Horticulture

in New Zealand

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HORTICULTURE
IN NEW ZEALAND

BULLETIN OF THE ROYAL N.Z. INSTITUTE OF HORTICULTURE

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EDITORIAL

The first important thing for me to do in this Summer Bulletin is to wish you all a very happy New Year.

I must apologise for the Bulletin being so late but we have had delays with getting all the material ready for publication. I'm sure, however, you will enjoy it just the same.

There are a wide variety of articles in this issue so I know you will find something of interest to read.

Annual General Meeting and Conference for 1986: Please read this notice and book now. An incredible amount of work is involved in organising an event such as this so the more people that attend the better it becomes. You will come away having made many new friends as Dunedin is a very friendly place.

I was not going to mention it but, we must start the year off right. So, I hope the vast majority of you are feeling guilty about not yet having sent in some sort of contribution to the Bulletin. Wasn't this one of your New Year resolutions to send something in!! If you are one of those who finds nothing of interest in the Bulletin you have no one to complain to but yourself. So please make an effort to make it a real members' Bulletin.

I hope the weather in your part of New Zealand or the world is what you want.

David Shillito
EDITOR.

BOOK REVIEW

"VEGETABLE SEED PRODUCTION"

by Raymond A.T. George

Published by Longman, 1985

New Zealand Distributor: Longman Paul Ltd
Private Bag
Takapuna
AUCKLAND.

Price: $120.00

Reviewed by Ralph Ballinger

The author Raymond Geaorge states in the preface that he has set out to compile a text book for teaching undergraduate and postgraduate students in the United Kingdom and for those engaged in vegetable seed programmes in temperate and tropical regions of the world. This book does exactly that. The early chapters cover the principles of seed production including the harvesting and storage processes along with quality control.

The second section touches briefly on the production, pollination, isolation distances and harvesting requirements for the individual crops which are grouped under the family classifications.

As a reference book it gathers together from many sources information such as seed yields and 1000 grain weights, seed borne pathogens and the diseases they cause. Much of the information on cultivar characters, botanical classifications and agronomic advice is to be found in most good books on vegetable crop production.

The in-depth practical information on vegetable seed production found in North American work or indeed the advice from the Seed Production Committee of the National Institute of Agricultural Botany, Cambridge, is lacking in this book. However, as a university text book it meets the need. I was disappointed to find that the work of the former director of the N.I.A.B. Mr F.R. Horne, who spear-headed the research of qualitative control of seed and the introduction of Plant Breeders' Rights in Europe has not been acknowledged. Mr Horne was also the first overseas person to speak to the New Zealand seed trade on Plant Breeders' Rights.

The photographs for the most part are disappointing and many do little to bring out any specific point on the technique of vegetable seed production.

The bibliography at the end of each chapter covering the subject material of that particular section will help to make this a very good reference book. These references are very wide, covering every aspect of the subject.

FROM THE SECRETARY

1986 is well underway already and all of our student members who sat examinations in November will have received their results before the end of January. Congratulations to all successful students, particularly those who have now completed R.N.Z.I.H. qualifications. To those who did not pass I would suggest that you do try again this year; R.N.Z.I.H. qualifications are held in high regard and are well worth perservering at even if you did have a set-back this time.

The National Office is in full swing again and a busy year is in store for us. We are at present located in the Agricultural Engineering building at Lincoln College, having moved out of Ivey Hall to make way for renovations. We expect to shift again by June of this year to a wooden building alongside Ag. Engineering and I hope that we will then be in our permanent location.

A new innovation for the Institute in 1986 will be a move to computerisation. The National Exeuctive has approved of the purchase of computing equipment for the handling of all members' record, subscription details, student records, financial records and so on, as well as provision of word processing facilities. As the complexity of our operation grows this move has become essential, and I hope to be able to provide an improved service to all members as a result.

The 1986 Annual General Meeting and Annual Conference will soon be upon us. It is to be held in Dunedin on 17-18 May and will be hosted by the Otago District Council. The venue will be the University of Otago and the organisational arrangements are being spear headed by National Executive member Robin Bagley and O.D.C. Secretary, Robert Scott. I hope a large number of members will attend as I am sure the programme will be the most varied to date, providing "workshops" on a wide range of horticultural topics. The Banks Memorial Lecture will be given by Dr David Given and should be a memorable highlight.

On the Examinations front, revised prescriptions for the N.C.H./N.D.H. programme and the Certificate in Horticultural Practice will come into effect, while examinations for a new qualification, the Certificate in Horticultural Management will be held for the first time this year. Yet another new qualification, the Certificate in Parks Practice (C.P.P.) will also come into effect with tuition being offered by the Technical Correspondence Institute. A pilot scheme of examinations for the Groundmanship option of the C.P.P. will be held in Wellington in 1986 with the formal examinations for second year students commencing in 1987. (Now you know why 1985 was a busy and meeting filled year!).

We are about to start in earnest the task of revising the prescription for the National Diploma in Apiculture. Hopefully the new prescription will allow for cross credits from the National Beekeepers' Association "Certificate in Beekeeping"

currently being taught on a correspondence basis from the Bay of Plenty Community College.

SUBSCRIPTIONS

A reminder to all members who have not yet paid their 1986 subscriptions. These were due on 31 October 1985, but as at 31 December (the end of the Institute's financial year) only 1,048 subscriptions had been received. So nearly 50% of our members are currently in arrears. Your co-operation in forwarding your subscription before the end of February would be appreciated as it is primarily members' subscriptions which allow the national office to function and provide a service to members, and in addition, District Councils are dependant on capitation payments for their financial viability.

Capitation will be paid to District Councils on behalf of all financial members as at 31 March 1986.

1985 ANNUAL JOURNAL

The 1985 Annual Journal is better and brighter than ever before in its sparkling new format. Orders for the Journal were incorporated in the subscription form but a discount was available for those who didn't wish to receive the Journal. If you didn't order a Journal but would now like one, or if you wish to purchase additional copies, these are currently available from my office at $8.00 each.

BULLETIN NO. 38

Do you think this issue of the Bulletin is running late? If the answer is "NO" then that's fine. If the answer is "YES" please don't blame your hardworking Editor, David Shillito, as the fault, if any, lies in this office. You see we chose to handle examination scripts and post out results before typing the Bulletin ..... it's a good thing we are moving towards the computer age here in the Institute engine room .....

