

**CHRYSANTHEMUM
CULTURE
IN
WESTERN AUSTRALIA**

FOREWARD

The initial booklets published by the Western Australian Chrysanthemum Society Inc. provided persons interested in the growing of the "Queen of the Autumn" flowers with invaluable aids to them in their culture. In this publication the author, who has had many years of 'mum' growing in both country and metropolitan areas, has incorporated additional facets of cultural information covering the growing of the cascade, miniature, charm and spray types of chrysanthemums, stopping dates for a number of cultivars, as well as sections dealing with pests and diseases, nutritional disorders and a month by month calendar of activities. Readers will find this booklet "Chrysanthemum Culture in Western Australia" a most informative and valuable reference and presented in a manner which is simple to follow. The advice is equally applicable to persons who wish to grow good garden flowers for decorative purposes or to the specialist exhibitor. The Western Australian Chrysanthemum Society Inc., a group formed to promote Chrysanthemum growing in our State holds meetings in the S.P.C.C.A. Hall, Sandgate Street, South Perth, 6151, on the second Monday of July, September, November, February, March and April. In addition a show is held each May and garden visits are arranged. Further enquiries may be made by contacting the Secretary (refer Directory incorporated in the West Australian Gardener).

**K.W.MAY
PRESIDENT**

**The booklet has been compiled by Mr E. Elms in association with the
Western Australian Chrysanthemum Society Inc.**

Front Cover illustration - Mutos Crimson

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Back Cover - Perfect Accent

PREFACE

There are certain basic facts which must be understood if chrysanthemums are to be grown successfully either as a garden flower or as a show bloom. Firstly, it is not possible to obtain good blooms by simply cutting back the old clump and allowing the suckers to run up to flower again. The stool must be lifted and fresh cuttings struck out each year.

To obtain a worthwhile result the soil must be prepared annually and if possible, a new bed selected to spell the old ground as the chrysanthemum tends to take a lot out of the soil which cannot be quickly replaced. Alternatively, the soil must be completely changed, or container culture adopted.

Basic cultural procedures must be followed if the best or even better than average results are to be obtained.

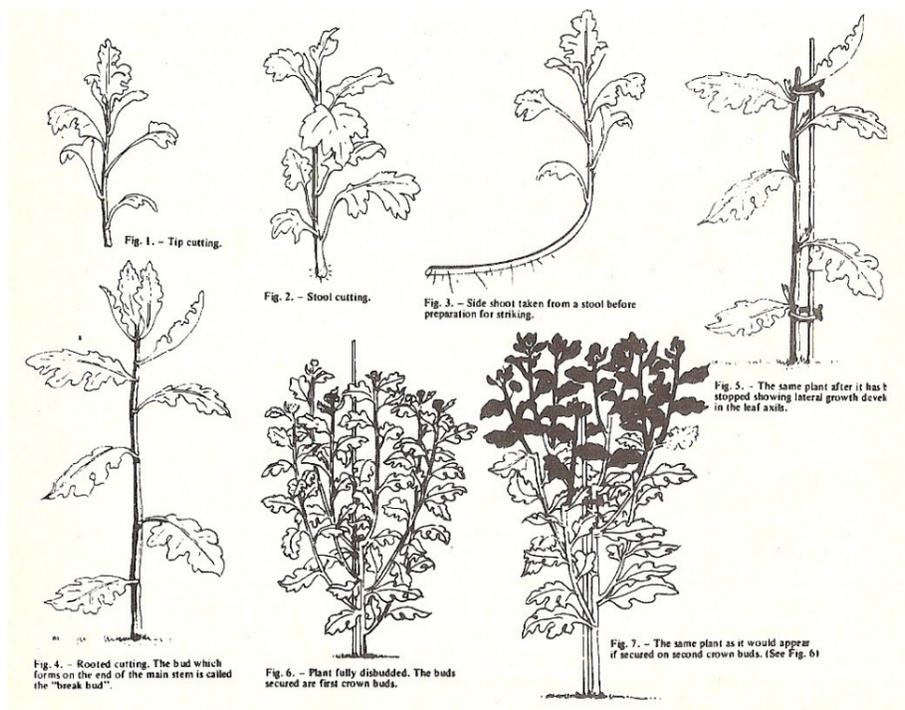
One of the objects of this booklet is to follow up in a different format, the cultural information supplied in the booklets "Culture of Chrysanthemums in Western Australia" and "An Introduction to Chrysanthemum Growing", and in addition to provide advice to those who simply wish to grow good garden flowers or quality blooms for decorative purposes without becoming involved in show bench activities.

Facets of culture not previously dealt with in the two previous publications have now been included and in addition to providing a selection of recommended cultivars, a schedule of stopping times has been tied in with this list. A step by step, month by month calendar of activities is incorporated to make it easier for the reader to follow the cultural information provided in a practical manner.

It must be emphasised that the vast difference in soils, temperatures and environments in this state will necessitate adjustment or modification of any laid down procedure to make it adaptable to the requirements of the individual grower.

Furthermore, striking and stopping times set out will apply specifically to metropolitan growers and if followed as closely as possible in such areas should give excellent results - in other districts growers will have to make some trial and error adjustments if growing for the show bench, as the times set down are for city shows held in Mothers Day week, the second week in May.

The chrysanthemum is a very adaptable and extremely responsive plant, consequently growing them to perfection can be a rewarding experience. The extent of this reward will depend on your diligence and attention to detail which will in turn measure the degree of your success.



SECURING OF STOCK

In the first season of growing the new grower must start by obtaining good healthy young plants of proven cultivars. A check of names on the show bench can be an advantage in this direction. Start with those most regularly exhibited as obviously these are grown because of the high degree of success the growers generally achieve with such cultivars. It is not advocated that any new grower look at a State Championship exhibit and accept this as an ideal selection. Quite often the growing of less reliable cultivars requiring specialised treatment is a challenge which more experienced growers can accept successfully.

There are two specialist chrysanthemum nurseries in close proximity to Perth from which a wide range of cultivars can be obtained. Stock so purchased will be clean and healthy and having been rested will be vigorous.

GROWING FOR CUT FLOWERS OR GARDEN DISPLAY

It is usual for people growing for cut flowers or garden display to first cut back old stools or simply set out their plants and let them grow, support them with a few sticks, fertilise, water and leave them to grow as they wish. A little extra time and attention at certain times will see the production of far superior blooms and specimen plants. It is essential to obtain good, reliable, healthy stock and the paragraph headed "Securing of Stock" refers. A plot should be selected in winter where chrysanthemums have not been grown the previous year and dug over to spade depth after an application of a liberal dressing of animal manure. In September the bed should be top dressed with a complete fertiliser, one handful per square metre, and with fibrous material such as compost incorporated then dug over twice with a fork. After about two weeks dig over again, rake level and firm down hard. A good recommended home mixed artificial fertiliser for chrysanthemums would have a ratio of 3 parts of blood and bone to 3 parts of superphosphate and 1½ parts of sulphate of potash.

Plant out in mid October and stake each plant individually. The number of blooms on each plant is determined by the number of times the plants are stopped and the number of laterals permitted to grow on to flower.

The plants should be sprayed regularly with an all purpose spray to combat caterpillars, other leaf eating pests and aphids.

Spray in the cool of the evening after watering.

About four weeks after planting out, the plants should be stopped by pinching out the growing tip. This encourages the plant to throw out side shoots or laterals from the leaf axils. After ensuring that these laterals are not blind and growing normally, retain the top five or six and remove the rest. The growing laterals must be supported by staking and tying.

