Welcome to the May DCGO Presentation Watering and Fertilization





Agenda

- How much water is needed
- Effective ways to water
- Best time to water
- What to those numbers on the fertilizer bag mean
 - Soil test
 - NPK is only part of the story
- Formulating you own organic fertilizer
- Examples of how much and when to fertilize

How much water do my plants need

- A general rule is one to one and half inches per week
 - Larger plants such as tomatoes and okra will need more
- How many gallons is that, now for some math.
 - On cubic foot equals 7.48 gallons
 - On inch of rain on a 4x8 bed is 2.7 cubic feet (4x8)/12
 - That is 20.2 gallons
 - 7.48 x 2.7

Effective Rootin	ng Depth of Select	ed Vegetables	
Shallow	Moderate	Deep	
(6-12")	(> 36")	(> 36")	
Beet Broccoli Carrot Cauliflower Celery Greens & Herbs Onion Radish Spinach	Cabbage, Brussel Cucumber Eggplant Muskmelon Pea Pepper Potato Snap Bean Squash, Summer	s Sprouts Asparagus Lima Bean Pumpkin Squash, Win Sweet Potat Watermelor	ntei to n
	Sweet Corn Tomato		
Crop*		Most Critical Period	
occoli, cabbage, cauliflower, lettuce		head development	
rot, radish, beet, turnip		rootenlargement	
eet corn		silking, tasseling, and ear development	
cumber, eggplant, pepper, melon, tomato		flowering, fruit set, and maturation	
an, pea		flowering, fruit set, and development	
ion		bulb development	
tato		tuber set and enlargement	

in./ft.

.0 .2	(field capacity) Leaves wet outline on hand when squeezed. a short ribbon.	(field capacity) Appears very dark. Leaves wet outline on hand. Makes ribbon out about one inch.	(field capacity) Appears very dark. Leaves wet outline on hand. Will when squeezed.	(field capacity) Appears very dark. I slight moisture on h Will ribbon out abo
.4	Appears moist. Makes a weak ball. Appears slightly moist. Sticks together slightly	Quite dark color. Makes a hard ball. Fairly dark color. Makes a	Dark color. Forms a plastic ball. Slicks when rubbed.	Dark color. Will slic ribbons easily.
.6	Appears to be dry.	good ball.	Ouite dark. Forms a hard	Quite dark. Will ma ribbon. May slick w
.8	Will not form a ball under pressure.	Slightly dark color. Makes a weak ball	ball.	rubbed.
1.0	Der la construella construel	Lightly colored by moisture.	Fairly dark. Forms a good ball.	Fairly dark. Makes a ball.
1.2	Flows through fingers. (wilting point)	Very slight color due to	Slightly dark. Forms weak ball.	Will ball. Small clos flatten out rather th
1.4		through fingers. (wilting point)	Lightly colored. Small clods crumble fairly easily.	Slightly dark. Clods
1.6			Slight color due to moisture.	Some darkness due t
1.8			Powderv. Drv. Sometimes	available moisture. I

Best Watering Methods

- Drip Irrigation
 - Can be set on a timer
- Using a hose
 - Water at base of plants
- Hand watering
 - Either a bucket or sprinkling can
 - Water at base of plants
- Roots need water wet leaves can promote disease and fungus on the leaves





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Tips

- Water the soil not the plants
 - More effective and reduces the chance of fungus
- Mulch
 - Mulches are beneficial in decreasing water loss from the soil around plants. Mulches serve other purposes, i.e. to reduce weed growth and to warm or cool the soil. Some growers use organic mulches, such as straw, without irrigation to hold in soil moisture. Organic mulches can be used with overhead or drip irrigation systems. Plastic mulch, however, should not be used without irrigation and is most effective with drip-irrigation. It is important to have good moisture in the soil when mulch is applied. Irrigation and rainfall will penetrate organic mulch, but not plastic mulch. Soil under plastic mulch should never be allowed to dry out, because rewetting the entire bed is difficult with drip-irrigation.







