

# Improving soil fertility to drive grassland production



Dr Norman Weatherup

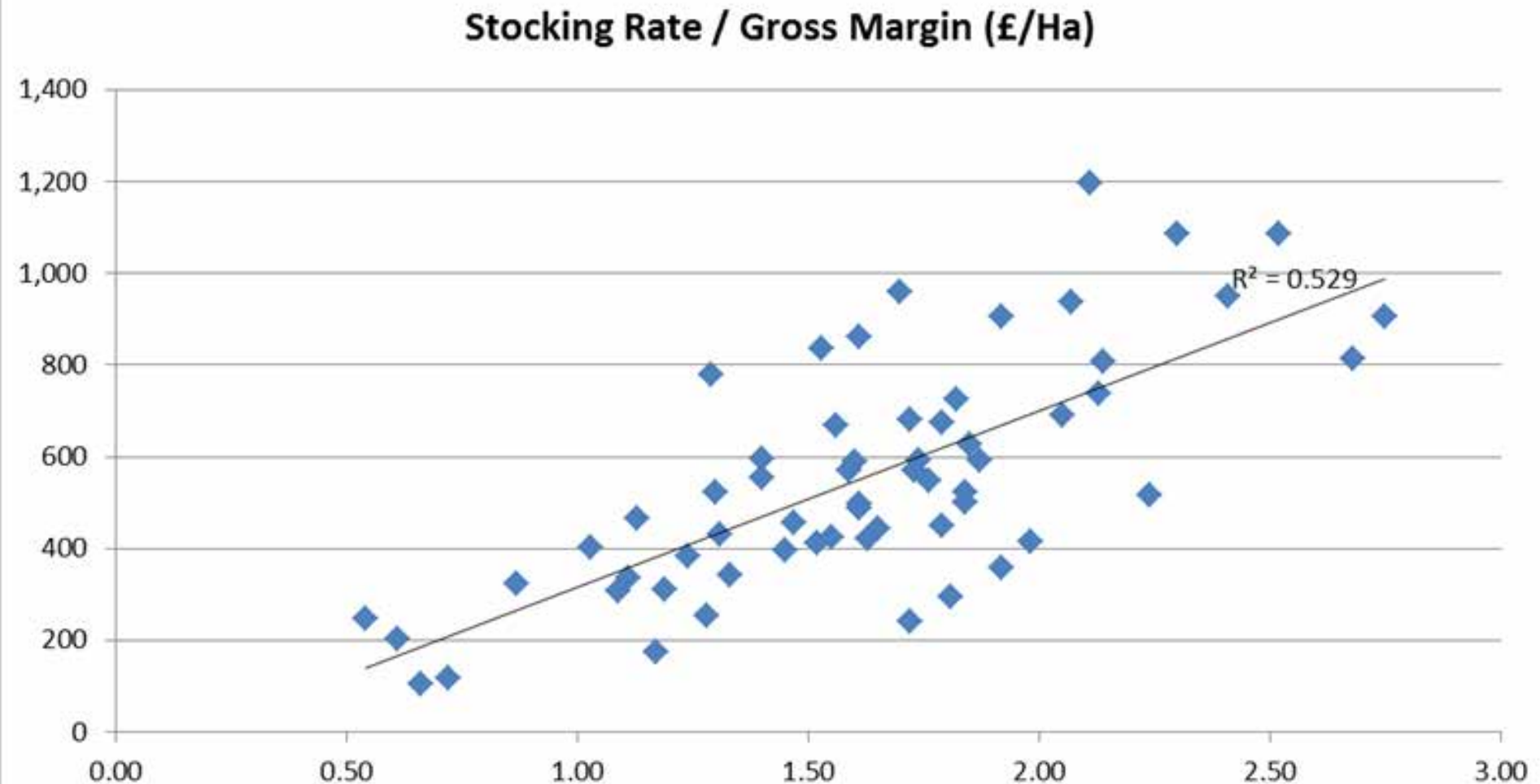
**Improving soil**

**Soil fertility**

**Drive grassland production**

**Why should we care?**

# Close correlation between stocking rate (grass growth) and Gross Margin/ha



**IMPROVING SOIL**



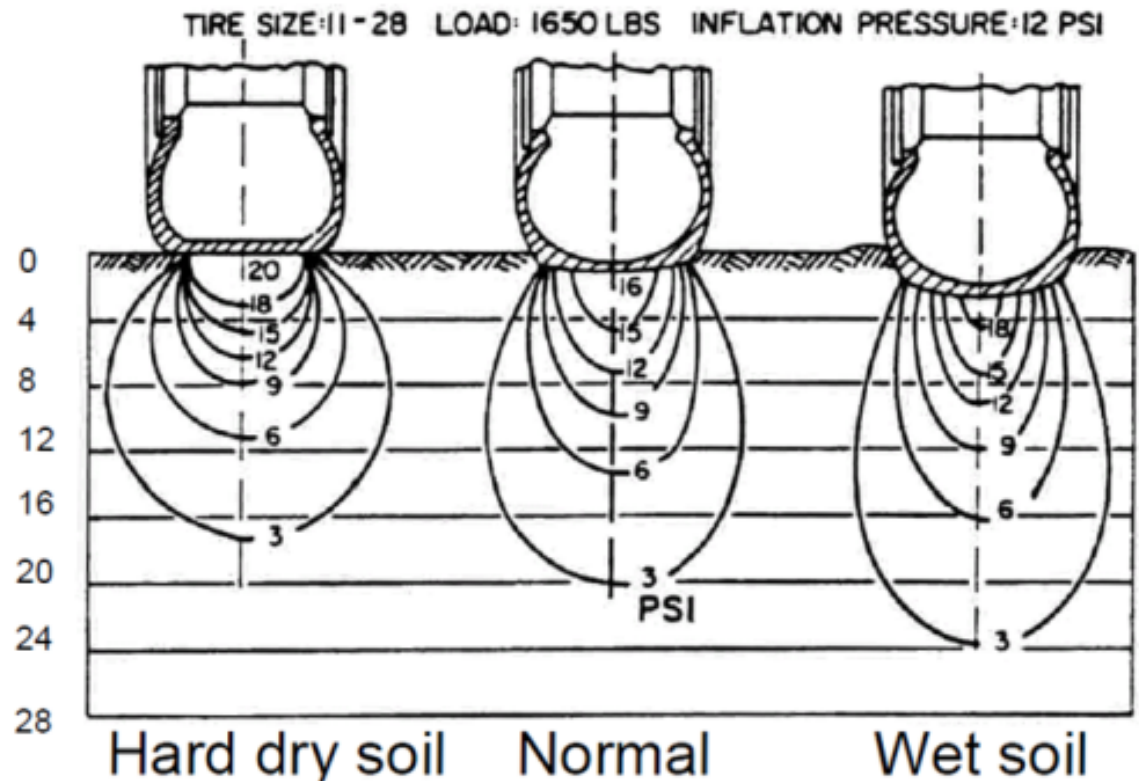
# Soil Compaction



# Compaction by Farm Machinery

- Reduce total axle weight
- Maximise tyre width and diameter
- Reduce tyre pressure
- Control traffic

Keep  
machinery  
out of wet  
fields



# Improving soils

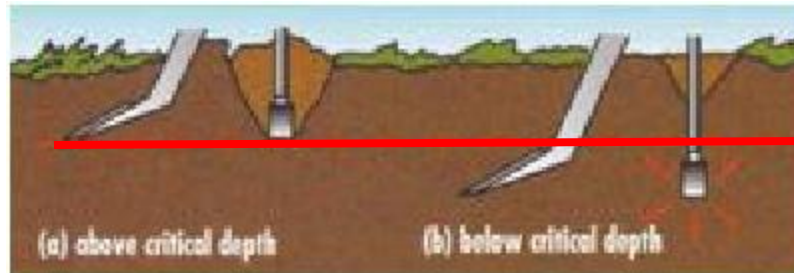
- Dig a few test holes!
- Look in likely spots, gateways etc
- Identify the cause of any problems





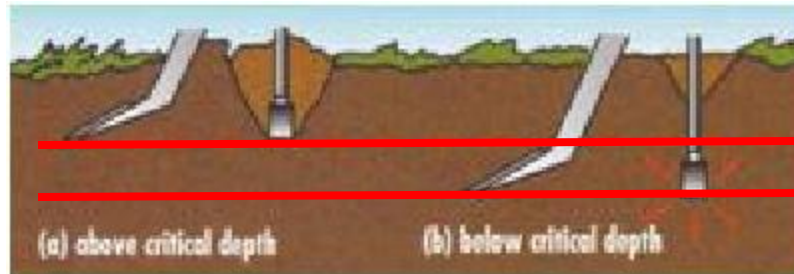
# Alleviating soil compaction

- Better done in autumn
- Soil must be dry