When massed beds are cultivated and laterals are too numerous to individually stake and tie, the bed can be covered with wire netting having sufficiently large mesh to hold the laterals erect as they protrude and grow on. The netting must be fixed to stakes at a height suitable to cater for the particular cultivars set out in the bed, remembering that the height to which different cultivars grow varies considerably. Beds should be set out so that those grown in each bed or section, bloom at an even height. The netting can be raised as the laterals develop so obviating staking and tying.

In late December these laterals should be stopped a second time by pinching out the tips of each of them to force further side shoots or laterals from the five or six originally retained.

The number of laterals retained and grown on will determine the number of flowers as a single bud should be retained to flower on each stem. That is, if 6 were retained in November and 6 on each 6 now, the end result should be 36 flowers on each plant. The buds will be produced in March as the number of laterals will delay bud formation. Buds produced in January or before the end of February are too early and should be pinched off to allow the top shoot to grow to bud at the correct time. All side growths on the 36 laterals should be removed so forcing the plant to direct its energy into producing a quality bloom on top of each stem. (Similar to fig. 7 which shows only 9 second crown buds secured)

After mid December your plants should be fed by spreading a teaspoonful of complete fertiliser around the base of each plant every 7 to 10 days up to the time of bud show when all dry feeding should cease as a good reserve of food will have built up in the soil. Two liquid dressings of a balanced liquid fertiliser between this point and the time the bloom is half open should suffice after which all feeding should cease.

In mid December the soil around each plant should be mulched with well rotted cow manure to protect the feeding roots and conserve moisture. Avoid direct contact between the stem and mulch then continue spraying weekly or according to makers recommendation with a complete spray until bud formation is evident, always spraying the mulch around each plant to prevent earwigs and other pests breeding under it. Cow manure is the ideal mulch.

Change to a granulated systemic insecticide when petals show. Spray plants and buds with a fungicide like Zineb once only when all buds are secured to combat fungus diseases.

Plants for cut flowers or garden display can be grown in containers if a suitable plot is not available and moved to a flowering position later in the growing season.

By following this advice and selecting a mixture of early and late cultivars quality blooms and a good garden display can be available from mid April to early June.

PROPAGATION

It is important that an effort be made to propagate by stool or tip cutting, (refer to figs. 1 and 2) even when growing for cut flowers, to obtain the best result and although a rooted sucker (see fig. 3) may be easier to strike the same well developed root system will not result and consequently there must be a fall off in bloom quality. Exhibition growers should certainly strive to propagate by tip cuttings. Although stool cuttings will give a very good result the extra effort can be the difference between winning prizes and exhibiting very good blooms.

Cuttings can be successfully struck from July to late October but the exhibitor should commence striking at a convenient time as close to 1st September as possible and the propagation notes which follow are based on this premise.

Around 7th August the suckers should be cut back leaving only those which are showing through the soil or just starting to develop. The stool should then be covered with good garden soil and lightly dressed with a complete fertiliser to encourage the development of new and healthy suckers for propagation. About 21st August spray with a systemic fungicide to eliminate any fungus disease such as rust which can quickly take hold of your cutting nursery if allowed to develop.

Spray with either a residual spray, such as Malathion, or a systemic spray, such as Metasystox, to eradicate aphids and other pests about a week before setting out, as they can damage and hinder the development of your cuttings.

A good watering of the stool the day before selection will ensure that cuttings are nice and fresh when taken.

The best means of setting out cuttings is in a seed tray or round the edge of pots. Use a base of good garden soil lightly dressed with bone meal and superphosphate then if available, place a layer of clean sand on top of trays or pots, pressing holes with a stick and firming in. A good watering down after planting is essential. Some growers use a soft wood cutting powder as it helps sustain the cutting while roots form and will ensure the development of a good root system and seal out any virus or disease from the open wound. Roots should form in about ten days. It is common practice to remove bottom leaves from the cutting preparatory to setting out.

When the cutting stands erect, greens up and the growing tip starts to open and extend it is time to pot out your cuttings. It is advisable to protect them from the hot sun for several days when first set out and then harden up in full sunshine for about a week before potting on is commenced.

If your facilities dictate propagation of cuttings in the open ground, mix them up by setting out two rows of each cultivar, one of tip cuttings and one of stool cuttings, thus ensuring you do not lose a variety. The stool cutting properly rooted and grown on will still provide a good quality bloom. As you gain experience and confidence you will know which cultivars require that little extra protection and attention.

The ideal is considered to be 3 cuttings to a 100mm pot and 5 to a 150mm pot or in a seed box 60 to 73mm between cuttings.

If you do strike stool cuttings leave the very minimum of roots and trim those remaining right back to prevent your cutting becoming lazy and living on the existing root system. (Refer to figure 2).

Remember that potential cuttings, healthy, clean and in active growth will strike much easier than those still dormant.

It is not recommended that in this State terracotta pots be used for potting on as the heat causes them to dry out too rapidly and young plants tend to become root bound. However, this type of pot is ideal for striking as the porous wall of the pot allows it to breathe and so minimises the possibility of stem rot.

In areas where frosts are prevalent four thin sticks or knitting needles can be placed in the pot and a plastic bag pulled over to protect the young cuttings and provide artificial hot house conditions. Corks placed on the end of these sticks or needles will prevent the bag being pierced and so collapsing - this method will also retain moisture around cuttings and eliminate the need to water for several days.

Watering of cuttings is best done with a very fine spray after the pots are placed in the nursery. Alternatively, use of a watering can is recommended to ensure that overwatering does not occur.

METHOD OF CULTURE FOR EXHIBITION GROWERS:

The Chrysanthemum is equally at home growing in containers or in open ground and success has been achieved with both methods. In our small suburban back yards ground space is limited and root encroachment from surrounding shrubs or trees can rob your plants of nourishment at a vital stage of their growth. You may be able to limit or control your own tree and shrub planting but what your neighbours grow is beyond your control, thus containers are recommended.

Reasons for using containers are:

1. Control of outside root encroachment.
2. Better control of watering.
3. You can be sure of your feeding programme.
4. Containers can be moved to an alternative location if required.
5. It is easier to maintain good hygiene, as container watering restricts weed growth and facilitates keeping the surrounds clean and tidy.

These reasons add to a much higher percentage of good quality show blooms and although you may lose a little on size you will gain on form. Members have grown successfully in the ground, (4 gallon) 18 litre drums, plantainers, plastic pots and more recently 10 litre soft plastic nursery bags. The root system of cultivars should be examined and those having a smaller and less intense root system will give a better result in a smaller container such as a 10 litre nursery bag.

SOIL PREPARATION

The basic growth requirements of the plant are adequate humus, either animal manure or compost and good all round fertilisers fed in regular small quantities to provide a continuous source of nitrogen, phosphorus and potassium . They also need small quantities of other trace elements. There are a number of good brands of complete fertiliser on the market which contain all of these elements in a balanced formula especially prepared for use in our suburban soils. "Chrysmix" No. 1 and 2 have been specially formulated to cater for the needs of the chrysanthemum in Western Australia. This is available through the "Western Australian Chrysanthemum Society", A. Richards Pty Ltd and at least one specialist nursery. It is worth noting that the plant has its greatest intake of potassium and phosphate when running up to the bud stage, thus the changed formula in "Chrysmix" No's 1 and 2.

"Chrysmix" No. 1 formula is for use in early stages of growth and No. 2 late in the growing period, the change to "Chrysmix" 2 being essential from mid January.

