



## HAWAII COOPERATIVE EXTENSION SERVICE

College of Tropical Agriculture and Human Resources

University of Hawaii

GENERAL HOME GARDEN SERIES No. 16

### STARTER SOLUTIONS FOR THE HOME GARDEN

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#### What Are Starter Solutions?

Starter solutions are dilute solutions of fertilizer applied to plants at time of transplanting. They are utilized to give higher survival rate and earlier renewed growth of these plants.

#### Why Use Starter Solutions?

Many vegetables and flowers grown from very small seed are often seeded in pots, flats, beds, etc. to produce larger plants that may be transplanted. Transplanting is done when the plants reach sufficient size to be handled easily.

When plants are removed from the soil for transplanting, roots are broken or damaged causing "shock" to the plants. Uptake of water and nutrients are restricted, resulting in slow recovery of, stunting, or death of the plant. The use of dilute solutions containing plant nutrients used in place of pure water often reduces the shock of transplanting and results in faster establishment of the plant.

#### What To Use For Starter Solutions

Highly soluble fertilizers should be used for starter solutions. Concentrated fertilizers; those containing more than 50% by weight of one or more of the following plant nutrients—nitrogen (N), available phosphoric acid ( $P_2O_5$ ), and water soluble potash ( $K_2O$ ), are generally very soluble in water, although some are slow release or controlled release materials. Besides concentrated formulations, various chemical fertilizers may be used.

Fertilizers suitable for starter solutions may be classified as (1) high phosphate, (2) medium or moderate phosphate, or (3) low phosphate formulations depending upon the ratio of phosphate to the nitrogen and potash in the material. The low phosphate formulations may be further divided into high nitrogen, high potash, formulations of approximately equal amounts of nitrogen, phosphate, and potash. High phosphate formulations are those with 3 or more times as much phosphate as nitrogen and

potash, i.e. 10-52-17, 13-39-10, 10-50-10, 15-52-9, etc. Medium phosphate formulations  $1\frac{1}{2}$  to  $2\frac{1}{2}$  times as much phosphate, i.e. 15-30-15, 19-28-14, 6-25-15, etc. Low phosphate formulations are those where the ratio of phosphate is the same or less than the nitrogen and potash, i.e. high N would be 24-20-15, 23-21-17, etc.; equal amounts would be 20-20-20, 21-21-21, etc.; high potash would be 15-15-30, 15-5-25, etc. Fertilizers containing only nitrogen, nitrogen and phosphate, nitrogen and potash, or phosphate and potash may also be used for making starter solutions.

#### How To Prepare Starter Solutions

Starter solutions made with concentrated fertilizers are made by dissolving the fertilizer in water. Use  $2\frac{1}{2}$  to 3 pounds in 50 gallons of water or one to two level teaspoonsful in one gallon of water.

Commercial liquid fertilizers may be used to prepare starter solutions, use  $1\frac{1}{2}$  pints to 1 quart in 50 gallons of water or  $1\frac{1}{2}$  to 2 ounces in one gallon of water.

Regular lower analysis commercial fertilizers, such as 10-30-10, 5-10-5, etc., may be used also. To prepare starter solutions from these materials, mix one pound per gallon of water to prepare a stock solution. Stir this solution thoroughly and allow to settle. Use the clear liquid and mix 5 gallons of stock solution with 45 gallons of pure water or 14 ounces per gallon of water. Solutions stronger than these should not be used as damage to plant roots may occur due to too great concentration of salts in the solution.

#### How To Apply Starter Solutions

Starter solutions should be used to water in the plants at time of transplanting. Use  $\frac{1}{2}$  pint of the solution in place of pure water for each plant for most vegetable and flowering plants. Apply one pint for the larger vegetables and flowering plants and smaller ornamentals. Apply one quart to  $\frac{1}{2}$  gallon

for larger ornamentals and up to one gallon for large trees. Do not apply starter solutions where dry fertilizer has been applied in the row or hill before transplanting.

High phosphate formulations are needed for tomatoes, peppers, lettuce, eggplant and similar plants. A medium phosphate solution is best for cabbage, cauliflower, celery, cucumber, melons and most of the annual flowering plants. A low phosphate, high nitrogen, high potash solution is best for ornamental plants and fruit trees. However, on the highly weathered soils of Hawaii, the high phosphate solutions should be used as these soils are very low in phosphorus and tend to fix large quantities when applied to the soil.

The use of starter solutions, when properly applied, will result in earlier establishment of the plants, resulting in earlier maturity. Yields are increased and quality of the produce is improved. These factors result in greater satisfaction for the home gardener as he harvests and utilizes his produce.

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**NOTE:** The use of trade names is for the convenience of readers only and does not constitute an endorsement of these products by the University of Hawaii, the College of Tropical Agriculture and Human Resources, the Hawaii Cooperative Extension Service, and their employees.

Reprinted June, 1980—2M