



MASTMA PFA Recertification

Judy McGowan

MDA Nutrient Management Program

March 4, 2021

Today's Objectives

- Understand Credit Policy
- Identify Common errors applicator's make in following the law
- Understand how sports turf recommendations differ from residential turf recommendations.

Contacting us

MDA building is currently closed to the public
No one is in our office more than 1 day a week
Your messages will be returned
Best to contact me by email or cell phone

I am permanently working from home and have a new telephone number.

410-980-9084

Judy.McGowan@Maryland.gov



You can leave a message on my old number and it will be forwarded to me.

My number is also on our website.

Renewal questions and requests for reprints of your cards should be addressed to

nminfo.mda@Maryland.gov

Records Reviews

All reviews are currently no-contact.
Email is preferred, but if that isn't
feasible, we will make other
arrangements for a no-contact
review.

Fertilizer Exams

The fertilizer exam will be offered again beginning at the end of March.

Anyone wishing to take the exam should call or email me to get put on the list.

New!

Online AFAR* Submission

AFAR – Annual Fertilizer Application Report

Due March 1

OneStop will (eventually) allow you to go to one place to renew all your licenses, certifications & permits

The AFAR is available now in OneStop. Renewals may be online by June. When the renewals go online, you should be able to use your credit card and check your credits online!

Complaints

With more people working from home,
we are getting more complaints!

We are required to investigate all
complaints.

Complaints

Unlicensed applicators

Fertilizing before/during rain

Fertilizing swale

Fertilizing during blackout dates

New policy for credits

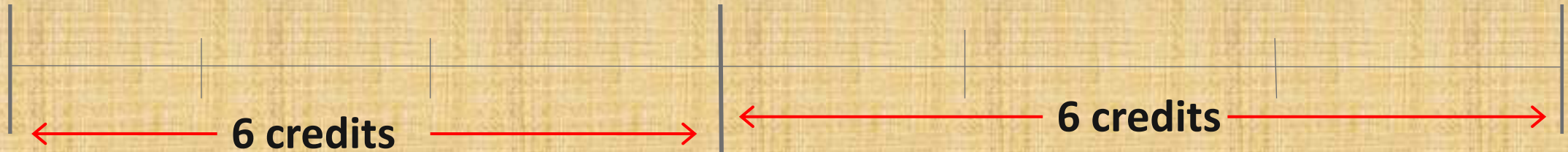
- 2 credits/year or 6 in a specific 3-year period
- The current 3-year cycle began on July 1, 2020
- No credits earned before July 1, 2020 carried over into this 3-year cycle
- You must get 6 credits before June 30, 2023 to renew in 2023
- You will still be allowed to renew your certification in 2021 and 2022, even if you have no credits

Credits

July 1, 2020

June 30, 2023

June 30, 2026



Credits are Reported on Your PFA Renewal Form

Your private Professional Fertilizer Applicator (PFA) certification expires on the date printed above. Please review the information in this renewal form carefully. If any information is incorrect, please cross it out and neatly correct information on this form, or forward an email notification to nminfo.mda@maryland.gov. The fee of \$100.00 made payable to the Maryland Department of Agriculture (MDA) should either be attached directly to this form, or this form should be attached to your business's license renewal form and payment. Maintain a copy of this application for your records.

This certification requires two continuing education credits (2 CEUs) per year.

The following are your credits as of **April 12, 2019**.

<i>2018 Course No.</i>	<i>Credits</i>	<i>2019 Course No.</i>	<i>Credits</i>	<i>2020 Course No.</i>	<i>Credits</i>
121317wa	2	031519falcan	4		

Check your credits at each renewal to ensure all your credits are recorded in our system

2020 law change codified the business license requirement.

This will enhance our ability to fine people

You could be fined for not submitting your AFAR – even if you don't renew your certification!

Maybe you didn't know

\$30 late fees have been assessed (in 2019) for renewing certification late – including public employees

Of course, everything was different in 2020!

2018 Law Change

From November 16 through December 1, Professional Fertilizer Applicators (PFAs) may apply up to 0.5 lb N/1000 sq ft of soluble or insoluble nitrogen

Previously, they were only allowed to apply 0.5 lb N/1000 sq ft of soluble N

2018 Law Change

Phosphorus from an **organic** source is no longer limited to 0.25 lb/1000 sq ft per application and 0.5 lb/1000 sq ft annually.

Applicators may apply up to amount of phosphorus recommended by University of Maryland according to soil test, provided they don't exceed the nitrogen limit.

See pages 51-52 of your manual

RECORD KEEPING

Keep the following records of fertilizer applications.

