Society's Annual Meeting

Normally, the report on the Society's Annual Meeting appears in the September issue of the Journal. However, the unique circumstances of the Pacific Rhododendron Conference decided the Editorial Committee to make a special feature of Rhododendron lochae as our own representative of the genus, so a good many pages were devoted to the Australian species and its history. Similarly, space was short in the December isue with so much arising from the Conference and the Annual Show. It is important that, even at this late date, the records should be completed by the inclusion of this report, if only for reference purposes.

The Eleventh Annual General Meeting of the Australian Rhododendron Society was held at the Camberwell Civic Centre on Friday, August 21, 1970, with the Senior Vice-President in the chair. In the absence overseas of Mr. Lindsay McCallum, the President's Report, covering the past twelve months, was submitted on his behalf by Mr. Ralph Sangster.

Reference was made to the approaching Rhododendron Conference and the thoroughness of the preparatory planning which already promised to ensure its success.

The enterprise and enthusiasm of Members of the Illawarra and Blue Mountains branches was mentioned in connection with the notable achievement of obtaining garden sites at Mt. Pleasant and Blackheath.

Tribute was paid to the late Mr. F. G. Coles, a valued Member of the Society, whose loss has been keenly felt.

Appreciation was expressed of the work of those responsible for the various departments within the Society, including the Conference, Garden, Show, and Technical Sub-Committees, the Ladies' Auxiliary, the Journal and the Library.

Following the presentation of Accounts and Balance Sheet the meeting proceeded with the business of electing office-beaerrs and Committee for the ensuing year.

Mr. McCallum had advised that he would not be available for nomination for a further term as President. The appreciation of the Society for his untiring efforts throughout his two years in office was recorded.

Mr. Alan Raper, a Committee member since 1965, was elected unopposed as President. Mr. Ralph Sangster was re-elected unanimously as Senior Vice-President; the other Vice-President elected being Mr. Neil McKenzie.

The Constitution provides for a Committee of 12 members, three of whom were due to retire. Two vacancies had occurred through the appointment of Mr. Alan Kepert as Secretary, and the resignation of Mr. Michael Spry for business and family reasons. Mr. Spry, an ex-President, was thanked for his services to the Society over many years. An additional vacancy resulted from the nomination of Mr. Raper as President.

Those elected to fill the six positions were Mr. Tom Atkinson, Mr. Alan Beveridge, Mr. Lindsay McCallum (ex-President), Mrs. Reba McCallum, Mr. Allan Taylor and Mr. Arnold Teese.

The retiring auditors, Messrs. Price Waterhouse & Co., offered themselves for re-election and were duly confirmed. (Subsequently, they found it necessary to withdraw, and have been replaced by Mr. R. L. Smith).

An important item on the agenda was a recommendation from the Committee that subscriptions be increased to help cover the Society's increased operational costs. It was agreed to amend the existing rate of $3.00 to the new rate of $5.00, with a special rate of $8.00 for family membership.

As the National Rhododendron Garden plays such an important part in the Society's activities, the annual report of the Garden Sub-Committee was presented by its Chairman, Mr. Ralph Sangster. Dramatic progress has been made over the past year as a result of the tremendous efforts of the sub-committee and a few inspired Members. The assistance of the Tourist Development Authority and Forests Commission, together with a substantial grant from the State Government, has enabled the considerable advance in construction which all can see.

(Continued on page 16)

THE LIFE CYCLE OF A RHODODENDRON

By P. G. Valder

Notes accompanying an exhibit at the Botany School, Sydney University, on October 26, 1970, for the Pacific Rhododendron Conference.

Part 1: The Life Cycle as it Occurs in Nature

Many enthusiasts have carried a rhododendron through its complete life cycle from pollination, through seed setting, harvest, and germination, back to flowering. Since not everyone has a really clear idea of what has happened, let us start by taking a close look at that most complex of organs, the flower, the important parts of which are illustrated in Figure 1.

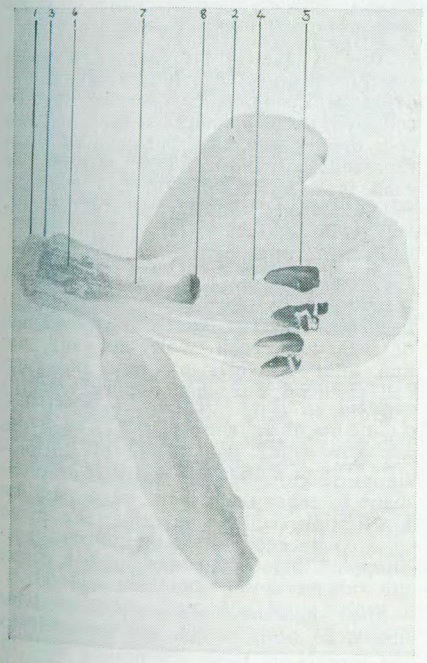


Figure 1: Flower of R. macgregoriae, partially dissected to reveal its structure. 1, calyx; 2, corolla; 3, disc, which secretes nectar; 4, filament; 5, anther; 6, ovary; 7, style; 8, stigma.

