

**Bee Walls
Bee Gardens
Bee Habitat
Bee Trees**

Planting and Creating Habitat to Attract Bees

Conserving *all* bees : for the health of our environment and on-going food supply

**Valley
Bees**

Gardeners can choose a wide variety of plants to attract and support bees. Some plants provide valuable supplies of nectar and pollen for the bees whilst others assist the bees with their nest building.

Native plants are usually best for native bees, and can be used in both wild areas and gardens. There are also many garden plants - particularly heirloom varieties of perennials and herbs - that are good sources of nectar or pollen.

Together with native plants, these will make a garden attractive to both pollinators and people.



The need...

The need for this document arose from our Valley Bees meetings.

Members enquired about habitat that could be of benefit to all bees, what trees and plants to conserve and plant on their properties, how to attract pollinators to our gardens, and (for those who had bees as an activity) when did these plants produce nectar and pollen to provide food for bees.

A call was put out for a survey, and the knowledge of people experienced in the field was collected and collated to provide this survey of the trees in the local Mary River Catchment area. We thank Ernie Rider, Kayle Findlay, Roy Barnes, Norm Salt and Pauline Alexander for their valuable responses to this survey.

In fact, **the response was so diverse** that a number of contributions have been included to expand this information to bee gardens, native bee walls, and stingless and solitary bees.

Thanks go out to Chris Fuller, Robert Luttrell, Dr. Tim Heard, Jerry Coleby-Williams, Athol Craig, Mark Grosskopf and Adrian Jones. Information was also gleaned from a wonderful local document by Bill Milne and from Aussie Bee Online. Special thanks to Cnr Julie Walker for kick-starting the idea.

The chart and info in this booklet are all a work-in-progress, there are adjustments to be made and input to be added, so we look forward to your contributions - from members and the community - to amend, improve and expand the knowledge. And to add your own experiences and observations - take note of those bee-visitations! In particular, we are wanting to add info on flowering herbs and vegetables that attract bees, native berries and bush tucker, and planting for specialised bee gardens.



Floral embrace!
PHOTO BOB LUTTRELL

What is pollen?

Pollen is the male component of the reproductive cycle of flowering plants. It is produced in the anthers of the flowers. For fruit and seeds to form, the pollen must be transferred to the stigma to enter the ovaries.

The pollen of each species of plant has its specific size, shape, colour, pollen tube length and thickness, and chemical components, preventing cross pollination.



“Don't let bees bottom out!”



Pollination

is the transfer of pollen from the anthers of a flower to the stigma of the same flower or of another flower.

Pollination is a prerequisite for fertilization: the fusion of nuclei from the pollen grain with nuclei in the ovule. Fertilization allows the flower to develop seeds.

Some flowers will develop seeds as a result of self-pollination, when pollen and pistil are from the same plant, often (but not always) from the same flower. Other plants require cross-pollination : pollen and pistil must be from different plants.

Most plants need help moving pollen from one flower to the pistil of another. Wind moves the pollen for some plants such as grasses like corn. Animal pollinators move pollen for many other flowering plants.

A 'pollinator' is an animal that moves pollen from the anthers to the stigmas of flowers, thus effecting pollination.

Animals that are known to be good pollinators of flowers include bees, butterflies, birds, moths, some flies, some wasps, and nectar feeding bats.

What are the benefits?

Plants benefit from pollinators because the movement of pollen allows them to reproduce by setting seeds. However, pollinators don't know or care that the plant benefits. They pollinate to get nectar and/ or pollen from flowers to meet their energy requirements and to produce offspring.

In the economy of nature, the pollinators provide an important service to flowering plants, while the plants pay with food for the pollinators and their offspring.

Trigona carbonaria on native citrus
PHOTO BY WITJUTI GRUB BUSHFOOD NURSERY



PHOTOS
BY GLENBO



**Solitary bee
(Hylaeus spp)
on native
citrus**

PHOTO BY
WITJUTI GRUB
BUSHFOOD
NURSERY

Bees pollinate ...for life!

Valley Bees recognises the diversity of pollinators needed for the web of life to be sustained. A dominant percentage of plants that provide food and habitat in a healthy environment depend on a very wide variety of pollinators, including bats, birds and insects. Only a few plants are wind pollinated.

It is essential that we provide habitat and other environmental requirements to ensure that sufficient numbers of these pollinators are present in a healthy system. The system of food production developed by humans has necessitated the provision of large numbers of pollinators in concentrated areas of broad acreage.

Some of this pollination is carried out by bees naturally foraging in surrounding trees and crops. Many farmers pay beekeepers to place beehives amongst their crop to ensure pollination. Where large acreage has been cleared for crop growing, paid pollination is essential as there are no large populations of other insects in the area to carry out any 'incidental' pollination.

Pollination is essential for the production of many of our vegetables, fruits and nuts and even the legume pastures necessary for the livestock industry. Two thirds of food crops grown in Australia require insect pollination to set economical quantities of seeds or fruit. The remaining crops are wind or self pollinated.

Honeybees (*Apis mellifera*) are an efficient agent in the pollination of most of our food plants, both for edible fruits and seeds for propagation. Having evolved in cool to cold climates, they have adapted to all areas of Australia where they forage for pollen and nectar year round. Managed hives are portable and can be moved where needed to pollinate large areas of horticulture and crops. Enhancing this are the large numbers in each hive and their ability to forage over 5 km from their hives. Their constancy in visiting only one type of flower on a flight is over 90%.

Native stingless social bees are extremely effective pollinators of many horticultural crops as well as native plants. They have a number of advantages which have proven to increase nut and fruit size and yield. Their small size allows them to easily negotiate small, delicate flowers such as the macadamia flower. Native bees have only about a 500m flight range (one tenth of the range of the honeybee) from their hive so if placed in the middle of an orchard, crop or garden, they will work flowers within this range.

Native solitary bees are the original, natural pollinators of Australian native plants. They are now being recognised and generally being used successfully in combination with other pollinators. Many of the solitary bees are extremely effective due to the unique and unusual ways they collect, carry and store their pollen. Some actually cover their whole body with the pollen.

The following is a list of horticultural crops on which native bees have been used : macadamia, avocado, tomato, strawberries, rockmelon, watermelon, mango, passion fruit, blueberries, citrus and lychee. Many more are being trialled.

The natural flora has become a major resource for bees, and beekeepers (of honeybees and native bees) need this resource to build strong hives to use in pollinating large areas of crops.

Bees, along with all pollinators, are under threat from newly arrived pests and diseases, habitat loss and chemical pollution. To combat these threats, beekeepers must be knowledgeable and efficient in management strategies to ensure that pollinators are there for our future food security.

Valley Bees is addressing these concerns.

**Valley
Bees**



PHOTO THROUGH CHRIS FULLER



PHOTO GLENBO



LEAFCLUTTER - PHOTO BOB LUTTRELL

Balance between ALL bees!



Honeybees

Native Stingless bees



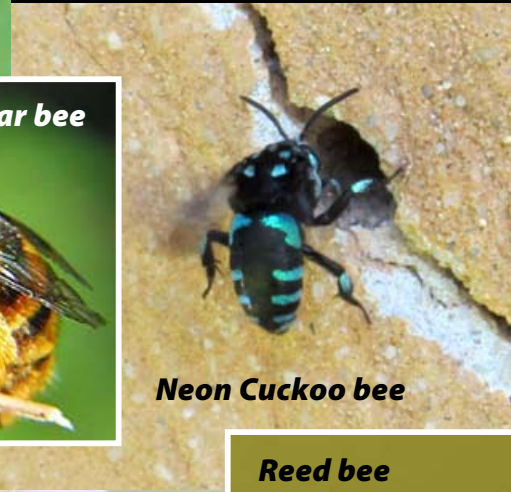
Blue-banded bee

Native Solitary bees



Teddy Bear bee

Leafcutter bee



Neon Cuckoo bee



Great Carpenter bee



Reed bee



Leaf faced bee



**Halictid bee -
Homalictus flindersi**



Green Metallic bee



**Fire-tailed
Resin bee**



**Big Black
Resin bee**



Saddleback bee



Planting for Pollinators...

Article by Jerry Coleby-Williams : ABC Gardening Australia Series 22, Episode 15

Jerry Coleby-Williams explains what plants attract pollinators and starts a new garden bed to bring even more into his productive backyard...

“ I love being in my productive garden, but I’m not the only one at work. There’s a quiet army helping me to get the best out of my food plants. They’re the pollinators - the birds, bats, butterflies, blow flies and of course, bees. They’re attracted by flowers and together with the wind, they spread pollen which in turn, produces my fruit and vegetables.

Right now, my front garden is buzzing with activity. It’s full of pollinators because I’ve planted a variety of flowers to bring them here. And one of my favourites is a tufted succulent *Bulbine frutescens*. Right now, the flowers are being worked by our native stingless bees and these are brilliant in the garden. They pollinate any plant in the cabbage family and they produce honey.

Then there’s *Tradescantia (pallida)* ‘Purple Heart,’ and it’s growing amongst a cycad. Honey bees like the flowers and they’ll comb the pollen and make honey. But if you plant these, native Blue-banded bees love them and they’re buzz pollinators. They use vibrations from their wings to release the pollen and that means any plant that you grow in the tomato family - chilli, eggplant, capsicum and tomato - everyone will set fruit. Blue-banded bees are a great asset in the food garden.

While my front garden is alive with the sound of busy pollinators, my back garden just doesn’t have the same buzz, so I’m going to do something about it.

I’ve made a boomerang shaped bed in a relatively sheltered part of the garden which is ideal for a planting dedicated to attracting pollinators. So even when I’m starting with new season crops and not a lot is happening, there’ll always be something flowering to tempt pollinators to visit.

I prepared the bed by digging it over and I’ve added some mushroom compost. I’m spacing the plants out first which I find is really handy if you’re not sure exactly how well the plants will fit. There’s *Grannies Bonnet (Angelonia sp.)* and it’s a favourite with native stingless bees. Also I’m putting in a *Zinnia* and if there’s any honey bees in the area, they’ll find its flowers.

Video :

There is a video on the subject, just go to www.abc.net.au/gardening and search for “Planting For Pollinators” video or <http://www.abc.net.au/gardening/stories/s3220491.htm>

I’m going to try this *Melampodium (sp.)*. I’ve never grown it before. It comes from Central America and because it’s in the daisy family, it should attract pollinators. We’ll just have to see.

Coleus (Solenostemon sp.) are commonly planted for their decorative foliage and while they’re pretty, it’s their flowers that are the most important thing. They’re real magnets for pollinators and the same applies to *Salvias*. There’s not a single *Salvia* that won’t bring a pollinator into your garden. And *Antirrhinums* - they’re a favourite with the blue-banded bees.

You could plant mixed lettuce to eat them, but in this bed, they’re going to attract lots and lots of pollinators. They’re powerful plants.