- Name of the fertilizer applicator
- Size of the area fertilized
- Date of nutrient application
- Address/location of client
- Rate of application (for example 4 pounds of fertilizer per 1,000 square feet)
- Total amount of fertilizer used per application
- Analysis of the fertilizer product used
- An original or legible copy of the fertilizer label

NITROGEN LIMITS

A single application may not exceed 0.9 pound total nitrogen per 1,000 square feet and 0.7 pound of soluble nitrogen per 1,000 square feet, except

when using enhanced efficiency fertilizer. Annual limits may not exceed UMD recommendations as shown in Table 3.

Page 52

FERTILIZER TIMING RESTRICTIONS

- No nitrogen or phosphorus fertilizer may be applied to turf between December 1 and March 1.
- From November 16 through December 1, lawn care professionals (not homeowners) may apply water-soluble nitrogen (no slow-release formula) to lawns at a maximum rate of 0.5 pound per 1,000 square feet, if agronomically appropriate.
- The law prohibits anyone from applying lawn fertilizer containing nitrogen and phosphorus to impervious surfaces or frozen ground.
- Lime, potassium, and other nutrients are not regulated under the law.

NEWLY ESTABLISHED LAWNS

Turf fertilizer used for routine maintenance applications may not contain phosphorus unless a soil test that is less than three-years old indicates the need. When establishing turf after a tillage operation or more drastic disturbance,

such as construction, phosphorus may be applied without a soil test following University of Maryland Extension recommendations for seeding. See UMD publication TT-116 on MDA's Nutrient Management website.

Judy's Top 10

Common errors in no particular order

1. Applying 1 lb N/1000 sq ft

Please just stop.

Other than requiring fertilizer applicator to be certified, this was the biggest change brought about by the Fertilizer Use Act.

Do not apply more than 0.7 lb/1000 sq ft of soluble nitrogen or 0.9 lb/1000 sq ft of total nitrogen in a single application

Accidental overapplications happen,
but you should know not to
deliberately apply 1#/1000

Sometimes the bag rate is given as 1# N/1000 sq ft!

Recommended applications are at the rate of one pound of nitrogen per 1,000 sq ft. Actual rates and timing of applications will vary with weather, soil and turf conditions.

For additional LESCO, Inc. product assistance call 1-800 347-4272.

According to state law in Maryland, this product may not be applied at an application rate of more than 0.9 lbs. Nitrogen per 1,000 sq. ft.

COVERAGE: 50 pounds of LESCO 28-0-3 Fertilizer covers approximately 14,000 sq ft at the application rate of one pound of nitrogen (3.57 pounds of fertilizer) per 1,000 sq ft.

ROTARY SPREADER	SETTINGS
LESCO Calibration Gauge	#14
SCOTTS® R8A	J
Cyclone® or Spyker®	4¼
LESCO Pendulum	22
Lely®	4 II

2) Applying during the blackout period

Neither nitrogen nor phosphorus may be applied after December 1 or before March 1.

Phosphorus can't be applied after November 15.

Adjust your program accordingly and don't ever expect the weather to cooperate.

3) Applying phosphorus without a soil test

You must have a soil test showing need to apply phosphorus, unless you're starting a new lawn or applying a patch product.

Overseeding is not new seeding. You need a soil test to apply phosphorus when you're overseeding

4) Following the recommendations of the lab.

You must use the table on pages 70-71 of your manual to convert your soil test results to the appropriate MD Soil Test Category and then apply the appropriate amount of P2O5 based on the MD Soil Test Category

