

Nutrient Management Recommendations for Commercial Cut Flower Production

Integrated Pest Management for Commercial Horticulture

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Fact Sheet 806 - Revised 2012

Introduction

Since December 31, 2001, the state has required Maryland cut flower growers to have a nutrient management plan in place for producing their crop. University of Maryland Extension compiled the fertilizer recommendations that follow to serve as general guidelines for the nutrient management of commercial cut flower production. In developing nutrient management plans, growers should follow the recommended rates of fertilization provided here.

Using Nitrogen for Cut Flower Production

Nitrogen applications are needed annually for producing most cut flower species. The rate of application varies according to plant species. We have divided plant nitrogen requirements into three categories: **low**, **medium** and **high**. Cut flower plants started in the fall and harvested in the spring generally require less nitrogen than plants harvested in summer and fall. We have created a list of common cut flowers grown in Maryland with a rating assigned for “low”, “medium”, and “high” nitrogen requirements.

If you are using the higher rates of nitrogen on crops that flower over a long period of time, it may be beneficial to split the applications into two or more, especially if you are using water-soluble forms of nitrogen such as ammonium nitrate or urea. If you are using controlled-release nitrogen sources, make a single application early in the season.

Table 1. Nitrogen Application Rate Recommendations

Nitrogen Range	Rate (lb N per 1,000 sq ft)
Low	1.0 - 1.5
Medium	1.5 - 2.0
High	2.0 - 3.0

Table 2. Cover Crops That Add Nitrogen

Crop	Pounds per acre	Pounds per 1,000 sq ft
Perennial Crops		
Alfalfa	100 - 150 ^a	2.3 - 3.4 ^a
Ladino clover	60	1.4
Red clover	40	0.9
Birdsfoot trefoil	40	0.9
Winter Annual Crops		
Hairy Vetch	75 - 150 ^b	1.7 - 3.4 ^b
Crimson clover	50 - 100 ^b	1.2 - 2.3 ^b
Austrian winter peas	75 - 150 ^b	1.7 - 3.4 ^b
Summer Annual Crops		
Lespedeza	20	0.5
Soybeans	15 - 40 ^c	0.3 - 0.9 ^c

If you are rotating leguminous cover crops with your cut flower crop, factor a nitrogen credit into the rate of application; this credit reduces the amount of chemical nitrogen that you have to apply.

^a Depends on stand; if stand is good (greater than 4 plants per square foot), credit 150 lb; if stand is fair (1.5 to 4 plants per square foot), credit 125 lb; if stand is poor (less than 1.5 plants per square foot), credit 100 lb.

^b Depends upon planting date and biomass production, kill date, and subsequent tillage.

^c A minimum of 15 lb. May be as much as 1 pound per bushel of soybeans up to a maximum of 40 lb.

Source: University of Maryland Agricultural Nutrient Management Program

Using Compost for Cut Flower Production

Before applying composted material to your cut flower growing site, find out the nutrient content of your sources of organic nutrients, including composted manure, by having the sources tested by a soil testing lab. Soil testing is available through private testing laboratories. A list is available by going to [http://www.hgic.umd.edu/content/documents/ for HG110SelectingandUsingaSoilTestLab.2011.pdf](http://www.hgic.umd.edu/content/documents/HG110SelectingandUsingaSoilTestLab.2011.pdf). By examining the organic nitrogen and ammonium nitrogen content of manures and compost, nutrient management consultants can determine the plant-available nitrogen content.

These nutrient values of manure sources are only averages. Regulations require that growers test the manure and compost for nutrient content. All manure values are based on wet weight.

Nitrogen Rates for Woody Cut Stems

For producing cut woody flowering stems such as forsythia, flowering quince, sparkleberry, pussy willow, and flowering cherry, use nitrogen rates of 2 to 4 lb/1,000 sq ft for optimum rates of growth. Phosphorus and potassium recommendations are the same as those for cut herbaceous plant materials.

Using Phosphorus and Potassium for Cut Flower Production

University of Maryland Extension's relative crop categories describe crop availability of a given nutrient as: *low*, *medium*, *optimum*, and *excessive*.

Low: nutrient concentration in the soil is inadequate for optimum growth of cut flowers and all other crops.

Optimum: nutrient concentration in the soil is adequate for optimum growth of all cut flowers.

Excessive: nutrient concentration exceeds what is adequate for optimum growth of cut flowers and most other crops.