I hope to renew acquaintances and meet many more members in Dunedin in May.

Dave Cameron
NATIONAL SECRETARY.

OBITUARY

Lancelot William McCaskill died on 10 August at Christchurch after a short illness. He was 85.

Lance was widely respected by many New Zealanders and was an outstanding Educator, Naturalist, Author and one of New Zealand's greatest conservationists.

He had tremendous love for the New Zealand environment and was dedicated to preserve New Zealand scenic and natural resources and often fought with great tenacity of purpose for this cause. This was evidenced in the strong and successful case he made for the preservation of the Tarns at Arthurs Pass which were threatened by a new and unsympathetic road alignment.

Lance was always active in the preservation of our New Zealand Flora and one of the outstanding cases is the Castle Hill Buttercup; (threatened with extinction) which has now increased from 30 plants to over 400 and the area now a reserve.

In his earlier years Lance taught agriculture and natural science at many primary schools, both in the North and South Islands. He also was lecturer at the Dunedin and Christchurch Teachers' Training College. While at the Christchurch College he was substantially involved in lecturing and the training of Horticultural students who were studying for Institute examinations. He also compiled a comprehensive set of horticultural notes which were of tremendous assistance to N.D.H. students. Lance was an ardent supporter of the Institute and was an inspiring lecturer and generally commanded large audiences.

In 1944 he was appointed lecturer at Lincoln College and subsequently became Associate Professor of Rural Education. The same year he was a recipient of the Bledisloe Cup.

In 1946 he established the first course in soil conservation, the fruits of this far-sightedness are actively seen today.

He was also involved in the establishment of the foundation course in Horticulture at Lincoln College.

Lance was a recipient of the Loder Cup in 1952 and was made an Associate of Honour A.H.R.I.H. of New Zealand in 1954.

In 1961 he was appointed Foundation Director of Tussock Grass-Grassland and Mountain Land Institute and in 1966 was awarded a Fellowhip of Institute of Agricultural Sciences. Lance received the C.B.E. Commander of Most Excellent Order of British Empire in 1969 in recognition of his outstanding services to New Zealand.

The New Zealand Institute of Landscape Architects in 1975 made Lance their first Honorary Fellow.

In 1978 during the Lincoln College Centennial, Lance had conferred on him by the University of Canterbury an Honorary

Doctorate of Science.

In his retirement he has written several books including "Molesworth", "Hold This Land" and others.

He has also written extensively including surveys of Scenic Reserves throughout New Zealand.

In 1984 Lance received from the I.U.C.N. the prestigious Peter Scott Award for Conservation. This high honour was a most fitting award for a lifetime of outstanding dedication to conservation.

In the passing of Lance McCaskill New Zealand has lost a great son, a wonderful friend whose wisdom, vision and inspiration will continue to illuminate the generations which follow.

George Malcolm.

A NATURAL IDENTITY FOR THE PROVINCES?

by Alan Fielding

For a country with such a diverse and rich flora and fauna, it is surprising that New Zealand has not, as yet, given official acceptance to provincial plants and animals.

Looking at nations such as Australia, Canada and the U.S.A., their states or provinces have for some time enjoyed an association with a distinctive native flower or tree, and an animal.

It is true to say that such states are somewhat more autonomous than ours, but that is a poor reason for ignoring such recognition in New Zealand.

A provincial plant and animal could without doubt add to a sense of local identity and also focus attention on some of our rare and endangered species. Surely we can't just leave it at the silver fern and the kiwi - or can we????

Perhaps NOW is the time to act. With the completion of the country mapped into its 84 ecological districts, this might provide the means of identifying suitable plants and animals to represent the various areas and their distinctive ecolgical character.

ROYAL NEW ZEALAND INSTITUTE OF HORTICULTURE ANNUAL GENERAL MEETING AND CONFERENCE

DUNEDIN 16-18 MAY 1986

CONFERENCE THEME - HORTICULTURE, OUR HERITAGE AND FUTURE

VENUE ST MARGARET'S COLLEGE, OTAGO UNIVERSITY

We plan sessions and trips on ------

District Council remits and topics of concern

Notable and Historic Trees

Horticulture Education and Student Affairs

Garden history.

We may arrange 10% Conference Air New Zealand discount

Newmans and Road Services may also offer discounts.

Plan now to join us and take part in this conference

Your are assured of a warm welcome and a pleasant stay in Dunedin.

PACHYSTEGIAS
OR MARLBOROUGH ROCK DAISIES

This summary is based on a talk given by

Dr B.P.J. Molloy
Botany Division
D.S.I.R.
Lincoln

Pachystegias belong to the Compositae or daisy family and are placed in the tribe Astereae along with such well known groups as the asters, celmisias and olearias. Their flowers are clustered in large heads on a common receptacle and there is usually one head per stalk. Each head consists of an outer series of female ray florets, and an inner series of perfect disk florets. The plants are woody perennial shrubs with thick leathery leaves. The underside of the leaves, the flower stalks and receptacle, and young branches are covered in woolly felt which ranges in colour from white to rusty red.

Pachystegias were first brought to the attention of taxonomists when Sir J.D. Hooker of Kew received material collected by Dr Monro in Marlborough. Hooker was immediately struck by its attractiveness and in 1855 he described it as *Olearia insignis* (=striking), though remarking that it did not fit comfortably in *Olearia*. This name was used by subsequent New Zealand taxonomists, and in 1915 Cheeseman described a small flowered/leaved form as *Olearia insignis* var. *minor*. However, Cheeseman was also unhappy about the placement of these plants in *Olearia* and in 1925 he erected the genus *Pachystegia* to include *P. insignis* and its var. *minor*. This position has been upheld by later flora writers.

Recent D.S.I.R. surveys show that *Pachystegias* occur from the Wairau River in Marlborough to the Hurunui River in Canterbury, largely in steep rocky or stony habitats. These surveys also show that more than one species is involved, and hybrids also occur in the wild. Some idea of the broad range of wild plants is given in Audrey Eagle's second book of trees and shrubs.

