

## MAINTAINING DISEASE-FREE GERANIUM STOCK PLANTS...

### The Impossible Dream?

Is it possible to maintain disease free geranium stock plants for more than one year? Is it worth the effort? Most authorities agree that the answer to these questions is a resounding "No".

Several years ago, major crop losses in geranium were experienced and expected by growers due to various bacterial and fungal diseases, particularly bacterial blight (*Xanthomonas compestris* pv. *pelargonii*) and Verticillium wilt (*V. dahliae*). To this day, there are no chemical treatments for these highly destructive diseases, however, the practice of culture-indexing has given us a way to select plants which are disease free. Most propagators subject the plants to three different culturings in order to assure that they are free of *Xanthomonas*.

#### Common geranium pathogens:

**Botrytis.** Gray mold on leaves, stems and flowers. Sanitation, good air movement and other practices to prevent moisture accumulation on plants, remove flower trusses before they bloom and drop petals. Benlate (Benomyl), Daconil 2787 (Chlorothalonil), Ornalin (Vinclorolin), Chipco 26019 (Iprodione).

**Pythium.** Shiny coal black areas on stem. Sanitation, avoid overwatering, sterile media, discard infected plants. Truban (Ethazole), Banrot, Subdue (Metalaxyl)

**Rhizoctonia.** Stem rot. Sanitation, sterile media, Benlate, Terraclor, Banrot, ChipCo 26019.

**Thielaviopsis.** Black rotted areas on roots; mainly- a problem on cuttings. Sanitation, sterile media. Banrot.

Although culture indexed plants do not have disease at the time they are shipped to growers, these plants have no inherent resistance to fungal or bacterial disease. Therefore, if they are exposed to pathogens, they can become infected. This is why grower's manuals recommend that indexed stock never be mixed with non-indexed stock and that plants not be held over from year to year. If stock plants are used for more than one year, it is inevitable that they will succumb to diseases sooner or later.

As if the list of bacterial and fungal diseases striking geraniums were not formidable enough, there are also a slew of viruses. Viral diseases in geranium do

not generally cause any of the more clear cut and dramatic symptoms of fungal and bacterial diseases. Whereas plants infected by bacterial blight might exhibit such symptoms as leaf spots, stem rot, dieback and blackleg, plants infected with a virus tend to have symptoms that are more subtle and difficult to detect, such as fewer and smaller flower heads, stunting, poor plant habit and poor rooting. Fortunately, both culture and virus indexed (CVI) plants are available to growers.

As part of the virus indexing procedure, geraniums are generally exposed to a heat treatment, cultured from meristems and then indexed to assure that the plants are truly virus free. However, just as culture indexed plants are not resistant to fungal or bacterial pathogens, virus-indexed plants are not resistant to viral infections.

The question then becomes, "What actions can a grower-propagator take to keep stock plants as healthy as possible?" The answer to this question lies primarily in sanitation. The grower must prepare and maintain the greenhouse for his fresh stock plants with the same thorough and dedicated attention to sanitation as hospital staff preparing a room for surgery. Before planting stock plants the greenhouse should be clean and free of weeds, pests, and diseased plant material. It is best to sterilize the entire greenhouse with steam if possible. Benches and surfaces should be washed down with a hospital disinfectant such as Physan or bleach.

Wooden benches should be sprayed or painted with copper naphthanate (without penta) to protect against rot. All plant debris should be removed from under benches. Potting media should be sterile. Floors and benches should be sterilized with a formaldehyde solution before dumping sterile media on them. It is best to use new pots. If old pots are used, they should be cleaned and steam sterilized or soaked 1/2 hour in a 10% Chlorox solution or 1 hour in a 10% hospital disinfectant. Any tools or nozzles which might come in contact with the plants should be disinfected and hose nozzles should never be allowed to touch the ground.

When cuttings are taken, it is best to snap them cleanly rather than cutting them with a knife. If knives are used, they should be changed every 10 minutes and soaked in disinfectant.

Weeds and insects must be faithfully controlled. Vents should be screened to protect against invasion by aphids, white flies and thrips. Since several viral diseases are transmitted by aphids, and the white fly is a known vector of *Xanthomonas compestris* pv. *pelaigonii*, control of these insects is crucial.

Plants must be watered and handled carefully. Because fungal spores and bacteria can be spread by splashing water, care should be taken to avoid splashing water onto leaves during watering (drip irrigation would be a good choice here). Plants should be adequately spaced for good light penetration and air flow; leaves large enough to impede air flow and shade the rest of the plant should be removed. Flower stems and buds should be removed to reduce chances of Botrytis infection. Any plants infected with bacterial blight should be thrown out, and, if possible, burned. Appropriate preventative fungicides should be employed in a timely manner.

Looking at this preliminary list of things one should do, it becomes apparent that a good geranium grower's work is never done! When we consider such factors as: (1) The availability of CVI material; (2) the high odds that CVI plants will become infected with disease over time; and, (3) the relative ease of transforming stock plants into showy tree geraniums or patio plants capable of commanding a good price - **the value of keeping stock plants over seems highly questionable.**

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