

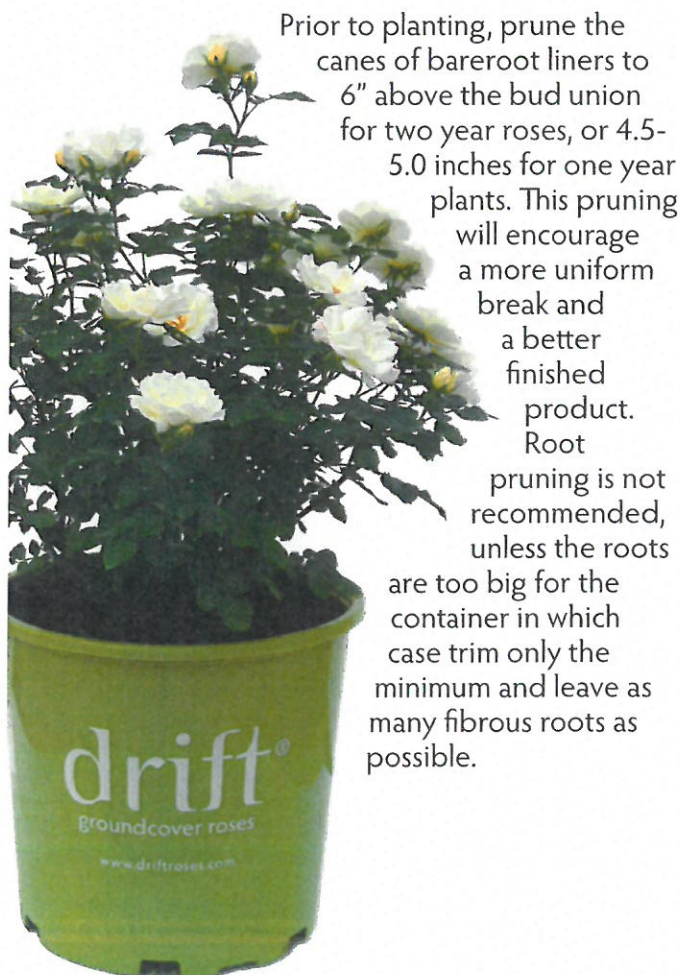
4. Planting

Containers

You can choose a wide range of container sizes for your crop. Typically plugs smaller than 4" are grown in containers less than 3 gallons. Two year or 1 year bareroot plants are grown in 2 gallon sizes or larger, and bareroot trees are grown in 5 gallons. Remember to order branded containers as required as discussed in Chapter 1.

Media

Roses may be produced in a wide range of media. The mix should be well drained and high in organic matter (optimally 80%). Provide a starter charge with Calcium, NP & K, Magnesium and micronutrients. Your media recipe should be designed to fit your personal growing style. The optimum PH for growing roses is 5.5-6.2. It is important that the media be adjusted if necessary to achieve this PH range prior to planting.



Prior to planting, prune the canes of bareroot liners to 6" above the bud union for two year roses, or 4.5-5.0 inches for one year plants. This pruning will encourage a more uniform break and a better finished product. Root pruning is not recommended, unless the roots are too big for the container in which case trim only the minimum and leave as many fibrous roots as possible.

It is extremely important to keep the bareroot plants from drying out during the entire planting operation. Do not leave roses for very long without water between planting and spacing. Do not expose plants to extreme cold (below 22 degrees F) during planting and spacing. When planting a budded rose, the bud union (graft area) should be at or slightly above the soil line. Firming the soil around the roots during potting is important to reduce air pockets which can dry out the roots. It is a good idea to stake tree roses to keep them straight in the container.

