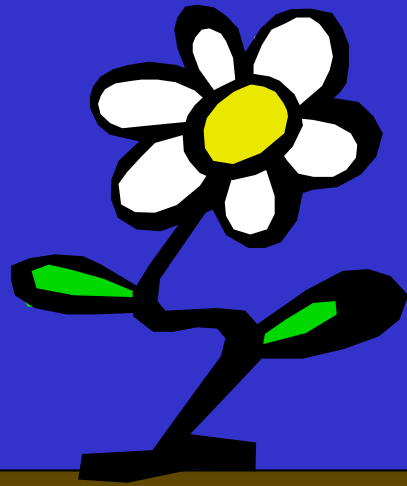


Balancing the Diet for Your Dahlias



Prepared for the American Dahlia Society

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ADS Research & Education Committee

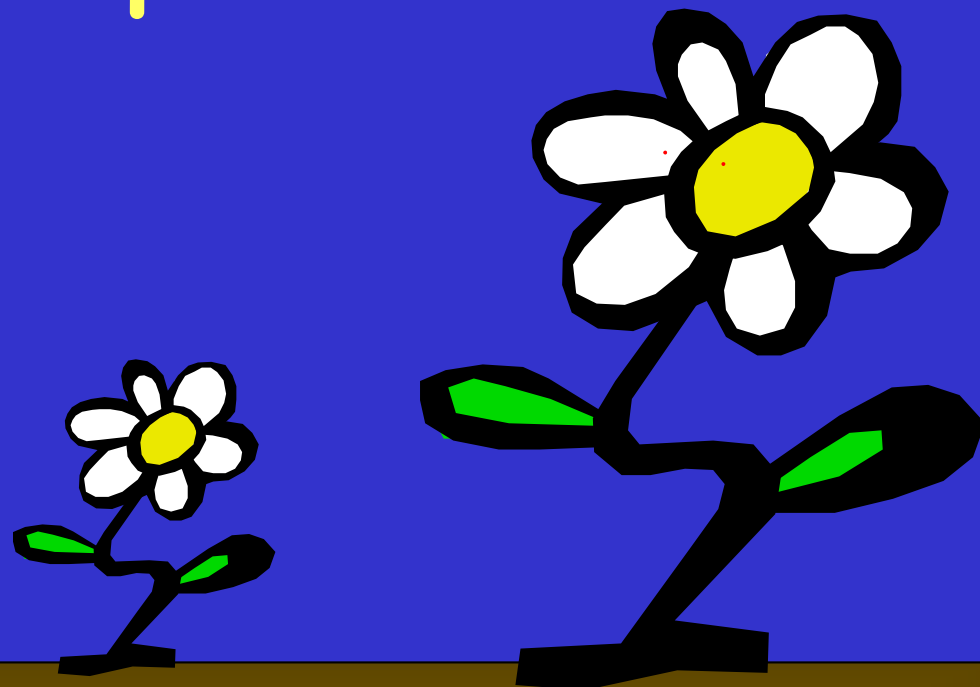
Benefits of good plant nutrition

Insect tolerance

Disease tolerance

More flowers

Bigger flowers



Stronger stems

Longer blooming season

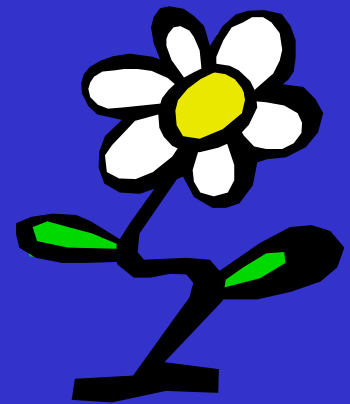
Larger tuber system

More blue ribbons - we push our plants!

Primary Nutrients that plants require:

Nitrogen, Phosphorus, & Potassium

N - P - K



Secondary Nutrients

Calcium, Sulfur, Magnesium

Minor Nutrients

Bo, Mn, Cu, Mo, Fe, Zn, Cl

What is a soil test going to tell you?

