

## **BENEFITS OF FALL FERTILIZATION**

by Dirk W. Muntean, M.A., Consultant, Soil & Plant Laboratory, Inc., Bellevue, WA

Application of fertilizers in the fall can be of great benefit to established landscape plantings. With proper use of selected fertilizers and application timing, improved cold hardiness of plant material can be encouraged. Proper fall fertilization can also supply the plant with a reserve of nutrients, which will be drawn upon during the subsequent spring flush of growth. Owing to the leaching effect of fall and winter rains in the Pacific Northwest, nutrient reserves can be depleted when spring growth resumes if fall fertilization is not practiced. Even though vegetative top growth of landscape plants has for the most part ceased in early fall, there is usually an abundance of activity within the plant that is not seen, mainly proliferation of roots. Even though the plant does not appear to be active, the roots are taking up nutrients in the soil throughout the fall until soil temperatures drop low enough to inhibit root function. Thus, early fall applied nutrients are actively taken up by the plant material during a most opportune time of plant root function. The selection of appropriate fertilizers for fall application should rely primarily on soil test data to establish the actual deficits of the individual essential elements.

### Cold Hardiness

Even if soil test data show marginal nitrogen availability, this element is typically withheld or minimized in a fall fertilization program. This is due to the fact that low nitrogen can assist in promoting frost hardiness induction in plant material. If nitrogen soil availabilities are on the high side, they tend to maintain vegetative growth in plant material for a slightly longer period of time, and therefore may keep a plant in a non-frost hardy condition slightly longer. Fall fertilizer blends will typically be relatively low in nitrogen and higher in phosphorus and potassium by comparison. Depending upon soil test data, there may be additional requirements for the other two essential major elements (calcium and magnesium) or minor elements, such as copper, zinc, manganese, iron, boron or sulfur.

Frost hardiness in plants is mainly induced by exposure to relatively low temperatures (e.g. 40 degrees Fahrenheit) for several days, along with short day length exposure. The metabolic changes which occur in plant material upon induction of frost hardiness include higher concentrations of dissolved materials within the cell protoplasm, higher concentrations of chemically-bound water and greater elasticity of protoplasm, which is able to remain elastic during freezing. When plant tissue is exposed to freezing temperatures, ice crystals physically form outside of the membranes of the cells and grow larger as they pull water from the protoplasm. When temperatures warm back up, these crystals melt and release water back to the cells, which rehydrate and resume metabolism. In frost sensitive plants, the water does not enter back into the protoplasm completely, and plant metabolism cannot be resumed.

Essential elements taken up by plant roots during fall result in higher concentrations of dissolved materials within cell protoplasm and therefore assist in increasing the ability of plant tissues to withstand cold temperatures.

### Spring Growth

Particularly in young landscape plantings where establishment and rapid size attainment are desirable, the importance of fall fertilization cannot be overemphasized. As soil temperatures warm up in late winter, root action begins, even though above ground vegetative growth has not yet started. If a late winter/early spring fertilization program is not employed, then the main nutrient reserve from which the plants have to draw is that which was taken up the previous fall. Much of the spring flush of growth which could be encouraged is lost, because of no fall fertilization. By accumulating fall-applied nutrients which are not directly used in vegetative growth, these elements are within plant tissue and provide a ready source to meet plant needs as buds break and the spring flush of growth proceeds.

### Summary

Application of fertilizer in the fall provides an opportunity to build the reserve of mineral elements required for plant growth when active vegetative growth is not "using them up." As the reserve of nutrients increases in the plant tissues, the ability of the plant to withstand low temperature damage is increased, particularly if fertilizers employed are relatively low in nitrogen compared to the other major essential elements. Until low soil temperatures are reached, plant roots actively absorb applied fall fertilizers. Once taken up into plants tissues, these mineral elements are no longer subject to leaching by the fall and winter rains, nor are they directly used by vegetative growth, and are therefore available to help support the spring flush of growth. Fall fertilization is as natural as stocking your pantry before the winter and adding antifreeze to your car!