



# Pre-Conference Education Sessions

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# DLF

# Pure Live Seed

## Does it even matter?



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@BIGTurfKnowHow





# Reading and Understanding The Seed Label or Tag



**Sun to Shade**  
GRASS SEED MIXTURE Net Wt. 50 LB (22.68 KG)

Purity	Variety/Kind	Germination	Origin
14.80%	Chinook Tall Fescue	85%	OR
12.35%	Arusi Perennial Ryegrass	90%	DK
12.23%	Boreal Creeping Red Fescue	80%	CAN
03.93%	Transam Intermediate Ryegrass	90%	OR
03.08%	Candidame Annual Ryegrass	90%	OR
02.69%	SR2100 Kentucky Bluegrass	85%	ID
00.25%	Other Crop Seed		
00.65%	Inert Matter		
50.00%	ProNitro Coating Material		
00.02%	Weed Seed		

Noxious Weed Seeds: None Found

7 **38835 10818** 8

**GUARANTEED ANALYSIS**  
Iron (Fe) - 3.0% Chelated Iron 0.0169%

**COATED SEED IS NOT FOR HUMAN OR ANIMAL CONSUMPTION**

# UNDERSTANDING A SEED TAG

**GERMINATION RATE**  
Germination percentage by seed variety

**VARIETY AND KIND**  
Variety and kinds of grass contained in the product

**PURE SEED**  
Percentage by weight of each grass variety and kind

**OTHER CROP SEED**  
Other seeds that comprises of 5% or less of the product

**INERT MATTER**  
Non seed materials such as mulch or fertilizer

**WEED SEED**  
Percentage of weed seed contained in the product identified by state

**NOXIOUS WEEDS**  
Number of noxious weed seeds contained per pound. Noxious weeds are regulated and may be restricted by state.

**GUARANTEED ANALYSIS**  
Guaranteed analysis for fertilizer containing products

**LOT NUMBER**  
Production lot identification number

**TEST DATE**  
Germination test date

**SELL BY DATE**  
Sell by date variable by state

**OneStep Complete Seeding Mixture**  
For Sun and Shade Areas .6 - 0 - 0 MAT: 100520281  
Sun and Shade Mixture NET WT: 5 POUND

PURE SEED	VARIETY	KIND	GERMINATION	ORIGIN
4.00%	REBEL XTREME TALL FESCUE		85%	OR
1.80%	PENNINGTON ATF1376 TALL FESCUE		85%	OR
1.70%	VIRTUE II TALL FESCUE		85%	OR
1.00%	BLUE BONNET KENTUCKY BLUEGRASS		80%	WA
0.80%	PENNINGTON ASC295 RED FESCUE		85%	OR
0.70%	SURVIVOR CHEWINGS FESCUE		80%	OR

0.09% OTHER CROP SEED  
89.90% INERT MATTER\*  
0.01% WEED SEED

\*CONSISTS OF 84.50% MULCH, 5.00% FERTILIZER, 0.40% INERT FROM SEED

NOXIOUS WEED: NONE FOUND PER POUND

**GUARANTEED ANALYSIS: .6 - 0 - 0**

Total Nitrogen (N).....0.60%  
0.60% Urea Nitrogen  
Derived From: Urea  
**SOIL AMENDING GUARANTEED ANALYSIS**  
Active Ingredients:  
84.50% Mulch  
Soil Amendment Inert Ingredients:  
10.50% Seed  
5.00% Fertilizer

INFORMATION REGARDING THE CONTENTS AND LEVELS OF METALS IN THE PRODUCT IS AVAILABLE ON THE INTERNET AT: <http://www.aapfc.org/metals.htm>

LOT# MH14WWS001

TEST DATE 12-14

In AK, AZ, CA, CO, CT, DE, ID, IL, MD, MN, NC, ND, NE, NH, NJ, NV, NY, OH, OR, PA, SC, UT, VA, VT and WA SELL BY: ..... 03/31/2016  
In MA, MT, SD, WI and WY SELL BY: ..... 12/31/2015  
In FL SELL BY: ..... 07/31/2015  
In all other states SELL BY: ..... 09/30/2015

**GUARANTEED BY:**  
Pennington Seed, Inc. P.O. Box 338 Greenfield, MD 65661

**PENNINGTON**  
THE GRASS SEED PEOPLE

# The Seed Label aka The Seed Tag (**Key information**)

- **Purity:** The percent by weight of each seed component (variety or species) in the package.
- *Purity is not necessarily an indication of "seed quality" but rather is a measure of "seed quantity".*
- This is important because not all pure seed is capable of growth and surviving to maturity during establishment.

Scotts® Turf Builder® Brand Grass Seed  
Tall Fescue Mix  
Grass Seed Mixture/Blend

Lot No. 12030033

<u>Pure Seed</u>	<u>Variety/Kind</u>	<u>Germination</u>	<u>Origin</u>
17.06%	Wolfpack II Tall Fescue **	85%	OR
17.04%	Tar Heel II Tall Fescue *	85%	OR
14.64%	Greenkeeper WAF Tall Fescue	85%	OR

Other Ingredients

0.25%	Other Crop Seeds
50.00%	Water Smart® coating
1.00%	Inert Matter
0.01%	Weed Seed

Noxious Weed Seeds: None Found  
\* PVP Protected Variety - Unauthorized Propagation Prohibited  
\*\* PVP Pending

Net Wt. 3 Lbs (1.36 kg)  
The Scotts Company  
14111 Scottslawn Road  
Marysville, OH 43041

