Cloud Forest Daisies: Horticultural Treasures of Montane Mexico

MARTIN GRANTHAM and BIAN TAN

Biologist EO Wilson has stated that as much as ninety percent of the world's biodiversity has not even been named, let alone studied by scientists. The UN-sponsored Global Biodiversity Assessment report estimates that 13-14 million species of plants and animals exist on planet Earth while only some 1.75 million have been scientifically described. Strybing is one of the few places where a bit of this dazzling but fast disappearing abundance can be seen, transported far from its exotic origins to Strybing's New World Cloud Forest and Upland Mexico plantings.

Among the most unusual and exciting plants at Strybing Arboretum and Botanical Gardens are those from montane Mexico, where a mixture of north-temperate and neotropical taxa has resulted in one of the world's richest centers of plant diversity. With the contribution of botanical expertise and wild-collected plants from Dr Dennis Breedlove, originator of the Flora of Chiapas project at the California Academy of Sciences, as well as the consistent support of the Stanley Smith Horticultural Trust, Strybing has built an impressive collection of plants from the montane forests of southern Mexico, where the rich and varied flora is under pressure from human encroachment. Many of the plants now growing at Strybing had not previously been brought into cultivation. Not only are they of great interest for botanical research, but they have demonstrated significant horticultural potential.

The New World Cloud Forest planting at Strybing, along with the Meso-American hillside at UC Botanical Garden (UCBG) in Berkeley, has served as a repository for the massive collecting efforts of botanist Dennis Breedlove since he began work on the flora of Chiapas, Mexico's southernmost state, in the mid-1960s. A botanist seldom brings back many plants alive; dry herbarium specimens for study and documentation are the primary goal. But Dennis brought many back alive. His selections from high-elevation plant communities have been grown and unofficially tested for many years at Strybing, UCBG, a few private gardens, and some small, adventuresome nurseries. Many of these plants have shown outstanding horticultural potential for portions of our region (coastal California) but are as yet poorly known by gardeners and unavailable in the horticultural trade.

Recently, with the support of the Stanley Smith Horticultural Trust, Strybing has begun to compile information generated through the long-term cultivation of these promising plants, information that can be used to bring them to the attention of the gardening public and facilitate their entry into the horticultural trade. In this article, we have the honor of presenting some delightful "cloud forest daisies" brought into cultivation in the San Francisco Bay Area through the efforts of Dennis Breedlove and Strybing Arboretum.

A Forgiving Climate

How is it possible for tropical cloud forest plants to thrive out-of-doors in coastal California? A number of familiar Bay Area garden plants—fuchsia and begonia for instance—are native to higher elevations within the tropics, such as the Andean foothills. Vireya rhododendrons and lipstick plant (*Aeschynanthus*) come from the montane tropics of Southeast Asia, particularly New Guinea. These plants succeed here because of important similarities between coastal California's climate and that of mountainous areas in the tropics. The temperature variation between day and night and between summer and winter is not great in the tropics, even on tropical mountains. Coastal California also has moderate temperatures year round, due to the ocean's strong influence.

Cloud forests are so named because they are found at elevations where moisture, rising in air masses from the humid lowlands, condenses in a shroud of mist and fog. The resulting high moisture levels are comparable to that of coastal Northern California's wet winters and fog-dampened summers, in what would otherwise be a typical Mediterranean climate. Views from atop tropical mountains are remarkable in their resemblance to panoramic summer views of the Bay Area with thick fog advancing and retreating below the higher hills.

A Big Family

The daisy family or Asteraceae (also known as composites or the Compositae) may be the largest family of flowering plants, rivaled only by the orchids (Orchidaceae). The family probably originated in western Gondwanaland, in a part of that ancient supercontinent that gave rise to South America, where composites with the most primitive features are found. Wherever the family arose, it has radiated far and wide, achieving prominence in nearly every region of the world as well as in our gardens. Perhaps it is unwise even to attempt to generalize about such a large and varied plant family, but most gardeners would agree that the more familiar plants in this group are generally easy to propagate and grow, rewarding us with generous floral displays in spring, summer, and, to a lesser extent, fall and winter. Most of the plants discussed here, however, come into their own in fall and winter, offering massive floral displays at a time when there may be little else in the garden to distract us. All are hardy to at least 32°F, with the majority hardy to about 20°F, at which they may be killed to the ground.

