Application of Woodchip Waste to Sown Pastures

P. A. Lane[1], H Addison[2] and R B Doyle[1]

[1] School of Agricultural Science, University of Tasmania, Hobart, TAS.
[2] School of Tropical Biology, James Cook University, Townsville, QLD.

ABSTRACT

The application of woodchip waste, commonly referred to as 'woodchip fines', to improved pasture at rates of application of up to 20 t/ha (wet weight) was shown to have a minimal effect on pasture quality and performance. At higher rates of application, woodchip fines were found to depress pasture production and adversely affect the proportion of an important annual species, *Trifolium subterraneum,* in the pasture. It was therefore concluded that spreading of woodchip fines on improved pasture could offer an alternative low cost disposal method for this industrial by-product.

KEY WORDS

Improved pasture, woodchips, nitrogen, botanical composition, yield.

INTRODUCTION

The processing of pulpwood produces a significant quantity of by-product or wood waste material, which contains little or no bark, and is commonly referred to by industry as 'woodchip fines'. The re-use or disposal of this natural cellulose and lignin material is a significant environmental and economic issue for North Forest Products Ltd, the company responsible for the operation of export woodchip mills in Tasmania. Possibilities such as composting have been considered but the large quantities of material, cost involved and limited local market in Tasmania make this impractical at the present time.

The application of woodchip fines to pasture was considered a novel and possibly acceptable approach to the safe disposal of this material. However it was not known whether the woodchips fines posed any adverse effects on the future performance of treated pasture. Issues of concern included: phytotoxic effects due to the presence of toxic compounds in the wood material (1, 3); depletion of available soil nitrogen during microbial breakdown of the wood particles; and smothering of seedling and established plants.

An experiment was conducted to investigate the effect of application of woodchip fines in combination with nitrogen on a well established permanent pasture.

MATERIALS AND METHODS

The experiment was conducted at the University of Tasmania Farm located at Cambridge, Tasmania, in 1998. The soil type was strongly duplex with a grey-brown sandy loam over a sandy medium clay subsoil. The trial site consisted of a three year old improved pasture containing predominantly cocksfoot (*Dactylis glomerata*) and subterranean clover (*Trifolium subterraneum*), with perennial ryegrass (*Lolium perenne*) as a minor component. The experimental design was a split plot with five rates of woodchip fines, three rates of nitrogen and four replications.

Prior to application of the woodchip fines the pasture was fertilised at a rate equivalent to 250 kg/ha of 0-6-17 NPK fertiliser. Woodchip fines were applied to the pasture on 2 June 1998 at rates equivalent to 0, 10, 20, 40 and 60 t/ha (wet weight). The woodchip material contained approximately 50% moisture. Nitrogen as urea was applied at rates equivalent to 0, 30, and 60 kg N/ha.

Botanical composition was determined at 4, 10 and 16 weeks following application of woodchips using the rod-point method (2) and herbage yield was determined at 16 weeks following application of

woodchips by harvesting above ground herbage from three 25 x 40 cm quadrats from each treatment plot.

RESULTS AND DISCUSSION

The botanical composition of the pasture was significantly affected by the application of woodchip fines when measured on three occasions in the year of application. At higher rates of application (40 and 60 t/ha) the proportion of subterranean clover in the pasture was reduced substantially, which is considered unacceptable in terms of pasture quality and long-term productivity (Figure 1). At the lower rates of application (0,10 and 20 t/ha) the proportion of subterranean clover in the pasture was not significantly affected. The proportion of cocksfoot in the pasture was not affected by the application of woodchips.

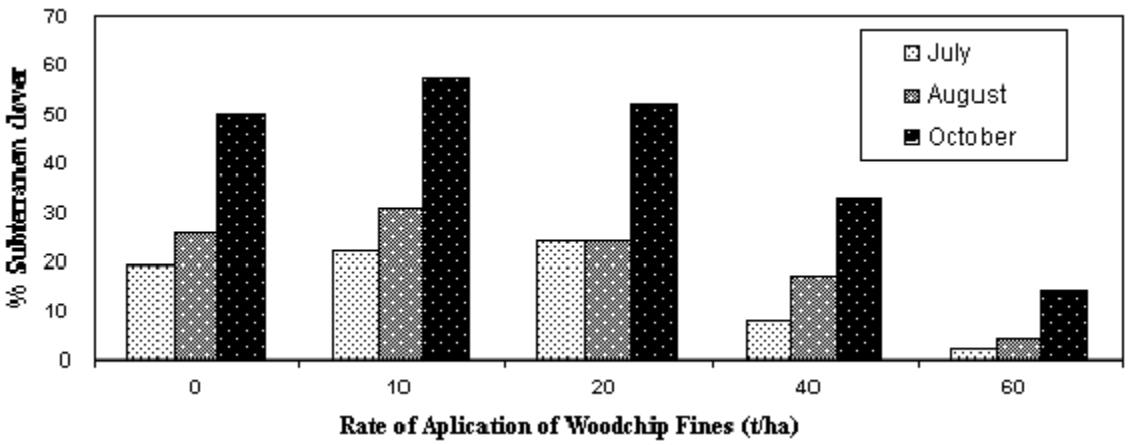

Figure 1. Effect of application of woodchip fines on the proportion of subterranean clover in the pasture.

The application of woodchip fines, averaged across all nitrogen treatments, had no effect on herbage production at lower rates of application but caused a significant ($P < 0.05$) decrease in herbage yield at rates of application of 40 and 60 t/ha, when measured at 16 weeks after commencement of the trial (Table 1).

Table 1. Effect of rate of application of woodchip fines on pasture herbage production (kg DM/ha).

Rate of Application of Woodchip fines (t/ha)	Herbage Yield (kg DM/ha)
	(LSD = 439)
0	2412 [a]
10	2334 [a]
20	2445 [a]
40	1561 [b]

The overall effect of nitrogen was to reduce the proportion of subterranean clover and increase the proportion of cocksfoot in the pasture relative to the control treatments, which received no nitrogen. This effect was evident at pasture samplings conducted in August and October. There was no difference between rates of nitrogen on the composition of the pasture and no effect on herbage production, despite plots receiving nitrogen appearing more vigorous and greener in colour.

CONCLUSION

The results of this experiment indicate that it is safe to apply woodchip fines to improved pasture at rates of up to 20 t/ha (wet weight), without having any adverse effects on pasture composition or productivity. These results were obtained from a well-established pasture, which had been fertilised with adequate quantities of phosphorus and potassium prior to application of the woodchip fines. The use of a single low rate of application of nitrogen at time of application of the woodchip fines does not appear to be necessary and may cause an initial decrease in clover composition. However such a response is likely to depend on initial pasture composition and available soil nitrogen levels.

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