Last year when I planted *Bacopa (Sutera cordata)* - a little groundcover that never stops flowering, I actually had to fight off the honey bees in order to put it into the ground, so that’s going in. And lastly, bedding *Begonias*. These are treated as annuals but with care, they’ll last for 3 years. And the reason I love these is that even in the middle of winter, in a frost-free area, they’ll attract blue-banded bees into the garden.

This is sure to attract pollinating insects and my reward will be a more productive vegie garden with better harvests. ”

Note : Jerry recommends that we all make sure there are at least two flowering plants in your garden at all times of the year. This continuity helps to ensure regular visits from our pollinators.



PHOTOS JERRY COLEBY-WILLIAMS

Plants loved by Stingless bees

Abelia x grandiflora

We have found that the original full size Abelia variety attracts native bees much better than the dwarf variety or the golden Abelia.

Brachyscome

These long flowering ground covers are popular with Stingless bees.

Grevilleas

Many Grevilleas such as Grevillea Moonlight provide good nectar for bees.

Hebe

The lush blooms of the long flowering hebes strongly attract Stingless bees.

Coral Plant - Russelia

The coral plant's red tubular flowers are great for Stingless bees but it spreads quite strongly and can be hard to contain.

Thryptomene saxicola FC Payne

This graceful winter flowering shrub attracts Stingless bees and other native bees.

Plants loved by Blue-banded bees and Carpenter bees

Abelia x grandiflora

Blue-banded bees and Carpenter bees are also regular visitors to the dense flowers of the large Abelia variety.

Butterfly Bush - Buddleja davidii *

Blue-banded bees love Buddleja flowers and can often be seen darting from flower to flower.

Lavender

Lavenders are special favourites of the Blue-banded bees. The French lavender, *Lavandula dentata*, is a strong shrub with abundant flowers.

Salvia

Many varieties of *Salvia* attract Blue-banded bees. Densy Clyne, naturalist and author, says *Salvia uliginosa* is particularly popular with her bees.

Paraguay Nightshade - Solanum rantonetti

This fast growing plant forms a very large, dense shrub. Its abundant purple flowers attract Carpenter bees and Blue-banded bees. These bees are capable of a special type of pollination called buzz pollination. The bee wraps her body around the flower and buzzes it (by vibrating her muscles) to release the pollen. These flowers offer great opportunities for watching the bees perform this interesting behaviour.

Plants loved by Leafcutter bees

Butterfly Bush - Buddleja davidii *

Leafcutter bees find the Buddleja's soft leaves ideal for nesting materials. They leave their characteristic circular cuts in the edges of the leaves and if you are lucky you may see the Leafcutter bees' antics as they cut their tiny leaf pieces.

Roses

Leafcutter bees love clipping rose leaves for nesting materials.

Other Good Bee-Friendly Plants

Bottlebrush - Callistemon

These nectar rich flowers also attract native bees.

Christmas Bush - Ceratopetalum gummiferum 'Alberys Red'

This large shrub, with dense cream flowers in springtime, attracts many native bees.

Coast Rosemary - Westringia fruticosa

Rates very highly - all bees love this species. It flowers over a long period and is tough and reliable. Also **Westringia longifolia**.

Daisies

Many varieties such as the African Daisy *Dimorphotheca* are long flowering, and popular with native bees.

Eucalyptus

Gum blossom is often covered with clouds of native bees.

Fan Flower - Scaevola humilis

Many small native bees and Leafcutters visit these flowers.



Photo Dianne Clarke

Article (this page) from

Aussie Bee Online

Article 5, 2002

www.aussiebee.com.au



Hibbertia dentata

The Teddy Bear bee and the Blue-banded bee love buzzing the flowers of *Hibbertia scandens*. *Hibbertia dentata* has a slightly less vigorous growth and is better suited to native gardens.

Lemon Scented Tea Tree -

Leptospermum polygalifolium
Rates very highly for plants to attract native bees.

Senna clavigera

Teddy Bear bee, the Blue-banded bee and the Emerald Homalictus buzz the flowers of this bush. Leafcutters also clip pieces of the leaves for their nests. It flowers over a long period.

*** Note:** *Buddleja davidii* is a particularly good garden plant for native bees. However, it can act as an environmental weed. Take care that it does not cause a weed problem in your area.

Establishing a bee-friendly garden using native plants

Here is a list of plants found useful for general bee foraging. This is only a relatively small range of the plants native to Australia, and many others are recorded as used by the bees of Australia.

Sighting the various bees in the wild can be very challenging. It is exciting and rewarding. I am always interested to hear from people who can add to this information, especially if they can add a photo.

There are many exotics used by all the bees, stingless and solitary. By complimenting the 'feast or famine' flowering times of the native plants they provide important forage for the various bees in an urban situation. The stingless bees do well in suburbia because of this.

Xanthorrhoea spp. : Grasstrees

Favourite of stingless bees and an indicator of their presence. Old stems are best site for carpenter bee nest tunnels - do not cut after flowering if entry holes are present.

Hibbertia spp. : Guinea flower

Popular with many solitary bees and stingless bees.

Dianella spp. : Flax lilies

Attracts many stingless bees, leafcutters and other bees.

Brachychiton bidwillii : Dwarf kurrajong

An unusual small tree liked by stingless bees.

Plectranthus spp. : Sometimes called Lemon twist

Popular with stingless bees and a range of others such as blue banded bees, leafcutters and various resin bees.

Peltophorum peltatum

Addictively attractive to stingless bees & blue banded bees.

Senna spp. : clavigera (Pepper leaf senna), acclinis (Edge senna), guadchaudii (Climbing senna)

Liked by blue banded bees, teddy bear bees and other solitary bees, stingless bees, lipotriches bees, Emerald homolictus and red singers.

Bracteantha spp. : Paper or Ever-lasting daisy

Loved by many small bees, stingless bees, leafcutters.

Backhousia citriodora : Lemon myrtle

Worked strongly by stingless bees.

Syzygium spp. Lillipillies

Liked by stingless bees.

Hakea spp.

Worked by stingless bees.

Westringia fruticosa : Coastal rosemary

Worked by stingless bees, green & gold nomia, reed bees.

Grevillea spp.

Worked by stingless bees, especially for pollen, but also nectar, less consistent than others.

Palms, various

Very popular with stingless bees, even days after flowers are cut, collect profuse white pollen.

Tecomanthe hillii : Fraser Island creeper

Worked by stingless bees, the small bees tiny against the huge tubular flowers.

Pandorea jasminoides : Bower of beauty

Pandorana pandorea : Wonga vine

Both worked by stingless bees.

Macadamia spp.

Worked by T carbonaria especially for pollen, very efficient pollinators.

Crotalaria spp. : Rattlepods

Liked by large firetailed resin bees.

Leptospermum spp.: Tea-trees

Stingless bees work at certain times, also other bees and flower wasps. L petersonii has been spectacularly attractive to many species of bees in my garden if it flowers well.

Hardenbergia violacea : False sarsaparilla

Stingless bees, common spring bees.



by Bob Luttrell

Bob The Beeman - long time native beekeeper, meliponist, ex farmer, home gardener and bee-photographer
www.bobthebeeman.com.au
www.rovingphotos.com.au

Scaevola spp. : Fan or Half flowers

Great for Leafcutters, special relationship to 'open' the flowers of some species.

Acacias spp. : Wattles

Source of pollen from flowers and nectar from extrafloral nectaries.

Eucalyptus spp. and Corymbia spp.

The mainstay of the Australian bush for bees of all kinds.

Angophora spp. and Lophostemon spp.

Worked by stingless bees and others, variable flowering.

Meleleuca spp. : Tea-trees and Bottlebrushes

Used by many bees, M armillaris reported to provide 'resting and gathering' place for many species, as well as forage. The weeping shape and the fine twigs are part of the reason.

Banksia spp.

Used by the banksia bee.

Persoonia spp. (Geebung)

Specifically used by the Persoonia bees.



DWARF KURRAJONG FLOWER

Trees used by stingless bees for resin :

Corymbia citriodora : Spotted, Lemon-scented gum

Used by stingless bees for resin.

Corymbia torelliana (a weed in S E Qld)

Addictively popular source of resin from seed capsules after they ripen.

Syncarpia glomulifera : Turpentine tree

Observed source of resin.

Kauri pine and Hoop pine

Observed source of resin.

Callitris spp. : Cypress pine

Popular source of resin.

Xanthorrhoea : Grass trees

Likely to be resin source.

Plants that provide leaf material for leafcutter bees : (spares the roses)

Barklya syringifolia : (Crown of gold tree)

Harpullia pendula : Tulipwood

Used by leafcutters at particular stages of leaf maturity.



Grass tree

PHOTO CHRIS FULLER

We have observed that they also love various ginger leaves.

Some other plants recorded as used by the bees of Australia :

Baeckias, Jacksonia, Daviesia, Gompholobium, Pultenaea, Thryptomene and Brachyscomes for example, but I have not had the chance to record that use, or link it to particular bees.

The stingless bees do well in suburbia.

Among those plants that are useful and restricted to the small **exotics section** of our garden are :

Gazanias, Escholtzia, Arctotus, Abelia, Zephyranthes, Buddleia, Leucophyllum frutescens, Nasturtium, Polygalia, Metrosideros, Lagerstoema (almost a weed), **Raphiolepis indica** (a weed to be replaced), **Citrus spp., basils and other herbs, Zygodactylus.**

Grewia occidentalis is liked by several resin bees.

Chokos in our garden do not 'fruit' unless stingless bees can fly.

Tropical fruits : Many of the tropical fruits are very attractive to stingless bees, and pollination is the service provided.

Stone fruits : Despite the cool weather at the time, my stingless bees are all over our tropical **nectarines & peach trees** when they flower.

Strawberries are well served by the stingless bees, fruit yield is increased and the size and quality of fruit is also improved.



Wattle/acacia



Eucalypt



PHOTO GLENBO

Leafcutter bee NATIVE SOLITARY

These bees will nest in holes in timber blocks but the holes are generally slightly smaller than those of other solitary bees. As the name suggests this bee cuts circular or oval shaped pieces of leaf and uses them to line her nest.

She creates individual cocoons within each nest hole and again provisions each one with pollen and nectar before laying an egg in each one.

Leafcutter linked cocoons (often called leaf cigars). These are found within the nest holes. These particular cocoons were accidentally discovered inside the fingers of old garden gloves.

They were treated very gently and successfully returned into the fingers of the glove.



Leafcutter on *Bulbine bulbosa*
PHOTO BOB LUTTRELL





Great Carpenter bee - buzz pollinating

Buzz pollination (sonication)

Blue-banded bees, Teddy Bear bees and Carpenter bees are just three of the Australian native bees capable of buzz-pollination. Most flowers release their pollen passively, but others like the tomato flower only release their pollen when the flower is vibrated rapidly. This resonant vibration is called 'buzz pollination.'

