An Overview of Coastal California Protea Production®

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INTRODUCTION

The Proteaceae family consists of over 1400 species, with the *Protea* genus itself containing 150 species. The name protea comes from Greek mythology and the god Proteus, who was able to change into many different forms. This name is reflected in the multitude of exotic and spectacular inflorescence forms exhibited by this genus. Forms that can vary greatly in color and size with some flowers being up to 12 inches in height or diameter. The largest array of genera and species is found in South Africa, followed next in number by Australia.

Over the last several decades, California growers have been commercially producing proteas extensively for the cut flower trade and to a lesser extent for the nursery and landscape trade. Commercial cut flowers are shipped worldwide, while plants produced for the nursery and landscape trade are sold in a market that, for the most part, is limited to the Mediterranean climate of coastal central and southern California. The majority of California's commercial cut flower protea production occurs in southern California's San Diego County, with lesser amounts of production in other southern and central state coastal areas. A limited amount of production exists in northern California coastal regions. Container-grown ornamentals are grown in much lesser numbers and basically follow the above regional patterns. Commercial protea production is most successful with low humidity, acidic soils, and growing temperatures between 40 and 80 ºF, hence the focused area of growing near the coast of central and southern California.

Five genera of the protea family: *Protea, Leucospermum, Leucadendron, Banksia*, and *Grevillea* predominate commercial production, with the first four making up a significant portion of the specialty-cut flower trade as well as being popular in the specialty ornamental trade and the last being very popular in the ornamental/landscape trade. This paper, in its overview, focuses on these five popular genera.

OVERVIEW OF FIVE MOST POPULAR PROTEA GENERA

Protea. *Protea* is an exceptional genus, for its shrubs rival some of the world's most exotic flowers. Appearing like cups of colorful, feather-rimmed flowers filled with soft fur, they are a treat for the visual and tactile senses. The flowers are actually a group of colored bracts (modified leaves) surrounding a dense mass of separate florets. In general, proteas grow in shrub form with laurel-like leaves in varying shades of green. Culturally they require sunny locations free from hard frosts and good drainage and moderately acidic soil. Soil sulphur can be added to lower pH. Proteas are generally phosphorus intolerant and can thrive with little fertilization. Ammonium sulfate or cottonseed meal in modest amounts should provide ample nutrients. Sometimes an addition of a micronutrient blend can be beneficial. Once established, these showy shrubs are very drought tolerant and almost deer-proof. Summer waterings should be deep and infrequent. Proteas are also excellent producers of fresh or dried cut flowers.

Leucospermum. The show-stopping qualities of a pincushion bush covered with scores of bright orange flowers in full bloom cannot be underestimated. These captivating shrubs grow in mounding to upright forms with gray-green foliage. More frost sensitive than most members of the Protea family that we grow, leucospermums will thrive in warm sites with good drainage. Culturally, their needs are similar to *Protea*; they need sun, little or no summer water, and require little fertilization (and show the usual intolerance for any phosphorus). Producing stunning cut flowers, they are also deer-proof.

Leucadendron. From South Africa come the unique, visually appealing leucadendrons, with many durable hybrid cultivars. Growing in mostly shrub form, they vary from upright and somewhat vase-shaped to mounding and widely spreading shrubs. The brightly colored bracts are stunning during the flowering season (usually winter into spring) and vary in color from silver to yellow to orange to ruby red. The actual flowers are cone-like structures that are borne on separate male and female plants. Depending on the cultivar, male or female flowers will be enclosed with showy, colored bracts (actually involucral leaves). As a rule, inflorescences are produced in mass profusion by each plant, creating a show of color and contrast that also rewards the gardener with excellent, long-lasting cut flowers. Leucadendrons should be grown in mostly sunny sites with good to average drainage. Like other Protea family members, they are generally intolerant of phosphorus fertilizers. These shrubs tend to be more frost tolerant than other South African proteas, so in a borderline region should probably be chosen over *Protea* or *Leucospermum*. They need sun, good drainage, and occasional to little summer water once established.

Banksia. Early explorers of Australia, including the young botanist Joseph Banks, were amazed by the rugged presence and disarming inflorescences of the unusual shrubs and trees that were to be later named for Sir Joseph Banks. Today they do not cease to amaze and in warmer Mediterranean climates these shrubs have become interesting (although still fairly rare) garden subjects. Commercially they are grown for the cut flower trade and can often be admired with their cousins, proteas and leucospermums, in large "hotel-lobby" floral arrangements. Banksias, for the most part, grow as shrubs, or to a larger tree form, although some have a low prostrate habit. They prefer climates with a pronounced coastal influence, sites with good drainage, a sunny aspect, and acidic soil relatively free from phosphorus. Flowering times vary, but in general they are in flower from late fall to early spring. Flowers are popular with hummingbirds as during this time of year other flowers can be scarce.

Banksia species that grow from lignotubers (woody rootstalks) have the ability to resprout after bushfires, or in our climate, severe freezes. Some species without lignotubers did regrow from basal branches after the 1990 freeze in California. Most banksias are propagated from seed. Many species will flower in 3–5 years from seed; however, some will take longer. Established plants need occasional to little summer water.

Grevillea. From Australia, and chiefly through the U.C. Santa Cruz Arboretum, come the colorful, textural, and rugged grevilleas. Their forms range from dense, widely spreading groundcovers to large, many branched shrubs that can become small trees. Leaf shapes vary greatly; some are short and needle-like while others can be laurel-shaped, some even resemble herringbones. Flowers in a wide range of

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 ºF. 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-leafed 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 ºF bottom heat and cool, shaded, and mist-regulated top environment. Rooting medium of 4 perlite : 1 peat moss (v/v) is in flats or 2¼-inch rose pots.

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 2½ 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?