

won't be able to top dress because the surface of the medium stays dry which is an advantage in that it restricts the growth of weeds to a great extent.

CHARLIE PARKERSON: How soon after you added the fertilizer to your mix were the plants canned and irrigation started? Some of these materials are pretty hot.

EDDIE AUGER: These were mixed into the medium as we were canning them.

ANN MOLES: In some work done at North Carolina State University using different levels of Osmocote we found that with subirrigation the growth at half the manufacturers recommendation was far better. I was wondering what rate you used?

EDDIE AUGER: We used the manufacturer's recommendation for all the material.

MIKE DODGE: One of the problems in using mats is the buildup of algae, did you have any problem with this?

EDDIE AUGER: Algae didn't seem to be a problem and of course can't there is little chance of it to build up.

## **MINIATURE ROSES BY OASIS ROOTCUBES**

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### **CUTTING PREPARATION AND STICKING**

We start by taking 4 to 5 inch cuttings directly below a node using hand clippers. For convenience we use Clorox sterilized 2 gal buckets, which are used by our mail-order picking department, for collection of cuttings. While collecting cuttings, we try to keep them shaded and cooled with water to maintain turgidity. The average cutting is medium soft with six nodes and approximately 5 inches in length depending on cultivar. We find that we have a greater percentage of rooting and much less disease problems if we cut out the soft tip growth. Leaving two nodes with leaflets, we strip the rest of the cuttings and put them in bundles of 50. We have found it critical that the cuttings be cut within 1/8" below the node, for if more of the stem is left below the node a larger percentage of cuttings are lost due to rotting off. The cuttings are dipped in a quick-dip solution of: 10 grains of IBA (K salt), 20 cc isopropyl alcohol and 1 gal water. The cuttings are now prepared to stick.

To prepare the Oasis Rootcubes, a sterilized plastic shallow flat which measures 1-1/2" x 11" x 21" is filled with 1" of potting mixture which consists of 1/2 #7030 Choice Mix, 1/4 #2

vermiculite and 1/4 Canadian peatmoss. This is the same consistency of mix these cuttings will be potted in 21 days from sticking. I feel this is an important detail; the cuttings will root down into the mix that they will later be grown in, giving us a much stronger, vigorously growing cutting to pot off. Also, with the use of soil in the flats, when the production schedule lags, these cuttings have the same mixture to feed on as they will be potted in and will not reach a nutrient deficient stage until they can be potted.

The block of cubes is laid on the soil and watered in; in the process we sterilize and fertilize the cube by injecting at 200 ppm Banrot, Peters 20-20-20 and Sequestrene 330 FE, with Aqua Gro wetting agent, which cuts our time in half wetting the cubes. By following this procedure at the time of sticking, our percentage of rooted cuttings is much higher with more uniform, stronger root development and with minimal disease problems. When using the 3/4" cube, care must be taken as to depth the cutting is stuck. We have had best results by sticking the cutting 2/3 of the way through the cube. Cuttings that are stuck too deep tend to rot off. We have also found that an application of 4 oz. of Osmocote (19-6-12) per flat at the time of sticking will save 4 to 7 days in the rooting process. Contrary to literature printed on mist cycles with the use of Oasis, I have found on typical rooting months of May, June and July, days when the temperature can reach the 90's, we can set our 10 sec, 15 min clock to run from 9:00 a.m. to 5:00 p.m. without injury from wilting. In general I have found the least amount of excess moisture on the foliage, the more enhanced the rooting process and naturally less disease problems. Obviously we alter the mist cycle on cloudy days, usually misting only twice a day. Depending on the cultivar the time from a cutting to salable plant ranges from 7 to 11 weeks.

We prefer to use the 3/4" rootcubes eliminating the root breakage which occurs when sticking four cuttings in 1-1/2" rootcubes. We do not actually need the depth of the 1-1/2" cube because we just want to use the Oasis as a rooting medium and then get roots down into the soil, which will result in much stronger growing cuttings.