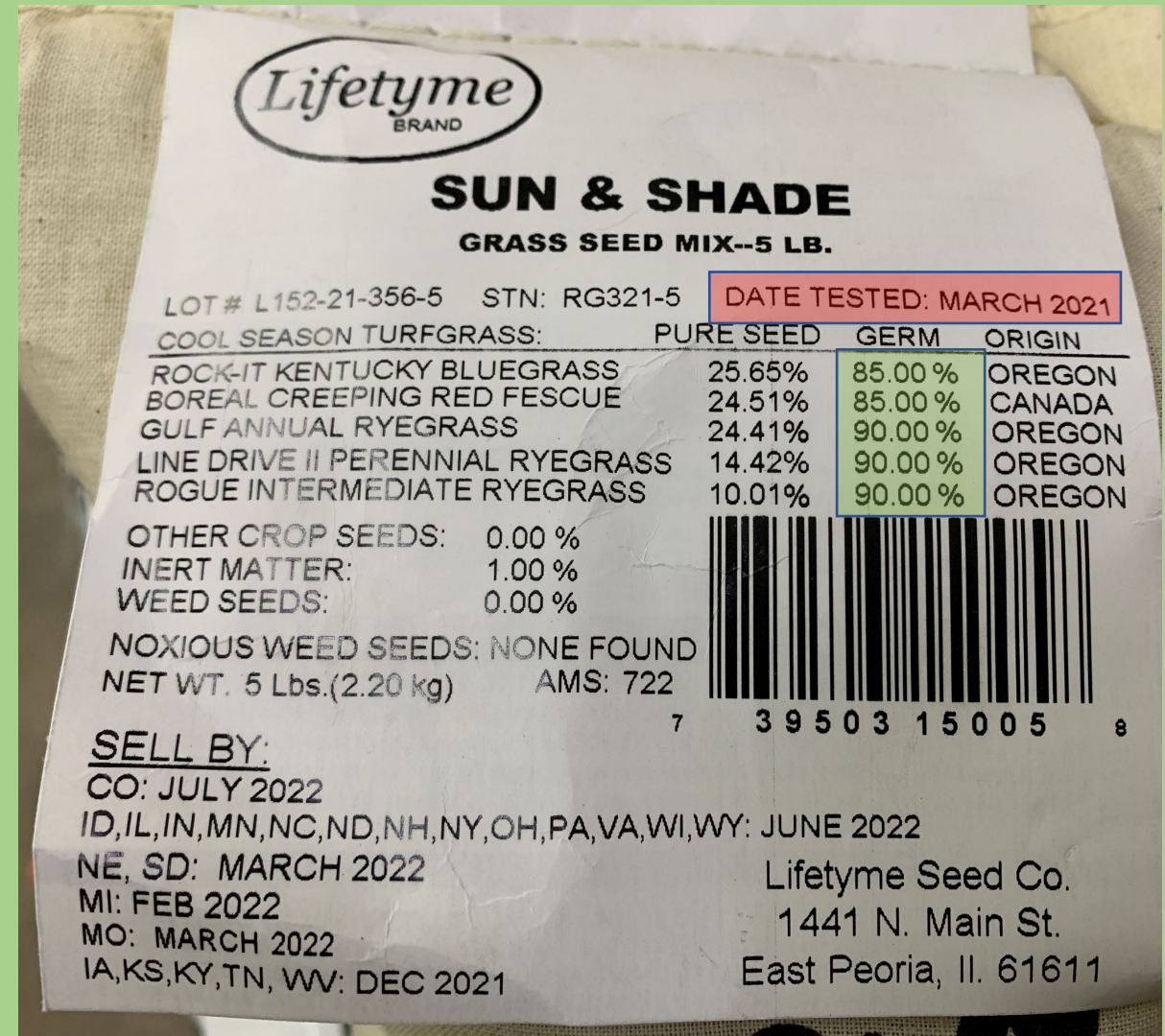
Lot No. 12030033  
TESTED: 12/11 SELL BY: 9/30/12  
In FL and LA SELL BY 7/31/12  
In MT, NE, SD, WI and WY SELL BY 12/31/12  
In AK, AZ, CA, CO, DE, ID, IL, IN, MD, MN, NC, ND, NH, NV, NY,  
OH, OR, PA, UT, VT, WA & DC, SELL BY 03/31/13

AMS 522  
18220-3



# The Seed Label aka The Seed Tag (**Key information**)

- **Germination:** This percentage is expressed on the seed label as the **percentage of pure seed that is capable of growth**.
- This value is determined using a strict laboratory procedure under near "**ideal conditions**" in terms of temperature and moisture. Note: the germination percentages indicated on the seed tag do not necessarily reflect the percentage of seed that might be expected to survive under difficult field establishment conditions.
- The seed test date is included on the analysis tag as an indication of freshness and to protect the buyer. General guidelines are to avoid purchasing seed with less than 70% germination.
- **Note:** *germination declines with age*. Seed older than 9-12 months may be less viable than freshly harvested seed.





## What exactly is Pure Live Seed (PLS)?

- In simple terms: it is the amount of seed by weight that is viable and will germinate and hopefully establish into a dense, healthy, turf.
- It is calculated by multiplying % purity x % germination
- For example a seed with 95% purity x 98% germination = 93.1% PLS
  - $(0.95 \times 0.98 = 0.931 \times 100\% = \mathbf{93.1\% \text{ pure live seed}})$

\*\*\* "**Your mileage may vary**": In other words, realize that the published germination % on the seed label is based on ideal laboratory conditions-seedling life in the real world is subject to many factors affecting establishment success.



