

CHAPTER 1 HOW TO GROW TROPICAL PLANTS

This book is about how to grow plants commonly cultivated in the tropics and subtropics. Many of the plants listed here can also be grown successfully in mild temperate climates as indoor plants, greenhouse plants, or in protected warmer parts of a garden.

In writing this book, I have tried to give you value for money by covering more plant varieties than most other books of a similar size, and by providing general guidelines which should enable you to avoid most of the major problems that confront gardeners in the tropics and subtropics.

GETTING TO KNOW PLANTS

The bulk of this book deals with different genera of cultivated plants suitable to at least some parts of the tropics. The information for each of these groups is arranged under four headings:

Appearance

The characteristics that are usually representative of the Genus.

Establishment

How and where to start the plant growing in the garden.

Culture

The most important things which you need to know about keeping the plant growing and healthy.

Cultivars

Some of the more important differences between selected species, hybrids and/or varieties from the Genus, which are cultivated in tropical and subtropical areas.

WHAT DO WE MEAN BY TROPICAL OR SUBTROPICAL?

For the purposes of this book, a tropical plant is one that will grow successfully between the Tropic of Cancer and the Tropic of Capricorn. Tropical climates are found in south-east Asia, much of India, northern Australia, central America, the Caribbean, the northern parts of South America, many of the Pacific islands and perhaps the central half of the African continent. Tropical areas in general have the highest average temperature levels, the longest frost-free growing seasons, and the greatest amount of light (intensity and duration) compared to other regions on the planet.

Subtropical generally refers to the regions between about 23° and 30° south and north of the equator. These regions generally have lower average temperatures, shorter frost-

free growing seasons, and less light overall than tropical regions but without the cold winters of the temperate zone. Subtropical climates are found in Australia (e.g. south-east Queensland), Africa (e.g. northern parts of South Africa), the USA (e.g. parts of Florida, Louisiana, Southern California, Texas), and so forth.

TROPICAL GARDENS

Tropical gardens can vary from dry and desert-like to coastal, or dense, lush and leafy environments resembling the dynamic workings of a rainforest. Many different garden effects are possible using tropical plants. You can also, on a small scale, transform a garden into a microclimate using tropical plants that are not normally found in your locality.

TYPES OF CLIMATES

It is important to understand that there are variations in climate within tropical and subtropical regions, and that not all tropical plants like the same conditions. These are just some of the different climates which tropical plants come from:

Seasonal or Constant

Many tropical climates have two distinct seasons - a wet season (monsoons) with heavy rains and high humidity, and a dry season when there is little rain. Some parts of the tropics are much less seasonal with temperature and rainfall conditions remaining similar throughout the year (e.g. Honolulu, and some other parts of Hawaii).

Mountain

Mountains can be high and cold in some parts of the tropics. There are even snow-covered mountains in tropical New Guinea. Plants which grow on tropical mountains can be quite different to plants that grow in tropical lowlands.

Savannahs (Grasslands)

Savannahs are tropical or subtropical open grasslands that are bordered either by rainforest or swamps - or mixtures of both. They are often prone to greater variations in temperature than coastal or rainforest environments. They can also be very humid and damp environments due to high moisture levels and open sunny conditions. Broad-leaved groundcovers with bright flowers are very much at home in this environment.

Arid

Some tropical areas experience extremes when it comes to moisture availability. For instance, arid zones are usually very dry with poor soils such as clay pans, sands or gravels, and are subject to occasional downpours that can result in flooding. Therefore, the plants that thrive in this type of environment are either very hardy or have very specialised survival strategies to meet such conditions. Arid environments can be much colder at night and hotter during the day than other parts of the tropics or subtropics.

Rainforest

The rainforest is one of the most dynamic environments that exists and can support an abundance of species that often cannot be found elsewhere. Conditions throughout a rainforest are constantly changing as the forest undergoes a competitive aging process that sees many species unable to survive. Thus, those that do remain do so as a result of highly specialised ecological refinements.

