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# NEWSLETTER

VOLUME 16, Number 9, October 1994

# FERN SOCIETY OF VICTORIA Inc.

POSTAL ADDRESS: P.O. Box 45, Heidelberg West, Victoria, 3081.

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Subscriptions fall due on 1st July each year.

#### PRESIDENT'S MESSAGE:

I am writing the message this month from my camp site next to O'Reilly's in the Lamington National Park. Despite the drought the main part of the rainforest is still lush. I noted about 45 species in my walk today and I hope to add to that tomorrow with a walk to some of the higher parts.

But to return to more mundane items - but still important. Firstly, I welcome Bev Gouge into the Secretary's position. Bev is a relatively new member of the Society and a brand-new Committee member. She has volunteered to take on the job, I am sure she will do it well and I thank her on behalf of the Society.

Visit to Chris and Lorraine Goudey: This will be held on Sunday, 27th November, starting at 11.30 a.m. Bring your own picnic lunch. Some BBQs will be provided, as will tea and coffee. It would be wise to bring your own seating.

This will be our final event for the year and will therefore serve as our Christmas breakup. There will be the usual Christmas raffles, including the Christmas cake, courtesy of Mavis Potter, and a special fern, courtesy of Chris Goudey. There will also be several other prizes of garden goodies.

Those who have been to Chris and Lorraine's nursery before will need no urging; those who haven't should take the opportunity to see the best collection in Australia. To find their place, take the Lara turn-off from the Geelong Highway (Princes Freeway), head south along Avalon Road towards the Bay, turn right into Cozens Lane, and Chris and Lorraine's place is the first on the left (Melway Ref. 222 J9).

Barry White Acting President

# COMING EVENTS

## SUNDAY, 16th OCTOBER

Excursion to the Andrew's Fern Nursery / Castle Creek Orchids at Arcadia and to the ferneries of Lyn Gresham and Dot Miniken at Shepparton. See August and September Newsletters for details.

# SUNDAY, 27th NOVEMBER

The final event of the year will be a visit to Chris and Lorraine Goudey's nursery which will include our usual end of year Christmas function. See President's Message opposite for details.

# SEPTEMBER GENERAL MEETING

The speaker scheduled for this meeting was Neil Pike of Fern World Nursery, speaking on "Tree Ferns: Harvesting, Export and Marketing", but a delay in his return flight from London forced a last minute change of plans. Chris Goudey stepped into the breech and showed slides of his trips to New Guinea and New Caledonia. These had been shown at meetings some time ago and the repeat screening was no less enjoyable.

Terry Turney, who chaired the meeting in the absence on holiday of Barry White, thanked Chris for an excellent presentation and for undertaking his role at such short notice. Members present endorsed his thanks enthusiastically.

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#### SEPTEMBER FERN COMPETITION

The category for the fern competition for this month was announced at the August meeting as a fern native to Victoria. However, with the late arrival of the September Newsletter to confirm this, Diana Mayne was the only member to back her memory and bring in a fern. Hence, Diana was the winner of both the competition and the exhibitors' draw with her *Histiopteris incisa*.

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# ANNUAL FINANCIAL STATEMENTS

The Annual Financial Statements for the Society were presented by our Treasurer Don Fuller at the Annual General Meeting on 18th August. Publication is being held over until the November Newsletter because of space limitations.

The start of Spring seems an appropriate time for an article about fertilizers. The one following is copied from *LAIFS Fern Journal*, 20(3): 44 (Apr. 1993) - a publication of the Los Angeles International Fern Society Inc. Another talk on fertilizers by Don Delano to the San Diego Fern Society was reproduced in the *Fern Society of Victoria Inc. Newsletter* 15(7): 77 (Aug. 1993).

# FERNS AND FERTILIZERS

An Overview of Fern Feeding and Some Recent Developments in Fertilizing

By Don Delano

Don Delano is now associated with Los Angeles Fairplex where he is in charge of horticultural matters. The Exhibition grounds and buildings are in use all year round, providing many opportunities to increase public knowledge of horticulture. Although the annual county fair is the best known activity, the largest attendance is during the two or three months after the Fair (in late September) is over. Don still teaches two classes at California State Polytechnic University in the evenings. He is greatly concerned with good horticultural practices, as he has always been.

