

## Effect of seed structure on the water relations of germinating pasture grass seeds

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The caryopsis of grass seeds has been shown to be protected by the lemma and palea from injury during germination due to phosphorus seed coating (1, 2). This study investigated the role of the lemma/palea during imbibition of the grass seed caryopsis.

### Methods

Imbibition study. Intact seeds and caryopses of cocksfoot and phalaris were sown on filter papers with controlled water potential (3) in petri dishes sealed with parafilm and placed in a growth cabinet at 25°C without light. Moisture content on intact seeds (I) and caryopses (C) was measured. The intact seeds were then dissected into lemma/palea (LP) and caryopses (CD) on the moistened filter paper and were likewise measured for moisture content. These weights were then added to obtain 'CD+LP'. When this sum was subtracted from the weight of the imbibed intact seed (I), the weight of free water between the lemma/palea and the caryopsis was determined.

Germination study. Parallel experiments compared the speed of germination of intact seeds and caryopses with the same sowing conditions as above.

### Results and discussion

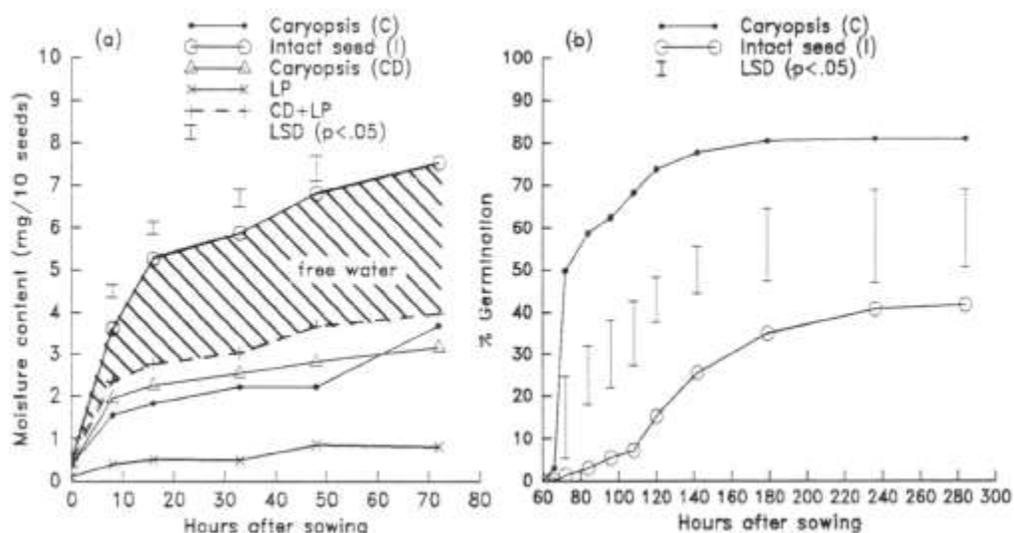


Figure 1. Effect of seed structure on (a) imbibition and (b) germination of cocksfoot

The effect of seed structure on the imbibition of cocksfoot seeds is shown in Fig. 1a. Imbibition of the caryopsis was not slowed down by the presence of the lemma/palea; rather it appeared to be slightly enhanced (compare C with CD). The presence of free water in the air spaces between the lemma/palea and caryopsis was unexpected. Fig. 1b shows the effect of the presence of lemma/palea on the speed of germination of cocksfoot seeds. It is clear that while the lemma/palea did not slow down imbibition of the caryopsis (Fig. 1a) it did delay germination (Fig. 1b). Similar results were obtained with phalaris except that relatively less free water was found in the air spaces between the lemma/palea and caryopsis than for cocksfoot. It appears that the lemma/palea may protect the caryopsis from injury due to phosphorus seed coatings by slowing down germination (due, perhaps, to germination inhibitors), not by slowing down imbibition.

1. Scott, J.M. (1986) Ph.D. Thesis. University of New England, 203pp
2. Garrote, B.P., Scott, J.M. and Blair, G.J. (1987). Proc. 4th Aust. Agron. Conf.. p.248
3. Fawcett, R.C. and Collis-George, N. (1967). Aust. J. Exp. Agric. Anim. Husb. 7, 162-167