The anther of buzz-pollinated species of plants is typically tubular, with an opening at only one end, and the pollen is inside - smooth-grained and firmly attached. Bees capable of buzz-pollinating clamp their legs onto the anther cone and contract their flight muscles so vigorously that the pollen is released.

In some cases, wind may be sufficient to shake loose the pollen, while visits by other bees may also shake loose some pollen. But the most efficient pollination is accomplished by a few species who specialise in 'sonication' or buzz pollination. While sonicating, bees can generate forces of up to 30 G! (That's near the record for human tolerance on a rocket sled!)

Without appropriate pollinators, commercial tomato yields are significantly reduced. In Australian glasshouse-based tomato farms, there was no common buzz pollinator available, so tomato growers were forced to use an 'Electric Bee' vibrator to pollinate flowers. Research has shown that native blue-banded bees are an effective option for commercial buzz pollination for crops such as tomatoes, kiwi fruit, eggplants and chillies, and are thought to improve yields in Australia by at least 30% overall.

Other plants that are pollinated more efficiently by buzz pollination include potatoes, many members of the Solanum and Solanaceae families, Hibbertia, Dianella (flax lily), blueberries, shooting stars and Senna.

Interestingly, the sensory and cognitive aspects of pollen foraging is an ideal basis for understanding how 'pollen-based rewards' and 'flower advertisements' have evolved over the millennia. A whole other book in itself!

Check out - <http://australianmuseum.net.au/movie/Buzz-pollination/>



Teddy Bear bee NATIVE SOLITARY

About 15mm long and covered in dense red/brown fur, the Teddy Bear bee is one of Australia's most appealing native bees. They have been seen nesting in a variety of soil types underneath houses - in heavy black soil, harder yellowish clay, and in fine sand. They prefer a site with some shelter. Most nesting shafts are about 9mm wide and 10cm deep. Each nest consists of a cluster of urn-shaped cells made of mud, built by just one female. Even though it's a solitary bee, it likes to build near others of its own kind.

Info and photo from www.aussiebee.com.au

Great Carpenter bee NATIVE SOLITARY

The 24mm Great Carpenter bees are the largest bees in Australia. They cut nest burrows in soft timber such as dead limbs of the mango tree. The females have glossy black abdomens and bright yellow waistcoats. The males are quite different - they are covered with soft golden fur. They are especially attracted to the flowers of Crotalaria, wisteria and Cassia fistula. They will nest in all types of dead branches, as long as they are not too hard, and will build in stacks of old timber. Males can emit a chemical pheromone to attract females. This scent smells like flowers or pollen, and is so strong that even humans can pick it up.

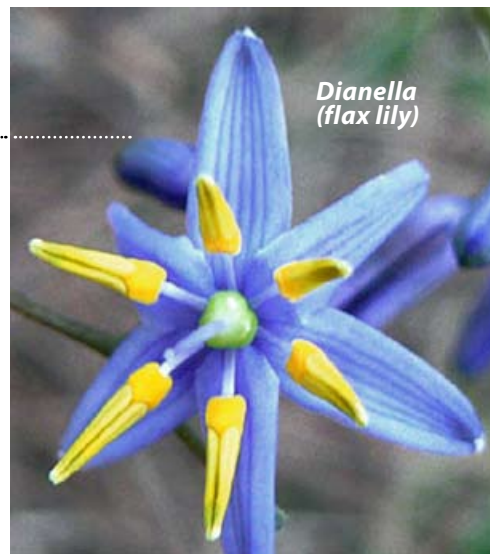
The males set up their territories in places which do not have flowers and seem to use their perfume to 'trick' the inexperienced young females to come to them!

Information gleaned from www.aussiebee.com.au and an article by Remko Leijs.

BOTH GREAT CARPENTER PHOTOS BY JENNY THYNNE



Great Carpenter



Dianella (flax lily)

Salad and veggie greens!

Allow some of your salad greens and vegies to bolt (go to seed / flower).

These provide a great source for regular bee visitations!

- Cabbages • Mustard greens
- Lettuce • Yacon
- Broccoli • Daikon
- Bok choi • Radish



Bok choi



Lettuce



Yacon

ALL PHOTOS ON THIS PAGE BY GLENBO

Observations from friends and family ... This is an additional list of flowering herbs, garden greens, vegies, fruits, berries, for plant flowers suitable for bee gardens, as gleaned from observant friends and family. This is not a comprehensive list, just some examples where we all have observed good bee-activity...

• **Basil** - Many people list basil as their favourite bee-enticer, having observed that some of the best bee-activity is on and around their basil plants and larger "basil-trees."

• **Lavender** is great for attracting bees. Long-flowering, high in nectar and with a wide range of varieties, it's possible to have lavender in flower most of the year.

- Rosemary
- Marjoram
- Mints (all types)
- Dill and Fennel
- Bee balm (Bergamot)
- Lemon balm
- Angelica
- Thyme



Tarragon

• **Sage** - The sweet red pineapple sage flowers are one of the favourites.

• **Coriander flowers** - Very potent, it's been noted that up to 26 species of beneficials visit the flowers, including numerous species of bee.

• **Italian flat-leaved parsley** - Very attractive to varied pollinators.

• **Borage** - Very attractive to bees, flowers refill with nectar every 2 mins.

• **Comfrey** - Flowers refill with nectar every 45 minutes.



Broccoli

Berries & Cherries :

- Midyim berries (Austromyrtus spp.)
- Beach (Cedar Bay) cherry
- Raspberries, Blueberries
- Gooseberries
- Jaboticaba
- Panama berry (Strawberry tree)
- Grumichama (Eugenia brasiliensis)
- Acerola cherry
- Native bush tucker plants : Trees, shrubs, vines and berries



Tomato

- Tomatoes
- Eggplant
- Pumpkins

- Potatoes
- Rockmelon
- Watermelons
- Cucumbers
- Chokos
- Gingers
- Galangal
- Turmeric
- Passionflowers
- Capsicum
- Chillies
- Chives and onions
- Strawberries
- Fruit trees : Apples, pears, citrus, guava, stonefruit
- Avocados
- Soybeans
- Squash

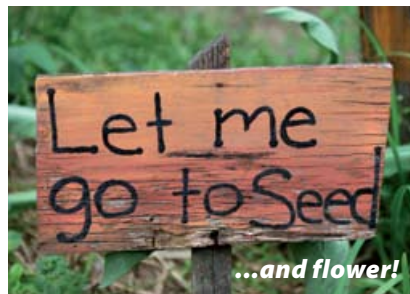
• **Luffa (Loofa) flowers** have been observed with a huge variety of regular bee visitations.

• **Sunflowers** - Sunflowers are an excellent - and spectacular - bee enticer in any garden!

- Nasturtiums
- Marigolds
- Geraniums
- Salvia (best blue)
- Clover
- Sennas and Cassias
- Echinacea
- Brachyscome and other groundcovers
- Butterfly bush
- Honeysuckle
- Daisies
- Dandelions
- Chrysanthemum
- Evening primrose
- Hippy astrum
- Roses
- Fan flower
- NSW christmas bush
- Alfalfa (lucerne)
- Thistles

• **Polygala (Mytifolia)** - We have observed intense activity on the purple pea-like flowers, with buzz pollination from the native Great Carpenter bees.

• **Bacopa** - Bees appear to love the blue-coloured flowers, but almost no activity on the white.



...and flower!

Stingless bees work the sweet pineapple sage flowers



Sunflower



Nasturtiums



Bacopa

Flora of the Gympie area significant



by Bill Milne

for beekeeping...

Spotted gum : June

Caramel-flavoured, medium-coloured honey; pollen of around 34% crude protein. This combination makes it one of the most beneficial of all the trees. It carries its buds for 12 months and like messmate can drop them at any stage. Pollen off spotted gum going in the entrance of the hive is unmistakable. It is carried in huge wedge-shaped loads. It is not a regular flowerer. The usual is a heavy flowering every fourth year, with scattered flowerings in between.

Citrus/Orange blossom : Late August / September

High priced honey which is usually absorbed by the bees in brood rearing. Abundance of orange-coloured pollen. Breeding is fantastic, if bees have come off spotted gum, onto orange, be prepared to reduce strength of hives by making more hives or moving onto a heavy honey flow as soon as orange is finished. Hives that have been on orange always seem to be better than other hives many months later. Use to raise nucleus hives.

Avocado : August

Produces both honey and pollen.

River mangrove : October

Not a reliable producer but can supply quite a quantity of almost water-clear honey.

Grey mangrove : February / March

Produces pollen and a trickle of not very nice honey.

Lotononus : September

A tropical legume which creeps along the ground. It has an abundance of yellow clover-like flowers which supply a trickle of honey and a quantity of red pollen. Bees build fast on it and swarm readily. Use only for building hives. All legumes are beneficial to bees.

Camphor laurel

Bees work it?

Flandowski (Crows ash) : October

Bees work the blossoms for nectar. The first young growth of the season is attacked by a small sucking insect. The leaves become shiny with a sweet sticky substance which the bees really hum on in the early morning. Low grade honey.

Dogwood : October

A small shrub resembling an oak. It is however a parasite,

feeding off the roots of other plants. Its flowers are golden and pea shaped. It produces a trickle of honey and quality red pollen.

Red, white and pink bloodwoods :

Late December to early February

These three flower around the same time. They produce a medium-coloured honey with a ropery texture. This honey darkens with age. Pollen is white and plentiful.

Brown / yellow / white bloodwood (Yellow jack) : March

This tree has smaller flowers than the other bloodwoods and is of a creamy colour. Honey is lighter in colour.

Jacaranda : September

Mauve flowers and mauve pollen of good quality. Bees work the flowers for honey after they have fallen from the tree.

Clover : September / October

High protein pollen; brown - looks like mud; honey good quality; good building of bees.

Blue Gum / Forest red gum : July / August / September

Time slightly variable; pollen - yellow, good quality; good quality honey. Produces well; best within 30 km of the coast.

Hairy bush pea : June / September

Quality pollen, trickle of honey used for building bees (wallum).

Wattles : Winter / Spring

Not a top quality food source for bees - pollen is about 14% in coastal areas; in western country protein can reach 28%.

Narrow leaf red ironbark : varied flowering

Flowering time can vary from May to December according to the season. Quality of honey is excellent and flows are sometimes heavy. Creamy-coloured pollen is also produced in abundance provided reasonable rain falls. If conditions become dry, pollen loses nutrition value and sac brood can develop.

Grey ironbark : September / October

Excellent honey usually produced in good quantity. No pollen, although bees seem to thrive on grey ironbark - they should be built up before shifting on to it for best results.

Scribbly gum : September / October

Light honey flow, very little pollen. Useful combined with some other source.

