Flower Growers Plan to attend Florists Conference next year and meet your friends.

EXCHANGE INFORMATION

GROWERS RELAX BETWEEN SPEAKERS AND
ROSE MILDEW
Warm days and cool nights such as occur during October set up conditions in the rose ranges which are favorable for the development of powdery mildew. As the temperature drops in the late afternoon and evening, moisture condenses on the plants and the powdery mildew fungus will develop rapidly. This condensation may be prevented by cracking the vents and supplying some heat in the house as the outside temperature drops. If the disease becomes established, use sulfur on the pipes or use sprays of Karathane WD or Mildex as valuable supplements to your preventive measures.

BOTRYTIS BLIGHT ON HYDRANGEAS
The fungus Botrytis cinerea often becomes a problem on hydrangeas after they are brought into storage. The fungus normally grows on dead and decaying plant refuse, but under the cool moist conditions found in storages, invades the stems and may kill the buds. To avoid loss of buds as the result of this disease, early removal of the leaves from the plants before or after they are placed in storage is important. In addition, keep the old dead leaves from accumulating around the base of the plants. Lower the humidity in the storage by increasing the air circulation. Zineb or captan sprays applied to the plants just before they are placed in storage and at 7 to 10 day intervals during the storage period are effective in keeping the disease in check.

POINSETTIA ROOT ROT
Plants panned in August or September may need a drench of Dexon about October 15. Yellowing and curling of the poinsettia leaves may be an indication of the presence of Pythium root rot. A drench of Dexon 35% WP, 8 ounces per 100 gallons of water, ½ pint per 6 inch pan, will help prevent losses from root rot.

PESTICIDE APPLICATION RECORDS
Pesticide residues are usually not a problem on flower crops but it is essential that accurate records of pesticide application be kept. This information is valuable in measuring results in the control of diseases, insects, and weeds and is useful also in planning next season’s applications. Occasionally injury to the crop may result from the application of some pesticide. A record of the pesticide applications will help in locating the source of the trouble.

Pesticide Application Record Sheets are available for the asking at the office of your local county agricultural agent.

NEWS FROM SAF
Flowers for Church use
New aids for florists to use in solidifying good relations with clergymen have been prepared by the Florist Information Committee, announces William O’Laughlin, FIC Chairman. Four articles, written for FIC by L. J. Tolle, Jr., Instructor, Department of Horticulture, Michigan State University (now at Valparaiso University), are now available: “Flowers in Catholic Worship” (Reprinted from St. Anthony Messenger, June, 1964); “Flowers in Methodist Worship,” “Flowers in Presbyterian Worship,” and “Flowers for the Sabbath” (Jewish).

The articles are part of a series of stories — for each of the major denominations — on the use, value, and symbolism of flowers in the church. They portray the true meaning of flowers used in church; show those responsible for church floral arrangements how they can take full advantage of the beauty and symbolism of flowers; and give practical aids and basic principles underlying flower arrangement.

FIC suggests that florists call on local ministers, providing them with appropriate copies for church use. Mr. O’Laughlin states that such visits also afford an excellent opportunity to discuss the subject of flowers and funeral tributes with ministers. “This is a good time,” he says, “for florists to demonstrate their interest in the church’s needs. It is also an opening for winning a new friend . . . and possibly a new customer.”

Additional copies of these articles can be obtained at 3¢ each from the Society of American Florists, Sheraton-Park Hotel, Washington, D.C. 20008.

John Seeley Receives SAF Award
Dr. John Seeley, Professor of Floriculture and Head of the Department of Floriculture and Ornamental Horticulture, Cornell University, was the (Continued on page 5)
BENEFITS OF STANDARD GRADES

John G. Seeley, Cornell University

Standard grades are the key opening the door to efficient marketing!

How do standard grades benefit our industry?

FOR ALL SEGMENTS OF INDUSTRY
1. Provide a common language for description of the product.
2. Improve efficiency of buying and selling.
3. Improve mutual understanding between grower, wholesaler, and retailer.
4. Facilitate settlement of claims because grades aid in establishing the value of the product in dispute.

