

Why feed phosphorus?

Mick Sullivan DAF Rockhampton









Outline

- Why cattle need P
- Identifying a P deficiency
- Correcting a P deficiency





Why Phosphorous (P)?

Cattle need phosphorus

Essential for the chemistry of life, Building bones, producing milk, Achieving high feed intake and efficient feed utilisation

P deficiency is often the most important nutritional constraint for cattle in northern Australia which we can economically fix











Phosphorus deficiency

Reduced appetite - intake of grass decreased by 10–30%



- Chewing bones and other objects increased risk of BOTULISM
- Bone deformities e.g. peg leg or abnormal walking
- Bone breakages when handling e.g. necks and hips in crush



Phosphorus deficiency





Reduced appetite and grass intake

Growing animals

• Reduced growth rates

Cows

- Lower heifer weights at mating
- Lower body condition
- Reduced conception & weaning rates
- Increased mortality
- Lower cull cow weights



Identifying a P deficiency

Observations and experience

- Symptoms in the cattle
- Cattle behaviour
- Cattle performance in different paddocks
- Ask the locals

Understand land types

- Varying fertility
- Different management options

Test the animals

 Blood plasma inorganic phosphorus (PIP)

Soil and pasture testing

- Cattle are very selective when grazing
- Soil and pastures vary across a landscape
- Very hard to choose sampling sites