- Critical depth



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- Critical depth



- Soil is very prone to re-compaction

# *Lumbricus terrestris* AKA "Dave"





A person wearing blue jeans and brown shoes is using a metal soil probe to test the ground in a grassy field. The probe is a long, thin metal rod with a small circular base at the bottom. The person is standing on the grass, and the probe is inserted into the soil. The grass is green and appears to be a mix of different types. The background is a vast, open field of grass under a clear sky.

**SOIL FERTILITY**

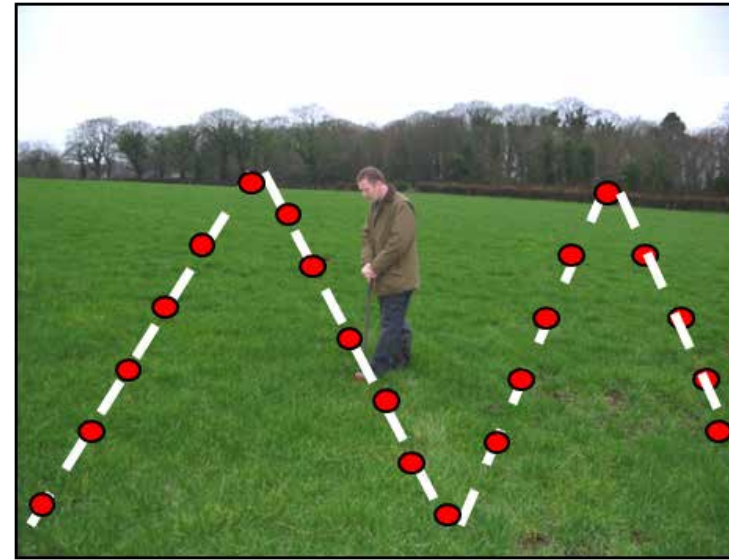


# Soil sample results from NI

- 31% of samples below index 2 for P
- 44% of samples below index 2- for K
- 64% of samples below 6.0 for pH
- Only 18% are optimum
- **So 82% (4/5) ARE NOT!!**