Tallowwood : August sometimes into November

Little honey, not much pollen. Useful only as a supplement with something else.

Black bean : October / November

Grows along creeks usually in scrub country; produces honey of very low density.

Swamp box / Mahogany : October / November

Produces excellent, sweet, sometimes almost water-clear honey - often in quantity. Produces or flowers well after a fire in July or August. No pollen; good to move onto when orange finishes, end of first week in October.

Jelly-bush (or Wild may) : September

Good pollen, off-white colour. Usually a super and a half of jelly honey that cannot be extracted. Bees thrive on it. This produces Medihoney.

Red myrtle (or Soapwood) : February / March

Produces honey and pollen. If there are enough trees growing in the area one and a half supers are usually obtained.

Swamp mahogany : May to August

Begins flowering in May and usually goes through till August. Flowers are creamy coloured with very large cups - reasonable producer.

Melaleuca (or Tea-tree, Paperbark) : varied flowering

This tree has a different flowering habit to most other trees and its times of flowering vary from year to year, but the usual pattern is: there is a medium break in March lasting about 10 days; another heavy break in April; scattered flowers through May with another heavy break in June. Sometimes there is a light flowering in July, followed by fresh growth. This signals the end of the season. Honey is medium colour and has a distinctive flavour. Pollen is a dirty white colour and high quality. Buds wait until there is moisture in the air before they open.

Red stringybark / Mahogany : not regular

Not regular flowerer but worth watching when trees do have buds on.

Banksia : flowers through year

Produces dark, low grade honey and pollen. Worker bees become hairless from working it.

Grey gums : February / March

Produces honey and large quantity of low grade pollen. This results in a generation of young bees with no stamina, many die on their first work flight.

White cedar : September

Blue flowers, bees work it and collect pollen.

White bottlebrush : September / October

It is a heavy producer of both honey and pollen, absolutely fantastic for raising queen cells.

Moreton bay ash : December

Bees hum well in the trees. Does produce honey; not a plentiful tree in this area.

Water gum : early December

Yellow golden flowers - honey is the colour of the flowers.

Queensland nut (Macadamia or Bauple nut) : mid August / mid Sept

Yields both honey and pollen for a short period about a fortnight. Good build of bees but care must be taken with spray. Even though many growers pay for bees to pollinate their crop, they don't realise that the bees must be alive to do so. A little bit of co-operation would benefit both.

Black tea-tree (or River tea-tree) : September

Grows around creeks; yields thin honey, tiny specks of white pollen. If bees are strong, they have a tendency to swarm on it.

Silky oak : September

It flowers about the same time as clover. If both are growing in the same area a brown honey with a clover flavour is often produced.

White or Queensland stringybark : November

Yields a dark honey of good flavour; large quantities of quality off white pollen.

White mahogany / Yellow stringybark : November / December

This tree is hard to distinguish from stringy bark, the difference being: the flowers are borne on the outside instead of amongst the leaves as with the stringy bark. They are also larger. This tree does not produce pollen but does produce a quantity of very good quality honey. Bees will lose strength.

Brush box : mid November / December One of the major producers of high grade honey; tiny specks of white pollen.

Gympie messmate : mid November / December

Good supply of creamy-coloured pollen, fair quantity of dark honey. This tree carries its buds for 12 months and may drop the lot for no apparent reason a week or so before flowering. It is one of the most unreliable trees I know. Colonies build well.

Broad-leaved red ironbark : December

Creamy coloured flowers, good honey.

Blackbutt : December / January

Produces an abundance of creamy pollen, some honey tastes like golden syrup.

Sugar gum (Smooth bark apple) : December

Snow white when in flower, can be seen for miles. Yields both honey and pollen heavily for a short period. Honey is dark.

Turpentine : November

Pollen; unpalatable honey, can flavour other blends.

Grey or Gum-topped box : late February / March

Often yields honey heavily; no pollen, very hard on bees. Move bees off it after 10 days or so.

Groundsel : April

A member of the noxious weed group. It only flowers for a short period of about a fortnight. For this time a heavy supply of pollen and honey is produced. Bees go absolutely berserk for the time it flowers. It cuts off suddenly and discontented bees can kill virgin queens if the hives disturbed. Fortunately this weed is well controlled in this area.

Grass tree : September / October

Produces bitter honey. Bees work well on it; good pollen.

Flat weed : September

Resembling dandelion, the main differences being that flat weed has a single flower head but dandelion has many flowers on one stem. Pollen is red and of good quality. Honey is golden colour.

Grasses, Weeds : varied flowering

Often too much attention is paid to trees and not enough to grasses and weeds. Many of these produce much higher grade pollen than trees. Small crops farms, after crops have finished, usually become covered with weeds of various descriptions.

A mixture of pollens is more beneficial to bees

than just one straight line. If a site can be located in a forest where they can work trees for honey flows and have access to nutritional pollen from grasses and weeds within a mile, much better results will be achieved.

Blady grass : around January / February

Produces a grey pollen especially if it has been burnt a month or so before.

Nadi setaria : January

Produces a very heavy supply of pollen. Water couch, blue couch, giant paspalum and many others supply good pollen.

Weeds

The weeds which supply pollen are too numerous to go into - rag weed, devil's pitch fork, billy goat weed, are a few of the most common.

Suburban flora : varied flowering

Besides the natural flora, there is an abundance of citrus, melaleucas and grevilleas which will provide major honey and pollen throughout the year. This is supplemented by the heavily-watered and fertilized shrubs, annuals and grasses in house yards. Hives will produce 80 to 120 kg of honey per year in these areas. The only drawback is when some unknowing gardener sprays his flowering trees with a toxic spray.

Local bylaws and good 'neighbourliness' must be considered.



Heavy Macadamia flowering

White Bottlebrush



NAME	POLLEN	NECTAR	FLOWERING...												NOTES...		
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC			
Blue gum/Forest red gum <i>E. tereticornis</i>	● ● ●	● ●															Good quality pollen, major source. Good quality, medium coloured honey. One of the most beneficial of all the trees.
Spotted gum <i>C. citriodora</i> subsp. <i>variegata</i>	● ● ●	● ●															Good every 2-3 years. Top grade pollen. Honey colour light amber.
Grey gum <i>E. propinqua</i>	● ●	● ●															Both good and poor quality pollen. Minor honey. Honey colour pale to medium amber.
Lemon scented gum <i>C. citriodora</i>	● ● ●	● ●															Top grade pollen, but irregular.
Scribbly gum <i>E. racemosa</i>	●	●															Light honey flow, very little pollen.
Rose/Flooded gum <i>E. grandis</i>	● ●	●															Good pollen. Minor honey. Pale amber to medium amber honey colour.
Red stringybark/mahogany <i>E. resinifera</i>	● ● ●	● ●															Every 2 seasons. Honey colour pale amber.
Swamp yellow stringybark <i>E. latisinensis</i>	● ● ●	● ● ●															Yields a dark honey with good flavour.
Grey ironbark <i>E. siderophloia</i>	—	● ● ●															Honey colour extra light amber.
Narrow-leaved red ironbark <i>E. crebra</i>	● ● ●	● ● ●															Honey colour extra light amber.
Broad-leaved red ironbark <i>E. fibrosa</i>	● ●	● ●															Hard on bees. Honey colour extra-light amber.
Silver-leaved ironbark <i>E. melanophloia</i>	● ● ●	● ●															Honey colour light amber.
Blue top ironbark <i>E. nubila</i>	● ●	● ● ●															
Gympie messmate <i>E. cloeziana</i>	●	●															Nectar irregular, good supply of creamy coloured pollen. Unreliable source.
Tallowwood <i>E. microcorys</i>	● ●	●															Stimulates brood.
Grey/gum-topped box <i>E. moluccana</i>	—	● ● ●															Hard on bees. Hives dwindle.
Blackbutt <i>E. pilularis</i>	● ●	●															Not very reliable.
White mahogany/Yellow stringybark <i>E. acmenoides</i>	● ● ●	● ●															
Moreton bay ash/Carbeen <i>C. tessellaris</i>	●	●															Support only.
Red bloodwood <i>C. gummifera</i>	● ●	● ●															Stimulates swarming.
Pink/Red bloodwood <i>C. intermedia</i>	● ●	● ●															Medium coloured honey with a ropey texture, that darkens with age. Pollen is white and plentiful.

NAME	POLLEN	NECTAR	FLOWERING...												NOTES...		
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC			
White/yellow bloodwood <i>C. trachyphloia</i>	● ●	● ●															Honey is lighter in colour than other bloodwoods.
Swamp mahogany <i>L. robusta</i>	—	● ●															Good honey.
Brush box/Pink topped box <i>L. confertus</i>	● ● ●	● ● ●															Good honey in high country Honey colour light amber.
Apple <i>Angophora subvelutina</i>	● ● ●	●															
Wattle <i>Acacia</i> spp.	● ●	—															No honey, Pollen variable. At least 12 species in this area.
Crow's ash <i>Flindersia australis</i>		● ●															Honey distinctive taste, very similar to leatherwood honey.
Silver (bumpy) ash <i>Flindersia schottiana</i>		● ●															Honey distinctive taste, very similar to leatherwood honey.
Red ash/almond soapbush <i>Alphitonia excelsa</i>	●	● ●															
Sheoaks <i>Allocasuarina & Casuarina</i> spp.	● ●	—															Lower grade pollen. 6 species around this area.
Tea trees <i>Melaleuca</i> spp.	● ● ●	● ● ●															Good winter honey, distinctive flavour. Rain washes out.
Black river tea tree <i>M. bracteata</i>	● ●	● ●															Unreliable, thin honey, white pollen. Good for building hives and holding.
Paper-barked tea tree <i>M. quinquenervia</i>	● ●	● ● ●															
White bottlebrush <i>M. salicina</i>	● ● ●	● ● ●															Heavy producer of honey and pollen. Fantastic for raising queen cells.
Weeping bottlebrush <i>M. viminalis</i>	● ●	● ●															Provide a 'resting and gathering' place for many species, as well as good forage.
Silky oak <i>Grevillea robusta</i>	● ● ●	● ● ●															If clover is also growing in the same area a brown honey with a clover flavour is often produced.
River mangrove <i>Aegiceras corniculatum</i>	● ● ●	● ● ●															Produces a very distinctive honey - almost water-clear. Potential for a niche market for this honey.
Grey mangrove <i>Avicennia marina</i>	● ●	● ●															Small amounts of unusual flavoured honey only.
Banksia spp.	● ●	● ●															Small leaved banksia (<i>oblongifolia</i>) produces well. Broad-leaved banksia (<i>robur</i>) is of little use.
Jellybush/Wild may <i>Leptospermum polygalifolium</i>	● ● ●	● ● ●															Very difficult honey to extract - this produces Medihoney. Good pollen, off-white colour.
Hairy bush pea <i>Pultenaea villosa</i>	● ● ●	●															Little pollen. Good honey. Good for building hives and holding.
Grasstree <i>Xanthorrhoea</i> spp.	● ● ●	● ●															Honey is bitter. Produces good pollen. 4 species in this area.

