



BASICS OF FOLIAR APPLICATION



Foliar feeding or foliar fertilization is a term describing the application of necessary plant nutrients to the above ground, living plant parts. Its purpose is not to replace soil fertilization, but rather to supplement plant nutrient needs during shortages and/or critical growth stages. Foliar feeding is intended to delay natural senescence processes shortly after the end of reproductive growth stages. Foliar feeding targets the growth stages where declining rates of photosynthesis and the leveling off of root growth and nutrient absorption occur. It attempts to aid translocation of nutrients into seed, fruit, tuber or vegetative production. Foliar feeding can be an effective management tool to favorably influence pre-reproductive growth by compensating for environmentally induced stresses such as adverse growing conditions and/or poor nutrient availability.

Early foliar applications can make an already good crop better, either by stimulating more vigorous regrowth or by increasing the yield potential. The practice is a highly efficient and timely method of applying needed plant nutrients and a means of compensating for soil or environmentally induced nutrient deficiencies.

CROP GROWTH STAGES: It is important to apply foliar fertilizer at the proper growth stages. Foliar applications should be timed to provide needed nutrients during the yield determining growth stages. Multiple, low rate applications may show the most favorable crop yield responses. Monitor crop growth on a weekly or even on a daily basis for proper determination of the targeted growth stage. Regular plant tissue testing is essential to identify those nutrients that are most limiting crop growth.

CROP CONDITIONS: Generally, crops that are nutritionally sound will be more likely to respond to foliar feeding. This is due to better tissue quality (allowing for maximum absorption of nutrients into leaf and stem) and faster growth (translocatable nutrients will be moved rapidly to the rest of the plant). Crops under heat or moisture stress show less response to foliar fertilizer applications. When the stress is removed and the crop begins to recover, foliar applications may be resumed successfully.

METEOROLOGICAL CONDITIONS: Environmental influences, such as time of day, temperature, humidity and wind speed influence the physical and biological aspects of foliar applications. Warm, moist and calm conditions favor highest plant tissue permeability.

- **Time of day:** Ideal conditions are most likely found during the evening hours and early morning.
- **Temperature:** 65-85 degrees F, 70 degrees is ideal.
- **Humidity:** Greater than 70% is best.
- **Temperature + humidity:** 140-160.
- **Wind speed:** Less than 5 mph.

FERTILIZER MATERIALS: Not all fertilizers are suitable for use in foliar applications. The objective is for maximum absorption of nutrients into the plant tissue with a minimum or no foliage damage. Fertilizers should meet the following standards:

- **Low salt index:** Reduces or eliminates potential tissue damage from fertilizer burn.
- **High solubility:** Reduces the volume needed for application. Liquid fertilizers are the easiest to work with.
- **High purity:** To eliminate interference with spraying, solution compatibility or unexpected adverse effects on foliage.

SURFACTANTS AND OTHER SPRAY ADDITIVES CAN HAVE A POSITIVE EFFECT: Consult product labels for appropriate uses and follow all instructions. Always run compatibility tests on the products that will be sprayed together before mixing into the spray tank.

Reference: Foliar Nutrition, Midwest Laboratories, Inc., Omaha, NE, 1995.

FOR MORE INFORMATION

The Andersons, Inc.
800-831-4815
www.AndersonsPlantNutrient.com



FIELD CROPS

Suggested application rates and time of application

CROP	GALLONS/ACRE	TIME OF APPLICATION
Alfalfa	1.5 - 4.0	Apply after each cutting when sufficient foliage is present.
Canola	1.5 - 3.0	Apply just before bolting.
Corn Field	1.5 - 2.0	12 to 24 inches tall. Tassel emergence. After pollination.
Seed Corn	1.5 - 2.0	Before detasseling. Repeat after pollination.
Cotton	1.5 - 4.0	Early boll formation and repeat at 14 to 21 day intervals.
Flax	1.5 - 3.5	Early boll development.
Grain Sorghum	1.5 - 2.0	After pollination.
Grass seed production	3.0 - 4.0	Seed head elongation.
Hops	1.5 - 2.0	Before cone development.
Peanuts	1.5 - 2.0	Early bloom. Repeat at 14 to 21 day intervals until pods are filled.
Potatoes	2.0 - 3.5	Tuber initiation. Repeat at 10 to 14 day intervals until maximum tuber development has occurred.
Rice	3.0 - 4.0	Panicle initiation. Repeat if needed.
Small Grains	3.0 - 3.5	Tillering through flag leaf emergence.
Soybeans	2.0 - 3.5	Early pod formation. Repeat in 14 to 21 days.
Sugar Beets	3.0 - 4.0	10 to 12 leaf stage. Repeat at 20-leaf stage.
Sunflower	2.0 - 3.5	When outer seeds start to fill. Repeat in 10 to 14 days.
Tobacco	2.0 - 3.5	Plant bed stage to near maturity as needed to maintain crop growth and quality.
Other field crops	1.5 - 2.0	When sufficient foliage is present or at early fruit set. Slightly higher rates may be necessary.

GROUND APPLICATION Apply with a minimum of 5 gallons of water per acre or more for good coverage.