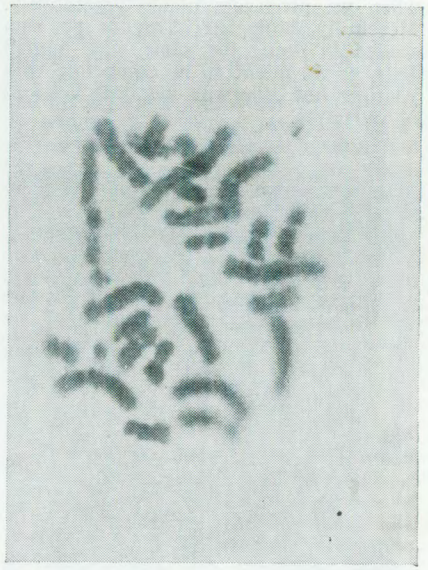


Figure 2: Chromosomes photographed at the times of nuclear division.

The flower, like the rest of the plant, is made up of a large number of cells, each of which contains a nucleus, which in turn contains a number of chromosomes on which occur the genes, which determine every characteristic exhibited by the plant (Figure 2). The chromosome complement of each nucleus is made up of two sets, identical in appearance but differing in genetic make-up, one of which has come from the pollen-parent and one from the seed-parent.

In each nucleus an exact copy is made of every chromosome, so that, when the

nucleus divides, the group of chromosomes in each new cell is an exact replica of that which was present in the original cell before it divided. Thus in every cell the complete genetic make-up of the plant is recorded on an identical set of chromosomes.

It is because of this that botanists have been able to take a single cell from a plant and produce from it a complete plant, identical with that from which it was taken. We do the same sort of thing on a much less sophisticated scale when we propagate plants vegetatively. Mercifully, biologists have not yet succeeded in doing the same with human cells, or we might all be competing with younger but otherwise identical versions of ourselves.

Figure 3: Longitudinal section of an ovule. The ovules are borne in cavities within the ovary and each is attached to the wall of the ovary by a short stalk through which it is nourished. 1, stalk; 2, embryo sac, in which is situated the egg cell containing a single set of 13 chromosomes; 3, integument, which later develops into the seed coat.

The number of chromosomes in each nucleus of a particular organism is known, not surprisingly, as its chromosome number. For instance our chromosome number is 46, made up of a set of 23 from each parent. Most rhododendrens have a chromosome number of 26, made up of a set of 13 from each parent.

Some rhododendrons have more than two sets of chromosomes. Those with 52 have four sets, each parent contributing two, and those with 78 have six sets, each parent contributing three. Occasionally rhododendrons are found with 39 chromosomes, and it is thought that these plants arose from crosses between parents with 52 and 26 chromosomes respectively, the former contributing two sets and the latter one. Plants with three sets, or any other odd number, are usually sterile, since the chromosomes cannot divide into two equal groups. This is the most common reason for sterility in hybrid rhododendrons arising from crosses between parents with different chromosome numbers.

Now in the flower there are some special cells in the young anthers and ovules which undergo a special sort of cell division. In the anthers, each of these cells divides into four, but each of these four cells gets only one chromosome of each type, a single set of 13 in most rhododendrons. These cells are the pollen grains and they remain joined together in groups of four (Figure 4).

Likewise in the ovules there are also special cells which divide into four. Unlike the anthers in which there are lots of such cells, each ovule has only one and, after it divides into four, only one cell survives. This then divides to form a group of cells called the embryo sac, one of the cells of which becomes the egg cell with a single set of 13 chromosomes (Figure 3). For further development to take place there must next be fertilisation, which can only take place if it is preceded by another event, pollination, the transfer of pollen from the anthers to the stigma.

Most rhododendrons are pollinated by insects or birds, which are attracted to the flowers by their appearance and, in some cases, scent, their reward being a meal of pollen or nectar.

The anthers of rhododendrons open by means of pores at their tips (Figure 1), and it is from these that the pollen is

shed. Amongst the pollen grains of rhododendrons are fine threads, which are entangled with one another and with the pollen grains (Figure 4). When an insect or bird touches the tip of the anther, it pulls the pollen out through the pores in a tangled mass and then may move off to another flower, perhaps on another plant, and some of the pollen may be wiped off onto the stigma.

Figure 4: View of the pollen grains to show the viscin threads lying between them. It is the presence of these threads which causes the pollen grains to remain together in a tangled mass.

