

FERTILISING PASTURE ON ACERAGE AND SMALL HOLDINGS (New South Wales)

1. INTRODUCTION

This Agritopic gives basic information on fertiliser programs for improved pasture in New South Wales. Pasture and livestock management are complex, and if a detailed knowledge is not held on both, advice should be sought. Publications on these topics are available from State Departments of Agriculture/Primary Industry.

Where livestock, e.g., cattle and horses, are run on small blocks, reliance on purchased feeds can often be reduced with pasture improvement and the use of fertilisers, usually at a reduced cost. Depending on the number of stock to be carried, it may not be necessary to improve or fertilise the whole block. In these situations, or if finance is a constraint, it will probably be best to concentrate on part of the block, and do it properly, rather than spread seed and fertiliser at less than optimum rates over the entire farm. If only part of the property is to be developed, choose that with the most productive pasture species, the deepest and most fertile soil, or that closest to water if irrigation is envisaged.

2. FERTILISER ANALYSES

The analyses of the Incitec Pivot products referred to in this publication are:

Incitec Pivot Product	%N	%P	%K	%S
Granular Urea	46			
SuPerfect		8.8		11
Muriate of Potash			50	
Crop Lift 15	14.6	12.1		11.6.7
Multigro	13.1	4.5	7.2	15.4



3. PASTURE SPECIES

Most native pasture species do not respond well to fertiliser. If naturalised clover and/or other introduced species are not present, improved grasses and/or legumes will need to be introduced to allow the full benefits of fertiliser (improved quality and quantity of pasture) to be achieved. Seek advice, e.g., from local Seed Merchants or Produce Agencies, or from Department of Agriculture/Primary Industry publications, as to the most suitable species for your area, soil type and grazing management. Make sure legume seed is inoculated before planting.

4. STOCKING RATES

In the eastern parts of the State, i.e. coastal and inland tableland areas, sufficient rainfall is received to support a legume. Legumes, e.g., clover and medic, fix their own nitrogen from the air through nodules on their roots. Consequently, nitrogen fertiliser is not required in grass legume pastures. Legumes will not persist at stocking rates above about a beast to the hectare, or if other nutrients are lacking. In the higher rainfall areas and where irrigation is available, higher stocking rates can be achieved by nitrogen fertiliser on improved grass pastures.

5. LEGUME-BASED PASTURES

Most Australian soils are low in phosphorus, exceptions being alluvial and some basalt soils. High rates of phosphorus are recommended initially when establishing a new pasture, to build up soil phosphorus concentrations to a more acceptable level. Thereafter, lower annual maintenance rates can be used when topdressing.

Where phosphorus is low in the higher rainfall areas on the coast and the adjacent inland areas, apply Incitec Pivot SuPerfect at 375 - 500 kg/ha for the first two years. Thereafter, apply SuPerfect at 250 kg/ha per annum. In drier less favoured rainfall areas where pasture improvement is still feasible, but the carrying capacity is lower, superphosphate rates may be reduced to about one half of those used closer to the coast, i.e. annual topdressings of Incitec Pivot SuPerfect at 125 kg/ha.

Incitec Pivot SuPerfect (Single Superphosphate) supplies phosphorus (P) and sulfur (S), both of which are important in pasture.

Molybdenum (Mo), a trace element, is important to *Rhizobium* bacteria, which fix nitrogen (N) in the nodules on the roots of legumes. Not only is this important to the legume, but the nitrogen also that is returned to the soil in plant residues, dung and urine enriches the soil, which in turn allows grasses to grow better, resulting in a balanced productive grass legume pasture. Incitec Pivot SuPerfect Mo 0.025% should be used in place of ordinary SuPerfect in the first year, and thereafter every third to fifth year on legume-based pastures, to supply molybdenum.

Potassium (K) is unlikely to be required on loam and alluvial soils but may be needed on light-textured sandy soils. Where used, a typical application rate for Incitec Pivot Muriate of Potash is 50 kg/ha per annum.



In legume-based pastures, the most common time at which fertiliser is applied is the autumn, prior to the main growing season. After the first few years, when the soil's phosphorus status has been built up to an acceptable level, pastures can be top-dressed in either the autumn or spring.

6. NITROGEN - FERTILISED GRASS PASTURE

Winter active grasses such as Cocksfoot, Fescue and Ryegrass, and summer active grasses such as Digitaria (Couch), Kikuyu, Paspalum, Setaria and Rhodes Grass, are responsive to nitrogen fertilisers when moisture conditions are favourable for growth. This may allow higher stocking rates to be sustained. The botanical composition of the pasture, rainfall patterns and the availability of irrigation water will dictate when nitrogen is best applied. There is little point in applying nitrogen fertiliser outside the main growing season, during the dry season, or at times of drought. Winter active grasses are grown in the south of the State and in elevated inland areas; summer active grasses on the coast to the north of Sydney.