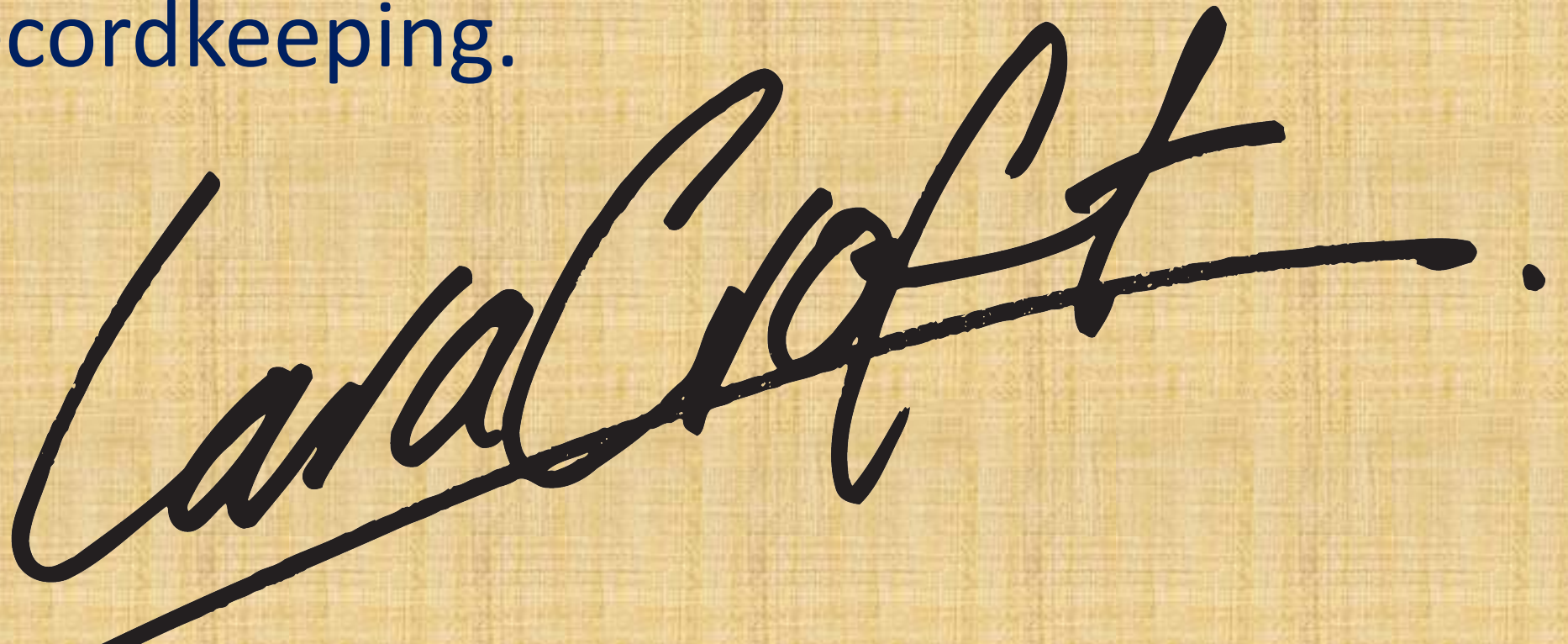
Appendix D: Maryland Fertility Index Value Soil Test Category

Table D-1. Determining University of Maryland Soil Test Category

Laboratory	Units Reported	Extraction Method	Lab P Result	MD Soil Test Category
A & L Eastern (now Waypoint Analytical)	ppm	Mehlich-3	0-21	low
			22-44	medium
			45-90	optimum
			91+	excessive
Agri Analysis: Use P ₂ O ₅ value	lb P ₂ O ₅ /ac	Mehlich-3	0-81	low
			82-193	medium
			194-415	optimum
			416+	excessive
AgroLab	ppm	Mehlich-3	0-21	low
			22-44	medium
			45-90	optimum
			91+	excessive
Brookside: Use easily extractable P, ppm P	ppm	Mehlich-3	0-18	low
			19-39	medium
			40-81	optimum
			82+	excessive
Brookside: Use easily extractable P, lb/ac P as P ₂ O ₅	lb/ac	Mehlich-3	0-84	low
			85-181	medium
			182-373	optimum
			374+	excessive
CLC	lb P/ac	Bray 1	0-22	low
			23-52	medium
			53-111	optimum
			112+	excessive
Harris: Make sure lab knows sample is from MD	ppm	Bray 1	0-10	low
			11-27	medium
			28-60	optimum
			61+	excessive
Logan	lb P ₂ O ₅ /ac	Mehlich-3	0-84	low
			85-181	medium

5) Not recording the applicator's name

This is the most common mistake I see with recordkeeping.

A handwritten signature in black ink, written in a cursive style. The signature is written over a horizontal line that extends across the width of the page. The signature appears to be "Caralsoft".

6) Not registering your trained employees

Employees who apply fertilizer under your certification must be registered as Trained Employees with the Nutrient Management Program and they will receive a card with a TE number on it, but without a picture.

Employees who apply pesticides must be registered with the Pesticide Section and they get cards with their picture on them. Employees who apply both should have and carry both cards.

7) Not following the “Required Actions” listed on your review form.

Required does not mean optional, especially if you were given a warning.

8) Applying more than 0.5 lb
N/1000 sq ft between November
15 and December 1

Again, print out pages 51-52 from the
online manual, laminate it and post it in
your office so you will always have those
rules available.

9) Keep your labels

I need the label to see the amount of slow release. Take a picture with your phone.

Even if you don't apply more than 0.7 lb/1000 sq ft of N, you are still required to keep it.

It's in the actual law.



10) Not Recording Rate

- Rate tells what you are trying to do. Everyone should know what they are trying to do!
- Don't divide the total applied by the area to get the rate
- Rate is amount of fertilizer (or N) applied per area

Always do an end of the day check

Compare the amount of fertilizer used to what should have been used



The purpose of keeping records is to help you be a better manager of nutrients (and other resources).



Math Review!



[This Photo](#) by Unknown Author is licensed under [CC BY-NC](#)

How to decrease the amount of nitrogen you apply

The label says that this fertilizer, when applied at 3.75 lbs fertilizer/1000 sq ft, will provide 0.9 lbs N/1000 sq. ft.

