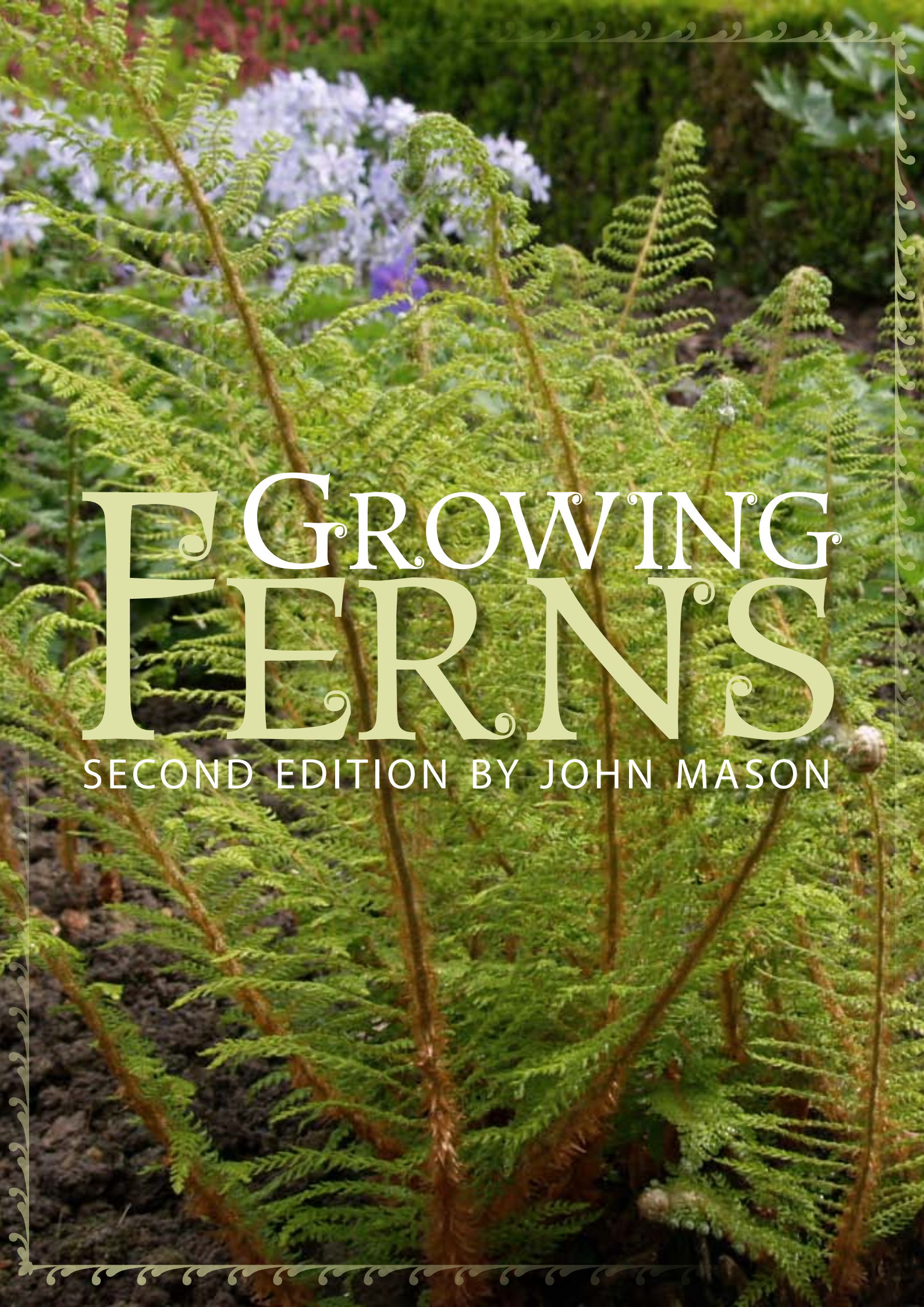

Growing Ferns

SECOND EDITION BY JOHN MASON

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CREDITS

Written by
John Mason Dip.Hort.Sc. FIOH, FAIH, FPLA

Photos
John and Leonie Mason

Editorial Assistants
Adriana Fraser
Gavin Cole

Published by
ACS Distance Education

P.O. Box 2092, Nerang MDC, Queensland, Australia, 4211
admin@acs.edu.au
www.acsbookshop.com

