USING PLANT WAX ALKANES TO ESTIMATE THE SPECIES COMPOSITION OF SUB-TROPICAL GRASS MIXTURES

S.E. HOEBEE[A], H. DOVE[A] and D.I. OFFICER[B]

[A]CSIRO Plant Industry, GPO Box 1600, Canberra ACT 2601
[B]NSW Agriculture, Grafton Agricultural Research & Advisory Station, Trenayr Road, Grafton, NSW 2460

Giant Parramatta grass *(Sporobolus indicus var. major;* GPG) is regarded as an unpalatable weed which threatens animal production from pastures on the north coast of NSW (Mears *et al.* 1996). Due in part to the difficulty of measuring the intake of individual pasture components, the effect of GPG on herbage intake and animal performance has not been quantified. Plant cuticular wax alkanes have been used to estimate species composition of grass/clover mixtures (Dove and Moore 1995). We extended this approach by assessing their potential for determining the composition of all-grass mixes, with a view to later field studies of GPG intake and its effect on total herbage intake and animal performance.

Five herbage mixtures (each weighing 2 g DM) were prepared, containing GPG and four to nine other grasses in proportions similar to those in grazed pastures (see Table 1). Alkane concentrations in the mixtures and component species were quantified by gas chromatography (Dove *et al.* 1996). The species composition of the mixtures was estimated from these alkane concentrations using the procedure of Dove and Moore (1995), and compared with known compositions by linear regression.

Table 1. Comparison of known species compositions of herbage mixtures (in parentheses) with those estimated from the alkane concentrations of the mixtures and their component species

	Species composition (%DM)									
Mix	*Axopinus affinus*	*Imperata cylindrica*	*Paspalum dilatatum*	*Setaria sphacelata*	*Chloris gayana*	*Pennisetum clandestinum*	*Pasp. notatum*	*Digitaria didactyla*	*Cynodon dactylon*	GPG
1	22.9 (20)	11.7 (5)	44.1 (35)	-	-	-	-	-	0 (10)	21.4 (30)
2	0 (5)	-	17.4 (15)	1.4 (5)	9.3 (5)	60.0 (60)	-	-	11.8 (5)	0 (5)
3	11.4 (30)	5.8 (5)	3.6 (15)	3.9 (5)	24.6 (4)	9.1 (5)	0 (5)	0 (5)	41.6 (25)	0 (1)
4	44.7 (25)	8.2 (2)	20.8 (7)	2.7 (2)	0 (2)	0.7 (2)	0 (2)	0 (2)	0 (15)	22.9 (41)
5	5.7 (7)	0 (1)	16.9 (2)	0 (1)	0 (1)	0 (1)	0.4 (1)	0 (1)	5.1 (4)	72.0 (81)

There were discrepancies between estimated and known compositions (Table 1). The estimates for major species were better and less variable than those for minor components, and none of the five regression relationships had a slope or an intercept which differed significantly from one or zero, respectively. There was a tendency for GPG content to be under-estimated, but when considered across mixtures, the relationship between estimated and known GPG content did not differ from the line of equality (GPG_{est} = 0.895±0.0958*GPG_{known} - 5.030; r^2 = 0.967).

Our results should be interpreted with caution, because of the possible undue leverage exerted by a dominant species in some regressions (eg, GPG in Mix 5), and the few degrees of freedom involved in Mixes 1 and 2. However, they do suggest that plant alkanes could be used to estimate GPG content of pasture and the influence of GPG on total pasture intake. Moreover, the estimates could be further refined by including other plant wax components. For example, our preliminary analyses indicate differences in long-chain alcohol concentrations between the above grasses and also suggest that two sterols, stigmasterol and b-sitosterol, could be useful markers. However, the methods for analysis of alcohols and sterols require refinement before these compounds could be used routinely to improve the capacity of the alkane technique to discriminate between plant species in the diet.

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