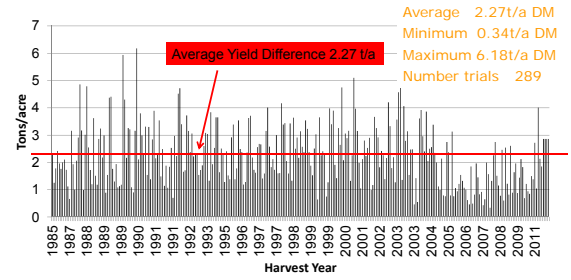


# MAPLESEED

## Establishment of Alfalfa

Dr. Dan Undersander  
University of Wisconsin

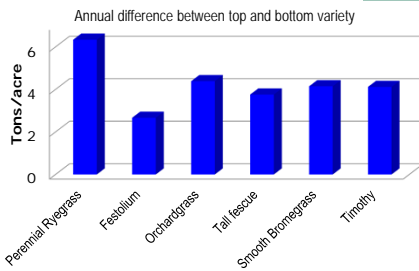
### Yield difference between top and bottom alfalfa entries in Wisconsin Alfalfa Trials, 1985 to 2011



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### Selecting Grass varieties - Yield difference among varieties in UW Trials



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### Topics to be covered

- Getting a good stand
- Assessing stand replacement

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### Causes of Seeding Failure

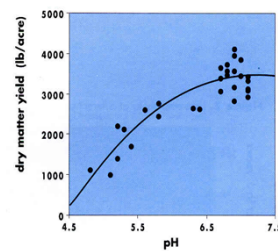
- Low soil pH
- Loose soil – poor seed soil contact
- Seeding too deep

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### Optimum soil pH for alfalfa is 6.8

Figure 2. First-cutting alfalfa yield relative to soil pH.



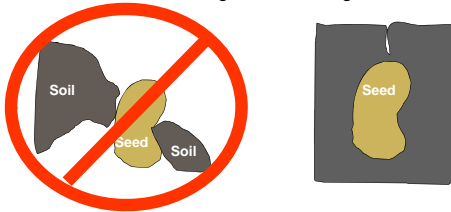
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## Cause of seeding failures

### Poor Seed-to-Soil Contact

Most forage seeds must absorb more than their own weight in water from the soil before germination begins.



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## Good seed soil contact



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## Firm Soil



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## Firm Soil



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## Poor packing



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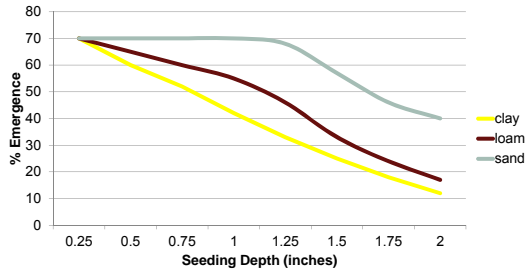
## Packing use corrugated roller



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## Effect of Seeding Depth on Alfalfa Emergence



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## Why incorporate some grass into dairy rations?

### Agronomic

- Improve yields of seeding year stands
- Faster drying
- Less risk of winterkill
- Manure management

### Nutrition

- Higher total fiber with grass/legume mixtures than alfalfa
- Higher proportion of digestible fiber than alfalfa or CS
- Possible good fit with high NFC, low fiber diets (i.e. high corn silage diets)?

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## Typical composition of high quality grass forages

Forage	CP	NDF	NDFD	NFC
	%			
Reed Canarygrass	20	55	68	12.5
Perennial Ryegrass	18	47	65	22.5
Tall Fescue	17	56	60	14.5
Annual Rye	20	55	60	12.5
Orchardgrass	16	60	55	11.5
Alfalfa	20	40	48	27.5
Corn Silage	9	41	68	37.5

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Rumen papillae with proper development.

Rumen papillae With acidosis – high grain with high fermentation

Rumen papillae NOT developed - too much bulk and low grain.



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## Lameness in Dairy Cattle



### Midwest United States:

Overall 20-25% of cows are mildly to seriously lame.

