



# AUSTRALIAN PERMACULTURE

GROW . BUILD . EAT . THRIVE . NURTURE . DESIGN



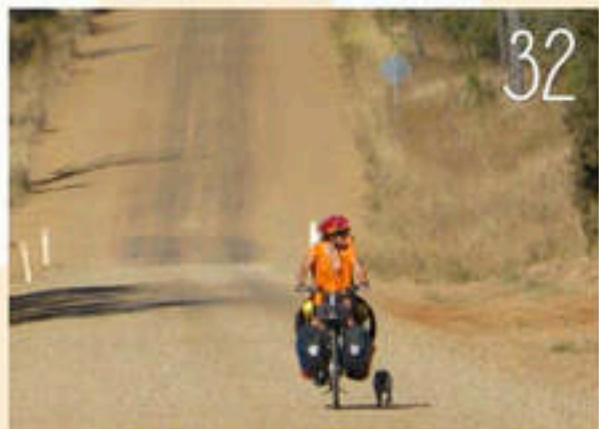
GUIDE TO BEEHIVES . BROTH . PERMACULTURE TRAVEL . MENDING  
DESIGN PROCESS . EDIBLE PERENNIALS . LIFE WITH BEES . 18-DAY HOT COMPOST



# CONTENTS

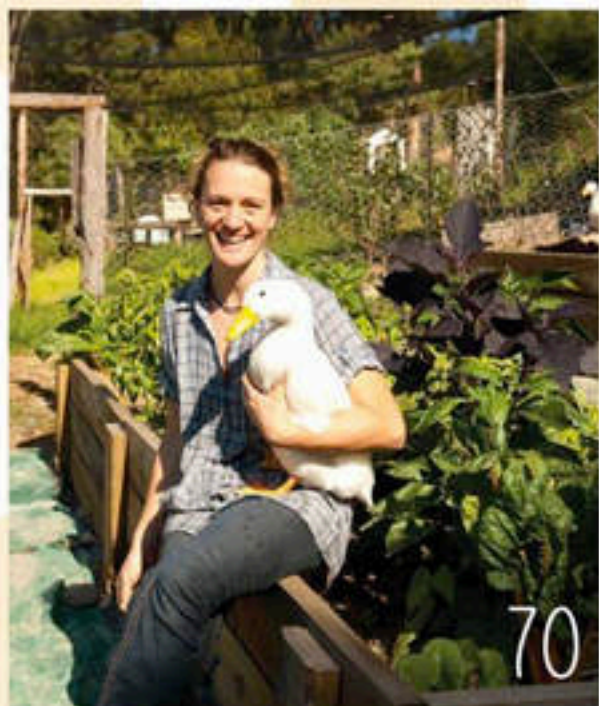
## REGULAR

- 6. PERMACULTURE AROUND THE WORLD by Morag Gamble
- 8. PIP PICKS
- 10. NOTICEBOARD
- 11. PERMACULTURE'S NEXT BIG STEP by Ben Habib
- 12. PERMACULTURE PLANT: COMFREY by Beck Lowe
- 13. RARE BREEDS: CAYUGA DUCK by Tabitha Bilaniwskyj-Zorins
- 14. EAT YOUR WEEDS: DANDELION by Patrick Jones
- 15. SAVE YOUR SEEDS: LETTUCE by Liz Worth
- 89. COURSE PROVIDERS
- 92. COURSE DIRECTORY
- 95. REAL ESTATE
- 96. BOOK REVIEWS



## FEATURES

- 17. LIFE WITH BEES by Simon Mulvaney, Julie Armstrong and Robyn Rosenfeldt
- 22. NATIVE BEES IN THE PERMACULTURE GARDEN by Megan Halcroft
- 26. A LOOK INSIDE THE HIVE: A GUIDE TO CHOOSING THE BEST HONEYBEE HIVE by Adrian Iodice
- 32. ARTIST AS FAMILY: THE ART OF PERMACULTURE TRAVEL by Patrick Jones and Meg Uffran
- 36. PERMACULTURE TIMOR LESTE AND A TROPICAL PERMACULTURE GUIDEBOOK by Sarah Davis and Lachlan McKenzie





## GROW

38. SAVE OUR SOILS by Geoff Lawton  
42. MERRI BEE ORGANIC FARMACY by Ross Mars  
44. PERENNIAL ABUNDANCE: TEN EDIBLE PERENNIALS by Morag Gamble

## BUILD

47. ATAMAI VILLAGE: A RESILIENT COMMUNITY by Rafael Joudry  
52. EARTHBAG BUILDING: HOW TO BUILD AN EARTHBAG STRUCTURE by Ella McHenry

## EAT

54. TOWARDS A PERMACULTURE DIET by Ian Lillington and Marita Zeh  
59. EMMA LUPIN: TROPICAL FOOD AMBASSADOR by Holl Thomas

