Poinsettia Nutrition

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Producing a good quality crop of poinsettias requires careful attention to plant nutrition. The fertilizer program should be planned before the crop is potted.

The major factor to be considered is the nutritional requirements of the crop. Poinsettias have a relatively high demand for major elements and are prone to some specific nutritional problems.

The first element to consider is nitrogen. In the early stages of the crop (at potting), apply 300 to 400 ppm N in a constant liquid feed program. Some ammonium nitrogen is desirable at this stage but avoid fertilizers containing more than about 40% of the total nitrogen as ammonium. Avoid letting the medium dry when using high fertility levels. Once established, reduce the constant liquid feed rate to 250-300 ppm N and reduce ammonium to less than 25% of the total N. Two weeks before shipping, switch to clear water. This will make for better postproduction longevity. However, if a soil test indicates too low a fertility, use 100-150 ppm N to finish the crop.

Phosphorus can be incorporated into the growing medium as superphosphate. Commercial soilless media are generally low in phosphate, and phosphate is readily leached from soilless media. In soilless media, use a soluble fertilizer providing about 50 to 150 ppm P_2O_5, or a ratio of about 2 or 3 N to 1 P_2O_5.

Potassium recommendations vary from a N to K_2O ratio of 3:2 to 3:4. Growers must provide ample potassium (K) to produce poinsettias with strong stems. When using a constant liquid feed with 300 ppm N, use 200 ppm K_2O to achieve the low N:K_2O ratio or 400 ppm K_2O for the high N:K2O ratio.

Calcium, magnesium and molybdenum are especially critical for poinsettia nutrition. Functional deficiency of calcium causes leaf chlorosis and marginal necrosis and, apparently, is involved in marginal bract necrosis. Inadequate magnesium

causes marginal chlorosis of lower leaves, and ample magnesium is required for development of dark green leaves. Molybdenum deficiency can occur with poinsettias grown in soilless media, especially if the pH is too acid (pH less than 5.0).

Growers must also address the following questions before selecting a nutritional program:

1. What is the water quality? If irrigation water is alkaline (high pH) or has excess sodium or boron, these factors must be compensated for in the choice of fertilizers.

2. What growing medium will be used? Will it contain a high proportion of soil or will it be a soilless mix? Will the mix be blended by the grower or will it be a bag mix?

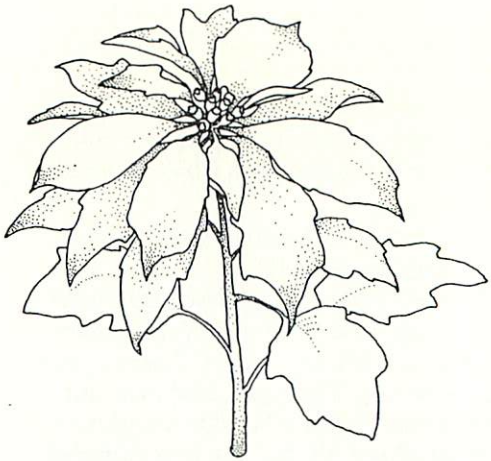
3. How will fertilizers be applied? The options are too numerous to consider in detail here but consider the following: fertilizers can be provided as soluble (liquid feed) or as controlled release (i.e., Osmocote). Soluble fertilizers can be applied at every irrigation (constant liquid feed), once a week or at every second or third irrigation. Controlled release fertilizers can be incorporated into the mix, dibbled into the pot at planting or top-dressed after planting.

4. What kind of injector system is to be used for liquid feed? Is it a single head injector or can it add two or more fertilizers to the irrigation water? What ratio is the injector? Are fertilizers compatible in the same stock solution? Is the fertilizer soluble at high concentrations (i.e. 200x)?

5. How is the crop irrigated? Is it being watered by hand, with a drip system or with a flood and drain system? The irrigation method will influence the fertilizer concentrations used. All these factors and options will influence the choice of a nutritional program.

Given all the above factors and choices, what can a grower do to provide the best possible nutrition for a poinsettia crop? A few common situations will serve as examples.

