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## Experiments to measure the reduction of Soursob density.

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RESEARCH REPORT

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EXPERIMENTS

1. To measure the reduction of soursob density twelve months after herbicide applications in cereal crops.

Northam  
Toodyay  
Greenough.

2. To determine the optimum growth stage of a cereal crop for spraying and a suitable rate of application of the herbicides diuron, linuron and tribunil for soursob control.

Northam  
Greenough.

3. To test the various formulations of diuron to determine whether any differences exist which cause suppression of cereal growth.

Wongan Hills R.S.	74 WH 41
Chapman Valley R.S.	74 C 19
Esperance Downs R.S.	74 E 16

4. To determine the effect of sowing a crop over an area previously treated with high rates of diuron used for roadside and firebreak control of soursob.

5. To test several chemicals for control of matricaria.

6. To determine whether Skeleton weed seed collected from maturing plants is capable of germinating.

7. To determine whether any differences exist in the length of Skeleton weed seed collected from different sites.

Soursob (*Oxalis pes-caprae* L.) is a major weed of pastures and cereal crops in areas adjacent to the major water courses in the cereal growing districts of Greenough, Moora, Northam, York, Quairading and Narrogin. Several other small infestations are present where the weed has escaped from farm gardens.

The weed in agricultural situations reproduces by bulbs. The plant appears immediately after the break of the season and establishes itself to the detriment of pasture. Under cropping situations cultivation for preparation of the seed bed only aids in spreading and multiplying the plant numbers. For this reason it is a very strong competitor in cereals.

It has also been reported that under certain conditions, deaths of stock grazing heavily soursob infested pasture can result from oxalic acid in the plant causing severe kidney damage.

Previous research has been undertaken to determine whether control is possible within pastures and crops. Results have indicated that the most successful control has been under cropping situations, and experiments have been continued to arrive at a firm recommendation for control in cereals.

1. To measure the reduction of soursob density twelve months after herbicide applications in cereals.

<u>Location</u>	Northam
	Toodyay
	Greenough.

#### History

All sites had been heavily infested with soursob for a number of years. Herbicides diuron, linuron and tribunil were applied to the cereals at the 2-5 leaf stage of growth of the crop during 1973.

<u>Soil Types</u>	Northam	-	Brown fine sandy loam
	Toodyay	-	" " " "
	Greenough	-	Brown loamy clay.

#### Method

Twenty plant counts of 25 x 40 cms were taken from each plot.

Results

	Plant Counts/m <sup>2</sup>			Percent Reduction of Soursob		
	Northam	Toodyay	Greenough	Northam	Toodyay	Greencugh
Tr 1. Diuron 1.1 Kg/ha	77	358	80	81	99	86
Tr 2. Diuron 1.7 Kg/ha	41	102	68	92	88	88
Tr 3. Tribunil 0.8 Kg/ha	208	465	329	50	47	43
Tr 4. Tribunil 1.1 Kg/ha	241	411	254	42	53	56
Tr 5. Linuron 0.8 Kg/ha	122	399	243	72	55	58
Tr 6. Linuron 1.1 Kg/ha	91	356	129	78	62	77
Tr 7. Untreated	416	882	581	0	0	0

2. To determine the optimum growth stage of a cereal crop for spraying and a suitable rate of application of the herbicides diuron, linuron and tribunil for soursob control.

Location Northam

Soil Type Brown fine sandy loam.

Method

Plots 20 m x 3 m. Plots sprayed at three rates of chemical. 1, 2 and 3 Kg/ha at three stages of growth of the cereal crop. (Roughly 1½ to 2½ leaves, 2½ to 5 leaves and early tillering stage.) At maturity 10 rows x 20 m of each plot harvested.

Results

Herbicide	Rate Kg/ha	Average Yield Kg/Plot Stage of Cereal Growth		
		1½ - 2½	2½ - 5	Tillering
Diuron	1	5.1	3.6	1.9
	2	6.4	4.6	0.2
	3	4.6	2.9	0
Linuron	1	<del>5.0</del> 5.2	3.7	2.8
	2	<del>4.2</del> 5.7	4.0	3.9
	3	<del>4.7</del> 6.9	5.4	3.0
Tribunil	1	<del>5.0</del> 5.0	4.9	3.9
	2	<del>5.1</del> 4.2	5.3	3.4
	3	<del>6.9</del> 4.7	4.2	4.3
Untreated		2.9		

Location . Greenough.