5. Growing On

The roses are now ready to be set down in the growing area. The growing area will vary depending on your geographical location (Chapter 3) and the size of the nursery / greenhouse. In most nurseries bareroot roses are spaced directly on the final spacing. Starting plants off with pot-to-pot spacing can save space initially, but this is usually not very cost effective. Furthermore, spacing too late may result in significant breakage. Roses grown from plugs can be set down pot to pot and spaced at a later date. Once set down, water plants thoroughly until the media mix is fully saturated. **DO NOT APPLY HERBICIDE TO ROSES AT THE TIME THEY ARE POTTED.**

Forcing / Sweating

This process is typically only used in a cold frame environment with bareroot roses to shorten the growing cycle. This practice although effective, requires extremely close attention to details. It is suggested that growers experiment with this practice on a small scale and gain experience first. Sweating starts by covering the newly potted roses with a thin clear polyethylene plastic sheet to create a seal and an environment that will have very high humidity; this will help force leaf expansion. Walk the crop daily to monitor for bud break and any dry media which may develop under the plastic blanket. When bud eyes expand and the uppermost shoots come in contact with the plastic, the blanket should be removed. Removal should be done

in stages to avoid burning the foliage. First day, early in the morning, remove blanket back 1 row, to break the contact with the floor and allow humidity to escape. On the next day early in the morning remove the blanket back half way, continuing to not allow the plastic to have contact with the floor. On the third day early in the morning remove the blanket all the way, water roses to saturation, and begin a fungicide rotation (Chapter 8). Poly blanket can also serve as good protection against frost. In the event of below freezing temperatures pull the poly blanket back over the crop, this will help protect the new growth. This frost protection practice can be continued until the tender flush of growth becomes too tall and covering damages the young leaves.

Cold Protection

When growing in cold frames any roses sweated or forced for early spring sales, typically in colder climates, will need to be protected from temperatures below 32 degrees F. Poly blanket can be pulled until the new shoots reach a certain height. Once growth height becomes 6.0-8.0" tall, heat (if available) or irrigation bursts can be applied to raise temperatures above 32 degrees F. When newly potted roses are grown outside, they should be protected from wind and sun until plants are rooted in. Irrigation bursts can be used to prevent canes from drying out.

Hardening Off

Roses grown in greenhouses or cold frames are softer and more succulent and therefore need to be gradually acclimated to outdoor conditions at finishing. Sides of cold frames should be raised gradually over a 14 day period prior to shipping to harden the crop off.

Fertility

Nurseries use a wide range of fertilizer formulation and methods. A well balanced incorporated slow release, and soluble form, are the most common. Soluble or liquid applications should begin when shoots are 1.0-1.5" long, and

when the first leaves have fully expanded. Feed at a beginning rate of 125ppm-150ppm N, apply only clear water at every third or fourth irrigation to avoid salts buildup. Growers who use incorporated fertilizer should select a well balanced product with minors and as with soluble applications maintain a target EC of 1.0-1.5. Growers that plan to have plants go dormant for next season sales should reduce to 75 ppm N soluble in the fall and then stop feeding entirely, and if using a CRF, plan the longevity accordingly.



Irrigation

Roses prefer a thorough watering but do not want "wet feet". To reduce disease, avoid leaving foliage wet into the night. Roses do best when they dry down so they are slightly moist before the next irrigation. It is important to make and execute irrigation decisions early in the day. You want your foliage to be dry and your humidity to be as low as possible at the end of the day.

Trimming / Pinching

As a general rule roots should be reaching the outside of the container before trimming. At that time the plant will begin to grow rapidly. Usually buds should also have begun to form before the first pinch. Generally, the second pinch should occur once you have one well developed "five leaflet" above the last pinch. Subsequent pinches should be made on the same basic schedule. Look for bud development to dictate the time of each pinch; this will usually occur in time frames around 5-7 weeks apart. It is important to irrigate your plants before pinching. During the hottest weeks of the year pinching can cause problems for growers, especially in Texas and Southern California when temperatures are above 100 degrees F. It is best to avoid pinching

during extreme heat spells. Bareroot #1 grade plants in most cases do not need to be trimmed prior to finishing.