# Suggested seeding rates of various species when planted on bare soil



## Target Seeding Rates

Turfgrass Seeding Rate Chart

Grass Monostands	Seed Count	Seeding Rate per 1,000 sq ft	Seeding Rate per acre
Perennial Ryegrass	250,000-300,000	7-8 lbs	300-400
Turf Annual Ryegrass	200,000-230,000	7-8 lbs	300-400
Intermediate Ryegrass	200,000	7-8 lbs	300-400
Tall Fescue	200,000-250,000	8-10 lbs	350-435
Kentucky Bluegrass	900,000-1,700,000	2-3 lbs	50-100
Creeping Red Fescue	400,000-500,000	4-6 lbs	200-250
Slender Creeping Red Fescue	400,000	4-6 lbs	200-250
Chewings Fescue	350,000-425,000	4-6 lbs	200-250
Hard Fescue	500,000-600,000	4-6 lbs	200-250
Sheeps Fescue	500,000-550,000	4-6 lbs	200-250
Poa Trivialis	2,000,000	2-3 lbs	
Creeping Bentgrass	6,000,000-6,500,000	1-1.5 lbs	23-67
Alkaligrass	2,000,000	2-3 lbs	
Mixes	Seed Count	Seeding Rate per 1,000 sq ft	Seeding Rate per acre
85% Perennial Rye 15% K. Bluegrass	435,000-517,000	7-9	300-400
80% K. Bluegrass 20% Perennial Rye	770,000-1,420,000	2-3	90-125
60% K bluegrass 40% Perennial Rye	640,000-1,140,000	3-4	125-175
50% Perennial Rye 50% Fine Fescue	337,500	6-8	250-350
70% Perennial Rye 30% Fine Fescue	312,500	7-9	300-400
90% Tall Fescue 10% K. Bluegrass	270,000-395,000	8-10	350-435
60% Fine Fescue 20% K. Bluegrass 20% P.Rye	470,000-640,000	4-6	150-250

In practical terms to hit your target PLS should be considered



# Can the amount of Pure Live Seed Really Affect My Turf Performance?



## Shade Grass Mixture Analysis

% Pure Seed	Origin	% Germ
43.55% Creeping Red Fescue*	CAN	86%
43.30% Annual Ryegrass*	OR/CAN	85%
8.90% Chewings Fescue*	OR	85%

\*Variety Not Stated

### Other Ingredients:

3.05% Inert Matter, 0.60% Crop Seed, 0.60% Weed Seed. Noxious Weed Seed: None Found

### Seeding Rate:

New Lawn: For average or dense cover, use 4-5 lbs. per 1000 sq. ft.

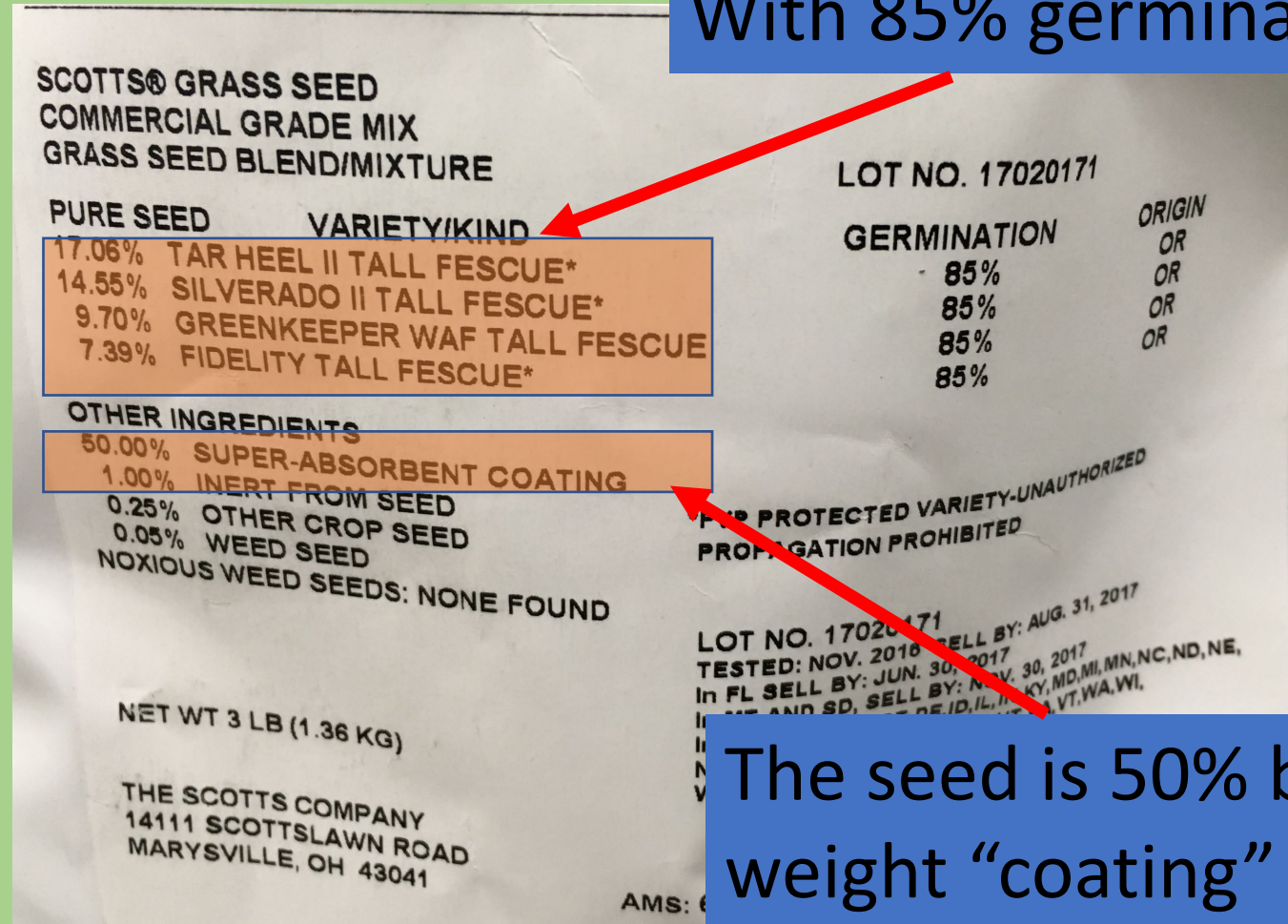
Lawn repair: Use 3-4 lbs / 1000 Sq. ft. depending on the severity of the damage and the desired density.

