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RYEGRASS STAGGERS: MANAGEMENT AND CONTROL

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Abstract

An outline is given of *some* of the main factors and interactions involved in the development of ryegrass staggers – viz: pasture structure, neurotoxin distribution within the pasture, and livestock feeding behaviour. Because neurotoxicity is mainly associated with ryegrass leaf sheath the aim of control measures is to minimise ingestion of this component when it is toxic. This can best be achieved by avoiding practices such as set-stocking in summer, which may lead to ryegrassdominance, and by using a rotational grazing system in which the essential feature is daily movement of stock.

Keywords: Ryegrass staggers, management, development, control.

INTRODUCTION

Because ryegrass staggers (RGS) is a dietary-dependent disorder (Cunningham & Hartley 1959) more prevalent on ryegrassdominant than on mixed (grass/legume) pastures (Keogh 1973a, 1978), studies were made of pasture growth, composition and structural characteristics, and defoliation patterns and diets of animals grazing these pastures both before and during the development of RGS. Results have given greater insight into factors associated with the aetiology of RGS and an outline of some of the main factors and interactions is shown in Fig 1.

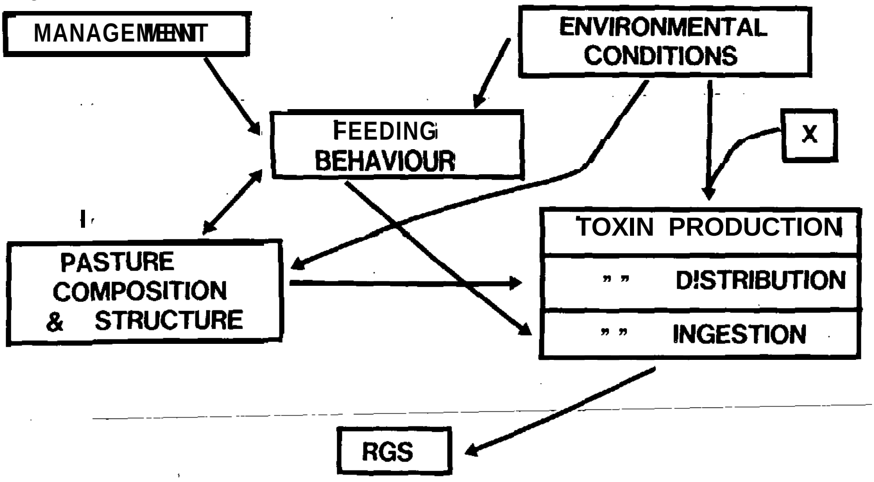

Figure 1: *An outline of the main factors and interactions involved in the aetiology of a dietary-dependent disorder such as ryegrass staggers.*

This paper summarises information on pasture structure, neurotoxin distribution within the pasture, and livestock feeding behaviour, so that both the development of RGS and options for control through management can be understood.

PASTURE STRUCTURE AND LIVESTOCK FEEDING BEHAVIOUR

The grass component of pastures may be considered as a population of tillers and the form of the tiller then determines, in part, the structure of the pasture. Vegetative tillers consist of a series of leaves on a very short basal stem which is embedded in the soil and from which the roots grow. Each fully-expanded leaf comprises a leaf blade and a sheath and in undefoliated tillers each successive leaf has a longer sheath than the previous one. Reproductive tillers differ only in respect to the production of the flowering stem and seed-head.

In summer a ryegrass-dominant pasture consists of populations of vegetative and reproductive tillers. The basal zone of such a pasture is synonymous with the lower portions of the tiller populations and comprises mainly leaf sheath and flowering stem, and constitutes the bulk of the litter present in grazed pastures during summer and autumn (Keogh 1973b, 1975).

During summer and autumn the feeding behaviour of livestock in grass dominant pastures is largely determined by the contrasting influences of excreta deposited during the earlier moist spring period. As a result three main types of site develop viz: urine-patch, dung-patch, and inter-excreta. Regrowth about urine-patch sites is highly preferred and has a higher tiller density and very few flowering stems present. Herbage around dung deposits is largely avoided and generally contains more mature herbage which may become very rank when conditions for growth are good. Acceptability of inter-excreta material is intermediate between the two excreta types. Deposition of sheep dung during dry conditions does not influence either current pasture growth or feeding behaviour. The result of such feeding preferences is that grass dominant pastures are not grazed uniformly. Urine-patch sites are grazed more frequently and intensively than other sites (Keogh 1973b, 1975) and are often over-grazed under set-stocked management. More leaf sheath is ingested from urine-patch than non-urine patch sites by sheep during the development of RGS (Keogh unpublished).

The presence of white clover throughout a pasture has a major influence on the feeding behaviour of sheep and cattle and hence also on defoliation patterns and pasture structure. Overall ryegrass content of tiller populations, and differences between urine-patch and inter-excreta type sites are reduced. In particular grass growing at inter-excreta type sites is more readily grazed with the end result that grass/clover pastures are grazed more uniformly than are grass dominant pastures.

"TOXIN" DISTRIBUTION

Although the neurotoxins responsible for the RGS condition have still not been clearly defined (Gallagher *et al* 1981) it can be inferred from the results of both grazing and feeding experiments (Keogh 1973, 1978) that much of the neurotoxicity is associated with the basal portion of ryegrass, i.e. the leaf sheath component. Where sheep have been grazed or fed solely on ryegrass leaf blade no signs of RGS have been noted. In contrast, RGS has frequently been induced in animals fed or grazing predominantly leaf sheath of perennial ryegrass (Keogh 1973, 1978).

CONTROL

Because it is well established that the most severe outbreaks of RGS occur on ryegrass-dominant pastures (Keogh 1973) it follows as a corollary that any measure taken to prevent the development of ryegrass dominance should also lessen the risk of occurrence of severe outbreaks. In this context the encouragement of white clover growth by ensuring adequate spelling between grazings from early summer onwards should be practised. Apart from a lower risk of RGS there are the obvious agronomic and nutritional benefits that will also be gained from good white clover production.

Control of RGS outbreaks can be achieved, even on ryegrass-dominant pastures, by either grazing management alone or if there is very little pasture growth by a combination of grazing management and other precautions such as feeding supplements. As the neurotoxins responsible for the development of RGS are acquired from the base of pastures and are predominantly associated with ryegrass leaf sheath, control over the ingestion of this component by animals is a prerequisite for any control of RGS by grazing management. Such control can only be achieved by rotational grazing in which the essential feature is daily movement of stock to prevent regrazing sites that have been grazed within the previous 24-hour period. Such management is, however, only required when the early signs of RGS are first noted thus indicating that pastures are in a "toxic" state, and precautions should be continued until the danger period has passed.

It should be noted that there is no conflict between the practices advocated for RGS control and those associated with good pasture and animal husbandry. In the final analysis, however, the individual farmer must decide whether the direct and indirect benefits associated with control of RGS sufficiently outweigh the likely losses and inconvenience associated with severe RGS outbreaks to warrant any additional inputs required to achieve control.

Further progress in control of RGS awaits more precise determination of the neurotoxins involved, the conditions necessary for their formation, and their distribution within pastures.

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