Little, clear plastic bags of white crystals, others with various colored powders or granules, and some bottles in their original boxes - all plant fertilizers or their components - were the subjects of Don Delano's presentation on feeding plants at the November LAIFS meeting.

A lot of what can be said about fertilizers can get very involved very quickly, but Don said his aim was to explain how they help plants grow and how to use them properly without a lot of technical details. The information was intended for those who grow their plants in containers, but often the same ideas and products can be used in the home garden.

Recent horticultural research on plant nutrition has led to two methods of fertilizing potted plants. One is easy and requires little expenditure of time by the gardener, and the other is likely to take much more time and have interesting results. The use of slow release fertilizers means applications of fertilizer globules or pellets to plants at long intervals, such

as every three months. (There is even a product formulation that need be applied only once a year, at the beginning of the growing season.) For the other method, powders, granules, or concentrated liquids are added to water and applied to the plant at frequent intervals, indeed with every watering in many instances.

Both methods aim to provide a fairly constant food source for the plants which is important when most potting media are "soilless." Either slow-release or constant feed with each watering aims to supply plants with the chemical building blocks that they need at a Ph that makes it possible for plant cells to absorb them.

Some kinds of plants such as alocacias, Malay rhododendrons various plants from Madagascar, and maidenhair ferns occur on limestone and need lime, a basic pH. Many others grow on somewhat acidic to acidic soils. This can usually be managed by adding a source of lime (calcium ions) to the potting media which otherwise tends to be acidic.

#### Controlled Release Fertilizers

One granular fertilizer, Turf Supreme, is very easy to use. It is an instant release substance and supplies nutrients to the plant as soon as it becomes wet in the soil. The grower distributes the granules over lawn or puts 1/4 tsp over the top of a 6" potted plant and waters down. There are no liquids, no mixing, no mess, and the product can be used exclusively to give a nice lawn and potted plants. However, the product does have to be applied about every two weeks because it leaches away. If the grower has very many potted plants this effective product may go unused because of the time and

effort required to reapply it.

One way to overcome the last problem is to use slow-release products such as Osmocote. The small balls consist of a water permeable resin membrane containing formaldehyde and other fertilizer compounds. Nutricote is a pelletized slow-release plant fertilizer made with different resin and different ingredients in its formulation. The grower puts the pellets or balls into the mix or on top of the medium. As water seeps through the membrane it releases minute amounts of the fertilizer compounds to the soil. After a while the compound is depleted and bubbles of water are left. The time for this process depends upon the formulation inside the bubbles, which are compounded to last about three months, six months or nine months. Also, there are formulations with different proportions of the basic elements.

Slow release fertilizers are dependent upon bacteria and the soil temperature to be useable by plants. Other organic substances such as Gro-power, blood and bone meal, and horn and hoof meal likewise must be acted upon by soil bacteria to break them down into chemical particles that plants can absorb into their cells. This is rather like a person cutting a huge steak into small pieces in order to be able to eat it. For the soil bacteria to convert the complex organic compounds to simple chemical forms, particularly from one nitrogen form to simpler ones that the roots can latch onto, may take a couple of weeks in summer, but will take six-to-seven weeks in winter. Where temperatures are below freezing, no reaction at all may occur when the ground is frozen. Osmocote works better when the weather is warmer, but at temperatures over 120 degrees F., the resin can melt and burn the plants. It should not be used on cactus plants in the sun in the summer. Nutricote, can withstand temperatures up to 200 degrees F. without "melt-down." The duration for effective usage listed on the labels of slow release materials can vary by a month depending on how

the temperature changes. Slow release products are not effective immediately so it is a good idea to feed a liquid plant food once or twice until the slow-release formulation can take effect. Osmocote and Nútricote are most effective when mixed into the potting soil so the released nutrients are in the root area. The slow release substances should not be added to soil mix that is going to be stored. The fertilizer is released and becomes very concentrated in spots while the mix is stored. Then the concentrated fertilizer will burn tender roots when during transplanting.

Slow release fertilizers are simple to use and cut down on the amount of work that the gardener must do. Because it is so convenient, even the laziest or most time-pressed grower can get the plants fertilized.