Since 1978 Botany Division, D.S.I.R., has undertaken a detailed study of this group. This study has two basic objectives. First, to increase our understanding of the botany of the group and second, to explore their horticultural potential. A large field plot is established at the Lincoln Research Centre and the information gained from these plants, some now six years old, is supplemented by field and laboratory work. The taxonomy of the group is seen as a top priority botanical objective, especially if the various entities become more widely used in horticulture. Botany Division through the N.Z. Nurseryman's Association, has also made seed available for regional testing. In addition, a demonstration selection of various entities has been planted in the Christchurch Botanic Gardens. Already, much information has been gathered on the botany of these plants to satisfy both study objectives. Some of this information is now being prepared for publication. However, Botany Division welcome contacts with anyone interested in this group and invite visitors to view and discuss their experimental plot.

THIS AND THAT

by Walter Gibson

CONIFERS AND CANKER

A common sight in the Dunedin area are the *Chamaecyparis lawsoniana* conifers usually "Ellwoodii" that are dead or partially dead.

The ruined foliage usually caused by canker, remains on the plants for a long period and for some reason most owners never seem to prune the affected parts off nor remove the plant. The result is one can tour around most of coastal Otago and view dead and diseased conifers far too frequently. The percentage of "Ellwoodiis" that reach maturity without being effected must be quite low, as a mature, healthy unpruned specimen is quite a novelty.

Fifteen years ago I knew a nurseryman who refused to deal in conifers that were particularly prone to cankers. I'm sure if more nurserymen refused to deal in susceptible stock it would encourage more investigation into treatment and to the propagation of only high health plants.

MODERN BUGS

A few months back I noticed in a garden an artificial plant made from plastic stems and polyester leaves. This plant must have either fallen or been knocked off a window ledge of the five storied building above the garden. As I am not too fussed about plastic plants lying on a garden that is under my care I picked it up and continued my rounds without even losing a step. I took another look at the leaves and noticed two stuck together so I pulled them apart and there between them was the Larva of an insect which remains unidentified as I immediately did what I always do to insects between leaves, I squashed it. I then stopped dead in my tracks. Hell! What had I done, this could be history or at least been a wonderful experiment to pursue. (Perhaps a plastic, probing parasite).

Sure I know that leaves are used more as a protection than an item to obtain nutrients from at that stage of life, but is it perhaps our artificials are becoming too realistic or is it that our insects are finding less natural material to use. Wouldn't it be strange to see florists out the front of their shops spraying their plastic plants with insecticides. The systemics wouldn't be very effective. Well never mind, I have placed the artificial foliage in a shrub that has leafroller and I will watch it with interest and inform the Bulletin of future developments.

UNDERGROWTH

A friend asked if I would identify the plant growth under his house which is on a flat section and has the usual foundations,

that is, about two steps high. Several weeks passed before I could encourage leaves onto the stems to be more positive in the identification.

The growth which was very extensive belonged to *Ulmus glabra* "Townsendii".

This horizontal Elm is further than 6-10m (20 feet) from the house with absolutely no sign of any suckering in the gardens or lawn.

The reason I mention this is. If any reader has a tree that tends to have an invasive root system it would pay to check under the house every few weeks.

By the time my friend had cut the mass of growth from under his floor, pushed it all up the manhole (or should that be personhole) he had a heap the size of a small haystack.

BRASSICAS

At the establishment where I am employed a few varieties of vegetable plants are produced to supply the gardens at our other establishments at various localities.

Invariably there are usually some plants to spare and staff members from the various trades are welcome to the extras rather than they be wasted. But it always seems to be the same few people that rush in first take more than needed and never say thanks.

This year several trays of special healthy looking plants disappeared as quickly as ever and without so much as a thankyou or, what variety of cabbage are they?

So, if you are in Dunedin for the Conference next May and notice a lot of damaged fences around vegetable gardens, it was caused by stray cattle pushing into the private cabbage patches to get at the Chou Moellier.

Chow for now,

Walter Gibson.

NEW ZEALAND BOTANICAL SOCIETY

The first newsletter of the N.Z. Botanical Society was published in August 1985. It hopes to provide a forum for botanists and plant lovers, amateur and professional to "spread the word" and provide better communications between these groups and collegues around the country.

As from 1986, the newsletter will become a quarterly publication. A subscription of approximately $10.00 per annum will be charged. Final details of the subscription will be included in Issue 2, December 1985.

Anyone wishing to subscribe should write to:

Anthony Wright
Editor
New Zealand Botanical Society Newsletter
c/- Auckland Institute & Museum
Private Bag
AUCKLAND 1.

The publication of the first two newsletters has been made possible by the generosity of a few individuals and institutions. If you would like these first two newsletters it would be a great help if you would make a small donation towards the cost of these publications.

RURAL CHANGE

MEETING THE CHALLENGE

Given that the rapid and dramatic changes in New Zealand's economy are creating problems of adjustment in the rural community, the Agricultural Training Council, working in with the Ministry of Agriculture and Fisheries, Federated Farmers and Fruitgrowers Federation, has developed this positive action project.

The aim is to help the rural community through a period of rapid change and adjustment by providing support through practical assistance and wider community awareness of the situation.

The primary objectives are:

1. To motivate the individual farmer/grower and the rural family to take positive action to manage the changing situation to the best advantage.

2. To provide support for and further develop local support networks.

The secondary objective is to inform the wider community of the changes that are occurring.

The Methods:

1. Local community-based workshops will be the focus of the project. Set up by the industry advisory and producer organisations in each region these will address the problems of coping with the current rapid rate of change - financial management, production options, stress. The topics and content will vary with the different needs of each region. However, all will have the common elements of being participative and of encouraging each individual to take a positive self-help approach to manage his/her changing circumstances. Working in with the Agricultural Training Council's 15 regions, M.A.F's. 52 district offices will serve as the basic network for organising the regional activities.

2. The project will be serviced by a central administration group directed by a co-ordinator. This group will organise project publicity, arrange sponsorships, produce resource materials for regional use and operate an ideas exchange and briefing service for the regions. A consultative committee made up of all organisations involved at the national level will help shape the project. A smaller executive committee will oversee the day to day running. Funding will be administered through a trust set up for this purpose.

