The Signpost Series

‘Pointing the way to a low emissions agriculture’

Protected Urea

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Sources of N?

- Biological fixation from legumes
- Manure – mineral and organic N
- Fertilisers
- Atmospheric deposition






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Nutrients including N fertiliser: Where are the signs pointing over the next decade?

European Commission

The **Farm to Fork Strategy** is at the heart of the **European Green Deal**

States the EU Commission's intention to:

"act to reduce nutrient losses by at least 50%"

Signals "will reduce the use of fertilisers by at least a 20% by 2030"

Why?

Because, as outlined, nutrients not absorbed by plants are a

" major source of **air**, **soil** and **water pollution** and of **climate impacts**"

and

"It (fertiliser) has **reduced biodiversity** in rivers, lakes, wetlands and seas"

Source: EU Commission, 2020, Communication – A Farm to Fork Strategy for a fair, healthy and environmentally friendly food system

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Why Protected Urea Now?

We need to show progress towards reduced emissions
Protected urea is the largest single tool on the table

- Yield – grows top yields ☑
- Cost – costs less than CAN ☑
- Greenhouse Gas – reduces emissions ☑
- Ammonia – holds onto N to grow grass ☑
- We get credit for reduced emissions ☑

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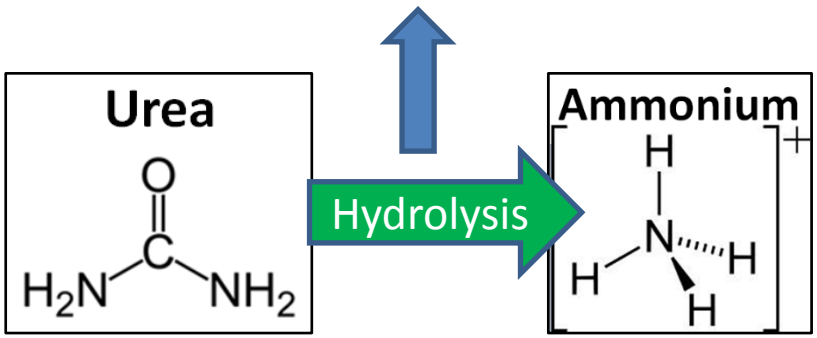
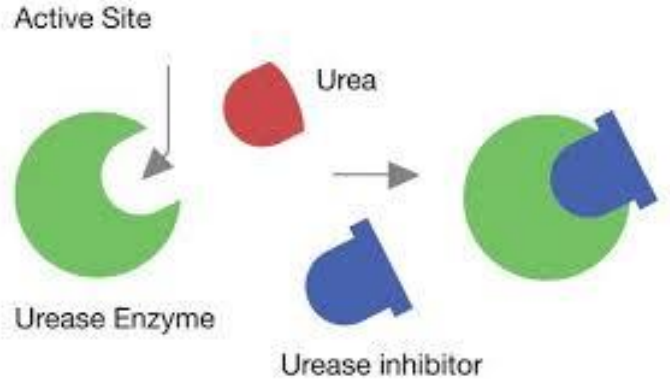
What is protected N/urea?

- Urea N fertiliser made safe from ammonia gas loss with a <u>urease inhibitor</u> on surface or in melt

Ammonia
NH_3





Schematic of the mode of action of
A urease inhibitor Credit: BASF

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Urease inhibitors

- Three urease inhibitors are registered under the EU fertiliser regulations
  - NBPT (from: Koch & others)
  - NBPT+NPPT (from: BASF)
  - 2-NPT (from: SKW)
- Department of Ag. will be carrying out surveillance to check that regulatory levels are met at the point of sale

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There ar s from 6 fertil c List

Company	Product Name	Inhibitor Type & Name	N %	P %	K %	S %	
Grassland Fertilisers (Kilkenny) IFI	IFI Topper N-Sure	NBPT + NPPT (LIMUS)	46	-	-	-	
	IFI Super Topper N-Sure	NBPT + NPPT (LIMUS)	38	-	-	7	1
	IFI Topper Boost N-Sure	NBPT + NPPT (LIMUS)	29	-	14	3.8	
Grassland Agro	Eco Urea	NBPT + NPPT (LIMUS)	46	-	-	-	
	Eco N 38	NBPT + NPPT (LIMUS)	38	-	-	7.6	2
	Eco 29-0-14 +S	NBPT + NPPT (LIMUS)	29	-	14	2	
	Alzon Neo-N	2-NPT + MPA	46	-	-	-	
	Alzon Neo-N + S	2-NPT + MPA	40	-	-	6	3
Goulding Fertiliser	Sustain / KaN	NBPT (Agrotain)	46	-	-	-	
	Sustain / KaN	NBPT (Agrotain)	38	-	-	7	4
	Sustain / KaN	NBPT (Agrotain)	29	-	14	3.5	
NitroFert	Nitro Guard	NBPT + NPPT (LIMUS)	46	-	-	-	
	Nitro Guard	NBPT + NPPT (LIMUS)	38	-	-	7	5
	Nitro Guard	NBPT + NPPT (LIMUS)	30	-	15	2	
Target Fertilisers	UreaMax	NBPT + NPPT (LIMUS)	46	-	-	-	
	UreaMax + S	NBPT + NPPT (LIMUS)	38	-	-	7	6
	29-0-14+4% S Max	NBPT + NPPT (LIMUS)	29	-	14	4	
Yara	Yara Vera AMIPLUS	NBPT (AMIPLUS)	46	-	-	-	