Soil Type Brown loamy clay.

History of Site

Paddock cropped for second year in succession.

Method

As for Northam except plots 40m x 5m and harvested sample from 10 rows x 40 m.

Results

Herbicide	Rate Kg/ha	Average Yield Kg/Plot Stage of Cercal Growth		
		1½ - 2½	2½ - 5	Tillering
Diuron	1	7.9	3.8	1.4
	2	7.8	1.0	1.2
	3	4.1	0.1	0.1
Linuron	1	7.8	4.8	3.4
	2	7.4	5.5	2.1
	3	8.7	3.9	0.7
Tribunil	1	7.5	4.6	3.9
	2	8.2	5.8	4.9
	3	7.7	5.8	4.2
Untreated		4.2		

Comment

Plant counts will be taken at both sites after the break of the season in 1975 to determine the reduction of source density with the various herbicide treatments.

Estimated net returns per hectare from early spraying treatments at both sites. Net returns only considers the

cost of the herbicide and its application and assuming 1975 wheat price of \$110.00 per tonne.

Diuron	\$6.70	/	kg
Linuron	\$10.30	/	kg
Tribunil	\$6.90	/	kg
Application	\$2.00	/	kg

Estimated Net Returns \$/ha

Treatment		Northam	Greenough
Diuron	1 Kg/ha	168	123
	2	205	117
	3	138	50
Linuron	1 Kg/ha	169	122
	2	174	104
	3	204	116
Tribunil	1 Kg/ha	164	114
	2	130	125
	3	140	111
Untreated		103	72

3. To test the various formulations of diuron to determine whether any differences exist which cause suppression of cereal growth in a crop that is weed free.

Location                   Wongan Hills Research Station  
74WH41.

Soil Type                   Yaling loamy gravel and Wongan  
loamy sand.

Location                   Chapman Valley Research Station  
74C19.

Soil Type                   Chapman loamy sand and Chapman  
sandy loam.

Method

Plots 20 m x 3 m at Wongan Hills Research Station and  
40 m x 3 m at Chapman Valley Research Station sprayed  
with the four formulations at the 2-5 leaf stage of  
cereal growth.

Gamenya wheat variety at Chapman Research Station.  
Egret wheat variety at Wongan Research Station.



Results

Herbicide	Rate Kg/ha	Average Yield Kg/Plot	
		Chapman Valley Res. Stn.	Wongan Hills Res. Stn.
Nocweed Diuron	1	8.67	3.9
	2	0	3.4
	3	0	4.0
Diuron BL	1	9.27	3.4
	2	0	3.4
	3	0	3.7
Diurex 80	1	8.10	3.0
	2	0	3.3
	3	0	3.0
Karmex	1	7.80	3.0
	2	0	4.0
	3	0	2.2
Untreated		13.00	2.7

Comment

A similar experiment was conducted at the Esperance Downs Research Station in a crop of Dampier Barley. Visual ratings were made during the early portion of the season and no visible depression due to any of the diuron formulations was noted. Due to root rot affecting the major part of the experiment later in the season, no yield data was taken.

More work needed to determine the effects of soil moisture, temperature and level of soil organic matter on the performance of the herbicide in this State.

4. To determine the effect of sowing a crop over an area previously treated with high rates of diuron used for roadside and firebreak control of soursob.

Location Northam.

Soil Type Brown fine sandy loam.

Method

Treatments of 3.5 and 6.5 Kg/ha applied during 1972. In 1974 a bulk crop of Gamanya wheat sown through the treated areas.

Samples of 1 row x 1 m were taken from the mature crop and the following measurement taken.