TOPDRESS THE NATURAL WAY

by David Henshaw

Taken from N.Z. Farmer
February 12, 1976

The average cow produces, each day, vast quantities of nutrient material which in the normal course of events gets washed away into a lake somewhere, or otherwise wasted, says "Jock". Production tends to be dropped in concentrated piles.

The objects of this idea are:

1. To adjust the regularity of production, and
2. Redistribute the material more evenly where it is most needed.

The first objective is achieved by the application of *Sheer Terror*. The second follows as a direct consequence of the first. Any light plane can be readily adapted for the purpose. We do, however, recommend planes. We tried balloons but the flight proved much to placid an affair; the production unit chewed its cud, enjoyed the view, and completly failed to produce the goods. A pilot's licence is an advantage.

Safety Features have been given careful and detailed study: In event of power loss the heavy stick strapped to the fuselage may be used to prod the area of the rumen. In the event of real problems, the entire production unit may be dropped off with a quick slash with the sheath knife conveniently located on a wing strut.

The trial indicated no significant breed differences. Feeding is of greater importance, and lush pasture is strongly recommended. Springing heifers did, however, prove an advantage for take-offs.

A variable speed fan (as illustrated) is essential. Natural urea, in particular, has greater benefits if spread in fine-droplet form as opposed to a solid stream. We recommend a fast setting on the fan.

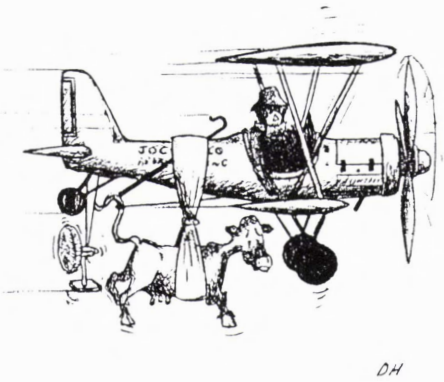
Heavier blades and a slower setting are recommended for solid fertilizer. The actual weight of blade used will largely depend on the feeding programme offered to the production unit. A sloppy mix can be quite readily spread by a lightweight fan (slow speed) whereas the solid stuff will most probably need a fast setting and a pretty heavy fan. Use your judgment.

In any event, always use the fan. Quite apart from the advantages of spreading it around a bit, there are certain advantages if the pilot is caused to make an error of judgment; our trial flight caught Mum in the garden and, because he had no fan attached, the pilot had to sleep in the hayshed for just on three weeks.

We do not recommend any particular spreading rates - you couldn't stick to it anyway. Actually, we found it difficult even to hit the right paddock, which we hasten to add is not the problem it may seem; rotational grazing, rotated just a little out of sequence, will quickly effect an appropriate transfer of fertility.

At a recent field day at Otunui a large gathering of farmers, dogs, wives, the Cow, Ron Vine, Boyd Wilson and others witnessed a highly successful launching of this ingenious scheme. The cow sprung, was instantly terrified, and was last seen free-falling into the gully behind the back ridge fertilizing those hill-country pastures in fine style. There's a minor problem with the sling but we're not too worried about the cow as we heard her bellowing later when the wind changed.

WARNING: Do not operate the unit with a tail wind, or in up-draft conditions.



DH

QUOTE FROM AN EXAM PAPER 1985

RE: *Rhododendron supranubium*

"Some people grow Rhododendrons just for the scent they produce. *R. superbum* doesn't sound like a sweet smelling plant, but is reputed to be the strongest scented Rhododendron available."

WELCOME:
to the following new members

Anderson J.G.	Christchurch	Arnold M.D.	New Plymouth
Baker A.M.M.	Wanganui	Barker S.G.	Auckland
Bartlett I.J.	Mangakino	Beavis Miss H.	Christchurch
Beecroft Miss S.L.	Christchurch	Bernstein S.A.	Rotorua
Birchler J.D.	Eltham	Blick S.J.D.	Auckland
Brewster R.P.	Hastings	Brown Miss H.	Christchurch
Budd S.G.	Kerikeri	Cannell J.F.	Christchurch
Chetham L.R.	Bluff	Christchurch City Council	
Clay E.F.	Christchurch	Close C.	Wellington
Cooper V.M.	Auckland	Cowan J.G.	Gisborne
Davis J.N.	New Plymouth	Fearnley J.M.	Perth
Fisher R.A.	Gisborne	Flowers W.A.	Hastings
Genefaas A.T.	Christchurch	Hamilton S.T.	Auckland
Hansen F.S.	Waihi	Johnson S.G.	Cambridge
Jones K.O.	Petone	Kirby Mr & Mrs J.N.	Auckland
Knox Mrs J.	Dunedin	Lasenby Mrs N.	Wanganui
Morrison K.D.	Hamilton	Moyes T.W.	Kihi Kihi
Neal Mrs R.E.	New Plymouth	Paynter M.J.	Hastings
Pentecost M.A.	Kaiapoi	Sammut C.C.	Christchurch
Schrader M.	Oamaru	Singe V.S.	Wellington
Steinhagen S.	Auckland	Steven M.L.	Hamilton
Stevens S.L.	Cambridge	Stockley Mrs L.	Tauranga
Swale R.M.	Manapouri	Van Tiel M.R.	Kaeo
Vercoe C.E.	Tauranga	Walker A.J.	Gisborne
Watkins G.	Tauranga	Whitman J.C.	Auckland
Wilson Mrs L.F.	Otorohanga	Young Dr & Mrs D.W.	Dunedin

Pittosporum daltii

NATIONAL CERTIFICATE IN HORTICULTURE DIARY

The following is a page from the diary of Mr Brent Smith which he submitted for his N.D.H. Mr Smith is working for the Ministry of Works and Development in the Ohau area of the Mackenzie Country, South Island, where there is little opportunity to practice amenity horticulture. He has accepted the challenge to learn by reading and observation. On each page of the 80 page diary he has at least one pencil drawing about a horticultural feature or botanical feature.

Laburnum anagyroides (Laburnum)

Growing up to 10 metres high, it has smooth brownish-green bark and green hairy twigs. Leaves are compound, each with 3-leaflets and slightly hairy beneath. Flowers are densely borne on long hanging spikes up to 25cm long, and sometimes almost covering the tree. Individual flowers are the characteristic pea-flower shape about 2cm long. The dry brown pods open violently throwing out the seeds. The whole tree (especially the seeds) is extremely poisonous.