P O Box 4171, Stourbridge, DY8 2WZ, United Kingdom
admin@acsedu.co.uk
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The information in this book is derived from a broad cross section of resources (research, reference materials and personal experience) from the authors and editorial assistants in the academic department of ACS Distance Education. It is, to the best of our knowledge, composed as an accurate representation of what is accepted and appropriate information about the subject, at the time of publication.

The authors fully recognise that knowledge is continually changing, and awareness in all areas of study is constantly evolving. As such, we encourage the reader to recognise that nothing they read should ever be considered to be set in stone. They should always strive to broaden their perspective and deepen their understanding of a subject, and before acting upon any information or advice, should always seek to confirm the currency of that information, and the appropriateness to the situation in which they find themselves.

As such, the publisher and author do not accept any liability for actions taken by the reader based upon their reading of this book.

FORWARD

Scented plants can be either a delight or a curse. For many people, there is nothing more pleasing than a garden filled with fragrance, but for others who suffer allergies, certain plants can make them physically ill; sometimes very seriously.

Some scented plants (eg. Lavender and Eucalyptus) are unlikely to be a problem to any of your neighbours or friends. Others including Jasmine, Gardenia and Citrus; while a delight to many people, are common problems for others.

These problems should not stop you from growing scented plants, but they should cause you to choose what you grow carefully and appropriately for the place that you live. If your garden is on a large property, away from other people, your choices might not be as important, provided they do not affect your own family.

If however, you live on a small property, surrounded by neighbours, frequented by passers by, it may be a responsible thing to avoid problem plants, particularly those with very strong scents.

CHAPTER 1 DISCOVERING FERNS

There is a very special quality about ferns which conjures up images of coolness, calmness, peacefulness. They are graceful and lush, and have the potential to make a major contribution towards a relaxed and inviting feeling in any garden.

Ferns are popular as both garden and indoor plants. If you choose carefully the varieties you wish to grow there is no reason why ferns cannot become some of our most successful and attractive plants.

Ferns don't have flowers like most other garden plants and in many ways they are more like mosses than flowering plants. This lack of colourful flowers is more than made up for by the enormous variety to be found in plant size, foliage texture and colour.

Lypolepis rugulosa

FERNS AS INDOOR PLANTS

Many indoor plants suffer through a lack of light. Ferns are often the solution to this situation. Most (but not all) tolerate very poorly lit situations. They are generally ideal as indoor plants, both creating the aesthetic effect required and being able to deal with the indoor environment for a reasonable period of time without deteriorating. Remember though, neither ferns nor any other plants occur naturally inside buildings. Any indoor plant will sooner or later need a spell outside to rejuvenate itself.

Woodwardia unigemmata

FERNS AS A SOLUTION FOR PROBLEM AREAS

Heavily shaded places and wet soggy sites in the garden are often problem areas which seem to defy solution. Everything you plant there seems to die. In both cases, ferns are often an excellent solution, most species being tolerant to both excessive moisture and shade. Just check on the varieties you want to use first though, as there are some which do not like these conditions.

There are varieties of ferns to be found in all corners of the world, from the Arctic to the tropics, and on every continent except Antarctica. Even though we think of ferns as growing in wet places, this is not always so. Some species in fact thrive in dry climates. There are ferns which grow in coastal areas, exposed to severe wind and salt spray. There are varieties which are drought resistant and others which tolerate extremes of heat or cold.

Generally, those varieties which occur in harsher environments have developed special mechanisms for dealing with extreme conditions. Some are deciduous plants which die back to the roots when the weather becomes severe, then regrow when the season turns more favourable. Other ferns have small, thick, hardy fronds to help them resist cold or wind. Drought-resistant ferns frequently have a covering of scales or hairs which reduce the rate of water loss from the fronds. Many ferns survive dry conditions by growing their roots among and under rocks or logs where the soil remains cool and moist even on the hottest days.