Most rhododendrons have evolved devices which make it probable that cross-pollination will occur. In some the stigma protrudes from the bud before it opens to reveal the anthers. In others, the anthers mature and shed their pollen before the stigma is mature. In some of these the style remains shorter than the filaments of the anthers and elongates, pushing the stigma forward, after the pollen has been removed. In yet others the anthers bend back after a time exposing the stigma, making it more probable, as in the previous case, that it will be touched by a bird or insect visiting the flower. The mature stigma secretes a sugary fluid which has two main functions. Firstly, it traps the pollen grains and, secondly, it provides them with moisture and food materials for their further development. Also, if experience with other plants is any guide it will probably be found that it inhibits the further development of pollen grains of most plants other than rhododendrons.

After the rhododendron pollen grain has been deposited in this fluid it commences further development. Each pollen cell has a conspicuous pore in its wall and through this a tube develops (Figure 5) which then grows into the tissue of the stigma, down the style, and into the ovule where it discharges two nuclei into the embryo sac. One of these nuclei fuses with the nucleus of the egg cell to produce a cell with two sets (26) of chromosomes once more. This cell commences dividing and develops into the embryo of the next generation and the tissues surrounding it also develop further, the whole thing becoming the seed. Fertilisation also triggers off the further

Figure 5: Germinating pollen.

development of the ovary which enlarges, as the seeds develop, becoming a fruit of the type known as a capsule.

As the seed matures the embryo ceases development and becomes dormant. At this stage, however, there has already been considerable differentiation. The embryonic stem bears at its base an embryonic root, the radicle, and at its apex an embryonic growth bud, which will develop into the shoot (Figure 6). On either side of this are the two seed leaves, the cotyledons, and the whole embryo is surrounded by several layers of cells in which is stored sufficient food to enable the seedling to establish itself and commence manufacturing its own food.

The seeds are scattered when the capsules open and may be carried away by air currents or dispersed by other means. The seeds of many species have wing-like projections which assist aerial dispersal. The long-tailed seeds of the Malesian species are particularly well adapted for being blown away.

If the seed falls in a suitable place, it will germinate, sooner or later, when conditions of temperature and moisture are satisfactory. The seed absorbs moisture and the cells of the embryo commence dividing once more, the embryo continuing its development with the aid of the food materials stored in the tissues which surround it. A root emerges from the seed and grows down into the soil and the young stem grows up into the air and the seed-leaves are pulled from inside the seed-coat. The young seedling then becomes independent, its root system absorbing water and dissolved substances from the soil, and the shoot absorbing carbon dioxide and light energy. It then grows on and eventually flowers, the cycle being repeated.

Seed production ensures dispersal, continuity of the species in time, and variability, since each seedling has a different complement of genes received from the pollen nucleus and egg cell from which it developed.

The development of the seedling is, of course, influenced by many environmental factors. Since gardeners are likely to provide adequate moisture and nutrients and some protection from diseases, pests and other adversities, the factors which will be considered here are day length and temperature.

In temperate climates most rhododendrons flower in the spring, grow in late spring and early summer, cease growth with their shoots terminating in flower or shoot-buds, ripen their seeds, and then become dormant prior to the onset of the cold weather. This dormancy is induced

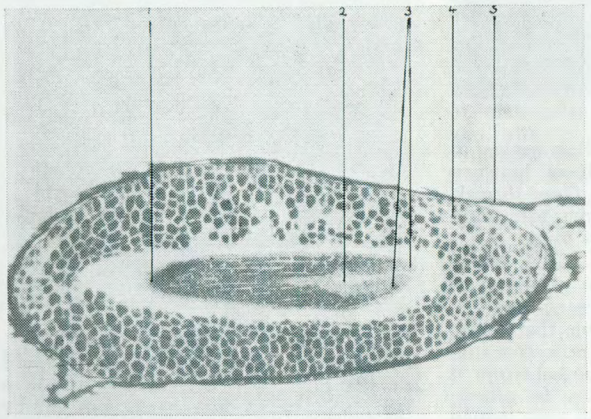
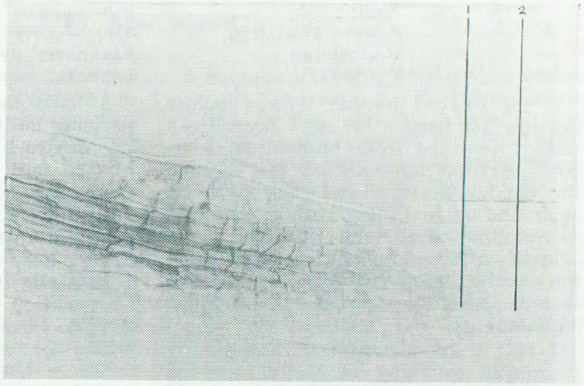


Figure 6:

Longitudinal section of a mature seed, showing the seed coat surrounding the food storage tissue in which the embryo is embedded. 1, embryonic root; 2, embryonic shoot; 3, seed leaves (cotyledons); 4, food storage tissue; 5, seed coat.