TUESDAY 2ND APRIL

A mixed day with cool weather all morning followed by a hot afternoon. Today I began the planning for this year's planting season. We are concentrating on the lower Ohau riverbed, Ohau 'B' & 'C' powerhouses, and the Wairepo Arm - Kellands ponds area of Lake Ruataniwha.

Around the powerhouse areas, we are concentrating on native tussocks, sedges, shrubs and trees (we hope to establish some large pockets of Nothofogus). In the areas where man-made ponds and lakes are formed, we are planting with sedges, willows, poplars and various deciduous species. An interesting deciduous tree is the Montpelier Maple.

Acer monspessulanum (Montpelier Maple)

A smaller maple, with the wings of the pairs of fruits almost parallel and sometimes reddish. It has dark, leathery, 3-lobed leaves. This maple has only been brought into our area in trial quantities.

WEDNESDAY 3RD APRIL

A similar day weather-wise to yesterday. I continued working on the planning for this years planting season, today concentrating on the areas to be planted out with natives. Although we have ceased to do so now, earlier on in the project, various plants were tried in the riverbeds for wildlife shelter and food. One such plant was the holly.

Ilex aquifolium (Holly)

STUDENT SECTION

EDITORIAL

Well another year has ticked by - seemingly at an amazing rate of knots - and we now look forward with expectation to 1986.

It is time again to welcome new student members and congratulate successful examination candidates. Planning for the new study year is next on the agenda and along with this you are encouraged to participate in events organised by your local District Council.

The unusually frequent periods of rainfall over the early summer season has resulted in a plentiful moisture supply for vegetation resulting in prolific growth. This has been especially evident in the Canterbury Plains where pastures normally showing a parched brown appearance are luscious green.

Water uptake for plant growth is most rapid at this time of the year and it is interesting to note the adaptations of some plants to ensure they never have to search for water - that is the group of plants termed hydrophytes. These have adapted to living in water or very wet soil. This group contains great diversity of form ranging from the surface-lying water lily *Nymphaea stellata*, the upright blue flowered pickerel weed *Pontederia cordata*, the massive foliaged gunnera *Gunnera manicata* to the tall majestic swamp cypress *Taxodium distichum*.

One of the more unique hydrophytes is seen in the Avicenniaceae family - the mangrove *Avicennia* spp. of which there is one native species *Avicennia resinifera*. These are the only trees which grow in areas of muddy shores periodically covered by salt water.

Kind regards for the new year.

Nick Owers

FACTORS INFLUENCING SOIL MOISTURE

Taken from 'How to keep a soil moisture balance'
- New Zealand Meteorological Service Information Publication No. 10

by

Richard W. Heine

While rainfall records tell us how much moisture has gone into the soil, they do not tell us how much moisture the soil has lost. Moisture can be lost to the air, not only by direct evaporation from the ground surface, but also through transpiration by the plant leaves. This combined loss of moisture by evaporation and transpiration is EVAPOTRANSPIRATION, or ET for short.

Rainfall is easily measured using a gauge, but ET is much more difficult to measure because it depends on the type of crop, its stage of development and rooting depth, *and* the amount of moisture actually in the soil at the time. In practice, ET is never measured directly. Instead the maximum possible evapotranspiration (called potential ET) is calculated from routine weather observations for a standard agricultural surface - which is simply short green grass. From this starting point various crop and soil factors can then be introduced so that an estimate of the actual ET can be worked out.

The New Zealand Meteorological Service is now providing potential ET figures at a number of places in New Zealand, and is expanding this network to cover the main agricultural regions.

SOIL MOISTURE QUANTITIES

The soil can be thought of as a storage reservoir of water for plants. When all the water that a plant is able to extract from the soil has been removed, the soil reservoir is said to be at the WILTING POINT (Fig. 1a). At the other extreme, when a soil is holding the maximum possible amount of water, the reservoir is said to be at FIELD CAPACITY (Fig. 1b). The difference between these amounts is called the AVAILABLE WATER CAPACITY.

Any more rain that falls on a soil at field capacity will cause the reservoir to overflow, and the excess water will be lost as RUNOFF over the ground.

If a soil at field capacity loses some of its water, through evapotranspiration, then the water remaining in the soil reservoir is called the AVAILABLE SOIL MOISTURE (Fig. 1c). The amount of water needed to fill the soil reservoir back to full capacity again is called the SOIL MOISTURE DEFICIT.

FINDING THE AVAILABLE WATER CAPACITY

Finding the available water capacity (AWC) of your soil involves knowing two things: the depth of soil containing the

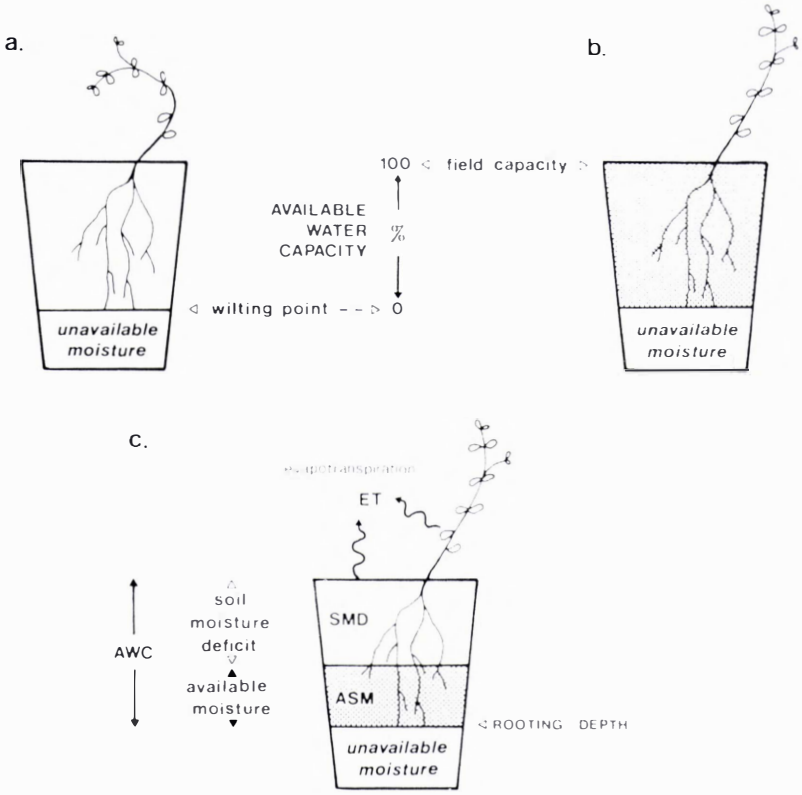


Fig. 1. Relationship of soil moisture quantities. Total soil moisture includes unavailable soil moisture.

roots (which will increase considerably during the growing season with crops, and a soil type factor (called a MOISTURE VOLUME PERCENT) to allow for the fact that different soils hold different amounts of water. These moisture volume percents (MVP) are just the average amount of water held per 100 mm of soil depth.