Ferns are one of the oldest groups of plants in existence. Fossil records show ferns existed over 400 million years ago. It is estimated that today there are around 11, 500 species spread over 240 genera, making ferns one of the largest groups of plants in the world.

GETTING TO KNOW YOUR FERNS

The classification and identification of ferns is full of contradictions. Many of the experts around the world have conflicting viewpoints on what different ferns should be called. The information on ferns in this book, as in any other, will have some experts who agree with it and others who do not.

Unlike many other fern books this book does not set out to give you a tool for identifying ferns. It aims to give you a broad understanding of each of the groups (or genera) which ferns belong to, and in this way to provide a very practical, easy-to-refer-to guide on how to grow most of the ferns you are likely to come across.

Ferns can be grouped under five broad headings - terrestrial filmy ferns, terrestrial tree ferns, rock ferns, epiphytic ferns and water ferns.

Terrestrial Filmy Ferns

This group have fronds one cell thick. They occur only in wet or misty areas.

This group includes: Apteropteris, Cephalomanes, Crepidomanes, Gonocormus, Hymenophyllum, Macroglena, Microgonium, Hymenophyllum, Macroglena, Microgonium, Microtrichomanes, Pleuromanes, Polyphlebium, Reediella, Selenodesmium, Spaerocionium, and Trichomanes.

- In the Apteropteris group the fern fronds have a dense covering of stellate hairs.
- The Cephalomanes group can be identified by a tufted rhizome and pinnate fronds with a harsh texture.
- The Crepidomanes group have narrow segments with false veins, their rhizome is filiform.
- The Gonocormus group have very narrow segmented with venation.
- With Hymenophyllum the tips of the indusium are proportionately longer than the base.

Terrestrial Tree Ferns

The most obvious feature of these ferns is their woody upright trunk or caudex. At least part of the trunk is made up of masses of aerial roots which if covered by soil tend to grow out to produce a root system.

The trunk is topped by a crown of long and divided fronds. There are two main groups, Cyathea and Dicksonia, although Cyathea are frequently broken up into several other genera. In Cyathea the caudex is erect and stout or slender, and the young developing fronds are covered with scales on all surfaces.

The Dicksonia groups are regarded as more primitive since no scales are produced, but the young fronds are covered with stiff fine hairs. The stipes are smooth and lack the rough protuberances usually found on Cyatheas.

Rock Ferns

This group contains the genera Bommeria, Cheilanthes, Goniophlebium, and Pleurosorus.

Members of the Bommeria have distinct hairy fronds.

Members of the Cheilanthes group are found almost worldwide throughout the tropics and subtropics. Members of this group are able to withstand dry conditions, having small, finely divided fronds and protective coverings of hairs and scales. Some are able to shrivel but recover when moisture becomes available.

Cheilanthes lindheimeri

The rock ferns in the genus Goniophlebium have long weeping Fronds: rock ferns in the genus Pleurosorus are small, have short rhizomes and are clad in clathrate scales.

Epiphytic ferns

Epiphytic ferns grow in the air, attached to another plant, but are not parasitic on that plant. Some epiphytes will also grow in dead or composting organic material on the ground.

Though there are exceptions, epiphytic ferns tend to be spreading and have only dropping fronds. Genera in this group include Aglaomorpha, Antrophyum, Campyloneurum, Cephalomanes, Davallodes, Gonophlebium, Humata, Lecanopteris, Macroglena, Microsorum, Microtrichomanes, Niphidium, Platycerium, Pleuromanes, Polypodium, Polyphlebium, Reediella, Selleguea and Trichomanes.