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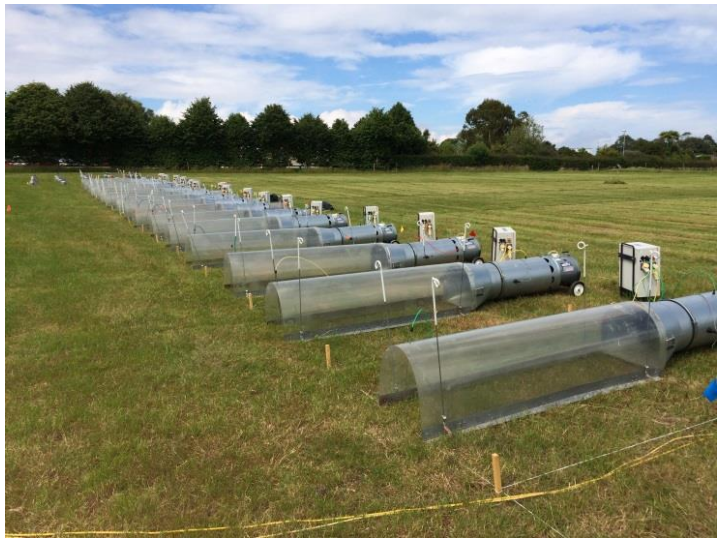
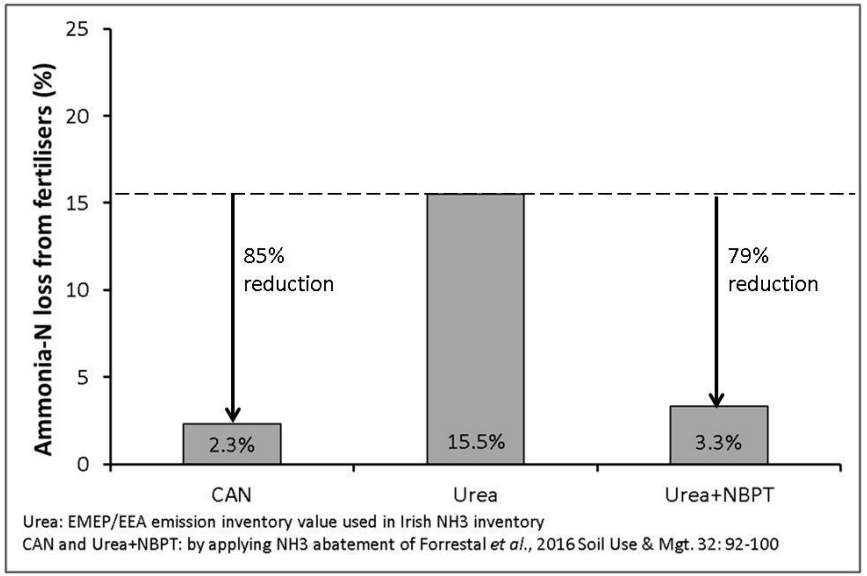
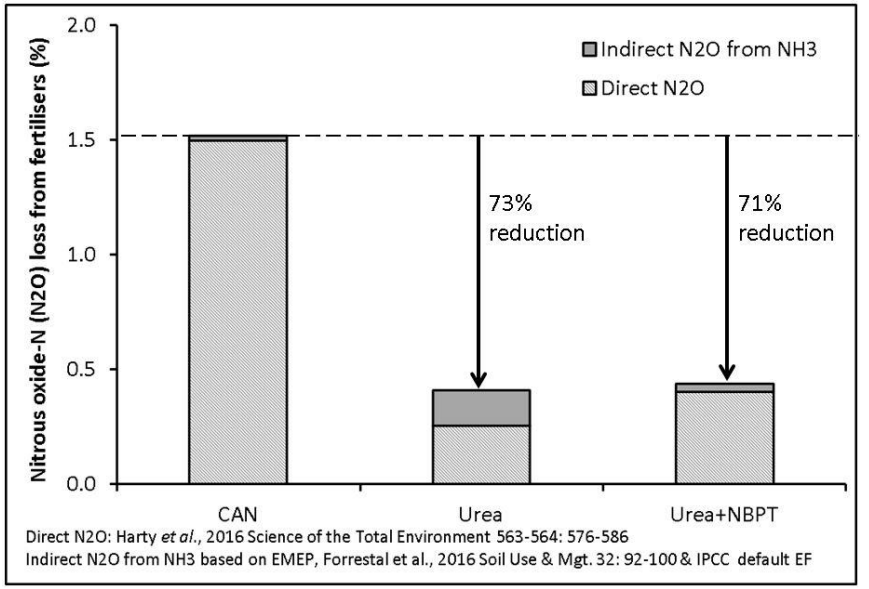
Teagasc urea + NBPT Research - Gases