Low germination rates and/or excessive inert matter will result in reduced stand density



# Another form of "Inert Matter" Coated seed in the Marketplace

Contains 4 Turf-type  
tall fescue cultivars  
With 85% germination



The seed is 50% by  
weight "coating"

# Some Seed Terminology

- **Seed treatments**
  - Often a fungicide like “Apron” to limit “damping off” disease, etc.
- **Seed enhancers**
  - Proprietary “Special sauces” like biologicals (e.g. mycorrhizae), plant hormones like gibberellic acid, nutrient packages, etc.
- **Seed coatings**
  - The actual “coating” which may be a clay or limestone material





# Seed Treatments and Coatings

- **Marketed benefits:**

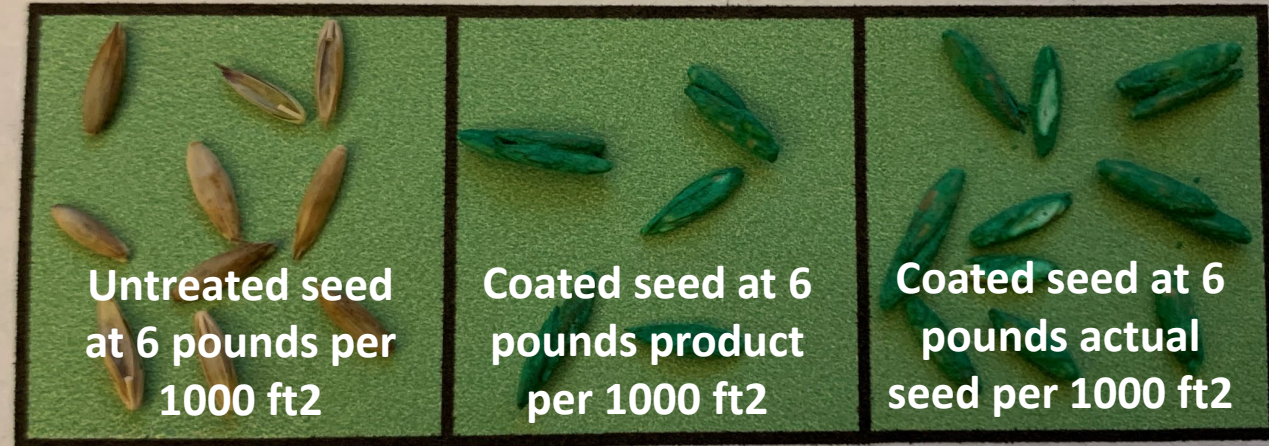
- Reduced seedling “damping off” (Fungicide: Apron XL, mefenoxam)
- Coatings = improved water uptake/germination/frequency needs?
- Growth stimulation: addition of nutrients, microorganisms and/or biostimulants – “The special sauce”
- Increased bulk density, heavier seed=better “ballistic characteristics”= improved seed/soil contact?
  - Reduced seed movement
- Visibility (colorant)/uniform application



# Treated versus Coated Seed?



Remember seed coatings are classified as “inert” matter on the seed label. While these coatings may aid/improve seed germination-establishment, they often double the seed weight. One should still pay attention to intended target seeding rates and account for this coating in order achieve the desired species stand density.



Tall fescue is often seeded around 6 pounds seed per 1000 ft<sup>2</sup> this roughly translates into about 10 seeds per square inch. If one plants a coated seed product at this seeding rate you only have half the seeds per square inch, possibly resulting in poor initial stand density.