The available water capacity is then given by :

AWC = MOISTURE VOLUME PERCENT x DEPTH (mm)/100

As an example, a 300mm deep soil with a moisture volume percent of 22mm, will have an AWC of 22 x 300/100 - 66mm.

If you don't have a measured available water capacity for your particular soil, it will need to be estimated by rule of thumb. In general terms :

1. *Coarse silt* to *very fine sand* soils hold the most water, with moisture volume percents of 20 to 22mm, i.e. MVP = 20-22mm

2. Soils dominated by *silt*, but with little or no *fine sand*, AND also *clays* with significant *silt and fine sand*, hold up to 17mm of water per 100mm of soil depth (MVP - 17mm). (That's 25mm per 150mm of soil depth.)

3. *Heavy clay* soils hold about 13mm of water per 100mm of soil septh (MVP - 13mm).

4. Soils which contain *medium or coarse sand* have an MVP of about 8 mm.

These moisture volume percents are average values over a depth of 760mm, and the top organic A horizons may have higher values. To obtain further information on the soils in your area, you should consult the local office of the N.Z. Soil Bureau, (DSIR).

TUBE TALK

Thirsty crops may some day be able to tell their owners when they need water most. Their water tubes will do the talking. Scientists are experimenting with methods of wiring those tubes with an electronic system that will tell farmers when it is time to irrigate. A Colorado plant pathologist has been listening to corn plants for two years, using microphones and ultra-sensitive electronic equipment to record high-frequency popping sounds. Those sounds are more than five times the upper frequency limit audible to humans. The monitors pick up only the sound of cells making up the water tubes, which carry water and nutrients from roots to leaves. Water flows upward from the soil, when there is enough of it. Water tubes fracture if the tension gets too great because there is not enough water in them. The minute noise of those fractures is detected by sound equipment. The scientist says that some growers wait until a plant wilts before more water is applied. Although the crops may recover, their eventual growth and yield may already have been reduced. Other growers prevent plant stress by applying too much water. A Canadian biophysicist developed equipment that operates at frequencies which miss the normal noise of plant growth, such as the sounds made by stalks and leaves sliding against each other as they grow, and the rustling of leaves in a breeze.

SEEDLINGS

PROPAGATION AND TRANSPLANTING IN THE HOME GARDEN

(Taken from Ministry of Agriculture & Fisheries Ag. Link Series)

Under perfect conditions a seed sown directly into the garden will grow faster and into a better vegetable than one tampered with by such processes as pricking out and transplanting. However, conditions are rarely ideal.

Propagation techniques such as these enable plants to start off under protection from the weather, pests and diseases.

Raising plants indoors in trays or pots can be a means of saving space or assisting care and attention of seedlings. The handling of seeds and young plants depends on the particular vegetable; some are very delicate and must not be upset by rough treatment.

GERMINATION AND GROWTH

For a seed to germinate and grow it requires water, warmth, air and, in some cases, light. If these factors are favourable the seed will germinate unless it is too old or becomes diseased.

Water: Even moisture levels must be maintained once the seed is sown. Conditions should never be wet, because this can encourage diseases.

Use a fine spray, especially early on, so as not to dislodge seeds or damage young seedlings. Clear polythene bags can be used at this stage for covering seed trays to conserve moisture and keep the temperatures up (Fig.1).

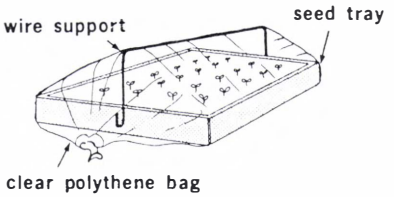


Fig. 1: A polythene bag can be used to conserve moisture.

Heat: Each vegetable species has an optimum temperature for seed germination. The faster the germination the better, because the seedling will be healthier and less prone to disease. Table 1 gives optimum temperatures for specific

vegetable seeds, but around 21°C should be satisfactory for most. These temperatures should, however, be held only until the seed has germinated and then reduced to harden the seedlings.

Table 1: Planting guide for vegetable seeds.

	Seed viability (years)	Best germination temperatures (°C)	Sowing depth (mm)	Time from sowing to planting out (weeks)
Asparagus	2-3	24	10	40- 45
Beans	2-3	27	30	2- 4
Beet	5-6	30	10	-
Cabbage	4-5	30	6-12	4- 8
Carrot	2-3	27	12	-
Cauliflower	4-5	27	6-12	4- 8
Celery	4-5	16-21 (night-day)	3- 6	8-12
Cucumber	5-6	35	1- 2	3- 6
Egg plant	4-5	30	3- 6	6- 8
Lettuce	4-5	24	6	4- 5
Onion	1-2	24	10	10-12
Parsley	1	24	6	3- 4
Parsnip	1-2	18	6-12	-
Peas	2-3	24	2- 3	-
Pepper	2-5	30	3- 6	6- 8
Pumpkin	4-5	35	1- 3	3- 4
Radish	4-5	30	1- 3	3- 5
Rock melon	4-5	32	1- 3	3- 5
Spinach	4-5	21	8-16	-
Sweet corn	1-2	35	3- 5	2- 3
Tomato	4-5	30	3- 6	6- 8
Turnip	4-5	30	6	-
Watermelon	4-5	35	1- 3	3- 5

One method is to pre-germinate seed in a hot-water cupboard. Place seeds on a tray between folds of newsprint or cloth which must be kept moist. As soon as there are signs of germination the seeds can be transferred to a growing medium, either soil or a seedling mix. Be careful not to damage the radicle (young root) if it is emerging.