Rootcubes are sterile and safe to use as received from the manufacturer, but if exposed for a period of time must be sterilized before a reuse. Oasis Rootcubes contain very small amounts of fertilizer that will supply a minimum fertilization during the rooting period, thus the reason for the application of Osmocote (19-6-12) at time of sticking.

## POTTING

Rootcubes should not be potted below normal growing depth. When this was done we had as high as 40% loss in transplanting due to cuttings rotting off. Keep the cutting and Oasis cube up out of the pot and let the soil filter in around the roots, with the top half of the cube exposed when finished. This procedure gives 95 to 100% transplant success. We also run all of our transplanted cuttings in a shaded house for 10 days after being potted.

We are producing 31 cultivars of miniature roses at Spring Hill, 16 of which are for our mailorder catalog. We have four main growing houses for miniatures and one propagation house.

## INSECTS AND DISEASE PROBLEMS

While working under Mr. Geid Stroombeck, he taught me to have a keen eye for problems as they arise and to find prompt, correct solutions to those problems. One of the main insect problems of miniature roses is the two-spotted spider mite. To control spider mites we use several insecticides some of which are Omite, nicotine, Pentac, Kelthane, Plictran, Orthene, and Temik.

One of the main disease problems of miniature roses is powdery mildew, which thrives when the air is saturated with moisture. One of the best devices we have used to help control powdery mildew is the sulfur burner, which operates by a 60 watt light bulb inside a canister, which vaporizes the sulfur. I don't profess to have complete control of powder mildew, but fungicides I have seen used are Karathane, Pipron, Benlate, Phaltan and Acti-dione. In my opinion Pipron is the best to eradicate the problem and Benlate sprayed regularly to keep it in check.

## PROGRAMMED OVERWINTERING FOR SPRING CUTTINGS

From mid-November to mid-December we strip all the leaves off our miniatures and trim them back about 2/3 to get a well-branched plant about 6 inches high with no foliage and no debris in the pots. From December 15 to March 1, the miniatures will be kept at 35 to 40°F. Starting on March 1 we raise the temperature to 50°F the first week, to 55°F the second and 65°F the third week.

Fertilization with Osmocote (19-6-12) at 2 lbs/1000 sq ft provides supplemental feed for the plant roots during the dormant period. On the fourth week of February we fertilize at 200 ppm using Peters 9-45-15 along with some iron chelate. This in combination with the Osmocote and rising temperatures in

March gives us the highest quality and quantity of disease free cuttings that I have seen on any single crop anywhere.

## **CONTROL OF DISEASE PROBLEMS AS IT RELATES TO PLANT PROPAGATION**

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Control of all diseases relates to propagation. Propagation is where general nursery disease control programs begin. Programmed, i.e. successful, plant disease management is based on propagation of only healthy plant material in an environment free of disease.

Achieving an environment free of disease is the same as saying controlling diseases during propagation. Active disease at this stage of the game means we will lose cuttings or seedlings. Disease means we will lose control of crop management and rooting or seed germination programs. Finally, disease means that we will be producing a certain amount of lower quality material that may actually be infected already. This infected material will be impossible to adequately program later on. It may eventually die after you've invested time, space, and money into it!

### **DISEASE AND THE PROPAGATION ENVIRONMENT**

Why does disease sometimes become active during propagation? It is because the environmental conditions inherent in propagation programs tend to favor the spread and survival of pathogens. These are warm, humid situations in which water is sometimes splashed about. The key to the control of propagation diseases rests in part in altering these conditions. For instance, misting programs that allow the foliage to dry by night-fall would be a good idea for botrytis control. Moving seedling flats or changing the environment to cooler, drier situations as soon as seeds emerge will help control damping off. Spacing or removing foliage of cuttings in flats to allow more air movement will aid in disease control. The rooting medium can also affect the percent rooting of cuttings of several woody plants. Changing the rooting medium can change the pathogen environment.

### **REDUCING PLANT STRESS TO CONTROL DISEASE**

Cuttings without roots are highly stressed plants. That is, they are subject to invasion by organisms that would, in the