6. Crop Scheduling

Crop scheduling and timing finished plants varies drastically with geographic location and environmental conditions. Most container rose sales occur from early to late spring, with a large percentage being finished for Mother's day. The following are examples of crop finish times for #1 grade bareroot plants without pinching:

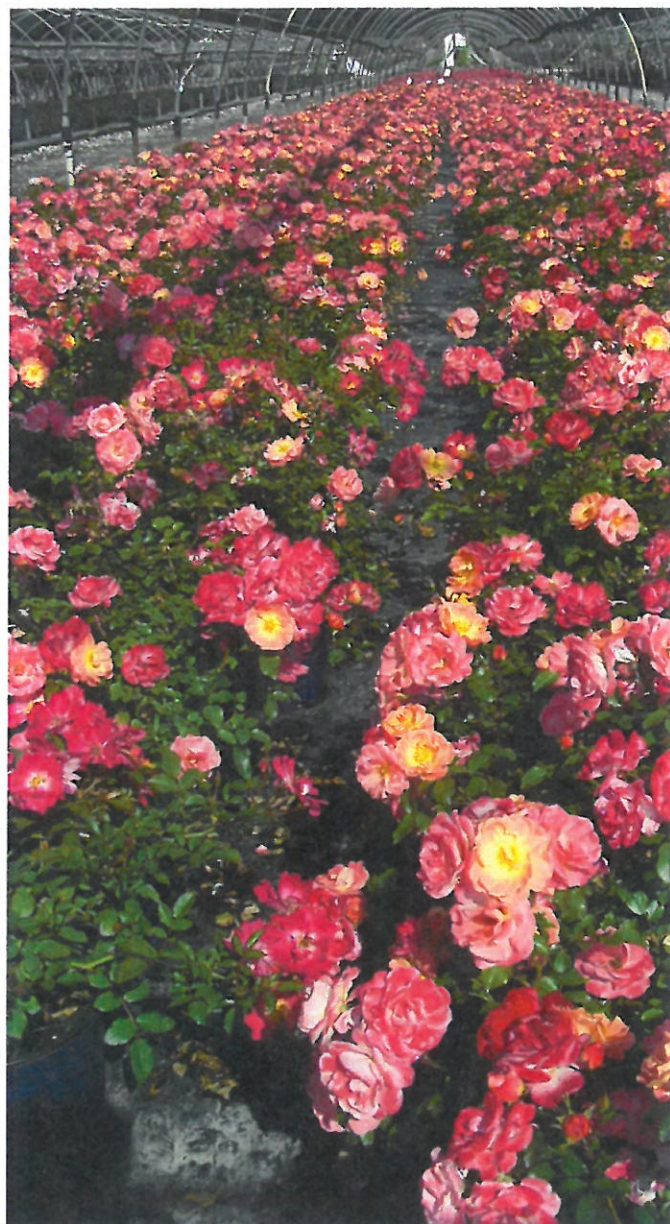
- Outdoor production in Southern California for early spring sales. Production time is nine weeks: Pot in mid-December and ship late February.
- Outdoor production in Northern California for Mother's day sales. Production time is twelve weeks: Pot late January
- Cold frame production in the Northeast and Mid West for Mother's day sales. Production time is ten to twelve weeks: Pot in early February and ship from late April to early May.
- Outdoor production in Texas for Mother's day sales. Production time is eight to ten weeks

In general, smaller plants such as grade # 1.5 will usually require a pinch, adding three to four weeks to the total crop time, unless they are grown in very mild climates.

The following are examples of crop finish times for finished plants started from plugs:

- Plant liner in early spring and grow for 5-6 weeks, pinch the liner and then grow for another 5-6 weeks, pinch the liner again and grow for an additional 6-7 weeks to crop finish. Plant to finish time total 4-5 months, depending on location, facility and pot size.
- Plugs can be planted in late summer or fall and then sold the following spring. In this case the plant would be allowed to grow

and the first pinch would not be done 5-6 weeks after planting. In warmer climates and depending on planting date the first pinch could occur once the plant has fully bloomed out or at about 8-9 weeks after planting. The plant would then, under either scenario go dormant for the winter. The grower must then work backwards from his desired ship date to determine when the next pinch will be. Subtract 6-7 weeks from the ship date to determine the 3rd pinch. Subtract 5-6 weeks from the 3rd pinch to determine the 2nd pinch. Subtract 5-6 weeks from the 2nd pinch to determine when the 1st pinch should occur right after winter.