Ammonia



Nitrous oxide



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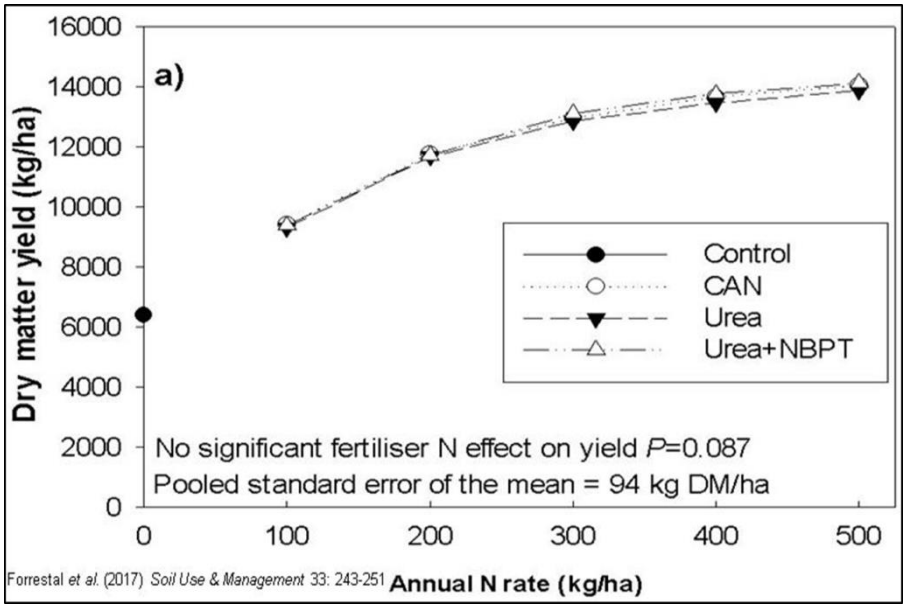
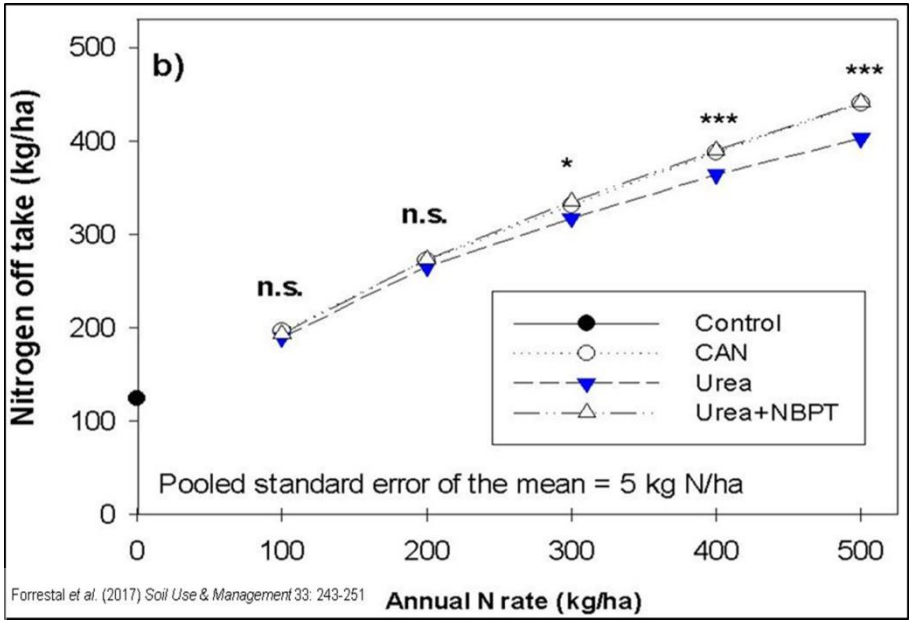
Teagasc urea + NBPT Research – Grass Production