Causes: 58 % due to disease or trauma,  
42% due to nutrition (excessive grain/inadequate fiber)

Severity influenced by diet, stall design and bedding, stocking density, time in parlor holding area, etc.

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## Potential Milk Losses Due to Lameness

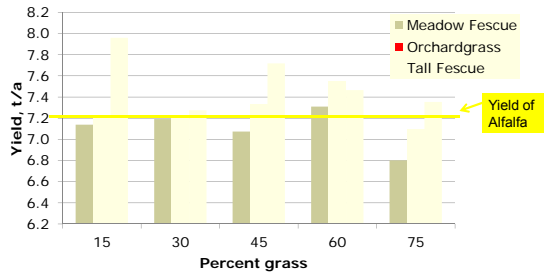
Locomotion Score	2 (Mild)	3 (Moderate)	4 (Severe)	5 (Severe)
DM intake reduction, lb	1	3	7	15
Milk Yield Loss, lb	0	5	15	30

Adapted from P. Robinson. UC-Davis Cooperative Extension

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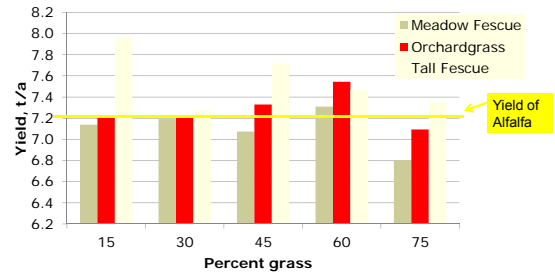
## Yield of alfalfa/grass mixtures



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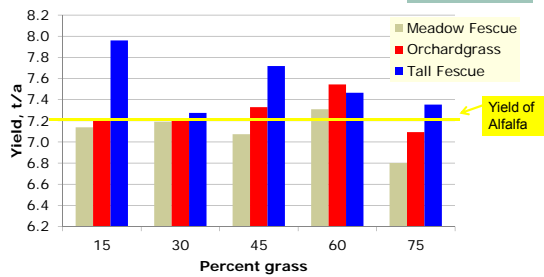
## Yield of alfalfa/grass mixtures



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## Yield of alfalfa/grass mixtures



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## Select Grass Varieties for

- Yield
- Winterhardiness
- Late maturing varieties
- Consistent yield throughout season ( $\beta$ )
- Rust resistance (orchardgrass, tall fescue, ryegrass, festolium)

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## Seeding Alfalfa Grass mixtures

- want 30 to 40% grass (as % of DM)

- Alfalfa - orchardgrass
  - 10 lbs/a alfalfa; 4 lb/a orchardgrass
  - 47 alfalfa  
18 orchardgrass  
65 seeds/sq ft
- Alfalfa - tall fescue
  - 10 lbs/a alfalfa; 6 lbs/a tall fescue
  - 47 alfalfa  
23 tall fescue  
70 seeds/sq ft
- Alfalfa - meadow fescue
  - 10 lbs/a alfalfa; 6 lbs/a meadow Fescue
  - 47 alfalfa  
27 meadow fescue  
74 seeds/sq ft

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## Poor stand Angular - Likely soil related



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## Poor stand Oval pattern – likely biological



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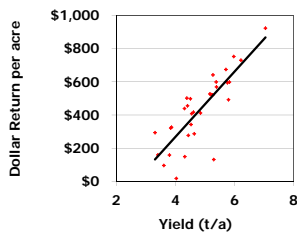
## Poor stand – seeding depth



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## Alfalfa Yield and Dollar Return from Wisconsin Green-Gold Program



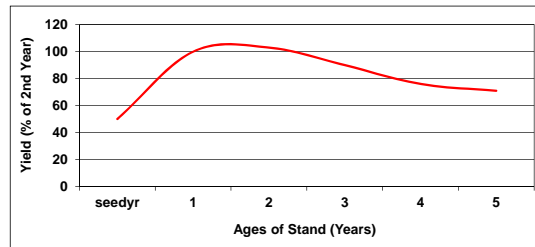
Profitability increases with yield because