# Sample soils this winter

- Sample every 4 years
- W pattern – avoid gates
- Best time October – February
- Do not sample within 3 months of applying nutrients
- Cost - £10/sample (4ha)
- **Act on the results!!**



# Lime



- Improves soil structure
- Encourages micro-organisms in soil which help to release nitrogen from organic matter
- Increases availability of soil nutrients
- Improves fertiliser efficiency (up to 2X)

# Soil P and K Indexes: what do they mean?

Increasing Soil P or K



Soil Index		What the Index means
0	Deficient	<b>Production will be limited.</b> Requires slurry/manure and/or P or K fertiliser.
1	Low	
2	Optimum	Continue with usual slurry & fertiliser policy.
3	High	
4 +	Excessive	<b>No yield response to P or K.</b> Redistribute slurry to more suitable fields. Use a zero- P fertiliser.

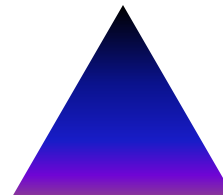


# Nutrient Management Planning

## Getting the balance right!



Nutrients In



Nutrients  
Out

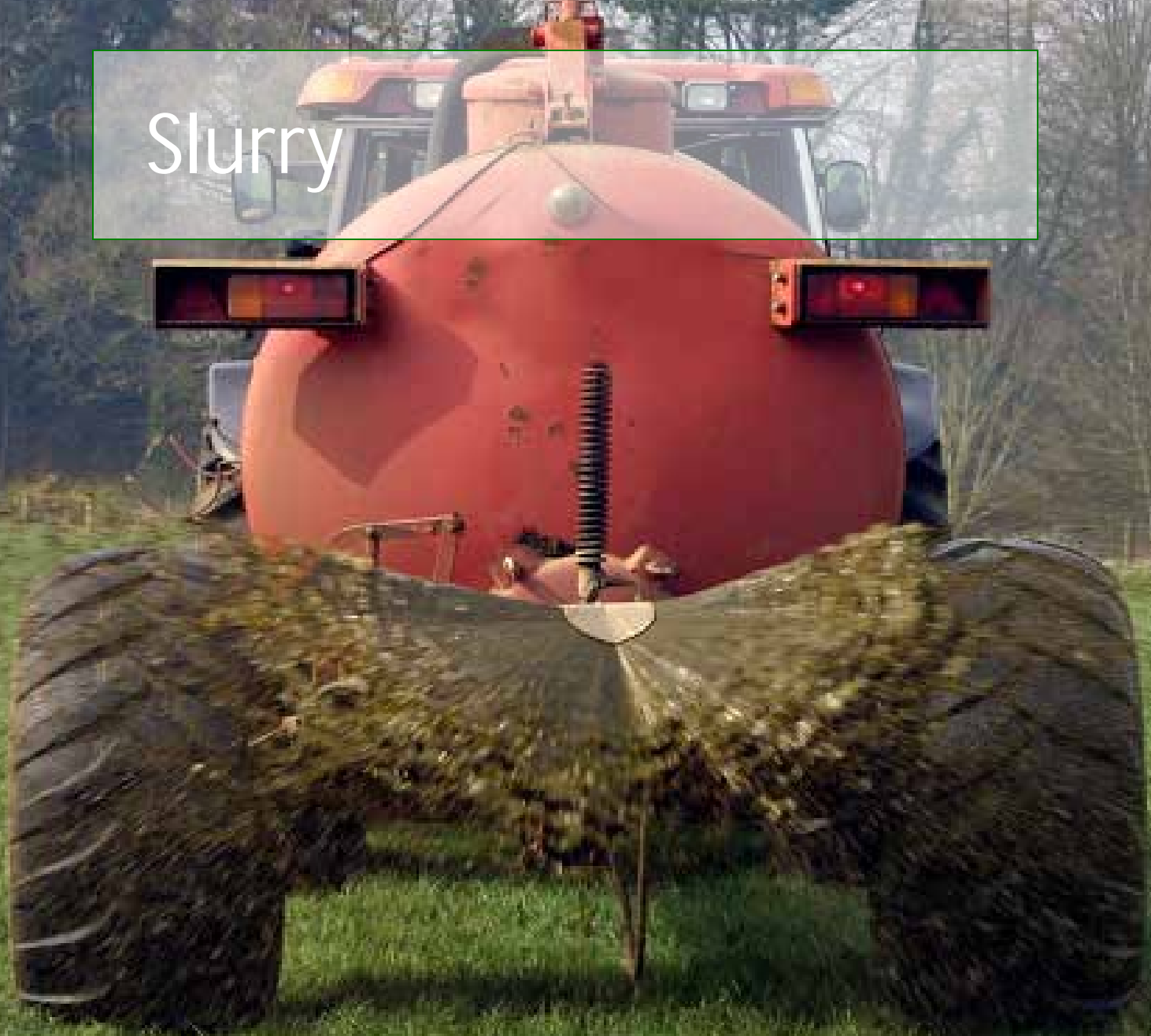
# Crop recommendations

[www.defra.gov.uk](http://www.defra.gov.uk)

