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## The ecology of skeleton weed (*Chondrilla juncea*) in Western Australia, seed pools and seedling establishment in pennyroyal (*Mentha pulegium*), regeneration of Afghan thistle (*Solanum hoplopetalum*)

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DEPARTMENT OF AGRICULTURE  
WESTERN AUSTRALIA

Experimental Summary 1982

1. The ecology of skeleton weed (Chondrilla juncea) in Western Australia
2. Seed pools and seedling establishment in pennyroyal (Mentha pulegium)
3. Regeneration of Afghan thistle (Solanum hoplopetalum)

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1. THE ECOLOGY OF SKELETON WEED IN WESTERN AUSTRALIA

Objective

To assess the viability of seed produced under natural conditions.

Experimental

Mature seed was collected from field-grown plants enclosed in nylon mesh stockings and was tested in the laboratory.

Results

Table 1. Cumulative germination percentage after 10 days at 25°C.

<u>Site</u>	<u>Date of Collection</u>	<u>Plant No.</u>	<u>Germination percentage</u>
East Chapman	29.12.82	1	88.0
		2	92.0
		3	95.0
		4	94.0
		5	90.0
East Badgingarra	30.12.82	(bulked)	74.0
Narembeen	4.01.83	(bulked)	95.0

Comments

Viability of seed produced early in the season was high. There was little or no evidence of seed dormancy.

## 2. SEED POOLS AND SEEDLING ESTABLISHMENT IN PENNYROYAL

### Objectives

To determine the size of seed banks in different areas and to determine when seedling establishment occurs on a seasonal basis.

### Experimental

Soil samples were obtained in several sites and seeds were extracted.

Seedlings were marked within permanent quadrats at the same sites. At fortnightly intervals, the numbers of surviving seedlings were noted and new seedlings were marked.

### Results

Table 2. Seed density to a depth of 6.5 cm

Site	Seed Density (no. m <sup>-2</sup> x 10 <sup>-3</sup> )
Denmark (1)	91.7
Denmark (2)	176
Mt Barker	2.11
Frankland	5.35

Table 3a. Survivorship of Pennyroyal seedlings at Denmark

<u>Cohort No.</u>	<u>Date</u>	<u>Total no.</u>	<u>Proportion alive</u>
1	3.11.82*	213	1.00
	17.11.82	210	0.986
	2.12.82	148	0.695
	16.12.82	80	0.376
	30.12.82	16	0.0751
	13.01.83	4	0.0188
2	17.11.82*	56	1.00
	2.12.82	28	0.500
	16.11.82	10	0.178
	30.12.82	0	0.000
3	2.12.82*	60	1.00
	16.12.82	22	0.367
	30.12.82	3	0.050
	13.01.83	0	0.000
4	16.12.82*	16	1.00
	30.12.82	3	0.188
	13.01.83	0	0.000
5	30.12.82*	2	1.00
	13.01.83	0	0.00

\* date cohort first recorded

Table 3b. Survivorship of Pennyroyal seedlings at Mt. Barker

<u>Cohort No.</u>	<u>Date</u>	<u>Total no.</u>	<u>Proportion alive</u>
1	1.11.82*	385	1.00
	15.11.82	374	0.971
	1.12.82	339	0.880
	15.12.82	302	0.784
	29.12.82	141	0.366
	12.01.83	75	0.195
2	15.11.82*	31	1.00
	1.12.82	22	0.710
	15.12.82	10	0.322
	29.12.82	0	0.000
3	1.12.82*	7	1.00
	15.12.82	0	0.00

\*date cohort first recorded

Table 3c. Survivorship of Pennyroyal seedlings at Frankland.

<u>Cohort No.</u>	<u>Date</u>	<u>Total no.</u>	<u>Proportion alive</u>
1	2.11.82*	174	1.00
	16.11.82	119	0.683
	1.12.82	62	0.356
	15.12.82	40	0.230
	29.12.82	29	0.167
	12.01.83	20	0.116
2	1.12.82*	63	1.00
	15.12.82	0	0.00

\*date cohort first recorded

Comments

Seed densities were considerably higher in coastal sites.

All seedlings surviving to the last count had appeared before November. No seedlings appearing during or after November survived. Mortality rates for the first cohort were higher in Denmark than in Mt. Barker and Frankland.

### 3. REGENERATION OF AFGHAN THISTLE

#### Objectives

1. To assess the relative contribution of reproduction by seed and root fragments to the persistence and growth of populations.
2. To determine if reproduction from root fragments occurs more readily at certain times of the year.

#### Experimental

Soil samples were taken from sites at Toodyay, Cunderdin and Quairading and sieved for seed contents.

Root fragments (3 cm) taken from flowering plants were incubated in darkness at constant temperatures.

#### Results

Viable seeds were found in soil from only one site (Toodyay), at a density of 40 m<sup>-2</sup>.

Table 4. Cumulative sprouting percentage at 6 weeks for lateral root fragments kept in darkness at constant temperature.

<u>Diameter size class (mm)</u>	<u>Temperature (°C)</u>			
	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>
2-4	26.7	31.7	28.3	31.7
4-6	16.7	29.2	29.2	8.3
>6	33.3	33.3	33.3	0

#### Comments

This species does not develop large, persistent seed banks.

Regeneration may occur from root fragments of various sizes, although potential for regeneration is low during flowering. Regeneration from the smallest fragments appeared to be unaffected by temperature over the range investigated.