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# Teaching Tree Management Programs to the Medellin Botanical Garden and City of Medellín Ground Maintenance Personnel, a Successful Approach!

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The City of Medellín is the second-largest city in Colombia and the capital of the Department of Antioquia. It is located in the Aburrá Valley in the central region of the Andes Mountains in South America at 4900 ft. above sea level. As of 2014, the metropolitan area has an estimated population of 3.7 million people and covered 445 square-miles which results in a population density of 17,940 people per square mile (Miami has 11,178). Medellin's weather is almost perfect for a sound and diverse urban forest. The annual temperature is 72 °F, and average precipitation of 65 inches. Due to those factors the city nickname is "the city of eternal spring." However, as the city is located in a valley and much the urban sprawl and streets are on slopes, it presents a challenge for tree establishment and maintenance. Additionally, poor planning and design, the lack of tree space, poor tree selection and maintenance, lack of city ordinances and tree code, lack of professional credentials, poor tree quality at planting, lack of grades and standards and lack of tree inspectors are the main factors for a poor street tree quality in the city.

The city of Medellín Ministry of Environment is in charge of the policies and regulations related to the city's urban forest, the Medellín Botanical Garden (MBG) for growing and producing the plants that the city is going to need, and the Antioquia School of Engineering together with the National University of Colombia are responsible for the research and training.

The University of Florida Commercial Urban Agent was approached by the Antioquia School of Engineering in order to design and implement a one week workshop about urban tree production, management and tree risk assessment. Two days of the workshop were directed to MBG employees and the rest of the program to the city of Medellin Public Works Ground Maintenance employees. Twenty-seven people from MBG participated in the program. The format of the class was formal presentations in the morning with hands-on activities in the afternoon. Topics included: production, identification and repair of root problems, soil substrates, types of containers, irrigation, fertilization, pruning and overview of the Florida Grades and Standards. The remaining of the week was for the Medellin Public Works Grounds Maintenance employees. Thirty-five people participated in the program. The topics included: planting, pruning trees and palms, chain saw safety, tree selection "right tree in the right place" and tree risk assessment (Fig. 1).

Fig. 1. León Morales assessing tree decay using an increment borer

To measure knowledge gain we used a pre-and post-test with 10 multiple choice questions. Seventy-eight percent (n = 48) of the participants responded to the pre- and post-test. The average pre-test score was 42% and the average post-test was 78%, which represents a 36% gain in knowledge. Also, post-seminar questionnaires indicated that 91% (n = 56) of 62 surveyed participants reported that they increased their knowledge and 81% (n = 50) stated that will make at least one practice change. Also, 97% (n = 60) of participants were very satisfied with the workshops.

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