How many lbs/1000 of fertilizer do you need to apply to supply .5 lb on nitrogen/1000 sq ft?

Divide your desired rate of nitrogen by the % of nitrogen in the bag.

$$\frac{0.5}{.24} = 2.08 \text{ lbs of fertilizer/1000 sq ft.}$$



Math Help is Here!

From our friends at Penn State

Rate of Fertilizer to Apply Per 1000 Square Feet

Pounds of Nitrogen desired per 1000 sq. ft (Granular Material)

Fertilizer's Percent Nitrogen (%)

	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	1.25
5	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	25.00
6	5.83	6.67	7.50	8.33	9.17	10.00	10.83	11.67	12.50	13.33	14.17	15.00	15.83	16.67	20.83
7	5.00	5.71	6.43	7.14	7.86	8.57	9.29	10.00	10.71	11.43	12.14	12.86	13.57	14.29	17.86
8	4.38	5.00	5.63	6.25	6.88	7.50	8.13	8.75	9.38	10.00	10.63	11.25	11.88	12.50	15.63
9	3.89	4.44	5.00	5.56	6.11	6.67	7.22	7.78	8.33	8.89	9.44	10.00	10.56	11.11	13.89
10	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	12.50
11	3.18	3.64	4.09	4.55	5.00	5.45	5.91	6.36	6.82	7.27	7.73	8.18	8.64	9.09	11.36
12	2.92	3.33	3.75	4.17	4.58	5.00	5.42	5.83	6.25	6.67	7.08	7.50	7.92	8.33	10.42
13	2.69	3.08	3.46	3.85	4.23	4.62	5.00	5.38	5.77	6.15	6.54	6.92	7.31	7.69	9.62
14	2.50	2.86	3.21	3.57	3.93	4.29	4.64	5.00	5.36	5.71	6.07	6.43	6.79	7.14	8.93
15	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00	5.33	5.67	6.00	6.33	6.67	8.33
16	2.19	2.50	2.81	3.13	3.44	3.75	4.06	4.38	4.69	5.00	5.31	5.63	5.94	6.25	7.81
17	2.06	2.35	2.65	2.94	3.24	3.53	3.82	4.12	4.41	4.71	5.00	5.29	5.59	5.88	7.35
18	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17	4.44	4.72	5.00	5.28	5.56	6.94
19	1.84	2.11	2.37	2.63	2.89	3.16	3.42	3.68	3.95	4.21	4.47	4.74	5.00	5.26	6.58
20	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	6.25
21	1.67	1.90	2.14	2.38	2.62	2.86	3.10	3.33	3.57	3.81	4.05	4.29	4.52	4.76	5.95
22	1.59	1.82	2.05	2.27	2.50	2.73	2.95	3.18	3.41	3.64	3.86	4.09	4.32	4.55	5.68
23	1.52	1.74	1.96	2.17	2.39	2.61	2.83	3.04	3.26	3.48	3.70	3.91	4.13	4.35	5.43
24	1.46	1.67	1.88	2.08	2.29	2.50	2.71	2.92	3.13	3.33	3.54	3.75	3.96	4.17	5.21
25	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00	3.20	3.40	3.60	3.80	4.00	5.00
26	1.35	1.54	1.73	1.92	2.12	2.31	2.50	2.69	2.88	3.08	3.27	3.46	3.65	3.85	4.81
27	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78	2.96	3.15	3.33	3.52	3.70	4.63
28	1.25	1.43	1.61	1.79	1.96	2.14	2.32	2.50	2.68	2.86	3.04	3.21	3.39	3.57	4.46
29	1.21	1.38	1.55	1.72	1.90	2.07	2.24	2.41	2.59	2.76	2.93	3.10	3.28	3.45	4.31
30	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50	2.67	2.83	3.00	3.17	3.33	4.17
31	1.13	1.29	1.45	1.61	1.77	1.94	2.10	2.26	2.42	2.58	2.74	2.90	3.06	3.23	4.03
32	1.09	1.25	1.41	1.56	1.72	1.88	2.03	2.19	2.34	2.50	2.66	2.81	2.97	3.13	3.91
33	1.06	1.21	1.36	1.52	1.67	1.82	1.97	2.12	2.27	2.42	2.58	2.73	2.88	3.03	3.79
34	1.03	1.18	1.32	1.47	1.62	1.76	1.91	2.06	2.21	2.35	2.50	2.65	2.79	2.94	3.68

<https://extension.psu.edu/turfgrass-management-determining-how-much-nitrogen-or-active-ingredient-you-are-applying>

Tanner Delvalle- Penn State Extension Educator

Also has a chart telling you how much to apply based on Ai

Fertilizing Athletic Fields

Sports Turf vs. Residential Turf

**Nutrient Management Guidelines for Athletic
Fields in Maryland**



**University of Maryland
Turfgrass Technical Update
TT 119 – June 2014**

**Dr. Thomas Turner, Turfgrass Specialist
University of Maryland Department of Plant Science & Landscape Architecture**

Find the nutrient recommendations for Athletic
Fields on MDA website,
www.mda.Maryland.gov/fertilizer

Why are there special recommendations for Athletic Fields?