Greenhouse Production of Cut Flower Transplants for Farm Use Only

Preventing runoff from your greenhouse depends on where you site the building(s) and how you manage the operation. If you produce any plants for sale off the farm, you must have a nutrient management plan and a risk assessment for the greenhouse.

If you use your greenhouse to start transplants for use only on the farm, you must record the following information; however, your plan need only include the total amount of fertilizer used for transplant production:

- Production season
- Number of greenhouses used in transplant production
- Total square feet of greenhouse space in production
- Transplant species grown
- Substrate (components and percentage) used
- Production months
- Flats or container size

Irrigation methods used:

- Hand watering with hose
- Subirrigation
- Overhead sprinklers
- Other methods

Fertilizer analysis used:

- Amount of fertilizer used per season
- Injector setting

Table 3. Compost Nutrient Values

Manure type	N	NH ₄	P ₂ O ₅	K ₂ O	S
Poultry -broiler -caged layer	2.88	0.73	3.17	2.05	0.40
	2.22	0.69	2.91	1.89	0.26
Dairy -solid -liquid	0.61	0.12	0.37	0.61	0.08
	0.31	0.11	0.17	0.26	0.03
Swine -solid -liquid	1.05	0.26	1.12	0.64	0.12
	0.47	0.18	0.29	0.18	0.04
Horse	0.51	0.03	0.36	0.42	0.09

Table 4. Phosphorus Ranges

	Low	Medium	Optimum	Excessive
Phosphorus lb/a P ₂ O ₅	0-61	62-102	103-205	>205
Phosphorus index value	0-25	26-50	51-100	>100
Potassium lb/a K ₂ O	0-84	85-160	161-320	>320
Potassium index value	0-25	26-50	51-100	>100

A starter fertilizer may be used even on those soils testing excessive in phosphate and/or potash, and where no P₂O₅ & K₂O is recommended by a soil test. A good starter fertilizer should supply 20-30 lbs/A of N, P₂O₅, and K₂O.

Table 5. Recommendations of Phosphorus (P₂O₅) and Potassium (K₂O)

(in lb per acre per 1,000 sq ft)

	Low	Medium	Optimum	Excessive
Phosphorus	4.0 lb	2.0 lb	1.0 lb	0
Potassium	4.0 lb	3.0 lb	2.0 lb	0

Table 6. Limestone Recommendations (50% oxides) for Cut Flowers.

Target pH = 6.5 (in pounds of limestone per 1,000 sq ft)

Initial pH	Loamy Sand	Sandy Loam	Loam		Silt Loam & Clay Loam	
	All Regions	All Regions	Coastal Plain	Piedmont & Mountain	Coastal Plain	Piedmont & Mountain
6.3	10	20	25	25	25	40
6.0	20	40	50	55	50	85
5.8	30	55	65	80	70	120
5.5	45	75	85	110	95	165
5.3	55	85	100	130	110	210
5.0	70	105	120	165	135	210
4.8	90	120	135	185	160	210
4.5	90	140	160	185	160	210

Table 7. Requirements for Spring- and Summer- Harvested Field Cut Flowers.