Air: Roots need oxygen to breathe, so the soil or seedling mix must be porous and well drained. This is why seeds should not be planted too deeply. Root development will be much more rapid in an open medium.

Light: Some seeds, e.g. lettuce, germinate better in light, so avoid sowing these in darkness (such as a hot-water cupboard) or too deeply in the growing medium or soil.

DISEASES

The main enemy of seedlings is damping off. This term covers various fungal diseases that can attack seedlings before or after emergence and result in rotting below ground or after they are up. There are three methods of combatting this problem :

Sterlised seedling mix: Many proprietary mixtures are already sterilised to control root diseases and weed seeds, and sealed in polythene. Some soil sterilants are available to domestic gardeners and should be used according to instructions on the label.

Peat available to the public is not sterilised, but there is little risk of serious problems. Avoid contaminating clean materials by keeping bags sealed and using clean tools.

Seed protectants: Many seed lines are already dressed with a fungicidal powder. This protects the young emerging seedling and is particularly necessary when planting direct into cold wet soil. Captan is the material most suitable and this can be lightly dusted on seed not already treated.

Spraying: Captan can be sprayed over seedlings to protect them from damping off after emergence. However, by keeping plants well spaced, not too wet, and well isolated from diseased plants, the need for spraying is reduced.

SOWING DEPTH

Table 1 gives a guide to the depths for planting seed. Also note the recommendations on seed packets.

In light soils seeds can be planted deeper than in heavier soils that stay damp or restrict seed emergence. Soil should be lightly firmed around the seed to allow good contact.

PRICKING OUT: Seeds are sometimes sown thickly in a germinating medium, then pricked out to a wider spacing for the seedling to grow and develop until large enough to plant out in the garden.

The germinating medium does not require fertiliser and finely sifted peat or vermiculite are suitable materials. Pricking out is done while the seedling is still small - about the first true leaf stage.

When ready, it is carefully separated from a clump with an improvised spatula. The seedling is picked up by a leaf (not clasped by the stem) and planted with only gentle firming into trays or singly in pots (Fig.2). Water the trays or pots after pricking out

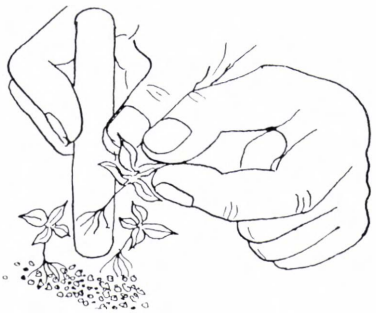


Fig. 2: Lift up plant by leaf when pricking out.

GROWING MEDIA

The growing medium should be such that it drains well, but does not dry out too quickly. Ready-mixed and sterilised media are available and are convenient for the home gardener.

A good all-purpose medium can, however, be made from a 50/50 mix of peat and fine pumice sand. To provide the necessary nutrients, the following amounts of lime and fertiliser should be added per 50 litres of peat and pumice:

* 30g dolomite
* 7g superphosphate
* 4g sulphate of potash
* 10g sulphate of ammonia

or

* 30g dolomite
* 20g general garden fertiliser

The ingredients should be thoroughly mixed and kept moist until used.

CONTAINERS

The medium suggested above is suitable for timber seed boxes, trays, and plastic or peat pots. Small compressed peat pellets that expand on wetting are also available. These do not require filling.

Ordinary peat pots do need filling with soil or potting mixture. When seedlings grown in peat pots are planted out, the pot goes in too, but tear back the top edge before planting and cover with some soil.

If the peat is left exposed it acts like a wick and tries out. Provided the peat pot remains moist, roots will penetrate the peat and move into the surrounding soil.

HARDENING OFF

This process prepares plants grown under protection for the outside, so lessening the shock of transplanting.

Hardening off should be gradual - between a week and 10 days. Watering should be reduced and the young plants exposed to cooler conditions. They can initially be placed outside, but kept sheltered and shaded and moved again out into the open for the last 2-3 days, if necessary.

TRANSPLANTING

Although transplanting checks growth, it gets plants away earlier. To reduce the severity of this check :

* Break as few roots as possible.
* Don't let plants get too big.
* Keep plants well watered at and after transplanting.
* Space well in seed trays.
* Use separate pots (essential for beans and cucurbits).

Take particular care with carrots, egg plants, onions, peppers and sweet corn.

SAVING SEED

In most cases, seed production is best left to specialists with the right facilities to produce good lines. It is difficult to maintain good quality disease-free seed.

Cross-pollination is a major problem, particularly in city areas where many varieties and related plants growing nearby may produce seed which could result in vegetables not true to type.

Seed producers must often grow plants in isolation to avoid this. Seeds of hybrid varieties should never be retained because they will not produce vegetables of good quality.

This is because of the very intricate breeding programmes involved in the production of hybrids. To produce the same vegetable it is necessary to cross-pollinate the two parent lines, and only the breeder will have these.

Plants that self-pollinate with little danger of cross-pollination include broad and french beans (Scarlet runner is cross-pollinated), capsicums, egg plant, endive, lettuce, peas, and tomatoes.

On the other hand, cucurbits (cucumber, marrows, melons and pumpkins) are often cross-pollinated, resulting in seed that will not be true to type. This can also happen to a lesser degree with celery, carrots and parsnips. Parsley is in this category, but its seed can be saved.

Plants that naturally cross-pollinate include beetroot, broccoli, cabbage, kohl rabi, brussels sprouts, onion, radish, spinach, sugar beet, mangold, garden beet and silver beet.

Seed can be retained from these vegetables, but there may be a deterioration in quality with time. It may be possible to produce seed true to type by covering suitable plants with a fine mesh cage, before flowering starts. Asparagus seed can only be produced by cross-pollination, because male and female flowers are on separate plants.

Never save seed from diseased plants or from plants near them because many diseases are seed-borne. Select from the healthiest plants only. Before flowering remove plants showing abnormal characteristics.

Keep seed in dry airtight containers to extend their life as long as possible.