## Fertiliser Manual (RB209)



Slurry



# Factors affecting slurry value

- Dry matter





4.5% dry  
matter

9.5% dry  
matter



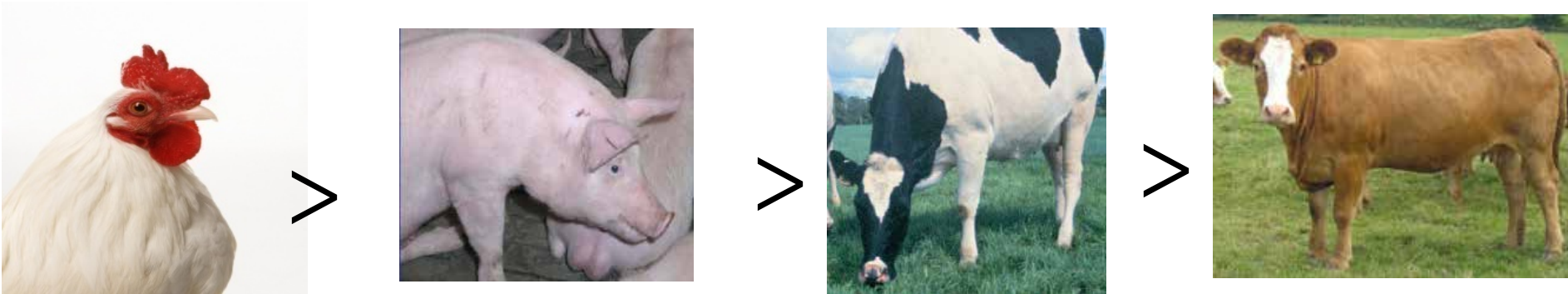
7.5% dry  
matter



Thicker slurry has a higher nutrient content

# Factors affecting slurry value

- Dry matter
- Species and feeding type



# Factors affecting slurry value

- Method of application
- Timing of application
- Weather factors





# Fertiliser Nutrients





# Crop Nutrient Recommendation Calculator ([www.daera-ni.gov.uk](http://www.daera-ni.gov.uk))

## Farm nutrient calculators

There are five farm nutrient calculators which will help you with the Nitrates Action Programme (NAP) measures on nutrient limits, manure storage requirements and record keeping.



### Nitrogen loading calculator

Check if you are below the 170kg N/ha/year limit or if operating under a derogation the 250kg N/ha/year limit



### N Max for grassland calculator

Check that nitrogen applications to the whole grassland area on the farm do not exceed the NAP limits



### Crop nutrient calculator

Helps you to comply with nutrient limit requirements and draw up a nutrient management plan (NMP) for your farm



### Phosphorus balance calculator

Calculate the P balance for your farm and help manage P inputs and outputs to meet the limit



### Manure storage calculator

Calculate the weekly slurry, dirty water, manure production and current storage capacity for your farm

**DRIVE GRASSLAND PRODUCTION**

# Potential increases

- Native grasses to rye grass - yield **+50%**
- Native grasses to rye grass - energy **+20%**
- Set stocking to rotational (UDM) **+56%**
- Set stocking to paddocks (UDM) **+92%**