FOR GROWERS
1. Enable comparison of crops and growing practices from season to season, and assist the grower in making production and marketing decisions.
2. Aid in evaluation of markets to determine most popular and most profitable grades.
3. Enable precision grower to produce maximum quantity of desired grades.
4. Encourage uniformity which leads to reputation for dependable material.
5. Reduce the human factor by providing inflexible standards for the grading process.
6. Improve returns because the buyer tends to price ungraded flowers on the basis of the poorest in the bunch.
7. Provide a basis for growers to pool their products in cooperative marketing groups.
8. Facilitate long distance selling.
9. Make easier the establishment of the value of the product when settling claims with transportation companies.
10. Stimulate growers to correct past mistakes and improve their production and marketing methods.
11. Induce labeling of the product, and the resulting maintenance of high quality standards.

FOR WHOLESALERS
1. Enable salesmen to sell by telephone without confusion in description of the merchandise.
2. Can complete sales in less time with economies in wages and telephone charges.
3. Save time by eliminating independent evaluation of each bunch.
4. Avoid costly arguments that may arise over differences in evaluation of flowers not graded to uniform standards.
5. Eliminate problems of changes in growers’ grades from season to season, and from times of scarcity to times of high production.
6. Enable wholesalers to advise growers of the grades most desired in their market.

FOR RETAILERS
1. Enable buying by telephone with confidence.
2. Assure a product which meets standards as represented by grades.
3. Enable the purchase of grades best suited for specific purposes.
4. Provide uniformity within the bunch, and reduce loss from concealed sub-standard blooms, thus saving time by eliminating need to inspect each bunch.
5. Facilitate stock control. Provide opportunity feature one grade at special price.

FOR COLLEGE RESEARCH AND EXTENSION WORKERS
1. Provide means of expressing research results which will be meaningful to and practical for growers, wholesalers, and retailers.
2. Facilitate collection of information on the demand, supply, prices, etc. for economic studies.
3. Facilitate dissemination of marketing information in a more meaningful, understandable, and useful form.

PROBLEMS CAUSED BY, OR LACK OF BENEFIT, OF STANDARD GRADES?
1. Difficulty of training grading crews?
2. Costs more to grade by standard grades?
3. Will make wholesale business too complicated?
4. Reduces opportunity for grower to maintain his own identity and standards?
5. Eliminates the opportunity to buy bunches of mixed sizes?
6. Makes it necessary for everyone to be more honest?
7. Standard grades don’t necessarily tell age of flowers?
SOILS, TEMPERATURES AND CO₂ FOR CUT CHRYSANTHEMUMS

WILLIAM AULENBAUCH, Yoder Brothers, Inc.
Presented at 1965 Penn State Greenhouse Florists Conference

Since Pennsylvania is ranked third in the nation in standard production, I thought it would be worth while concentrating my talk today on this portion of cut mum production.

The subject of standard chrysanthemums is quite an extensive one especially when you consider the adjustments necessary for winter and summer crops, so in considering what to discuss with you today, I have attempted to narrow the field down to what's new and also what are some of the common problems of northern growers as pertains to very specific phases of a standard crop.

The areas I would like to cover are:
1. Soils and Soil Maintenance
2. Growing Temperatures in Winter
3. CO₂

SOILS AND SOIL MAINTENANCE

Perhaps one of the most important yet one of the most neglected areas in many mum programs is the soil that the crop is grown-in.

I have often wished that I had a glib tongue to drive home the importance of this problem area because it lacks the glamour in discussions of that of a new fertilizer or growth retardant, yet we at Yoders have long felt that conservatively 60% of the growing problems that occur are due to a grower's soil. This includes disease problems, stem rots in particular, as well as cultural problems.

Bench soil is much like a checking account. You cannot continually take out and never put anything back in, without your account running out. Yet many growers do just that with their soil and over a period of time their crops will eventually point this out.

Having been born, raised, and traveled extensively in Pennsylvania, I know that growers in most areas of the state, as well as many surrounding areas, have to deal with heavy clay soils. So besides the checking account situation just discussed, soil aeration and drainage become very important factors to consider in discussing soils with you.

The regular and continual applications of peat over a long period, it does not do the job it originally did of providing aeration.

Also the fact that peat does break down slowly means with regular application over a period of time you can slowly convert your soil to a predominantly muck type soil.

We at Yoders have found chopped straw extremely satisfactory as an organic soil amendment. This has not only been true in our own greenhouses, but to growers we have recommended it to where specific soil problems have developed.