Figure 7:

Tip of a rootlet enlarged to show the region of cell division (1), which gives rise to the tissues of the rootlet on one side and the root cap (2) on the other. The root cap cells protect the root tip from injury as it pushes hrough the soil.



by a shortening of the days and is broken by subjection of the plant to a period of cold, followed by rising temperatures and increasing day-length. Thus the plant ensures that, in its natural habitat, it becomes dormant before winter arrives and doesn't flower and grow until the danger from frosts is over.

There is one other feature of the behaviour of rhododendron plants which seems worthy of mention. As happens with most plants, the roots of rhododendrons enter into complex relationships with fungi. The absorbing organs of the plants are thus not just roots, but roots invaded by a fungus. When such an association appears to benefit both partners we call it a symbiosis, and the symbiotic association between a root and a fungus is called a mycorrhiza.

As it happens, almost nothing is known concerning the type of mycorrhiza that occurs in rhododendrons, other members of the Ericaceae, members of the Epacridaceae, and certain other plants. The identity of the fungus or fungi has not been established nor has the function of the mycorrhiza been elucidated. It seems likely, however, that the position will be shown to be similar to that occurring in many other plants. For these it has been shown that, while the fungus is parasitic on the plant, the disadvantages of this are far outweighed by the increased efficiency of the mycorrhizal roots in taking up minerals, particularly phosphorus. It is probable that many plants growing under natural conditions in poor soils would be unable to survive were it not for these mycorrhizal associations. In cultivation, however, the plants will grow perfectly satisfactorily without the fungus, provided they are given adequate mineral nutrients.

The root systems of rhododendrons and their relatives are very characteristic in appearance. The main branches are rarely extensive and give rise to a mass of extremely fine and frequently branching rootlets. Some of the tropical, epiphytic rhododendrons are described in the literature as having "thick, fleshy roots," a description which calls to mind the orchids. There is no evidence, however, that these are anything more than the main roots, which give rise to the fine rootlets in situations in which it is possible for them to develop. The fine roots grow through the soil as a result of the elongation brought about by the rapid division of a group of cells at the tip. These cells divide to produce the root cells on one side, and root-cap cells on the other. The root cap cells are loose and easily pushed off and, being continuously replenished, they protect the root tip from injury as it pushes through the soil (Figure 7).

Each rootlet has a single layer of large cells surrounding a fine central core of conducting tissues. The mycorrhizal fungus grows around these roots and into the large outer cells, in which it forms complex coils.

fine reds with pale centres, the finest he called 'Ilam Alarm.' I have a beautiful specimen of this plant, 11 ft. high and 9 ft. across, in my own garden. It flowers in early October, seems very hardy, and is quite beautiful. Later he crossed 'Ilam Alarm' with griersonianum and got "Some of the best dark reds I have seen with well built up trusses." (These could possibly again be his Scarlet Kings).

R. 'Lady de Rothschild' x arboreum gave him a brilliant cerise which we now call 'Ilam Cerise.' It has a large truss similar to the Loderis. I was fortunate to obtain a plant some three or four years ago which has already produced two magnificent trusses of an intense unusual colour. He crossed two pink Loderis which he doesn't name, resulting in the magnificent rich pink which he called after his wife 'I.M.S.' It is as fine a rhododendron as you would see anywhere in the world.

R. campylocarpum x discolor x a lemon Loderi gave him 'Ilam Canary.' Later he used dichroanthum on an arboreum 'Pink Pearl' cross, which gave him "some nice plants" and I think may be the origin of 'Ilam Orange' and 'Ilam Apricot.'

"A big batch of seedlings of eriogynum x Loderi, Loderi x auriculatum and Loderi x discolor, now 17 years old and nine feet high, flowers midsummer and lasts well, many have tints of cream or yellow and are attractive flowers."

Twenty-five years ago when we came to Ilam Road I acquired several plants from Mr. Stead, among them three of good habit of growth, varying shades of cream-pink in colour and in full flower in December, a lovely rhododendron that should be propagated and made available to the public. Mr. Stead told me when he gave them to me that they had not flowered to date. Another plant I collected at the same time was his form of 'Tally-Ho,' a very fine plant of excellent substance that had proved hardy and flowered prolifically year after year.