#### Constant Feed

Constant feed fertilizers are liquids and powders which can be put into water and applied to the potting soil. They are chemical substances that can be used in the dissolved condition or can be changed by soil bacteria into chemical forms that can be absorbed by the roots to maintain the plant. Generally the directions suggest an amount of the fertilizer to dissolve, say 1/2 teaspoonful to a quart of water. For ferns and young plants which are not heavy fertilizer users, the grower may use the fertilizer at half or one-fourth the recommended dilution.

Many growers simply dissolve some fertilizer and apply it every time they water their plants. Most commercial greenhouses fertilize with almost every watering. At regular intervals, plain water is used to clear the pots of any excess to prevent salt build-up and root burn.

A few plants do not like to be fertilized every time they are watered: orchids, adiantum ferns, and basket ferns such as polypodiums that are trimmed back to the rhizome. These seem to do better when they are not constantly fed. Fertilizer should be withheld until the new fiddleheads appear, and then

resumed on the regular schedule.

#### Plant Nutrients

All plants need nitrogen, phosphorus and potassium in relatively large amounts, and some trace elements in relatively small amounts. The package labels for fertilizers show the percentages of nitrogen, phosphorus, and potassium by a N-P-K formula. A compound might have a formula of 20-20-20 and thus has equal parts of the three basic elements. Other formulas could be 5-10-5 which is high is phosphorus.

The balanced fertilizers with equal number formulas offer a supply of nutrients for the plant to "pick and choose." The plant absorbs what it wants, the rest is wasted, but the plant is generally "happy."

If the formula is unbalanced, the presence of a large amount of one substance will force the plant to absorb more of it and will promote certain sorts of reactions within the plant cells. For instance, abundance of nitrogen causes cells to expand and thus the plant develops a lot of green leaf tissue and holds a lot of water.

An abundance of phosphorus causes cell walls to become thicker, encourages root development and strong stems, and promotes plant stability. It also improves cell organization.

Potassium helps thicken cell walls, promotes resistance to pressures of expansion and contraction, and will aid in cold tolerance. Use of high potassium in October and November (fall) will make the plant more able to withstand temperatures near freezing without damage. Don's rex begonias, for example, fertilized in this way, lost leaves when the temperatures hit freezing but regrew new ones on the good strong rhizomes the next season. A neighbor with a similar planting but without high potassium fertilizing lost the plants to winter cold.

Plants in nature are fertilized by dust and pollen in the air, acid rain, bird and animal droppings, and composting debris. These furnish the three basic elements N-P-K in varying proportions. They also supply very small amounts of other elements: magnesium, iron, chlorine, zinc, silicon, boron, copper, molybdenum, etc.

Plants do not need much of these elements. Houseplants and greenhouse plants in soilless media that are watered with distilled or reverse osmosis water can develop deficiencies if they do not have a supply of these elements. But the amount that the plants need is very tiny. Don said that the mineral rich tap water in the local areas contain sufficient trace elements for most plants to absorb whatever they might need from a single soaking with tap water to last a year. If a grower considers using trace elements as a separate application, great care must be taken to use them according to the label directions as they can actually be quite harmful in large amounts. Toxicity shows as yellow foliage. The formulations can be toxic to the plants, pets, and people as well. Fortunately many fertilizers already have trace elements in them. A quick check on the package label will give the information.

#### Plant Starvation

Many old books say that it is not necessary to fertilize ferns, but the writers and growers did not take into account that the ferns were absorbing nutrients from various sources.

You must not starve ferns. It is important to start fertilizing ferns right away. If the spores do not get nutrients from the time they are sown, the plants never recover, but will be less vigorous all their lives. The same thing is true for bedding plants.

A classic research study involved a greenhouse in which half the newly sown plants were fertilized with 10-30-30 and the other half were given only water for the first seven days. The results proved that plants will grow nice and strong if they are not starved. Plants from both sides had the same number of cells, but the fertilized seedlings and sporelings developed much faster and stronger. The fertilized plants were already transplanted and ready to bloom

in eleven weeks, while their counterparts had not yet attained enough growth to be transplanted. The tests showed that the plant nutrients must be in the soil when the first rupture in the seed or spore occurs.

## Tricks with Fertilizers

Twenty years ago, pansies grown from seed went to market at 25 to 30 weeks of age. Now pansies are ready for the public in 11 weeks. If a grower has to maintain the plants for a 12th week his costs may be greater than his profit and he will lose money on his crop. Competition and cost effective nursery management have caused horticulturists to examine closely what fertilizers do, and how they do it.

