

end of the season, and I decided to keep them in storage for another month or two. We looked at these buds throughout April and May, and they looked nice and plump. About the first of June, I took out these roses. The roots were just wrapped and the tops were frozen. The buds looked plump so I budded them. Everyone of them grew. Well, that gave me the idea that rose budding "eyes" could be kept in storage.

Our first method was to cut the buds in late fall, put them in a peach box with a layer of peat moss, another layer of buds, and another layer of peat moss, and then dip them in a pail of water and freeze them solid at 25 degrees. However, they were hard to thaw out. So, finally, we decided to start wrapping them in newspaper and butcher paper, and from there we went to newspaper and polyethylene bags, which we use now. Now we keep these buds at 30° or 31° F.

We take these roses just before digging, in late October, and take off just the very hard wood along with the entire leaf. Then we wrap them in paper, dip them in a pail of water, let them drain a little, and then put them in the polyethylene bag and tie it tight. This method is now used exactly in rose garden areas all over the world. The European growers, however, have not gone ahead with it as much as American growers.

Of course, frozen buds are much harder to dethorn than fresh cut buds, I tried to trim mine one time without experimenting, and I dethorned about a half million buds. Needless to say, the frost got into where the thorn had broken off and we lost the entire lot.

MODERATOR HAUSCH: Thank you, Mr. Dering. Now we will hear from a rose grower from Wilsonville, Oregon, Mr. Fred Edmunds, who will discuss commercial production of roses in Oregon. Mr. Edmunds!

COMMERCIAL PRODUCTION OF ROSES IN OREGON

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Our aim in production of two-year field-grown roses is to provide a plant with a well-branched, heavy top, a shank of two inches or less, and a finely divided root system with many flexible roots. From the standpoint of trade acceptance as well as an item that can be handled with ease, we try to approach the ideal as nearly as possible by varying our cultural methods.

Our climate is best divided into the dry season and the wet season. From June 15 until October 1, less than 10% of our rain falls. The rest of the year is cool and moist with our coldest weather arriving about the middle of January. By employing the attributes of our climate to best advantage and devising pro-

tection from severe weather, we are able to produce one of the finest quality plants at the lowest possible cost per unit.

Our cuttings are shorter than usually planted, being only eight inches in length. We use the Clarke strain of *Rosa multiflora* for early budding, and the Burr strain of *R. multiflora* for mid-summer and late-summer budding. Both are upright and nearly thornless. *R. multiflora* is relatively free from pests and diseases and seems to thrive in our climate. We find also that it will produce the most ideal root system under proper cultivation procedures. The cuttings can be made any time between October 1 and February 15; planting begins in early December and should be finished before March 1. Planting earlier than December 1 results in premature rooting and sprouting which can result in winter injury when our temperature dips below 15 degrees F. Planting after March 1 results in a small, sub-standard plant.

Our soil is prepared in September from summer-fallowed sod. The ground is worked to good tilth to a depth of 10 inches and ridged up with hilling discs providing rows approximately 50 inches apart. When the cuttings are planted they are stuck directly into the hills with only about an inch sticking up. Roughly we plan to have the bottom of the cutting above the bottom of the ditch between the hills over winter and, when the ground is leveled out in the spring, the cutting is actually in the ground only about half an inch. This procedure seems to take advantage of the warmer soil temperatures close to the surface in the spring and our cuttings root earlier and more evenly. The cuttings are hoed about May 1 after the hills have been worked down as far as possible with cultivators. Hoeing is usually simple because we apply three and a half pounds of Simazine per acre for weed control as soon as the soil preparation has been finished in the fall. The cuttings are watered immediately following hoeing, usually within three or four hours. By using irrigation even during cool, moist weather we insure that the cuttings have good soil contact even though disturbed by inept hoeing. A half inch of water is all that is usually necessary to insure perfect survival and a uniform stand. The hoeing in early May is usually down to the two-inch level because the cuttings are not well enough rooted at this time to allow lower hoeing. By June 15 the cuttings are rooted well enough to stand by themselves and we hoe them out to budding level, usually leaving only one-half to one inch of soil over the roots.

Cuttings can be irrigated just prior to budding the first week in July if the plants lack water. If plenty of moisture is available, additional moisture will cause the buds to sprout immediately or for the bark of the rapidly growing understock to close over the buds. Budding is usually completed by August 20. Budding after this date usually results in smaller plants and poorer stands. The resultant plant, too, is often more susceptible to mechanical damage the following spring, due to an imperfect bud union. The budded plants are covered up, usually follow-

ing the first rain in September. The covering must be done to protect the buds over winter, particularly if any sprouting is in evidence. Waiting until the first rain germinates the perennial grasses will almost obliterate the weed problem. Weed seeds germinating after October 1 are usually heaved out and severely injured during our December and January freezes.