Now just what does straw do for your soil?
1. Supplies a small amount of CO₂.
2. Supports soil micro-organisms in the soil.
3. Improves aggregation of soil particles especially on clay soils. It opens up silty soils.
4. Adds to moisture holding capacity which is most important on sandy or silty soils.
5. Increases soil porosity and air space because as it breaks down rapidly, easily by the end of a mum crop, it leaves small voids or air spaces.
6. Last but most important, in decomposing it leaves no residue so that over a period of time it leaves no by-product that will change soil structure as is the case with peat.

Our general recommendation has been application of 3-5” pieces of chopped straw ½” thick or about 2 bales per 400 sq. ft. applied and turned into the soil prior to steaming. Depending upon your source, this is an investment of $1.50-$2.00 per 400 sq. ft. of bench.

Since straw does break down rapidly, we make applications before each new crop on a year round basis.

Finally, one important point that should be remembered by those using straw is that additional N. fertilizer will be required in the early stages of crop development. A good rule of thumb is full strength feeds from planting through the first 4-5 weeks.

This extra feed offsets the nitrogen used by soil bacteria in breaking down the straw.
Generally less N. will then be required towards the finish of a crop since this nitrogen begins to come available to the plants toward the end.

In other words, the total amount of N. required for a crop grown in straw-improved soil is no greater than in a soil without straw added. The only difference will be the time of application.

Steam sterilization should also not be overlooked. It is just as important to you in creating good soil structure, which in turn provides for better aeration and drainage, as for insect and disease control purposes.

How does steam accomplish this? Well, steam in forcing its way down through the soil creates millions of tiny pore spaces which if left undisturbed will aid in providing better aeration and drainage. Therefore, it is most important to do most of your soil work before steaming so that this newly formed soil structure is not all ground up again.

While we are speaking of soil, how about the beds that soil is in? When was the last time you cleaned out the cracks in the bottom of your beds? How many have nearly swelled together or become crust ed over with a combination of soil and salts?

Those cracks should be cleaned out once a year, preferably just prior to planting the winter crop in each one. In some cases a skil saw is necessary to widen out those cracks.

Remember, just because the water finally comes through the beds does not mean everything is just right. Unless carried to extreme, the faster the excess water comes through, the less chance for overwatering and salt buildup, as well as improved aeration for the plant’s root system.

Perhaps I have done a bit more than highlight on this subject; however, I consider it a production trend more growers should develop. A planned soil program should be a part of every growers year round mum program.

GROWING TEMPERATURES IN WINTER

Next to soil management, one of the most important factors in obtaining better quality in winter is a complete awareness and constant attention to the temperature requirements of a winter mum crop.

Yet this is one factor in growing so often overlooked by the Northern grower. The 60° NT has been well hammered into our thinking, but daytime temperature requirements generally needs some repair work. I am sure you have gone into greenhouses during an extremely cloudy day in December or January and feel temperatures in the mid-60’s or higher and see heavy condensation on the glass.

Mum plants have one heck of a job producing enough food during low light periods and they don’t have any, not-one-little-bit-of food energy to-spare. Yet growers waste this food energy by forcing the plant to maintain a higher respiration rate than necessary. A respiration rate completely out of balance with the available light.

Light and temperature go hand in hand. Going into winter, as light decreases, day temperatures must also be decreased. In December and January this past winter, light intensity really dropped along the NE seaboard and the area generally south of the Great Lakes. We even had reports bearing out this light drop as far south as Louisville, Kentucky. In our area, the Wooster Experiment Station recorded light intensities in December and January 15% below the previous year.

Now this is a tremendous drop, and quality really suffered, however, the growers who watched their day temperatures suffered least and incidentally those using CO₂ came out pretty well.

For most growers who are flowering a bed or two a week in the same unit (without CO₂) the cool 60° formula for mid-winter is still the most reliable.

That is a 60-62 NT, 60-62 CDT, 60-62 BDT

As we pass into late winter, a higher BDT can be maintained, but in mid-winter this should not be the case. Even if one ran BDT a bit higher that might still be satisfactory. You see, the key here is close attention to temperature on those dull cloudy days. Even when vents are frozen you can still ventilate with an inexpensive poly tube to maintain strict day temperatures in winter.