# Potential increases

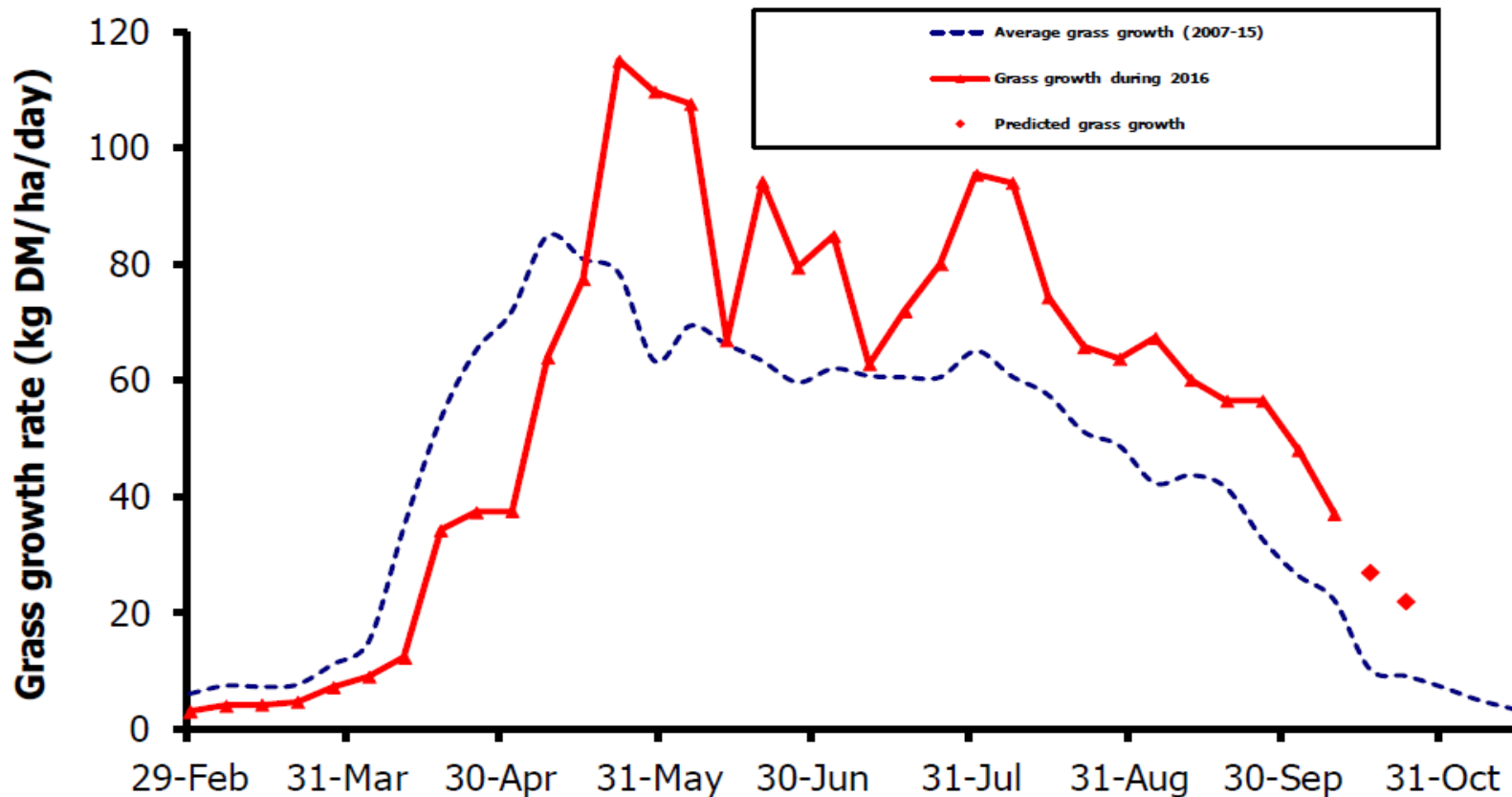
**Priority 1 – set up paddocks**

**Priority 2 – improve sward quality**

# Variable growth 2016!

## GrassCheck

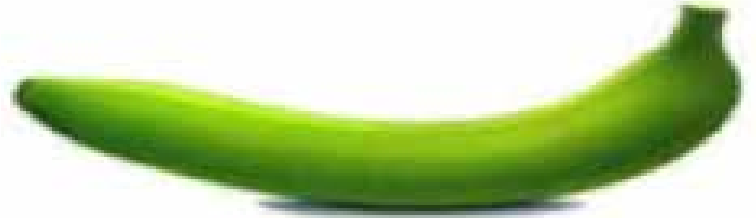
Week beginning 10 October





# Grass is a perishable food item!

1 leaf



3 living leaves



3 living leaves,  
some dead ones



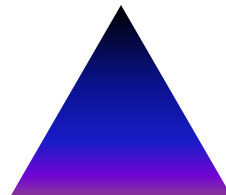
# Grass Budgeting

## Getting the balance right!



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Supply



Demand

# Grass covers



**1300 kg DM/ha**

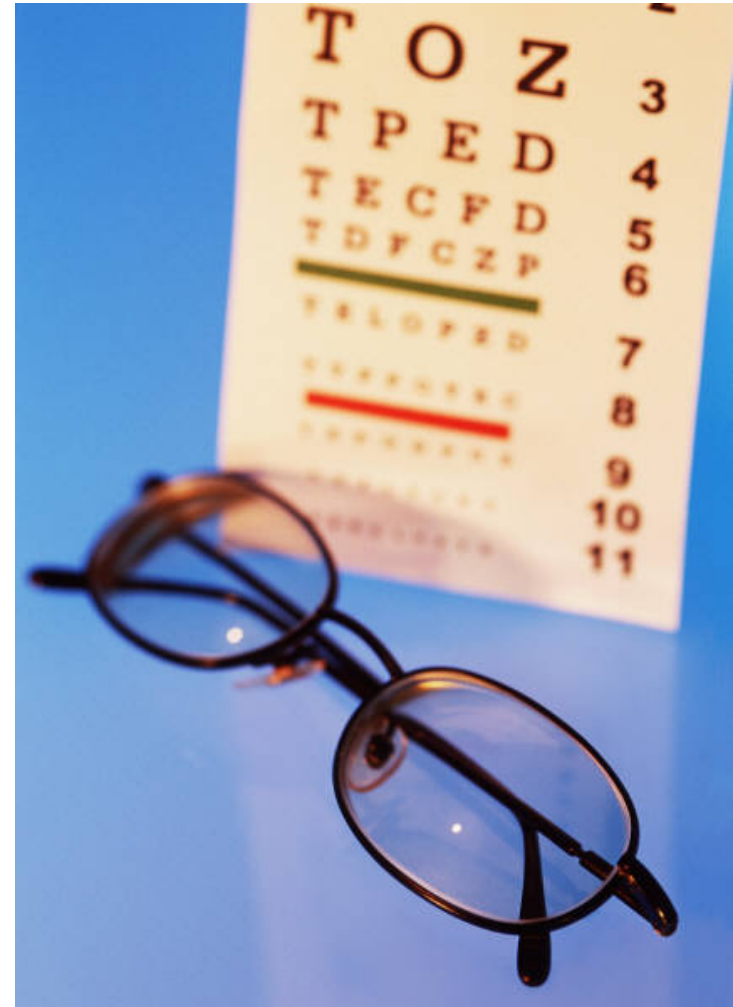


**3000 kg DM/ha**



**4000 kg DM/ha**

# Measuring grass





# Wellie boot



# Rising plate meter

- Plate is supported by height and density of grass
- Readings averaged out over a paddock