Yield



N recovery



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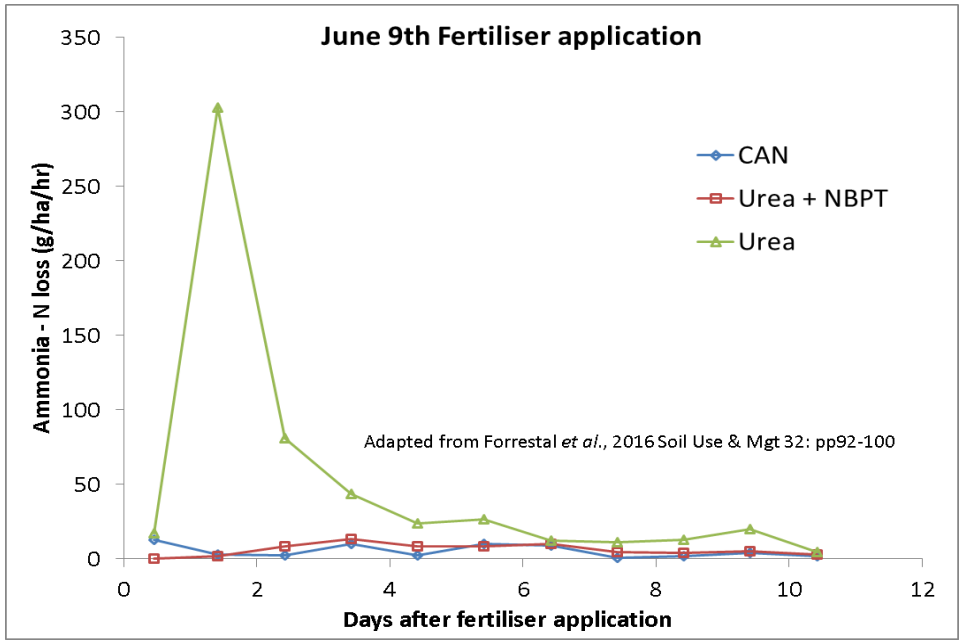
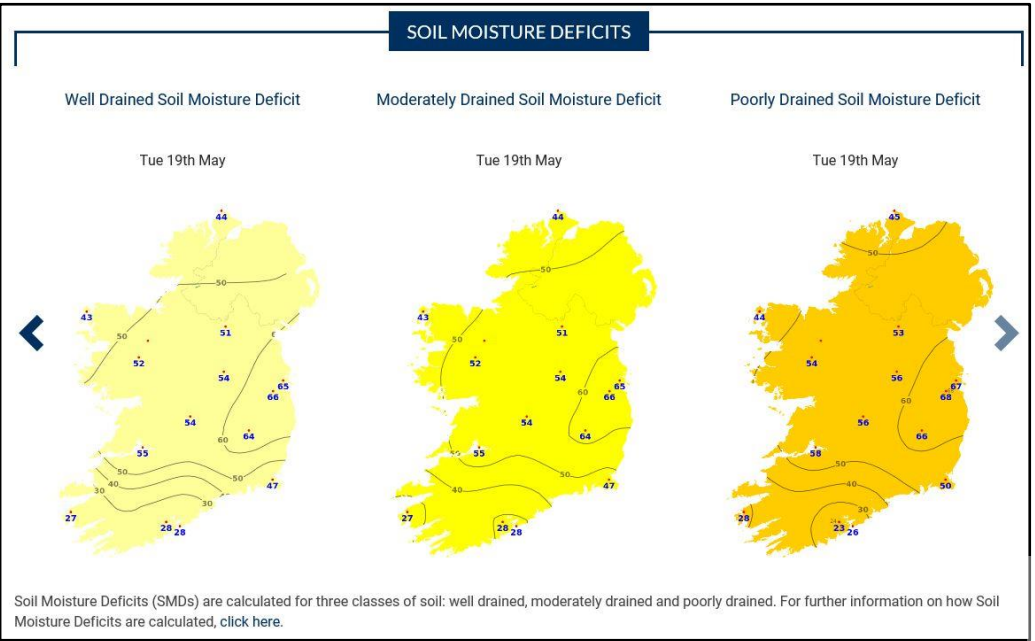
Protection from Ammonia loss in dry summer weather



Will a urease inhibitor protect urea from loss in dry summer conditions?

Yes, this is what it is what protected urea products are designed to do



What happens to N response with High and climbing Soil Moisture Deficit?

Nitrogen is not a substitute for water (think 2018) growth response to protected urea and other N forms will be disappointing until Deficits decline, adding more N won't change this

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Will protected urea cost more?

Work it out per kg/unit of N not per tonne

- E.g. Protected urea @ 385/t ÷ 460kgN/t = €0.84/kg N
- E.g. CAN @ 240/t ÷ 270kgN/t = €0.89/kg N

Fertiliser		CAN	Protected urea
Big bag	(kg)	500	375
Nitrogen	(%)	27	46
Big bag	(kg N)	135	172.5
At 30 kg N/ha covers	(ha)	4.5	5.7
At 24 units/ac covers	(ac)	11.1	14.1