- ✓ fixed inputs remain constant
- ✓ variable inputs increase only slightly

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## Yield of alfalfa as stand ages (% of first production year)



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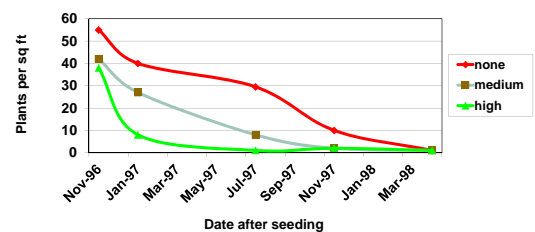
## Extending Stand Life

Interseeding to thicken stand has little effect on yield in the seeding year.

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## Overseeding to Thicken Stand Survival of Over Seeded Alfalfa



Source: Rachael Long, Univ of CA

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## Stand Assessment

- Weeds in an alfalfa field indicate low yielding stand
- Controlling weeds in established stand will not increase yield



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## Results of economic analysis

- Benefits of shorter rotations are great:
  - Increased alfalfa yield from younger stands
  - Increased corn silage yield following alfalfa
  - 10 to 15% higher corn yields following alfalfa
  - More legume credits
  - Less rootworm insecticide needed following alfalfa

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## Alfalfa Legume Credits

Stand Density	Med, Fine Soils		Sandy Soils	
	-----Regrowth after last cutting-----			
	>8 inches	<8 inches	>8 inches	<8 inches
Good, > 4 plt/ft <sup>2</sup>	190	150	140	100
Fair, 1.5 to 4 plt/ft <sup>2</sup>	160	120	110	70
Poor, < 1.5 plt/ft <sup>2</sup>	130	90	80	40

-----lb nitrogen/acre-----

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## Winterkilled alfalfa plants



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## Getting a Good Stand



- Control weeds for the first 60 days.

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## Winter Injury



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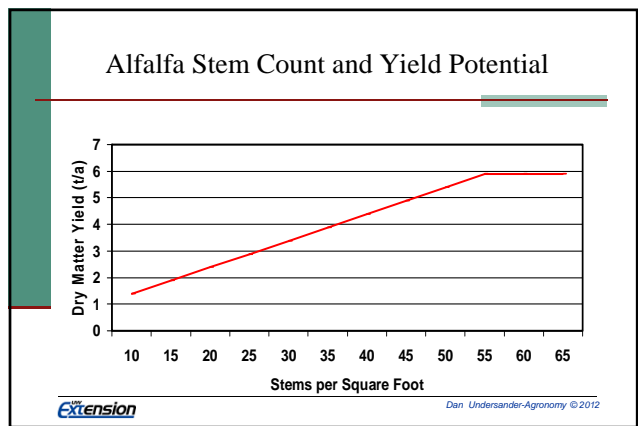
STAND AGE	PLANTS/SQ FOOT
SEEDING YEAR	20 OR MORE
FIRST YEAR	12 OR MORE
SECOND YEAR	8 OR MORE
THIRD YEAR	5 OR MORE

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STAND AGE	PLANTS/SQ FOOT
SEEDING YEAR	20 OR MORE
FIRST YEAR	12 OR MORE
SECOND YEAR	8 OR MORE
THIRD YEAR	5 OR MORE

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- ### Plant density
- Plant density is not a good indicator of yield
    - Stands should have at least 6 plants/ft<sup>2</sup>
  - Stems are a good indicator of yield potential
    - Stands should have at least 40 stems/ft<sup>2</sup>
- Extension* Dan Undersander-Agronomy © 2012