It has been established that the chrysanthemum grows best in a soil with a pH rating around 6.5 but a commencing rate of about 7 will be lowered by the application of successive artificial manurings. Remember you cannot get an accurate pH reading after a lime dressing or manuring, the soil must be settled by a number of waterings before an accurate pH reading can be obtained. A simple pH test kit is marketed through nurseries at a very reasonable cost to C.S.I.R.O. specifications and contains a set of instructions which are easy to follow.

Coastal soil is generally alkaline enough and a lime dressing should only be necessary if loam, compost or peat is added. The addition of lime may be essential in the heavier inland soils, and where it is required, a rate of a handful per square metre should suffice.

The garden bed being prepared should contain about 20% animal manure or compost and an application of a complete fertiliser at the rate of a handful per square metre. It should then be dug over several times one spade depth. Do not overfeed with nitrogen early in the growing cycle as a soft lush plant will result. A complete fertiliser with a base around 5% nitrogen, 10% phosphate and 5% potash is recommended and a light bone meal dressing should be applied to the bed at the same time.

When growing in containers a recommended mixture is 1/3rd soil, 1/3rd jarrah buzzer chips and 1/3rd compost but jarrah sawdust is an alternative to buzzer chips. The buzzer chips or sawdust have a tendency to absorb nitrogen before releasing it thus a small handful of complete fertiliser is added to each 10 litre container. Similarly it has been found that this and the compost lower the pH rating which can be counteracted with a light lime dressing mixed through the compost. The addition of a little extra bone meal and a quantity of well rotted animal manure is an advantage. Prepare soil for containers well in advance of planting out so that the pH rating can be checked and corrected if necessary and the earlier decomposition of buzzer chips or sawdust will prevent any excessive nitrogen withdrawal after plants are set in their final growing position.

A word of warning on animal manures. Hormone weed killers are known to be used by grain producers and the effect of these can be passed on by wheat and other crops, passing through the animal and into the manure. 2-4.D has caused plant malformation in this manner as a hormone content of approx. one part per million can cause plant deformities. Exercise caution if you use manure from a racing stable. If using poultry manure it is advisable to mix sawdust at the rate of 1 part manure to 5 or 6 parts sawdust and rot down well before use.

Should you decide to use containers good drainage is essential and can be provided by the use of crocks. Broken pots, rocks and bricks, although satisfactory, add weight to the containers consequently the use of solid foam plastic broken up in large irregular shaped pieces will reduce weight and make handling easier. It is worth noting that crocking is not necessary in nursery bags or modern plastic containers.

Should buzzer chips or sawdust not be available, peat can be substituted, but the use of local peat can add to watering difficulties as it becomes easily saturated and does not dry out quickly. Imported peat is preferred for this reason.

The prepared bed or containers can, if necessary, be treated with a nematicide to combat eelworms but ensure that instructions on the packet are rigidly adhered to and warnings heeded.

When preparing drums and providing drainage holes always punch holes from the inside out to ensure that water is not retained by rough edges protruding inwards. Drums can be ripped open across the bottom with an old fashioned tin opener to

provide good drainage.

GENERAL COMMENTS

Some cultivars bloom best when grown on first crown buds, some on second crown buds, while others will flower on either first or second crown buds. Those shown in the recommended list and list of stopping times are second crown cultivars. Although first crown cultivars may succeed in the extreme south of this state, metropolitan growers should grow second crown cultivars exclusively if a high success rate is to be obtained and maintained.

In many instances the difference in first and second crown growth has proven to be that the first crown has more and finer petals while the second crown has fewer but broader petals. However, there are some cultivars which can only be grown on a first crown otherwise they will show an open centre revealing a daisy eye. Cultivars falling into this category would include Duchess of Kent, Hilda Veal, J.R. Dyer and Cream Duke. Few growers have had success with these varieties in the coastal districts of Perth. I mentioned earlier that some cultivars provide a challenge. Amongst this group would be Bronze Turner, Pink Turner, William Turner, Monument, J.S.Lloyd, Keith Luxford, Bessie Cook and Showgirl. If you choose to grow any of this selection it is necessary for a vertical incision or a row of holes pricked with a bag needle or similar instrument be made through the cambium layer of the stem just below the bud on at least three sides after the bud has formed otherwise you will suffer the disappointment of seeing the neck crack under the bud preventing proper flowering and perhaps you may even see the bud roll right off.

Demand for many of these cultivars has lessened as newer varieties, which are easier to grow in the State, have been introduced, consequently they seldom appear in our catalogues and are now more difficult to obtain.

Over manuring or watering will increase the tendency to spit the neck in cultivars showing this tendency and is caused by the inability of the plant to absorb the take up of moisture when the sap rushes up in the cool of the evening.

It is usual to grow three laterals on an exhibition plant, four to six on decoratives, spiders and quills, six to eight on anemones and singles. Too much size can cause anemones, singles, spiders and quills to become too coarse and the gain

in size can easily be lost in form.

A cut of single is recognised as having a minimum of four blooms to a cut but some cultivars can easily carry six blooms. Reference is made to the final treatment of singles under the heading "Single Chrysanthemums".

FIRST CROWN TIMING (See Fig. 6)

To obtain the best result a plant must be kept growing continuously and holding back can be detrimental to the final result, consequently it is recommended that cultivars grown on a first crown should be struck between 15th and 30th September if this method is adopted. Potting on should be done between 15th and 30th October using 100mm pots. A second potting to 150mm pots should follow between 15th and 30th November before planting to the final position in mid December. Normally a blind or break bud will appear in mid December which will not flower but helps the plant branch out or run on past with lateral growth. The plant should be held till early January when the centres can be taken out permitting the selected laterals to run on to bud formation. Should a break bud not appear the plant should be stopped at this time. In the case of decoratives set back this programme one to two weeks. Remember flowering of other types on a second crown bud was recommended. A first crown bloom, having more petals, takes a little longer to reach full bloom.

SECOND CROWN TIMING (See Fig. 7)

Strike these cultivars a week or two earlier and this spreads the planting and potting time over a greater period.

Strike for this method between 1st and 15th September, pot to 100mm pots 1st to 15th October, to 150mm 1st November and to final position by 1st December.

Whether a break bud forms or not take out the centre with exhibitions and informal anemones by 7th December, late flowering cultivars first, followed by earlier flowering varieties and with decorative and formal anemones by 15th December. The plant must be stopped again to run on past a first crown to a second crown bud. With exhibitions, informal anemones and late blooming cultivars, this should be done before 7th January, but decoratives should be held back as late as 15th January, with some early varieties held to as late as 31st January. Singles are

dealt with under the heading "Single Chrysanthemums".

The extremely hot weather experienced in this State coupled with a lack of cold nights often shows up in odd bud formation with the result that plants grown on first crowns have a second crown, or even a terminal bud formation, giving the impression of missing growth stages, but the heavier and finer petallage gives the indication of a first crown bloom.

When potting into 100mm and 150mm pots use a mixture along the lines previously recommended for container culture. Should your potted plants become root bound they will need to be untangled before setting out to your final growing position to obtain the best results and permit full root development. A method is to move the plant slowly up and down in a container of water to loosen the root system. However, one accepted practise is to slit the outside of the root ball in 3 or 4 places with a sharp knife or razor blade to encourage expansion and the development of new roots from those severed or shortened by this operation. However, it is advisable to ensure the absolute minimum of root disturbance occurs.

STAKING AND TYING

It is essential to protect your plants throughout the growing period with proper tying and staking. So many things such as wind, animals and falling objects can damage them and in fact a stake can prevent you stepping on one when working in a bed. The use of bamboo canes is not satisfactory except to top up a short stake after the bud has formed as they can become very brittle and harbour pests such as earwigs. If possible, obtain a good supply of jarrah stakes. Jarrah flooring run up on a saw bench is the ideal stake.