# A Practical “Pure Live Seed” Calculation:

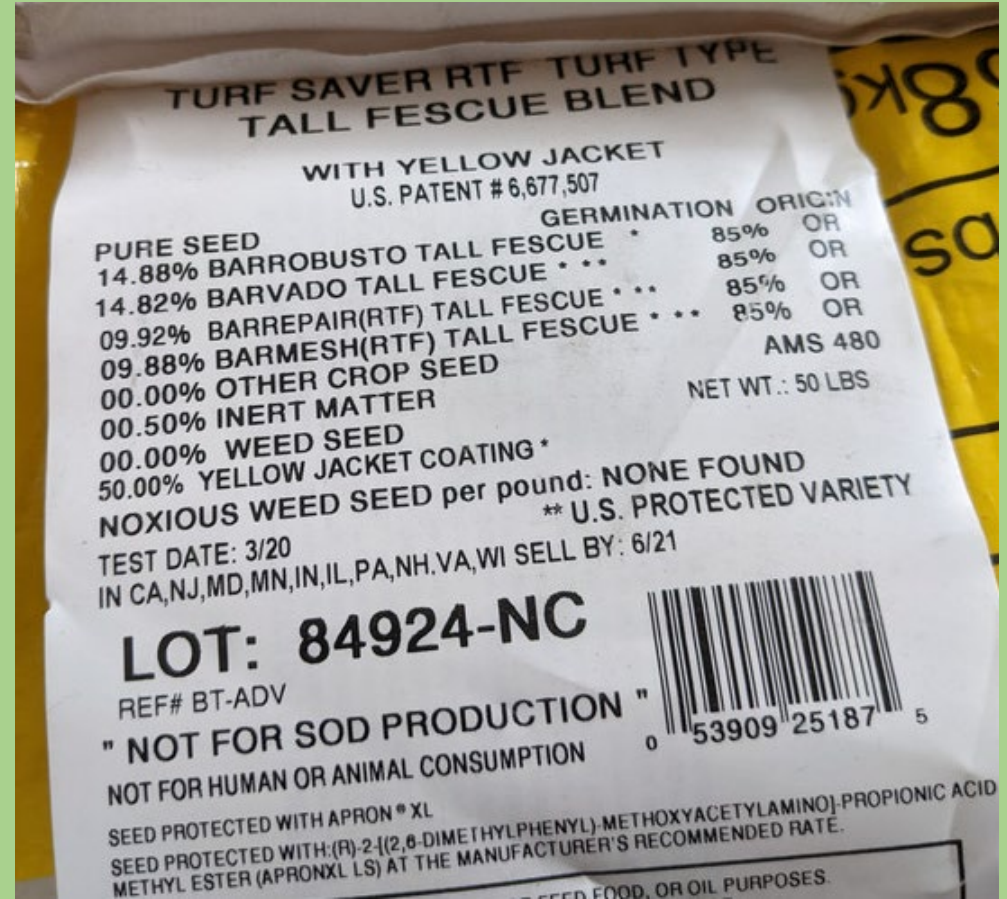
Recall that a suggested planting rate for TTF is generally 8-10 pounds of seed per 1000 ft<sup>2</sup>



Turfgrass Seeding Rate Chart

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Alkaligrass	2,000,000	2-3 lbs	

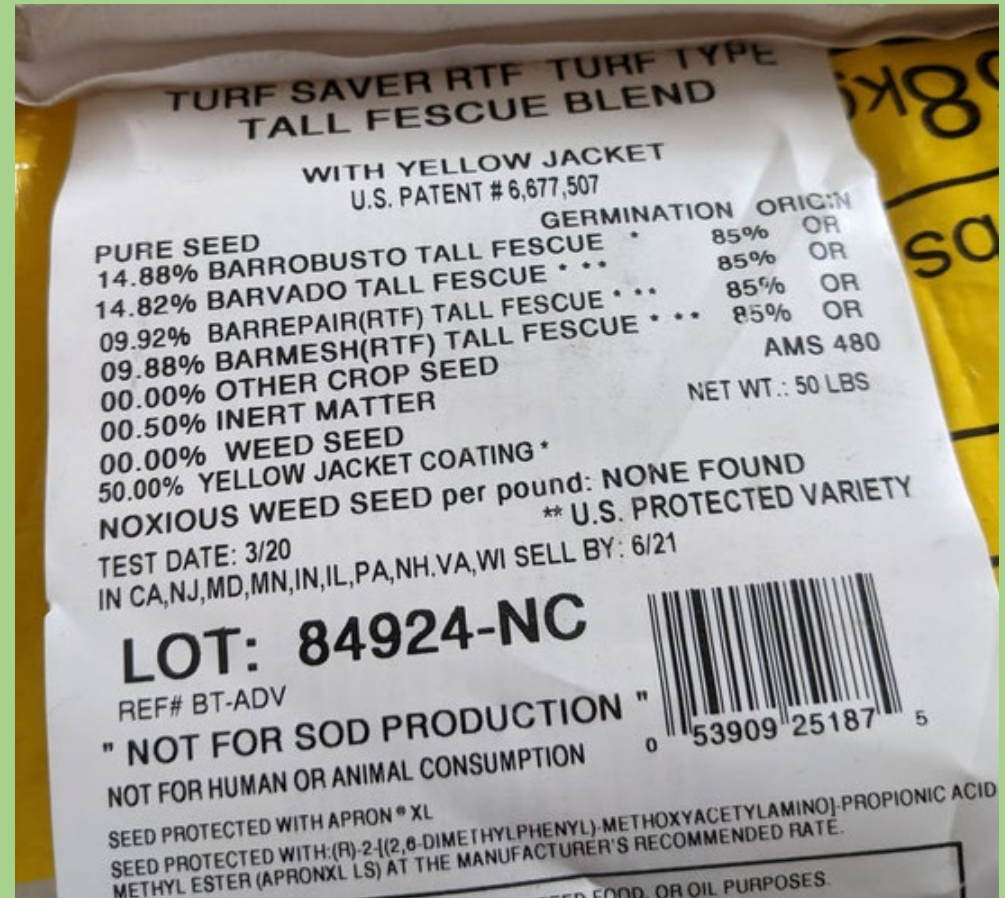
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How much of this seed will I need to put in my spreader?