Coastal

Coastal regions can be a mixture of all those previously mentioned environments with the added complications of salt-laden sea spray, periods of strong winds, nutrient-deficient soils, and, at times, encroaching sand dunes. Plants that grow in coastal areas need to be quite hardy to survive in such a climate. Being close to water has a buffering effect upon temperature extremes. They do not get as hot or as cold as otherwise similar environments that are further away from water.

WARM CLIMATE GARDENING

Warm climates can create both good and bad conditions for gardeners:

- Plants tend to grow faster, for longer, and produce more lush growth in a tropical climate.
- Pests and diseases also tend to grow larger and faster, but if plants are relatively healthy they should be able to recover faster from these problems in a warm climate.
- Humidity can be higher and more prolonged than in cool climates.
- Winds and storms can be more forceful.
- Soil can dry out faster.
- Foliage can suffer sunburn more readily.

What do these things mean?

- Often, plants need to be grown differently in the tropics than they are in the subtropics (or in temperate climates as an indoor plant).
- Generally, but not always, the same plant grows bigger in the tropics than in the subtropics, and bigger in the subtropics than in temperate climates.
- Drainage is very important in tropical areas to avoid roots from becoming waterlogged in heavy rainfall.
- Plants susceptible to damage from waterlogging might be better planted on mounds or slopes.
- Plants need to be inspected for pests and diseases more often, and action taken immediately. In a cool climate, you might wait for a few days or weeks to see whether insect infestations develop into a serious problem, but in the tropics they can develop from a minor to a serious problem overnight.

Note: These are generalisations only!



Warm climate gardening

SOILS AND FERTILISERS

Different plants like different types of soils:

Some plants will only grow well in acidic soils and others only in alkaline soils. You can tell whether a soil is acidic or alkaline by testing it with a pH test kit or probe. Organic material such as mulch or manure will make a soil more acidic (rainforests often have acidic soils). Lime, shell grit or coral will make a soil more alkaline (alkaline soils are often found on coral islands or beach gardens containing lots of shell grit). Where plants mentioned in the plant descriptions of this book have specific requirements for acidic or alkaline conditions, it will be mentioned under cultural details for that plant variety.

Many tropical plants need good drainage. Without it, the roots tend to rot very easily and rapidly. In general they prefer well-drained soils on slopes, sandy soil, or well-structured (i.e. friable) soils.

Heavy rains in tropical areas will leach nutrients from the soil faster than in most temperate climates.

High temperatures and humidity often cause fertilisers to 'dump' their nutrients within a very short time. As such, so-called 'slow-release' fertilisers may actually release their nutrients very quickly.

IMPROVING SOILS

Before deciding how, or even whether, to improve a soil you need to know if the soil is good, poor, or in need of improvement.

Drainage can be tested easily by observing the way in which water moves through soil. Place a sample of the soil in a pot and water, watching how quickly or slowly the water passes through. Keep in mind that this is a simple test. When soil is disturbed by digging, its characteristics may change. However, this test will give you a general picture of your soil's drainage capacity. Periodic sampling of the soil will enable you to understand its drainage characteristics (e.g. is a lot of water being retained, does water drain away quickly, etc?).

Soil nutrition is, to some extent, indicated by the vigour of plants growing in a particular soil. Nutrition can be easily improved by the addition of fertilisers and, over the long-term, by the addition of organic matter.

A well-structured soil usually has a crumbly nature with plenty of pore space (voids) between the small crumbs. These types of soils are generally easily cultivated, have good drainage, and good aeration (oxygen is needed by plant roots). Anything that destroys this crumbly structure such as over-cultivation, regular trampling, or vehicular traffic should be avoided.

Soil pH, which is a measure of how acid or alkaline a soil is, can be easily measured using a simple colorimetric test kit available from many nurseries and garden centres.