- Members of the group Aglaomorpha have thick scaly rhizomes.
- Members of the Antrophytum have tufted rhizomes.
- Campyloneurum may be identified by entire strap-like fronds.
- Cephalomanes by harsh-textured fronds and tufted rhizomes.
- Davallodes are known as hare's foot ferns because they have scaly rhizomes.
- Gonophlebium have creeping rhizomes.
- Humata have leathery fronds.
- Lecanopteris may be recognised by hollow fleshy rhizomes.
- Macroglena members can be identified by very fine bristle like ultimate segments.
- Microsorum members have simple strap- like fronds.
- Microtrichomanes have either simple or forked brownish fronds.
- Niphidium members can be identified as medium sized ferns with simple fronds.
- Members of the Platycerium group have drooping, easily spreading fronds.
- The Pleuromanes may be identified by broad bipinnate fronds, which may be grey, glaucous or white. These fronds are covered with waxy powder.
- The Polypodium group have short creeping rhizomes.
- Members of the Reediella are small with upright fronds with one or two rows of marginal cells thickened to form a border.
- Members of the Selleguea have creeping rhizomes.
- Members of the Trichomanes have thick rhizomes and erect fronds or long stipes bearing no veins.

Water Ferns

There are two distinct groups of water ferns, the Salviniales (e.g. Azolla) and the Marsileales (e.g. Pilularia and Marsilea).

The fronds of Pilularia are very small and similar in appearance to a grass; Marsilea has fronds similar to a four leaf clover. The Salviniales have tiny overlapping leaves borne alternately on branching stems. All water ferns grow in shallow water and, where they are periodically flooded, may grow as annuals.

CHAPTER 2 HOW TO GROW FERNS

To get the most from your ferns you must provide the best possible conditions for their growth. As there are thousands of different types of ferns from many different types of environments, be wary of generalising too much about what conditions are best for your ferns. While most ferns may well prefer wet shaded conditions there are many exceptions, with some ferns being adapted to quite arid conditions, open sunny positions, or even exposure to salty ocean spray.

To grow such species in your garden or home generally requires that you provide similar conditions to those that they normally experience in their natural habitats. It is important to remember that these plants have adapted or evolved to grow in specific conditions over thousands and even millions of years and are often very precise in the conditions they require, although some may prove quite adaptable.

Matteuccia struthiopteris (Aspidaceae)

GROWING CONDITIONS

To fully understand the conditions for growth that a fern requires, you should first carefully read the information label generally supplied when you purchase a fern. If a label is not supplied you may need to obtain your information directly from the person who supplied the plant. Other useful sources are your local fern society or club and the extensive plant directory provided in this book.

While remembering the previous warning about overgeneralising on growing conditions of ferns, there are a number of general rules that can be applied to the majority of ferns commonly cultivated.

Situation

Most ferns do best in a situation where they are protected from strong winds, extremes of temperature, and excessive dryness.

Ferns growing in containers are usually best placed on a shaded veranda or patio or underneath some large trees where they will only receive filtered sunlight.

Ferns growing in the ground are normally best with moist soil in semi-shade or full shade. If there is any likelihood of the ground drying out, heavy organic mulch is recommended.

Greenhouses may be needed to provide shade protection for growing ferns, particularly in warmer climates. Shade houses need to have shade cloth (or something else) on the sides, as well as on the roof, to break strong winds.

Adequate ventilation is generally important to minimise fungal infections. This can be achieved by not placing plants too close together, and by ensuring that there is some air movement, particularly through greenhouses. Too much air movement, however, can also be a problem.

SOILS AND POTTING MIXES

Ferns are only as good as the soil they are growing in. If you want quality plants you must use quality soils and potting mixes. Ferns are generally adaptable as far as soil type goes, but a soil that is well-drained, well-aerated, has a reasonable pH, has high organic matter and good moisture-holding capacity is preferred by most. For container growing of ferns, or even in specially prepared beds, potting mixes can provide an excellent substitute for the fern's natural soil type.

There are basically two types of potting mixes - those which contain soil and those that don't. The essential consideration for a potting mix is that it should drain freely. To test this, fill a pot with your soil mix and dip it into a bucket of water. If the water moves away quickly, then it is acceptable - if it does not, then either the soil requires more sand (or similar drainage material) in it, or possibly the pot just doesn't have sufficient drainage holes in it.

