

Effects of moisture during flowering on seed yield of subterranean clover

K.A. Archer

NSW Agriculture and Fisheries, Agricultural Research Centre, RMB 944, Tamworth NSW, 2340

It has been shown (1) that subterranean clover cultivars such as Woogenellup and Seaton Park are productive and persistent when aerially sown into natural pastures on the north-west slopes of New South Wales. In this environment, rainfall is year-round and is generally unreliable. The objective of this study was to determine the effects of various moisture conditions during flowering on the seed yield of these mid-season cultivars in comparison with the early maturing cultivar, Nungarin.

Methods

The experiment was conducted in 1985 at Tamworth, NSW, under a stationary raincover. On 10 May, 24 plants of each of 3 cultivars (Nungarin, Seaton Park and Woogenellup) were established in polystyrene fruit boxes, (42 x 30 x 15 cm deep), filled with soil typical of the red-brown earths of the slopes. Four moisture treatments were applied, 1. continuous watering until 10 January, 2. early termination of watering approximately 34 days after flowering commenced, 3. termination of water for all cultivars when Nungarin finished flowering (18 October), and 4. as for 2, but watering was resumed after plants became stressed. Flowering began on 23 August, 10 September and 25 September for the three cultivars, respectively. The experimental design was a randomised complete block with 3 replications.

Results and discussion

Early termination of water severely reduced seed production, but on average, 350 kg/ha of seed was recovered from the drought induced regime (treatment 2) (Table 1). Some increases in seed yields were recorded when plants were rewatered, especially for Seaton Park. Woogenellup and Seaton Park also produced some seed in treatment 3. Less seed was recovered from continuously watered Nungarin than when watering ceased at the end of flowering, indicating that 37% of the seed produced by Nungarin was lost if the soil remained moist during seed maturation. This did not occur to the same extent for Seaton Park and Woogenellup because they each retained about 3 seeds/burr, compared to only 1 seed/burr for continuously watered Nungarin. Seed viability exceeded 80% for all treatments.

Table 1. Seed yields of subterranean clover under different moisture regimes.

Moisture regime	Seed yield (kg/ha)		
	Nungarin	Seaton Park	Woogenellup
1. Continuous water	610	2300	2160
2. Water early	150	530	380
3. Water for Nungarin	970	390	150
4. Water early + late	350	1230	450
	S.e. (mean of 3) = ±122		

Both Seaton Park and Woogenellup have high potential seed yields, and will also produce a significant quantity of viable seed if dry conditions occur early in spring. Some increase in seed yield can also be expected from later rain following dry conditions if plants survive the dry period. In contrast, Nungarin is better adapted to a rainfall pattern in which soil moisture becomes limiting immediately after flowering. These results support findings from field studies (1) that the mid-season cultivars produce sufficient seed in most years to ensure their persistence in permanent pastures on the slopes. Advantage can therefore be taken of the longer seasonal growth of the mid-season cultivars in preference to early maturing cultivars.

1. Archer, K.A. et al., 1987. Aust. Wool Corp. Tech. Bull. pp 283-286.