THIS CHART IS A WORK-IN-PROGRESS. MORE TO BE ADDED...OR ADD SOME YOURSELF...

NAME	POLLEN	NECTAR	FLOWERING...												NOTES...			
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC				
Dogwood <i>Jacksonia scoparia</i>	● ● ●	●																Good for building hives & holding. A trickle of honey, quality red pollen. Makes bees angry due to high pollen content.
Jacaranda <i>Jackaranda mimosaeifolia</i>	● ●																	Good quality mauve pollen. Bees work the flowers after they have fallen from the tree.
Macadamia, Bauple/Qld nut <i>Macadamia integrifolia</i>	● ● ●	● ● ● ●																Entices bees into swarming mode. Great honey, for a short period. Good for building hives and holding.
Citrus spp.	● ● ●	● ● ● ●																High quality pollen. Good honey. Use to raise nucleus hives.
Avocado	● ●	● ●																Produces good pollen and honey.
Clover <i>Trifolium repens</i>	● ● ●	● ● ● ●																Great for building bees. High protein brown pollen.
Wild turnip (radish)	● ● ●	●																High protein pollen.
Setaria/African pigeon grass <i>Setaria</i> spp.	● ●																	Good pollen.
Lotononus	● ● ●	● ●																Good pollen, an abundance of yellow clover-like flowers which supply a trickle of honey.
Lucerne	● ●	● ●																Hard on bees.
Stone fruits	● ●	● ●																Stonefruits are heavily reliant on bees for a productive crop.
Sunflowers	● ● ●	● ● ● ●																Huge flower-heads can accomodate many bees at once.
Grasses, various species	Variable pollen + nectar																	Many of these produce higher grade pollen than most trees. Provide a mixture and variety, which strengthens the hives.
Weeds, various species	Variable pollen + nectar																	Many of these produce higher grade pollen than most trees. Provide a mixture and variety, which strengthens the hives.
Suburban gardens	Variable pollen + nectar		Year-round															Due to the abundance and variety, major pollen and honey is available all throughout the year. High productivity.
Garden herbs	Variable pollen + nectar		Year round															It's great to let your herbs go to flower, these prove very popular with all types of bees. Variety strengthens the hives.
E = Eucalyptus L = Lophostemon M = Melaleuca																		

This chart is a work-in-progress. So please, if your experiences slightly differ, or you have updated info, or you have new info on local trees not included here, please let us know. We'd love to get some valuable feedback and new input.

The following trees are also significant for pollen and nectar in this area. More information is needed on them...

- **Large fruited grey gum**
E. major
- **Queensland peppermint**
E. exerta
- **Flax-leaved tea-tree** (Snow in summer)
M. styphellioides
- **Mountain yellow stringybark**
E. carnea
- **Swamp box**
L. suaveolens
- **Prickly-leaved tea-tree**
M. linariifolia
- **Gum-topped ironbark**
E. decorticans
- **Smooth-barked apple** (S-gum)
Angophora leiocarpa
- **Cadaghi**
C. torelliana



Sow pigeon peas for native bees...

Article by Jerry Coleby-Williams, presenter ABC Gardening Australia

Jerry is also a director of The Seed Savers Foundation, a community organisation which conserves rare and heritage plants, and is a member of Australian Institute of Horticulture.

Pigeon peas are a 21st century crop. Last spring I decided to grow my own dahl. Protein-rich split peas are the main ingredient, also added to soups and stews, and these are dried pigeon pea seed, *Cajanus cajan*. Pigeon peas are as useful as maize, but have a far smaller ecological footprint, and are easier, but slower, to grow. They're a universal food, but India grows 80% of the global harvest.

Indian farmers grow pigeon peas for good reason. They're short-lived shrubs, 2 - 4 metres high. Their first crop is heavy, so they're grown as annuals. Unlike maize, they aren't too fussy about soil type, their roots fix nitrogen, shoots make good mulch and forage for stock. Stems produce firewood for cooking, plants tolerate slightly saline soil, don't need fertiliser, and they're drought-tolerant : 600 - 800mm of warm season rainfall produces a crop.

Smallholders often interplant rows of plant pigeon pea with crops, like sorghum, or fruit trees. Dried peas can be eaten green or when brown and fully mature. Pigeon peas are a 21st century crop, especially for poor farmers and marginal land. They're Climate Change winners.

Cultivars can be early maturing (3 - 4 months) or late maturing (5-11 months). I sowed mine in my Brisbane garden in October. Every seed germinated: I thinned heavily. By late March, plants resembled leafy umbrellas four metres tall and the first flowers opened. Mine were a late maturing cultivar, the type traditionally grown. Modern cultivars are early maturing and preferred by industrial farmers.

Flowering lasted six weeks and, curiously, our honeybees seemed disinterested. Native bees found them irresistible, their visits increasing as flowering peaked. Fascinated, one weekend I observed their group dynamics. The first and last to visit were energetic Blue-banded bees, *Amegilla cingulata*. Around midday along came Teddy Bear (*Amegilla* spp.) and Carpenter bees (*Xylocopa aruana*). Carpenter bees are divas, large, colourful, energetic and noisy.

After drinking deeply, off they zoom. But most of the action came from Fire-tailed resin bees (*Megachile mystaceana*) and leafcutter bees (*Megachile inermis*). The Leafcutters assertively drove off others, like the Blue-banded bees.

Importance of Blue-banded bees to horticulture

Tim Heard, a local CSIRO entomologist and native bee expert, visited my garden in May. Captivated by the pigeon pea scene, he identified another bee of the genus *Chalicodoma*, working their flowers.

Tim explained how important the Blue-banded bee is to horticulture. These are solitary species, but frequently nest in communities. They're common, occurring everywhere except the NT and Tasmania. Soft sandstone, mud-brick and old mortar are favoured nesting sites. At night, males congregate on thin-stemmed plants, like grasses, resting and holding on with their mandibles.

Commercial tomato growers, through the Australian Hydroponic and Greenhouse Association, have been lobbying for the introduction of the exotic European bumblebee (*Bombus terrestris*) to increase yields and profit. Conservationists are already alarmed by the appearance of the bumblebee in Tasmania, where they are competing with native bees for pollen and nectar. Bumblebees are inefficient pollinators of natives, but pollinate weeds and exotics.

The Australian Native Bee Research Centre has proven the Blue-banded bee is superior to bumblebee pollination of avocado, eggplant and tomato. Blue-banded bees are buzz pollinators, using wing beats to vibrate pollen off for collection. ANBRC techniques for establishing new colonies now offer a viable alternative to the bumblebee.

With six bee species working my pigeon peas, every flower set pods. Branches drooped under their heavy burden. Storms further bent branches earthwards, a reminder to space them two metres apart, and possibly stake them too.

Tim Heard was surprised when I told him my Blue-banded bees don't vanish in winter, as they're supposed to do. They forage on salvias and bedding begonias, proof that we can never know everything about gardening.



Pigeon pea flower



NATIVE SOLITARY

Blue-banded bee

These are very attractive bees with bands of pale blue metallic hair around their abdomen. With 'buzz' pollination they are very good at pollinating tomatoes and chillies which require vibration to release pollen. Their buzz is very loud when flying and their flight pattern is quite jerky and erratic. The Blue-banded bees were found nesting in a pizza oven Chris Fuller had built out of 'cob'. Cob is simply a mix of three parts sand to one part clay. Chris doesn't use the oven for cooking anymore as it has hundreds of Blue-banded bee holes bored all around it. He is now trying to encourage the bees to also move into nesting blocks which he has made out of sections of rectangular PVC pipe filled with the 'cob' mix and placed around the oven (design of these blocks is credited to Les Dollin of the Australian Native Bee Research Centre).



PHOTO CHRIS FULLER



PHOTO DIANNE CLARKE

Create your own

Bee Wall



Native solitary bees have two basic needs:

Food and shelter.

It's as simple as that.

We can all provide
Habitat, Homes and Hollows for Native Solitary Bees...

Though bees' housing needs vary, they all feed exclusively on nectar and provision their larvae with pollen. Of course, a good nectar and pollen source must be present when each species is active, which may be for only a few weeks per year.

They must have access to a diversity of plants with overlapping blooming times so that flowers are available to forage all year round. And because native bees come in a range of sizes, it is important to provide flowers of various sizes, shapes, and colours.

They need places to nest. Solitary native bees don't build the wax or paper structures we associate with honey bees, social stingless bees or wasps. Many solitary bees nest in a small series of tunnels and cells they construct underground. These burrow narrow tunnels down to small chambers. In order to build these nests, bees need direct access to the soil surface, often on sloped or well-drained sites. Others nest in narrow tunnels often left behind by wood-boring beetle larvae in dead trees (carpenter bees will excavate their own holes), and a few use the soft pithy centres in some plants. Some bees require small cavities, either in tree boles, underground, or under clumps of fallen grass. Whether underground or in wood-tunnels, most solitary bees spend most of the year maturing in their nest (brood) cells. In these cells, they are vulnerable to nest disturbances such as soil tillage or tree removal.

Bees need protection from most pesticides. Insecticides are primarily broad-spectrum and are therefore deadly to bees. Furthermore, indiscriminate herbicide use can remove many of the flowers that bees need for food.

Avoid disturbing the soil surface during flowering; never apply insecticides to plants in flower (apply herbicides in the most targeted way possible e.g. spot spraying), and leave logs, branches, posts, wood whenever they do not pose a hazard. Create holes for nesting.

Enhance habitat for bee communities by removing vegetation from small patches of sunny, well-drained soil.

Solitary bees will be productive year-round if temperature range is good, however most activity in your garden will be in September through to late Autumn (April May). Little is known of the complete life cycle of solitary bees. Basically, there are two generations of leafcutter in a year, most of the others lay just once.

Enhancing pollinator habitat is an opportunity to educate landowners, community and friends about the value of this habitat for the ecosystem.

Creating foraging habitat for bees :

Patches of foraging habitat can be created in many different locations, from backyards and school grounds to golf courses and city parks.

Even a small area planted with good flowers will be beneficial for local bees, because each patch will add to the mosaic of habitat available to bees and other pollinators. Have a diversity of plants flowering all season. Most bee species are generalists, feeding on a range of plants through their life cycle.

By having several plant species flowering at once, and a sequence of plants flowering through spring, summer, autumn and winter, you can support a range of bee species that fly at different times of the season.

Choose several colours of flowers. Bees have good colour vision to help them find flowers and the nectar and pollen they offer. Flower colours that particularly attract bees are blue/violet, mauve/pink, white, and yellow.

