

use some different management procedures. However, almost all growers I know are now using a soilless mix because it has the key qualities listed.

Seed selection is another important link in the transplant production cycle. One reference I have says to "Obtain the best seed money can buy!" The authors state that the cost of the seed relative to the total production cost is small, so it pays to get good seed. Good seed will have a high germination rate, the resulting seedlings will have good vigor, and the seed itself should be free of any diseases. However, there are no guarantees that any seed will be completely disease free. Seed can be disinfected but this is a time consuming and sometimes tricky process. Be aware that you should not treat seed that was treated by the supplier and you should only treat seed just prior to sowing.

Vegetable seeds should be germinated as quickly as possible to help reduce susceptibility to disease. The seedlings should be kept at a warmer temperature early in their development to have the cotyledons come free from the seed coat as soon as possible. This reduces the opportunity for disease transfer from the seed coat to the seedling. Once the seedlings are free of the seed coat then they can be transferred to a cooler location, if necessary, for growing on.

There were many details of greenhouse environmental control discussed along with the resulting effects on the growth of seedlings when changes are made within this closed environment. Unfortunately, the length of this column prevents a detailed discussion of most of these factors. However, one important factor in the control of plant height and development in the greenhouse is temperature, particularly the difference between day and night temperatures. As you probably already know, war-

mer temperatures promote greater seedling growth. One problem that sometimes occurs during transplant production is that the plants become too large prior to planting in the field. You can reduce the height of your seedlings by reducing the difference between the day and night temperatures. By keeping the temperature fairly constant, the internodes of the seedlings will not develop fully and your seedlings will stay smaller. A warm greenhouse (day and night) will result in seedlings that are short but have more leaves than a cool (also day and night) greenhouse. High temperatures during the early morning hours (just after sunrise) will also result in greater seedling height. You can also reduce plant height by keeping the temperature cooler during this time.

Another important factor in greenhouse environment control is maintaining the proper humidity levels. High relative humidity in the greenhouse, especially going into the evening hours, can be an invitation to a disease problem. As the temperature falls, the water vapor could condense on the roof of the greenhouse and then drip on the plants through the night. Cool temperatures and wet plants are a major contributing factor in the development of plant diseases. Be sure to vent your production greenhouses, even on cool days, to prevent this buildup of humidity going into the evening. The slight

increase in heating costs will be low when you consider the potential cost of losing all or a portion of your plants to disease.

Preventing the start of a disease in your vegetable transplants is important but the way you respond to the appearance of any diseases is also critical. Plants showing any possible disease symptoms should immediately be isolated, if possible, to determine if a disease is actually present. If a disease is identified, then action can be taken on those specific plants and the rest of your transplants were not unnecessarily exposed to the disease while you determined the cause of the problem. The mixing of plants from different production areas should also be avoided to reduce the spread of disease. A rapid response on your part is most important in preventing the further spread of disease in your transplant operation.

Ultimately, management of your greenhouse to promote the development of strong, healthy vegetable transplants will help reduce the possibility of a disease outbreak. Healthy transplants will also establish in the field faster and most likely result in greater yields throughout the growing season. Take some time to review your vegetable transplant production methods to see if there are any ways to improve. It will surely be time well spent.

**THE COMING SEASON**  
Many activities are already under way for the coming growing season.

Producers of vegetable transplants have either started their plants or will soon be seeding. As is the case with most other plant production processes, there are many factors that can cause failure during the growing process.

Recently, several agents from this area hosted a vegetable transplant production meeting in York County. Topics of discussion included diseases, greenhouse environment control, and the actual growing of transplants.

I know there are many growers in the area who were not able to attend the meeting so I thought I would summarize some of the information presented in this month's column. While the meeting was specifically for vegetables, the principles discussed will often apply to the production of bedding plants as well.

Disease prevention in the greenhouse starts with sanitation. Any materials that are reused from the previous production cycle need to be cleaned and disinfected. This includes flats, benches, and even the greenhouse itself.