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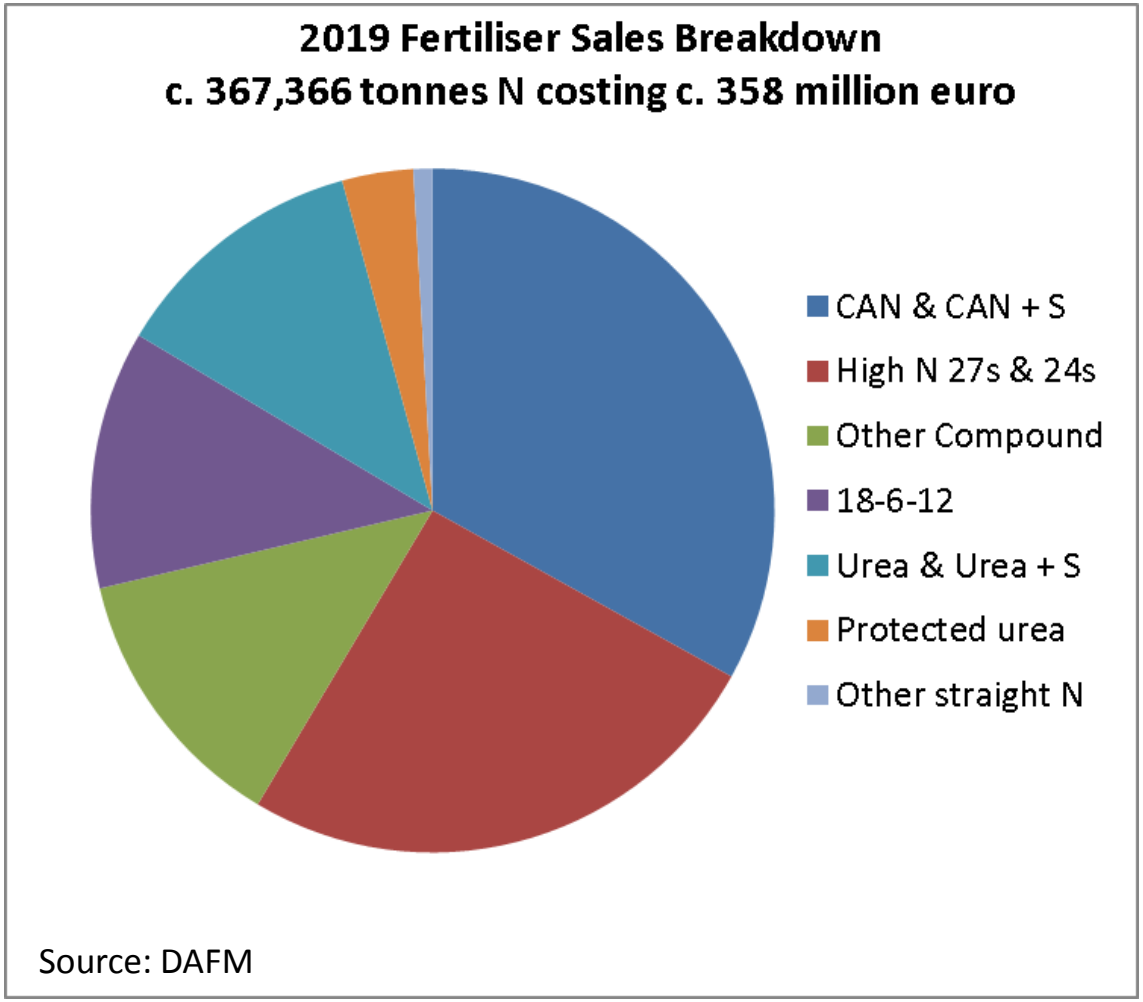
If the Greenhouse Gas and Ammonia abatement from fertiliser identified by Teagasc is to be availed of substantial change in fertiliser selection will be need.



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Nutrient advice ?

One soil does not fit all!