It is becoming increasingly difficult to obtain suitable soft string for tying but fortunately rolls of plastic garden ties are becoming available through stores at economy prices. I believe the ideal tie is printer's cord as it is durable and will not come loose when properly tied and at the same time being soft enough to prevent stem damage. It is not recommended that you use binder twine as it can untie and rot very quickly.

You must provide a separate stake for each lateral grown on to flower.

Proper staking and tying will ensure straight stems and enable you to stage more

effectively. However, manipulation of the stems should only be done during the warmth of the day and not in the cool of the evening when they tend to become hard and brittle.

Blooms tend to turn on the stem chasing the sun and if staked on the sunny side and tied right below the bud the bloom will be better positioned and flower on top. Container grown plants can be turned periodically to overcome this problem.

WATERING

Watering is undoubtedly an art which must be mastered if you are to obtain the best possible result. Underwatering can retard plants both by dehydration and starvation while overwatering can cause root damage and soften up your plants. What then is the ideal? In this State, with the vast differences in climatic conditions, soil variations and the many and varied potting mixtures used it is impossible to give a specific watering programme without knowing the full facts in relation to these factors. Beyond the following it must be left to your judgement and commonsense:

1. Do not let your plants dry out to the extent that they do not pick up quickly after a hot day.
2. Do not keep your plants constantly wet. Loam and peat mixtures warrant careful watching.
3. Try and regulate watering so that the soil or potting mixture does not dry out beyond finger depth. Keep it moist but not wet.
4. Do not water overhead in the heat of the day.
5. Cease all overhead watering immediately bud formation is apparent.
6. Switch to morning watering when buds are secured.
7. Remember that water is the vehicle which transports the nutrients through the system of the plant.
8. Trickle irrigation is a good safe medium well worth consideration as:
 - It conserves water
 - Prevents washing out of fertilisers thus reducing the quantity required
 - Prevents foliage splash and consequently leaf burn
 - Eliminates the conditions which assist fungus diseases to flourish
 - Is ideal for watering container grown plants
 - A rate of 2 litres per plant at each watering is adequate on a hot day.

FERTILISING

If you have prepared your garden plot or containers thoroughly and incorporated liberal quantities of well rotted animal manure fortified with Chrysmix 1 or a suitable complete fertiliser, this should be adequate to sustain the plants for a few weeks. However, an early dressing of magnesium sulphate (Epsom Salts) and iron sulphate fed separately, in liquid form, at the rate of 30 grams to 10 Litres of water and a half litre per plant, is beneficial. Apply these dressings a week apart and commencing a week after planting out. Nevertheless, you should not wait until all the available nutrients have been consumed before commencing a regular programme of fertilising, as the chrysanthemum must be kept growing continuously to obtain the optimum result and is a fairly gross feeder. Furthermore, fertilisers are not immediately available when applied to the soil or mixture, they take time to break down.

Approximately three weeks after setting out, apply a good 5ml measure of Chrysmix 1 or a complete fertiliser to each plant or container and continue regular weekly feedings alternating Chrysmix 1 and a suitable liquid fertiliser, such as "Aquasol", at full strength, a half litre per plant.

It is good policy to mulch containers and soil around plants with well rotted cow manure at the commencement of the hot summer months to conserve moisture and at the same time, this retains plant nutrients, allowing them to leach slowly and continuously to the plants.

As the chrysanthemum moves towards bud formation, the intake of phosphates and potash increases and the increased quantities of these elements should be available to facilitate the development of strong hard stems so essential to carry a quality bloom, following development of a good healthy bud. Consequently a change to Chrysmix 2 is recommended commencing mid January. At the same time, a liquid fertiliser with a higher level of phosphates and potash should be substituted and at the time of writing, Vegetable Zest (red pack) is the most suitable available in this State. The application rates should remain the same, that is, Chrysmix 2 a good 5ml measure, alternated week about with full strength liquid Zest, a half litre per plant. If you are unable to obtain Chrysmix 2, substitute a fertiliser with a balance around 1-3-2.

All dry fertilising should cease the first week in March and any future fertilising

must be by the liquid method. After bud formation nitrogen is required in reduced proportions to lengthen petal cells and so increase bloom size. Dry fertiliser takes longer to break down and if dry feeding continues during bud development, misshapen blooms or petal rot can result from a build up of food salts around the root system after the bloom is half open, a point at which your feeding programme should cease completely.

From the second week in March, weekly liquid dressings of red pack "Zest", or a suitable alternative, should be applied, the strength being gradually reduced until the half bloom stage, when all fertilising should cease. The author has learnt from experience that some quilled cultivars are particularly susceptible to petal rot if a fertilising programme is sustained too long and at first signs of this problem, the containers or soil should be flooded and dried out a couple of times to wash out any excess nutrients.

With ground culture the recommended quantities can be increased because of run off and spread of soil but always remember that light and often is better than seldom and heavy.

The above programme sets out proven guidelines for a specified method of culture and will need to be varied by trial and error to suit your soil and location.

Remember always water before fertilising whether by liquid or dry method and in the case of dry fertiliser again after the application, This will ensure an even spread through the soil or container.

Never apply a dry fertiliser to an exposed root system, always ensure any exposed roots are covered with soil before application, otherwise root burn will occur.

BUD SELECTION

It is recommended worldwide that the bud on the end of the stem be secured by removing all other growths from leaf axils. However, it can be fatal to prematurely secure buds for the following reasons:

1. You can accidentally remove or damage the crown bud.
2. Premature securing can result in stem⁷damage.
3. Unless the bud secured is a good regularly shaped bud free of damage the

bloom will not be up to exhibition standard.

4. Growths can be allowed to develop for up to a week in the leaf axil without it being detrimental to the crown bud and at the same time making their removal a safe and easy process.

Should it be obvious that a bud has developed too early, flowering can be retarded by retaining some growths in the leaf axils well removed from the bud until they are 50 to 75mm long.

Remove unwanted side growths from the top immediately it is safe to do so then take them alternatively from opposite sides of the stem. This procedure should be spread over a period of several days.

Some growers ensure a higher percentage of quality blooms by growing additional laterals, say 1 to exhibitions and 2 on other varieties, later removing the excess laterals gradually when the quality of the bud can be determined by visual examination, those laterals carrying the best buds being the ones retained.

METHOD OF DISBUDDING

Some growers find the best method of removing unwanted buds is to roll them out with a thumb tip. Although others find it easier to use a finger, it is simply a matter of personal preference. A sharp knife or razor blade can slip and damage the stem.

Following bud selection shoots develop in the leaf axils lower down the stem and these must be removed in order to direct all the plant's energy into the selected buds.

PESTS AND DISEASES

APHIDS* - There is more than one type of aphid which affects chrysanthemums. They breed so rapidly any infestation must be quickly controlled. Although residual sprays such as MALDISON 50 or MALATHION are useful, METASYSTOX is very effective. (Do not use ROGOR as it can defoliate). THIMET and DISYSTON can be applied through the soil, being granulated insecticides and both give good control, particularly at bloom stage.

CATERPILLARS* - Moth and butterfly larvae can do immense damage to foliage and bloom. Handpicking is a useful control, but MALDISON or MALATHION are effective residual sprays. There are other proprietary remedies available. CARBARYL is also effective but a build up of this chemical in hot weather can damage foliage. (Do not use DIBROM and heed manufacturer's warning). Spray underneath foliage and into growing tips.

CLIMBING CUTWORMS* - As for caterpillars.

