

Pasture legume seed survival following ingestion by sheep

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Carter has reported variability in survival of medic seeds following ingestion of intact pods by sheep (1) and also the selection by sheep of large pods before smaller pods of *Medicago truncatula* (2). Depletion of seed reserves of pasture legumes by overgrazing in summer and autumn has considerable ecological implications in terms of both pasture yield and botanical composition. This paper describes some of the ongoing research in 1986-87 on the survival of pasture legume seed following ingestion by sheep.

Methods

Three groups of five Merino wethers fitted with faecal-collection harnesses were used for concurrent testing of three legume species. *Medicago* and *Ornithopus* species were fed as whole pods at 150g/sheep and 100g/sheep respectively; *Trifolium balansae* and *T. resupinatum* were fed as unscarified seed at 20g/sheep and 10g/sheep respectively. *T. subterraneum* was fed as intact burrs at 150g/sheep. Initial hard seed percentage and seed weight were determined before feeding. Pods, burrs and loose seed were fed once, mixed with the daily diet comprising 600g pellets, 150g chaffed oat hay and 50g chaffed lucerne hay. A contrasting species was fed every 7 days. Sheep were fed and faecal collections made daily at 0900hr. The daily output of wet faeces from each sheep was weighed and a 100g subsample taken for extraction of seed by wet sieving. Sieve sizes of 1.0, 0.7 and 0.5mm were used according to seed size.

Results and discussion

Table 1. Seed fed and seed survival.

Legume Seed Fed	Seed Weight (mg)	Initial Hard Seed (%)	Seed Survival (%)
<i>Medicago arabica</i> SA 3792	2.9	2.7	0.1
<i>Medicago aculeata</i> SA 3059	10.4	88.5	2.8
<i>Medicago intertexta</i> SA 3447	16.0	75.6	1.9
<i>Medicago littoralis</i> SA 8682	1.7	95.4	3.5
<i>Medicago murex</i> 15415	4.5	73.9	1.0
<i>Medicago murex</i> 15443	5.6	66.0	1.2
<i>Medicago murex</i> 5320 (WA)	5.2	82.7	1.1
<i>Medicago murex</i> 64.11.1 (WA)	3.1	88.0	0.8
<i>Medicago murex</i> SA 4662†	6.6	90.6	0.4
<i>Medicago orbicularis</i> SA 7557	4.7	99.7	10.3
<i>Medicago polymorpha</i> SA 7455	4.6	97.8	4.7
<i>Medicago rigidula</i> SA 4708	6.9	85.0	0.7
<i>Medicago rugosa</i> cv. Paraponto	11.0	56.6	1.6
<i>Medicago rugosa</i> SA 9803	8.3	100.0	3.8
<i>Medicago sauvagei</i> SA 4636	5.5	89.8	8.4
<i>Medicago scutellata</i> cv. Sava†	15.9	87.2	1.9
<i>Medicago scutellata</i> SA 2681	14.8	90.3	2.8
<i>Medicago tornata</i> SA 17715	6.0	62.5	3.0
<i>Medicago turbinata</i> SA 3759	5.6	57.6	0.8
<i>Medicago truncatula</i> cv. Paraggio	4.5	74.9	1.7
<i>Medicago truncatula</i> SA 14159	4.8	74.6	4.2
<i>Ornithopus compressus</i> cv. Pitman†	1.8	73.0	2.0
<i>Ornithopus compressus</i> cv. Tauro	1.9	86.0	6.8
<i>Ornithopus sativa</i> G 19	1.7	2.0	0.5
<i>Trifolium balansae</i> cv. Paradana	0.8	85.2	37.9
<i>Trifolium resupinatum</i> cv. Kyambro	0.5	91.3	55.1
<i>Trifolium resupinatum</i> 12240	0.5	51.4	34.3
<i>Trifolium resupinatum</i> 18333	0.8	50.0	30.5
<i>Trifolium subterraneum</i> cv. Trikkala	7.7	80.6	1.7

†Mean of two separate feeding trials

The data show an obvious relation between seed size and seed survival in the *Trifolium* species though this is less clear for the *Medicago* species. Of special interest is the relatively high rate of seed survival of balansa clover and Kyambro Persian clover which contrasts with the older Maral cultivar which has virtually no hard seed. As a group, the *Medicago murex* lines survived ingestion poorly, which is a distinct disadvantage on hard-setting soils where sheep may prehend a high percentage of pods, though this would be less of a problem on sandy-textured surface soils to which this species may be well suited. As a whole, the data support the contention of one of us (EDC), that small, hard-seeded pasture legumes are ecologically best fitted for survival in self-regenerating sheep pastures. Further research on the ecological significance of seed size is proceeding.

(1) Carter E.D. (1980). Proc. Aust. Agron Conf. Lawes, Qld, Aust. p.178

(2) Carter E.D. (1981). Proc. XIV Int. Grassl. Cong., Ky, USA. p.p.447-50.