One must realize that even the cool 60 is a compromise to proper winter mum temperature. The rules of the game have not changed, we just tend to forget them.

Starting plants off at 62-64, tapering to 60-62 and finishing at 56° NT’s, is still a basic premise for the best quality. Here we see a trend, because as growers expand their operations, we see more of them building separate units that can be temperature maintained independent of next week’s planting or the one the week before.

Now these don’t have to be large units, even the plastic quonsets we have used for our experimental work on CO₂ with 3-90 x 3½ ft. beds can provide a small-medium sized grower with good weekly production of 300-350 dozen standards and yet is a bright, compact, reasonably priced unit that can be just the thing for each weeks production.

Regardless of the unit, the trend is coming and it’s a good trend because it will boost the winter quality of the Northern grower and make him more competitive.

You may or may not be a part of this trend, but in either case, the point to be made here is that you
can make or break a winter crop on day temperature control alone. That's just how important it is to you.

CO₂

I would now like to swing my talk over to a very important production trend in standard production. This is probably the greatest single tool made available to the Northern grower for improving quality and production in the past 5-10 years.

I am, of course, referring to CO₂ and the new era of controlled atmosphere growing that the greenhouse industry is just stepping into.

There is no shadow of a doubt that CO₂ significantly improves quality production and shortens crop time. The only thing about CO₂ is that there are still questions that we need more answers to. For example:

1. How is the best way to inject it?
2. How much more feed is required?
3. What temperature levels should be maintained, especially in the darkest period of winter?
4. What is the most efficient concentration, or where is the point of diminishing returns?

Let's take a few minutes to review some facts to back up my statement, and also cover what we do know to date on those questions that still need more answers.

1. Going back to our 1963-64 work, 500-750 ppm provided us with an average increase of 10% in flower diameter on 35 standards and disbuds tested.
2. At that time we also learned CO₂ hastened the maturity of mums in the short day period. This averaged about 7-10 days on standards thereby cutting total crop time.
3. This past winter demonstrated that 2000 ppm hastens maturity more than 1000 ppm at the same night temperature.

4. It appears that eventually long day time could be cut by some growers so that between this and the accelerated response, total crop time could be cut 2 weeks and still maintain an increased grade and quality.

5. CO₂ definitely upgrades quality. You can get stronger, heavier stems with CO₂ than without it, even at lower concentrations of 500-750 ppm.

6. As to the best way to inject CO₂, we now have several more units on the market so that you will have ample opportunity to review the data on all of them if you are interested.

7. Feeding concentration does have to be increased, however, the rate will vary with each grower. Let me explain what I mean. It takes approximately the same amount of feed to produce a good quality crop without CO₂ as with it. The only difference is that the total crop time with CO₂ crops will be shorter, therefore, to get the same amount applied you will have to feed stronger with each feeding.

Now, we and you have known of cases where growers using CO₂ had to increase their feeding concentration by 1/4-1/3, but they have not cut their crop time by 1/4-1/3. The answer here was they were quite likely underfeeding their crops prior to the time they began using CO₂. CO₂ only pointed this out more clearly. It does this quite well, because those plants are growing at a more rapid rate and calling for feed at a faster rate.

One point that I would like to make here it that many growers underfeed their winter crops and they could do better by getting more feed to their crops with or without CO₂. Consider this; it is so true with many Northern growers — winter or summer.

8. Temperature levels is another area that needs more investigation.

First of all let's discuss NT. You know for a while we began to wonder if future mum crops would be grown at 56° NT with CO₂. The reason was that our 63-64 work showed that CO₂ would produce some excellent quality mum crops with LTT varieties, and even with some previously known to require 60° NT for initiation and development. Crop time was about that of winter crops without CO₂ at 60° and of course a considerable saving in heat could be obtained with 4° less NT.

There is a group of varieties that can be grown at 56° with CO₂ through the winter, and growers who have trouble holding 60° during extreme cold spells won't have to worry too much about possible delay when using CO₂; however, this past winter's experience clearly pointed out, that 60° is still the optimum NT for mums with CO₂.

