

colors can be shaped like spiders, claws, toothbrushes or bottlebrushes, and are attractive to hummingbirds. In general, grevilleas appreciate sun and good drainage although many are clay and shade tolerant. They prefer somewhat acidic conditions with little fertilizer (no phosphorus) and general winter lows above 20 °F. They are very deer and drought tolerant, practically carefree, and should be used more in the Bay Area, Central and Southern Coast gardens. Occasional to infrequent summer water will keep them in fine form.

### PROPAGATION

Softwood cuttings are the primary mode of propagation for the above genera with the exception of *Banksia*, which are chiefly grown from seed. Some fine-leaved varieties of *Banksia* however are propagated from softwood cuttings. Cuttings are taken from slightly hardened new growth. Terminal and side-shoot cuttings can be taken. Many varieties in the genus *Protea* show better rooting success from side-shoot cuttings. Medium strength IBA powder or IBA/NAA liquid are used in conjunction with a constant 70 °F bottom heat and cool, shaded, and mist-regulated top environment. Rooting medium of 4 perlite : 1 peat moss (v/v) is in flats or 2 1/4-inch rose pots.

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## GENERAL SESSION I: QUESTION AND ANSWER SESSION®

**Ed McCulloch:** Did you determine what percentage of native soil in the nursery soil was needed for effective inoculation?

**Shengjen Lu:** We haven't quantified the density. What we did was collect the soil very close to the conifers and used about 10 ml per plant.

**Chris Martin:** Did you consider blooming cycles when you harvested your cuttings?

**Jack Kelly:** In June the plants had no flowers and in July they had very few. We looked for shoots that had fewer flowers and flowers or flower buds that were present were removed.

**Mike Evans:** Do you find actinorhizae inocula only under plants growing in the wild or can you harvest it from cultivated plants growing in the ground?

**Shengjen Lu:** That's part of the study. We dug the plant and grew it under nursery conditions. We harvested and used that soil.

**Mike Evans:** How soon after planting in the ground can you realize the inocula presence?

**Shengjen Lu:** After about 2 1/2 months we start to see things and see the totally developed structure after 3–4 months.

**Germaine Boivin:** Can mycorrhizae from the Oregon area be used to grow native plants in California?

**Shengjen Lu:** Mycorrhizae (not actinorhizae) can be purchased commercially; however, native-site inoculum should be used because it will be more adapted to the site.

**Doug Justice:** Did you use any pre-treatments or auxins in your rooting studies?

**Jeff Rosendale:** Yes, we used medium-strength liquid or powder. Some of the genera have side shoots that work better than terminal cuttings especially for the genus, *Protea*. The more juvenile the plants the quicker the rooting was.

**Lane McGlaughlin:** How long should you wait when germinating the more difficult restios? If you don't see anything in 3–4 weeks is that about it? Do you recommend bottom heating?

**Martin Grantham:** I generally sow the seeds in the fall; they like diurnal flux in temperature that occurs seasonally in the fall and spring. You can also use a refrigerator if you're willing to take them in and out everyday. There will usually be a flush of germination in the fall and another in the spring. It can take this long and moss may grow on the pot while you wait for the seeds to germinate. I probably wouldn't use bottom heat unless there's a chance of a freeze. They do like to experience the cool nights and the warmer day.

**Gene Blythe:** Would you comment on the vegetative propagation of restios by layering?

**Martin Grantham:** Many plants will form when a juvenile branch stays in contact with the soil. Division can be used to propagate many species.

**Chris Martin:** Please comment on your nitrogen fertilizer regime and the extent to which nitrogen nutrition may enhance actinorhizal formation in a container situation in a nursery environment?

**Shengjen Lu:** We're still in the early stages of this research, but in my opinion it's not like mycorrhizae where you have to be careful with the level of phosphorus in the soil. You see actinorhizae everywhere, in rich soils and poor soils. We use about 100 ppm nitrogen in a balanced nutrient solution for fertilization and we use composted soil which is nutrient-rich and we still get good actinorhizal inoculation. I don't think the level of nitrogen in the soil is that crucial for actinorhizae.

**Sheryl Davis:** What kind of fertilizer program do you use for liner production?

**Jeff Rosendale:** For liners we use a reduced amount of slow-release fertilizer, which is called Native Blend (21-2-11 plus minors) at a rate of 4-5 lb/yard<sup>3</sup>. In the past I've had good success using cottonseed meal mixed with ironite, but has changed and is now a more complete fertilizer.