## THRIVE

62. THE LOST ART OF MENDING by Annie Werner  
66. JEFF NUGENT by Andrea Chapman and Georgina Warden  
68. CREATE A CO-OP: OWN WHERE YOU WORK by Emma Chessell



## NURTURE

70. WHY PERMACULTURE IS GOOD FOR YOUR HEALTH by Angelo Eliades  
75. INTRODUCING PERMACULTURE TO CHILDREN by Lauren Carter

## DESIGN

78. PERMACULTURE DESIGN PROCESS by Hannah Maloney  
82. AUSTRALIAN NATIVES IN A FOOD FOREST GARDEN by Dan Harris-Pascal

## COURSE GUIDE

85. A COMPLETE GUIDE TO PERMACULTURE COURSES by Beck Lowe





# PERMACULTURE AROUND THE WORLD

Words by Morag Gamble. Photos courtesy of projects.

## BIJA VIDYAPEETH (SCHOOL OF THE SEED) INDIA

Bija Vidyapeeth is Dr Vandana Shiva's Earth University in the Himalayan foothills. Dr Shiva is an eco-feminist, physicist, activist for the rights of the earth and farmers in India, and permaculture supporter.

People go to Bija Vidyapeeth to learn from nature, from organic farmers and from visionary thinkers like Dr Shiva and Satish Kumar, about how to become farmers of the future, activists for the planet and savers of seed.

The centre is located on the Navdanya Biodiversity Conservation Farm, a sanctuary for birds, insects and soil microorganisms – which has saved more than 1500 varieties of seeds and trees. The farm has created an environment where students are able to: explore deeply the key issues around organic farming, food sovereignty and seed sovereignty; and gain practical skills to support changing practices in how we interact with seed, soil and society.

Bija Vidyapeeth's website states that the learning centre: 'draws inspiration from Rabindranath Tagore, who created Shanti Niketan, a university based on living in and learning from nature', and is associated with Schumacher College in England. It is part of a growing network of independent centres for positive change. Bija Vidyapeeth runs a series of programs, internships, courses, festivals and events throughout the year. It is also possible to visit as a volunteer.

See: [www.navdanya.org/earth-university](http://www.navdanya.org/earth-university).

Vandana Shiva. (photo by Morag Gamble)



## GREEN SCHOOL VILLAGE, BULGARIA

Green School Village offers programs in permaculture, sustainable community, natural building and personal development. It provides the opportunity for young people from around Europe to get involved in exchange programs, informal education and research projects with a focus on creating positive, alternative models for the future.

The Green School Village project has restored a traditional 19th century house, and opened it as an education centre in the Eastern Rhodope Mountains, near Bulgaria's

boundaries with Greece and Turkey. The centre provides opportunities for learning in a natural environment, and learning how to live sustainably. It is also: developing an investment project for the reconstruction of the former school in the local village; and working on the development of integrated eco-centres and demonstration sites in Bulgaria, to promote alternative models of sustainable development as a solution to the ecological and financial crisis.

Green School Village is a non-profit organisation, established for public benefit, and driven by an interdisciplinary

team with varied educational and professional backgrounds – including architects, urbanists, lawyers, marketing and cultural studies experts. It welcomes people to get involved.

See: [www.greenschoolvillage.org/?lang=en](http://www.greenschoolvillage.org/?lang=en)



## SOLITUDE FARM, INDIA

Solitude Farm is the centre for permaculture and natural farming at Auroville – an emerging international township of 2400 people in southern India, near Puducherry. Auroville has been researching sustainable living and the future cultural, environmental, social and spiritual needs of humankind since 1968.

The two and a half hectare farm was started in 1996 by a group of young Aurovillians who had the vision of creating a self-sustainable farming community. They were inspired by permaculture and the ideas of Masanobu Fukuoka. The farm grows indigenous millets and rice, oilseeds, grams and pulses, and a diversity of vegetables and fruit.

This community, with sustainable farming at its core, embraces music and the arts and runs an organic restaurant: up to ninety per cent of the food served is produced on the farm, and harvested daily. The restaurant also serves food from other Aurovillian farms; surplus produce goes to Auroville shops and the central solar kitchen – the community dining hall which serves 1000 meals each lunchtime.

Solitude Farm is home to six permanent residents and a healthy population of volunteers who are welcomed to experience life in the community. It also offers internships and workshops.

See: [www.aurovillepermaculture.com](http://www.aurovillepermaculture.com)



## PROJECT BONA FIDE OMETEPE ISLAND, NICARAGUA

Project Bona Fide is an internationally recognised ten and a half hectare permaculture demonstration and education farm situated on the stunning volcanic Ometepe Island on Lake Nicaragua. Its focus is support for community self-reliance and regenerative living.