Best time to Water

- Morning
 - Cooler so evaporation is reduced and any water on the leaves has time to dry
- Early evening
 - After it has started to cool off and sun is less direct than afternoon
- Avoid afternoon watering is less effective because of hot sun and quick evaporation
- Late evening is not recommended because leaves stay wet for several hours

Fertilizer Labels

- Shows % by weight of Nitrogen, Potassium and Phosphorous N P K
- Look for fertilizer containing micronutrients
- Soil test strongly recommended
- Ph is also important
 - Will show on the soil test
 - Optimal Ph will very depending on the type of plant
 - Proper Ph is needed for plants to use the nutrients in the soil

Nitrate vs Nitrite

- Two types of Nitrogen in fertilizer
- Both occur naturally
- Nitrate can oxidize into nitrite
- Excess nitrate can run off in water
- Soil Ph effects utilization of both types of nitrogen
- Most fertilizers contain both types of nitrogen

To efficiently manage N:

1. Apply recommended rate based on expected yields.

2. Time N application to align with crop needs.

- 3. Consider all sources of N in the soil.
- 4. Water properly.

Shallow (6.12")	Moderate (18.24")		$\underline{\text{Deep}}$
(6-12)	(10-24 [°])	- Consulta	(> 36")
Broccoli	Cabbage, brussel	is Sprouts	Asparagus Lima Boon
Carrot	Eccelont		Dumpkin
Carliflower	Eggpiant		Saugh Winter
Calam	Dee		Squash, winter
Groops & Horbs	Perper		Watermalan
Onion	Pototo		watermeion
Radiah	Spap Baap		
Spinach	Snap bean		
Spinach	Squash, Summer		
	Tamata		
	Tomato		
Crop*		Most Critical Period	
occoli, cabbage, cauliflower, lettuce		head development	
rot, radish, beet, turnip		rootenlargement	
eet corn		silking, tasseling, and ear	development
		6, 6,	1
cumber, eggplant, pepper, melon, tomato		flowering, fruit set, and n	naturation
in, pea		flowering, fruit set, and d	evelopment
on		bulb development	
ato		tuber set and enlargemen	ıt

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ulse of our company comes from our position at the very heart of ation. Innovations become our guiding lights. We value them and they stand for. When you love a brand, you follow it into new places to progressive growth and positive change that benefits everyone. ovation is the engine of Dr. Earth^{*}, and we ensure that it is always viable roughout our enterprise. We understand and value the high-energy green natural movement. Our hard work and vision has contributed to its acd the growth. As we make great investments in our future and the ure of pure & natural, we welcome progressive gardeners to join us.

PEOPLE & PET SAFE: THE DR. EARTH PLE

Please see the Dr. Earth® Pledge on our front label under Safe." Our products are considered people and pet safe b not use ingredients such as biosolids, chicken manure, co household waste, or synthetic chemicals which can poten additional health risks to your garden. We will never use a that might cheapen the integrity of our products.

TRUBIOTIC FOR SOILS

TruBiotic® is a broad spectrum biological soil inoculant des life to all soil types in backyard gardens or in container plan



Please always buy American products. -Owner, Milo

FERTILIZER TEA A RICH LIQUID MIXTURE OF EARTH'S HOME GROWN'S, OUnds, or 5 cups for every 5 water. Let the mixture set urs. Strain well and mulch saround the root zone.

portion (tea) can be 2 cups for shrubs, or 2

of all plants

nthe Home Grown®

eralso be used to speed

enjoy our other

products. We hand f blended fertilizers

prays. For more drearth.com

with the

e your compost pile

COMPOST STARTER

ger plants. Use full at feed & for deep

TOMATOES, PEPPERS & HERBS

NEW PLANTINGS: During garden preparation, mix in 11/3 cups per 10 sq. feet of growing area, or 6 cups per 50 feet of planting row. FOR CONTAINERS: Use 1/2 cup per ½ cubic foot. (approx. 5 gallons) of potting soil. Mix with the soil and water thoroughly.

ESTABLISHED PLANTS: Use 1 cup per 10 sq. feet of growing area for every 50 feet of row. FOR CONTAINE cup per 5 gallons of potting medium. Wo and water thoroughly. WHEN TO APPLY:

Every 2 months throughout the growing se

EGGPLANT, CORN, BEANS, CUCUMBER, LETTUCES, BROCC

NEW PLANTINGS:

During garden preparation, mix 1½ cups per 10 sq. feet of growing area, or 8 cups per 50 ft. of row. For CONTAINERS: Mix ¼ cup per ½ cubic foot (approx. 5 gallons) of potting soil. Mix with soil and water

ESTABLISHED PLANTS: Use 11/2 cups per 10 sq. feet of growing area, or 8 d for every 50 ft. of row. FOR CONTAINERS: Mix 14 per 1/2 cubic ft. (approx. 5 gallons) of potting mediu Work in gently and water thoroughly. WHEN TO APPLY:

Every other month throughout the growing seas

CARROTS, ONIONS, POTATOES, BEETS, ETC.