Soil-less potting mixes have the advantage of being cleaner than those which contain soil, i.e. soil can contain weed seeds, insects, fungi and other harmful pathogens. A soil-less mix has much less chance of having these problems. Soil-less mixes are more likely not to contain the necessary nutrients found in soil mixes - this means that well-balanced fertilisers usually need to be added to them.

Components of a typical soil-less mix might include fine shredded (and weathered) pine bark, coarse washed sand, scoria, vermiculite, perlite, rice hulls and old sawdust.

Soil mixes usually contains a mixture of different types of soils, and perhaps some soil-less components.

Components

The characteristic of a particular potting mix is a blend of the various components which make up that mix.

The components which are used in higher proportions have the greatest impact on the mix.

You can modify the characteristics of your mixes to suit individual plant requirements by adding more of a component which has the desired qualities. For example, if you want a mix to hold more water then you should add more peat moss because that holds water well. If you want it to drain better, add more sand because that improves drainage.

1. Peat Moss

Peat moss, though expensive, is one of the best components for fern potting mixes. The pH of peat is general around 4.5 (i.e. very acidic), which is too low for many ferns. This level may be raised by the addition of other components, though lime may also need to be added if growing varieties which require alkaline conditions.

Peat has both excellent drainage and water-holding characteristics, but problems can arise if it becomes too dry, as dry peat moss is difficult to rewet. Furthermore, peat is a non-renewable resource and the world's supplies are dwindling. Alternatives such as coir, made from coconut husks, are widely available. Coir has excellent water-holding properties and its usage means less damage to the environment from extracting peat.

2. Sphagnum Moss

Sphagnum moss is commonly used in lining hanging baskets and behind epiphytes mounted onto slabs.
It has excellent moisture-holding characteristics and has the ability to inhibit the development of fungal diseases. Its main disadvantage is its high cost.

3. Perlite

This lightweight material is derived from a volcanic rock and looks like small, hard, spongy white balls. It holds water very well and drains well. It is sterile and has a pH of around 7-7.5. Perlite can be purchased from large nurseries and hydroponic suppliers.

4. Vermiculite

This is another mineral material (derived from mica), which appears as spongy flakes or granules. It has the ability to absorb and hold large quantities of water, making it a useful additive to mixes, but can be a problem if used in too high a proportion. Never use more than 30% vermiculite in a mix.

5. Coarse Sand

This is the same as propagating or aquarium sand, sold in some nurseries, in aquarium shops and some soil supply yards. It is sometimes added to mixes which are predominantly peat, perlite or vermiculite to improve drainage. It can be useful in providing weight to a light mix - where plant foliage is large and soil is light, pots will fall over very easily. (In a commercial nursery though there are plastic supports available that attach to each pot and lock pots together in a grid to stop pots blowing or falling over so easily and keep them upright).

6. Pine Bark

Pine bark is an inexpensive substitute for peat moss. It has many of the same properties as peat, provided it is

graded properly and well composted before used. If shortcuts are taken during composting, toxic chemicals remaining in the bark in extreme cases will kill many ferns. The bark should be shredded and graded to a uniform particle size. If there is too much variation in particle size, there will be considerable variation throughout the potting mix and water-holding characteristics may vary greatly from one side to the other of the same pot.

7. Leaf Mould

Leaf litter or partially decomposed leaves are excellent for mulching ferns, digging into soil or even adding to potting mixes. Leaves from most deciduous trees (particularly oaks) are very good. Eucalypt and conifer leaves contain toxic chemicals which must be leached away during a period of composting before they are used.

8. Compost

Compost is made by heaping organic material (sometimes including soil) into piles and decomposing the material before it is used. When compost decomposes the pH will initially drop to a low level and then return close to where it started from as the process nears completion. The composting process can take anything from 2 to 12 months or more according to whether or not the conditions are appropriate for the decomposing bacteria to work. To speed up the rate of compost, you need the following conditions:

(a) The level of moisture in the heap should always remain the same as a squeezed sponge (never wetter or drier - around 40% to 60% moisture).