As I previously mentioned, Mr. Stead visited England several times in these early days of rhododendrons, and was a personal friend of all the great Rhodomen of that time, especially Lionel de Rothschild of Exbury. Here he obtained much of the original stock for the breeding of the famous 'Ilam Azaleas' mainly in those days aiming at producing more intense colours, especially reds and oranges (he introduced the Ghent Azaleas into his breeding programme for this purpose). The resulting plants are taller growing than the mollis, with larger and more compact trusses, and of a more intense colour and flowers later, particularly all in the orange and red range. The individual florets were not as large as the more recent cultivars of today.

A selective breeding programme is being carried out in the North Island by Dr. John S. Yeates on the 'Ilam' Azaleas. Many of you will know Dr. Yeates either personally or by repute for the work he has done with Lilium Auratum.

And now, lastly, I would like to tell you a little about the work of a novice and amateur. Fifteen years ago I was given permission to collect seed from 'Ilam.' Having been familiar with the garden of 'Ilam' since a child, I remembered many of the plants I had enjoyed and admired so much. I took the seed from what I considered I knew as the most beautiful of the hundreds of plants, mostly I think from the Loderis. I grew many hundreds — almost thousands of seedlings, many of which are distributed throughout New Zealand, but I always selected what I considered the most interesting plants to stay in the nursery until flowering.

You see the work the bees have performed for us isn't all bad. Now, of course, I would never think of growing open pollinated seed, with the result that none I have flowered in the past few years have matched or surpassed the ones raised from the seed taken from the plants of sound and selected breeding by Mr. Edgar Stead.

THE LIFE CYCLE OF A RHODODENDRON

By Dr. P. G. Valder

Notes accompanying an exhibit at the Botany School, Sydney University, on October 26, 1970, for the Pacific Rhododendron Conference.

Part 2. Some Practical Considerations for Hybridisers and Seedling-Raisers.

For those interested in raising species or hybrids from seed, a detailed knowledge of the growth and reproduction of rhododendrons can be of considerable use. Some of the practical aspects are examined below.

(a) Emasculation.

Because of the strong tendency for cross-pollination to occur, open-pollinated seed is notoriously unreliable except from plants growing in the wild or which flower at a time when there is nothing else for them to be crossed with. Hence, under garden conditions, hand pollination is essential, and even this must be combined with measures which render cross-pollination impossible.

Firstly, if a cross is to be attempted all the anthers must be removed from the flowers of the seed parent before the buds open, preferably well before if you wish to avoid self-pollination, since in many species and hybrids the pollen is mature and can be easily dislodged several days before the flowers open. It is usually easiest to remove most of the corolla with scissors and then cut off the anthers (Figure 8).

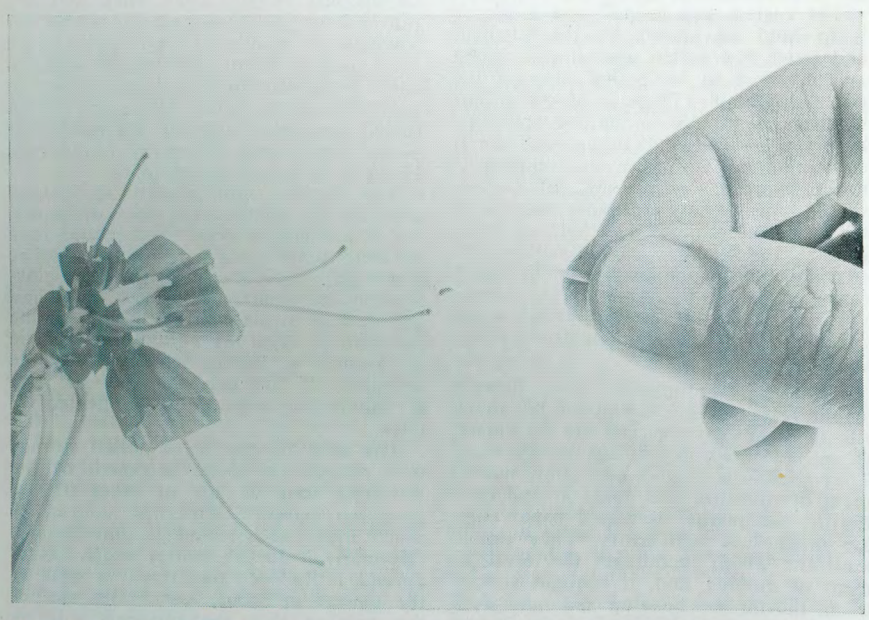


Figure 8: Pollination is easily carried out using an anther held by the filament. Anthers must be taken from unopened buds, since those from open flowers may be contaminated with pollen from elsewhere.

(b) Pollination.