Plant flowers in clumps. Flowers clustered into clumps of one species will attract more pollinators than individual plants scattered through the habitat patch.

Some plants used by solitary bees for nesting :

Grass tree spikes, bamboo, dried/dead cane of lantana, raspberry or elderberry, mango, soft deadwood such as banksia, casuarina, melaleuca and leptospermum.

Tunnel-nesting bee biology

The vast majority of native bee species, including tunnel-nesting bees, lead solitary lives. While they may have gregarious tendencies, preferring to nest near other members of their species, each female individually constructs her own nest and provisions it with food for her offspring.

To make a nest, a female bee builds partitions to divide the tunnel into a linear row of brood cells. Depending on the species, the partitioning walls may be constructed of mud, plant resins, leaf pieces, flower petals, and even cellophane-like glandular secretions.

The female provisions each brood cell with a mixture of pollen and nectar, onto which she lays a single egg before sealing the cell and moving on to supply the next cell. Her offspring pass through the egg, larval, and pupal stages in the cell before emerging as adults to renew the cycle, usually the following year. After several weeks of nesting, the mother bee generally dies.

Nesting bees may not fill the entire length of a tunnel with cells, or they may die before an entire length of a tunnel is filled. For these reasons it can be difficult to tell if a nest tunnel is occupied from outside observation. A bee that is able to fill an entire tunnel with eggs before dying will plug the tunnel entrance with mud, leaf pieces, or other nesting substrates to prevent predators from attacking her brood.

Solitary bees have the unique ability to determine the sex of the egg they lay; most male eggs are laid closest to the tunnel entrance. Because each female may mate with several males, males are more expendable from an ecological standpoint. Thus, the advantage of laying male eggs closer to the nest entrance is that they are the first to fall victim to predators such as nest-invading insects, or woodpeckers, while the developing females remain safe deeper within the nest. Being closer to the entrance, male bees emerge prior to the females, and will often wait outside, ready to mate with the females who will appear several days later.

Depending on the species and climate, there may only be a single generation of bees per year (univoltinism), or multiple generations per year (multivoltinism). Some species may also have parsivoltine lifecycles, laying dormant for over a year, waiting for the appropriate weather conditions to spur their emergence. The latter lifecycle is most commonly observed at high elevations, in deserts, areas prone to forest fires, and other extreme environments.

The exterior of the block can be any colour, although there is some anecdotal evidence that bees are most attracted to dark blocks, which can be achieved by lightly charring the front surface with a propane torch. Whatever the colour, bees are likely to use it as long as the tunnels are of appropriate diameters and depths, and hung in an appropriate location. As a final step, attach an overhanging roof to provide additional shelter from the rain.

"Tunnel Nests for Native Bees - Nest Construction & Management" - www.xerces.org

Construction of Solitary Bee Nest Sites

BY TIM HEARD - RESEARCH SCIENTIST FOR CSIRO ENTOMOLOGY
www.sugarbag.net

Basically, the bee wall should consist of two separate elements :

One of timber and the other of mud brick.

The wooden wall is basically a set of shelves upon which the nesting materials are placed. It should be made of unpainted recycled hardwood elements that provide a rustic appearance. See the example of Chris Fuller's wall.

The mud brick wall provides an earthen nesting substrate for bees, particularly blue banded bees. See example of John Klumpp's wall below as an example. John uses large blocks of pre-formed styrofoam (available at concrete supplies) filled with rammed dirt. An alternative is to make mud bricks. The mud texture is critical. Blue banded bees are quite particular about the texture of the mud. Generally use a mix of 3 parts sand and 1 part clay, but vary the types of sand and clay to increase the chance of making a brick that appeals to the bees. Poke holes of 6 mm diameter and 60 mm depth into the bricks as they are drying. These are pilot holes to encourage the bees to start nesting.

Both walls need to be protected from damp rising from the ground by being mounted on a base. I suggest a base of fired bricks. For the wood wall, post of galvanised steel, wood or brick could be used instead. The base also serves the purpose of raising the wall to closer to eye height.

Both walls need to be protected from rain by a roof. I suggest a roof of a wooden frame covered in corrugated galvanized iron sheeting. A generous overhang on the roof will protect both the wall and the bees. Rustic, rough wooden poles could be used for an attractive appearance. Recycled sheeting could be also used.

I recommend that the wall be placed on the **north facing slope** for winter warming. It should be positioned and built so that it receives minimal direct summer sun. A seat may be installed in front of the wall to encourage visitors to sit and watch the action.

Parts of the wall should be **protected by thick hedges of vegetation** as some bees like it private. I recommend that the south, east and west sides of the wall be protected by vegetation. Allow the vegetation to grow over the wall. The north side may be exposed for warming by the sun and to allow visitors to approach and inspect the wall. Both sides of the wall are open, that is they have no walls, so that bees can approach from the either the open side or the protected side.

Local solitary bees will adopt the nesting materials provided. I suggest that we initially provide only a small number, but great variety, of nesting materials. Then when you see which ones are adopted by your local bees, you can add more of those. Note that wasps and other insects may also colonise the nest materials. This adds another element of interest.

Also parasites of wasp and bees will follow their hosts, again adding to the biodiversity.

Remember : bees need a source of water

Types of nests could include :

1 Blocks of wood (both hardwood and softwood) with various sized holes drilled (see sizes below) at approximately **20 mm centres**. Make holes smooth and blind (that is not right through the timber).

3 mm hole	70 mm deep	(few)
5 mm hole	120 mm deep	(most common)
6.5 mm hole	150 mm deep	(most common)
9.5 mm hole	150 mm deep	(few)
13 mm hole	150 mm deep	(few)

Chris Fuller has noted through recent observation that he is having best success with : 6mm x 100mm and 8mm x 150mm and great results with Cypress Pine

- 2 Bundles of bamboo, rush and lantana stems**, with open end, cut about **150-200 mm** lengths (cut close to node so one end is open, other closed), pack horizontally into and **protected by enclosures** of recycled materials, such as plastic pipe, or wooden frame. Some bees like **hollow stems** and other like **pithy stems** that they chew out themselves. Bundles can also be hung in tree, but fix firmly so they do not swing in the wind.
- 3 Bundles of wax drinking straws**, packed into enclosures.
- 4 Tree stumps** preferably rotting and with beetle holes.
- 5 Mud bricks** of various textures.
- 6 Bare ground** : clear patch of ground and compact the surface. Put in a step, so that you have a flat slope and a vertical surface.
- 7 Sand pits** : in a sunny well drained spot, dig a pit about 600 mm deep and fill with mixture of fine-grained sand and loam. If necessary use chicken wire to protect the pits from cat poo, etc. Weed the sites when necessary.
- 8 Sand piles** : make a pile or raised bed of mixture of fine-grained sand and loam. This option is better than a pit where the natural soil is poorly drained.

If you wish to **identify the species** of bees occupying the nest, then insert a roll of newspaper in the hole. When the nest is occupied, pull out the newspaper and place in a container for emergence of the adult bee. Don't forget that many of these solitary bees will sting.

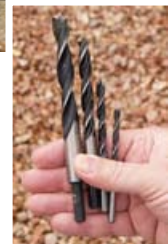
Other insects may also occupy these nests, including wasps and parasites of the bees.

You can expect an **increase in bee numbers** in the second and third year after construction. But sometimes the numbers of some species decrease as parasites accumulate.

Male bees will sometimes be found around the bees roosting in trees etc. They usually do not enter the nests. Keep your eye open for these.

Note that most of these bees are solitary but **some are gregarious** and so like nesting near others of their own species.

Bee walls, habitat and nesting blocks



Herb & Insect Spiral



Herb and Insect Spiral from Urban Bees.
Chris Fuller's Bee Village at Kin Kin.
Wall faces north-east.

This wall of dry stones built in a spiral shape helps to warm and dry light soil. This structure favours the growth of Mediterranean aromatic plants and nectariferous plants that bees love. Temperature and hygrometry differ between the top and the base of the spiral.

At the top, where the soil is the driest :

- **Lavender, hyssop, savory, thyme, rosemary, common rue, Aegean wallflower, red valerian, and sedum**, for example, can be planted.

A little lower :

- **Burnet, pyrethrum, and borage** thrive along the slope.

At the base, where the soil is cooler and more nutrient rich :

- **Dill, oregano, basil, chives, mint and lemon balm** flourish.

The stones of the spiral are deliberately placed with wide spaces between them and set with lime, in order to welcome other living creatures (ladybirds, spiders, hedgehogs, lizards etc).

The spiral offers homes and food to a multitude of small creatures by making maximum use of a small area (two to four metres in diameter).

This design is not only useful but pleasant to the eye.



Right :

John Klumpp's Blue banded bee wall. This one is made by pouring mud into a polystyrene packing frame.

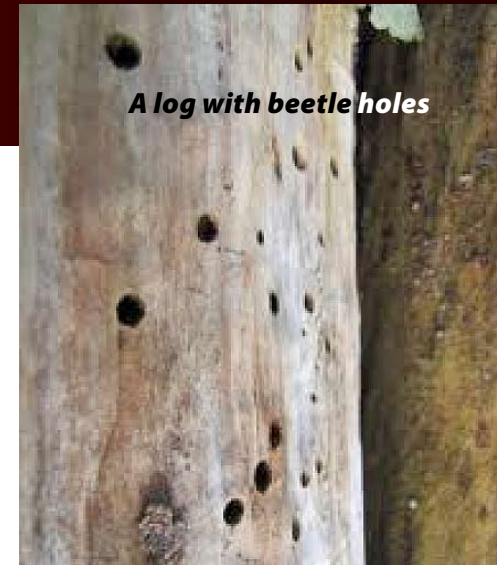
An alternative is to make mud bricks and pack them together.

Some additional notes :

Solitary bees don't clean out old debris from the previous year, and so each year they need clean housing.

As solitary bees, no-one directs traffic - each bee must find her nest on her own. Large artificial systems with too much uniformity can confuse solitary bees - asymmetry and bold decorations that define areas can help individual bees find their nests.

A log with beetle holes



Most nest systems need weather-resistant housing - a large diameter pipe capped at one end; a tennis ball tube; a milk carton set in an open wooden box; some other variation. To reduce rain soaking the nests, tilt the nests a bit forward after first binding them together, (with masking tape, wire). Shelter from strong wind is also important.



PHOTO BOB LUTTRELL

NATIVE SOLITARY

Fire-tailed Resin bee

This great looking bee with a bright orange abdomen nests in holes in wooden blocks. Here it is photographed on a *Leptospermum* flower. The Fire-tailed Resin bee will create a series of individual compartments (8 to 12) within each hole and provision each compartment with pollen and nectar before sealing the end of the hole with a mix of resin and mud.

