Mowanjum Irrigation Trial

Fertiliser management of irrigated rhodes grass

Production targets and desired growth potential will inform nutrient demands and calculation of fertiliser requirements. A fertiliser regime can be established to match the nutrient demands, which may include supply of nutrients through irrigation water.

Maintain Fertility

Maintain high soil fertility levels to maximise production and optimise the production potential of the irrigation system. The ideal strategy is to maintain a base monthly fertiliser application and then top up as the environmental or production requisites require.

Calculate and apply fertiliser requirements monthly

Production differences for each month are significant, with November being the highest and June the lowest. Plan for fertiliser requirements by the month and then adjust each week's application depending on the actual environmental conditions.

Manage leaching

At the end of the wet season be ready to apply fertiliser to boost early dry season growth. Leaching in a Pindan or lighter soil type may result in nutrient deficiencies and should be avoided. It is important to rectify leaching as quickly as possible to maximise production and carrying capacity on the pivot and avoid discharge to the environment.

Testing is imperative

Soil and plant tissue tests are useful to monitor soil and plant fertility levels. Once a deficiency can be seen visually, considerable production has been lost. Production is only as good as the limiting factor, therefore it is important to ensure the only limiting factors are environmental.

Pushing production

To boost or push production it is important to increase nutrient applications across all the macro elements and not just increase one, such as nitrogen. Trial work has shown that by only lifting one element the response is much less than a balanced increase in elements.

Liquid vs Granules

Liquid fertilisers applied through fertigation are more accurate and less work than granules. Granules are cheaper, can be applied to targeted areas within the pivot and are more concentrated. It is ideal to have the option of both when operating a pivot, however if only one can be selected then the pros and cons of both need to be weighed up to make the final decision.

Fertiliser Toxicity

Fertiliser can be lethal to an animal, in particular nitrogen, even in very small amounts. It is imperative that the fertiliser used in a pivot irrigation system is not consumed by cattle either as solid clumps of granules or through drinking from pools of nutrient-laden water on the ground. The best approach is to ensure granules are fully washed in before cattle graze a cell and that fertigation is not undertaken while cattle are grazing in a cell.

Identify soil type differences

Even though the soil type over the pivot may appear visually to be uniform, the likelihood is that there are subtle changes in soil type over the site. It may be necessary to treat each cell differently to maximise production.

Fertilising in the wet season

Fertigation in the wet season can increase water logging as more water needs to be irrigated to apply fertiliser. Granules can be useful during this period. Monitoring the weather that is forecast post fertiliser applications is important. If significant falls are forecast (30mm+), it is best to delay applications and apply the fertiliser after the rain event to minimise leaching.

Total fertiliser expenditure on the pivot for the period 1 July 2016 - 30 June 2017 was $76,991 or $2,026.08/Ha.

Mowanjum Pivot Fertiliser Total applied and application per Hectare

Fertiliser	N	P	K	S	Cu	Zn	Mo	Mn
Urea	46.00							
Potassium Chloride			50.00					
Muriate of Potash			50.00					
NKS21	27.80		12.40	5.50				
Zinc Sulphate				11.00		22.00		
Copper Sulphate				13.00	25.00			
Triple Super		20.50		1.00				
Sulphate of Potash			41.50	17.00				

Fertiliser	Total kg applied								
Urea	24,860	11436							
Potassium Chloride	4,000			2000					
Muriate of Potash	7,900			3950					
NKS21	34,000	9452		4216	1870				
Zinc Sulphate	150				17		33		
Copper Sulphate	22				3	6			
Triple Super	14,000		2870		140				
Sulphate of Potash	0			0	0				
Total kg/nutrient applied		**20888**	**2870**	**10166**	**2029**	**6**	**33**	**0**	**0**
Total kg/nutrient/Ha applied	**38**	**550**	**76**	**268**	**53**	**0**	**1**	**0**	**0**

Table 1. Fertiliser applied and nutrient application per ha. 1 July 2016 - 30 June 2017

Nutrient	N	P	K	S	Cu	Zn	Mo	Mn	Ca	Mg		
Nutrient removal/MT dry matter	13.5	1.6	25.4	2.2	0.008	0.069	0.0001	0.022	0.165	0.000465		
Dry Matter Production												
	MT/Ha	MT/Ha	MT/Ha	MT/Ha	MT/Ha	MT/Ha	MT/Ha	MT/Ha	MT/Ha	MT/Ha	MT/Ha	MT/Ha	
Monthly dry matter production	3.66	3.14	2.93	2.62	2.30	1.88	1.68	2.09	3.14	4.19	5.15	4.71	37.50

Monthly nutrient removal per Ha (kg)

nutrient	January	February	March	April	May	June	July	August	September	October	November	December	Total
N	49.5	42.4	39.6	35.3	31.1	25.4	22.7	28.3	42.4	56.5	69.5	63.6	506
P	5.9	5.0	4.7	4.2	3.7	3.0	2.7	3.3	5.0	6.7	8.2	7.5	60
K	93.1	79.8	74.4	66.5	58.5	47.9	42.7	53.2	79.8	106.3	130.8	119.6	953
S	8.1	6.9	6.4	5.8	5.1	4.1	3.7	4.6	6.9	9.2	11.3	10.4	83
Cu	0.03	0.03	0.02	0.02	0.02	0.02	0.01	0.02	0.03	0.03	0.04	0.04	0.30
Zn	0.25	0.22	0.20	0.18	0.16	0.13	0.12	0.14	0.22	0.29	0.36	0.33	2.59
Mo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mn	0.08	0.07	0.06	0.06	0.05	0.04	0.04	0.05	0.07	0.09	0.11	0.10	0.83
Ca	0.60	0.52	0.48	0.43	0.38	0.31	0.28	0.35	0.52	0.69	0.85	0.78	6.19
Mg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02

Nutrient	N	P	K	S	Cu	Zn	Mo	Mn	Ca	Mg
Nutrient Removal from 1 Jul 2016 to 30 Jun 2017	506	60	953	83	0	3	0	1	6	0
Nutrient Supplied from Irrigation/Ha	76	0	65	2	0	2	0	0	56	83
Nutrient supplied from Fertiliser	550	76	268	53	0	1	0	0	0	0
Nutrient Balance for 1 Jul 2016 - 30 Jun 2017	**119.60**	**15.59**	**-620.47**	**-27.59**	**-0.08**	**-0.22**	**0.00**	**-0.71**	**49.89**	**83.29**

Table 2. Nutrient Balance Sheet

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