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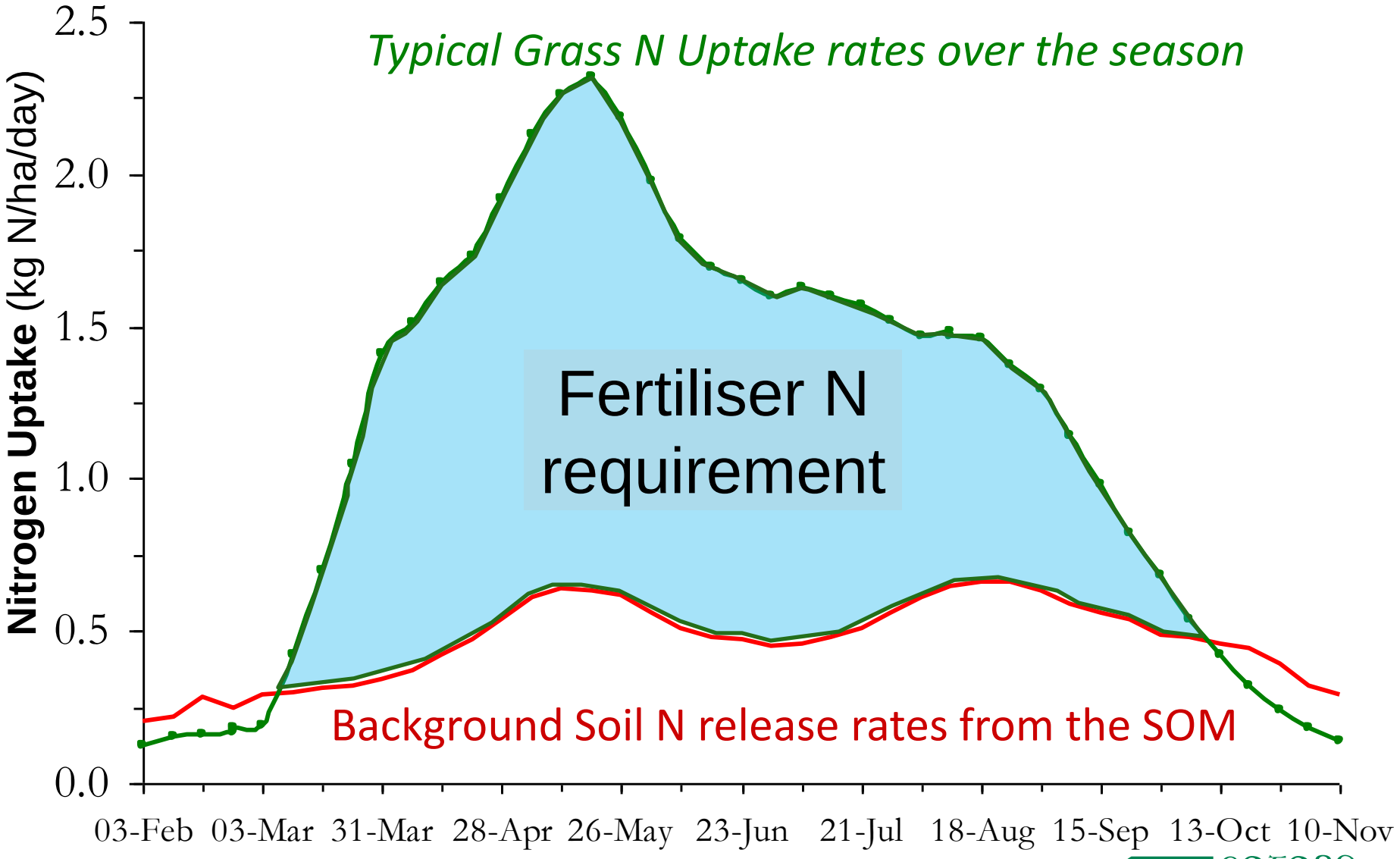
Fertiliser N Requirement by Grass Swards