# A Practical “Pure Live Seed” Calculation:

- From the seed label for this “Turf Saver RTF Blend” turf-type tall fescue blend to the right, we find:
  - The package includes 50% coating and 0.5% inert matter by weight
  - The quantity of pure live seed (PLS) calculated as the sum of the percentage purity and germination for each cultivar in this package equals 42.06%
- **Thus, in order to achieve a 8 pound per 1000 ft<sup>2</sup> target seeding rate you need to apply 19 pounds of actual seed “product”.**
  - **This was calculated by dividing 8 by the decimal fraction of PLS 42.06% (e.g. 0.4206):  $8/0.4206=19$ .**





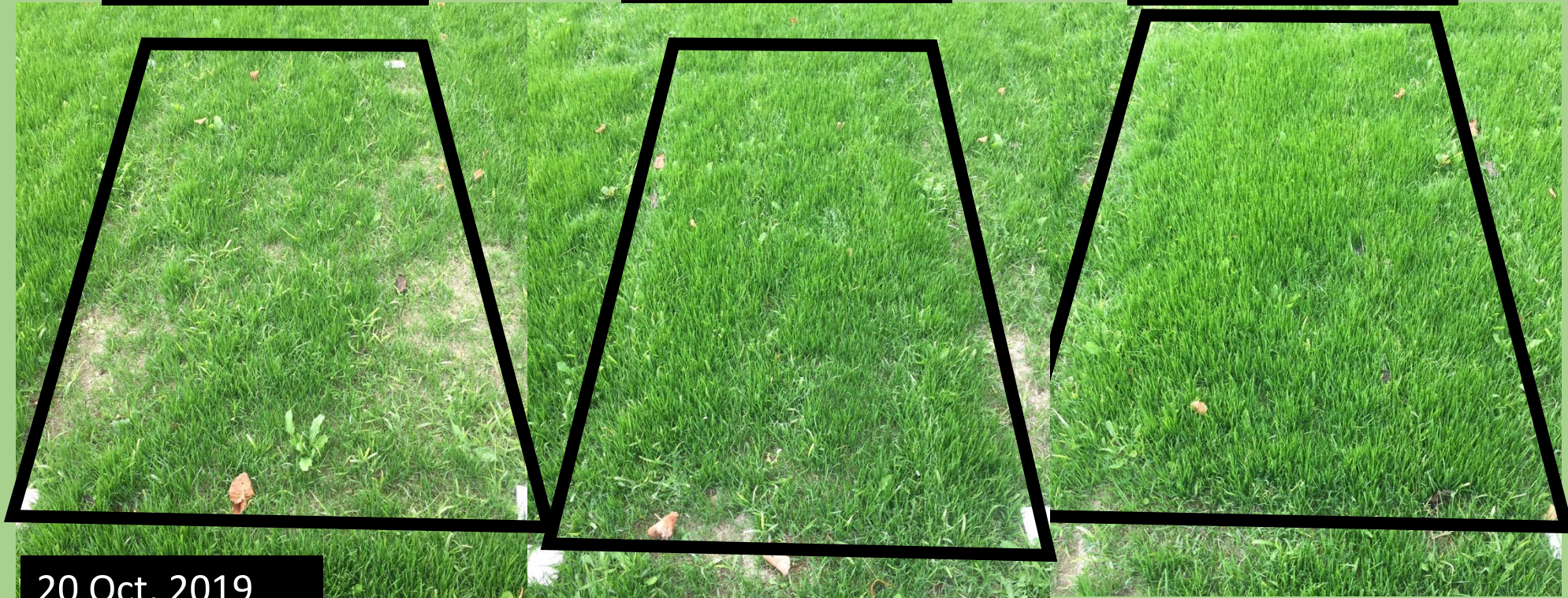
# Tall fescue seeding rates affect density/weed pressure

Note: Suggested seeding rates from vendor packaging for TF range as low as 3# and as high as 12#

5 lb/1000 ft<sup>2</sup>

10 lb/1000 ft<sup>2</sup>

15 lb/1000 ft<sup>2</sup>



20 Oct, 2019

Uncoated turf seed was planted on 20 Sept, 2019.

# Another important consideration of PLS



**% Ryegrass x % Germination**

$.97 \times .78 =$   
**0.76 lb PLS/lb**  
**seed**

$\$4.65 / 0.76 =$   
**\\$6.12/lb PLS**

## **Seed Blend #1**

**Lot# 012345**

'Nicklaus' Perennial ryegrass: 53.0 %  
'Palmer' Perennial ryegrass : 44.0 %

Weed seed: 1.0 %  
Other crop: 0.5 %  
Inert matter: 1.5 %  
Germination: 78 %

Tested: 4/2023  
Cost: \$4.65/lb

$.485 \times .78 =$   
**0.38 lb PLS/lb**  
**seed**

$\$4.65 / 0.38 =$   
**\\$12.24/lb PLS**

## **Seed Blend #2**

**Lot# 012345**

'Nicklaus' Perennial ryegrass: 26.5 %  
'Palmer' Perennial ryegrass : 22.0 %

Weed seed: 1.0 %  
Other crop: 0.5 %  
Inert matter: 1.5 %  
Polymer coating: 50%  
Germination: 78 %

Tested: 4/2023  
Cost: \$4.65/lb





**Cale Bigelow, Ph.D.**  
**Purdue University**  
**Turf Science and Ecology**  
**@BIGTurfKnowHow**  
**cbigelow@purdue.edu**