NEW PLANTINGS: Before you plant, add 1½ cups per 10 sq. feet of growing area, or 8 cups per 50 linear feet of planting row. Till to a depth of 6 to 12 inches and water thoroughly.

310

GUARANTEED ANALYSIS:

Total Nitrogen (N).

ESTABLISHED PLANTS: Top dress your root crops by using ¾ of a cup per sq. feet of growing area, or 4 cups per 50 feet of rea Work in gently and water thoroughly. WHEN TO APPLY:

Every 2 months throughout the growing sease Note: Do not feed carrots mid-season.

ALSO CONTAINS NON-PLANT FOOD INGREDIENT Colony Forming Units (CFU

Ectomyconthine

Laccaria Incenso

en	Bacillus amyloliquefaciens Bacillus licheniformis Bacillus megaterium Bacillus pumilus Bacillus subtilis
ther meal, , fish meal, kelp flour.	MYCORRHIZAE: Endomycorrhizae (VAM): Propagules/gram Glomus aggregatum0.16 Glomus clarum0.18

STORE In a dry cool place Avoid direct sunlight. EXPIRATION DATE

08-08-2023

OMRI G

.4% Water Insoluble Nitrog

Available Phosphate (P205). Soluble Potash (K,O). Calcium (Ca) .

DERIVED FROM: Fishbone meal, bone meal, fea alfalfa meal, potassium sulfate kelp meal, rock phosphate an

Laccaria bicolor slomus deserticola 0.16 Glomus etunicatum 0.76 Glomus intraradices 0.16 Glomus mosseae Glomus monosporum Paragtomus brasilianu Gigaspora margarita 0.16 .0.16 0.26

Contains 6% Numic Acids (derived from 18

THE REAL PROPERTY OF

10-10 ALL PURPOSE FERTILIZER

40 LBS.

GUARANTEED ANALYSIS

Total Nitrogen (N) 3.91% Ammoniacal Nitrogen 6.09% Urea Nitrogen Available Phosphete (P₂0₅) Soluble Potash (K₂0) Plant Nutrients Derived from: Urea, Diammonium Phosphate, Muriate of Potash

10.00% 10.00%

VS FOR USE:

EGETABLES:

on the bed surface and work into the top 2 to 4 inches of soll For vigorous growth, repeat application every 6 weeks during king into the soil surface along rows or around plants.

IND ORNAMENTALS:

dearly fall. Where rapid growth is desired, or in areas where nded, a third application is recommended in mid-summer. on the soil surface under the outer spread of branches, m trunk of plant. Scratch fertilizer lightly into the soil surface

once in the spring before new growth appears, early fer fruit and nuts have been harvested. Fertilizer should ne of established trees and watered in thoroughly.

before they break bud in spring. A second application is es have reached peak spring Glowth. Fertuize again in II, about the time of the average first frust date ing an auger to drill holes in a circle just inside the toximately 12 inches deep. Surface feeding near the

FERTILIZATION RATES

Analysis	Flowers & Vegetak
5-10-15	1-2.5%
6-12-12	1-21bs
8-8-8	1-21bs
10-10-10	1-1%
13-13-13	1-14 -
16-4-8	1-05.
34-0-0	+4 lbs
	100 B 1 1 B

SUGGESTED FERILIZERIES TREES AND SHUBS

SIZE OF TREE/SHRUB 12" Diameter 1" Diameter 2* Diameter

or city government to determine if there are local regulations for fertilizer use,



Micronutrients

- Magnesium and Sulfur are considered macronutrients
 - More of these are required than micronutients
- Boron, Copper, Manganese, Iron, Molybdenum, Zinc, Chloride
 - Lesser amounts are needed but still important
- Calcium, Zinc and Manganese are reported on the soil report