A "homemade" solution of 10 percent bleach or a preparation made from a commercially-produced disinfectant product should be used for this process. Be

sure that anything to be disinfected stays wet for at least 20 minutes. If bleach is used, be sure to rise the flats, benches, etc. before seedlings come into contact with them. If a commercially prepared product is used then be sure to follow the manufacturer's directions for mixing and application.

Sanitation in the greenhouse also includes removing/elimination other sources of infection. One such source is weeds under the benches. All weeds should be pulled or killed with an herbicide prior to bringing any vegetable seedlings into the greenhouse. Ornamental plants should also be removed from the vegetable growing area whenever possible. Many viruses will survive in weeds and ornamental plants and then can be easily spread to the nearby vegetable plants. The final disease vector in the greenhouse is an established insect population, particularly thrips. Failure to control thrips prior to starting your vegetable transplants is an invitation to a disease outbreak (not to mention a thrips problem!).

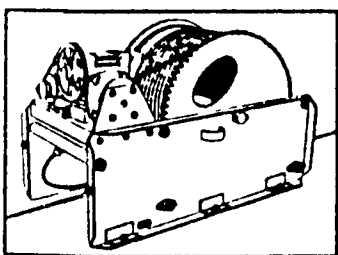
The next component for successful transplant production is selection of a good growing medium. The key qualities of a growing mix are: sterility, good drainage and aeration, and good water holding ability. I don't think there is one "ideal" mix for all operations since each grower will

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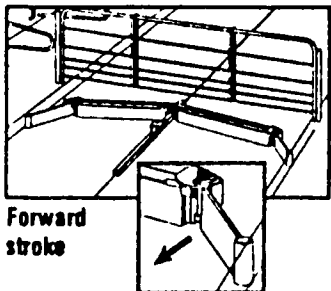
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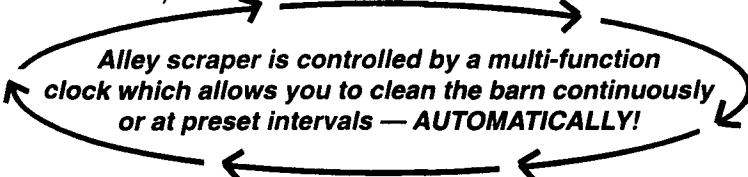
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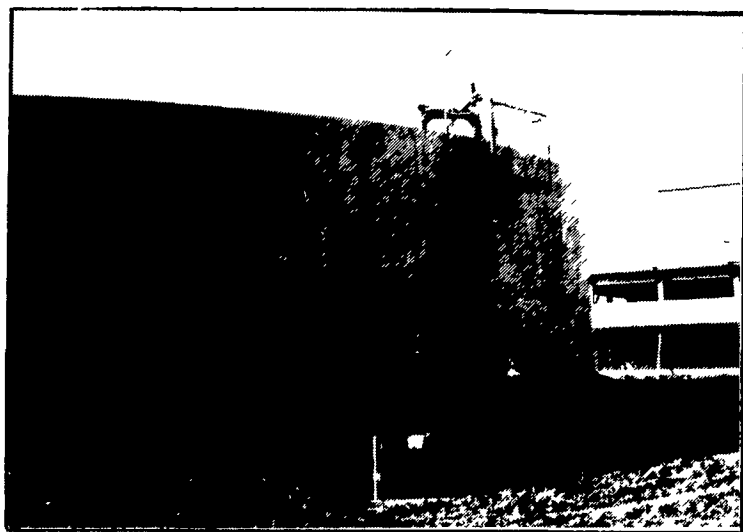
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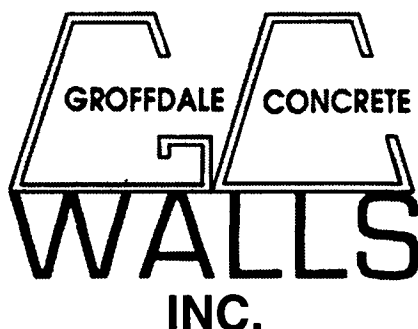


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