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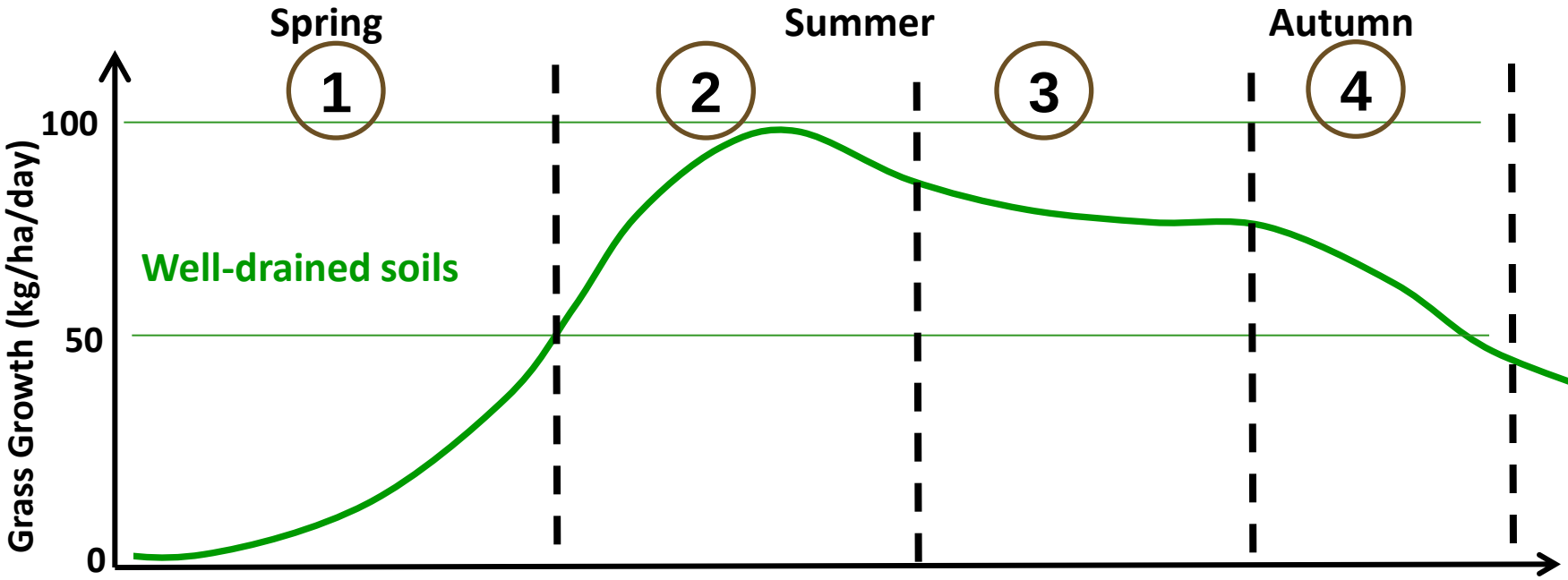
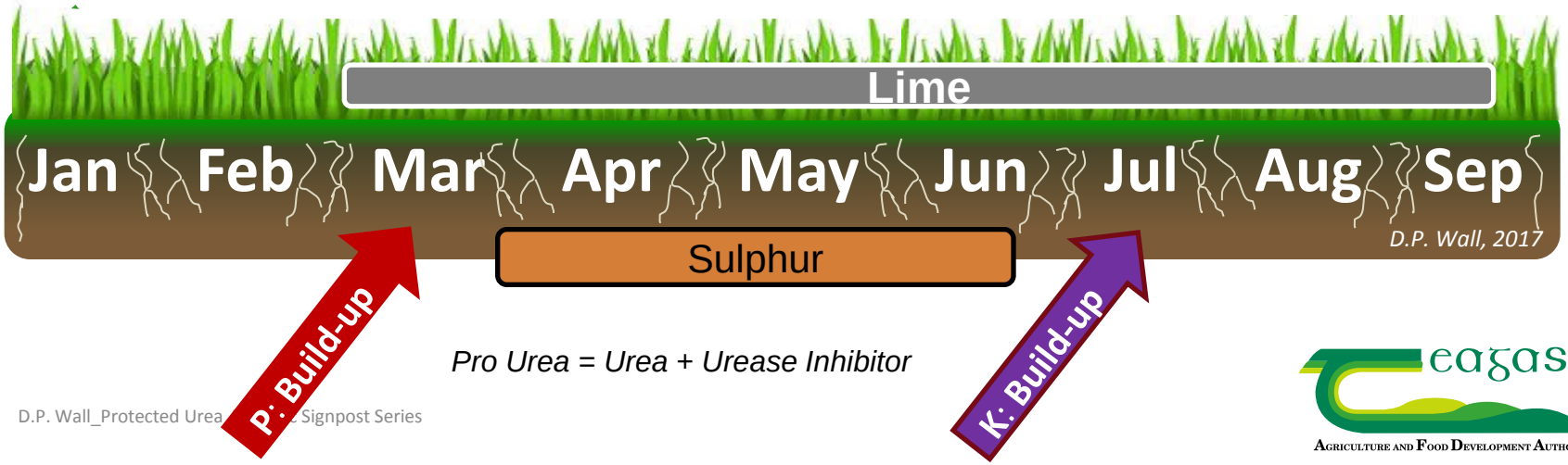
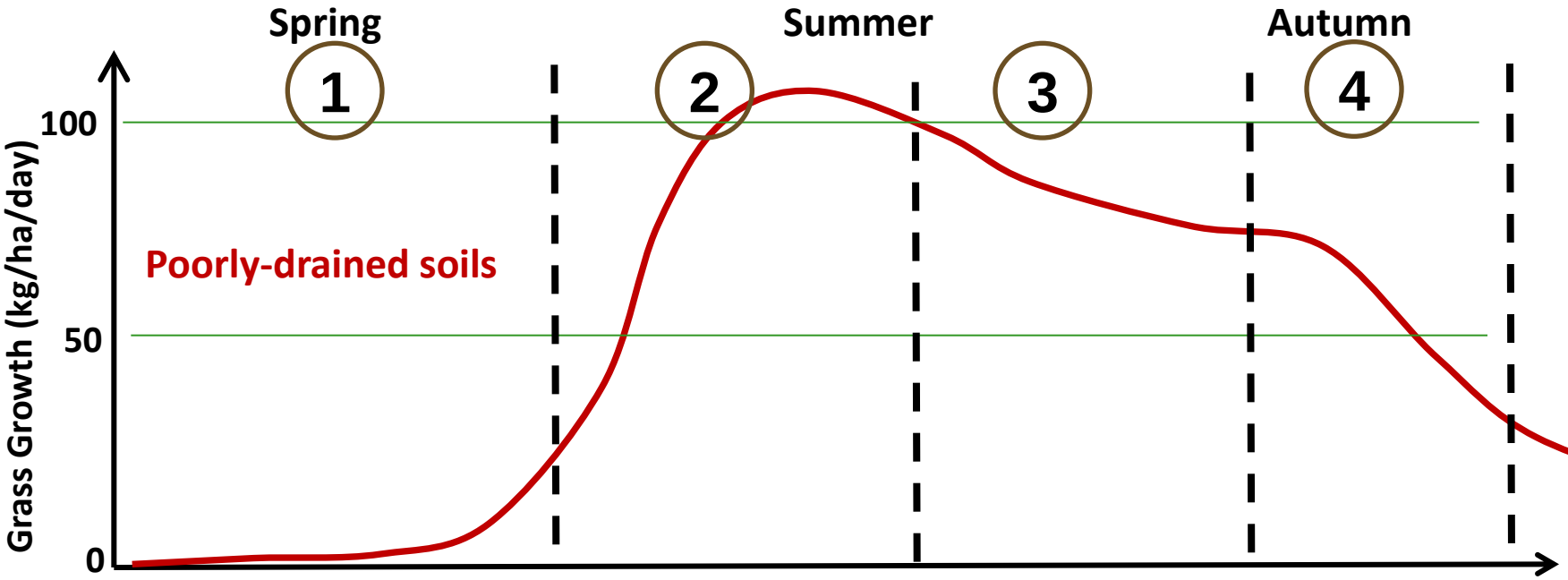
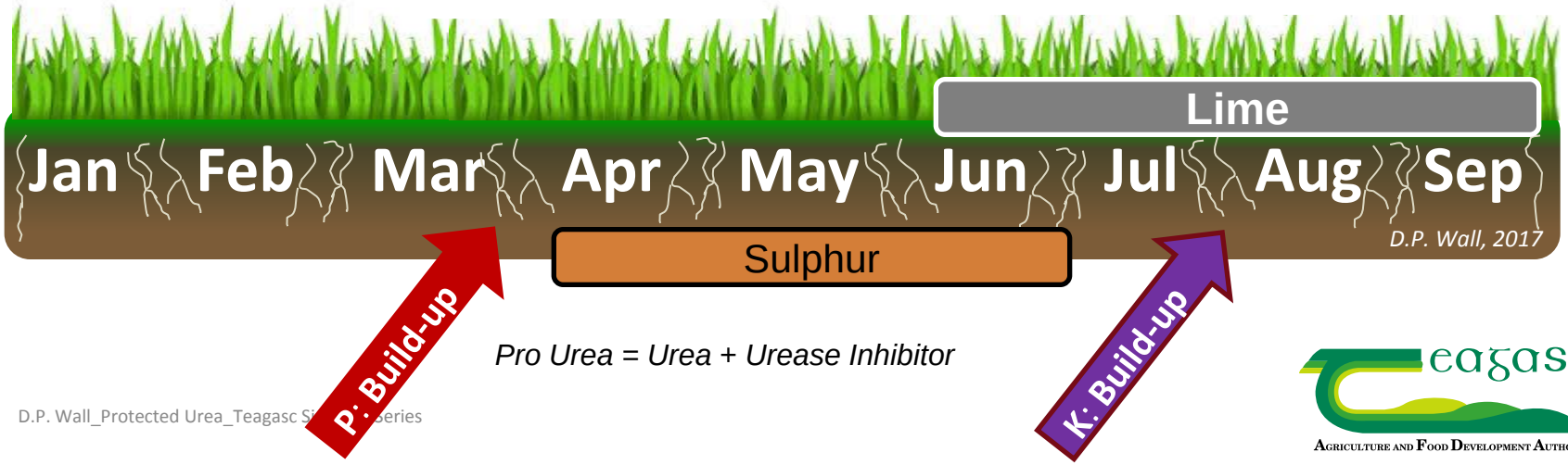