THE PRODUCTION OF EUCALYPTS *EUCALYPTUS* SPP IN NEW ZEALAND

The following is the second part of a two-part article.

NURSERY PRACTICE

For the past 15 years eucalypt seedlings have been raised in the F.R.I. nursery for experimental plantings. Most of these have been bare-rooted stock raised in beds but more recently large numbers of container-grown seedlings have been produced. Annual production is currently around 70,000 seedlings so the techniques for commercial production are well understood.

The use of bare-rooted eucalypt seedlings in the establishment of eucalypt plantations is a departure from accepted practice in other countries growing eucalypts, where container-growing is more usual. However, the ease of establishment in the field varies with species, *E. delegatensis* being more certain than *E. regnans* or *E. saligna*. Bare-rooted stock are planted in late winter or early spring, with winter planting advisable only in warmer areas. To ensure survival with more sensitive species and to extend the planting season into late spring and early summer, increasing attention has been given at F.R.I. to the production of container-grown stock.

Certain principles are common to both bare-rooted and container growing techniques. A fertile soil or medium is required to maintain vigour and to produce plants of the required size as quickly as possible. If growth stagnation occurs there is a loss of early vigour on outplanting. Seedling spacing is also important as eucalypts need ample room to develop in both nursery beds and containers. If seedlings are crowded they become spindly and tend to stagnate. For bare-rooted stock a compromise has to be reached between a wide spacing that allows maximum stem diameter growth in relation to height, and a narrow spacing aimed at suppression of branch size, as clean-stemmed seedlings are easier to handle and plant than heavily branched ones. Thus at F.R.I. the seedling stocking is reduced to about 15 trees per meter of drill. Similarly with containers a spacing of 55 mm is necessary in order to raise seedlings that are sufficiently large for planting and are ready to make rapid growth of both tops and roots.

Preparation of seed for sowing entails stratification for those species from naturally colder climates, with *E. delegatensis* requiring 12 weeks' treatment and *E. regnans* 4 weeks. *Eucalyptus saligna* is not stratified.

FIELD PROCEDURES

Care with tree handling and transport is imperative. After lifting from the nursery bed, bare-rooted seedlings are bundled any straggling roots trimmed, and the bundles (untied) are placed in polythene bags after the roots have been dipped in water. The bags are tied at root collar level and transported in an upright position with no stacking. Crushing, heating, or rough handling of the trees can lead to mortality on planting. Although seedlings can be held in cool storage for some days, survival is most assured if the time between lifting and planting is minimised. When possible trees should be planted the day after lifting.

Bare rooted seedlings can be planted with reasonable confidence from May to early September (May and August generally give best results). This applies to all the main species under consideration so provided transport, handling and planting are well supervised and co-ordinated there is no real reason for going to container raised trees.

Containers require care in handling to prevent damage to the seedlings or disintegration of the plot. The use of a system which allows the same container module to remain intact from pricking out to planting reduces handling damage to a minimum. Container-grown trees must be planted soon after the first roots have penetrated the pots.

A characteristic of past eucalypt plantings has been variation in growth between trees of the same planting. Silvicultural practices which enable the average height to approach that of the taller trees are site preparation, weed control, and fertiliser application.

Site Preparation

The aim of preparation should be to bring the site to a state where the seedling can make unimpeded root and shoot growth virtually free from competition from other plants. This can be best achieved by full site cultivation such as discing or rotary hoeing followed by the application of appropriate weedicides to destroy existing vegetation and delay the germination of weed seeds.

The rapid development of young eucalypts is very dependent on the ability of the root system to rapidly extend into the surrounding soil. Thus growth on compacted soil such as on skid tracks or in windrowed areas is poor. Where restrictive soil horizons exist these should be ripped. Even where no mechanical cultivation is possible such as steep slopes or on burnt areas a good working over of the soil in the immediate vicinity of the planting spot with a spade is worthwhile. As well as improving soil properties and reducing weed competition it raises soil temperature and thus reduces frost levels on hard sites. Where full machine cultivation is not feasible, alternative methods of soil disturbance should be used such as

contour ripping. On planting, the roots of bare-rooted seedlings should be well spread and the soil replaced and firmed around the tree without the undue compaction caused by hard stamping.

Container-raised trees should be planted in well-cultivated ground to allow rapid development of a strong root system. Where peat-based containers are used the rim of the pot should be torn off before planting or the whole pot buried below the soil surface. If this is not done the material acts as a wick desiccating the trees and making the pots impenetrable.

WEED CONTROL

It is well known that eucalypts are susceptible to a range of weedicides commonly used in forestry. Thus a general principle is to control weed growth prior to planting by cultivation, by using an appropriate weedicide, or by a combination of the two.

Knock-down chemicals suitable for pre-plant spraying are glyphosate, paraquat, 2,4-D, 2,4,5-T (without picloram) and fosamine. Longer term control can be obtained by the addition of 'Caragard' atrazine or simazine when planting bare-rooted seedlings, but research has shown that at least Caragard and atrazine are unsafe to use either before or after planting peat pot containerised seedlings.

The common triazines (simazine, atrazine, and 'Caragard') can be applied safely at recommended rates over large robust bare-rooted seedlings with little adverse effect, (although some problems have been experienced with 'Caragard' on soils low in organic content). Virtually all other herbicides used in normal forestry operations (including amitrole 2,4-D, 2,4,5-T, Velpar) should be regarded as lethal to young trees.

FERTILISER

Eucalypts usually respond to the liberal application of nitrogenous fertiliser soon after planting. Urea is the cheapest source of nitrogen.

A number of experiments with different fertilisers and rates on mainly pumic soils have led to the current recommendation that 60 g of urea be applied in a spade slit 15-20 cm from the tree at or soon after planting. For some sites and some species this rate could be reduced to 30 g. Container-grown seedlings planted in early summer have responded well to a balanced slow-release fertiliser incorporated in the soil at planting. Although there could be a requirement for additional phospate on some clay soils, the addition of nitrogen is almost certainly necessary in all but the most fertile soils.

If urea is placed too close to the young seedlings, mortality will result.

A general point to be emphasised with regard to eucalypt planting is that maximum fertiliser response can only be achieved and maintained with adequate weed control.

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