Today a typical plant will be watered with high phosphorus and potassium fertilizer solution until the first true leaf shows when it is transplanted. High phosphorus fertilizer is used for about a week and a half. Then the fertilizer is changed to 30-10-10 and the plant begins to leaf out for the next two to three weeks. Again the fertilizer solution is changed to high potassium and phosphorus to further develop roots and stems for two more weeks. Back to the high nitrogen formula and more leaf growth until the plant reaches the sides of the pot. At the very end of the process, a high bloom formula of 6-65-10 (low nitrogen, very high phosphorus, and a moderate amount of potassium) is used to bring the plant into bud. Once buds show, the last couple of waterings are done with balanced fertilizer to "finish off" the plant for market. (Cheap sources may omit this step.) Finishing off stabilizes the plant and it is ready to go to market. The best plant to buy is one with the buds just forming.

When asked how the purchaser should handle these bedding plants, Don said to take them home, plant them in the garden, and fertilize them. "Forcing the growth" does not hurt the plant, but failure to feed them does. They are accustomed to being fertilized. The plants can adapt to lowered feeding levels, but not to no fertilizing at all. The worst mistake a

purchaser can make is to not fertilize for a long period. The plant soon dies.

Don mentioned that fertilizers with formulas such as 8-14-9, 10-15-10, and 6-12-6 are called "hi-bloom" nutrients in the trade. They are very familiar products to the african violet growers who have found this sort of formulation prolongs flowers.

#### Recommendations for Ferns

The same sort of fertilizing tricks can be applied to ferns. Spores should be watered with weak fertilizer solution right from the start. If the grower chooses to use only balanced formulations, the ferns will grow. If tailoring fertilizing usage to the plant development, the ferns should be started with high phosphorus and potassium to develop strong roots and cell structure, then after a period high nitrogen to promote frond growth for a while, and so on. Don also said that the high bloom formulas will promote spore production, if that is a concern to the grower.

Fertilizers with formulas like 30-10-10 will favor growth of new fronds and will be beneficial to treeferns that are ready to leaf out. A good formula to alternate with is one that is 10-30-30 to promote strong stalks and cold resistance. Boston ferns with their many lush fronds love high nitrogen, but also need phosphorus and potassium, so that 20-20-20 is a good alternative to a high nitrogen fertilizer. This is true for the *Nephrolepis* 'Lemon Button' now in the trade.

#### Forms of Nitrogen

Some commercial growers who require large amounts of fertilizers are likely to purchase various chemicals to use in their nursery operations. The home grower should not do this for several reasons. It is not cost effective for the needs of a small greenhouse operation and it is not safe to do so. Fertilizer ingredients are explosive. (Fertilizers become scarce in times of war because the compounds are diverted to munitions uses.) Fertilizer compounds must be stored properly for safety.

Nevertheless it is desirable to know what the ingredients are and how they work to make good decisions for purchasing and using the products on the market.

White crystals of ammonium nitrate NH<sub>4</sub>NO<sub>3</sub> (34-0-0) furnish only nitrogen. The crystals can be broadcast on a lawn and watered in. The nitrogen in the nitrate portion of compound is in a form that can be absorbed into the cells. Its immediate effect is to make the lawn noticeably greener. The nitrogen in the ammonium portion of the chemical must be acted upon by soil bacteria to break it into nitrites and then nitrates which the plant can utilize. This process takes two to four weeks. Altogether the compound is effective for about three to five weeks. Adding more of the compound to the plants may burn the plant tissue - it does not extend the length of time it is effective.

Calcium nitrate Ca(NO<sub>3</sub>)<sub>2</sub> is more expensive to produce and products containing it will cost more. All the nitrogen in it is in the nitrate form which can be absorbed by the cells immediately. This is a neat product for fern growers because it enhances the crisp green color of the ferns. Ammonium can cause a dull, blackish tone to the leaf tissue if it is used exclusively. Also, calcium ions help to stabilize soil and reduce excess salts. Again this chemical has to be used with restraint as too large an amount will cause tissue burn

A compound that has been used extensively in Europe is a double salt of ammonium nitrate and sulfate. This chemical stores well and is an excellent fertilizer. It has the advantage of supplying sulfur which lowers the pH of the potting media. (It is not for maidenhairs and other plants that need a basic medium.)