FUNCTIONS of SECONDARY and MICRONUTRIENT ELEMENTS in PLANT NUTRITION

- MAGNESIUM (The keystone of chlorophyll) An essential constituent of chlorophyll. Necessary in the formation of oils and fats. Acts as carrier of phosphorus in the plant. Necessary for the formation of sugar. Regulates the uptake of other plant foods. Plays a part in the translocation of starch.
- SULFUR (Essential for Protein) Maintains the green color of leaves being a constituent of protein. Helps in the growth of roots and stems of plants. Important in the synthesis of oil. A constituent of several amino acids, including methionine, cystine and cysteine which are essential components of plants and animal proteins. About 90% of sulfur in plant is found in these three amino acids.
- BORON Enhances the development of actively growing tissues. Necessary in the formation offlowers and fruits. Essential in cell division.
- CHLORINE Necessary in small amounts in the formation of flowers and fruits. Helps the growth and development of plants.
- COPPER Plays a role in the enzymatic activity related to oxidation-reduction reactions. Important in the utilization of protein, in the growth of plants, in seed development, and in chlorophyll formation.
- COBALT Essential in symbiotic N-fixation and also in nonsymbiotic N-fixation of bacterial agents like Azotobacter.
- IRON Essential in the formation of chlorophyll but not a constituent of it.
- MANGANESE-Part of an important enzyme involved in chlorophyll synthesis.
- MOLYBDENUM Needed in the reduction of nitrates to nitrite. Aids leguminous plants utilize nitrogen from the atmosphere.
- ZINC An essential component of plant enzyme which regulates various metabolic activities. Probably connected with the formation of growth hormone auxin.

SLOW RELEASE 16-4-8 TOTAL NITROG GUARANTEED A 8.00 Slow

Dertved fre VAILABLE P

D. Slow (N)	MALISIS .
VAILABLE D	Iron (Fe)
UBLE POTASH (CACID (P.C.)	SULFUR (S)
(K=0) (F=0 =) 4.00%	CALCIUM (Ca)
Huriate of Polart	MAGNESIUM (Mg)
This product contains a new	s, Polymer Coated Sulfur Coated Urea, Urea,
Slow Release Nitrogen	from Polymer Coated Sulfur Coated Urea
Manufacture	d Br

Formulating an Organic 10 10 10 Fertilizer (10 lbs)

- Materials needed
 - Scale, kitchen scale with tare function will work
 - Container large enough to hold needed amounts
 - Mixing tool a garden trowel will work
- Select desired ingredients
 - For our example we will use
 - Blood meal 13-0-0
 - Bone meal 1-15-0
 - Potassium Sulfate 0-0-50

Here is the Math

- Need 1 pound each of nitrogen, phosphorous and potassium: 10 x .10 =1
- Bone meal 1 /.15= 6.6 lbs
- Blood meal ((1/.13)-(.01x6.6))=(7.69-.06)=7.63
- Potassium 1/.5 = 2
- 6.6 lbs of Bone meal 7 lbs 10 oz of blood meal, 6 lbs
 9.5 oz of bone meal, 2 lbs of Potassium Sulfate total
 16.23 lbs
- Use 1.62 lbs of mixture for each pound 10-10-10
- A spread sheet is useful for formulation of odd fertilizer requirements

UGA Does the Math

- http://aesl.ces.uga.edu/soil/fertcalc/
- Has the ability to make fertilizer calculation for several organic fertilizer components

Other bookmarks

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📑 🥥 🤌 🖪 🗋 🤵 🔇

← → C ↑ A Not secure | aesl.ces.uga.edu/soil/fertcalc/

🔡 Apps ★ Bookmarks 🎽 Fox News - Breakin... 💦 🔻 Capital One 360 - S... 🔚 Atlanta, GA (30360)... M Inbox - rosterho@g...