The daisy family is known for a tendency to weediness—what plant ecologists call the ruderal life style. Ruderals are plants that take advantage of disturbance; be it a landslide in the mountains or a cultivated bed in your garden, they are prepared to fill the void and cover the bare soil. Plants from areas with high rainfall, especially in summer, are unlikely to be weedy in California and none of the cloud forest daisies discussed here have shown aggressive tendencies in Bay Area gardens.

A Few of the Best Daisies

Except as noted, the following plants were collected by Dennis Breedlove in the cloud forests and neighboring montane plant communities in the state of Chiapas, Mexico, and had no prior cultivation history. All have been grown at Strybing, with some cultivated at UCBG where we have been able to observe their adaptability to different soil,

Massive leaves and flower heads on *Senecio uspantanensis*. Photographs by Martin Grantham

Pom-pom-like fruiting heads of *Montanoa hexagona*

Montanoa leucantha in flower

exposure, and microclimatic conditions. Most have their daisy-like flower heads arranged in flat-topped clusters. They are generally easy to propagate from cuttings.

Ageratina ligustrina (syn. *Eupatorium ligustrinum*) has been grown at Strybing since 1984 and at UCBG since 1976. Although listed in *Index Londonensis* as early as 1877 and in *The New Royal Horticultural Society Dictionary of Gardening*, this handsome shrub is apparently not in the nursery trade on the West Coast. Plants at Strybing and UCBG originated in collections made in Mexico by Breedlove and Don Mahoney and in Costa Rica by author Grantham, but plants from each of the three collections differ only slightly. In nature it grows in several communities including montane rain forest, cloud forest, and pine-oak forest at elevations from 3,500 to 8,400 feet, in association with many familiar genera such as *Arbutus*, *Buddleja*, *Clethra*, *Drimys*, *Garrya*, *Ilex*, *Liquidambar*, *Magnolia*, *Myrica*, *Podocarpus*, and *Vaccinium*. It grows as a shrub, four to fifteen feet tall, with lanceolate leaves from two to six inches long.

All of the plants in cultivation have white flowers tinged with pale pink, though the color can vary from white through pink, lavender, and even purple. Plants show a range of adaptability in cultivation, growing and flowering well in moist semi-shade at Strybing as well as in a harsh southwestern exposure at UCBG on drip irrigation. They develop a dense, shrubby habit without pruning and would be suitable for hedge or screen plantings; they will also tolerate severe pruning. Cutting-propagated plants flower at a smaller size and in less time than seed-grown plants. Masses of mildly fragrant flower heads in seven-inch diameter clusters are produced in fall and winter, borne in such abundance that the branches may droop under their weight. The flowers provide an excellent source of nectar for butterflies. At UCBG plants have shown some resistance to oak root fungus (*Armillaria*) but have been damaged by temperatures below 20°F; established plants regenerated rapidly from the base after exposure to temperatures as low as 16°F during the winter of 1990.

Senecio cristobalensis has been grown at Strybing since 1991**.** Endemic to the mountains surrounding San Cristobal de las Casas, this species grows at elevations of 5,000 to 6,000 feet or more in montane rain forest, cloud forest, and pine-oak forest with such plants as alders and liquidambar. It grows as a shrub or giant herb from three to fifteen feet in height. The color of the flower heads may vary from white to yellow, but the form in cultivation bears orange flower heads in late fall and winter. Bold foliage and a vigorous habit mark this outstanding plant. A velvety down of purple-magenta hairs covers the underside of mature leaves (eighteen inches across), the robust stems, and all parts of the new leaves. The upper surface of mature leaves is of a rich green hue. This plant requires regular watering and prefers bright shade. It can be cut back once or twice a year to maintain production of the colorful new foliage. Its cold-hardiness was put to a first test in the winter of 1998-99 when temperatures dipped below freezing for three days at Strybing, reaching the low 20s F. With tree cover, plants were undamaged except for some leaf drop. In the greenhouse it is highly attractive to aphids, mealy bugs, and scale, but the problem does not seem to follow the plant out-of-doors.

Stevia polycephala (at UCBG) and *S. microchaeta* (at Strybing) have been grown since the early 1980s. In nature *S. polycephala* grows at elevations of 3,000 to 10,000 feet in cloud forest and pine-oak woodland with buddleja and junipers, and with firs (*Abies*) at the higher elevations. They grow as shrubs from three to six feet in height. Plants from the highest elevations have small fuzzy leaves. The form in cultivation at UCBG grows upright to four feet and has large leaves, four to ten inches long and five inches wide; in fall, the large floral clusters (up to eighteen inches across) bear masses of small, white flower heads, patches of which turn pink as they age.