From the standpoint of day temperatures we believe more has yet to be learned. The bright winter of
1963-64 gave a misleading idea of how high one could go with day temperatures. We went as high as 80° for 8 hours a day all through the winter and were quite successful. In 1964-65, we had a low light winter and hurt our quality until we recognized the problem and adjusted downward. With this in mind, the formula we will be trying to prove out for mid-winter this year is:

- Nights 60°
- Cloudy Days NT + 10°
- Bright Days NT + 15°

This is the maximum that will be run. Should we get into exceptionally dull weather, we may adjust downward.

Another major adjustment will be to follow the light curve of the day rather than running these temperatures from sunrise to sunset as was done previously. In other words, we plan to turn up our thermostats at 10:30 a.m. and turn them back down to NT levels at 3:00 p.m.

As we go into late winter and early spring this timing and/or day temperatures will be adjusted upward again.

If we had the equipment we would set our CO₂ units on the light curve rather than on the manual approach just described.

Actually light is an extremely important factor in getting the most out of CO₂. Not only the actual light intensity the weather provides, but the conditions growers provide. The brighter the house, the more effective it becomes.

9. Definitely more needs to be learned as to where the concentration of CO₂ ceases to be profitable as it is increased. We honestly don’t know. We plan for 1500-2000 ppm this year in our trial flowering area; however, we do plan on an experimental unit at 5000 ppm for comparison purposes. To date this range of 1500-2000 ppm has provided us with maximum total growth compared to no CO₂ or lesser concentrations. In speculating a bit in years to come as CO₂ becomes cheaper, human tolerance may become the limiting factor rather than plant tolerance.

10. In summarizing up all this for you as we see it today, we feel safe in stating that with 2000 ppm of CO₂ at a 60° NT and a reasonably bright house, a grower can achieve a 15% increase in total fresh weight over a similar unit without CO₂.

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**MAY WE REMIND YOU OF THE JOSEPH M. JOHNSTON, JR. MEMORIAL SCHOLARSHIP FUND**

CAMPAIGN NOW IN PROGRESS
The annual Pennsylvania greenhouse florist conference, held at University Park, Pa., August 3 to 5, attracted over 300 growers. Highlights of the meeting were the election of a new president, presentation of two awards and reports on the latest research on CO₂, plastic greenhouses, geraniums of the future and new wrinkles in Easter lily and cut chrysanthemum production.

The conference opened at the Pennsylvania State University research greenhouses, where the visiting growers were given an opportunity to see firsthand results of the latest floricultural research. Interest ran high among the growers who viewed the continuing geranium-breeding project and the carbon dioxide experiments on roses and carnations. A new varieties display attracted a great deal of interest; African violets, foliage plants, chrysanthemums, petunias, coleus, marigolds and zinnias were featured.

The formal part of the program began the morning of August 4 when C. S. Wyand, vice-president for development at Penn State, welcomed the florists to the campus and pointed out that their group was the first to meet in the new building.

Dr. James Tammen, head of the plant pathology department, led the morning session. He introduced three colleagues who reported on their work. Dr. John W. Mastalerz, of the floricultural section, spoke on recent advances with CO₂. Research has revealed that high-temperature crops, such as roses and chrysanthemums, show a greater response if greenhouse vents are kept closed longer during the winter. Soil fertilization levels are no problem if the grower maintains a luxury level with his crops. However, if he maintains a limited fertilizer level and uses carbon dioxide, he may encounter problems.

Ventilation is the prime source of CO₂, but a maximum of only 300 ppm could be attained. Doctor Mastalerz stated that CO₂ levels should be maintained at 1,000 ppm; so, other sources must be utilized. Mulches have been used by some growers to help raise CO₂ levels, but manufactured sources produce the most. The manufactured source, whether it be from liquid or compressed CO₂ or as a by-product of combustion, can be used to maintain high levels. The growers were cautioned to use materials that would burn clean for the combustion method. Impurities that are potential troublemakers are carbon monoxide, ethylene and sulphur.

The following points should be considered by the greenhouse owner: (1) cost of CO₂, (2) the advantages of renting or buying, (3) installation costs, (4) operational costs and (5) gas purity in his area.

Dr. Robert Aldrich, of the agricultural engineering department, gave a progress report on his work with plastic greenhouse structures. Currently three experimental multibareled houses are being tested, and soon the radically designed H-P plastic house will be erected.