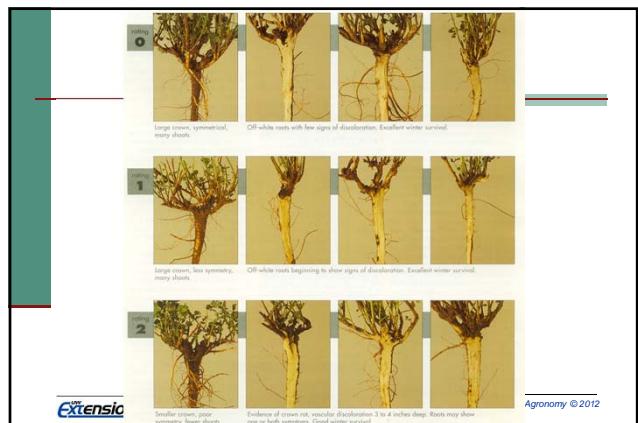


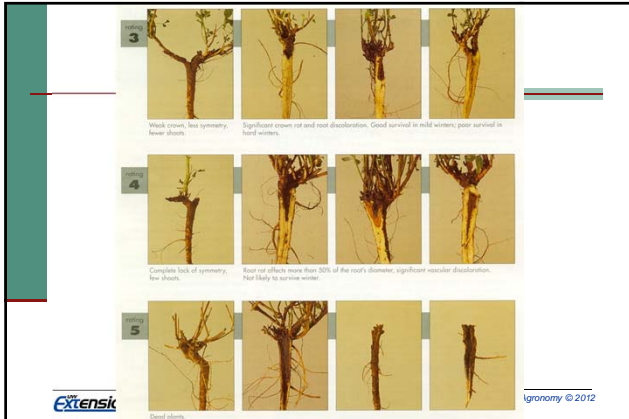
### Stand Evaluation –

Use Photos and chart to rate and categorize plants

Stand Density (Stems/ft <sup>2</sup> )	Action	Predicted Yield Potential (Assuming no winterkill)
>55	Stem density not limiting yield	Same as current year
40 to 55	Some yield reduction	If good health, same as current year If >30% in category 4, significantly less
<39	Consider replacing stand	If good health, same as current year If >30% in category 4, significantly less

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## Stand Evaluation –

Use Photos and chart to rate and categorize plants

Rating	Condition	Winter Survival
0	Healthy	Excellent
1	Some Discoloration	Excellent
2	Moderate Discoloration/Rot	Good
3	Significant Discoloration/Rot	Good for mild winter Poor for hard winter
4	Greater than 50% Discoloration	Poor
5	Dead	-----

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## Crown rating 0 – no damage

- Large crown
- Crown has any shoots
- Crown appears symmetrical when viewed from top
  - Shoots coming out all sides

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## Root rating 0 – no damage

Internal root off-white with few signs of discoloration

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## Crown rating 1 – little damage

- Large crown
- crown has fewer shoots
- Crown less symmetry than previous

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## Root rating 1 – little damage

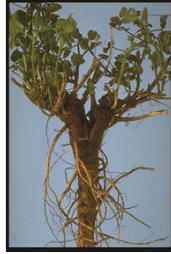
Off-white roots beginning to show signs of discoloration

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## Crown rating 2 – some damage

- Smaller crown with moderate shoot number
- Poor symmetry circular, often split



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## Root rating 2 – some damage



Evidence of crown rot or vascular discoloration 3 to 4 inches deep

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## Crown rating 3 – moderate damage

- Crown few shoots
- Crown is weak
- Crown not oval when viewed from above, less symmetry



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## Root rating 3 – moderate damage



Significant crown rot and root discoloration

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## Crown rating 4 – severe damage

- Complete lack of symmetry
- Few shoots



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## Root rating 4 – severe damage



Root rot affects more than 50% of root diameter, significant vascular discoloration

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## Crown rating 5 – Dead plants

- Dead plants



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## Root rating 5 – Dead plants

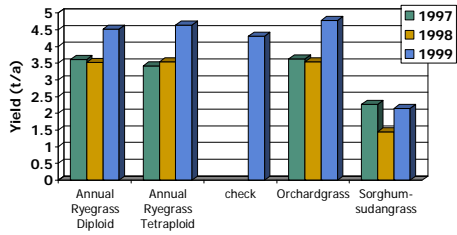


Dead or dying plants

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## Interseeding into thin alfalfa stands



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