EARWIGS* - This pest hides under garden refuse and rubbish. It can damage foliage and blooms. It is known to attack and ring bark the stem of the chrysanthemum. Good housekeeping and cleanliness will aid control but CARBARYL will eradicate.

EELWORM - This is a nematode invisible to the naked eye. It can enter through the root system and fumigation of containers before planting out with a nematicide such as NEMACUR can eliminate this problem.

THRIPS* - Small thread like insect which can damage buds and blooms. They are very common and widespread. If aphids are effectively controlled with systemic insecticides such as METASYSTOX, THIMET or DISYSTON, this pest should also be eradicated.

SPIDERMITES* - These pests spend most of their time under the foliage and are almost invisible without strong magnification. With the two spotted mite and spider mites, webbing may be observed at leaf axils. If out of control, blooms can be observed crawling with mites and matted with web. KELTHANE or KELTHANE V9 will give good control. It is essential to thoroughly wet underside of foliage.

LEAF GALL MIDGE - Horn like projections appear under foliage and on leaf stems. METASYSTOX gives good control.

GRASSHOPPERS - The dual control by bran and MALATHION or MALDISON bait and CARBARYL should be effective against any normal infestation.

LEAF ROLLERS* - These small moth larvae eat out the growing tip and then roll up in a leaf by sealing the edges with web to form a type of cocoon. MALDISON, MALATHION or CARBARYL (at half strength) will eradicate.

RUST - This disease is spread by spore and will show as yellow spots on the top of the leaf, but examination will show brown blobs on the underside which spread when rubbed. If eliminated in spring it should not reappear if proper hygiene is practised. To control, remove affected foliage and burn. Then spray with a fungicide such as ZINEB, THIRAM or MANCOZEB. The soil should be sprayed as well and with container grown plants the surrounding soil can be dusted with powdered sulphur. If the sulphur enters containers or is used with ground culture, the pH is lowered and must be adjusted after eradication.

POWDERY MILDEW - Sometimes appears in Autumn in damp or shaded locations. MANCOZEB, KARATHANE or BENLATE should give good control.

WILT - The various forms of wilt which affect chrysanthemums are not known by growers to be a problem in this state. Check for mineral deficiencies/excesses if foliage wilt occurs. Ensure that moisture is not to blame. Destroy any plants which are suspect.

* MALDISON 50 (MALATHION) is a good preventative spray for aphids, earwigs, thrips, caterpillars, cutworms, leaf rollers and mites but with any infestation, use of a more specific chemical will be necessary as shown under the particular heading.

Western Australia is fortunate in that a number of pests and diseases affecting the chrysanthemum in other countries cannot prevail in our climate, or have not been introduced because of strict quarantine regulations. One example is the leaf miner which dies when the temperature reaches 90° fahrenheit. Some common-sense policies to adopt with pest and disease control are:

- Always water before spraying and not after.
- Spray in cool weather after rain or when no rain is imminent, then always in the cool of the evening and never the heat of the day.
- Read labels carefully and never exceed the strength recommended by the makers.
- Limit yourself to using the minimum of sprays and take any precaution necessary to protect yourself from spray drift. Do not spray in wind. Use gloves and a mask (a wet handkerchief is a substitute) and wash thoroughly afterwards. Do not smoke while spraying.
- Do not spray blooms as petal damage can occur.
- Spray at regular intervals to prevent rather than eliminate problems.

NUTRITIONAL DEFICIENCIES AND EXCESSES

Although a list of nutrient deficiencies and excesses has been tabulated and included in this section, it must be stressed that provided the pH is checked and corrected before planting out, following which a balanced fertilising programme is maintained, nutrient deficiencies and excesses should not occur. It must also be appreciated that it is often extremely difficult to differentiate between the symptoms of various deficiencies and excesses. Additionally, many of the trace or minor elements are required in such minute quantities, grams per acre in some instances, that any corrective action on the basis of the chart provided should be confined to nitrogen, phosphates and potash, unless reference is made to someone who is an expert in the field of soil deficiencies. Reference is made under fertilising to small additional dressings of iron and magnesium and care should be taken to ensure these recommendations are not exceeded as sulphate of iron can lower the pH value and is often utilised for this purpose.

TABULATION OF NUTRITIONAL DISORDERS

DISORDER	SYMPTOMS	REMEDY
NITROGEN DEFICIENCY	Leaves become pale green and growth checked. Leaves turn yellow with margins greener. Reddish spots can develop near leaf margins	15grams of sulphate of ammonia per 10 litres water ½ litre per plant weekly till rectified.
NITROGEN EXCESS	Very dark green leaves. Older leaves remain green but younger leaves turn yellow with veins remaining green.	Water heavily till nitrogen leached out then resume normal fertilising.
PHOSPHOROUS DEFICIENCY	Growth checked and plants become spindly. New leaves dark green and smaller. Older leaves become grey and turn yellow with marginal necrosis.	5 grams mono-ammonium phosphate to 10 litres water ½ litre per plant till rectified or in ground 30 to 60 grams superphosphate per square metre watered in.
PHOSPHOROUS EXCESS	Deficiencies of micro nutrients - iron, copper, manganese and zinc are induced.	One recommendation is to water heavily to leach out the excess, but other opinions indicate that this is not successful. If a balanced fertilising programme is adopted an excess should not occur.
POTASSIUM DEFICIENCY	Margins of lower leaves become yellow and rapidly turn brown. Foliage size reduced and lower leaves die prematurely	10g sulphate of potash to 10 litres of water ½ litre per plant weekly till rectified.
POTASSIUM EXCESS	Leaves very dark green and growth checked - plants wilt. Magnesium deficiency develops and calcium deficiency may develop in acid soils.	Water heavily to leach out excess and omit potash from feeding till rectified.

MAGNESIUM DEFICIENCY	General loss of colour lower leaves. Lower and middle leaves turn yellow. Veins and margin remain green at first with reddish-purple areas on older leaves. Interveinal necrosis can develop.	Foliar spray with Epson Salts at rate 100g to 10 litres of water and add wetting agent. Repeat in 10 days.
MAGNESIUM EXCESS	Leaves become dark green and plants wilt prematurely. Potash and calcium deficiencies can be induced.	Water heavily to leach out excess magnesium and treat deficiencies if necessary.
CALCIUM DEFICIENCY	Youngest leaves turn yellow and plant internodes shorten. Small brown spots develop in margins of upper leaves which form rosettes and curl downwards. Buds on growing points can die.	Apply a lime dressing to plants at rate 15g to sq m & water in heavily. Watch pH as it can be lowered by lime application. A light dressing during soil preparation should obviate.
CALCIUM EXCESS	Lime induced deficiencies of boron, iron, manganese, copper, phosphorous.	Treat for deficiencies of phosphorous and micro-nutrients.
BORON DEFICIENCY	Leaves brittle and closely spaced. Tips of middle and upper leaves pale green to yellow and white with purple tints at margins. Leaves tend to curl upwards.	Treat with 2g of boron to 100 litres water ½ litre per plant 3 or 4 times.
BORON EXCESS	Tips of small upper leaves become scorched. Marginal necrosis middle and lower leaves.	Limited flooding can help.
IRON DEFICIENCY	Interveinal yellowing of expanding leaves. Basal areas remain green at first. ²³ Youngest leaves turn pale yellow and reduced in size.	5g iron chelates to 10 litres water - ½ litre per plant weekly till remedied.