Pro Urea = Urea + Urease Inhibitor





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Protected Urea - Grazing Fertiliser Programmes

Example fertiliser programmes integrating protected urea during the growing season for dairy and drystock farms at different stocking rates and soil test levels

Dairy

Table 1. Recommended rates of N, P & K (kg/ha) & fertiliser products (kg/ha).
Farm stocked at 210kg Org N/ha or **2.5LU/ha**. Soil P & K levels assumed to be **index 1**

Advice		Feb	March	April	May	June / July	Sept	Total kg/ha
Product (kg/ha)		55 kg/ha Pro-Urea	310 kg/ha 18-6-12+S	125 kg/ha Pro-Urea	310 kg/ha 18-6-12	60 kg/ha Pro-Urea	55 kg/ha Pro-Urea	
N	**250**	25	56	58	56	28	25	**248**
P	**39**		19		19			**38**
K	**95**		37		37			**72**
S	**15**		9		9			**18**
Cost €/ha		***21***	***115***	***48***	***115***	***23***	***21***	***€343ha***

Pro-Urea = Urea 46% + NBPT / 2-NBPT, Cost/tonne = €380/t, Pro-Urea+S (40% N & 6% S)= €380t/, 18-6-12+ 3% S = €370,
To convert units/ac to kg/ha multiply by 1.25. Apply 125kg/ha of MOP 50% once every 4 years.

Further information available on the Teagasc Website
https://www.teagasc.ie/crops/soil--soil-fertility/protected-urea/

Note: Complete a farm fertiliser plan to determine max. N &P allowances as per Nitrates Legislation

Summary: why Protected Urea Now?

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