- Heavy traffic, sometimes year-round
- Field use when grass is dormant
- Safety
- Pesticide use may be limited
- Rapid recovery

These factors contribute to the need for more nutrients than typical residential turf

Nutrient needs vary depending on field use



Table 1. Recommended annual nitrogen rates for typical athletic fields in Maryland.

Species	Total Annual Nitrogen Rate	
	Pounds/1000 square feet	Pounds/acre
bermudagrass	2 – 5*	87 – 217*
Turf-type tall fescue	2 – 5*	87 – 217*
Kentucky bluegrass – perennial ryegrass	3 – 5*	130 – 217*

***The high N rate should only be necessary on fields that are intensively used, have clippings removed, and/or are irrigated.
The lowest N rate will generally only be sufficient on less intensively used fields where clippings are returned.**

Other factors affecting nitrogen need

- Irrigation
 - Soluble nutrient like N and K may move through the soil profile more quickly
- Clipping removal
- Soil type/field construction
 - Sandy soils hold fewer nutrients
 - Organic matter retains nutrients better
- Mowing height

Mowing too low increases nutrient need because it stresses the grass

Table 4. Mowing height for Maryland turf

Turf Type	Spring and Summer (inches)	Autumn and Winter (inches)
Kentucky bluegrass	2.5 - 3.0	2.0
Perennial ryegrass	2.5 - 3.0	2.0
Tall fescue	2.5 - 3.0	3.0
Fine-leaf fescue	3.0 - 4.0	3.0
Zoysiagrass	0.5 - 1.0	0.5 - 1.5

(Dernoeden, 2003b)

A little extra nitrogen for newly seeded fields

Rates for Establishment and Initial Grow-In Period - When athletic fields are established from seed, sprigs, plugs or sod, it is recommended that a slow release N-source at a rate of 0.9 pounds N/1000 ft² (or a soluble source at a rate of 0.7 pounds N/1000 ft²) be applied to the soil at the time of establishment. This N application is usually adequate for the first 4 weeks.

For the period from 4-8 weeks after seeding, sprigging, or plugging of bermudagrass, it is recommended that ¼ to ½ pound N/1000 ft² be applied weekly (or ½ to 1 pound N/1000 ft² biweekly) to maximize establishment rate and ground cover. After 8 weeks, rates recommended for maintenance (Table 1) should be followed.

For the period from 4 - 6 weeks after seeding cool season grasses, or sodding either cool season grasses or bermudagrass, rates recommended for maintenance (Table 1) should be followed.

Table 2. Suggested N programs for Bermudagrass athletic fields

	High N Rate	Medium N Rate	Low N Rate
	Pounds N/1000 square feet		
April 1 – May 1	0.9*		
May 1 – June 1	0.9	0.9	0.9
June 1 – July 1	0.9	0.9	-
July 1 – August 1	0.9	0.9	0.9
August 1 – Sept.1	0.9	0.9	0.5
Sept. 1 - Sept. 15	0.5	-	-
TOTAL ANNUAL N	5.0	3.6	2.3

***any application greater than 0.7 lb N/1000 ft² must use fertilizer containing at least 20% slow release N. Also, see section on the use of enhanced efficiency nitrogen fertilizers.**

Fertilizing Bermudagrass after
September 15 can increase the
likelihood of winterkill

Avoid unless you are overseeding with a cool season grass

Table 3. Suggested N programs for cool season turfgrass athletic fields in Maryland.

	High N Rate	Medium N Rate	Low N Rate
	Pounds Actual N/1000 square feet		
March 1 – April 15	0.9*	0.5	-
May 15 – June 15	0.9	0.5	0.5
August 15 – Sept. 15	0.9	0.9	0.9
Sept. 15 – Oct. 15	0.9	0.9	
Oct. 15 – Nov. 15	0.9	0.9	0.9
Nov. 15 – Dec. 1**	0.5	-	-
TOTAL ANNUAL N	5.0	3.7	2.3

***any application greater than 0.7 lb N/1000 ft² must use fertilizer containing at least 20% slow release N. Also, see section on the use of enhanced efficiency nitrogen fertilizers.**

Choose the right nitrogen source

- Soluble
- Insoluble
- Enhanced Efficiency (EEF)

Enhanced Efficiency Fertilizers

- Release nutrients very slowly over a very long period of time
 - May be a good choice for fields you can only fertilize once
 - Expensive
- In MD, EEFs can be applied at the lesser of 2.5 lb N/1000 sq ft or 80% of the annual nitrogen recommendation (TT-119) for grass type
- Must be approved as an EEF by the MD State Chemist
 - It is not always easy to tell if an EEF is approved
 - Call me or call the MD State Chemist

