged fruits



Mooja Discovery Sheet 2b

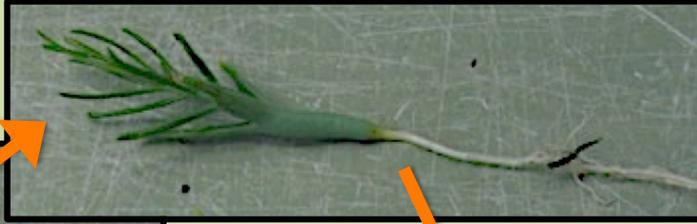
A Mooja from seed to seedling



winged fruits



Seeds can start growing (germinate) in 10 days but may take more than 15

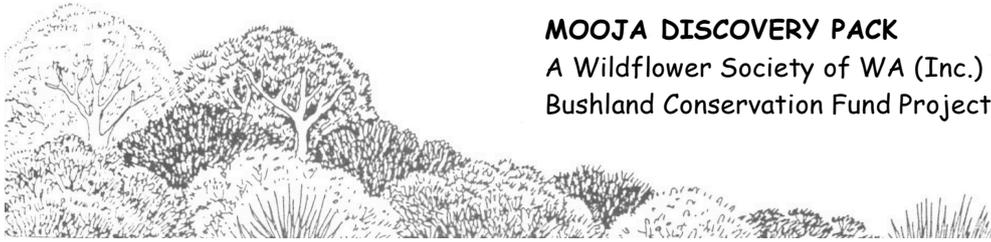


Young Mooja



Host plant.
 The Mooja's roots grow white ring-like haustoria around the host plant's roots to feed the Mooja.



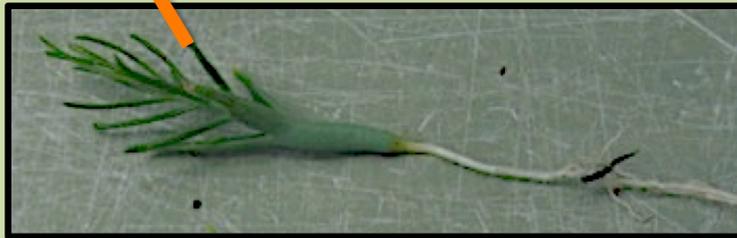


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Mooja Discovery Sheet 2c

A Mooja from seedling to tree

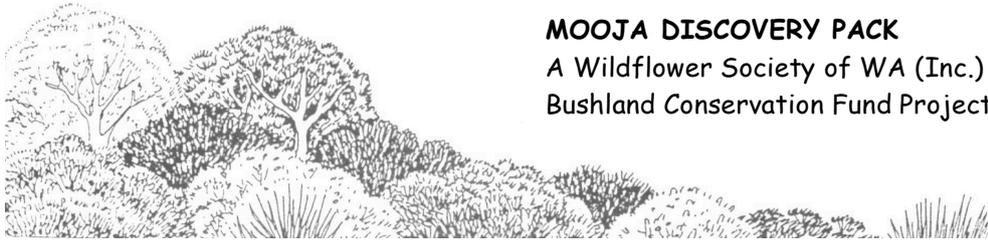
Seedling



Shrub stage
 Once the young Mooja tree finds a host it grows a group of stems from a thick underground stem. The underground stem may spread and form additional groups of stems. These Mooja plants look like shrubs. This stage is often not recognized as being a Mooja.
 The shrub phase can last for many years. The shrub Mooja does not flower. A Mooja has to be around 20years before it flowers.



Tree Stage
 Eventually some of the stems develop and grow tall to form a tree. Most Mooja trees have more than one trunk. This tree is ready to flower.



2.2 Mooja Discovery Activity Sheet 2a

My Baby Tree Album

See Discovery Sheets 2a to d.

First the Seeds INFO 2G

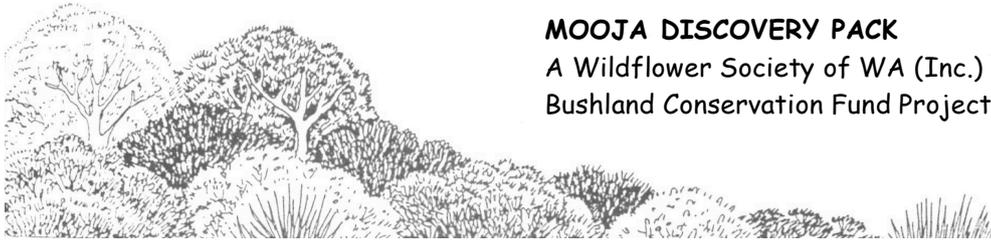
My Mooja tree began life as a seed. The seed is in the middle of the fruit. How many wings does the fruit have? **1 2 3 4** (Circle number)

DRAW and COLOUR your Mooja seed here. 