Ways To Improve Soils Include:

- 1 Adding sand to clay soils to improve drainage - this is only practicable on a small scale (e.g. garden beds) as a lot of sand would be required to have a reasonable effect, and it would also need to be well mixed.
- 2 Adding clay to sandy soils to improve their ability to hold water - much less clay is required to improve the water holding ability of sand than when adding sand to help improve drainage in clay. Thorough mixing is also important in this case.
- 3 Adding organic matter to any soil - (except those rare ones already high in organic matter) will help improve soil structure, and hence drainage. It will also improve soil fertility, soil moisture holding capacity, and will provide a buffer against sudden chemical or temperature changes in the soil.
- 4 Adding soil ameliorants - lime can be added to help improve structure in clay soils and/or to raise pH levels in acidic soils. Gypsum can be added to help improve structure in clay soils, without affecting pH significantly, or to help improve saline-sodic soils by displacing sodium ions from soil particles so that they can be leached out of the soil.
- 5 Using acidifying fertilisers - (e.g. ammonium sulphate, ammonium phosphate) will help lower soil pH as well as provide valuable nutrients. Repeated applications of organic matter may also have an acidifying effect over time. On a small scale, sulphur dust can be used to lower soil pH, but this is quite expensive.
- 6 Mulching - will help protect the soil from erosion and compaction, control weeds, and help protect plant roots from temperature extremes. Organic mulches will add valuable organic matter to the soil as they decompose.

WATER MANAGEMENT

Generally speaking, you should water plants well when they are growing and reduce watering when growth slows or the plants become dormant. Excess water may result in the roots rotting which is a particular problem with 'true' tropical plants when they are grown in cooler climates, even under cover.

The heat of a tropical or subtropical climate will cause water to evaporate quickly from the surface of the soil, so frequent light water applications may achieve very little. As such, irrigation methods must be designed and used which get the deeper layers of the soil wet. This can be done by:

- Watering slowly for a long period so that the water soaks into the soil (e.g. by using a drip irrigation system).
- Drilling holes beside plants (e.g. with a narrow auger) whilst being careful to minimise any root damage, and inserting a pipe into the hole to stop it collapsing. Water can then be poured into the pipe so that it enters the ground at a deeper level rather than near the surface.
- Adding soil ameliorants such as liquid soil wetting agents. This aids in water conservation. These products allow soils to hold additional water so that less frequent irrigations are required.
- Applying frequent light applications of water directly to the foliage by such methods as overhead sprinklers or misting systems (using nozzles or sprinklers that release small sized water droplets). This is important where high levels of humidity are required to maintain healthy plant foliage.



Japanese style water garden

LIGHT

Light requirements will vary considerably from one tropical plant species to the next. Those that grow naturally in open sunny conditions, such as in a savannah or in the upper canopy of rainforests, generally require plenty of light. By comparison, the large numbers of plants that live beneath the protective upper canopy of rainforests generally do best in filtered sunlight or partial shade. Many of these plants have large, broad leaves to maximise the amount of light they receive and are very decorative. It is from this group of plants that many of the plants grown indoors in cooler climates are derived.

When deciding how much light your plants require, the best indication is to find out their normal growing conditions in the wild. If you find that when you grow certain plants they become tall and spindly, it is likely they require more light. If you find they become a bit sunburnt or their leaf tips are show signs of scorching, then you may need to provide some sun protection.



Upper canopy of rainforests protects plants from harsh sunlight

PLANTING

The first step in planting a garden is to choose the right plants. This can be a difficult task, even with expert advice. There are so many choices and so it often comes down to personal preference.

To avoid creating problems, consider the following:

- Do not place plants that have invasive root systems near buildings, paved areas, water features, drains, or septic tanks (e.g. poplars, eucalypts, and figs).

- Don't use plants that have the potential to become weeds. This includes plants that seed prolifically, those that are prone to sucker, or those that are rampant creepers (e.g. wandering Jew, lantana, Russian vine, or even jasmine).
- Consider how big each plant is likely to grow - you should allow sufficient space for future growth. Avoid planting large trees in places where they will eventually create problems (e.g. shade out lawns or other plants, damage buildings).
- Don't use trees that are likely to drop branches (e.g. many eucalypts).
- Choose plants which are likely to be trouble-free (e.g. those that will withstand local storms, pests and diseases, or poor soils).
- Select plants suited to the tropics or subtropics. Many people become disheartened when a beloved plant dies when all too often it was a plant that had little chance surviving in the climate to begin with.