Slow-Release Nitrogen

- Slow-release fertilizers include, sulfur coated urea, IBDU, urea formaldehyde, polymer coated urea, & methylene urea
- First consider the amount of slow-release nitrogen
- Then consider how long the nitrogen will last
 - This usually depends on temperature, moisture and/or microbial activity
 - Some slow-release formulations can last for several months

Slow-Release Nitrogen

- More uniform turfgrass response
- Less prone to leaching; better on sandy soils
- Better choice if fertilizing when the grass is not actively growing

Soluble Nitrogen

- Quickly available for grass uptake
- Greater potential for leaching
- Need about ½ lb of soluble nitrogen to see “green up”
- Nitrogen may be in either the ammonium form (NH^+4) or the nitrate form (NH^+3)



- Most common form used in lawn fertilization
- Available to grass in 7-10 days
- Includes urea, ammonium sulfate and ammonium chloride
- Ammonium nitrogen can be adsorbed by the soil, making it less likely to leach than nitrate nitrogen

NO⁻³

- Leaching and runoff potential are much greater than with fertilizer containing nitrogen in the ammonium form
- Available to plants within 1-3 days
- Includes ammonium nitrate, potassium nitrate and calcium nitrate
- Not recommended for home lawns
- Used for the “wow” factor

Phosphorus recommendations are also slightly higher

Table 4. Phosphorus Application Recommendations for Athletic Fields⁺

	Soil Test Phosphorus Category			
	low	medium	high	excessive
	Pounds P ₂ O ₅ per 1000 square feet			
Establishment				
Broadcast*	2 - 3	1 - 2	0 - 1	0
Incorporated**	3 - 4	1 - 2	0 - 1	0
Overseeding	2 - 3	1 - 2	0 - 1	0
Maintenance	2 - 3 ⁺⁺	1 - 2	0	0

⁺Any subsequent applications should be based on additional soil tests

^{*} Or incorporated into soil up to 2 inches

^{**} Incorporated into soil over a 2 inch depth

⁺⁺ 3 lb. P₂O₅/1000 ft² should only be used on soil testing "very low" for phosphorus

You need a soil test showing need to apply P205 for maintenance or overseeding.

Compost

Not considered a fertilizer when
incorporated into the soil during field construction or
tilled in during field renovation

Is considered a fertilizer when top-dressing
requires a soil test < 3 years old
requires a compost analysis < 2 years old

** Not regulated in VA*

Potassium Recommendations

Table 5. Potassium Application Recommendations for Athletic Fields

	Soil Test Potassium Category			
	low	medium	high	excessive
	Pounds K ₂ O per 1000 square feet			
Establishment				
Broadcast*	2 - 3	1 - 2	0 - 2	0
Incorporated**	3 - 5	1 - 2	0 - 2	0
Overseeding	2 - 3	1 - 2	0 - 1	0
Maintenance	2 - 4	1 - 3	0 - 2	0

* Or incorporated into soil up to 2 inches

** Incorporated into soil over a 2 inch depth

Potassium

- Potassium improves tolerance to heat, drought & cold
- Promotes recovery
- Frequently applied in the fall
- Not regulated by MDA
 - Not known to harm water quality



Lime

- Maintain pH between 5.8-6.4 to maximize nutrient availability
- A lower pH (5.6-5.9) helps to control spring dead spot of Bermudagrass.
- An application of lime may be more effective (and cost effective) than a fertilizer application on a low-end field
- Apply lime, if needed, a month before overseeding in the fall to maximize phosphorus availability and minimize nitrogen volatilization

Understanding Liquid Fertilizer Calculations



Determining nutrient content of liquid fertilizers

- Analysis of the fertilizer shows the % by weight of nutrients
 - For granular fertilizer multiply the weight of the bag by the % nutrient to get pounds of nutrient
- Analysis of a liquid fertilizer also shows the % by weight of nutrients
- Need to determine how much the liquid fertilizer weighs

How to find the weight per gallon

By law, all fertilizer labels must contain the net weight of the fertilizer

To determine the weight per gallon, divide the weight of the fertilizer by the volume

Cultive plantas grandes y bellas...
de forma natural!

Miracle-Gro

ORGANIC CHOICE

ALL PURPOSE
PLANT FOOD
CONCENTRATE

Alimento para Plantas Concentrado Todo Propósito



FPO
2D
CODE

NET CONTENTS/CONTENIDO NETO 1 qt (32 FL OZ) 946 mL

For indoor & outdoor plants

Para plantas de interiores y exteriores

Feeds flowers, fruits, vegetables, trees, and shrubs

Fertiliza flores, frutas, vegetales, árboles y arbustos

Natural plant-based formula begins feeding your plants immediately

Fórmula natural a base de plantas que empieza a fertilizar sus plantas inmediatamente

$$\frac{32 \text{ oz}}{2.67 \text{ lb}} = \frac{128 \text{ oz}}{x}$$

$$(128)(2.67) = 32x$$

$$X = 10.68$$

(leaf) feeding for houseplants.