PHOTO CHRIS FULLER

Black Parasitic Wasp

for solitary bees



This wasp homes in on partially completed nest holes and takes a look inside. If the bee is in residence, the wasp withdraws to a strategic distance and waits. Once the bee leaves, the wasp creeps up and if the coast is clear, inserts into the hole its long tail with its needle-like egg laying tubes.

If successful, the offspring of this wasp will be the product of that nest site instead of the offspring of the solitary bee!

Article from www.aussiebee.com.au

Paper tubes / straws / hole liners

The simplest bee homes are holes drilled in wood or made in clay. While easy to make, they have several disadvantages. Pests, especially mites, are a natural part of the bee life cycle. In wood or clay, the mature cocoons cannot be removed for cleaning, so pest populations remain high. It is also nearly impossible to clean the holes for re-use without destroying either unhatched adults or freshly laid eggs.

Many people who have drilled bee nesting blocks will use paper liners. These treated paper or cardboard tubes fit into holes in wood, clay or other mediums, or are sometimes used alone. The bees nest in the tubes (or 'straws'), which can be removed when the bees are mature. Once removed, they can be exchanged, brought to another site, stored in suitable safe containers to await hatching etc.

Fresh liners in the holes then provide clean nest spaces for the following season. Some liners can be opened for access to the cocoons for cleaning, but many are difficult. In those, bees still emerge in association with pests.

The liners can either be purchased, or you can make them yourself. We are currently in the process of working this through for our bees here in this area, and it is a work-in-progress. There is a bit of info available on the www, or speak to people who are currently actively involved in the solitary bees. And start researching...and experimenting. Let us know.



PHOTOS BY GLENBO



Chris Fuller, as well as a number of our Valley Bees members, are currently experimenting with various techniques, and we will try to keep you updated.

Try ANBees Forum - Yahoo Groups
 These guys sell the liners :
www.pollinatorparadise.com/Binderboards/new_products



Sometimes the bees (and the weather) will work the liners out of the holes

This resin bee takes a liking to the liners!

Native Stingless Social bees

ARTICLE BY
JERRY COLEBY-WILLIAMS

Most people are surprised to learn that there are around 2000 species of bees native to Australia. But of most interest to the backyard beekeeper are the stingless bees that store honey - *Austroplebeia* and *Trigona*.

Stingless bees and European bees coexist in gardens, and work the same flowers.

Often mistaken for fruit fly, these minute black bees are just 4 per cent of the weight of a European honey bee. Best suited to the warmer parts of New South Wales, Queensland, the Northern Territory and Western Australia, they are good alternative pollinators.

Specially designed compact hives need to be in a sheltered spot with shade to protect from hot western and northern sun. Morning sunshine helps stir these bees to action in winter.

Stingless bees forage up to 500m from their home and in warm areas a happy colony can produce up to 1kg of sugarbag honey a year.

While they are far less productive than their European counterparts, many like sugarbag honey for its distinct 'bush' flavour, and as an alternative to honey produced by honeybees.



DIANNE CLARKE



Unique photo of the native queen bee laying in the brood cells - *Austroplebeia australis*. Photo (and photo left) by Dianne Clarke.



Bob Luttrell and Rob Raabe discuss a hive split



The easily identified spiral brood patterns of *Trigona carbonaria*.



Typical view inside a *Trigona hockingsi* hive. Photo Chris Fuller.

Species of Native Stingless bees BY CHRIS FULLER

Only about 14 species of Australia's 2000 odd native bee species live as an organised colony. Individuals within these colonies work with and on behalf of each other, each with certain jobs to do, and are known as social bees. Native Stingless bees are easily distinguished from honeybees as they are a lot smaller, generally black and do not have a sting. They do differ slightly from each other. Here in south-east Queensland the most common three species are :

Trigona carbonaria

is the most widespread of the native bees, and the most common in the south east of Queensland. It can however be found in North Queensland and the southern coast of New South Wales. This species of native bee is easily distinguished from others by the flat spiral pattern of the brood mass.

Trigona hockingsi

Trigona hockingsi is most likely to be found north of Brisbane. It is slightly larger than most other species of native stingless bees. The eggs of it's brood mass are laid in a more hap hazard manner and this can help to distinguish a hive of these bees from one of *Trigona carbonaria*.

Austroplebeia australis

This species is most common inland but can also be found on the coast. The small creamy white marks at the base of the thorax help in it's identification. *Austroplebeia australis* hives commonly have a small flute at the entrance to their hive which they close each afternoon with a lattice of nest material to act like a security screen door.



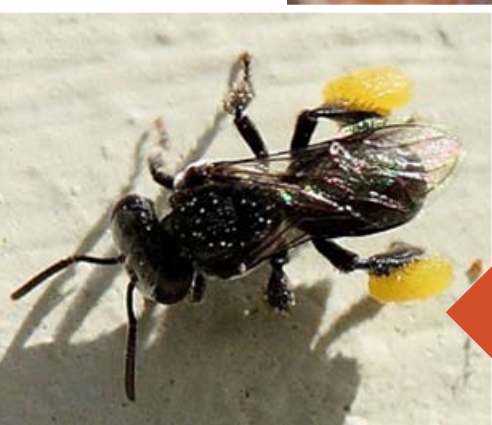
Trigona carbonaria

PHOTO BY WITJUTI GRUB BUSHFOOD NURSERY



Austroplebeia australis

PHOTO BY DAVE HENRY



Trigona hockingsi with pollen sacks

PHOTO THROUGH CHRIS FULLER

For more info go to www.aussiebee.com.au



Dr. Tim Heard, Entomologist with CSIRO Brisbane (right) with Chris Fuller, Kin Kin Native Bees, at a recent Valley Bees 'Habitat Hives and Hollows' day at Landcare in Gympie. Tim was our invited special guest, and very kindly donated this healthy hive of *Trigona Hockingsi* to Valley Bees, which now takes pride of place in the Landcare Nursery's dedicated Bee Habitat Area, and placed below an established Native Frangipani.

Our Bees Bring Bushtucker to the 'Burbs

One of the most important reasons for people keeping hives of native stingless bees is for conservation, according to CSIRO entomologist, Dr Tim Heard. 'Native bees are important for pollinating native plants. They are especially useful in areas where bush regeneration activities are underway,' says Dr Heard.

'CSIRO is also interested in native bees for crop pollination to complement the important role played by the European honey bee,' says Dr Heard. 'Our aim is to increase the number of species available for this purpose.'

Using a native species for crop pollination and as a source of food is also a positive move for the bees, as clearing bush for farming has caused them to vanish from many areas. 'Using a natural resource like native bees may ultimately ensure their protection,' he says.

Our native stingless bees are low maintenance and are especially suited for family life in the suburbs. CSIRO research showed that over half of native stingless beekeepers kept their hives in suburban backyards.

'People keep native bees for many reasons – enjoyment, conservation, crop pollination, honey production and hive sales,' Dr Heard says. 'They have an affection and affinity with these attractive creatures, and are now finding that stingless bees can be kept in hives and can be propagated.'

From a CSIRO media release. Dr Tim Heard is an Entomologist with CSIRO Brisbane.

Getting started with hived bees...

Native Stingless Social bees :

The obvious place to start if you want to be a native bee keeper and don't have a hive of your own is finding where to get some. There is a list of hive sellers on the Australian Native Bee Research Centre's web site at www.aussiebee.com.au. You should try to get your bees from as close to where you live as possible. It is the best way of ensuring your hive has the best chance of surviving your local conditions. You may also know someone who has a hive already and you could try to negotiate buying a split from their hive. Hives can be bought in boxes or in logs and what you go for depends on what you intend to use them for. Hives in logs are generally cheaper and make a great garden feature if you want to use them solely for pollination in your yard.

Boxed hives will cost more but will generally have the ability to be split when the hive is at full strength and also allows for the addition of a honey super so you can harvest some of the unique 'sugar bag' honey. It is worth looking over any old, dead trees which have fallen after a storm as you may be in luck and find a hive for free. If you come across a fallen hive, and it has not broken open, simply cut the log 500mm above and below the entrance and then seal the top and bottom of the log. If the log has busted open and exposed the nest, get as much of it into a box as you can. Start with the brood mass, then the pollen pots and lastly the honey pots. Do not transfer any leaking honey pots. If you want to transfer a log hive you may have to a box, and are not sure how to go about it, contact your local native bee keeper.

BY CHRIS FULLER ▲



Native bee relocation expert Rob Raabe shows a spectacular cross-section through an old wild stingless bee hive. ▶

Basic principles...

General principles that apply to both honeybees & stingless bees :

- 1 Ensure the bees are disease free, strong and housed in a sound hive or log.
- 2 Before acquiring bees, also acquire the knowledge necessary for managing bees.
 - Understand the biology and habits of the bees.
 - List the equipment required to house and manage the bees.
 - Talk to people experienced in bees.
 - Attend workshops, field days and meetings.
 - Google! There are amazing Australian sites loaded with great info that is relevant & informative.
 - Also explore some of the overseas sites - there are good inspirations on those as well.
- 3 Ensure you have the right facilities and resources that will satisfy the needs of the bees - suitable site and aspect, solid stand, good sun, closeness to water etc.
- 4 Start early in the season. Here are the general rules :
 - Aug - Dec In Spring, bees are active, nectar and pollen is abundant, activity is high.**
 - Jan - May Wet weather does not favour bees & resources are not as abundant in our area.**
 - Jun - July Bees are very quiet. It's the time for creating and/or renovating your equipment.**
- 5 Even after acquiring bees, you should continue searching to expand your knowledge and enjoyment.
- 6 Native bees do not need to be registered yet.

BY ATHOL CRAIG ▲



Stingless bees in a logged hive on Chris Fuller's property

Productive back yard honeybees

ALL PHOTOS BY GLENBO

Conserving our bees...

by Chris Fuller

There are around 2000 species of bees native to Australia. Around 12 of these are social bees and live in hives or colonies (e.g. Native Stingless or 'Sugarbag' bees). The vast majority of our native bees are solitary insects, building and provisioning their own nest but often living near other bees of the same species (e.g. Blue-banded, Leafcutter, Resin and Carpenter bees). Honeybees (*Apis mellifera*), or European or Italian bees as they are often known, were introduced around 1824 and have become the basis of a large honey industry.

Both Australian native bees and honeybees are vital pollinators of both horticultural crops and native plants. It is said that one third of every mouthful of food we eat comes from pollination.

Native bees and honeybees are currently under threat from a number of sources and this could very well start to effect the pollination of our crops, sooner rather than later. Varroa mite is in every country in the world other than Australia. The most recent two countries to become infested were New Zealand and PNG. Most in the industry believe it will only be a matter of time before Varroa mite arrives here. This mite drastically reduces the strength of a hive and leaves it open attack from other pests and disease. It has the potential to decimate large numbers of hives in only a few years once established in Australia. The nature of the commercial honeybee industry, where large numbers of hives are trucked around the country chasing 'nectar flow', will almost certainly spread the mite around the country fairly quickly.

