

have remained almost neglected in this direction. The present communication provides an account of some medicinally important orchids from India with their biological status and suggests both *in situ* and *ex situ* conservation measures for their sustainable management in the country.

## Plan de manejo para la conservación de *Cattleya quadricolor* Lindl. en el Valle del Cauca, Colombia

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*Cattleya quadricolor* es endémica a Colombia, presente en solo 3 departamentos (Valle del Cauca, Quindío y Risaralda), categorizada como EN en el libro rojo de plantas de Colombia (Calderon *et al.*, 2007), y es una de las 22 especies de flora con mayor amenaza en el Valle del Cauca. Con este estudio, se generó el mapa de distribución actual y potencial de *C. quadricolor*, se evaluaron las condiciones ecológicas y demográficas en su hábitat, y se identificaron las amenazas y fuentes de presión para su plan de manejo. Un total de 3.000 m<sup>2</sup>, fueron medidos, distribuidos en parcelas de 50 m × 2 m, en los que árboles y arbustos con DAP mayor o igual a 2,5 cm que hospedaran *C. quadricolor* fueron censados. Se contaron los individuos sobre los forófitos detallando, estado reproductivo, número de pseudobulbos, altura sobre el forófito, ángulo, posición del forófito, entre otros. Los resultados demuestran la presencia de la

especie en 16 municipios con un área de extensión de presencia de 234.359 Has. comprendidas entre los 930 y 1.450 msnm. Se demostró que *C. quadricolor* es más abundante al interior del bosque (55%) que en árboles aislados (16%) y sus densidades oscilan entre de 260 a 1.180 Ind/Ha. *Cattleya quadricolor* crece sobre 20 tipos de forófitos, sin embargo 4 de ellos *A. excelsum* (37%), *G. ulmifolia* (26%), *F. insipida* (12%) y *E. ulei* (7%) y representan el 82% de la preferencia de esta especie. Se concluye que la estrategia de conservación *in-situ* debe incluir un incremento de la cantidad y la calidad del hábitat a través del manejo de sus cuatro principales forófitos, la consideración de las variables aquí medidas, el desarrollo de un protocolo de propagación *in vitro* para su reintroducción, así como la disposición de exedentes en viveros comerciales para restar presión en campo.

## Characterization of *Brassolaeliocattleya* Raye Holmes 'Mendenhall' - putatively transformed for resistance to Cymbidium mosaic virus

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Orchids are infected by more than 50 different viruses. Infected plants bloom less efficiently, lack vigor, and produce lower-quality flowers than healthy plants. One of the most important viruses, with worldwide distribution, is Cymbidium mosaic virus (CyMV). It is a single-stranded, RNA virus belonging to the group of rod-shaped potexviruses. In previous

research, a *Brassolaeliocattleya* orchid was transformed with the coat protein gene from Cymbidium mosaic virus using an *Agrobacterium*-mediated method. The aim was to improve resistance of the orchid to CyMV. Protocorm-like bodies of *Brassolaeliocattleya* Raye Holmes 'Mendenhall' were used. A full-length coat protein gene of CyMV was cloned into a vector, which

also contained kanamycin resistance for the selection of transformants. The coat protein was inserted under control of a *CaMV 35S* promoter in an anti-sense orientation. Putative transformants were selected for four months on media containing 25 µg/mL Geneticin Disulfate (G418). The objective of the present study is to further investigate and characterize the putative

transgenic lines, which have been selected for antibiotic resistance. Molecular characterization of transformants is ongoing. Micropropagation is being carried out to multiply the transformed plant material. Plantlets will be used to develop an *in vitro* inoculation assay to test the resistance to CyMV. Future work will investigate the resistance of these lines to the Cymbidium mosaic virus.

## Pestiferous scale insects on native epiphytic orchids in south Florida: a new threat posed by exotic species

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In 2009, phytophagous insects (Hemiptera: Coccidae, Pseudococcidae) were collected from the inflorescences of the ghost orchid, *Dendrophylax lindenii*, at an isolated natural site in Collier Co., Florida, surrounded by an urban area. During the next two years, additional surveys were carried out in more remote orchid-rich habitats to determine if, and to what extent, other native epiphytic orchids were infested. Within the Florida Panther National Wildlife Refuge in 2010, 29 of 46 orchids sampled at one site (Cochran Lake) harbored three species of exotic scales: orchid pit scale (*Asterolecanium epidendri* Asterolecaniidae), brown soft scale (*Coccus hesperidum*, Coccidae), and boisduval scale (*Diaspis boisduvalii*, Diaspididae). Heaviest infestations were noted on *Epidendrum amphotomum*, *E. nocturnum*, *E. rigidum*, and *Prosthechea cochleata*.

The follow-up study the second year (2011) was then expanded to include Fakahatchee Strand State Preserve. A total of 1,726 orchids spanning 10 taxa were surveyed at seven locations. Boisduval scale was detected on 2.3% of the orchids from six of the ten orchid species in both the Florida Panther NWR and Fakahatchee Strand. *Prosthechea cochleata* and *E. amphotomum* appeared to be most vulnerable to this scale, with infection totals of 5.8% and 2.1%, respectively. Of 44 scales collected from the 39 orchids, 27% hosted hymenopteran parasitoids in various stages of development. The presence of *D. boisduvalii* adds an additional burden to state-endangered orchid populations and indicates that resource managers may need to expand management approaches to include plant-parasitic insect control.