Nutrient content - correct as recommended

N - 30-60 ppm 60-120 lb/acre

P - 50-100 ppm 100-200 lbs/acre

K - 150-300 ppm 300-600 lbs/acre



pH - Affects nutrient availability

6.2-6.8 = ideal

6.0-7.2 = OK

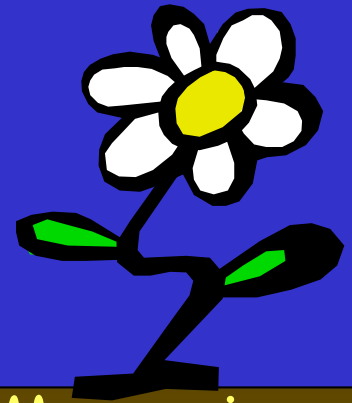
Salinity/Soluble Salts - $EC_e = 0.2-3.5$ OK

Other toxicities

What do you need to apply to your dahlias?

Primary Plant Nutrients

N, P, & K



Secondary Nutrients Calcium, Sulfur, Magnesium

Secondary nutrients are more than likely in adequate supply with the exception of calcium

Minor Nutrients Bo, Mn, Cu, Mo, Fe, Zn, Cl

Rarely need to be applied

Most Critical Nutritional Factor=Availability

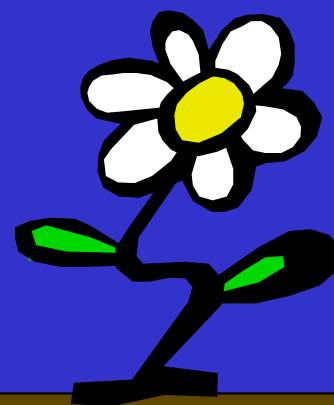
What affects availability?

Placement

Amount

Timing

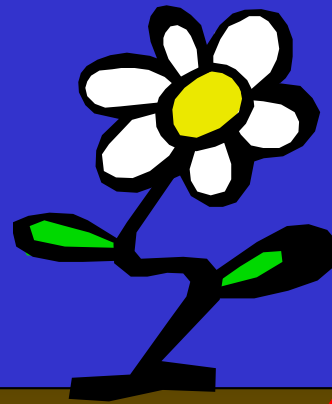
Source



Placement

- 99% of nutritional uptake through roots

- Dahlias have roots



shallow feeder

- Mix pre-plant fertilizer into the top 3-4 inches
- In-season applications best watered-in vs. top-dressed

Amount

- Apply 0.04 lb nitrogen per plant during the course of the season
 - $0.04 / (\%N \times .01)$
 - Example: 10-10-10, apply 0.4 lb/plant/season
2-0-0, apply 2.0 lb/plant/season



- Know the properties of the product that you use or read the label for rates
- Apply a little at the time you plant and every 3-4 weeks thereafter

Timing

- Constant uniform availability ideal
frequent light doses - Balanced Diet
- Till/mix in P & K before planting
- Apply N & Ca on a regular schedule - 2-4 weeks
- Stop 30 days before the season ends

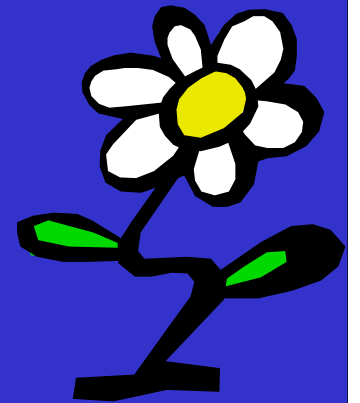


Source

Natural vs. Synthetic

Plants use ionic forms:

NO_3^- , NH_4^+ , P_2O_5^- , K_2O^+ , Ca^{++} etc.



Availability dictated by form in which it exists in the soil for the roots to access - *digestability*

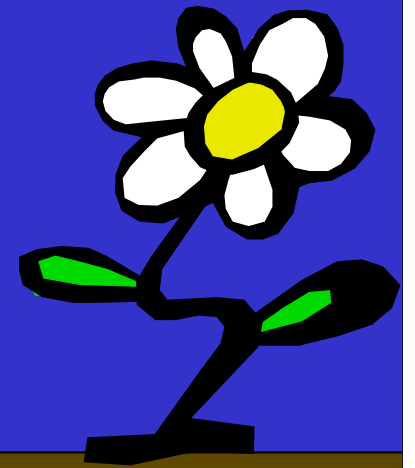
Natural Nutrient Sources

- Compost - Low nutrient value, but - many other benefits. "Facilitator".
 - Humic acid and other facilitative traits
 - Compare quality