TAKE A SIMPLE APPROACH TO PLANTING

The best way to approach planting is often the simplest:

- Keep plants together in compatible groups - for instance keep foliage plants together, herbs together, orchids together and so on. Alternatively, keep plants together that require similar amounts of watering, shade, and so forth.
- Let the fittest survive.
- Mass plant areas (i.e. place several of the one variety together) to form hedges or eye-catching displays.
- Be prepared to get rid of plants which don't work (e.g. they don't look good or don't grow well) - there's no harm in being ruthless.
- Use reliable plants that your neighbours or other people in your area are already growing successfully, unless you wish to experiment. If so, then you should research the requirements of your plants well or be prepared to lose a few along the way.

■ PLANT ESTABLISHMENT METHODS

The hardest part of growing plants is getting them through the first year. After that, they are usually quite well established and can tolerate harsher conditions with little ill-effect. Watch for the following when plants are young or newly planted:

Drying out - because the roots are not yet deep into the natural soil where reserves of water can be drawn on hot days.

- Attack by insects or animals eating the foliage.
- Attack by insects (e.g. grubs) and animals eating the roots.
- Transplant shock - where the plant may be damaged, particularly its roots, during the planting stage or immediately afterwards due to poor environmental conditions (heavy winds, rain).

Note: Never plant during the hottest time of the day.

When establishing plants in a garden, it is best to nurture them through the establishment phase. This might involve providing protection (e.g. windbreak) and support (e.g. staking), and then gradually reducing this degree of support until that plant is mature enough to survive by itself.

WAYS TO HELP PLANTS GET ESTABLISHED

1) Trickle and Drip Irrigation

Trickle and drip irrigation systems are a simple, cost-effective means of irrigation for many gardens. Such systems provide a reliable source of moisture to your plants. This helps both plant establishment and subsequent growth.

Advantages:

- Constant or timed supply of water as desired.
- Reasonably priced and easy to install.
- Parts are often easy to replace or repair.
- Water use is greatly reduced.
- Water can be supplied to the ground and not to foliage so there are fewer disease problems (e.g. mildews).

Disadvantages:

Blocked nozzles can be a problem due to residues or debris (e.g. soil) that might build up.

- Nozzles and drippers need to be checked to ensure they are still pointing in the desired direction.
- Sometimes moisture on the foliage is desirable.
- Depositing water in one or two spots may not encourage root development in all directions, making the plant less stable.

2) Mulches

Mulches assist in plant establishment and subsequent plant growth by:

- Reducing competition to your plants by reducing weed growth.
- Conserving moisture in the root zone of plants.
- In the case of organic mulches, providing nutrients and humus to the soil as they decompose thereby aiding plant nutrition and contributing to improved soil structure.
- Acting as a buffer to sudden changes in soil temperature that may damage plant roots.
- Providing a layer of insulation between the soil and the hot air above, helping conserve water and helping keep the plants roots cooler. (This method of keeping roots cool can sometimes allow you to grow some plants in the tropics which would otherwise be difficult in such climates).
- Reducing erosion and compaction of top soil.

Note: Mulches can be composed of inorganic materials (e.g. rocks, gravel, synthetics, etc) or organic materials (e.g. newspaper, manures, compost, leaf litter, straw, sawdust etc).

Mulches mainly come in two forms:

1. Mat mulches - flat sheets or layers of materials such as plastic, newspaper, carpet underlay, weed mats, etc.
2. Bulk mulches - quantities of loose material such as sawdust, bark, leaf litter, grass cuttings, etc. (Note: these bullets should read 1 & 2 but the ACS list automatically adds them to the previous list in this chapter)

Bulk mulches are easy to put in position, but they can also be easy to dislodge. Weed growth penetrates bulk mulches more readily than mat types. Bulk mulches tend to be cheaper or more readily available than mat mulches. Some mat types prevent good water penetration (e.g. plastic, paper and cardboard). Mat-type mulches need to be secured down (i.e. pegged) to prevent them from lifting. The type of mulch you use will depend on factors such as cost, availability, ease of transport, and the situation in which it is to be used.