The project researches and develops agro-ecological systems, and cultivates a diversity of resilient food plants to support greater food security in Nicaragua. It demonstrates permaculture strategies, off-grid living, natural building, and the use of biochar and appropriate technology. It includes a seedbank, extensive nursery, bamboo plantings, forestry plot, diverse

orchard, medicinal gardens, terraced vegetable gardens, composting toilets, buildings using local materials, renewable energy systems and water harvesting.

Beyond the farm, Project Bona Fide supports a community seed exchange program, reforestation projects and a children's nutritional kitchen. It is about to launch an initiative to grow and produce natural medicines for the island's free integrative health clinic. The farm offers educational programs and accepts volunteers.

See: [www.projectbonafide.com](http://www.projectbonafide.com)







NATIVE BEES HAVE A SYMBIOTIC RELATIONSHIP WITH A PERMACULTURE GARDEN

Marcelo Piment





# NATIVE BEES IN THE PERMACULTURE GARDEN

Words and photos by Megan Halcroft

Bees are under threat worldwide. As we urbanise our environments we remove bees' natural habitat – we create flowerless landscapes when we substitute concrete and lawn for flowering trees and shrubs. And agricultural practices, such as monoculture, remove the variety of floral resources bees need for good health. Add to these the increasing use of pesticides in crop management and domestic landscapes, and the future for bees looks bleak.

Mention bees and people invariably think of honey bees. Humans have had an important relationship with honey bees for millennia, managing them for honey and pollination services. The social European honey bee, *Apis mellifera*, can be found in most parts of the world, and was introduced into Australia in 1822; however, this species is only one of 20 000 species of bees worldwide. Australia is home to almost 2000 species of native bees, and most of them are very important plant pollinators.

We can support native bee health and populations by improving our understanding of bee behaviour, and how that drives biodiversity. And understanding the importance of bees is about understanding pollination, which facilitates plant sexual reproduction, and the bees' role in it: biodiversity relies on mixing in the gene pool.

## FLOWERING PLANTS AND BEES COEVOLVED

Around 100 million years ago, flowering plants (angiosperms) began to evolve. During this time, some wasps began to collect pollen as a protein source to

rear their offspring (brood) instead of feeding them other insects; a complex coevolutionary system developed. Plants are immobile therefore unable to move about to find a mate, and this is where pollination vectors such as insects play an important role.

Plants have evolved ways of attracting pollinators to their flowers by enhancing the sugar concentration in their nectar, producing attractive scents and colours, and providing nectar guides to help insects find the food source. This, in turn, helps the plant to reproduce.

Pollination is the transfer of pollen from the anther (male flower structure) to the stigma (female flower structure). The stigmatic surface is highly nourishing and stimulates pollen germination. As the pollen tube grows, it carries the male gamete towards the female gamete, within the ovule. Gamete union is called fertilisation, which leads to seed set and results in the production of a plant hormone that stimulates fruit tissue development. So, good pollination produces good fruit quality and yield. Seed produced through good pollination has superior germination qualities.

## SOLITARY BEES

Of the 2000 Australian bee species fewer than fifteen are highly social and colony-forming. Most species are solitary and do not make honey, but they are very important pollinators. Female bees are experts at collecting and transporting pollen and nectar back to their nests, to rear brood.

Most bees are covered with branched, electrostatic hairs, to which pollen grains are attracted. Females have specially

adapted structures for transporting pollen, called scopa. Some species have stiff bristles under the abdomen where dry pollen grains are packed, while others – such as blue banded and teddy bear bees – have scopa on the outside of the hind leg, or on the inside of the hind legs and the abdomen. One of the most important aspects of these scopal hairs is that they carry millions of dry pollen grains. These are available for transfer from one flower to another as female bees move over the flowers.

Solitary bees live their lives independent of other bees in various nesting substrates. Once a female has mated, she finds a safe nesting place to rear her brood. She forages for floral resources, returns to the nest, unpacks the pollen from her scopa and regurgitates swallowed nectar. She combines these resources into 'bee bread', lays an egg on top, seals the brood cell and leaves the egg to develop alone. This process is repeated many times, until she dies. As she collects her precious cargo of pollen and nectar she performs pollination services.

## NESTING BEHAVIOUR

### Ground dwelling bees

Seventy per cent of bees nest in the ground and can dig burrows from five to fifty centimetres deep. Side branches are formed off the main burrow, and brood cells are created at the end of these branches. The number of brood cells can range from one to dozens, all created by a single female. Some species live in 'aggregations', where dozens to hundreds of individuals nest close to each other. Ground dwelling bees produce a water-repellent secretion which is painted onto the internal surfaces of the brood cell to protect developing brood. These secretions also help to 'mark' nest entrances, enabling individuals to find their home among the



# PERENNIAL ABUNDANCE

## TEN EDIBLE PERENNIALS

Words and photos by Morag Gamble

Edible perennials are at the heart of a successful permaculture garden. These plants live for several years, are abundant, and bring diversity and resilience to the garden. They perform many functions in the system, and dramatically increase the harvestable yield.

