The effects of irrigation management on seed production and the regeneration of subterranean clover

K.B. Kelly and W.K. Mason

Research Institute, R.M.B.3010, Kyabram, Vic. 3620

The survival and productivity of subterranean clover are related to seed production and the density of establishment at the initial irrigation. The combination of genotype and environmental factors determining seed set, summer survival and breakdown of hardseedness in this expanded growing season must be understood if reliable, high producing pastures are to be maintained. This paper details aspects of seed production, change of germinability with time and regeneration of an experiment where growth responses have previously been reported (1).

Methods

Pure swards of mixed subterranean clover cultivars (Clare, Woogenellup and Trikkala) sown in 1982 were initial irrigated February 1, March 1, and April 1 with final irrigation either mid October or mid November. Seed burden was assessed in December 1982 and prior to irrigation in 1983. The percentage of germinable seed was determined at 15?C in the laboratory. Residual seed was measured in August 1983.

Results and Discussion

Table 1. Seed data, establishment density, residual seed and % recovery of seed in 1983.

Initial irrigation	February		March		April	
Final irrigation	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.
December 1982						
Seed density no./dm²	35	68	38	87	32	75
Germination %	24	18	28	23	24	21
Prior to irrigation 1983						
Seeds density no./dm²	36	66	32	85	11	14
Germination %	46	36	59	61	74+	72+
Establishment no./dm²	3.9	4.2	6.1	12.1	17.1	30.8
Residual seed no./dm²	5	12	5	15	5	9
% seed recovered	25	24	29	31	69	53

+ Estimate - April treatment established by rain in mid March.

The data presented in Table 1 shows that the time of initial irrigation had no effect on seed production. Late spring irrigation increased seed production by 110% and increased the proportion of seed buried from 34 to 54%. There was no loss of seed during summer, with no rainfall until mid March. The change in germiability with time was lower than anticipated. Late 1982 irrigation (Nov), increased establishment density in the March and April treatments and resulted in an 0.5 t DM/ha yield increase in growth by May 1983. Residual seed represented 16% of the seed present in December.

Establishment as a percentage of the germinable seed present was 20% at February initial irrigations. There are several possible causes for this, such as embryo dormancy, high soil temperatures (2) and soil physical factors associated with the rapid soil drying which may occur. These factors are currently under evaluation. The potential to increase annual pasture production by manipulation of seed populations is practical under irrigation, but at this stage poor establishment in February and March is limiting the potential to maximize early production.

1. Kelly, K.B. and Stockdale, C.R. (1985). Proc. 3rd. Aust. Agron. Conf., Hobart.

2. Silsbury, J.H. et al. (1984). Aust. J. Agric. Res. 35:539