Many authorities say that following the removal of the anthers, the flowers should then be covered with a bag and left till the stigmas mature before pollination is carried out. It is certainly easy to get the pollen to stick on if this is done but it is much less bother to carry out the emasculation, pollination, bagging and labelling as part of the one operation. Because of the threads amongst the pollen grains a mass of pollen can usually be wound round the stigma even if it is not yet sticky. The proportion of "takes" following pollination at this time is no less than when it is carried out later when the stigmas have matured. If it proves too difficult to attach a mass of pollen to an immature stigma, it can be wetted with a drop of water, or even better, a 10 per cent sugar solution (two ounces in one pint of water). Under laboratory conditions rhododendron pollen has been shown to germinate and grow very well in such a solution. However, with a little practice, it should not be necessary to have to resort to such devices.

The easiest way to pollinate a stigma is to hold an anther by the filament and touch the pollen against the stigma and allow it to be pulled through the pores (Figure 8). The use of camel-hair brushes, or forceps, is finicky and they have to be sterilised between each use if contamination with unwanted pollen is to be avoided. The hands, of course, should always be thoroughly washed if there is any chance of their carrying unwanted pollen. It should always be remembered that pollen should be taken from unopened flowers only, as otherwise one cannot be certain that it has not become mixed with pollen from other flowers.

Following pollination the flowers should be enclosed in a bag and left there till the stigmas wither and are no longer receptive. Brown paper bags are the best. They shade the flowers and allow movement of moisture and gases in and out. Plastic, cellophane, or waxed paper bags are much less satisfactory. They retain moisture, which encourages the development of moulds, and, if sunlight strikes them, the flowers heat up and may well be injured, since they are in a water saturated atmosphere and are not cooled by evaporation from their surfaces as they would otherwise be.

Failure to emasculate properly, to bag the flowers, and to take pollen only from unopened flowers are undoubtedly the factors responsible for some of the unlikely sounding parentages recorded in the Rhododendron Stud Book.

(c) Pollen Storage.

Very often the most desirable crosses turn out to be those between species which do not flower at the same time, or in which there is no overlap between the opening of the last flowers of one and the first of the other. This problem can easily be overcome by storing pollen, which keeps quite well in a dry atmosphere, and will remain viable for quite long periods, probably several months, if kept in a refrigerator. It has recently been reported that dry pollen will keep for several years if frozen, and there is little doubt that pollen collected in the northern hemisphere in May could be used to pollinate flowers in the southern hemisphere in the following October.

If anthers are collected from flowers about to open and laid out in a matchbox or some other small container, and placed in the refrigerator with one end of the box slightly open, they will dry out and the pollen will remain viable for a couple of months at least, which is all most people want. The more sophisticated may wish to store their pollen in gelatin capsules over silica gel in a sealed container, although for most purposes this is an unnecessary refinement. However it is quite easy to do.

The anthers are placed in gelatin capsules, or folded in pieces of paper, which are just as good, and placed in a jar with some silica gel (Figure 9). The silica gel should be blue (if it is pink, heat in the oven until it goes blue) and can be kept in place in the bottom of the jar with a layer of cottom wool. The jar should be tightly sealed to exclude moisture. If the gel starts to go pink it should be replaced or reheated at once.

The only alternative to pollen storage is a retardation or advancement of the flowering time of one or other of the proposed parents. This, of course, is much more bother and is unnecessary. Ordinarily it doesn't matter which of the parents is the seed parent as, in spite of the claims of some, geneticists are of the opinion that the progeny will be similar either way. However, if a cross is found not to take it is always worth trying the reverse cross.

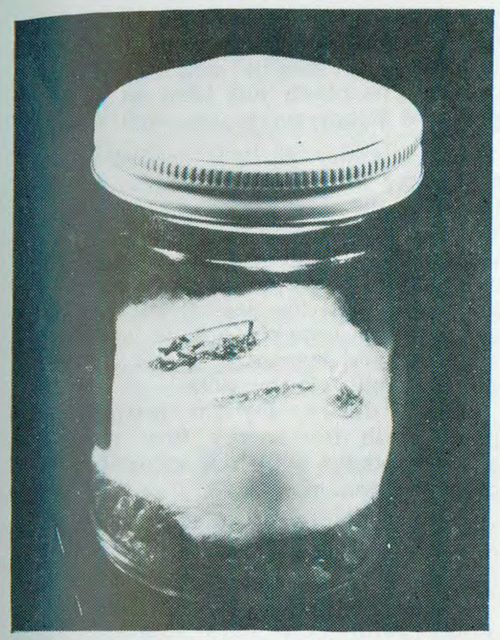


Figure 9: A more sophisticated (and largely unnecessary) method of pollen storage. The anthers are enclosed in gelatin capsules and held at low temperature over a layer of silica gel in a tightly sealed jar.

(d) Seed Harvesting

"In autumn, at the first sign of the capsules splitting, they should be carefully harvested and stored in a cool, dry place, etc., etc." say many authorities, and good advice it is too. Then when the capsules have dried out fully and split open, the seed can be shaken out, placed in a packet, and stored.