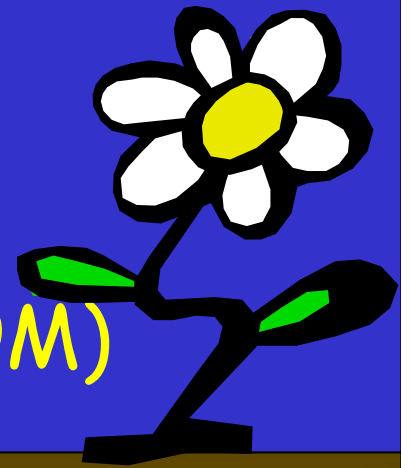
Benefits of Compost in Dahlia Culture

- Increased Recycling of Organic Matter
- Decreased Waste
- Improved Plant Health, Vigor and Yield
- Decreased Cost to Growers and Society



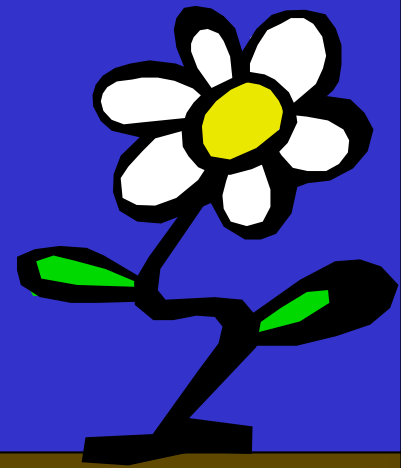
Compost Impact on Soil Chemical Properties

- Increase in the organic matter (OM) content
- Stabilization of nutrients
- Improvement in nutrient retention
- Formation of soil aggregates.



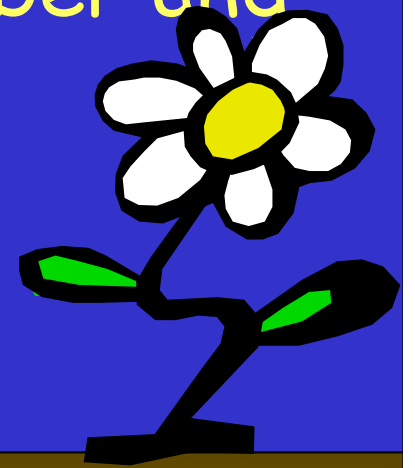
Compost impact on Soil Physical Properties

- Decrease soil erosion
- Reduce surface crusting
- Improve soil tilth
- Improve soil porosity
- Improve water holding capacity
- Decrease bulk density



Natural Nutrient Sources

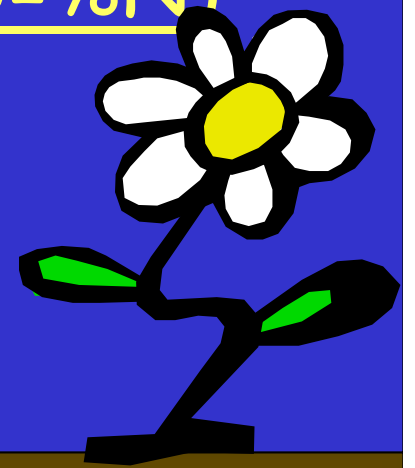
- Manures - 1-10% N, depending on fiber and moisture content
 - Horse = low - 1-3% Nitrogen
 - Cow = moderate - 3-6% Nitrogen
 - Bird = high - 6-10% Nitrogen
 - Available 15-45 days after applying
- Bonemeal - 20% Ca, slowly available. Years!



Natural Nutrient Sources

- Plant Proteins (%Protein/6.25=%N)

- Kelp = 1-3% Nitrogen
- Alfalfa, Soy = 3-6% Nitrogen

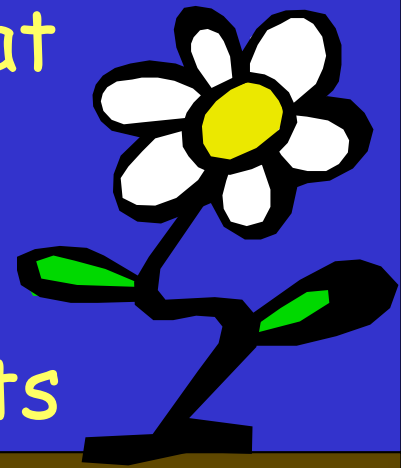


- Animal Proteins

- Blood meal = 6-10% Nitrogen
- Feather meal = 6-8% Nitrogen
- Fish emulsion = 6-10% Nitrogen
- Availability -21-45 days, possibly longer