# Treated versus Coated Seed?



SCOTTS® TURF BUILDER® GRASS SEED SUNNY MIX 2-0-0		GRASS SEED MIXTURE LOT NO. 21020081	
PURE SEED	VARIETY/KIND	GERMINATION	ORIGIN
12.41%	VISION PERENNIAL RYEGRASS*	80%	OR/WA
10.07%	SILVER DOLLAR PERENNIAL RYEGRASS*	80%	OR
9.59%	JUMP START KENTUCKY BLUEGRASS*	80%	OR
7.20%	COURTYARD KENTUCKY BLUEGRASS*	80%	WA
4.80%	ZIP KENTUCKY BLUEGRASS	80%	OR
3.85%	AVALANCHE KENTUCKY BLUEGRASS*	80%	WA
OTHER INGREDIENTS			
51.75%	INERT MATTER***		
0.32%	OTHER CROP SEED		
0.01%	WEED SEED		
***INERT MATTER CONTAINS 50% WATERSMART® PLUS FERTILIZER COATING			
NOXIOUS WEED SEEDS: NONE FOUND			
SCOTTS® TURF BUILDER® GRASS SEED SUNNY MIX 2-0-0		*PVP PROTECTED VARIETY - UNAUTHORIZED PROPAGATION PROHIBITED	
GUARANTEED ANALYSIS: F643		NITROGEN (N) 2%	

Various coatings containing materials to help the seed absorb water during germination, nutrients to help feed young seedlings and/or colorants to help visibility during seeding and have become increasingly popular with retail products.



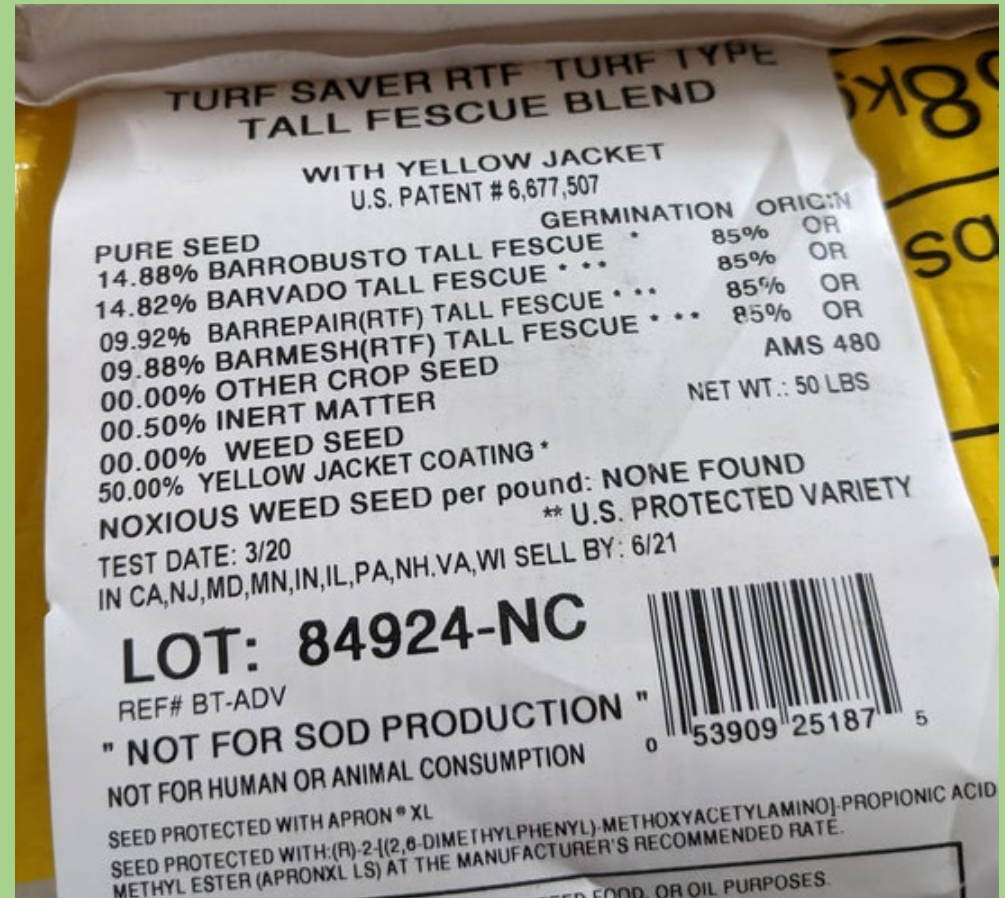
# A Practical “Pure Live Seed” Calculation:

- From the seed label for this “Houndogs” turf-type tall fescue blend to the right, we find that the amount of pure live seed (PLS) in the package is 42.2% and includes 50% coating.
- PLS is calculated by the sum of the percentage purity and germination for each of three cultivars. *Thus, in order to achieve a **6 pound per 1000 ft<sup>2</sup> target seeding rate** you need to apply **14.2 pounds of seed**. This is calculated by dividing 6 by the decimal fraction of 42.2% (e.g. 0.422):  $6/0.422=14.2$ .*

THE HOUNDOGS BRAND			
TALL FESCUE BLEND			
Purity	Variety/Kind	Germination	Origin
17.01%	Houndog 8 Tall Fescue	85%	OR
16.32%	Foxhound Tall Fescue	85%	OR
16.32%	Rhizing Star Tall Fescue	85%	OR
00.05%	Other Crop Seed		
00.30%	Inert Matter		
50.00%	Moisture Boost Plus Polymer Coating		
00.00%	Other Weeds		
Noxious Weed Seeds: None Found			
Tested: 01/2022    Sell By: 10/2022			
In AK, AZ, CA, CO, CT, DE, ID, IL, IN, MD, ME, MN, MT, NC, ND, NE, NH, NV, NJ, NY, OH, OR, PA, SC, SD, UT, VA, VT, WA, WI, WY, DC Sell By: 04/2023			
DLF PICKSEED PO BOX 229 HALSEY, OR 97348		Net Wt. 50 LB (22.7 KG) AMS 68 Lot No. L68-22-0527	