AERIAL APPLICATION Apply with a minimum of 2 gallons of water per acre or more for good coverage.

CENTER PIVOT Apply 4 to 7 gallons per acre per application as needed.

DRIP IRRIGATION Apply 4 to 7 gallons per acre per application 3 to 6 times during the growing season as needed.

SPRINKLER IRRIGATION Beginning at the 3rd to 4th leaf stage, apply 4 to 7 gallons per acre per application every 10 to 14 days as needed.



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VEGETABLES AND GARDEN FRUITS

Suggested application rates and time of application

CROP	GALLONS/ACRE	TIME OF APPLICATION
Asparagus	2.0 - 3.5	At mid-fern development and repeat at 14 to 21 day intervals.
Green Beans & Lima Beans	1.5 - 2.0	At early flowering and repeat in 7 to 10 days.
Broccoli, Brussels Sprouts, Cabbage & Cauliflower	2.0 - 3.5	Prior to head formation and repeat 10 to 14 days.
Carrots	1.5 - 2.0	When plants are 3 to 6 inches tall, repeat at three-week intervals or as required.
Celery	1.5 - 2.0	When plants are 8 to 12 inches tall and repeat at 10 to 14 day intervals.
Sweet Corn	1.5 - 2.0	When plants are 12 to 24 inches tall, then at tassel emergence and repeat after pollination.
Cucumber, Melons & Squash	2.0 - 3.5	Early flowering and repeat at 10 to 14 day intervals.
Kale	2.0 - 3.5	When sufficient foliage is present.
Lentils	1.5 - 2.0	Early flowering. Repeat at 10 to 14 day intervals.
Lettuce	1.5 - 2.0	After thinning, then at early head formation. Repeat at 10 to 14 day intervals.
Okra	1.5 - 2.0	Bud stage. Repeat at 10 to 14 day intervals.
Onion and Garlic	2.0 - 3.5	Mid-set development. Repeat at 14 to 21 day intervals.
Peas	2.0 - 3.5	Early flowering. Repeat in 10 to 14 days.
Peppers	2.0 - 3.5	Early fruit set. Repeat at 10 to 14 day intervals.
Strawberries	1.5 - 2.0	Early flowering and repeat every 14 days through harvest. Initiate fall application when new growth reaches 3 inches in height.
Tomatoes		
Process & Fresh	2.0 - 3.5	At full bloom. Repeat at 10 to 14 day intervals.
Other vegetable crops	1.5 - 2.0	When sufficient foliage is present or at early fruit set. Higher rates may be necessary.

GROUND APPLICATION Apply with a minimum of 10 gallons of water per acre or more for good coverage.

AERIAL APPLICATION Apply with a minimum of 4 gallons of water per acre or more for good coverage.

SPRINKLER IRRIGATION Beginning at the 3rd to 4th leaf stage, apply 3 to 7 gallons per acre per application every 10 to 14 days.

DRIP IRRIGATION Apply 3 to 7 gallons per acre per application 3 to 6 times during the growing season.



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FRUITS, BERRIES, NUTS AND CHRISTMAS TREES

Suggested application rates and time of application

CROP	GALLONS/ACRE	TIME OF APPLICATION
Almond, Filbert, Pecans & Walnuts	2.0 - 3.5	At full leaf. Repeat at early nut expansion.
Apples	1.5 - 2.0	Begin at first full leaf and repeat at early fruit color.
Blueberry	1.5 - 2.0	Early fruit set and repeat at early fruit color.
Caneberries	1.5 - 2.0	Prior to fruit set.
Cherries, Peaches, Pears & Plums	1.5 - 2.0	Prior to fruit set.
Citrus	4.0 - 10.0	Early bloom. Repeat after fruit set.
Winter rate	2.0 - 3.5	Apply in mid-January and repeat as required.
Cranberry	1.5 - 2.0	Hook stage. Repeat after fruit set.
Table Grapes	1.0 - 1.5	Prior to fruit set.
Raisin Grapes	1.0 - 1.5	When sufficient foliage is present. Repeat as needed.
Wine Grapes	1.0 - 1.5	When sufficient foliage is present. Repeat as needed.
Olives	1.5 - 2.0	Early fruit development. Repeat as needed.
Other fruit or nut crops	1.5 - 2.0	When sufficient foliage is present or at early fruit set. Higher rates may be necessary.

EVERGREEN TREES

- FOLIAR** 1.5 to 2.0 gallons per acre as needed or at 14 to 21 day intervals.
- GROUND APPLICATION** Apply with a minimum of 5 gallons of water per acre or more for good coverage.
- AERIAL APPLICATION** Apply with a minimum of 2 gallons of water per acre or more for good coverage.
- SPRINKLER IRRIGATION** Apply 3 to 5.5 gallons per acre per application every 10 to 14 days or as needed.
- DRIP IRRIGATION** Apply 3 to 5.5 gallons per acre per application 3 to 6 times during the growing season.

SRN may be applied in a concentrate spray (50 to 100 gallons of water) or dilute spray (200 to 400 gallons of water).



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