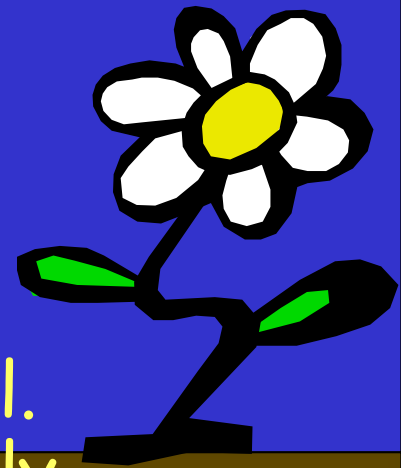
Manufactured Nutrient Sources

- Extracts of manure, plants, fish, etc concentrate the soluble forms that are more available
- Blends of plant and animal products to balance content and affect availability
- Synthesized nutrients - Garden fertilizers are highly concentrated



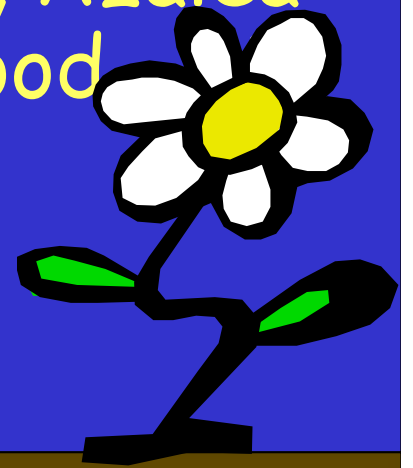
Not all synthetic Nitrogen is the same

- Three types:
 - Nitrate - Immediately available to plant. Quick response, short lived in the soil, leaches very rapidly
 - Ammonia - Converts to nitrate in soil. Slower response, but still very quickly available. Doesn't leach. Can burn roots.
 - Urea - Slow conversion to nitrate in soil (7-10 days). Slow response, longer lasting. Will not leach.



What's Out There

- Bat Guano, Rose Food, Blood Meal, Azalea Food, Fish Meal, Rhododendron Food, Lawn Food, etc.....



- Why no Dahlia Food?

- Buy the least expensive, least salty, least acidifying fertilizer that has high N and from a source you are comfortable about

What's Out There

- **Alfalfa Meal**

2.5-1-1

N Source = Plant protein

Slow response, short lived,

\$0.50/lb

1.6 lb/plant/season



- **Blood Meal**

12-0-0

N Source = Animal protein

Quicker response, short lived

\$0.90/lb

0.3 lb/plant/season

What's Out There

- **Fish Meal/ Emulsion**

10-4-0

N Source = Animal protein

Quicker response, short lived

\$1.00/lb

0.4 lb/plant/season



- **Feather-Bone-Soy Meal**

10-2-6

N Source = Animal + Plant protein

Quicker response, longer lasting

\$0.65/lb

0.4 lb/plant/season

What's Out There

- **Bat Guano**

10-3-1

N Source = Animal protein

Quicker response, short lived

\$2.00/lb

0.4 lb/plant/season



- **Chicken Manure**

4-2-1

N Source = Animal Protein

Quicker response, short lived

\$0.16/lb

1.3 lb/plant/season

What's Out There

- **Scott's Turf Builder**

27-3-4

N source = Urea

Long lasting, slower acting

\$0.50/lb

0.15 lb/plant/season



- **Vigoro Ultra Turf**

29-3-4

N source = Urea

Long lasting, slow acting

\$0.40/lb

0.14 lb/plant/season

What's Out There

- **Miracle Gro**

24-8-16

N source = Urea + Nitrate

Long lasting, quick acting

\$1.39/lb

0.16 lb/plant/season



- **Osmocote**

14-14-14

N source = Encapsulated urea

Longest lasting - 4-5 months, slowest acting

\$2.20/lb

0.25 lb/plant/season

What's Out There

- **Calcium Nitrate**

16-0-0 + 21% Calcium

N source = Nitrate

Short lived, quick acting

\$0.32/lb

0.25 lb/plant/season



- **Ammonium Sulfate**

21-0-0 + 24% Sulfur

N source = Ammonia

Short lived, quick acting

\$0.25/lb

0.2 lb/plant/season

What's Out There

- Urea

48-0-0

Nitrogen source = Urea

Slow acting, long lasting - 2 - 4 weeks

\$0.36/lb

0.08 lb/plant/season



What to Do ?



Maximize your soil's capacity to provide nutrients.

Apply nutrients in various forms before and during the season.

Let your plants eat, drink, and be merry!