# A Practical “Pure Live Seed” Calculation:

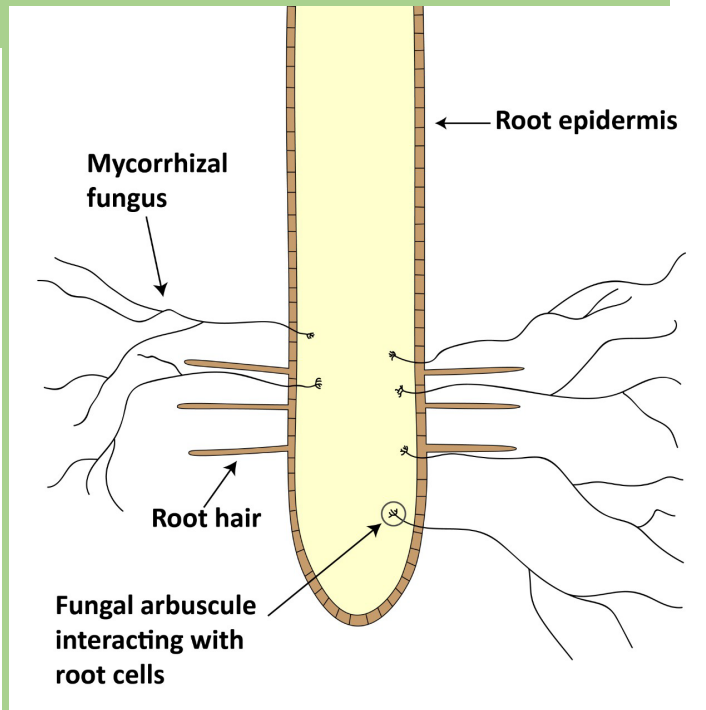
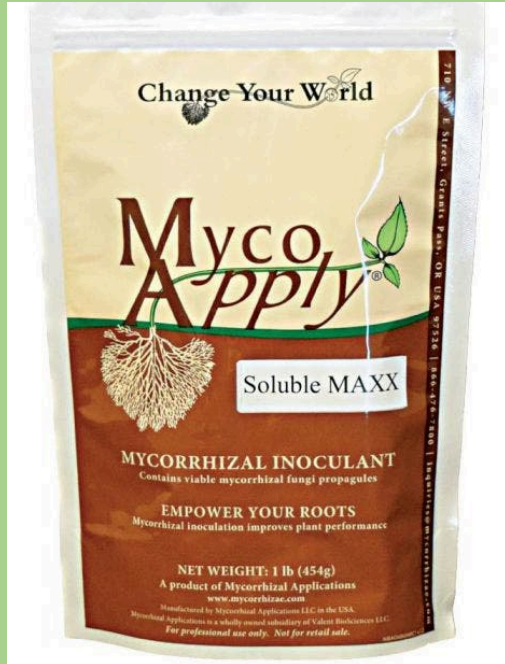
- From the seed label for this “Turf Saver RTF Blend” turf-type tall fescue blend to the right, we find:
  - The package includes 50% coating and 0.5% inert matter
  - The quantity of pure live seed (PLS) calculated as the sum of the percentage purity and germination for each cultivar equals 42.06%
- **Thus, in order to achieve a 8 pound per 1000 ft<sup>2</sup> target seeding rate you need to apply 19 pounds of actual seed “product”.**
  - **This was calculated by dividing 8 by the decimal fraction of PLS 42.06% (e.g. 0.4206):  $8/0.4206=19$ .**





# Seed Treatments

- Fungicides for “damping off”
- Additives: beneficial fungi, nutrients, etc.



Fungicide: mefenoxam for Pythium diseases

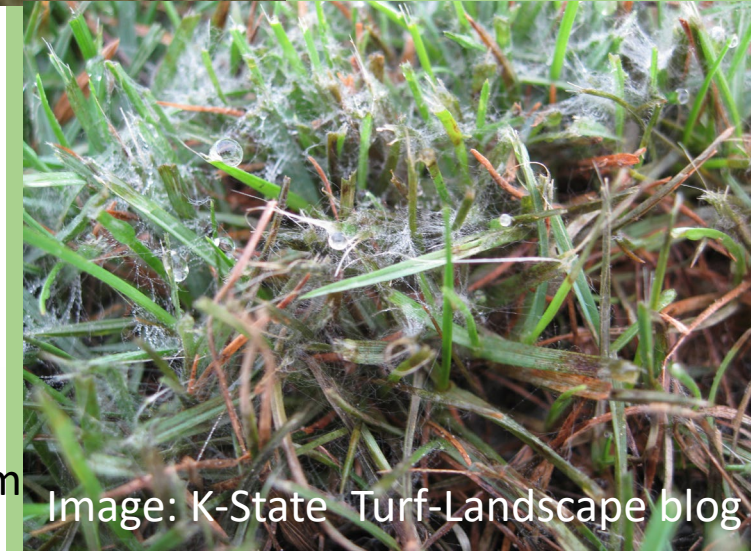


Image: K-State Turf-Landscape blog

**Mycorrhizae** can help plants increase their surface area of the root area and improve water and nutrient acquisition

**Seedling damping-off/rot** can occur at a wide range of temperatures (50° to 100°F) but are more common at temperatures above 70°F. Seed rot and damping-off are favored by excessive moisture