This product will cover up to 640 sq. ft. If product spills, wash surface thoroughly with water. Avoid contact with asphalt.

Este producto sirve para cubrir 640 pies cuadrados. Si el producto se derrama, llave la superficie completamente con agua. Evite el contacto con asfalto.

SATISFACTION GUARANTEED OR YOUR MONEY BACK

If you are not satisfied, return empty package to: Miracle-Gro Lawn Products, Inc., PO Box 606, Marysville, OH 43040 Limit: One package per family.

Disclaimer and Limitation of Liability: This product is intended only as a consumer product and not a commercial plant food. No warranty or representation is made, expressed or implied, concerning the results to be obtained from the use of this product if not used in accordance with directions or established safe practices.

The exclusive remedy of the user or buyer, and the limit of liability of the Scotts Company LLC or its handling of this product shall be a refund of the purchase price.

For free gardening tips and information, call our garden helpline at 1-800-645-8166, or visit www.miracle-gro.com.

Para obtener información y consejos de jardinería, comuníquese con nuestra línea de asistencia de jardines al 1-800-645-8166, o visite www.miracle-gro.com.

Instrucciones: Agite bien la botella antes de cada uso. En el jardín, para árboles y arbustos: 1. Mezcle 1/2 tapa llena (1 oz) en 2 galones de agua para fertilizar 20 pies cuadrados. Para obtener resultados espectaculares, aplíquelo cada 7 a 14 días. 2. Para aplicarlo moje las hojas y luego empape la tierra. Para plantas de interiores: 1. Mezcle 1/2 cda por cada 6 tazas de agua. Aplíquela cada 2 semanas a la tierra para obtener excelentes resultados. No recomendamos usar fertilizante foliar (para hojas) para las plantas de interiores.

¡SATISFACCIÓN GARANTIZADA O LE DEVOLVEMOS SU DINERO!

NET WT (2.67 lb (1.21 kg)

GUARANTEED ANALYSIS F1144

Miracle-Gro® Organic Choice® All Purpose Plant Food Concentrate 8-0-0

Total Nitrogen (N)8%

3.0% Ammoniacal Nitrogen

5.0% Other Water Soluble Nitrogen

Derived from fermented sugar beet molasses.

Information regarding the contents and levels of metals in this product is available on the internet at: <http://www.regulatory-info-sc.com>.

KEEP OUT OF REACH OF CHILDREN

MANTENER FUERA DEL ALCANCE DE LOS NIÑOS

©2010 Miracle-Gro Lawn Products, Inc. World Rights Reserved.

Packaged by: Miracle-Gro Lawn Products, Inc. 14111 Scottslawn Road Marysville, OH 43041

Made in France

FPO
2D
CODE

LB28020M000



HOLGANIX[®]

Blue Sky 21-0-0 Super High Performance fertilizer with bionutritional food sources

Holganix Blue Sky 21-0-0 is a slow release fertilizer that utilizes and maximizes efficiencies of methylene urea. The result is a much more effective and longer lasting green with less material. It is a great source all by itself or an optimal companion with any of the Holganix Super Concentrate formulas; further adding to and feeding the microbial activity in the soil.

21-0-0 GUARANTEED ANALYSIS

Total Nitrogen (N)	21%
8.4% Urea nitrogen	
12.6% Other Water Soluble Nitrogen*	
Derived from Triazone, Methylene Urea and Urea	
*12.6% Slowly available nitrogen from Triazone and Methylene Urea	
Weight per gallon	9.98 lbs
1 gallon contains	2.075 lbs of N
pH	8.1

MAXIMIZING AGRONOMICS & ECONOMICS FOR THE ENVIRONMENT

Net Content:

Use only as directed. Mix only with Holganix approved products. Questions Call - 866-563-2784 or online at: www.holganix.com
Holganix - 711 Concord Road, Glen Mills, PA 19342

HBS2100

Once you know the
weight/gallon, you can figure
the nutrient content

How much nitrogen is in 10 oz of a liquid fertilizer with an analysis of 15-0-15?

The weight/gallon of the fertilizer is 10.6 lbs/gallon

128 oz of fertilizer weighs 10.6 pounds

Set up a proportion.

$$\frac{128 \text{ oz}}{10.6 \text{ lbs}} = \frac{10 \text{ oz}}{X}$$

Cross multiply to solve for X $10.6 X 10 = 128 x$

$$\frac{(10.6)(10)}{128} = X$$

$X = 0.83$ lbs of fertilizer

Now that you know the weight of the fertilizer applied, you can find out how much nitrogen was applied

Multiply the weight of the fertilizer by the nutrient content, expressed as a percent.

