

## General Considerations

### Properties of Fertilizers

The physical and chemical properties of fertilizers vary depending upon their composition. For example, fertilizers purchased dry have varying solubilities depending upon elemental carriers (Table 1). The quantity of fertilizer that will dissolve in irrigation water also varies due to natural concentrations of nutrients in irrigation water. Some fertilizers have an extremely low pH and should not be broadcast on plant foliage but may be ideal where irrigation water contains excessive carbonates. The nursery operator should be aware of the length of time fertilizers can be stored and the effects of cold weather. Many solution fertilizers will salt out or precipitants will form at low temperatures, thus altering nutrient concentrations. For example, a urea-ammonium nitrate solution (35% N) will salt out at about 59°F (15°C) (Tennessee Valley Authority, 1979b). Check with manufacturers or distributors about these and other properties that may influence the desirability of fertilizers for use in your nursery.

### Fall Fertilization

Fertilizing woody ornamentals in the fall is important in northern and central Florida so the plant can accumulate nutrients for spring growth. The objective of the fall fertilization program is for the plant to accumulate nutrients to the point where elongation would occur if it were not for the onset of cold weather. This is easily accomplished with fertigation systems by reducing the concentration of applied fertilizer in the fall and, consequently, the rate of nutrient accumulation slows. Thus, the plant does not exhibit a shoot flush in late fall that would be damaged by cold, yet accumulates nutrients used for the spring growth flush.

Solution fertilizers may be applied during the winter if additional elemental accumulation is needed for maximum spring growth. However, in areas where drainage is inadequate, granular slow release fertilizer should be considered to prevent applying excess water.

### Marketing

Plants removed from fertigation will usually exhibit one or two shoot flushes. Thus, plants that will not be fertilized again for several months after being sold should be fertilized with a slow release fertilizer prior to shipping. The slow release fertilizer will result in the maintenance of foliage color and plant quality until plants are established in the landscape.

## Glossary of Fertilizer Terms

- Ammoniacal nitrogen:** chemical complex of nitrogen and hydrogen. May exist as  $\text{NH}_3$  or ammonium ( $\text{NH}_4^+$ ).
- Analysis (see also Grade):** the percentage composition of a fertilizer as found by chemical analysis. Methods of analysis are specified by laws and rules of individual states. Although analysis and grade are sometimes used synonymously, the term grade applies only to the guaranteed minimum quantities of N,  $\text{P}_2\text{O}_5$  and  $\text{K}_2\text{O}$ .
- Carrier:** chemical compound containing a desired plant nutrient.
- Chelate:** fertilizer element in unique chemical combination with organic constituents such that plant availability is often increased.
- Citrate:** chemical reaction product of citric acid.
- Clear liquid:** a fertilizer composed of materials that are totally dissolved. A true solution.
- Enzyme:** proteins or molecular constituents responsible for many biological reactions.
- Essential nutrient:** a nutrient required for plant growth and development.
- Fertigation:** application or dissemination of fertilizer through the irrigation water.
- Fertilizer:** "any material, organic or inorganic, natural or synthetic, that furnishes to plants one or more of the chemical elements necessary for normal growth" (Tennessee Valley Authority, 1979a).
- Fluid fertilizer:** "a general term including fertilizers wholly or partially in solution that can be handled as a liquid. This includes clear liquids, liquids containing solids in suspension, and (usually) anhydrous ammonia" (Tennessee Valley Authority, 1979a).
- Formula:** a statement of how various ingredients are combined to make a fertilizer. A recipe.
- Grade (see also Analysis):** "the grade of a fertilizer is the nutrient content expressed in weight percentages of N,  $\text{P}_2\text{O}_5$  and  $\text{K}_2\text{O}$  in that order. For example, a grade of 10-15-18 indicates a fertilizer containing 10% N, 15%  $\text{P}_2\text{O}_5$  and 18%  $\text{K}_2\text{O}$  as found by prescribed analytical procedures" (Tennessee Valley Authority, 1979a).
- Hydrolysis:** reaction with water.
- Macronutrients:** essential plant nutrients used in large quantities by plants. Nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur are the macronutrients.
- Micronutrient:** the essential plant nutrients iron, manganese, molybdenum, chlorine, boron, copper and zinc required by plants in small quantities.