A typical nitrogen application rate on rain-grown grass pasture, over the course of a year, is 180 kg/ha N. This can be split into three applications at 60 kg/ha N, e.g. Incitec Pivot Granular Urea (46% N) at 125 kg/ha/application. Urea is the most economical of the commonly used nitrogen fertilisers.

With cool season grasses, nitrogen is best applied during the autumn, winter and spring. With summer growing species, it is customary to apply nitrogen in early spring (September), the early summer (December) and again in the late summer (March). Irrigated ryegrass may be fertilised with up to 60 kg/ha N after each grazing, with 300 kg/ha N or more being applied per annum.

How much of the property is fertilised with nitrogen will depend on how much feed is required, and the number of stock carried. There is little point in applying nitrogen fertiliser if the number of stock on the property can be supported with a grass legume pasture, with no need to buy in extra feed. Applying too much nitrogen fertiliser at low stocking rates can result in the pasture growing rank and being under-utilised.

At high stocking rates, growing extra feed in the paddock is normally more economical than buying in supplementary feed as hay and grain. The use of fertiliser may allow such expenditure to be reduced, helping cut overall feed costs. If the event that finance is limited, or the whole property does not need to be fertilised with nitrogen to provide adequate feed, it is better to concentrate on part of the farm and fertilise it properly, rather than fertilise the whole property at a sub-optimal rate. Select the area of best soil and pasture for any such development, leaving the poorest areas until last.

Subsequent applications of nitrogen should be made to this same area, rather than to different parts of the property, i.e. once an area is chosen for pasture improvement and fertilisation, stick with it. Part of the property can be devoted to a grass-nitrogen system, and the remainder to a grass-legume pasture.

When nitrogen fertiliser is applied, only part of it goes towards leaf production, which grazing animals can utilise. Some is tied up by microorganisms in breaking down decaying plant roots and litter, while the grass itself will utilise some of the nitrogen in strengthening its runners and root system. This is particularly true for grasses that form a sward. If too little nitrogen is applied, a good part of it will be utilised for these purposes, and less left over for leaf production, which stock can graze. For these reasons, responses to nitrogen can be disappointing if it is applied irregularly and/or at low rates, i.e. less than 50 kg/ha N on grass pastures.



Once the sward has properly established and thickened, responses to subsequent applications of nitrogen generally improve, as more of the applied nitrogen is directed to the leaves. To help maximise the utilisation of the nitrogen by the pasture, and to minimize any gaseous losses of nitrogen to the atmosphere following application, nitrogen fertiliser is best applied when the prospects of rain are high, or the pasture is about to be irrigated.

Nitrogen is not the only nutrient that may need to be applied in fertiliser programs on improved grass pastures. All the nutrients that are important in legume-based pastures will still be required, with the exception of molybdenum. Molybdenum itself will be required if there is a legume component to the pasture.

Phosphorus and sulfur are likely to be needed and can be applied as Incitec Pivot SuPerfect at 250 kg/ha in the autumn where winter active grasses are grown or the pasture has a clover component, or in the spring for summer active grasses. Alternatively, phosphorus and sulfur can be applied as Crop Lift 15 at 175 - 200 kg/ha, and the rate at which urea is applied for the corresponding autumn (winter active grasses) or spring (summer active grasses) application reduced to 50 – 75 kg/ha, to allow for the nitrogen that is applied in the Crop Lift 15.

Urea will still need to be applied at other times of the year, e.g. two additional applications at 125 kg/ha. If potassium is required, e.g. on light-textured and sandy soils, it can be applied as Muriate of Potash. A typical rate is 50 - 100 kg/ha per annum. This can be applied in a single application in the autumn (winter active grasses) or spring (summer active grasses). Alternatively, Multigro can be applied at 500 kg/ha to apply nitrogen, phosphorus, potassium and sulfur at the start of the main growing season, and Urea on its own at 125 kg/ha on two other occasions each year during the season

7. WITHHOLDING PERIOD

While the risk is slight, the ingestion of freshly applied fertiliser with pasture may affect the health of grazing animals and wildlife, and in isolated incidents result in deaths, e.g. from urea poisoning, fluorosis from the fluorine present as an impurity in phosphorus fertilisers, or induced copper deficiency where molybdenum is applied. High nitrate concentrations in the first green pick after applying nitrogen fertilisers also poses some risk of nitrate poisoning, and sudden deaths.

While it may not always be practical, e.g. if the property is not fenced into separate paddocks, it is best to remove stock from areas being fertilised, and not to readmit them until after rain is received or irrigation applied, and regrowth occurs. This minimises the risk of direct ingestion of fertiliser by grazing animals, and nitrate poisoning in young regrowth where nitrogen fertilisers are used.

A Fact Sheet on “Withholding periods after applying fertiliser to pasture” is available in which these issues are discussed in more detail.

8. WARNING

The information in this publication is for use as a guide only. The use of fertilisers is not the only factor involved in producing a productive pasture. Local soil, climatic and other conditions should also be considered, as these could affect pasture response to applied fertiliser.



Before using fertiliser, seek appropriate agronomic advice. Fertiliser may burn and/or damage plants and affect the health of grazing animals.

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