This 15-0-15 fertilizer contains 15% nitrogen

$0.83 \text{ lbs fertilizer} \times .15 = .1245 \text{ lbs nitrogen}$

When figuring your Annual Fertilizer Report it may be easiest to add up all the applications of a given liquid and then figure out the pounds of nutrient on the total

Rate of Fertilizer to Apply Per 1000 Square Feet

Pounds of Nitrogen desired per 1000 sq. ft (Granular Material)

Fertilizer's Percent Nitrogen (%)

	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	1.25
5	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	25.00
6	5.83	6.67	7.50	8.33	9.17	10.00	10.83	11.67	12.50	13.33	14.17	15.00	15.83	16.67	20.83
7	5.00	5.71	6.43	7.14	7.86	8.57	9.29	10.00	10.71	11.43	12.14	12.86	13.57	14.29	17.86
8	4.38	5.00	5.63	6.25	6.88	7.50	8.13	8.75	9.38	10.00	10.63	11.25	11.88	12.50	15.63
9	3.89	4.44	5.00	5.56	6.11	6.67	7.22	7.78	8.33	8.89	9.44	10.00	10.56	11.11	13.89
10	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	12.50
11	3.18	3.64	4.09	4.55	5.00	5.45	5.91	6.36	6.82	7.27	7.73	8.18	8.64	9.09	11.36
12	2.92	3.33	3.75	4.17	4.58	5.00	5.42	5.83	6.25	6.67	7.08	7.50	7.92	8.33	10.42
13	2.69	3.08	3.46	3.85	4.23	4.62	5.00	5.38	5.77	6.15	6.54	6.92	7.31	7.69	9.62
14	2.50	2.86	3.21	3.57	3.93	4.29	4.64	5.00	5.36	5.71	6.07	6.43	6.79	7.14	8.93
15	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00	5.33	5.67	6.00	6.33	6.67	8.33
16	2.19	2.50	2.81	3.13	3.44	3.75	4.06	4.38	4.69	5.00	5.31	5.63	5.94	6.25	7.81
17	2.06	2.35	2.65	2.94	3.24	3.53	3.82	4.12	4.41	4.71	5.00	5.29	5.59	5.88	7.35
18	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17	4.44	4.72	5.00	5.28	5.56	6.94
19	1.84	2.11	2.37	2.63	2.89	3.16	3.42	3.68	3.95	4.21	4.47	4.74	5.00	5.26	6.58
20	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	6.25
21	1.67	1.90	2.14	2.38	2.62	2.86	3.10	3.33	3.57	3.81	4.05	4.29	4.52	4.76	5.95
22	1.59	1.82	2.05	2.27	2.50	2.73	2.95	3.18	3.41	3.64	3.86	4.09	4.32	4.55	5.68
23	1.52	1.74	1.96	2.17	2.39	2.61	2.83	3.04	3.26	3.48	3.70	3.91	4.13	4.35	5.43
24	1.46	1.67	1.88	2.08	2.29	2.50	2.71	2.92	3.13	3.33	3.54	3.75	3.96	4.17	5.21
25	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00	3.20	3.40	3.60	3.80	4.00	5.00
26	1.35	1.54	1.73	1.92	2.12	2.31	2.50	2.69	2.88	3.08	3.27	3.46	3.65	3.85	4.81
27	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78	2.96	3.15	3.33	3.52	3.70	4.63
28	1.25	1.43	1.61	1.79	1.96	2.14	2.32	2.50	2.68	2.86	3.04	3.21	3.39	3.57	4.46
29	1.21	1.38	1.55	1.72	1.90	2.07	2.24	2.41	2.59	2.76	2.93	3.10	3.28	3.45	4.31
30	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50	2.67	2.83	3.00	3.17	3.33	4.17
31	1.13	1.29	1.45	1.61	1.77	1.94	2.10	2.26	2.42	2.58	2.74	2.90	3.06	3.23	4.03
32	1.09	1.25	1.41	1.56	1.72	1.88	2.03	2.19	2.34	2.50	2.66	2.81	2.97	3.13	3.91
33	1.06	1.21	1.36	1.52	1.67	1.82	1.97	2.12	2.27	2.42	2.58	2.73	2.88	3.03	3.79
34	1.03	1.18	1.32	1.47	1.62	1.76	1.91	2.06	2.21	2.35	2.50	2.65	2.79	2.94	3.68

<https://extension.psu.edu/turfgrass-management-determining-how-much-nitrogen-or-active-ingredient-you-are-applying>

Tanner Delvalle- Penn State Extension Educator

REMEMBER

AFAR due March 1

Somebody is always watching!



Questions?



Email:

Judy.McGowan@Maryland.gov

Phone: 410 980-9084

