agriculture
& rural development
Department:
agriculture
& rural development
PROVINCE OF KWAZULU-NATAL

PASTURES IN KWAZULU-NATAL

Pasture Fertilisation

NITROGEN FOR PASTURES

N Miles and P E Bartholomew

INTRODUCTION

Soils generally do not contain sufficient nitrogen (N) for high grass yields. Therefore farmers are obliged to rely on fertiliser N to achieve high production. Responses of grass swards to fertiliser N are often linear for N rates up to 300-400 kg/ha/year. Research at Cedara has demonstrated that 375 kg N/ha applied to irrigated Italian ryegrass may produce 1 400 kg livemass gain/ha, while in the case of dryland kikuyu in the Mistbelt 300 kg N/ha may produce up to 1 000 kg livemass gain/ha.

Sound fertiliser N management practices are a key to efficient animal production off grass pastures. Unlike nutrients such as phosphorus and potassium, which are strongly held against loss on clay particles, a number of pathways exist whereby N may be lost from the rooting zone and thus to uptake by the plant. The fact that N fertilisers are frequently the most costly component in pasture production systems underlines the importance of a sound approach to N fertilisation.

NITROGEN RECOMMENDATIONS

The Cedara Fertiliser Advisory Service, in making N recommendations for grass pastures, caters for three production levels, *viz*. low, medium and high levels of production. Expected yields of various pasture species at these three production levels are listed in Table 1.

The figures given in Table 1 represent general guidelines on N usage. Actual yields achieved at a given N input are dependent on numerous factors, some of which are discussed later.

OPTIMIZING RETURNS FROM NITROGEN

To optimize returns from N fertilisers attention should be focused on the following aspects.

- Levels of other growth factors, in particular, water and other nutrients.
- Nitrogen losses by leaching, volatilization and denitrification.
- Nitrogen reserves in the soil.

It should be borne in mind that, unlike phosphorus fertiliser, N is not "fixed" in soils. However, in general, only 50 to 60 % of applied N is recovered in herbage. There is thus considerable scope for improving the efficiency of N utilisation in pastures. Encouragingly, the farmer has direct control over a number of other growth factors affecting N efficiency.

Other growth factors affecting the efficiency of N utilisation

Maximum response to applied N will only be achieved where other growth factors are not limiting.

- **Acidity problems** together with **nutrient insufficiencies** should be corrected prior to topdressing with N. Data presented in Table 2 demonstrate how pasture production under high N fertilisation may be influenced by unfavourable acidity and nutrient levels.

- Available soil moisture has a profound effect on pasture response to fertiliser N. For pastures grown under dryland conditions, N requirement is closely related to rainfall. The higher the rainfall, the higher the production potential and thus the higher the level of N required to realize that potential.

Where moisture supply is limiting, N inputs should be reduced accordingly. Obviously, where moisture conditions are optimized through the use of irrigation, relatively high N rates are required.

TABLE 1. Dry matter production levels of various pastures species (in tons dry matter per ha)

LEVEL OF PRODUCTION			
Species	**Low t/ha**	**Medium t/ha**	**High * t/ha**
Eragrostis curvula (weeping love grass) (weeping love grass)	5 - 8	9 - 13	14 - 16
Pennisetum clandestinum (kikuyu) (kikuyu)	5 - 8	9 - 13	14 - 16
Cynodon spp (coast cross II, star) spp(coast cross II, star)	5 - 8	9 - 13	14 - 16
Paspalum dilatatum (Dallis grass) (Dallis grass)	4 - 6	7 - 12	13 - 16

Digitaria eriantha (Smuts finger grass) (Smuts finger grass)	4 - 6	7 - 12	13 - 16
Dactylis glomerata (cocksfoot) (cocksfoot)	4 - 6	7 - 11	12 - 15