The impatient rhododendron breeder, however, may wish to be a bit more reckless. If the capsules are picked a month, or even more, before they are expected to mature and allowed to dry out, they can be broken open (they don't usually split if picked green) and viable seeds obtained. These usually look rather pale compared with those from mature capsules but, if they are sown at once, they germinate and a new generation gets under way earlier than would otherwise be possible.

It may be that these immature seeds do not keep as long as those from ripe capsules, but then they wouldn't have been harvested early if they weren't going to be sown at once.

(e) Seed Storage

The same remarks apply here as did for pollen storage, except that seeds of most rhododendrons will keep for at least twelve months at room temperature. The seeds of the Malesian species and their hybrids seem to be short-lived, however, and don't seem to remain viable for long whatever you do. No doubt there has been no reason for the Malesian species to have evolved a prolonged seed viability, since they come from tropical climates in which there is little variation the year round, whatever the altitude.

"The cool, dry place" we hear so much about is, of course, the best one in which to keep seeds of most kinds, since they stay alive longest at low temperatures and humidities. In refrigerators most rhododendron seeds will remain viable for at least two years and perhaps much longer.

(f) Seed Raising

As everyone knows, seeds need moisture, air, and warmth to germinate, and they won't get far after that if there isn't some light as well. An open compost with good water-retaining ability is the best and temperatures around 70-75 deg. F., although most rhododendrons will germinate at somewhat lower temperatures. While everyone has his or her own favourite compost, pure peat seems very reliable. The surface should be levelled and the seeds sprinkled on. They should then be moistened and anchored down with a fine spray of water, such as that provided by an atomiser.

A simple way of raising seedlings is to plant the seeds in a small plastic pot which is stood in half an inch of water in a tin or some other suitable container, and the whole thing enclosed in a plastic bag (Figure 10) and stood in good light but where no direct sunlight falls. When the cotyledons have expanded, it is a good idea to remove the bag and sprinkle the surface of the pot with sand (preferably sterilised by heating in an oven or boiling in water) to anchor the seedlings. The bag should then be replaced but left open a little at one end. This reduces the humidity and the seedlings harden off. After about a week the bag can be removed permanently, then, a few days later, a little direct sunlight will do no harm. The pot is kept damp by adding water to the tin as required.

If the seedlings are crowded, it is wise at this stage to thin them with forceps, so that those left are about a quarter

of an inch apart. The pot can then be watered with a soluble fertiliser such as "Aquasol," and subsequent applications made every three or four weeks. As soon as one or two true leaves have expanded the pot can be removed from the tin and gentle overhead watering commenced. It is usually a good idea to transplant the seedlings to individual pots before they get too crowded, as otherwise diseases, such as Botrytis-blight, may break out. A watch should be kept too for mites and insect pests and appropriate control measures carried out where necessary.

(g) Supplementary Light

Unless you live in a frost-free climate or have a glasshouse or growth room, it is not worth worrying about artificial light of any sort. However, if temperatures remain high enough for growth to take place throughout the year, supplementary light enables the seedlings to keep growing continuously. Otherwise, as the days shorten and temperatures begin to fall at the end of their first season, they will become dormant.

The response of plants to day-length is in fact very largely a response to night-length. As the nights lengthen the plant becomes dormant. By lighting the plants for a short period in the middle of the night, the dark period is divided into two short "nights" and no dormancy occurs. The plants just keep on growing provided temperatures are high enough.

The intensity of light needed is very small, and since the wavelengths required to affect the day-length response are at the red end of the spectrum, ordinary incandescent light bulbs are as good as anything. Without acquiring any complex apparatus, the desired effect can be achieved by hanging a bulb above the seedlings and leaving it on all night, or, more simply, all the time.

The ordinary daylight provides the plants with the energy they need for growth and the light bulb stops them becoming dormant.

Sooner or later the plants will have to be transferred to the natural seasonal regime, and this should be done in late spring or summer so that the plants can adjust before the days shorten. Then they will become dormant in the usual manner in the autumn. However, as a result of the early seed harvest and treatment with supplementary light, the seedlings should be pleasingly large 18 months after pollination.

