

Medic seed distribution in soil profiles

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The distribution of legume seed in the soil profile has a bearing on two fundamental biological processes: firstly, with hard seed of legumes, increasing depth in the soil retards breakdown of seed coat impermeability (1); secondly, seeds which germinate are impeded in their emergence through the soil if they are buried too deeply (2). Few data have been published on the distribution of annual legume seed in soil profiles, especially in common farming systems. This paper summarizes data on the amount of annual medic seed at various depths in the soil profile and the possible influence that different tillage implements may have had on the pattern of seed distribution.

Methods

Soil cores were taken after the commencement of the growing season in early June 1986, at three sites: Site 1, Relbanks; Sites 2 and 3, Palmer, South Australia. Eighty cores (diameter 50 mm and 15 cm depth) were extracted from each site. Each soil core was divided into 2.5 cm depth intervals. Medic pods were separated from the soil by wet sieving and after drying, pod weight and number were determined. Seed germination in the pods was assessed by keeping the pods moist at 20 C in a humidified incubator. After threshing the pods, seed weight and number were also determined. At all Sites *Medicago truncatula* was the predominant legume seed with a considerable amount of *Medicago minima* seed also present at Site 3. Primary tillage at Site 1 was with a scarifier and this site had not been ploughed in the last 10 years. The other two sites had more recently been disc ploughed. Depth of tillage was not measured.

Results and Discussion

Seed germination in the pods was very low (<0.1%), however, as expected, most seed in the soil was impermeable as the growing season had commenced. No seed was found below 7.5 cm at Sites 1 and 2. About 20 percent of the *M. truncatula* seed at Site 3 was found below 7.5 cm and slightly less than half was below 5.0 cm at that site (Table 1).

Table 1 Medic seed distribution in soil profiles as a percentage of the total number. (The first three columns show *M. truncatula*)

Depth Interval (cm)	Site 1	Site 2	Site 3	Site 3 (<i>M. minima</i>)
0- 2.5	45.0	58.8	32.0	38.3
2.5- 5.0	41.9	27.1	24.7	24.8
5.0- 7.5	12.1	4.1	24.7	18.3
7.5- 10.0	0	0	15.6	17.6
10.0- 12.5	0	0	3.0	1.0
12.5- 15.0	0	0	0	0

Data from Site 3 show that deeper tillage may also bury seed of medics relatively deeply. This practice may be detrimental to the maintenance of medic plant densities in pasture swards, as there is less opportunity for softening of hard seed and emergence of seedlings is reduced. The decline in legume leys (3) may be partly caused by inappropriate tillage practices.

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