IRON EXCESS	Deep red colouration in veins of older leaves.	Flood to remove excess.
MANGANESE DEFICIENCY	Leaves become lime green and plants uniformly pale. Middle leaves develop yellow margins which spread interveinally with areas around veins remaining green.	Mix manganese sulphate 5g To 10 litres with wetting agent and spray plants.
MANGANESE EXCESS	Small brown spots on mature leaves spreading to younger leaves.	5g mono ammonium phosphate per 10 litres water if growing medium low in phosphate, ½ litre per plant then apply 150g lime per sq m and water in.
COPPER DEFICIENCY	Leaves uniformly pale green. Unlikely to occur in soil based mediums. In extreme cases growing point dies and basal shoots may develop.	Copper sulphate 5g to 10 litres and ½ litre per plant till remedied.

NOTE:

A copper excess is highly improbable and a deficiency is only likely to occur in soilless mediums.

A severe nitrogen excess can cause symptoms identical to those of an iron deficiency and the first signs become evident in the evening, at sundown, when the foliage near, but not at the top of the plant, glows yellow, with a greener tinge on the edges. See remedy under NITROGEN.

SINGLE CHRYSANTHEMUMS

Singles require different and to a degree individual treatment after the second stopping. They should be stopped between 15th - 22nd December and again from 15th - 31st January, then when bud formation becomes evident, they must be given special attention to allow formation of a cut.

In the case of singles which become leggy, roll out the centre bud only and allow at least eight to ten side growths to run on to bud. Kathleen Olsen would fall into this category. The spacing and flowering time of the cut can be adjusted by removing excess flowering laterals from the top or bottom as necessary, thus ensuring a good cut at the time required.

Shorter growing cultivars such as Viola Benzie, Marjory Joan and Wildfire should be stopped by removing the crown bud and at least two side buds to encourage longer stem growth on the selected cut, again leaving additional flowering laterals to ensure good spacing and correct timing of the cut. Remove all excess side growth and leave a single central bud on each pedicel.

When singles are grown for show blooms it is recommended that at least eight to ten laterals be retained and run on to flower on a terminal bud with a third stopping about 1st March. All side buds and vegetative growth must be removed leaving a single flower on the top of each of the selected eight to ten laterals on the plant.

Cultivars which develop short stems are generally obvious because of their normal growth habit which is shorter and stockier.

To ensure a good evenly spaced cut each head can be wired against a diagonally opposite stem with pliable copper wire which is bent then gradually straightened as flowers open until required spacing is obtained. The author uses short lengths of dry bamboo cane with veed ends to space blooms on each cut whilst it is known that others use stiff cardboard strips. Do not forget to remove these aids when staging blooms on the show bench.

It is not a good policy to reduce cuts to four blooms until on the show bench as accidental damage can ruin a cut, besides a good cut carrying five or six blooms evenly spaced is much more attractive and any additional attention required to

obtain it well worthwhile.

The best means of protecting singles when in bloom is to grow in 300mm plantainers with handles or a hand grip and move into a garage or shed. Another problem overcome by this method of protection is fly spotting, which is very common with singles.

CASCADE CHRYSANTHEMUMS

Interest in growing the cascade type chrysanthemum has increased in recent years due to displays which have been staged in the metropolitan area. The initial stage of cultivation is similar to other types with cuttings being taken and when struck, potted on. The plants can be stopped while in small pots and again when placed into the final container. One of the developing laterals is selected as a leader with all other laterals having their top growth pinched out when showing three or four leaves.

Further laterals will form in the leaf axils and the pinching out process continued throughout the growing season until early March when bud development becomes evident. This growth forms the basic plant structure at and below the rim of the container.

When the lateral selected as the leader has grown to approximately 30-45cm it can be gradually tied down to cascade onto the chosen support. A wire mesh with 25mm squares is one form of carrying the cascading mass with the front edge of the wire attached to the container. With the development of the leader, lateral growth on it becomes evident and a similar process of pinching out is followed to formulate an attractive and compact cascade. Regular tying will be necessary to shape the plant. This includes sucker growth or basal shoots that develop within the container, which when regularly pinched out, form an attractive and neat extension of the cascade to a height of 20-25cm above the container.

Growth can be fairly rapid and it is essential that the "pinching out" process is not neglected. Full sunshine is necessary during this time but when the plant comes into flower it is an advantage to place containers in a shaded location to retain bloom colour and ensure that flowers retain their freshness and brilliance. Do not disbud as the aim is to have as many blooms as possible on the plant. Some thought has to be given to the area in which the plants are grown and it is sug-

gested that use be made of retaining walls, flower boxes or shelving. It is essential that sufficient depth be available for the cascading growth and it is also necessary to see that the container is made secure so that no damage is caused to the plant if strong winds develop.

Another fascinating variation of cascade growing is the use of hanging containers. It is suggested that three plants be grown in each hanging container. To achieve the desired shape a wire mesh is placed around the container and the leaders and laterals tied down with the process of "pinching out" adopted to ensure that the plant growth is spread completely around the container with the basal or sucker growth filling the centre area. Using these methods it is possible to achieve a specimen 1½ metres in diameter. Another variation is a fan which is achieved by training leader growths in a container upwards and outwards on a fan shaped frame.

During the growing period the cascade containers must not be allowed to dry out and in hot weather this can mean watering two or three times a day. Fertilising is similar to that adopted with other types of chrysanthemums. However, the use of a complete liquid fertiliser is recommended and this can be applied up to twice a week with care taken to regularly wash out any accumulated salts.

MINIATURES AND CHARMS

Another type of chrysanthemum being grown in greater numbers is the "charm" which is considered one of the easiest to grow and is ideal for pot display. The taking of the cuttings, potting on, the first and second stopping are similar to that with other types. No disbudding is carried out as maximum flower formation is the desired aim. Some form of staking or support may be necessary as the growth can be quite dense and heavy, consequently rain and wind damage can occur if not secured. When viewed from the top the outline should be circular, from the side circular or semi circular, depending on the size and height. Charms and miniatures are grown in full sun and as with cascades, can be placed in a shaded area to retain the freshness and brilliance of the flowers.

SPRAY TYPE CHRYSANTHEMUMS

Certain cultivars with blooms which are a²⁷ little smaller than exhibition decoratives, anemones and singles but have the same bloom conformation, are very suitable

for display when grown with a well spaced head of multiple blooms and are called sprays. These cultivars exhibited as sprays are so classified and a number are now available from local specialist nurseries. This type of cultivar is growing in popularity in other countries and can provide a spectacular display on the show bench. The spray is formed similar to a cut of singles but must carry more blooms, a minimum of five. It is defined as being a cluster of at least five or more blooms from which the central or lead bud has been removed. Each bloom being carried on an individual pedicel initiating from the same main stem or lateral and with only one bloom on each pedicel retained. When viewed from the side, the disbudded terminal spray should be rounded in appearance with the centre most blooms the tallest. When viewed from on top the blooms should be equally spaced and at an even stage of development with blooms not faded and uniform in colour. Other factors equal, the spray with the greater number of blooms is favoured.

RECOMMENDED STOPPING TIMES

Planting and stopping times of a number of cultivars have been specially noted in one metropolitan garden over the last three years and it has been established that the stopping times listed will provide a full bloom stage reached as close to 7th May as can be attained. It must be pointed out that when applied in gardens grown in close proximity under seemingly identical conditions there has been a variation of three or four days in bud show and full bloom. The table is provided as a guide only from which the new grower can work in the first year and from which he can make adjustments to suit his own conditions and method of culture.

It also has been pointed out elsewhere in this booklet that selection of a first crown bud is not recommended to novice growers in this State. Climatic conditions in the metropolitan area and the warmer districts of Western Australia do not suit flowering on first crown buds or the first crown method of culture. In the colder districts in the south of the State first crown culture is more likely to succeed.