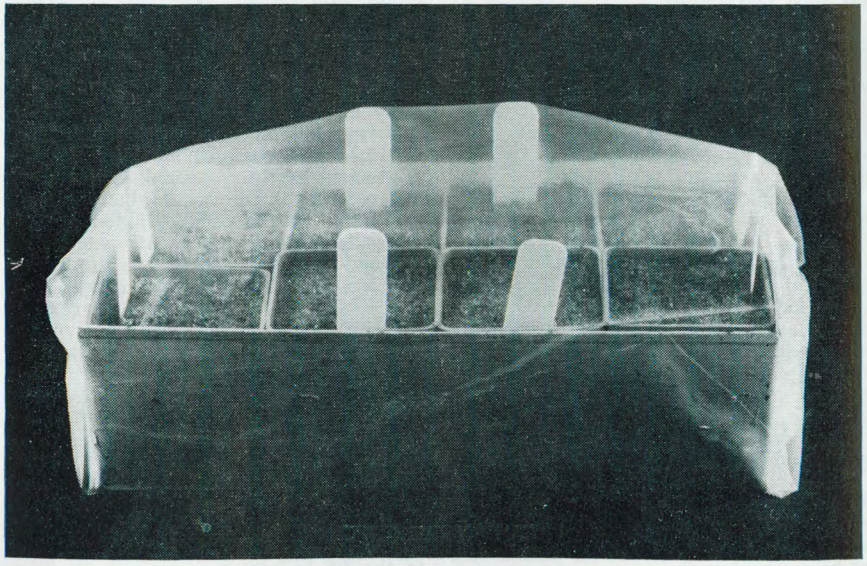


Figure 10: Pots sown with seeds are stood in half an inch of water in a container, which is enclosed in a plastic bag. If the whole thing is stood in good light, but not direct sunlight, at 70-75°F., germination should ensue within 14 days.

BOOK REVIEW

RHODODENDRON AND CAMELLIA YEAR BOOK, 1971

Year Book No. 25 contains 211 pages of interesting articles from many parts of the world. These include a detailed report of the Taiwan Venture, suitable shade trees for rhododendrons, a collection in a small garden, two articles on dwarf rhododendrons and many interesting notes from members, whilst the Camellia section is probably one of the best ever.

The description of a garden — a usual feature of the book — is of Mr. and Mrs. Charles Carlsson's garden, Kenron Park, Ferny Creek. This garden covers three acres of rich and friable volcanic soil on a rather steep spur of the Dandenong Ranges. In 27 years by their own efforts at terracing, rock walling and flagging paths, together with much care and attention, they have developed a magnificent garden that is one of the show places of the Dandenongs. Arthur Headlam, the author, portrays the hundreds of rhododendrons, azaleas, flowering trees and shrubs that thrive at Kenron Park.

Of fascinating interest is the article on the Azalea festival at Kurume, Japan, described by Leslie Riggall, who visited the festival on each of the seven days he was there. The Kurume festival is held in a large open air enclosure and provides a vast array of azaleas in the greatest possible variety, together with other plants. Everything in the festival is for sale. Each day the stocks of plants were replenished and very large numbers were sold. For example, there must have been a thousand plants of the pink azalea 'Kirin' on offer at any given time. This was the most popular variety, with the next most popular being 'Waka Kayede' which has large, shining, almost luminous crimson flowers and makes a dazzling display. One of the loveliest flowers were those of the rather rare 'O-Osawa' which has very large hose-in-hose flowers of white margined with mallow purple. The author also relates a delightful tale on how not to obtain scions from wily old men.

One of the most important contributions to the Year Book is the article on the classification of rhododendrons by Melva N. and W. R. Phillipson, respectively, of the Botany Division, Department of Scientific and Industrial Research, and of the Botany Department, University of Canterbury, Christchurch, New Zealand. The authors bring together the steady advances made in determining group relationships since 1930, when the Handbook on the Species of Rhododendron was published. In this Handbook the species was allocated to 43 Series; these still remain the readiest means of communicating ideas but, as no key is provided, it is difficult to allocate a species to its Series without previous knowledge of the genus. Some grouping together of the Series is needed, and in fact such a major classification already existed in botanical literature. A synthesis was required and this was provided by Dr. H. Sleumer in 1949. The authors provide a summary of Dr. Sleumer's system in chart form together with diagrammatic presentation of other scientific facts. These include flower and leaf buds, leaf folding, seed (nine separate types illustrated), hair types and their own work on nodes and cotyledons. The relationships of all these lines of evidence are set out in the chart which provides clear lines of demarcation and a wealth of information on classification of the genus.

Malesian rhododendrons are featured in three articles. Mr. E. F. Allen, who retired from the Malayan Government Service in 1958, describes the 14 species found on his second visit to Mt. Kinabalu in Sabah (North Borneo). There are 34 known species on the 13,455 foot mountain which he considers is a plant collector's paradise. One of the outstanding plants he found at 10,000 feet was the very strongly scented R. lowii which has very large flower heads, each with 15-17 waxy, funnel-shaped flowers of orange-yellow flushed apricot. Mr. Allen has flowered five species in Suffolk, England. He first flowered the strongly jasmine scented R. obiculatum in May, 1968, again in May, 1969, and during May, 1970, it produced ten trusses each with 20 to 22 pure white tubular