Effects of depth of sowing medic seeds on emergence of seedlings

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Tillage for cereal crops in wheat belt rotations buries clover and medic seeds produced in the pasture years. Observations suggest that deep burial of seed in the tillage program and lack of precision in depth of sowing cause low densities of pasture legumes both in Australia and overseas (1). This paper summarizes data on emergence of four medic species from three depths of sowing in sand and loam.

Methods

Seeds of Medicago scutellata cv. Robinson, M. rugosa cv. Paragosa, M. truncatula cv. Jemalong and M. littoralis cv. Harbinger were each sieved to give three seed sizes. Surface soil (0-15cm) of mallee sand from near Mallala and a red brown earth loam from the Waite Institute were sieved to remove debris and weighed into 15cm square, black plastic, free-draining pots which were located in a glasshouse. Twenty five seeds per pot were shown at 1,3 or 5cm depth and watered with rainwater. There were six replicates. After 14 days the plants were harvested.

Results and Discussion

Table 1. Percentage emergence+ and seedling dry weight of four medic species sown at three depths in both sand and loam. (Mean of three seed sizes.)

Species and Cultivar	Soil	Depth of sowing (cm)					
		1		3		5	
		(%)	(mg/pot)	(%)	(mg/pot)	(%)	(mg/pot)
M.scutellata cv. Robinson	Sand	99	305	94	257	93	241
(Seed weight 17.8mg)	Loam	64	172	40	84	9	13
M.rugosa cv. Paragosa	Sand	99	114	97	94	90	67
(Seed weight 6.5mg)	Loam	82	75	38	28	3	3
M.truncatula cv. Jemalong	Sand	90	66	81	48	53	26
(Seed weight 3.3mg)	Loam	73	41	28	16	1	1
M.littoralis cv. Harbinger	Sand	89	49	80	35	73	30
(Seed weight 2.7mg)	Loam	56	22	30	11	0	0

L.S.D. (5%) Soil x Depth of Sowing: Emergence = 10; Dry weight = 19

+ All data are adjusted for the percentage germination of the seeds.

As depth of sowing increased, emergence and seedling dry weight decreased: this was more obvious in the loam than the sand (Table 1). Emergence from the large seeds was less than that from seeds of medium size at 1cm and 3cm depth, especially in the loam (Table 2).

Table 2. Percentage emergence+ from different seed sizes. (Mean of 4 species.)

	Sand			Loam		
	1 cm	3 cm	5 cm	1 cm	3 cm	5 cm
Large	88	80	80	56	33	3
Medium	94	89	85	75	44	3
Small	100	94	66	75	25	4

L.S.D. (5%) Seed Size x Depth of Sowing = 8

This research has shown that emergence of medic seedlingsranges from 99% to 0% depending on cultivar, seed size, depth of sowing and soil texture. It highlights the need to avoid deep burial of medic seed by ploughing (2) and to avoid sowing the smaller-seeded medics below 1cm in loans.

1. Carter, E.D. 1974. A report prepared for CIMMYT, Mexico, and MARA, Algeria. Waite Agric. Res.Inst., South Aust. 54p. plus appendices.

2. Quigley, P.E., Carter,E.D. and Knowles, R.C. 1987. Proc.4th Aust.Agron.Conf., Melbourne.pp.