Stevia microchaeta has reached fifteen feet in height at Strybing with leaves up to seventeen inches long and six inches wide. In the fall its huge floral clusters may exceed twenty inches across, also bearing a mix of white and pink flower heads. These two species are believed to hybridize in the wild. Both perform well in partial shade to full sun with regular watering. Developing plants benefit from support or judicious pruning to improve their structure. Both experience leaf damage when temperatures drop to the low 20s F. Unfortunately *S. polycephala* has shown itself to be highly susceptible

Flower heads of *Stevia microchaeta* turn from white to pink as they age

Purple hairs cover the stems and undersides of leaves on *Senecio cristobalensis*

The bold leaves and tight floral heads of Bartlettina sordida

The flower heads of *Bartlettina tuerckheimii* resemble a large ageratum

to oak root fungus (*Armillaria*) at UCBG and this may be true for *S. monochaeta* as well.

Bartlettina tuerckheimii (syn. *Eupatorium tuerckheimii*) has been grown at Strybing since 1987. In nature it is found at elevations of 4,000 to 9,000 feet in montane rain forest, cloud forest, and elfin forest (at the highest elevations in the cloud forest) growing with genera such as *Abies*, *Ilex*, *Liquidambar*, *Magnolia*, *Podocarpus*, *Styrax*, and *Symplocos*. A four- to ten-foot shrub, its flower heads vary from white through mauve, lavender, and purple. The heads lack ray florets but the disk florets are fringed with long styles resembling a large ageratum. The form in cultivation has grown to seven feet in height and bears flower heads that look like soft lavender buttons in the fall. The leaves are lanceolate, up to nine inches in length, with three-inch petioles and glossy blades. It flowers well in shade and requires regular watering and protection from strong sun. Plants are damaged when temperatures dip into the low 20s F.

Bartlettina sordida (syn. *Eupatorium sordidum*) has been grown at Strybing since 1988, originating with a seed collection made by Breedlove in Oaxaca, Mexico. Plants at Strybing reach eight feet in height, with thick, upright, arching stems bearing large rhomboidal leaves having a satiny sheen, purple veins, and an irregular violet cast. Striking purple flower heads without ray florets are produced in masses at the tips of the cane-like stems in fall through spring. No pest or disease problems have been noted on this vigorous plant. Apparently it survived temperatures close to 20°F in the winter of 1990, but in 1998-99 exposure to the low 20s F produced some leaf and stem damage even under tree cover.

Bidens ostruthioides var. *matritensis*, found in Mexico and Guatemala, has been grown at Strybing and UC Botanical Garden since 1976. In nature, it grows at elevations of 5,000 to over 10,000 feet in montane rain forest, cloud forest, and pine-oak forest, where it is found in the understory of firs, *Arbutus*, buddleja, *Chiranthodendron*, *Clethra*, dogwoods (*Cornus*), *Drimys*, junipers, *Photinia*, podocarps, and *Symplocos*. It grows as a ground covering herb from one to three feet high in meadows and on steep slopes with red clay soil. The leaf dissection is variable but the flowers are always yellow. Not all botanists agree on the varietal designation of this plant. Those in cultivation seldom exceed two feet, producing a dense mat of coarsely dissected three- to four-inch leaves. Two-inch daisies are held well above the foliage in summer, fall, and winter. Partial shade is tolerated but ample sun promotes flowering. Regular watering is needed but plants have done well on drip in a harsh southwestern exposure at UCBG, where they made a handsomely cascading edging plant along the garden's stairways. Plants were severely damaged at 16°F in the winter of 1990. This makes a well-behaved ground cover.

Two closely related senecios have been grown at Strybing since 1987. Breedlove collected what is most likely *Senecio uspantanensis* (although the identification is as yet uncertain) in the mountains of Oaxaca, growing from 7,000 to 8,300 feet in association with oaks. Author Grantham has seen this beautiful plant in the mountains of Veracruz. A succulent-stemmed shrub from four to twelve feet in height, its pale green, smooth-margined leaf blades can be seventeen inches long and five inches wide, borne on handsome purple, five-inch-long petioles. In cultivation the shrub has reached seven feet in height and six feet in width with an open structure allowing appreciation of the heavy stems. In fall and winter, it produces massive clusters of tiny, golden-yellow flower heads, expanding over a long period to eighteen inches or more across. Each individual flower head bears only two or three ray florets, which may be placed opposite each other or off to one side; the entire inflorescence resembles a cloud of golden insects hovering above the foliage.