- No. of plants of wheat
- No of heads of wheat
- Height of wheat
- Total dry weight
- Grain weight
- Estimated Total nitrogen Kg/ha

Treatment	Repli- cation	No. of Plants 1 row x 1m	No. of Heads	Plant Height M	Total Dry Weight G	Grain Weight G	Total Nitrogen Kg/ha
Diuron 3.5 Kg/ha	1	21	56	1.48	547	80	131
	2	17	49	1.29	544	70	129
Diuron 6.5 Kg/ha	1	20	70	1.42	594	93	126
	2	25	84	1.47	593	100	130
Untreated		26	38	0.83	144	31	25

Matricaria (Pentzia suffruticosa (L.) merxm) is a recently introduced weed into Western Australia. At present its distribution is limited to several sheep stations east and north of Kalgoorlie. Small infestations are known on agricultural land between Trayning and Kellerberrin.

The weed, a member of the compositae, is a winter growing annual. At maturity the plants which can grow up to 150 cms in height set enormous amounts of seed which are tightly held in the flower head. Plant is recognised during the growing season by its characteristic strong colour.

It has been reported from other states of Australia that this weed causes tainting of meat and milk products if it is grazed. In cropping conditions it is also known to compete strongly.

5. To test several chemicals for control of matricaria along roadsides.

Location                      Mount Monger Station, Kalgoorlie.

Method

Experiment was sprayed using the following chemicals, linuron, tribunil, brominil M, and 2,4-D amine. Treatments were applied in May using 560 litres of water per hectare. Visual rating of the trial was made in September.

Results                      P.T.O.

Comment

Treatments to be repeated this season at earlier growth stage and using lower rates of herbicides.

Results from page 10.

Chemical Control of Matricaria along Roadsides  
Location Kalgoorlie

Treatment	Percentage Control from visual ratings
1) Linuron 1Kg/ha	18
2) " 2 "	52
3) " 4 "	75
4) Tribunil 1Kg/ha	16
5) " 2 "	26
6) " 4 "	30
7) Brominil M 2.5 l/ha	90
8) " 5.0 "	100
9) " 7.5 "	100
10) Linuron 1Kg +24-D amine 2 l/ha	65
11) " 2 " "	78
12) Tribunil 1Kg " "	54
13) " 2Kg " "	45
14) 24-D amine 2 l/ha	50
15) Untreated	0

Skeleton Weed (Chondrilla juncea.L.)

Small infestations of Skeleton Weed have been reported in this state since 1963. With the large increase in area and number of infestations more emphasis has been placed on this plant.

Skeleton Weed is a perennial herb with a deeply penetrating tap root. Although considered as valuable summer fodder by some farmers in the eastern states its benefits are far fewer than the problems associated with the weed under cropping situations. It is a strong competitor for moisture and nitrogen and can reduce yields by as much as fifty percent. In addition the wiry nature of the topgrowth often results in harvest<sup>ers</sup> being choked.

It is generally accepted that three forms of Skeleton Weed exist in the eastern states. The main features used to distinguish these forms are leaf profile, inflorescence and seed length. As yet no positive identification of the forms in Western Australia has been made.

- 6) To determine whether seed collected from maturing plants is capable of germinating.

Method Seed collected from plants found at:-

Narrembeen  
Pithara  
Kewdale  
Forrestfield  
Moorine Rock

Twenty-five seeds from each site were germinated between paper in petri dishes. A Daily fluctuating temperatures of +2-18°C were used.

Results

Site of Seed Collection	Germination percentage
Narrembeen	95
Pithara	70
Kewdale	75
Forrestfield	62
Moorine Rock	80

- 7) To determine whether any differences exist in the length of Skeleton Weed seed collected from different sites.

Method Seeds from Pithara and Narrembeen plants were collected. The plants had been grown from rosettes in a phyton cabinet set at 20-25°C. Fifteen seed from each site were measured ~~under~~ a microscope.

Results

Site	Length Seed mm
Pithara	3.73
Narrembeen	3.94

In addition field and laboratory studies are in progress on the following weeds.

Thornapples - *Datura* sp.

Salvinia - *Salvinia molesta* D.S. Mitchell

Saffron Thistle - *Carthamus lanatus* L.

Cape Tulip - *Homeria* spp.

Mexican Poppy - *Argemone Mexicana* L.