Mulches should be applied whilst planting, or soon afterwards. Before mulching, kill or remove any undesirable existing vegetation. This can be carried out by cultivation, hand weeding, or by using chemical weedkillers. Mulches should be thick enough to provide a good cover of the underlying surface but not so thick that they will smother your plants. Bulk mulches should be at least 5-7cm thick. If weeds are a problem, then between 10 and 15cm thick would be better. Aim to keep the mulch clear of the plant stems or trunks particularly if using organic types of mulch which can scorch the stems as they decompose and produce heat.



Rock mulch

Problems with Mulches

Mulches that consist of wood or bark products (e.g. sawdust, pine bark) will draw nitrogen from the soil unless they are well composted before use. The addition of nitrogen fertilisers will overcome this problem.

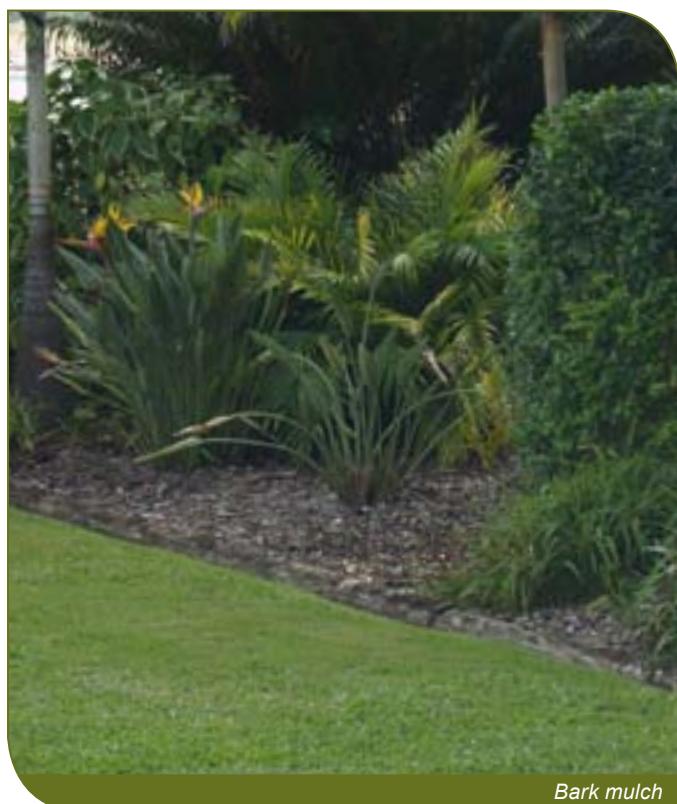
Some mulch materials, particularly those with fine particles, can pack tightly together creating a barrier that repels water and consequently reduces the amount of water available to the plant roots. Using a mixture of mulch materials, or composting the material before use, will reduce the likelihood of such problems occurring.

The bark and sawdust of some trees such as *Pinus* sp. and *Eucalyptus* sp. can contain materials that are toxic to other plants. Be careful if using fresh material derived from these trees or any unknown source.

Some mulch materials are very light and will easily blow away or become dislodged. Mix such materials with heavier materials to reduce the likelihood of this occurring.

Slits in mat-type mulches for plantings should be as small as possible and slit edges need to be overlapped to reduce the likelihood of weeds becoming established around the base of the plants.

Some mulch products may encourage termites, cockroaches, or other vermin.



3) Tree Guards

Tree guards in the tropics are used for three main reasons:

- 1 As protection against differing climatic conditions such as strong winds.

- 2 As protection against grazing animals such as rabbits, sheep, cattle, etc.
- 3 As a barrier to prevent damage by machinery, for example mowers. (Note: these bullets should read 1, 2 & 3 but the ACS list automatically adds them to the previous list in this chapter)

There are different types of tree guards as follows:

Plastic Tubes

The most durable types are UV stabilised. These should last for several years. In many cases, plant growth is significantly enhanced as the tubes create a warm, moist micro-climate. Protection from frost, wind, and rabbits is excellent. It requires 3-4 stakes to keep the tube upright. Plastic bags, shopping bags or old fertilizer bags can also be used as an alternative, although these are not as long-lasting or effective.

Plastic Mesh

These are durable guards which are available in both flexible and rigid forms. They require pegs or stakes for support. They don't create a protected, humid environment like plastic tubes.

