



# MARUMEGH

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### FOLIAR FEEDING: A SUPPLEMENTARY NUTRITION

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Foliar feeding refers to application of fertilizers to a plant's leaves. It is not a substitute for maintaining adequate levels of plants nutrients in soil but can be beneficial in certain circumstances. Most commonly, it is recommended for alleviating specific micronutrient deficiencies. In recent years, products have been developed that contain growth hormones, natural plant sugars, microorganisms and other ingredients.

#### Introduction

Foliar feeding has been used as a means of supplying supplemental doses of minor and major nutrients, plant hormones, stimulants, and other beneficial substances. Observed effects of foliar fertilization have included yield increases, resistance to diseases and insect pests, improved drought tolerance, and enhanced crop quality. Plant response is dependent on species, fertilizer form, concentration, and frequency of application, as well as the stage of plant growth. Foliar applications are often timed to coincide with specific vegetative or fruiting stages of growth, and the fertilizer formula is adjusted accordingly. Applications may also be used to aid plants in recovery from transplant shock, hail damage, or the results of other weather extremes. In terms of nutrient absorption, foliar fertilization can be from 8 to 20 times as efficient as ground application. However, this efficiency is not always achieved in actual practice.

One of the touted benefits of foliar fertilization is the increased uptake of nutrients from the soil. This notion is based on the belief that foliar fertilization causes the plant to pump more sugars and other exudates from its roots into the rhizosphere. Beneficial microbial populations in the root zone are stimulated by the increased availability of these exudates. In turn, this enhanced biological activity increases the availability of nutrients, disease-suppressive biochemicals, vitamins, and other factors beneficial to the plant. It is this rationale, in good part that reinforces the use of foliar fertilization in organic agriculture, where the philosophy of "feed the soil, not the plant" prevails. While foliar fertilization is being used on a wide variety of crops, its economic value is generally deemed greater for horticultural than for agronomic crops. This is because horticultural crops are of higher value and their nutrient status is more carefully monitored. At present, for example, foliar sprays are commonly recommended to correct zinc deficiencies in grapes, to control bitter pit and cork spot in apples, and for general supplementary nutrition in strawberries. Overall, the economics of foliar fertilization is dependent, first, on how successful applications are and, second, on whether or not the same nutrition might have been supplied more economically through another means. Because weather can be a factor and because circumstances differ

widely among farms and farm managers, there is no simple determination. The individual grower must decide based on need, and monitor for indicators of success.

### The Basics of Foliar Feeding

For foliar fertilization to work effectively, certain guidelines must be followed:

- To be efficient and to avoid crop damage, very dilute solutions of nutrient formulations are suggested. Highly concentrated sprays, especially those bearing inorganic salt-based fertilizers, have the potential to “burn” plant foliage. This is especially true of chloride salts (e.g., potassium chloride). Spray-solution pH should remain in the near-neutral range (5.5-8.5). If pH adjustment is required, vinegar can be used to increase acidity, and baking soda to decrease it.
- In addition to pH, some other qualities of spray-water should be considered:
  - *Cleanliness*. Small undissolved particles can quickly clog nozzles—even those well equipped with strainers can be plugged if enough suspended matter is present.
  - *Chemical and disease contaminants*. Some water sources are contaminated and should not be used at all for foliar feeding. If there is concern specifically about disease organisms, the water can be treated effectively with a small amount of hydrogen peroxide.
  - *Chlorine*. Chlorination of water removes harmful bacteria, but it can also kill beneficial organisms, which may be included in some foliar sprays. Allowing water to stand in an open tank overnight generally renders chlorinated water harmless to beneficial microbial mixtures.
- Best effect is achieved when foliar sprays are finely atomized. This can be managed by increasing sprayer pressure or by using a mist blower. Some advantage can be gained on boom-type sprayers by tilting the nozzles back to a 45° angle to allow the spray to drift onto the plants.
- Spray when wind is minimal. This is especially important with finely atomized sprays because they drift readily.
- Absorption is increased when sprays also reach and coat the undersides of leaves. This is where most of the plant’s stomates are located.
- Always delay foliar fertilization until air temperatures drop to 80°F or below. Absorption at higher temperatures is very poor because plant stomates are closed. Some of the most effective foliar feeding is done late in the evening or in the early dawn, when temperatures are right and wind is minimal.
- Absorption is further enhanced when weather conditions are humid and moist. The presence of heavy dew on the leaves facilitates foliar feeding.
- Addition of a surfactant to the solution decreases surface tension on the leaf and may increase absorption.
- Take note of possible chemical interactions among foliar fertilizers. Some materials are incompatible and should not be mixed together. They may create precipitates that tie up the nutrients and clog nozzles. Many product labels warn of incompatibilities. If there is

no information, mix relative quantities of the materials and water in a jar and shake it. If there is no precipitate, there should be no problem.

- For convenience and cost savings, foliar fertilization can sometimes be combined with a pesticide application. However, timing conflicts and material incompatibilities can make combining sprays unwise. Be certain to read all product labels and do the jar test if uncertain.

### **Crop Manipulation through Foliar Fertilization**

- Fertilization strategies can influence flowering, fruit set, fruit size, the amount of vegetative growth, and other plant characteristics.
- By carefully choosing the components of a foliar or side dress fertilizer, the grower can “nudge” a crop toward earlier, heavier fruit set, or discourage fruiting, an advantage when producing greens or a forage crop.
- This concept is fairly well recognized in the conventional agricultural community. Many citrus growers, for example, are known to foliar feed with fertilizer blends dominated by potassium and nitrate, vegetative-growth-enhancing nutrients to increase fruit size after the crop is well set.
- Generally speaking, fertilizer blends dominated by potassium, nitrate nitrogen, calcium, and chlorine tend to promote vegetative growth and fruit size.
- Blends dominated by ammonium nitrogen, phosphorus, sulphur, and manganese encourage the setting of fruit and seed.
- While this knowledge gives the farmer more management options, one should not assume too much when trying to manipulate crop performance. All crops—but especially fruit crops will need certain amounts of both growth and fruit-enhancing nutrients throughout the season.
- Imprecise timing, or attempts to tip the balance too far, can yield disappointing and costly results.

### **Conclusion**

It is obvious that foliar feeding is a good, reliable method of feeding plants when ground application is not efficient enough. However, it is important to understand that this method cannot substitute the supply of nutrients through the root system when the uptake of all plant nutrients through leaves involves considerable labour with a high risk of phytotoxicity.

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