The brush is topped off the understock the third week in February. Normally, understock will start to sprout at this time and we try to catch them just as the buds are starting to elongate. Topping at this time seems to result in less "bleeding" and conserves the stored food materials in the root system. By waiting as long as possible, bud dormancy is insured for the longest possible time. The buds can be uncovered any time after April 5. The average date of our last killing frost is about this date. The hilled up earth is removed in part by small plows and the rest done carefully with a hoe. Delaying hoeing results in mechanical damage because the buds start to sprout through the warming soil by April 20, even if not uncovered.

Budded stock is fertilized at the end of the heavy winter rains, which is about the middle of April. In some years the fertilizer is applied before the buds are uncovered, but usually it goes on afterwards. We use a 10-20-10 with trace elements at the rate of 600 pounds per acre. The buds are pinched as soon as the initial shoot has elongated four or five inches and has at least two full sets of leaves. Early sprouting buds appear to have their leaves opposite, although this is not true. In pinching we remove the soft tip, leaving two full-sized leaves. The first pinch occurs ordinarily the first week in May. Recovery takes about two to three weeks and the second pinch comes around the first of June. The second pinch is a cut back to about three inches. The second pinch not only serves to enhance basal growth, but it reduces the size of the still tender bud to prevent damage from wind and cultivation. A further pinch is usually carried out about the middle of June when we top back the largest of the basal breaks to about 12 inches.

During our warm weather in summer the plants develop rapidly. Daytime temperatures average right around 80 degrees with our highest temperatures rarely reaching 100 degrees. The long sunny days in our latitude, plus our mild, humid nights are ideal for growth. Since we are essentially moisture-free during the first six weeks, we rarely need to worry about the encroachment of disease. As the difference between the day and night temperature increases along about the first of August, we run into nightly dews which provide optimum conditions for the spread of mildew. Disease protection is in the form of sulphur, flown on at the rate of 35 pounds an acre. From the 15th of June to the first of August it is applied once every two weeks. From then until September, once every week. If our native wild roses have shown signs of a heavy rust infestation during the spring, we add 8% Maneb to our sulphur dust to prevent further spread in our cultivated block.

Our heavy soils and mild temperatures reduce the need for summer irrigation. Ordinarily, only one heavy irrigation is applied, which is at the rate of four inches, around the first of August. In particularly hot, dry seasons we can irrigate as early as July 15, followed up by another the second week in August. Irrigating too early, when the maidens are in full bloom the first part of July, causes excessive breakage of the larger canes and forces sprouting of the budwood. Ideally, proper application of water will add a full set of basal canes with enough time left in the growing season to harden them off into good, sound wood. Lack of irrigation can sometimes result in excessively soft growth at digging time, which is forced by abnormally heavy rains in early September.

Digging begins the last week in October and can continue on as late as mid-February. Since our winter season is so wet we usually undercut our field about the middle of October to root prune and stop further growth. A lifter can then be run through on the digger even in extremely wet circumstances to enable the plants to be pulled easily. The early root pruning will result in formation of root initials all along the extremities of each root. These initials reduce the time necessary after planting for the roots to take hold and support the top. Unless it is raining, the plants are never allowed to stay in the field more than an hour and a half, and are washed before entering storage. The leaves must be picked from plants dug before November 15. In plants dug after that date the lower leaves usually absciss. Topping the plants in the field or removing the foliage, particularly with chemicals, will force the plant to break dormancy, thus reducing its hardiness and storage life. After digging, the plants are graded, top-tied, labeled and bundled into 10's. Once prepared, the plants can be stored in moist storage, bare root, at 34° to 36° F. for six months. The tenderest varieties are always held in storage; hardier varieties can be heeled-in in sawdust to the tops out-of-doors to take care of amounts of stock in excess of our storage capacity. In theory, *botrytis* storage rot can be controlled by holding the humidity below 85% — or over 98%. Since water is cheap and damp storage easier to work with, we prefer the latter. Constant misting in front of the refrigerator blower, or watering twice a day, will provide the necessary moisture. Stock with low vitality will not respond to any storage treatment without dying back.

In some ways our method of growing is a little more expensive per acre, but per unit of No. 1's it is less. Most of our cultural procedures are adapted to our highly variable climate according to the needs of the plants. We try to provide our trade with a high quality product properly dug and stored to be in the peak of condition at the time of delivery thus insuring excellent results the first year when planted. The uniformity allows standardization of our warehousing procedures and simplifies packing and shipping.