Quality Geraniums and Bedding Plants *

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According to the USDA Census figures, about half of the commercial flower growers in Massachusetts are producing geraniums and bedding plants. Some growers are still heading down the road the same old way. The successful grower of geraniums has two avenues of approach. Continue to select your own stock plants from the best that you grow. If you pick your own, make sure that it is disease-free, has good growing habits and is typical for the variety. Make your selection while the plants are in flower in early April and remove all the buds. Put them in a special location where they won't be sold. Above all, don't pick your stock plants from the "tail end of the pickings" after the customers have pawed over them. If you buy in your cuttings, know your producer and what he has to offer.

The second avenue of approach to geraniums is being used by some growers. They have set their sights on the newer ideas. One Pennsylvania grower cut his losses to six out of 20,000 cuttings by using culture-indexed cuttings. What place do they have in your greenhouse? Should you be growing them? If you have had a disease problem, you should definitely be interested in culture-indexed geraniums. Research work has proved that geraniums can be cleaned of bacterial disease problems through culture-indexing. Rigorous sanitation practices are maintained by the propagators who are supplying culture-indexed geraniums to the trade. The cuttings from such plants are more expensive, but handled properly they will assure you of a finished crop. Can you be assured of a finished crop of cuttings obtained from a commercial propagator who grows his stock plants in the field? The field grown cutting may be low cost, but bacterial stem rot is no bargain.

How should you handle culture-indexed cuttings? Two methods of handling the cuttings are suggested. Method 1: Purchase your entire stock of cuttings from a specialist propagator and pot them directly

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Quality Geraniums *(Continued)*

for production and sale. This method means a single stem, and the chances of introducing geranium diseases are reduced to a minimum. There is no need to carry stock plants and propagation costs are eliminated.

Pots should be filled with soil, spaced and then steamed. The hose nozzle must be hung up to prevent its coming in contact with the greenhouse floor. The plants are grown on for sale, and all unsold plants should not be kept for future stock.

Method 2: Establish your own stock plants from culture-indexed cuttings. The initial cost of culture-indexed cuttings is reduced with this method, but strict sanitation practices and regular spray programs are a must. The cuttings should be grown in a separate location away from the regular production area. An ideal situation would be for the cuttings to be isolated in a separate house. If possible, the owner or one grower should be assigned the care of the culture-indexed stock in order to assure the disease-free condition.

Handle the cuttings as in method one, plant on a steam treated bench in sterilized pots and soil. The cuttings should be flowered only to verify the variety, then the flowers should be removed as they appear. Remove cuttings with a sterile razor blade, using one blade per plant. Cuttings may be broken off, but the use of a knife to trim the cuttings is frowned upon by the plant pathologists. The cuttings are propagated for your final salable plant.

What about mixing in culture-indexed cuttings with regular stock? It can be done, but chances are greater for the spread of disease organisms. The culture-indexed cuttings are disease-free, but they are not disease-resistant.

A new method of handling stock plants is being used by some propagators on a limited scale. With this method, single-stem or tree, the plant is trained to one stem and the lower lateral shoots are pinched with two or three leaves remaining. The terminal shoots are pinched one month before the cuttings are harvested. The stock piled cuttings are removed at one time. All terminal cuttings are removed and the remaining portion of the plant is cut up into leaf bud cuttings.

Most propagation of cuttings made are terminal or tip cuttings. Recent work where the entire stock plant is utilized for propagation, has increased interest in the use of single-eye stem cuttings. A stem cutting will require about a month longer to produce a 4" plant, compared with a terminal or tip cutting. It is suggested the stem cutting be inserted into the propagation bench so the surface of the sand is just below the bottom of the leaf petiole. The stem cutting cannot be plunged too deep. All nodes that have produced a flower should be discarded as no shoot growth will result. Stem cuttings taken from a stock plant will outnumber terminal cuttings by two or three times according to recent reports. At the end of three months, plants from terminal cuttings were slightly taller than plants from stem cuttings grown at the same temperature, but the difference was not considered significant.

Geraniums will root readily without the use of rooting hormone. If a rooting powder is being used, add a fungicide such as ferbam. The use of a puff duster is recommended for the application of this mixture. The cuttings only need a small amount on the cut end, and it is not necessary to coat the cuttings.

Sand is the most common rooting medium and should be sterilized between stickings. When this is not possible, sand might be used twice with ferbam being watered into the sand both times. Cuttings should be inserted in the rooting media about 1" but not buried. Usual spacing is 1" apart in the row, with 2" between the rows. Some varieties will require wider spacing. Geranium cuttings can be rooted directly in peat pots with a saving of labor and time. Cuttings should be potted in sterilized soil.

