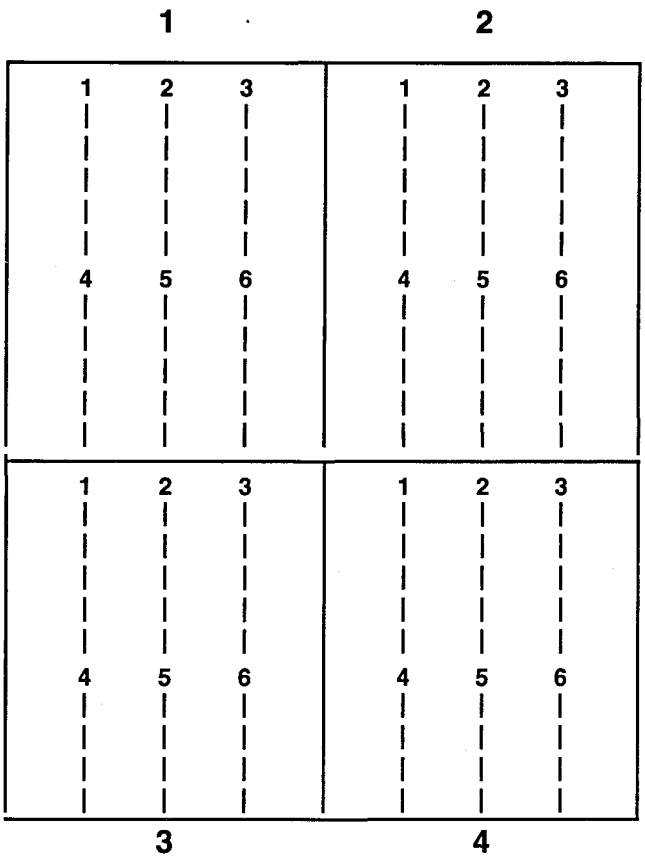

Fig. 1. Four blocks of container plants in which each block contains 6 beds or groups of plants.

each of 5 to 20 containers of bed 1 in order to obtain a 1-pint (473 cm^3) sample of media. At each sampling time, also remove media from 5 to 20 containers from each of 2 or 3 other growing beds in the block and at the next sampling time, sample the check bed and 2 or 3 beds not sampled last time.

Media Test Results and Interpretation

Once media samples are obtained, the saturated paste or 2:1 dilution procedure may be used to obtain the liquid extract needed for analysis (see Commercial Circular 556 for extraction details). If the reason for sampling was to obtain growing medium-soluble salts levels, then it is recommended that the extraction procedure be performed at the nursery since extract-soluble salts can be determined rapidly, indicating the relative fertility status of the container medium needed for quick management decisions. Optimum growing medium-soluble salts levels for most plants excluding azaleas and salt-sensitive plants range from 1000 to 1200 ppm for the saturated paste extraction and 600 to 700 ppm for the 2:1 dilution procedure (Smith, 1983). Optimum soluble salts for azaleas and salt-sensitive plants are about 400 to 600 ppm for the saturated paste and 250 to 350 for the 2:1 dilution (Smith, 1983).

A soluble salts level below optimum indicates that the concentration of fertilizer in the irrigation water should be increased. The magnitude of increase and number of irrigations with water of increased nutrient concentrations needed to increase soluble salts levels of the growing medium to optimum levels varies; therefore, soluble salts should be monitored at least weekly during the growing season.

Many N fertilizers contain urea and are hydrolyzed to ammonium carbonate by the enzyme urease. Urea does not increase soluble salts (conductivity) until hydrolyzed, so soluble salts levels of media fertilized with urea could be less than that of media fertilized with the same N concentration from ammonium nitrate. Urease is commonly found in the environment and hydrolysis of urea occurs naturally. Recent research (Wright, 1983a) indicated that about 70% of urea is hydrolyzed in 24 hours in a pine bark growing medium.

Soluble salts levels represent the electrical conductance of ions in solution and do not indicate a deficiency or excess of a nutrient or ion in the growing medium. Thus, N, P and K of the growing medium should be monitored at least monthly to ensure that desired levels are maintained. Sample the container medium as described previously and send media samples to the University of Florida Extension Soil Testing Laboratory or a private laboratory for analyses and interpretations. Detailed nutritional records should be maintained so future nutritional management decisions can be based on past experience.

Injection Calculations

A low growing medium concentration of N, P and/or K may be corrected by a supplemental application(s) of the deficient element(s). For example, a low growing medium N level may be corrected by a couple of irrigations in which only N is injected into irrigation water. The medium should be sampled again in 1 to 2 days to ensure the desired N level.

The nursery operator may wish to apply a corrective application(s) of 150 ppm N by dissolving ammonium nitrate (34% N) in irrigation water. Based on the fact that 1 ounce (28 g) of any pure dry substance dissolved to a volume of 100 gallons (379 liters) equals 75 ppm, the following formula can be used to calculate the ounces of dry fertilizer material to dissolve with water to a volume of 100 gallons to achieve the desired ppm.

$$\frac{\text{ppm desired}}{\text{75 (constant)}} \times \frac{\text{100 (constant)}}{\text{\% N in fertilizer}}$$

= ounces of fertilizer to dissolve to 100 gallons*

*No liability is assumed by the author or the University of Florida for the use of formulas in this publication.