A crop is grown in a soilless mix with constant liquid feed through a single injector, 100x proportioner. Start with 20-10-20 Peatlite Special, 15-5-25 Poinsettia Peatlite Special or comparable fertilizer as the backbone of the liquid feed program. Add magnesium sulfate (epsom salts) at 2 to 4 ounces per gal-



lon of concentrate. If the fertilizer is incompatible with epsom salts, apply epsom salts alone at 1 to 2 pounds per 100 gallons once a month. Alternate every third or fourth irrigation with a calcium-containing fertilizer such as 15-0-15 or 20-0-20, calcium nitrate, or calcium nitrate plus potassium nitrate. Don't overdo it with calcium fertilizers. They tend to raise the pH (making the medium too alkaline). ***Note: Do not mix magnesium sulfate with calcium-containing fertilizer.*** Provide molybdenum by adding about 0.1 gram ammonium molybdate per gallon of concentrate (available in 1 gram packets from Peters). Alternatively, Peters Mag-Mo fertilizer can be used to supplement both magnesium and molybdenum. Peters 15-5-25 Poinsettia Peatlite Special contains elevated levels of magnesium and molybdenum, so supplementing with these elements is not necessary.

Controlled release fertilizers (Osmocote or Sierra formulations) can be a valuable part of a poinsettia feed program. Controlled release materials are best used in conjunction with a liquid feed program. I find them especially useful in weekly or intermittant feed programs, because the controlled release material helps even out nutrient availability between liquid fertilizer applications. For controlled release/liquid feed programs use one-half the suggested rate for each.

A dual injector allows you to use calcium nitrate and magnesium sulfate in the same liquid feed program. I've used a combination of ammonium nitrate, potassium nitrate, ammonium phosphate, magnesium sulfate and micronutrients in one tank with calcium nitrate in the other tank. As an alternative, use ammonium nitrate, potassium nitrate and calcium

nitrate in one tank, with phosphoric acid in the other tank. This combination is particularly useful if irrigation water is excessively alkaline.

Reduce the fertilizer rate used in flood and drain (ebb and flow) irrigation systems. Initially, water the crop in with 300 ppm N prior to placing on the flood and drain table, then maintain 150 ppm N in the system.

At The University of Connecticut floriculture greenhouses, poinsettias are grown in a soil-based medium (1 soil: 1 peat: 1 perlite), with dolomitic lime (11 pounds per cubic yard), superphosphate (2.5 pounds per cubic yard), Sierra Poinsettia Mix (4.5 pounds per cubic yard), and Electra 5-10-3 (14 ounces per cubic yard) incorporated at mixing. The liquid feed program consists of weekly applications of 1 pound potassium nitrate plus 1.5 pounds calcium nitrate per 100 gallons, approximately 500 ppm N.

If you choose to mix your own fertilizer, see the table for some suggestions. Consult the Cooperative Extension System publication *Nutrition of Greenhouse Crops* (NE 220) for further information. If you are purchasing soilless media and fertilizer mixes, remember that sales and technical representatives of the major manufacturers are often well trained in nutrition. They can provide detailed suggestions for fertilizer programs, not only for poinsettias but also for all the crops you grow.

Once again, getting poinsettias off to a good start and keeping them on track nutritionally will help ensure a quality crop.

In the following table, all quantities are expressed as ounces per 100 gallons of fertilizer at 100 ppm N. To increase the concentration, simply multiply by the appropriate factor. For example, to

obtain 300 ppm N, multiply by 3. Use soluble fertilizer grade salts to avoid insoluble coatings and other impurities. These formulas do not contain micronutrients. To provide basic micronutrients, incorporate them into the potting medium or apply a single application of Peters Soluble Trace Element Mix or Peters Compound 111 with the liquid feed. See fertilizer labels for specific recommendations.

Table 1. Do-it-yourself Fertilizer Formulations For Poinsettias.

	A	B	C	D	E	F
	ounces/100 gal/100 ppm N					
Ammonium nitrate	-	2.3	1.7	1.3	1.8	1.8
Potassium nitrate	3.2	3	5	3	2.2	1.8
Calcium nitrate (15.5% N)	4.8	-	-	2	2	2.3
Mono-ammonium phosphate	-	1.3	1	1.1	1.1	-
Phosphoric acid (75%)	-	-	-	-	-	0.4 fl oz
Magnesium sulfate	-	1.3	1.3			

A. 15-0-18 equivalent
B. 20-10-20 equivalent
C. 15-5-25 equivalent
D. Dual injector, lower N:K2O
E. Dual injector, higher N:K2O
F. Dual injector, acidifying

***Note:** Thanks to Richard Biamonte, Rick Vulgamott and David Hartley for helpful suggestions.*