Spacing is important as crowded plants become leggy and branching is reduced. The leaves should just barely touch, with an ideal being 3" to 4" between 4" pots in each direction. For good growth and flowering, a minimum of 55 degrees at night and 65 degrees during the day is recommended.

Much has been said about the culture-indexed geraniums and the bacterial stem rot diseases. Will you have to turn your greenhouses into hospitals to grow plants in sterile conditions. No, but it will have to be remembered that the culture-indexed cutting is disease-free, not disease resistant. Two approaches to the disease problem are being made at Pennsylvania State University. Dr. James Tammen has approached it from the plant pathologists' viewpoint: find the plants that are disease-free and keep them that way. Dr. Darrell Walker, head of the horticulture department and plant breeder at Penn State and Dick Craig, graduate student, are presently trueing up the various lines of the geranium.

Inbreds, F_1 hybrids, F_2 families and backcrosses

are being observed to study the inheritance of many of the most important characters. Over 3000 F_1 and F_2 plants have been observed in the field and about 800 inbreds and F_1's in the greenhouse. Dr. Robert Snetzinger, research entomologist is testing the susceptibility of geranium varieties to spider mite attack. Normally, geraniums are not bothered by spider mites. However, some of the varieties have proved to be quite susceptible to spider mite attack.

The future for the geranium looks bright. Bacterial stem rot and other diseases are not transmitted by seed. However, all seed today that is available is not true seed, it is a mixture of various flower colors and leaf patterns. Progress is being made on producing true breeding commercial geraniums from seed. Dr. Walker estimates that the grower will be benefiting from this research in several years, when seed of high quality bedding geraniums in separate colors will be available.

The geranium seed is large with a hard seedcoat. Germination is slow and sporadic, until the seedcoat is scarified. A mechanical device will probably be worked out to scarify the seedcoat.

Seedlings should be transplanted when they are about one inch high and before the first true leaves develop. The seedlings can be grown in peat pots for about six weeks after transplanting. This depends on the size of the plant. Pinching the seedlings is not necessary as it will cause a delay in flowering, but is necessary with late fall sowings to control height. Seed sown in late November or early December is necessary for spring sales. Light intensity is the most important factor affecting the growth of geraniums from seed.

Another crop that seems to be booming, produced by many growers, both large and small, is bedding plants. Quality in bedding plants will become a must if the crop is to be marketed at a profit. Labor costs are very high for this crop, while the packet of seed accounts for only a small part of the overall cost.

There is no easy road to producing high quality bedding plants. The difference between a mediocre or fair plant and a superior plant is mainly the difference between poor planning and good planning. Of course, any plan will mean little if it is not carried out as originally planned.

The following steps may help to produce quality bedding plants:

1. Prepare a plan while the crop is still fresh in your mind.
2. Use good seeds and cuttings of the best varieties. Take advantage of the All-America trial grounds to see the new varieties. Plan on growing some of the All-America winners.
3. Use a good soil, prepare it ahead of time, have a soil test made to check on the soluble salts, pH, and fertilizer status.
4. If soil is a problem, perhaps the use of an artificial soil mix is a possibility.
5. Use careful preparation and supervision of seed flats. Perhaps artificial light can be used to advantage for germination. Seed flats should be lighted for 16 hours daily, with a warm white 40 watt fluorescent light about 8" above the seedlings.
6. Control insects and diseases. Tests conducted at Penn State indicated that Dexon-Terraclor is safe for the control of certain diseases on bedding plants.
7. Judicious watering.
8. Give adequate spacing to the plants.
9. Use optimum temperatures and ventilation.
10. Top the varieties that may need shaping.
11. Maintain the right nutrition.
12. All of these factors don't mean much unless the successful bedding plant operation has accurate records on sales information. Prices vary between areas, but you should not sell your bedding plants too cheap.

Have you considered any of the newer research findings on bedding plants? Compact petunias are an example of some of these findings. Petunias can be given "black cloth" treatment from 5 P.M. to 8 A.M. right after germination and continued for 40 nights. The short days will shorten the stems and give a more compact plant.

Growth regulators may be the new control measure to shorten the stems of petunias. The use of Phosfon D will make the leaves greener and thicker, and the petioles more rigid. Use ¾ to 1 oz. of Phosfon D per bushel of soil mixture and mix thoroughly. *This material should be used on a trial basis only.* Two other new growth regulators, Phosfon S and B-995 show exceptional promise. Both of these materials are applied as a spray and can be used at the seedling stage.

The future looks bright for bedding plant growers and increased production and sales. Let us hope that we can educate our American homeowners to really use flowers as they do in Europe.

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