It is generally accepted that earlier stopping encourages increased petallage. However, the hot conditions experienced through March and into April in Western Australia slow flowering and encourage the production of stale and heat damaged blooms. As a result it is generally preferable to stop later and lose a little in petal-lage producing better formed and fresher²⁸ blooms.

RECOMMENDED CULTIVARS

CLASS 1 Exhibition Incurving/Reflexed:

Garden State, Nob Hills, Pockets Late Crimson, Snowball, Coronation Pink.

CLASS 3a Exhibition Incurved - Large:

Autumn King, Mrs Frank Hay, Shirley Champion.

CLASS 3b Exhibition Incurved - Small:

Heather James, Luna, Pelsall Imperial.

CLASS 4a Reflexed Decoratives:

Garnet King, Leicester, Rose Greaves, Symbol.

CLASS 4b Reflexed Decoratives:

Princess Anne Family.

CLASS 5a-5b Incurving Decoratives:

Chester Jubilee, Elizabeth Burton, Gold Foil, Mayford Supreme, Stirling.

CLASS 6a Formal Anemones:

Daybreak, Helen Castles, Janet Castles, Stoakes Royale, Ted Elms.

CLASS 6b Informal Anemones:

Effect, Grace Hart, Sunrise.

CLASS 7 Singles:

Charmaine, Kathleen Olsen, Marjory Joan, Rose Walter, South Perth.

CLASS 8 Miniatures and Poms:

Frolic, Highball, Illini Igloo.

CLASS 9 Sprays:

Criterion, Glamour, Royal Purple, Ice Follies.

CLASS 10 Spiders and Quills:

Bunker Hill, Golden Bendigo, Florida, Smith's Red, Worlds Fair, Yellow Knight.

CLASS 12a Charms:

Apricot Charm, Bullfinch, Seagull, Yellow Hammer.

CLASS 12b Cascades:

Aki No Kagayaki, Gum Drop, Megume, Sugar and Spice

NAME	CLASS	PLANTING DATE	FIRST STOPPING	SECOND STOPPING
GARDEN STATE	1	15th Nov	1st Dec	1st Jan
NOB HILL	1	15th Nov	1st Dec	5th Jan
GOLDEN NOB HILL	1	15th Nov	1st Dec	2nd Jan
YELLOW NOB HILL	1	15th Nov	1st Dec	6th Jan
POCKETTS LATE CRIMSON	1	15th Nov	1st Dec	1st Jan
SNOWBALL	1	15th Nov	7th Dec	10th Jan
CORONATION PINK	1	1st Dec	7th Dec	10th Jan
AUTUMN KING	3a	1st Dec	7th Dec	16th Jan
MRS FRANK HAY	3a	1st Dec	7th Dec	16th Jan
SHIRLEY CHAMPION	3a	15th Nov	1st Dec	1st Jan
HEATHER JAMES	3b	1st Dec	15th Dec	20th Jan
SYMBOL	4a	1st Dec	20th Dec	25th Jan
PRINCESS ANNES	4b	7th Dec	20th Dec	31st Jan
CHESTER JUBILEE	5b	7th Dec	15th Dec	10th Jan
GOLD FOIL	5b	1st Dec	10th Dec	10th Jan
MAYFORD SUPREME	5b	1st Dec	7th Dec	10th Jan
DAYBREAK	6a	15th Nov	7th Dec	10th Jan
HELEN CASTLES	6a	15th Dec	23rd Dec	31st Jan
TED ELMS	6a	15th Nov	7th Dec	10th Jan
EFFECT	6b	15th Nov	1st Dec	1st Jan
BUNKER HILL	10	15th Nov	1st Dec	1st Jan
WORLDS FAIR	10	1st Dec	15th Dec	20th Jan
YELLOW KNIGHT	10	7th Dec	20th Dec	25th Jan

PROTECTION FROM WEATHER DAMAGE

After your buds have been secured and the petals begin to show, some form of weather protection is essential. The means of covering will be a matter of personal choice depending on the time and material available as well as the cost factor. A wooden structure covered by tarpaulins or shade cloth is one method used while some choose a hard or pliable plastic roof with detachable or drop side covers for use in high winds. Boxing is also a very good method. This is done by simply driving four stakes in around each plant and placing a plastic covered carton or plastic or canvas covered fruit case over the blooms. Fruit cases can be obtained for a few cents each from your local greengrocer and stored for use in succeeding years. If you box do not permit cartons to lie loose on your stakes as strong winds can blow them off. If they trap too much moisture through being too close to the ground on shorter growing cultivars, damping off can occur. In these circumstances use a short sided carton.

Boxing can be overdone and it is best to use an open fruit case covered by clear plastic on some yellow cultivars such as Shirley Champion, Garden State, Gold Foil and Mayford Supreme which lose colour if all light is shut out. On the other hand reds and some other colourful varieties need full protection to intensify colour. One such variety is Garnet King. However it is not possible to list in detail the varieties that require individual treatment when boxed in such a limited publication.

FINISHING AND STAGING

Selecting blooms for staging should not be based solely on size but also quality. Standard and classification notes list defects as:

1. Shallow or unspherical bloom.
2. Bloom showing disc florets.
3. Bloom showing more than one crown, an elongated crown or one not truly centred.
4. Split, twisted or malformed florets.
5. Clipped, bruised or malformed florets.
6. Purity of bloom (not defiled by dirt, pests or other causes)

Damaged or malformed florets can be easily removed by holding the bloom upside down and lightly shaking till lower petals lay flat then pulling out with tweezers to ensure correct and complete removal of the bottom defective florets. Turn

bloom upright and gradually shake down carefully eliminating unwanted petals through bloom progressively from bottom upwards.

When picking your blooms always crush or flute the stem to ensure that it draws up sufficient water.

Blooms should be dressed whenever possible before placing on the show bench.

It seems impossible to lay down definite rules on staging heights in this State as multi purpose tubes of varying heights from 150 to 380mm and a complexity of bottle sizes are encountered at different shows, so a commonsense attitude must prevail. A bench with blooms of even height throughout in each class or section looks best. It is suggested you should endeavour to set a standard by having foliage length at least equalling bloom depth on a large exhibition and take it from there on arrival at the hall. However, bear in mind that it is simpler to shorten a stem than pack it up or flute in a false stem to lift the bloom in the container.

Finally, a review of judging points as set out in the latest standards and classifications for chrysanthemums.

FORM:	20 points - your bloom should conform as near as possible to that set out for the class of bloom exhibited.
FRESHNESS AND CLEANLINESS:	20 points - blooms should have a crisp, fresh appearance, be free from dirt or marks, pests and blemishes.
SUBSTANCE AND TEXTURE:	15 points - florets should be strong and firm. Texture of florets should be as fine as possible.
COLOUR:	15 points - should be even and consistent and typical of that cultivar.
SIZE:	15 points - should be as large as possible consistent with refinement and should conform to those sizes laid down in the classification.
FOLIAGE:	10 points - the bloom's own foliage must be retained and should be as fresh as possible, of good colour and free of damage or blemish.
ARRANGEMENT:	5 points - should show exhibit to best advantage.

Standards and classifications can be obtained in full on application to the Western Australian Horticultural Council.

RESTING OF STOCK

After blooming has finished, covering materials and stakes must be removed and stored for next season and old stalks cut right back to rest your stools. During the winter months snails, slugs and caterpillars can cause extensive damage if allowed to go unchecked and you must remain constantly vigilant if these pests are to be properly controlled.

