Effect of seed structure on the tolerance during emergence of five grasses to phosphorus seed coating.

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Seed coating has been shown as a promising technique for the effective delivery of phosphorus (P) to pastures (1,2). The tolerance of buffel grass to soluble P seed coating has been attributed to its seed structure with its caryopsis contained within lemma and palea, glumes and fascicle (2). Previous work with phalaris (1) showed that the presence of a lemma/palea around the caryopsis permitted the emergence of phalaris to be little affected by P seed coatings. A growth chamber experiment was conducted to further investigate the role of the natural seed coat on the tolerance to P coating of 5 pasture grasses.

## Methods

Intact seeds of each of the 5 species were cleaned and portions threshed, winnowed, and sieved to obtain sufficient seeds/caryopses of each species for planting and for seed coating. P seed coatings (of monocalcium phosphate - MCP) were applied to each seed fraction at a rate equivalent to 200% of the intact seed weight. Coated and uncoated seeds/caryopses were sown 10mm deep in soil and placed in a growth chamber at 25 C (14h) and  $15^{\circ}$ C (10h) and emergence was counted daily.

## **Results and Discussion**

The effect of MCP seed coatings on the emergence of the various grass seeds/caryopses is shown in Table 1.

Table 1. Effect of seed structure on the tolerance during emergence of 5 pasture grasses to MCP coating (expressed as a % of the corresponding uncoated seed).

Species	Seed wt.		MCP wt.		Emergence					
	seed	cary- opsis	seed	cary- opsis	++	glumes lemma/ palea	+	glumes lemma/ palea	-	glumes lemma/ palea
stand is all	(mg/seed)				(%)					
Phalaris	1.72	1.35	3.44	3.42		-		87		34
Cocksfoot	0.77	0.57	1.49	1.51		-		102		57
Per, ryegrass	2.15	2.00	4.40	4.04		-		104		21
Buffel grass	2.96	0.71	6.01	5.85		98*		-		47
Green panic	0.84	0.50	1.73	1.71		86		85		16

Caryopsis plus lemma/palea and glumes contained within fascicle.

It is clear that the outer seed structures of all 5 species permitted the emergence of seedlings with little damage due to the P seed coating. In the case of green panic, the presence of glumes, in addition to the lemma and palea, afforded no increased protection to the caryopsis; thus, it appears that the lemma and palea are of greater importance in reducing injury than the glumes. The similar findings over this range of temperate and tropical grass species suggests that there may be wide scope for the application of soluble P coatings to grasses which possess a lemma and palea. Further work is needed to discover the mode of action of the lemma and palea in allowing emergence without injury.

1. Scott, J.M. (1986). Ph.D. Thesis. University of New England, 203pp.

2. Silcock, R.G. and Smith, F.T. (1982). Aust. J. Agric. Res. 33, 785-802.