Senecio cobanensis was collected in Chiapas where it grows at elevations of 5,000 to 8,000 feet in montane rain forest and cypress-pine forest with *Clethra*, *Magnolia*, *Ostrya*, and *Symplocos*. In cultivation it has has grown to seven feet tall and seven feet wide with a pleasingly dense habit. It differs from *S. uspantanensis* in having stems densely clothed with smaller, finely toothed leaves (eleven inches long and two to three inches wide) on two-inch petioles. The floral clusters are similar in

appearance, but about half to two-thirds the size of those on *S. uspantanensis*, with larger individual flower heads; flowering is initiated somewhat later in the season on *S. cobanensis*.

For both of these senecios, partial shade and some protection from wind is best with regular watering. No cold damage was evident in the winter of 1998-99 at temperatures in the low 20s F under tree cover; the plants were in spectacular bloom from November through March.

Verbesina turbacensis, from a collection by Dr Robert Ornduff, has been grown at UCBG since 1976. A Breedlove collection of this plant has been grown at Strybing since at least 1991. In Southern Mexico plants are found at elevations of about 3,000 to 9,000 feet in montane rain forest growing with firs, liquidambar, pines, podocarps, and oaks (*Quercus*). It is an upright shrub from eight to ten feet tall with white flower heads. In cultivation it has reached fifteen feet with a cluster of large cane-like stems shooting straight up in a narrow vase-like shape. The stems are clothed with handsome leaves, coarsely toothed at their ends, often exceeding twelve inches in length. In fall and winter the stems are topped by large clusters of white flower heads. Although normally escaping cold damage in most Bay Area winters, this plant was killed to the soil line at 16°F in the winter of 1990. Vigorous new growth was produced from the base the following spring and plants were almost fully regenerated by the following winter. It may be damaged by oak root fungus but can usually outgrow this pathogen.

Montanoa leucantha ssp. *arborescens* derived from Breedlove collections in Oaxaca have been grown at Strybing since the late 1960s and at UCBG since 1992. In southern Mexico plants are found at elevations of 3,000 to 8,000 feet associating with liquidambar and figs (*Ficus*) in montane rain forest and pine-oak forest. In nature, height ranges from ten feet to over twenty feet with a basal trunk diameter up to twelve inches. Under cultivation, this plant grows quickly to similar heights as a large shrub or small tree with arching branches. The light menthol-scented, pale green leaves are large on initial flushes of growth (twelve by six inches including the petiole); smaller leaves appear as the plant sets buds in fall. Large masses of sweet, cherry-scented flower heads, two to two and a half inches across with white ray and yellow disc florets, are produced over a long period in fall and winter. With bright light, supplemental summer water, and plenty of room this plant can make a spectacular display, covering itself with flowers from "head to toe." Established plants can get by with surprisingly little water (once every two weeks) and have performed well in a harsh southwestern exposure at UCBG on drip.

Don Mahoney of Strybing recommends using this and the following species to provide lush summer screening and a massive fall floral display. He cuts his plants down to a height of two feet just after Christmas to enjoy more winter sun in the garden and to spur vigorous spring growth. Some pruning in summer may be necessary but should stop at the end of September to avoid interfering with bud set in October. With exposure to temperatures in the 20s F there is leaf drop but no stem damage.

Montanoa hexagona has been grown at Strybing since 1984. In Southern Mexico this species is found at elevations of 4,000 to a little more than 9,000 feet growing in cloud forest and in disturbed sites. There it may be found with firs, *Clethra*, *Drimys*, liquidambar, magnolias, pines, podocarps, oaks, and *Symplocos*. In nature it can reach a height of forty feet. The flower heads have white ray florets with disc florets of a dark green becoming yellow. In cultivation, this is, as one might expect, a plant with a massive presence. Numerous vertical trunks produce a dense fountain of lush foliage to thirty feet or more. The leaves of basal or vigorous growth are large and broad (twelve by thirteen inches) with an attractive polygonal shape. As in the previous species, they become markedly reduced in size over the growing season. In fall and winter, the entire tree may be covered with three-inch flower heads. After flowering, bracts around the developing fruits enlarge and gradually turn from light, apple-green to a *café au lait* brown, transforming the clusters into attractive masses of long-lasting two-inch pom-poms. Again, with exposure to temperatures in the 20s F there is leaf drop but no stem damage.