Knowing your land types is important

Management

Vegetation - Woody

- Pasture

Soil

- Fertility
- Depth
 - Structure



FORAGE reports on the Long Paddock website

https://www.longpaddock.qld.gov.au/forage/

Val Outer Description Water With the Automation Description Description Description April 2014. Due to reduced bolt extention data supply, how will be a boot have description of produced Description description. We are closely methodening the effection of the produced Description description. We are closely methodening the effection of the produced Description. We are closely methodening the effection of the produced Description. We are closely methodening the effection of the produced Description. We are closely methodening the effection of the produced Description. We are closely methodening the effection of the produced Description. We are closely methodening the effection of the produced Description. We are closely methodening the effection of the produced Description. We are closely methodening the effection of the produced Description. We are closely methodening the effection of the produced Description. We are closely methodening the effection of the produced Description. The produced Description. Regional climate information class frequents Description Description of plan The religion of plan Regional climate information class frequents Description Description of plan The religion of plan Regional climate information class frequents Description Descripti	val code outer outer outer outer outer outer outer outer val code	ong Paddock								
Arr 2312. Due to reduced both status data suppry, have will be a short term decreased quality in the PORAGE Drought Assessment reports. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment reports. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment reports. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment reports. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment reports. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment reports. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment reports. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment reports. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment reports. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment report. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment report. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment report. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment report. We are docked minitating the short term decreased quality in the PORAGE Drought Assessment report. The port of the	<form>the set of the Set of</form>	About GOMC Drought o	Bouthern Beast	nel Climat Juliock		AsieGRA88 Intel / Pasture Pro	FORAGE perty Reports	Climate Adaptation		
All geals will be returned out: FUNCES FORAGE por Facamp and some forage one face one fa	<form> All gearly Will be returned solution Strate Strategies Strategies Strate Strategies</form>	orli 2018: Due to reduced BoM station	data supply, there will	be a shi	ort term decreased	quality in the FORA	SE Drought Ass	essment repo	rts. We are close	v monitoring the situation
	<form></form>	ull quality will be returned soon.								
 Sector response for the sector response for the point of th	Select report(s) Sel	quest FORAGE	Home Reque							
*Select report(s) Select report(s) Select report(s) Cop frequency Ranfall and pasture	*Select report(s) Select report(s) Select report(s) Select report(s) Select report(s) Select report(s) *Select report(s) Select	out FORAGE	Request	on	HOLITOPE	ity hepoin				
 Kond Cver Repol Landal and Pasture Report Corp frequency Dought assessment Ecoles is Folge projective core Gound core Indicative land type Raintal and pasture growth outlook Regional climate projections Satellite imagery Satellite imagery	For dequine 1 couplet assessment for data of the solis for large projective couplet and couplet assessment for data of the large projective couplet assessment for data of the large projective couplet assessment for data of the large projective couplet assessment and and and pasture growth outcols for projective couplet assessment and and and pasture growth outcols for projective couplet assessment for data of the large projective couplet assessment and and and pasture growth outcols for projective couplet assessment and and and pasture growth outcols for projective couplet assessment and and and pasture growth outcols for projective couplet assessment and	port Examples	*Select repo	rt(s)						
Rambia nd Pasture Reports Audaitus Land Tybe Report Support Assessment Information Sampla nd Pasture Growt Outook Report Assessment Information Support Assessment Information Suppor	 Antaliand Pasture Report Adata and pasture growth outlook Report Pasture Roport Antaliand pasture growth outlook Report Pasture Roport Report Pasture Roport<!--</td--><td>round Cover Report</td><td>Crop frequence</td><td>y Dr</td><td>ought assessment</td><td>Erodible soils</td><td>Foliage proje</td><td>ctive cover</td><td>Ground cover</td><td>Indicative land type</td>	round Cover Report	Crop frequence	y Dr	ought assessment	Erodible soils	Foliage proje	ctive cover	Ground cover	Indicative land type
Initiative Land Type Report Particulation of pa	Adate Land Type Report and you Assessment Information and and pasture Growh Couton seginal Clinate Projection Report roop Fraquency Aspact roop Fraquency Aspact roop Fraquency Aspact roop Fraquency Aspact report Secience Couton assess visions ** are roop ** and the provement of the provemen	ainfali and Pasture Reports	Rainfall and n	actura	Rainfall and nas	ture growth outlook	Regional c	limate ornier	tions Satalita	100000
 Pringe Prigetive Cover Report Cover Report Cover Report Cover Prequency Report Code Sola Re	 Angel projective Cover Report Angel projective Cover Report Angel projective Cover Roport Angel projec	dicative Land Type Report	reannan and p		. Comos and pas	a giorni catioor	- agronal c	man hisles	Cardina Cardina	
nogit Assessment Information ainfait and Pashure Growth Outlook agoit agoinal Climate Projections Report notable Soits Report notable Soits Report atelite imagery areness Videos	<pre>should takeseament information anise and Pasture Growth Outlood port geginal Climate Projections Report climate Projections Report atenties imagery arenees Videor Sectify Including Projections Report atenties imagery arenees Videor Current Provide Conference (Conference), Andrew (Conference), Andrew (Conference), Conference), Conference, Confere</pre>	ollage Projective Cover Report								
ainfail and Paskure Growth Outlook agenal Linkare Frojections Report aste linkare growth outlook aste linkare growth outlook aste linkare frojections Report aste linkare growth outlook aste linkare g	arinal and Pakure Growth Outoo gerinal clinate Projections Report foodbie Soils Report latente Inagery annees Videor	rought Assessment Information	Specify loca	tion u	sing lot on pla	n				
aginal Climate Rigeztions Report rotoble Solis Report ateries Videos Image: Prequency Report rotoble Solis Report ateries Videos Image: Prequency Report	aginal Climate Piogledion Report torbie Solis Report table Solis	ainfail and Pasture Growth Outlook eport	 Enter lot(s) on Search by lot of 	plan						
http://requency.Report indibie Solie Report ateries Indagoy arenees Videos	<pre>rp Prequency Appoit rot Bis Solis Repoit rate Image y are ress Videor </pre>	egional Climate Projections Report	ereating of the	in pien						
rotable Salite Report alerites imagesy areness Videos	table 30 is Report arcress Vidoor									3010
<pre>tellete imagery areness Videos</pre>	<pre>itema in agery are nease Videos</pre>	rop Frequency Report	Zoom In to M		Lot on Plan and olic	the second states of states	, Seul	Pa	1 Warming	Scannon Sea.
arenees Videos	areaes Vidoo	rop Frequency Report	Zoom In to Re	d your)	Lot on Plan and cili	ok in weient	1	P ^a	C Warrstry	Sharonya Seg
USTRALIA Delivery information	Period	rop Frequency Report rodible Solis Report atellite Imagery	Zoom in to fir	d your) 26	Lot on Plan and Elli				C Maryody,	Standard See
Definery information *Email Label Optional	Entring Foundary (1011) Desired to extra traces with USA Under Act, Germany, Act, Germany, Act, Bir Manager, and Re Gol Lase Community & Bare Delivery information *Email Label Optional	rop Frequency Report rodible Solis Report atellite Imagery arenees Videos	Zoom in to Re	d your l			A a		(Wardy)	
Delivery information *Email Label Optional	Pelivery information "Email Label Cptional	rop Fraquency Report rodbie Solis Report alelite Imagery areness Videos			AUST			in the second se		Trives Find
"Email Label Optional	*Email Label Optional	rop Fraquency Report rodible Solls Report alelite Imagery areness Videos								TOTAL SAL
		rop Fraquency Report rodible Solls Report alelike Imagery areness Videos	Delivery info							TOTAL CARACTER CONTRACTOR CONTRACTOR

1.1

13 Apr that fu



FORAGE REPORT: INDICATIVE LAND TYPE

Introduction

http://www.longpaddock.gld.gov.au/forage November 10, 2017 Lot on Plan: 10C57 Label: Example



This report displays the most current version of the Grazing Land Management (GLM) land ty pes for the selected Lot on Plan. The land type map is generated from a GES shapefile which is developed based on regional ecosystems mapping and GLM information. Most of the land types and their boundaries have not been validated with field observations. Therefore, the land type map is only indicative and can be used to understand what land types are expected on the area selected. The approximate land type area (hectares) and their percentage of the total area are summarised on the second page.



Indicative Land Type report

Expected land types (for land types more than 1 hectare)	Land type code	Estimated area (hectare)	Estimated area (%)	
02 Lancewood - bendee - rosewood (BD)	BD12	2200	31.8	
04 Narrow-leaved ironbark on deeper soils	BD14	1582	22.9	
06 Goldfields country - black soils	BD10	1228	17.7	
01 Loamy alluvials	BD13	1043	15.1	
05 Yellowjacket with other eucalypts	BD20	786	11.4	
03 Range soil (NG)	NG08	81	1.2	



0.6 1.2 1.8 2.4 km

Soil P, what is low?