Ammonium sulfate (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> is another form of nitrogen fertilizer. It consists of ammonium, sulfate, and nitrate to furnish 27% useable nitrate and 30% useable sulfur. It tends to counteract the high pH of California water which is good for many ferns. Lower soil pH allows trace elements to be absorbed by the plant, though a

chelating agent may be needed for iron absorption.

#### Some Points to Remember

- Plants in pots with soilless mixes need fertilizers. Starved plants do not develop strong structures.
- Slow release products should be mixed into the potting mix, wherever possible.
- 3. Liquid constant feed products are applied at weak strength whenever plants are watered.
- 4. The formula N-P-K on the fertilizer package is three numbers which stand for the amount of Nitrogen, Phosphorus, and Potassium in the fertilizer.
- 5. Nitrogen promotes lush blade growth. Phosphorus and potassium promote root development, strong plant structure, and cold resistance.
- 6. The plants take up whatever nutrients they need when "balanced fertilizers" with equal parts nitrogen, phosphorus, and potassium are used.
- 7. When the formula is high in nitrogen, the plant cells are forced into leaf production and photosynthesis. When the phosphorus and potassium levels are high, the plant structure is strengthened and blooming and seed production is promoted.

Both ways of fertilizing plants, slow release formulations and constant feeding water-in products, will give good results. It is up to the grower to evaluate time, money, and personal habits to decide which way is best for his or her own use.

#### A Few Questions

A number of questions from the audience were of special interest.

Q. Are plant stakes any good?

A. Yes, indeed, they are effective. They are convenient, but expensive. If the grower has convenience as a high priority, plant fertilizer stakes are okay to use.

#### Q. What is Magamp?

A. It is a by-product of sewage, and a semi-natural product. It is called a plant additive and not a fertilizer since its formula changes according to the composition of the sludge from which it is obtained.

Q. Are bananas good for staghorn ferns? A. Yes, if you choose to use them. They release their nutrients slowly. High nitrogen will cause larger shield fronds, then high potassium and phosphorus will stiffen them and keep them from being floppy.

Q. How do you use bananas?

A. Mash a banana with a quart of soil mix and pack this mixture into the nest back of the shield fronds. You can use 20-20-20 otherwise, or until the banana decays and starts to furnish some nutrients.

Q. What is foliar feeding and is it good for ferns?

A. Application of a fertilizer solution to the surfaces of the fronds or leaves allows some nutrients to be absorbed directly into the leaf cells. Spraying is a way to get the chelating agents to diffuse into the leaf. The fertilizer must be calcium nitrate. Ammonium ions have to be converted by bacteria in the soil to be of value to the plant.

#### An Interesting Extra

Don summarized a research project that he had been involved with recently.

A new product, made by the same company that makes Oxygen Plus, was tested for its property of improving and promoting growth of plants in difficult soils. Salvias, begonias, pansies, impatiens, marigolds, and maidenhair ferns, were the test subjects, with multiple plants of each kind being tested in a variety of soils and with and without applications of the new product.

All plants were grown in 1-gallon nursery pots. The potting mixtures included a typical clay soil, a good potting mix, clean sand, and a perlite mix. One series of pots had the drainage holes taped closed, and another set were placed in clear plastic containers that were about 1 1/2 inches taller than the pots so that these plants were actually sitting in water over the crowns. Each plant in the test was watered every day with 1/2 gallon of water or solution of the product. Any excess was allowed to flow away. At the end of the test period, all plants in clay that had the product applied were thriving, including the maidenhair ferns. The begonias performed best of all. The new product was effective in promoting growth in clay soils. Soon there will be limited distribution in Los Angeles and Orange counties, and those who have clay soils (common in many areas) have the opportunity to test it in their own gardens. PPB



ANTROPHYUM RETICULASUM (FORST.) KLF.

Further on the theme of fertilisers, the following article from the *Bulletin* of the Australasian Native Orchid Society Victorian Group Inc. 27(4) 9, Oct. 1994, while not particularly relevant to fern culture, may be of interest in your general gardening activities.