Growing my tree

Use the chart below to **RECORD** the **GROWTH** of your Mooja seed. You will need to copy it at least 5 times. Copy the symbols to put in the boxes.

KEY	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
seed planted 							
water 							
sprout appeared 							
sunny day 							
cloudy day 							
rainy day 							
seedling leaves appeared 							



2.3 Mooja Discovery Activity Sheet 2b

My Baby Tree Album

...in about 10 weeks your Mooja seed will sprout

How many seed leaves does your seedling have?

1 2 3 4 5 6 7 8 9 more

...in about 20 weeks your Mooja seed will grow seedling leaves

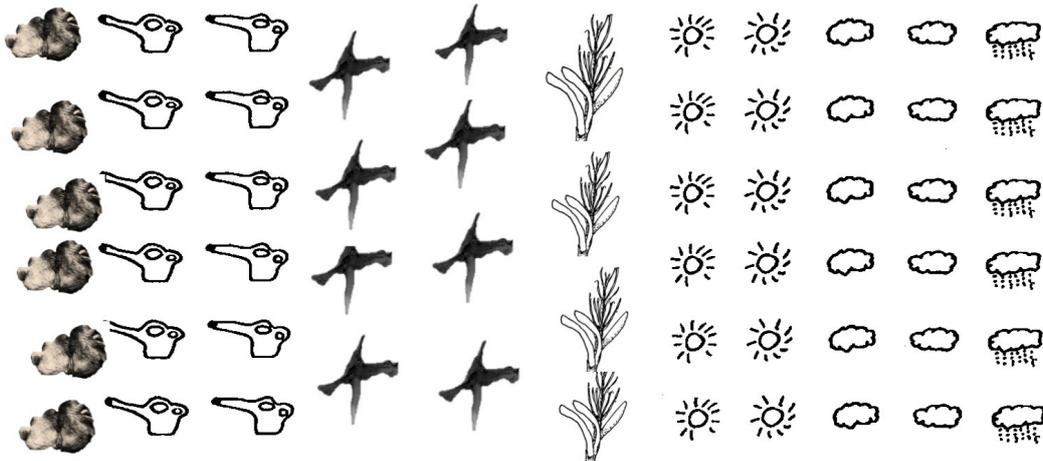
...in about 30 weeks put your plant in a bigger pot with another native plant

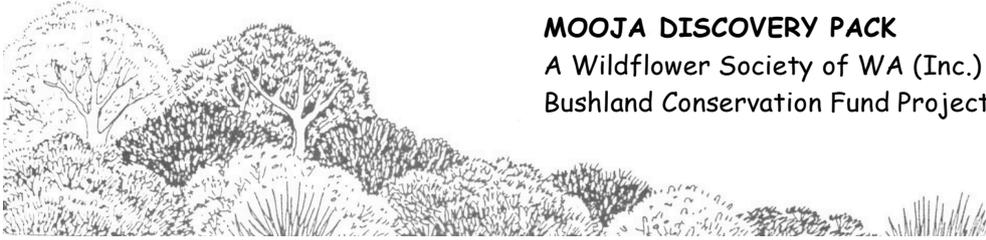
WHAT native plant did you choose?

.....keep visiting your tree over the next 20 years, post an article on the web to share when it flowers



Copy the symbols below and paste them in your chart.





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3 ACKNOWLEDGEMENTS

Many people from the Society and the community have helped with this project and are thanked for their happy help and advice. These people include Greg Keighery, Sarah Keighery, Hazel Dempster (photos of Mooja sprouting seeds and seedlings and horticultural advice on growing Mooja), Lisa Wright (Munzee hunter champion), Brian Moyle (a great Mooja hunter). Drawings are by Sue Patrick, Margaret Pieroni and, Greg and Bronwen Keighery.

Bronwen Keighery November 2014
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