Group 1: Spring-harvested field cut flowers	Nitrogen fertility requirements	Harvested once or extended harvest
<i>Allium</i> , Flowering onions	Low	Harvested once
<i>Consolida</i> , Larkspur	Low	Planted in fall and harvested in spring
<i>Delphinium</i>	Low	Planted in fall and harvested in spring
<i>Iris</i> (perennial)	Low	Harvested in spring. New varieties harvest in late summer and again in early fall
<i>Lathyrus odoratus</i> , Sweet pea	Medium	
<i>Lupinus</i> (perennial)	Medium	Harvested in spring over 3- to 4-week period
<i>Mathiola incana</i> , Stock	Low	Harvested once, in spring
<i>Narcissus</i> , Daffodil	Low	Harvested once
<i>Paeonia</i> , Peony	Low	
Group 2: Summer/fall-harvested field cut flowers		
<i>Achillea</i> , Yarrow	Low	Once
<i>Ageratum</i>	Medium	Repeated harvest during summer
<i>Alcea</i> , Hollyhock	Low to medium	
<i>Ammi majus</i>	Low	Once
<i>Alstroemeria</i>	Medium to high	Repeated harvest from May to July
<i>Antirrhinum majus</i>	Medium	Repeated harvest during summer
<i>Aquilegia</i>	Low	Once
<i>Artemisia</i>	Low	Repeated harvest over summer
<i>Asclepias</i>	Low	Repeated harvest August to September
<i>Baptisia australis</i> , Blue wild indigo (perennial)	Low	Once
<i>Celosia</i> [crested, wheat-type, and plume-type]	Medium to high	Repeated harvest July to September
<i>Centaurea</i> Cornflower	Low	Harvested over several months
<i>Callistephus chinensis</i> China aster	Medium to high	Harvested July through September
<i>Chrysanthemum</i>	Medium to high	Harvested over several months
<i>Chrysanthemum parthenium</i> Feverfew	Medium	Harvested over several months
<i>Convallaria</i> , lily of the valley	Low	Harvested in early summer
<i>Cosmos</i>	Low to medium	Harvested from July through October
<i>Crocasmia</i> (corn)	Low	Harvested in summer
<i>Dahlia</i>	Medium	Harvested from July through frost
<i>Daucus carota</i> , Queen Anne's lace	Low	Harvested once
<i>Dianthus</i> , Sweet William	Medium to high	
<i>Echinacea</i>	Low	Harvested from July through August
<i>Echinops</i>	Low	

Group 2: Summer/fall-harvested field cut flowers	Nitrogen fertility requirements	Harvested once or extended harvest
<i>Eucalyptus</i>	Low to medium	
<i>Eustoma grandiflorum</i> , Lisianthus	Low to medium	Harvested over 3- to 4-week period
<i>Gerbera</i>	Medium to high	Harvested over several months
<i>Gladiolus</i> (bulb)	Low	Harvested once
<i>Gomphrena globosa</i> Globe amaranth	Medium	Harvested either once or repeated harvest over time
Grasses and grains	Low	Harvested in late summer, early fall
<i>Gypsophila</i> , Baby's breath (perennial)	Low	Harvest once
<i>Helenium</i>	Low	
<i>Helianthus annuus</i> , Sunflower	Low to medium	Harvested over several months, July to September
<i>Helichrysum</i> , Strawflower	Low to medium	Harvested over several months
<i>Kniphofia</i> , Red hot poker	Low	Harvested in midsummer over 1 month period
<i>Lavandula</i> , Lavender	Low	Harvested over summer
<i>Lilium</i> (bulb)	Low	Harvested once
<i>Limonium sinuatum</i> Statice	Low to medium	Harvested once in early summer
<i>Limonium tataricum</i> German statice (perennial)	Low to medium	
<i>Monarda</i> , Bee balm (perennial)	Low to medium	Harvested over 1 to 2 months in summer
<i>Nigella</i>	Low to medium	
<i>Papaver</i> , Poppy	Low to medium	Harvested once in early summer
Penstemon	Low to medium	
Phlox (perennial)	Low to medium	Harvested over 3 to 4 weeks in summer
<i>Physostegia virginiana</i> Obedient plant (perennial)	Low	Harvested over 3 to 4 weeks
<i>Ranunculus</i>	Medium to high	
<i>Rudbeckia</i>	Medium to high	Harvested over 3 to 6 weeks in summer
<i>Salvia</i>	Medium to high	Harvested over several weeks
<i>Scabiosa</i>	Low to medium	
<i>Sedum</i> (perennial)	Low	Harvested from August through early October
<i>Symphotrichum ericoides</i> White heath aster	Medium to high	Harvested over several months
<i>Veronica</i>	Low to medium	Harvested over 3 to 4 weeks
<i>Zinnia</i>	Medium to high	Harvested July through early October

Reference:

Soil Fertility Management Mimeo SFM-3. Department of Natural Resource Sciences and Landscape Architecture, University of Maryland, August 1996.

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Summary by

Stanton Gill, Extension Specialist, IPM for Nurseries and Greenhouse, Central Maryland Research and Education Center, University of Maryland Extension, Ellicott City, MD, sgill@umd.edu

Reviewed by

Dr. John Lea-Cox, Associate Professor/Extension Specialist, Nursery and Greenhouse Management, University of Maryland
Dr. Trish Steinhilber, Program Coordinator, Agricultural Nutrient Management Program, University of Maryland
Dr. John Dole, North Carolina State University
Dr. Paul Nelson, North Carolina State University
Louise Lawrence, Maryland Department of Agriculture

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