

## Effects of tillage on burial of pasture legume seed and seedling emergence

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Tillage practices for cereal crops greatly influence burial of annual pasture legume seeds, subsequent germination of these seeds, and emergence and productivity of the pasture (1,2). This paper summarizes the effects of seven distinct tillage treatments on seed burial and seedling emergence of two medic species during the crop phase of a cereal-pasture rotation.

### Methods

Pods, from the 1987 growing season, of snail medic (*Medicago scutellata*) cv. Sava and barrel medic (*Medicago truncatula*) cv. Paraggio were spread separately at the rate of 4000kg/ha on four groups of seven drill plots (2.1m x 20m) in a split block arrangement at the Bolivar field station on 7 June 1988. The experiment site was a level, medic-free, loamy sand over clay. Seven tillage treatments each involving one pass of the implement were then applied to the plots as follows: A = No tillage control; B = Combine (tined) with working depth (w/d) 6-8cm; C = Scarifier, w/d 6-8cm; D = Trash cultiseeder, w/d 6-8cm; E = Offset disc harrows, w/d 8-10cm; F = Single disc plough, w/d 8-10cm; G = Mouldboard plough, w/d 15-18cm. After applying these tillage treatments, oats cv. Coolabah was sown with a 14 row narrow-tined drill over half of each plot but ensuring that all half-plots had the same disturbance with the drill. Emergence counts were made on 29 June 1988. Soil core samples of 29mm diameter were taken in September 1988 to estimate profile distribution of pods and loose seed.

### Results and discussion

**Table 1. The percentage profile distribution of snail(S) and barrel(B) medic seed, percentage emergence and the mean depth from which seedlings emerged. (Seed data are based on 80 cores).**

| Depth (cm)           | Tillage treatments and species |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------------------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                      | A                              |     | B   |     | C   |     | D   |     | E   |     | F   |     | G   |     |
|                      | S                              | B   | S   | B   | S   | B   | S   | B   | S   | B   | S   | B   | S   | B   |
| 0-2.5                | 96                             | 97  | 82  | 85  | 66  | 58  | 62  | 34  | 33  | 36  | 23  | 22  | 9   | 1   |
| 2.5-5.0              | 4                              | 3   | 16  | 14  | 21  | 23  | 19  | 42  | 22  | 29  | 21  | 23  | 7   | 4   |
| 5.0-7.5              | 0                              | 0   | 2   | 1   | 11  | 15  | 17  | 24  | 24  | 26  | 40  | 41  | 24  | 40  |
| 7.5-10.0             | 0                              | 0   | 0   | 0   | 2   | 3   | 2   | 0   | 13  | 8   | 15  | 13  | 35  | 26  |
| 10.0-15.0            | 0                              | 0   | 0   | 0   | 0   | 1   | 0   | 0   | 8   | 1   | 1   | 1   | 25  | 29  |
| Emergence (%)        | 6.4                            | 8.3 | 7.9 | 8.6 | 7.5 | 7.2 | 6.1 | 6.1 | 5.9 | 5.6 | 5.6 | 5.3 | 3.4 | 1.5 |
| Emergence depth (mm) | 11                             | 11  | 28  | 24  | 38  | 21  | 33  | 23  | 38  | 25  | 39  | 26  | 58  | 30  |

The data show clearly that with increasing depth of tillage there is an increased depth of burial of medic pods and a decreased emergence of seedlings. This is of little consequence in the crop year but becomes highly undesirable during the pasture regeneration year. It is noteworthy that snail medic (18.1mg/seed) and barrel medic (3.5mg/seed) did not emerge from mean depths greater than 58mm and 30mm respectively in this soil. Thus cereal farmers can greatly benefit by paying more attention to depth of tillage, especially avoiding working disc implements at depths exceeding 8-10cm. The experiment will continue to enable emergence counts to be made on the two species of medic in 1989 and 1990.

1. Carter, E.D., Thomas, P., Fletcher, E. and Cotze, E. (1987). Waite Agricultural Research Institute Biennial Report 1986-87, p.53.

2. Taylor, G.B. (1985). *Aust. J. Exp. Agric.* 25, 568-573.