#### BLOOD & BONE

Several weeks ago, Burke's Backyard presented a segment on Blood and Bone. John Evans sent away for the Fact Sheet. The following is a summary:

Australians are becoming increasingly concerned about the impact of chemicals on the environment, so more people are turning to organic fertilisers, especially for the vegetable garden. One widely used product is blood and bone, but doubts have been expressed as to the authenticity of this product's labelling.

The producers of Burke's Backyard commissioned a panel of experts (The Australian Government Analytical Laboratories, The Department of Agriculture in New South Wales, and Derryck Klarkowski, a Forensic Biologist, who was able to confirm the presence or absence of blood) to test six widely available brands of blood and bone. Their findings were then sent to a leading soil scientist for review.

The following products were tested:

- 1. Defender Blood & Bone (N)
- 2. Nitrosol Complete Organic Fertiliser (labelled as 'Traditional Blood 'n' Bone') = (O)
- 3. Paton's Blood & Bone = (A)
- 4. Pivot Blood & Bone = (1.)
- Sherringham's Blood & Bone (packaged by Brunnings and also sold as Cole's Country Garden Blood & Bone) = (M)
- 6. Yates Blood & Bone = (S)

When a sample of each product was placed in a petrie dish they looked quite different from each other. Some looked like genuine organic products while others appeared to be artificial mixtures of colours and textures. Some products contained "prills" (rounded pieces) from manufacturing processes not normally associated with blood and bone production.

Derryck Klarkowski carried out the 'O-Tolidine Test' which detects the presence of blood. His results were:

- ❖ Sample S (Yates) contained good blood products and appeared to be predominantly blood and bone.
- Sample L (Pivot) contained good blood products and appeared to be predominantly blood and bone.
- Sample N (Defender) contained good blood products indicating reasonable proportions of blood and bone.
- ❖ Samples A and M (Paton's and Sherringham's) contained blood but also contained additives not consistent with them being predominantly blood and bone.
- ❖ Sample O (Nitrosol) The worst product tested. No blood products detected. It also contained relatively high levels of potassium and chloride which would act as potassium chloride or potash when applied to soil.

❖ The Forensic Biologist, Derryck Klarkowski, is also a farmer. He uses blood and bone on his own property and was surprised to discover that the products tested were not pure blood and bone, and said: "If I wanted to put potash on my fields I can do it far more cheaply by buying those products (instead of) blood and bone."

Simon Leake of the Sydney Environmental Soil Laboratory also tested and analysed the same six products. His findings were:

- Pivot and Yates were superior to the others and were substantially (if not wholly) blood and bone products.
- Paton's was substantially blood and bone, with some inclusions.
- Although labelled as "Traditional Blood 'n' Bone", Nitrosol contained inorganic or chemical fertiliser in the form of potassium chloride and super-phosphate; but no blood and bone at all.
- ❖ Defender contained substantial quantities of blood and bone but the results showed other organic inclusions which could be poultry manure, wool scourings, sewage sludge, feather meal or other animal by-products. Phosphate levels were fortified with, possibly, rock phosphate or super-phosphate.
- Also labelled as blood and bone, Sherringham's only contained a minor proportion of blood and bone and was thought to contain super-phosphate in large amounts. Although uncertain, Sherringham's was also thought to contain wool scourings, dags or possibly sewage sludge. Fertiliser laws vary from state to state, one complication in relation to the blood and bone problem. State regulations for registration as blood and bone are:

NSW - 100% blood and bone NT - no specific standard QLD - no specific standard SA - no specific standard TAS - 90% animal origin VIC - 90% blood and bone

WA - must be wholly of animal origin.

Of the products tested, a number appear to violate these state regulations or consumer or trade practices laws in most, if not all, states. Although the NSW Department of Agriculture has the power to remove these products from the market, it has not yet done so.

There are two products recommended when choosing blood and bone for the home garden - Yates and Pivot. However, Yates does contain rock phosphate which is a natural product. Of the products tested, Pivot Blood and Bone appears to be the best.

NOTE: Six leading blood and bone products were tested. There may be other good products available.

## NEW LIBRARY BOOK

# "FLORA OF CHIAPAS" - PART 2, PTERIDOPHYTES

By Alan Smith and published by the California Academy of Science, 1981, 370 pages.