7. Pest and Disease Control

Root Diseases

There are three root diseases that could occur in growing roses. Pythium is typically encountered in cool media situations, Rhizoctonia in warm media situations, and Phytophthora is usually encountered in media with prolonged high moisture content. To prevent these problems, apply preventative chemical drenches. Applications to prevent these diseases should be done during the growing season.

a. Chemical rates per 100 gal

Subdue maxx 1 oz. plus Adorn 3oz

Segway 4oz plus Thiophanate-methyl (label rate)

Pageant 12oz

If you need to drench to control a disease outbreak (Phytophthora) it is important to correct the condition favoring the disease, most likely over watering. Allow the media to dry down to the point of being moist not wet. Any of the above drenches would be acceptable to correct an outbreak caught early in the disease cycle. After drenching and correcting an over watering situation new root growth should be seen in about 2 weeks.

Fungicides

Fungicide rotations are important to maintain healthy plant growth. Start the rotation when you have leaf break and continue until the plants go dormant. These rotations can be as aggressive as every 7 days during vigorous growth periods, and stretch to every 10-14 days during periods of slow or no growth.

a. Chemical rates per 100 gal

Rampart 80oz plus Protect DF 1lb (every other spray)

Segway 3.5oz

Affirm 8oz plus Orvego 12oz

Pageant 16oz

Insecticides

Aphids and spider mites are the most common insect and mite pests, although whiteflies and thrips can be problems, especially late in the season, when temperatures are warmer. IPM scouting is critical for identification of pests and timing of sprays.

a. Chemicals

1. Aphids

1% vv Horticultural Oil

Endeavor 5 oz. per 100 gal

Botanigard 22 WP 16 oz. per 100 gal

Flag Ship 25 WG 8 oz. per 100 gal

2. Mites

Avid 4 oz. plus 1% vv Horticultural Oil per 100 gal

Floramite SC 8 oz. plus Clearspray 4 oz. per 100 gal



Akari 20 oz. plus TetraSan 10 oz. plus
Clearspray 4 oz. per 100 gal

3. Thrips

Botanigard 22wp 32oz

Avid 8 oz

Xxphire 2.5oz

Overture 8oz

If a disease outbreak occurs spray Adorn 2 oz. per 100 gal along with the regular spray rotation. Use this combination only one time per crop cycle. If the disease pressure is still high, trim plants 7 days after the Adorn application and remove infected foliage and trimmings and flush the crop.

In 2011 Adorn was cleared by the EPA for use In NY and CA. Both these states have stricter requirements than the rest of the country so product registration to NY and CA always comes later.

Downy Mildew

Downy is probably the most common disease encountered in growing roses in cold frames, where controlling moisture on the leaves at night is not always easy. Downy mildew is observed on roses as angular purple / black blotches on the upper leaf surface. Favorable conditions for the development of this disease are when temperatures are 50-70 degrees F, relative humidity is 85% or higher, there is free water on the foliage, and reduced air flow due to crowded spacing.

a. Controls

Follow the previously listed Fungicide controls for prevention

Water is needed for spore development, once spores develop and the foliage dries, the spores are released and dispersed via wind. Irrigate the crop by mid morning to ensure a quick dry down, avoid irrigating in the afternoon and never in the evening. If conditions are favorable for disease development, time the spray application when foliage is dry from irrigation or morning dew.

Powdery Mildew

Powdery mildew is seen as long, white strands or chains of spores. Powdery Mildew will infect the upper and lower leaf surfaces as well as stems and buds. Conditions that favor the development of this disease are dry foliage, 60-80 degrees F overcast days with dry conditions and no rain, and high relative humidity usually seen during late spring and early fall.

a. Controls

Thiophanate-methyl (label rate)

Milstop 4lbs

Suffoil x 2% (2gal per 100gal)

Downy and Powdery Mildew are much easier to prevent than to cure. It is important to react to weather conditions and spray before the disease develops. Applications on 7 day intervals during the spring and summer months are critical.