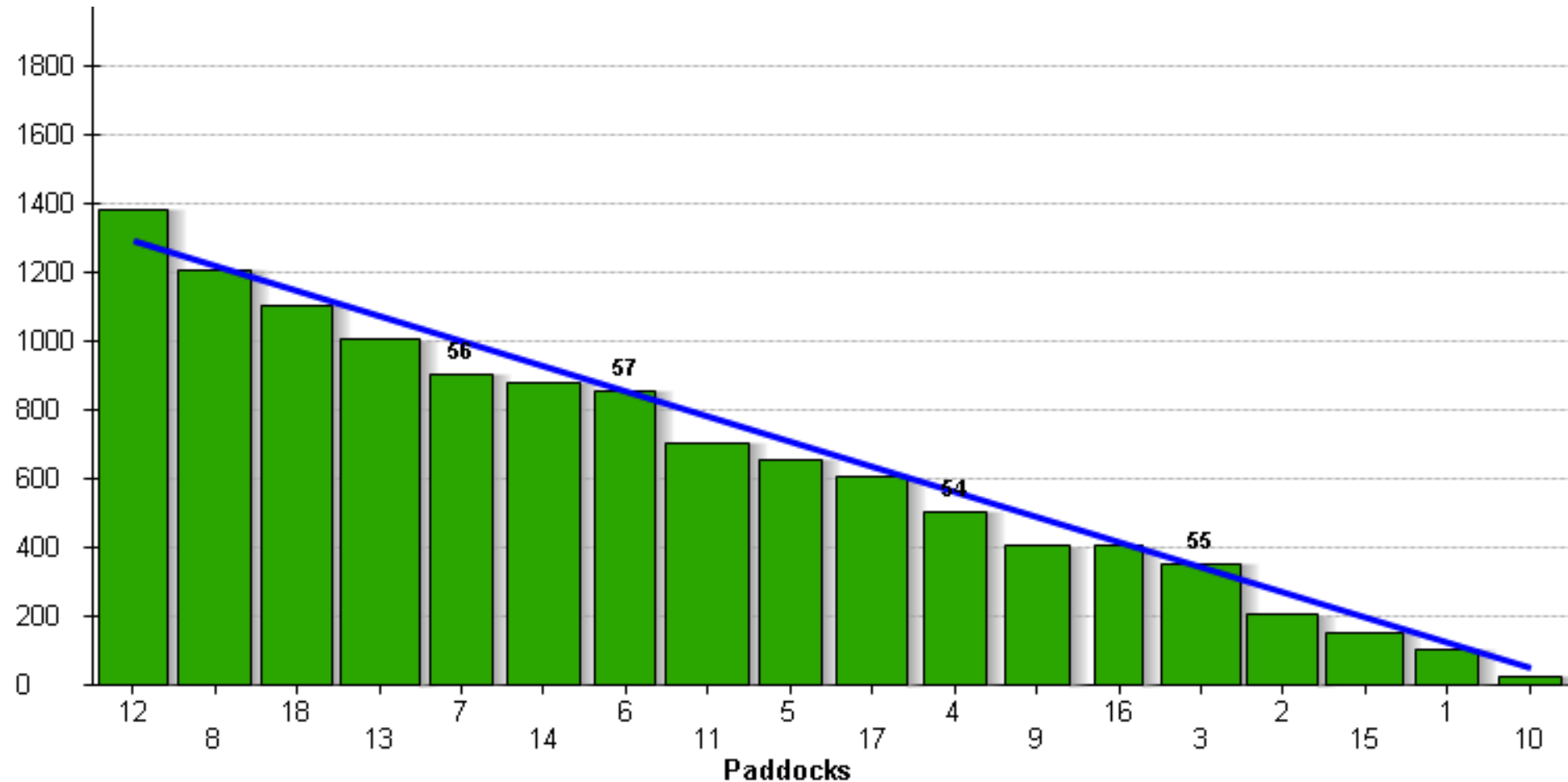


# Computer systems to budget grass?



# Perfect Grass Wedge