Plants	Cattle			
	Acutely deficient 2-3 ppm			
Vory low <10 ppm	Deficient 4-5 ppm			
very low <10 ppm	Marginal 6-8 ppm			
	Adequate >8 ppm			
Low 10 – 20 ppm	Colwell P – bicarbonate extractable P			
Moderate 20 – 40 ppm	ppm = mg/kg			
High 40 – 100 ppm	If your land type sheet says phosphorus			
Very high >100 ppm	low, further investigation is required			



Blood tests

- Blood P is the best diagnostic in growing cattle
- Breeders mobilize P from tissue and bones and replenish it
- P-Screen test was developed in 1990s
- Sampling kits and laboratory analysis available from DAF
- Bleed 25 head
- Diagnosis based on blood P and Faecal NIRS or faecal nitrogen (to estimate diet quality)
- > Diet quality is important because P requirement increases with diet quality



When to test cattle for P deficiency?

- In the wet season energy and protein are at their highest.
 This is when phosphorus requirement is highest.
- > Therefore testing in mid to late wet season is the best time
- Planning needs to start early
- > Test animals cannot be fed P supplements during the wet season
- > Target animals in 2020
 - No 9 & No 8 steers
 - Maiden heifers No 9s & No 8s

Testing breeder paddocks?

- > Breeders can mobilize P from tissue and bones
- > Test monitor group of young growing cattle in the breeder mob
- > Put 30 steers in breeder paddock for wet season
- > Assessing the mob/paddock using the growing cattle
- Maiden heifers can be monitor animals i.e. No 9s or No 8s in 2020



Faecal analysis

- Faecal P has been used to estimate diet P (No P or concentrate supplements)
- Faecal P/diet ME ratio is discussed in the 2012 Manual as an indicator of dietary P status (page 6)
- Recent research indicates this is not always reliable because of bone P mobilisation/replenishment

Phosphorus supplementation

- When to feed phosphorus
- How much phosphorus to feed
- How to feed phosphorus
- Cost of supplements and supplement selection
- Herd management to maximise benefits and reduce costs



Wet season

- Best response as animal requirements are highest when diet quality is good
- Challenge is protecting supplement from rain and getting it out

Dry season

- Lactating breeders need phosphorus with urea supplements
- Dry cattle show little response if losing weight

How much phosphorus?

Class of animal	Weight (kg)	Target weight	Acutely deficient	Deficient	Marginal	Adequate
		(kg/day)				
Steers & heifers	200	0	2	1	Nil	Nil
Steers & heifers	200	0.3	4	3	1	Nil
Steers & heifers	200	0.9	8	5	2	Nil
Steers & heifers	400	0	3	2	1	Nil
Steers & heifers	400	0.3	5	4	1	Nil
Steers & heifers	400	0.9	9	6	2	Nil
Pregnant breeders	400	-0.3	3	2	1	Nil
Pregnant breeders	400	0	5	3	1	Nil
Pregnant breeders	400	0.3	7	4	1	Nil
Pregnant breeders	400	0.6	9	6	2	Nil
Lactating breeders	400	-0.3	7	5	2	Nil
Lactating breeders	400	0	9	6	2	Nil
Lactating breeders	400	0.3	11	7	2	Nil
Lactating breeders	400	0.6	12	8	3	Nil

200 kg steer on deficient country requires 5 g P/day for target growth of 0.9 kg/day

400 kg lactating cow on acutely deficient country requires 9 g P/day for maintenance

How to feed phosphorus

- Loose lick
- Blocks
- Water medication

Loose licks



- Lowest cost/kg P
- Mix can be changed to achieve target intakes
- Need shelters in wet

Loose lick in bulk bags



- Reasonably weather resistant
- Need lifting gear

5% limestone to harden

Wet season blocks



- High cost/kg P
- Weather resistant
- Fixed recipe and intakes can be low
- Easy to distribute before wet

Wet season lick sheds









Water medication

- Can be hard to consistently achieve target intakes in wet season
- No problems in dry season
- Water quality can present problems

Lick composition

- Mono and Dicalcium phosphate blends and Dicalcium phosphate products are main P supplements
- Salt can be an attractant or limiter depending on country and water
- Protein meal e.g. 10-30% can be used as an attractant
- Aim to feed as little attractant as possible to reduce costs
- GranAm can be used a limiter
- Phosphorus component of dry season breeder licks is based on lick intake and desired P intake. Usually 10-20% MDCP or DCP.

Supplement selection

Choose supplements on the basis of:

- Cost per unit of P
- Ability to consistently supply required P
- Ease of management

Managing supplements

- Training animals is critical for good intakes and ease of management
- Experiment with supplement composition to find out what works best
- Good intake records enable nutrient intakes (phosphorus & protein) and costs to be monitored

Herd management

- Stocking rate
- Weaning

- Critical to maximise benefits of supplementation
- Enable cattle to make best use of pasture and supplements
- Reduce P requirements to minimise costs