(b) The temperature in the heap should be around 50 - 55ºC; this is best achieved by keeping the heap between 1 and 2 metres in length, width and height. The bacteria will generate that level of temperature in that sized heap.

(c) The level of oxygen in the heap should be high. To achieve this the heap must be turned every few weeks.

(d) The organic materials used must be balanced. Too high a level of nitrogen (found in manures, for example) or too low a level of nitrogen (as in sawdust or paper), will slow the rate of composting considerably.

9. Other Additives

A range of other things can be used in fern potting mixes e.g. rice hulls, pumice, composted sawdust, sandy loam.

Potting Mixes Suitable For Growing Ferns

1. A general soil-less mix:

6 parts peat moss

2 parts vermiculite

1 part coarse sand

2. A pine bark / soil mix:

7 parts 3mm hammer-milled composted pine bark

2 parts sterilised sandy loam

1 part peat moss

APPENDIX

DISTANCE LEARNING AND ONLINE COURSES

The author and associates of this book have developed a large variety of distance learning courses, online, on CD or by correspondence, which are available through various colleges that are part of the ACS Global Partners Network - visit: **www.acs.edu.au/about-us/affiliates.aspx** These courses include:

- Growing Ferns
- Australian Native Ferns
- Home Garden Expert Course
- Landscape Construction
- Landscaping I – Introduction to Design
- Landscaping II
- Landscaping III – Landscaping Styles
- Plant Selection and Establishment
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- Cottage Garden Design
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These include short courses and qualifications at various levels. Most shorter courses take about 2 hours per week for 12 months to complete.

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These are all internationally accredited courses (through the International Accreditation & Recognition Council), Most are also recognised as satisfying requirements for admission as a member of the Australian Institute of Horticulture. Lots of specialisations are offered (eg. in such things as Landscaping, Permaculture, Hydroponics, Crops or Turf). The school also conducts many other courses such as Royal Horticultural Society Certificates, Plant Propagation, Cut Flowers, Herbs, Cacti & Succulents, Ferns, and various other courses.

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These courses cover a wide range of disciplines, including Business, Management, Marketing, I.T., Biological Sciences, Health, Fitness, Nutrition, Psychology, Counseling, Writing, Photography, Hospitality, Tourism, Education, Construction, Horticulture, Agriculture, Environmental Management and more.

VIDEOS

The author of this book has also produced and presented a range of gardening videos, including: “Australian Native Plants”, “Identifying Plants”, “Designing a Garden”, “Identifying Herbs” and “Plant Propagation”. These are available by mail order, or on loan through some libraries.

E BOOKS BY JOHN MASON AND ACS STAFF INCLUDE:

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PRINTED BOOKS BY JOHN MASON

John Mason has been writing books since the 1970's and has over 40 titles published, some as printed books, others as ebooks. Some (print) titles are out of print, and now only available as second hand books or e books. If you have difficulty finding any of Mr Mason's titles, you can enquire by email to **admin@acs.edu.au**

Print Books by John Mason include:

Fun and Fitness Trails, Victorian Dept. of Sport and Recreation, 1978
Starting a Nursery or Herb Farm, Night Owl, 1983 (revised 1994)
The Environment of Play, Leisure Press, New York, 1982
Herb Review, self published, 1987
Landscaping with Herbs, self published, 1988
The Native Plant Expert, self published, 1989
Let's Grow Gardens, self published, 1990
Growing Ferns, Kangaroo Press, 1990
Commercial Hydroponics, Kangaroo Press, 1990, 2007
Growing Vegetables, Kangaroo Press, 1991
Growing Herbs, Kangaroo Press, 1993
Nursery Management, Kangaroo Press, April 1994
Tropical Gardening, Bay Books, October 1994
Yates Guide to Pests & Diseases, Angus & Robertson, February 1995
Growing Pelargoniums & Geraniums Hyland House 1996
Farm Management Kangaroo Press 1996
Growing Australian Natives Kangaroo Press 1997
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Sustainable Farming Simon & Schuster (Kangaroo Press) Spring 1997
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