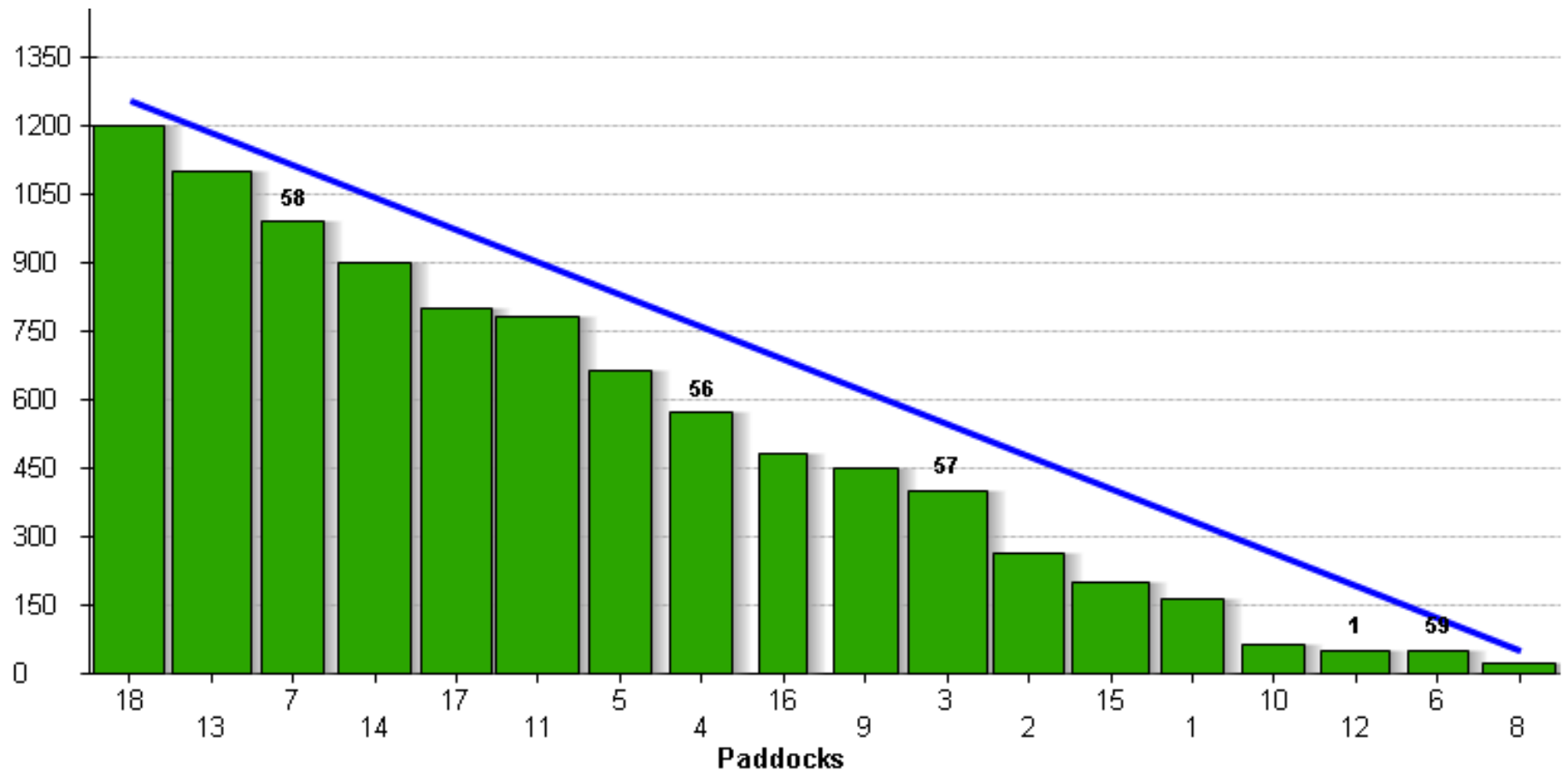
- Growth matching demand
- Covers close to the target line