While everyone is waiting for Varroa to arrive in Australia, there is currently another major pest of honeybees spreading quickly through the country as we speak, and unfortunately, not only is it already here on the Sunshine Coast but we seem to be a real hotspot for it. It is called Small Hive Beetle and was first detected in Sydney in 2002. It can fly up to 10 km a day and has now spread throughout mainland Australia.

I believe this pest is one of the main reasons why so many people are saying they are just not seeing honeybees around like they used to. If you have a hive or two in your garden or on your property here on the Sunshine Coast and you are not currently managing the beetle, you more than likely have it in the hive. These beetles essentially starve the hive to death by laying huge numbers of eggs in the hive and the developing larva eat all the honey and pollen stores.

A lot of growers of both commercial and backyard horticultural crops rely on hives of feral honeybees to help pollinate their crops. These are hives that have split or absconded from a managed box of honeybees and 'gone bush' finding a suitable tree hollow or other nesting site to establish. It is these hives that will be the first to disappear to Varroa and I believe are currently already under attack from Small Hive Beetle.

Australian Native Stingless Bees, as far as we know, are resistant to Varroa and most of the diseases associated with Honeybees. An established hive is also capable of defending itself from Small Hive Beetle attack. The main threat to Australian Native Bees is habitat loss through land clearing.

Stingless Native Bees need suitable hollowed out trees for nesting sites and these are always the first to go when land is cleared for new estates or rural uses. Thousands of hives are lost to clearing every year. Native solitary bees also require certain types of nesting sites.

Blue-banded bees nest in banks of sandy clay while resin and leafcutter bees live naturally in small holes in timber or pithy plant material. Carpenter bees like the spikes of Grass trees or soft decaying wood of trees like the Banksias.

What can we do about it?

- You can encourage all types of native bees onto your property by planting a lot of native plants. Eucalypts, Melaleucas (including Callistemons), Westringia, Leptospermums, Grevilleas, Baeckeas, Babingtonias, Banksias and many more.
- Encourage native solitary bees to set up residence on your property by providing suitable nesting blocks. Different types are required for different species but all are fairly easy to make.
- If you know of land to be cleared for development or road ways etc and suspect or know there is a hive of Native Stingless Bees in it, contact someone who can identify and remove the hive.
- If you suspect you have Small Hive Beetle try to trap and ID the beetle. Install traps such as the 'Beetle Eater' to reduce beetle numbers in your hive. These traps need to be inspected regularly (every 2-3 wks).

Find out more!

- There is a lot of information available on the web on DPI type sites about the management of Small Hive beetle
- Share what you learn. Tell people about the importance of Australian Native Bees for our futures pollination and make sure anyone you know who keeps honeybees knows they should be on the lookout for Small Hive Beetle

Article by
Chris Fuller, Kin Kin Native Bees
www.nativebees.com.au



BeeBits...

There is a role in Australia's future for the use of both European honeybees and native bees. They have different strengths and weaknesses in crop pollination and Australia would benefit from having stocks of both honeybees and native bees.

Likewise, the Sugarbag honey will become a useful niche bush tucker type industry for Australia...

from www.amazingbees.com.au



Halictid bee - *Homalictus flindersi*

A newly discovered native bee at Jerry's property 'Bellis' in Brisbane, working on the coriander flowers. Along with leafcutters, it's one of only a few native bee groups that have their primary pollen carrying areas on the underneath of the abdomen.

Target pollination

extracted from an article by Adrian Jones

Ideally, if you are positioning a hive for pollination, you want minimal plant growth and maximum crop yield for your target crop. Normally, the stronger the hive, the better results will be achieved at pollination : there are more bees to be fed, and more bees to work. It is important, of course, to have a lot of young brood in the hive. **Feeding young brood is what stimulates pollen collection.** If even strong hives have only capped brood in them, their pollen needs are reduced to minimal.

However, sometimes with a strong hive, the bees will 'shoot through' - fly straight over and past your desired crop to be pollinated, and they'll work a further crop or flowering, depending on what is around at the time. So you can choose to place a 'weaker' hive to get your desired result. These will be a single box, with about 6 to 7 frames of bees, and about 4 frames of brood. The 'weaker' hives do not forage as far and, although fewer in number (in terms of field bees), **they actually remain focused on the target crop** alongside which they were placed.

Bees don't just get their nutrients from one source. The pollen from the target crop mixed with the pollen from weeds such as wild turnip, keeps hives stronger, healthier and **breeding for a better colony.**



Deep Yellow Wood (*Rhodospaera rhodanthema*)

Witjuti Grub have several around their Nursery and have observed thousands of native bees around the flowers. It flowers prolifically and individual flowers are very small, well suited to the native bees...

or designed by Nature specifically for them!



Design, document assembly, additional photography by Glenbo.

Bees pollinate for life!

Valley Bees

Conserving all bees : for the health of our environment and on-going food supply

Colour theme your native bee-attracting garden



Colour-themed article created by
Maree McCarthy
Nature's Magic Garden Design
www.naturesmagic.com.au
dragons@naturesmagic.com.au

WHITE THEME (from tallest to smallest)

- Eucalyptus maculata Dwarf 'Little Spotty'
- Baeckea linifolia
- Callistemon 'Wilderness White' (3m), or C. Anzac (1m)
- Phebalium elatum
- Leptospermum 'Pacific Beauty'
- Phylothea myoporoides
- Grevillea linearis or sericea white forms
- Westringea fruticosa 'Zena' or 'White Rambler'
- Zieria smithii
- Orthosiphon aristatus (Cat's Whiskers)
- Austromyrtus dulcis (Midyim Berry)
- Hardenbergia violacea (white form)
- Grass Tree – seed grown (Xanthorrhoea macronema has long stamens and flowers within 18mths from planting seed. Will even flower in a pot)
- Libbertia paniculata
- Paper Daisies
- Brachyscome multifida (white form)



Grass tree

MAUVE, PINK THEME (from tallest to smallest)

- Macadamia 'Home Beauty' or 'Pinkalicious' (Beautiful pink flowers, good nuts)
- Callistemon 'Taree Pink'
- Melastoma affine Dwarf 'Liliane' (1m) has edible fruit.
- Philothea myoporoides 'Winter Rouge', or 'Profusion'
- Leptospermum 'Cardwell Pink'
- Prostanthera incisa (many others)
- Crowea – pink forms
- Correa – pink forms
- Indigofera australis
- Westringea 'Wild River' – looks great with Hardenbergia over it!
- Grevillea sericea – pink forms
- Hardenbergia violacea – small and large climbing forms and shrubby form
- Brachyscome multifida – mauve and pink forms
- Brachyscome 'Hot Candy' – suckering plant. Good low ground cover with flowers all year
- Paper Daisies
- Dianella spp.

Colours vary : pale lilac, deep mauve to pink tints and deep magenta shades



Crowea

YELLOW, CREAM THEME (from tallest to smallest)

- Hymenosporum flavum (Native Frangipani)
- Banksia spinulosa – Gold form
- Baeckea virgata 'La Petite'
- Pomoderris spp.
- Phebalium squamulosum
- Acacia 'Little Nugget' (1.5m)
- Acacia fimbriata Dwarf (1.5m)
- Pultenaea villosa (very soft and pretty)
- Goodenias – try G. 'Gold Cover', G. heterophylla
- Chorizema ilicifolium
- Hymenosporum flavum 'Gold Nugget' (1m)
- Hibbertia dentata, H. scandens, and others
- Bulbine bulbosa
- Calocephalus citreus
- Paper Daisies
- Philydrum lanuginosum (Frogsmouth) (Aquatic plant – looks nice in large water pot. Dies down in Winter – so also plant Milfoil and Nymphoides crenata)

Creams, pale yellows to deep egg-yellows



Paper daisies

PHOTO BY GLENBO

Article referred to us by Mark Grosskopf



Callistemon 'Wilderness white'



Melastoma



Leptospermum 'Cardwell pink'



Native hibiscus

PHOTO BY GLENBO

Valley Bees

*Balance between all bees
in the environment*

The commitment of Valley Bees is to nurture and maintain the population of all bees in the local environment.

To achieve this, a network is necessary to support the individuals and groups who want bees in their area : honeybees, native social stingless bees, and native solitary bees.

This commits us to be aware of management strategies to support the bees, to create an environment conducive to their on-going sustainability, and to focus on the nurturing of the Australian native bee populations in balance with the management of the honeybee, as all are needed to pollinate the extensive diversity in native flora, and native and introduced food plants.

Some of the threats to the sustainable maintenance of bees are the damage caused by introduced pests and diseases and the reduction of habitat, resource loss and introduced flora.

Valley Bees is a community-centred group which supports and coordinates the protection and management of bees to benefit the environment and horticultural industries in all their diverse rolls. There is a particular emphasis on the people who wish to maintain bees as part of their environment.

Valley Bees ...

- includes people specialising **in native bees, in honeybees, and in both!**
 - meets regularly, holds field days and outdoor demonstrations throughout the year.
 - invites speakers to share their knowledge, expertise and passion.
 - will prepare lists of plants and trees in our local area to attract pollinators to our gardens.
 - supports those who want to manage small numbers of bees on their properties.
 - embraces a collective wisdom of enthusiasts and members of the community alike.
 - expresses the specific areas of the value of all bees in regards to the health of our environment.
 - advises on issues and topics that will make a difference!
 - recognises the value of mutual support gained from the membership of a group of people with common interests.
- By participating in the activities of these groups, members benefit in their own lives, and contribute to their community.*



The Vision Statement of Valley Bees is :

- **to preserve and provide further habitat for all bees.**
This is achieved by providing suitable nesting habitat - both natural and managed.
- **to protect all bees from pests, diseases and environmental deprivation.**
- **to provide services for pollination.**
- **to harvest excess stores for human consumption.**

We recommend you visit the following :

- www.mrccc.org.au (go to "links" for free Valley Bees downloads)
- Aussie Bee (Anne and Les Dollin) www.aussiebee.com.au
- ANBees Forum (Yahoo Groups)
- QBA (Q'ld Beekeeper Assoc) www.qbabees.org.au
- Kin Kin Native Bees (Chris Fuller) www.nativebees.com.au
- Sugarbag (Tim Heard) www.sugarbag.net
- Bob The Beeman (Robert Luttrell) www.bobthebeeman.com.au
- Crop Pollination (Mark Grosskopf) www.croppollination.com.au
- Steve's Bees (Steve Maginnity) www.stevesnativebees.com.au
- www.amazingbees.com.au
- www.naturalbeekeeping.org.au
- www.buzzaboutbees.net
- www.honeybee.com.au
- www.queenofthesun.com

*Try Google Images : "Bee Nesting Blocks"
"Bee City" and "Bee Condominium"*

Valley Bees

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