Finally, the best results can be obtained by growing from rested stock and it is sound practice to cultivate some plants of good stock as garden flowers to ensure that they do not burn out. It is good policy to obtain some new stock each year as some cultivars seem to appreciate a change of soil and environment.

The culture of Chrysanthemums is a fascinating science, one which can give great satisfaction to any who are prepared to give their plants the necessary time and attention, particularly those who are prepared to accept a challenge and regard set backs encountered as experiences which will be of benefit in the future.

A SUGGESTED CALENDAR OF ACTIVITIES WOULD INCLUDE:

- | | |
|-----------|---|
| July | keep weeds away from resting stools - protect from damage by slugs, snails and similar pests. Prepare beds for open ground culture |
| August | around 7th August cut back suckers and leave only those just developing. Cover with good garden soil and lightly fertilise. About 21st August spray with fungicide. 28th August spray with malathion or similar pesticide. |
| September | 1st to 15th September strike out cuttings for second crown culture. 15th to 30th September strike late cuttings which can be used for first crown culture. |
| October | pot on to 100mm pots. 1st to 15th October second crown culture and 15th to 30th October for first crown culture. Prepare mixture for containers - fill containers and treat with nematicide and carbaryl separately a week apart. |
| November | when growing for second crown culture pot on to 150mm pots early |

November or in the case of exhibitions or lates to final growing position progressively by 1st December. For first crown culture pot on to 150mm pots 15th to 30th November.

- December plant to final growing position and stake well. Second crown cultivars other than lates and exhibitions 1st to 7th December. First crown mid December, late flowering cultivars first. Second crown cultivars should have the growing tip pinched out about a week after setting out (see Fig. 5). See timing chart for nominated cultivars. Commencing December or one week after planting out, one liquid dressing each of magnesium sulphate and sulphate of iron separately a week apart. See programme of fertilising - then a weekly fertilising programme should be commenced and maintained until March - initially a good 5ml measure of Chrysmix 1 alternated week about with a good complete liquid fertiliser such as Aquasol at rate of ½ litre per plant.
- January early January stop first crown cultivars - for first and only time. Second crown cultivars should be stopped a second time. Refer to paragraph "second crown timing". Also note programme for nominated cultivars. Mulch with well rotted cow manure. Continue weekly fertilising programme alternating Chrysmix 1 until mid January. At that point change to Chrysmix 2 and vegetable Zest (red pack) or suitable alternative.
- February continue weekly fertilising programme - Chrysmix 2 a good 5ml measure each second week and each alternate week, vegetable Zest (red pack) or substitute, ½ litre per plant.
- March switch to morning watering. Secure buds when safe to do so and gradually remove lateral growth after bud selection. After 8th March-dry feeding programme should cease completely. Commence weekly dressings of liquid Zest. See appropriate note under fertilising. Spray buds and plants with Zineb once only in isolation after selection to prevent fungus disease and petal blight, then resume regular spraying programme. Watch watering as over fertilising and watering can accentuate neck splitting. Watch under buds and treat neck splitters as a precaution. Prepare and check covering materials, stake and tie well under buds to prevent damage.

April	continue preventative spraying programme, systemic for aphids and thrips and kelthane at the first sign of spider mites. Watch for caterpillars and if hand picking is insufficient, use a preventative spray. Taper off liquid fertilising programme and cease altogether by half bloom stage (mid April) - cover blooms when colour shows. Study show schedule and decide where to exhibit.
May	when picking for show flute or crush stems to ensure blooms draw up water. Watch stem length when picking. Stems can be shortened but not lengthened. Note blooming times for adjustment of stopping times next year. Note any poor stock and destroy. List stock you need to replace and new cultivars you require. After blooming remove stakes, store and cut back stools to rest. Protect from slugs and snails.
June	place orders for new stock with nurseries. Keep weeds back from rested stools.

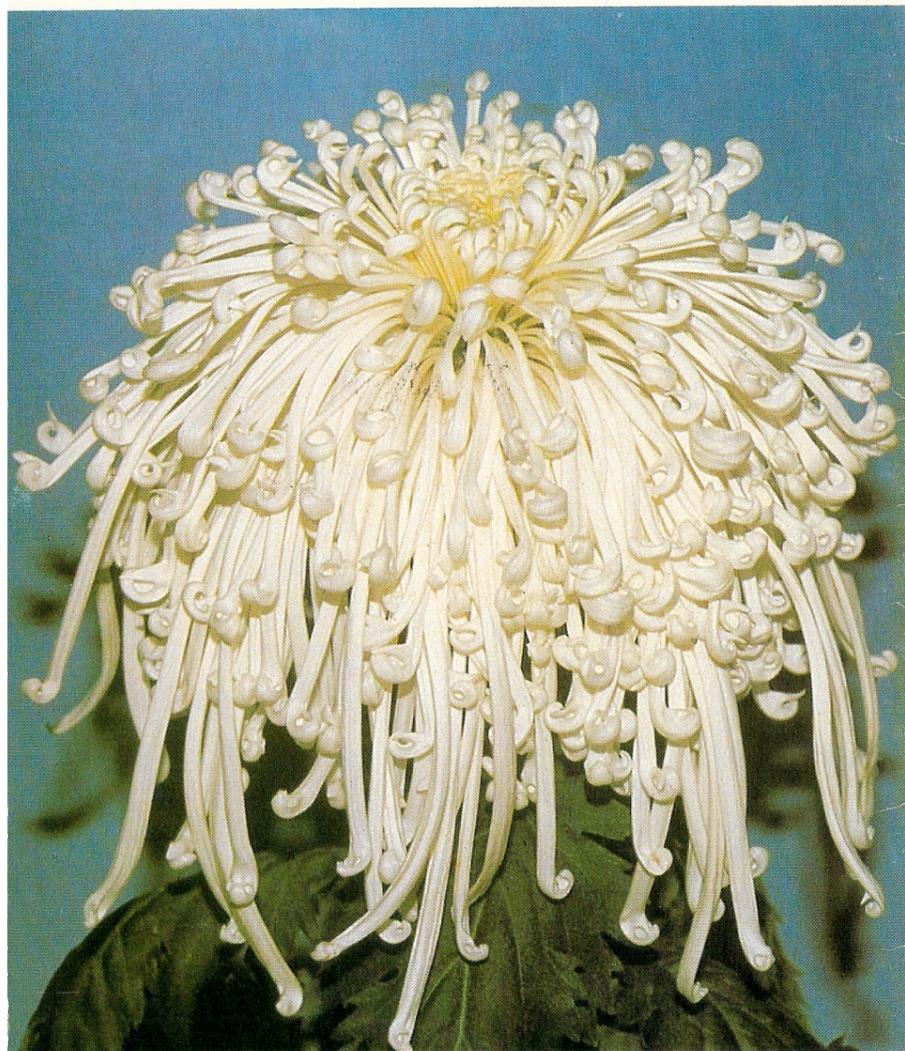
WHAT OF THE FUTURE

During the season you may have encountered problems not covered in these notes. Remember, if you did not succeed and were dissatisfied with your results in the first season you would be about average.

What can you do to improve your results:

1. Did you select too early or late and what adjustment of stopping times with the specific varieties is necessary to remedy the situation next season? It could be that some cultivars you have chosen to grow are early or late varieties and it may not be possible to make a major adjustment to flowering times to permit staging at the particular shows you had in mind.
2. Have you noted any neck splitters so they can be marked for attention in future?
3. Have you weeded out and burnt any poor or diseased stock?
4. What new varieties do you require to replace those discarded?
5. Could you cope with the number you grew this year?

No doubt you will seek the advice of experienced growers to overcome any other problems you encountered during the past season.



Perfect Accent