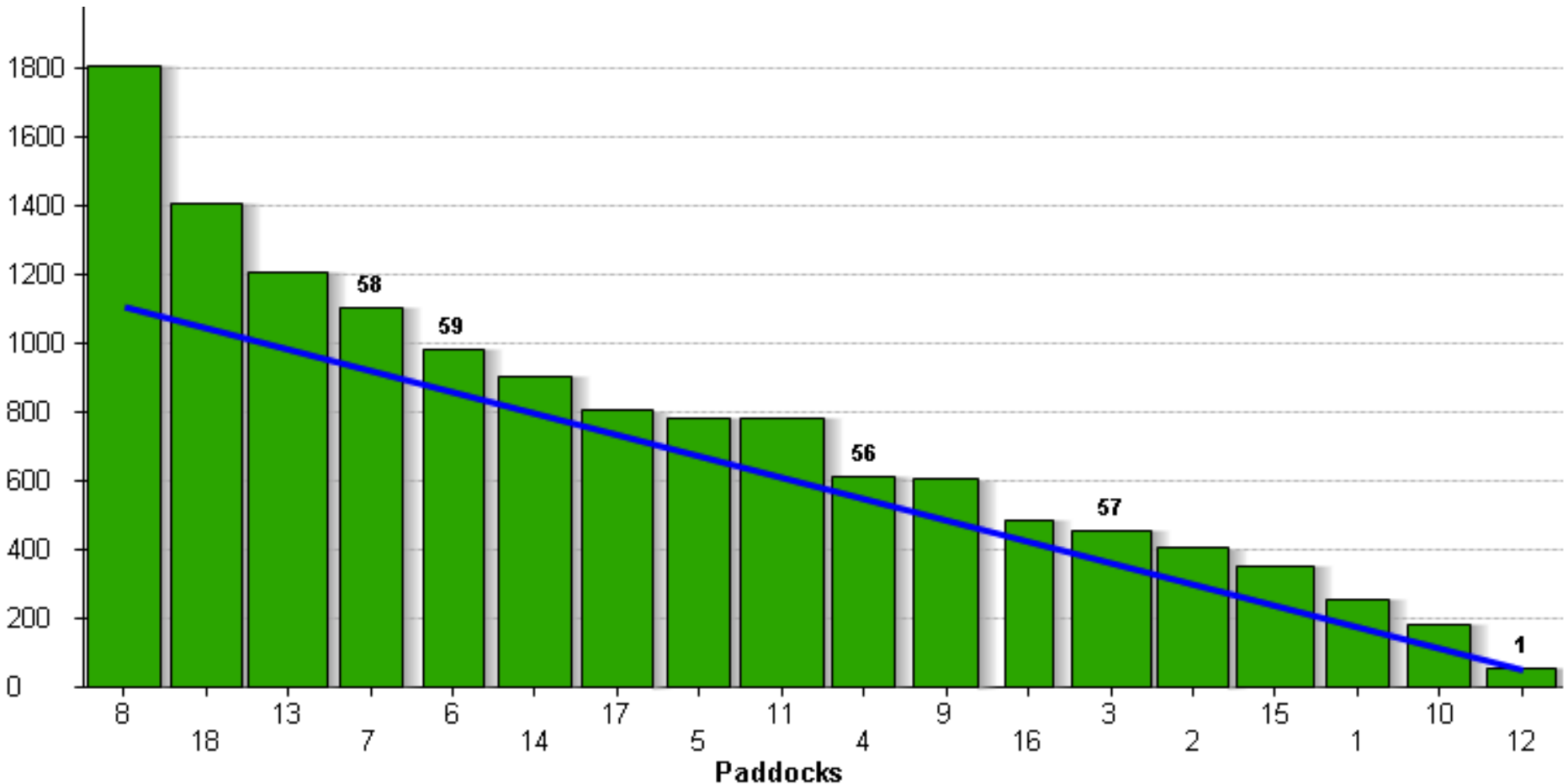
# Grass Wedge in Deficit

- Growth well below demand
- All covers under the demand line
- Action needed!



# Grass Wedge in Surplus

- Growth well above demand
- All covers above the demand line
- Action needed!



# Realising the potential

- Dig some holes



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- Dig some holes
- Take soil samples





# Realising the potential

- Dig some holes
- Take soil samples
- Spread lime



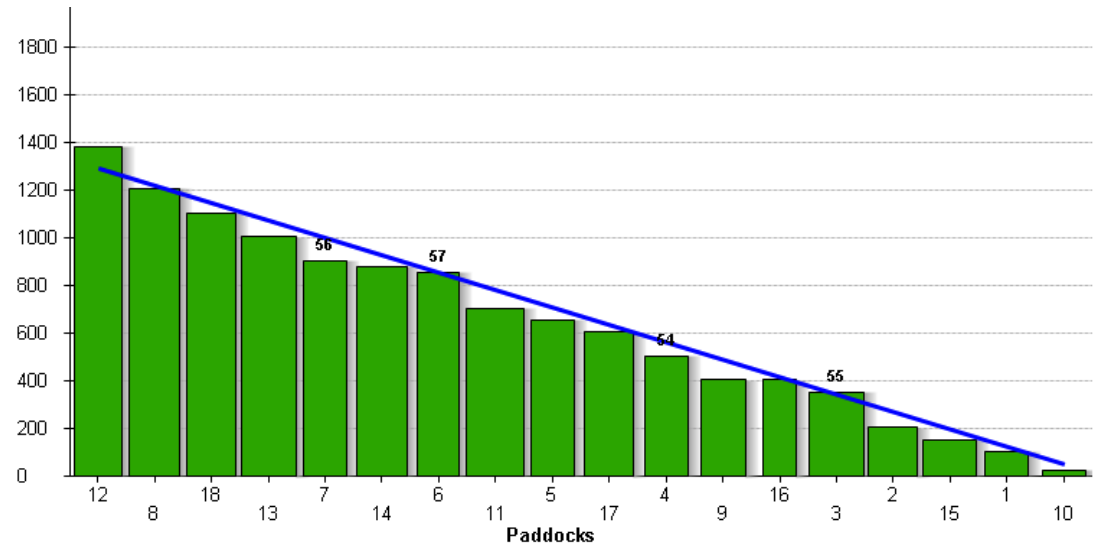
# Realising the potential

- Dig some holes
- Take soil samples
- Spread lime
- Manage nutrients



# Realising the potential

- Dig some holes
- Take soil samples
- Spread lime
- Manage nutrients
- Maintain a wedge





The royal mint makes it first.  
It's up to you to make it last!