Not only do perennials provide an ongoing supply of food, fibre and medicine for the gardener, they also provide structure to the garden, mulch, in-garden windbreaks or shade, habitat for beneficial insects, hides for birds and frogs, pollen for bees, and organic matter for the soil.

Perennials are easy to grow and harvest. Well-chosen perennials need little maintenance to be healthy and come back year after year. Their root systems access water and nutrients deep in the soil, making them typically more hardy and self-reliant than annuals. They can withstand difficult conditions and are great for challenging corners of the garden.

There are thousands of edible perennials to choose from. Here are ten easy ones to start with. Keep adding diversity.



### TURMERIC (*Curcuma longa*)



Turmeric has been used in India for over 2500 years. Well known as the yellow colour in curries, it is actually a medicinal powerhouse with a wide range of benefits. Eat some every day. Fresh is best – in juices, curries, grated in salad, yellow rice ... It is a pretty member of the ginger family, producing abundant rhizomes that are ready about nine months after planting.

### YACON (*Smallanthus sonchifolius*)



Also known as Peruvian ground apple, yacon is a superb addition to a food forest or perennial vegetable garden. It grows vigorously to two metres even in poor soils, and the ground heaves with the abundance of tubers forming underground in autumn. The crunchy sweet tubers can be eaten raw – in salads, juiced – or cooked.

### ALOE VERA (*Aloe vera barbadensis*)



Aloe vera, a perennial succulent, has incredible medicinal benefits and has been used therapeutically for over 5000 years. It is excellent for cooling burns and sunburn, and soothing bites and chapped skin. It's a fabulous digestive aid and detox plant that can be added to salads and smoothies. It survives in low water use gardens, but can get sunburnt, and it is resistant to most pests. Plant it in easy reach for emergencies.

### QUEENSLAND ARROWROOT (*Canna edulis*)



Arrowroot is an ancient Inca food, and an extremely useful perennial: it's easy to grow and prolific; its edible rhizomes and young shoots provide food year-round; the leaves can be used as mulch, providing abundant organic matter; and placed well, the fast growing stems can provide an in-garden windbreak or summer shade. The edible purple-skinned rhizomes are best harvested before the shoots become too big.



# WELL-CHOSEN PERENNIALS NEED LITTLE MAINTENANCE TO BE HEALTHY AND COME BACK YEAR AFTER YEAR



COMFREY (*Symphytum officinale*)



Comfrey is indispensable in a permaculture garden – an excellent soil conditioner, dynamic accumulator, mulch, compost activator, liquid manure ingredient, nutrient trap, weed barrier, animal and bee forage. It is also a great topical healing herb.

DAYLILY (*Hemerocallis species*)



For half the year, daylilies add bright colour to the garden with very little care. Daylilies are considered a delicacy by wild-food gatherers as many parts are edible – the young shoots, unopened flower buds and little tubers.

KANG KONG (*Ipomoea aquatica*)



Fast growing tender shoots and leafy greens are harvestable all year. A great tasting green with high iron, vitamins and minerals – for salads and stirfries. Easy to grow in a little pond or broccoli box. Excellent for limited space gardening and as a fodder.

TULSI, HOLY BASIL (*Ocimum sanctum*)



A sacred healing herb from India that helps reduce stress, strengthen immune systems, promote longevity, increase endurance, fight infections, relieve congestion and headaches, and improve digestion. Also a rich source of vitamins and minerals. In a permaculture garden its constant flowering attracts pollinators and other beneficial insects, and it provides protection for small birds that help with pest management.

SOCIETY GARLIC (*Tulbaghia violacea*)



Society garlic provides greens and flavour all year round and is very drought hardy. It makes an excellent edge – dense clumps of upright leaves can hold back mulch and help to keep weeds out. Both the leaves and mauve flowers are edible, and make a great addition to salads, dressings, omelettes, stir-fries, soups and sauces.

BRAZILIAN SPINACH (*Alternanthera sissoo*)



This edible groundcover is a leafy green which can be used raw or cooked and has a great texture. It forms an attractive mound of decorative shiny leaves that is productive all year round – guaranteeing fresh greens in your garden. As a herbaceous border it requires almost no attention and has few pests.

*Morag Gamble of SEED International and the Ethos Foundation ([ethosfoundation.org](http://ethosfoundation.org)) is a passionate permaculture teacher, designer and activist who gives away over 10 000 perennial cuttings a year from her award-winning garden at Crystal Waters.*