Step 1. Ent	ter fertiliz	er requir	ements		Step 2.	Select ava	ailable gr	ades			Step 3. Ch	ioose	application rate a	nd area	
Fertilizer recommendations are given in:			Choose from the list of commonly-available grades, or add your own in N-P ₂ O ₅ -K ₂ O format.					es,	ounces 🔻 per 100 square feet 🔻						
● pounds per acre ○ a specific grade (such as 10-10-10)			Show grades for:					If the area is unknown, what shape best describes the area to be fertilized?							
Recom	mendatio	on from			29-0-5			0 7-3-3			Rectangle Triangle Circle Oval Half				
N	P ₂ O ₅	K ₂ 0	Applicatio	on	0 18-2 0 10-1	4-6 0-10	5 4-6-2 10 18-0-3		Ontions						
10	10	10	pounds per a	cre	0 14-7- 0 10-5	-7 -4		0 10-0-6 10-0-6 10-0-0			Show a	all sco	res		
0.37	0.37	0.37	ounces per 10 square feet	00	□ 32-0 ☑ 1-15	-8 -0 Bone Me	eal			Meal	Number of grades to use in recommendation: 3 v Round recommendations to nearest:				
			5-6-3 5-5-5 Plant Food 0-10-10 5-5-3 4-5-3 Tomato Veg Food		d eg Food	 3-4-4 Garden Tone 6-8-0 Bone Meal 12-0-0 Blood Meal 9-23-30 		e al	o renun ooquarter or half oo vynole humber						
					Fertilizer grades \$ Cost per										
					1-15-0										
					13-0-0										
					0-0-50										
							Step 4. C	alculate						Clear data	
			Feri availat	tilizer rec ole grade	ommend s, applica	ations bas ation rate,	sed on , and area	1				Ţ	he Score	oow well a fertilizer	
			Nutrients supplied Nutrie per rate and area surplus or			Nutrients plus or de	ficit		re	recommendation matches the soil test report recommendation.					
Recommendation C		Cost	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ 0	Score	e P	perfect score is 100. oints are deducted if	the supplied nitrogen			
2.1 ounces of 1-15-0 plus 2.3 ounces of 13-0-0 plus 0.6 ounces of 0-0-50 per 100 center foot		_	0.32	0.32	0.30	0.00	0.01	0.02	99	is s s	outside 10% of N re upplied phosphorus is upplied potassium is	commended, if the s too high, or if the too low.			
per too square teet.												tł	ne best score or on al	endations based on I scores.	
												N T T C C fe	lumber of grades to ecommendation he Fertilizer Calculat ecommendation base ombination (best scol ertilizer grades.	use in or provides a d on the best re) of 1, 2, or 3	

Fertilization Examples

- Use soil test recommendations
 - The following are general recommendations if no soil test is available
- Tomatoes
- Okra
- Summer squash
- Green Beans
- Cucumbers
- Broccoli

Fertilizing Tomatoes

- Medium Feeder
- Before planting add 1.5 pounds of 10-10-10 per 100 sq ft, ½ pound for a DCGO bed
- Side dress with 1 pound of 10-10-10 per 100 sq ft, about 5 oz for a DCGO bed, when fruits are about inch in diameter.
- Repeat side dressing every three or four weeks







Okra

- Medium feeder
- 2 lbs of 10-10-10 per 100 sq ft., two thirds of a pound for a DCGO bed, before planting
- 2 side dressings of 3 oz of 10-10-10 per 100 feet of row, .2 oz for each sq foot when plants are 6 to 8 inches tall.
- Repeat side dressing in two to three weeks.
- Don't over fertilize.

Summer Squash

- Medium Feeder
- 3 tables spoons of 5-10-15 to each mound at planting
- When plants begin to flower and small fruits appear reapply.
- Water when applying fertilizer.





Green Beans

- Light Feeder
- 5 pounds of 5-10-15 per 100 feet of row, about 5 oz for a DCGO bed, at planting.
- Reapply when small beans begin to appear and every four to five weeks for the rest of the season

Cucumbers

- Medium feeder
- Before planting fertilize with 5-10-10 at 3 lbs per 100 square feet, about 1 lb for a DCGO bed
- Side dress when plants begin blooming and again three weeks latter with 1 lb of 33-0-0 per 100 square feet, about 5 ounces for a DCGO bed. Cover fertilizer with soil after side dressing
- Don't over fertilize as this will lead to excessive vine growth



Broccoli

- Heavy feeder
- Fertilize soil with 3.5 pounds of 5-10-10 before planting per 100 square feet, about 1 pound for a DCGO bed.
- Apply 2 pounds of 5-10-15 per 100 square feet every month until harvest, about two thirds of a pound for a DCGO bed.

Additional Resource

- https://extension.uga.edu/publications
 - Specific growing information for many vegetables

