HOUSE PLANT CARE:

# FERTILIZER

Plants and animals need the same kinds of foods: carbohydrates, fats, and proteins. Plants are *autotrophic*; that is, they can manufacture the carbohydrates, fats and proteins they need through the process of photosynthesis. This process requires raw materials found in the air and water, as well as mineral nutrients present in soil solids, that is, fertilizers.

**Humans and other animals are" heterotrophic", incapable of making inorganic raw materials into foods (organic compounds).*

Fertilizing is necessary for the long-term health of house plants; however, plants that are not growing in optimum conditions, without the normal stimuli for growth, do not require as much or as frequent doses. In addition, potted plants that do not have their soil leached periodically, for instance large containers that cannot be taken to a sink where water can wash through the soil, may be damaged by the accumulation in the potting medium of mineral salts from frequent fertilizing. It is best to err on the side of too little fertilizer for indoor plants, diluting the product considerably or reducing the frequency of application to only 5 or 6 times a year for foliage plants. An exception to this would be plants that are being "forced" for bloom, such as African violets, where regular applications of fertilizer are used to encourage flower bud formation.

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### Nutritional elements

There are 16 recognized elements necessary for the normal growth of plants. These are termed *essential elements*, and are used by plants in varying amounts. C**arbon**, **hydrogen**, and **oxygen** are obtained mainly from air and water, while the remaining 13 elements come from the soil.

There are six soil derived elements, used in relatively large amounts, known as *macronutrients*, three of which are most commonly added to soils as horticultural fertilizers: **nitrogen** (N), **phosphorus** (P), and **potassium** (K). Fertilizers containing these three *primary elements* are called "complete" fertilizers. Secondary macronutrients include calcium (Ca), magnesium (Mg), and sulfur (S), found in limestone and sulfur, as well as in manure, fish emulsion, and other organic fertilizers.

The remaining seven elements are called *micronutrients*—iron, manganese, boron, molybdenum, copper, zinc, and chlorine—and are used in relatively small amounts. They are found in organic fertilizers, or in commercial fertilizers listing *trace elements* or *minor elements*.

### Organic vs. Inorganic

Fertilizers are either inorganic (chemical) or organic. Chemical fertilizers are manufactured from inorganic materials, such as ammonium nitrate, superphosphate, and potassium nitrate. They are usually fast-acting, sterile, offer less bulk, can be formulated for specific plants, and are generally less expensive. Organic fertilizers are derived from living organisms, such as horse manure, fish emulsion, bone meal, and greensand (source of potassium). Advantages to organic fertilizers include: less chance of over-application; slow, continuous release of nutrients; and they improve soil structure, provide food for beneficial soil microorganisms, and help maintain ecological balance.

As far as the plant is concerned, there is no difference between organic and inorganic fertilizers. The plant will absorb the nutrients broken down into their inorganic forms.

Note: Soil pH affects a plant's ability to take up various nutrients

**Fertilizer Analysis**

All commercial fertilizers must have the *percentages* of each of the nutrient elements printed on the label. This analysis of ingredients is important in identifying the amount of any given nutrient that is being applied. With complete fertilizers (containing the three primary elements), the percentages of nitrogen, phosphorus and potassium are always indicated in this order by three numbers in this manner: 1-1-1, 5-10-5, 3-1-2, etc. This means that in relation to the total amount of product in the container, the first number is the percentage of nitrogen. For example, in a bag of 5-10-5, 5 percent is nitrogen, 10 percent is phosphorus, 5 percent is potassium, and 80 percent is filler (necessary for accurate application.) In organic fertilizers, the formulas tend to have lower numbers because the nutrients are in less concentrated form.

The numbers in the fertilizer analysis also represent *ratios*. That is, the proportions of nutrient elements to each other. Because nitrogen, phosphorus, and potassium fulfill specific plant needs, the ratio of these three elements will determine which fertilizer you choose. For instance, nitrogen (N) is necessary for vegetative growth and rich green color. Chlorosis (a pale yellow appearance) is often the result of too little nitrogen (*deficiency*), while lush leafy growth at the expense of flowers and fruits is the result of too much nitrogen. Ferns, plants that do not produce flowers, and other plants grown strictly for their foliage do well with a high-nitrogen fertilizer.

Phosphorus (P) promotes roots and flower bud formation, and is necessary for healthy stems. A phosphorus deficiency may display dark green or purplish colored foliage and reduced growth. Potassium (K) is important to protein synthesis and the movement of air and water through leaves. A deficiency of potassium can cause weak stems and reduced growth. Most fertilizer manufacturers have made formula selection easy, buy labeling their products for specific uses: "African Violet Food" or "Orchid Food".

**Application**

Fertilizers are available in several forms, the most commonly used forms for house plants being liquids, spikes, tablets, powders, pellets, and granules. Liquids come in concentrated or dilute forms, the dilute "ready-to-use" forms being convenient but expensive. Spikes, pellets, and tablets are often slow-release or timed-release. Some indoor gardeners prefer to use a very dilute solution of fertilizer every time they water, while others prefer the convenience of timed-release products. Choose a form or method of application that suits your gardening style, and follow the directions on the label.

Remember that too much fertilizer (soluble salt build-up) can be **toxic** to plants, damaging roots and leaves. Periodic leaching—washing excess nutrients out of the soil by deep, long waterings—and appropriate application of fertilizer will help reduce soluble salt burn. *Rule of thumb: feed plants when they're growing.*

ROOT HAIRS: Near the tip of each root are numerous *root hairs*. A chemical reaction occurs at the root hair, whereby all nutrient elements (as ions) in the soil are forced into solution and taken up by the roots, with water, to the shoots above.

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