Plastic Pipe

Flexible plastic pipe, 50-100mm diameter x 500mm length, can be placed around the stems of young frost-sensitive plants (e.g. fruit trees). These should be removed after the danger of frost has passed otherwise fungal problems may occur because the pipe tends to keep the stem damp.

Wire Mesh

Chicken wire tied to stakes, or stapled to 3-4 pegs, provides a barrier against grazing animals.

Hessian

Hessian bags or cloth need to be tied around 3 stakes. They provide good wind and sun protection although not in the long-term.

Tyres

Old car tyres placed around seedlings can be an effective and cheap barrier against rabbits and hares.

Milk Cartons

These are useful for marking the location of seedlings and providing limited protection against vermin, frost, etc.

COMMON PROBLEMS

The following are some of the most common problems encountered by the home gardener in the tropics and subtropics.

- Plants growing too fast or too tall - check carefully before purchasing plants. Some subtropical species become invasive when grown in tropical conditions. Some

temperate species, if capable of growing in the tropics, may also become weed-like and invasive.

- Excessive weed growth - mulch to control weeds, apply in thick measure for good control. Overuse or misuse of chemicals in a garden can be worse than no chemical control at all, so research your options.
- Poor plant growth - if plants are doing poorly in a certain area of the garden but quite well everywhere else, look at the past history of that area. It's possible that chemical or nutrient imbalances may have occurred by design or mistake. The site may have a slightly different soil type or be prone to flooding, etc.
- Pests and diseases - beware of importing pests and diseases into your garden from outside. Bringing in soil or sickly plants should be avoided if possible.
- Poor planning - you need to plan a garden if it is to be successful. This will involve considerations of where to put various species, what species to use, what will be required to care for them, and so on.
- Incorrect watering - frequent light watering in summer will cause roots of large trees to grow towards, or develop at, the soil surface. This can lead to damaged paths, buildings, or other constructions and may result in poor drought-tolerance of the plant. Overwatering can damage plant health, soil structure, nutrient availability, and cause yet other problems such as fruit splitting, etc.
- Not observing safety with plants - don't plant large trees too close to power lines or buildings. The maintenance of these trees in the future could become very high, and they may eventually pose serious safety problems. Don't choose plants that are known to cause allergies or which may be poisonous - particularly if children will visit your garden.
- Reduced longevity - the higher growth rate in the tropics seems to wear the plants out more quickly and as such many plants have a shorter life-span in the tropics.
- Not enough fertiliser - the fast growth rates of plants means that require additional watering and fertilising to keep them healthy compared to similar plants grown in temperate situations.

CONTAINER GROWING & GARDENING

Pot plants and container gardening can be a great way to add a new dimension to your garden. Consider the following points:

Plants grown in containers can be moved around to provide different effects thereby creating a constantly changing, dynamic garden.

- Some plants look good at certain times of the year, but not at others. When grown in containers, such plants can be shown in a prominent position when they are at their best and then hidden behind other pots when they don't look so good.
- There may be cases where you want to grow a plant that will not tolerate your garden soil, but the growing media in your pot will overcome this.

■ Vigorous plants can be controlled to some extent by containerising them.

■ Many tropical plants look wonderful in pots when brought indoors for special events, particularly when in flower (e.g. heliconias).

Points to look out for when growing plants in containers in the tropics:

- Potting media tends to break down more quickly in tropical areas than in temperate climates. This is because most potting mixes have a high organic matter content. As a result, re-potting will need to be more frequent.
- Climatic conditions (e.g. heat, day length) as well as vigorous growth and quick drainage characteristics of potting media, mean that very regular watering and fertilising is required during active growth seasons.
- Do not use saucers under pots as this may lead to rootrots and increased mosquito populations (many human diseases are spread by mosquitoes).
- Do not add earthworms to the pots, nor allow other insects or animals to live in the potting mix.



Large pots containing plants

When You Go Away

In the wetter months, you may find that placing your containerised plants in a sheltered position is necessary. In drier months, you may be advised to do one of the following:

Sit the pot in a trough, bath or other container with water (do not immerse more than the bottom one third of the soil).

Install a trickle irrigation system with drippers to each pot (place this on a timer mechanism so it switches on each day for a period).