The author starts off the book with a quote from Kurt Sprengel in 1804: "You have frequently expressed surprise at my great predilection for ferns....'How can a man' you used to exclaim, 'take so lively an interest in a family of plants so deficient in variety, and whose exterior has so little to recommend them.!' ". The author reasons that the comment was based on ignorance.

Chiapas is a state of Mexico and lies at the southernmost end next to Guatemala. It has drier areas, tropical rainforests and mountainous terrain, containing 563 species of fern and 46 fern allies. The author estimates that about 95% of the ferns of the area have been collected.

The author does not provide a key to families but instead has one overall key covering all genera. The uncertainty as to what genera are included within the various families is the reason for this approach. The genera are listed alphabetically throughout the book with keys provided to the individual species.

Excellent line illustrations are given for 106 species, the author giving preference to those not previously illustrated. A description is given of each species plus a brief comment on the habitat and notes on the occurrence elsewhere in Mexico.

Overall the book contains much useful information, e.g. there are 28 species of *Adiantum* described, but the book is more for the person seeking special information rather than the general reader.

Reviewed by Barry White

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# SPECIAL EFFORT WINNERS

September General Meeting

Dick Kissane

Bernadette Thomson

Joan Rowlands

Diana Mayne



"Goodness from the sea"

- \* Contains over 60 elements and minerals
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926 Mountain Highway, Bayswater, Vic. 3153 P.O. Box 302, Bayswater, Vic. 3153. Telephone (03) 720 2200

Opinions expressed in articles in this Newsletter are the personal views of the author and are not necessarily endorsed by the Society, nor does mention of a product constitute its endorsement.

# BUYERS' GUIDE TO NURSERIES

#### VICTORIA:

Andrew's Fern Nursery / Castle Creek Orchids - Retail.

Goulburn Valley Highway, Arcadia, 3613. (20 km south of Shepparton).

Large range of ferns and orchids for beginners and collectors.

Open daily 10 am - 5 pm except Christmas Day. Ph: (058) 26 7285.

Austral Ferns - Wholesale Propagators. Ph: (052) 82 3084. Specialising in supplying retail nurseries with a wide range of hardy ferns: no tubes.

Coach Road Ferns - Wholesale. Monbulk. Ph: 756 6676.

Retail each Saturday and Sunday at the Upper Ferntree Gully Market (railway station car park), Melway Ref. 74 F5. Wide selection of native and other ferns. Fern potting mix also for sale.

Fern Acres Nursery - Retail. Kinglake West, 3757. (On main road, opposite Kinglake West Primary School). Ph: (057) 86 5481. Specialising in Stags, Elks and Bird's-nest Ferns.

Fern Glen - Wholesale and Retail. Visitors welcome. D. & I. Forte, Garfield North, 3814. Ph: (056) 29 2375.

R. & M. Fletcher's Fern Nursery - Retail.

62 Walker Road, Seville, 3139. Ph: (059) 64 4680.

(Look for sign on Warburton Highway, 300m east of Seville shopping centre). Closed Tuesday, except on public holidays.

Kawarren Fernery - Wholesale and Retail. Situated on the Colac - Gellibrand Road, Kawarren (20 km south of Colac). Ph: (052) 35 8444.

The Bush-House Nursery - Wholesale and Retail.

Cobden Road, Naringal (35 km east of Warrnambool). Ph: (055) 66 2331

Ferns - trays to advanced. Visitors welcome.

#### NEW SOUTH WALES:

Jim & Beryl Geekie Fern Nursery - Retail. By appointment. 6 Nelson Street, Thornleigh, 2120. Ph: (02) 484 2684.

Kanerley Fern Exhibition and Nursery - Wholesale and Retail. 204 Hinton Road, Nelsons Plains, via Raymond Terrace, 2324. Ph: (049) 87 2781. Closed Thursdays and Saturdays. Groups of more than 10 must book in advance, please.

Marley's Ferns - Wholesale.

5 Seaview Street, Mt. Kuring-Gai, 2080. Ph: (02) 457 9168.

All Fern Society members welcome. By appointment.

#### QUEENSLAND:

Moran's Highway Nursery - Wholesale and Retail.

Bruce Highway, Woombye (1 km north of Big Pineapple; turn right into Keil Mountain Road). P.O. Box 47, Woombye, 4559. Ph: (074) 42 1613.