

Fenugreek Agronomy Trials

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Summary

Higher sowing rates resulted in higher dry matter yield at late flowering and higher seed yield with no significant differences between varieties “Fenugreek” and “A287”. Patchy emergence, high weed infestation and the dry season meant that target densities were not reached and thus results should be treated with caution. Fenugreek seed size is variable and should be considered when determining sowing rates. The application of Rovral seed dressing reduced root nodulation, dry matter and seed yield. P Pickle T did not effect nodulation indicating it may be a useful option for protection against fungal disease.

Introduction

Fenugreek (*Trigonella foenum-graecum*) is a legume grown to a limited extent in the Wimmera and southern Mallee as green manure or seed crop. The seeds are a major component of curry powder and are also used to make imitation maple syrup and vanilla essence as well as having pharmaceutical properties. The grain market offers good prices (up to \$400-500/t) but the market is small and volatile. Fenugreek shows great promise as green manure crop with wheat yields after fenugreek green manure similar to yields after vetch and higher than after medic. Overseas research has found fenugreek plant material to adversely effect soil pathogens including nematodes and fungi.

A project commenced in 1997 investigating the role of fenugreek in south eastern Australian farming systems. This is a collaborative project between Longerenong College and AWB Limited Seeds (formerly Revell Seeds). Experiences in 1997 posed questions about sowing rates, inoculation and disease management. Two trials were conducted at Birchip in 1998 to investigate these issues.

Trial 131: The Effect of sowing rate and variety on dry matter and grain yield of fenugreek.

Background

Data from 1997 trials showed differences between varieties for yield and dry matter production and plant structure. Some varieties were more branched than others and it was thought that this may effect optimum plant density. Information on optimum plant densities and recommended sowing rates for fenugreek was scant and contradictory. The aim of this trial was to investigate the effect of sowing rate on dry matter and yield for two varieties of varying plant structure.

Methods

The trial was located at Birchip Cropping Group main site. Treatments included two varieties and three sowing rates (Table 1). Each treatment was replicated 3 times. Seed was inoculated with *Trigonella* inoculum and dressed with P-Pickle T. Grain Legume Super with Zn was applied at 80 kg/ha.

Plant densities were recorded after emergence and during late flowering (early October). Dry matter yields were taken at late flowering and at harvest.

Table 1: Description of treatments

Variety	Sowing rate	Target Plant Density
Fenugreek	12.5	100
A287	12.5	100
Fenugreek	25	200
A287	25	200
Fenugreek	37.5	300
A287	37.5	300

Results and Interpretation

Establishment was difficult with such a dry start to the season resulting in some patchy plots. These plots became very weedy late in the season and one replicate was particularly poor. Analysis of results showed this replicate to be significantly different and hence further analysis was conducted on only two replicates. This should be remembered when drawing conclusions from the results presented.

Table 2: Effect of sowing rate on plant density, dry matter production and seed yield

Sowing Rate	Plant Density (plants/m ²)		Dry Matter (g/m ²)		Grain Yield (g/m ²)
	Emergence	Late Flowering	Late flowering	Harvest	
Low	56	85	107	118	23.8
Medium	73	87	103	156	44
High	145	138	187	195	65.1
LSD	14	34	67	Not significant	39.8
P-value	<0.001	<0.05	<0.05	due to large range	<0.1

Effect of variety

Variety A287 was more branched than “Fenugreek” but there was no difference between varieties for plant population, dry matter production or seed yield.

Effect of sowing rate

The highest sowing rate resulted in significantly higher plant densities, dry matter production and seed yield (Table 2). Even though the high sowing rate treatment performed best it should be noted that the average plant population of this treatment was only 140 plants per m² (60% establishment) which is equivalent to approximately 20kg/ha if 85% emergence was achieved. This experiment needs to be repeated before reliable sowing rate recommendations can be made. Another factor to consider when deciding on sowing rate is seed size. Fenugreek seed size varied from 8g/1000 seeds to 20 g/1000 seeds in the 1997 trials. In terms of sowing rate this could mean 12kg/ha compared to 30 kg/ha to achieve the same plant population. The two varieties used in this trial were of similar seed size.

Trial 132: The effect of inoculation and fungicidal seed dressings on Fenugreek production

Background

In 1997 trials, differences in root nodulation were observed between varieties even though all varieties had been inoculated with the same rhizobium. Root disease symptoms (thought to be fungal) were also observed. It has been suggested that a seed dressing such as P-Pickle T would be a good safeguard for the establishment of fenugreek crops. This experiment aimed to assess the effect of fungicide seed treatments on root nodulation and plant growth and to see if any varietal differences occurred.

Methods

The trial was located at Birchip Cropping Group main site. Treatments included two varieties and five fungicide/inoculant combinations (Table 3). Each treatment was replicated 3 times. Grain Legume Super with Zn was applied at 80 kg/ha.

Table 3: Description of treatments

Varieties		Fungicides	Inoculum
A80	Introduction from Egypt	Nil	Nil
	Nodulated well in 1997	P Pickle T (thiabendazole + thiram)	<i>R.meliloti</i> trigonella
	Root disease symptoms in 1997	Rovral (iprodione)	
	Large seeds	P Pickle T + Rovral	
	Sown @ 25 kg/ha		

Fenugreek Landrace sold by Revell Seeds
 Nodulated poorly in 1997
 Root disease symptoms in 1997
 Small seeds
 Sown @20kg/ha

Plants were dug up midway through the growing season and roots were given a score between 1 (poor) and 5 (excellent) for the extent of nodulation. Dry matter cuts were taken at late flowering and seed was harvested in late November.

Results

Table 4: Effect of fungicide and inoculation on nodulation, dry matter and yield

Observation	Variety	-Inoculum -Fungicide	Inoculum -Fungicide	Inoculum P Pickle T	Inoculum Rovral	Inoculum P +R	P<0.05
Nodulation Score 1= poor 5= excellent	A80	3	2.5	4	3	3.5	Y
	Fenugreek	2	3	3	1.5	1.5	Y
	Average	2.5	2.7	3.5	2.3	2.3	
Dry matter @ late flowering g/m ²	A80	116	114	146	80	142	
	Fenugreek	140	97	142	79	112	
	Average	128	106	144	80	127	
Grain Yield g/m ²	A80	43.1	41.4	43.3	23.3	41.3	
	Fenugreek	41.9	36.7	39.8	28.6	30.5	
	Average	42.5	39.5	41.6	25.8	35.9	

There was no difference in nodulation, dry matter or yield for the inoculation treatments. Uninoculated plots were nodulated indicating either lateral movement of rhizobium between plots or a naturally occurring population. A80 was slightly better nodulated than 'fenugreek'.

There was little evidence of root disease in either treated or untreated plots. The application of Rovral reduced nodulation and adversely effected dry matter and yield. Application of P-Pickle T did not effect yield or dry matter, but there was no adverse effect on nodulation. Yield and dry matter differences between the two fungicides results were not statistically significant.

Interpretation

The inoculation of fenugreek seed with *Trigonella rhizobium* is wise practice and cheap insurance even though uninoculated plots performed well in this experiment. Being a new crop to the region few paddocks would have a history of fenugreek production and natural rhizobium populations may occur in some areas but the extent is unknown.

In this trial, P Pickle T was used without affecting nodulation. Fenugreek crops in the Wimmera have been prone to disease with both fungal and bacterial pathogens being isolated. A fungicidal seed dressing should provide protection from fungal disease during establishment and help get the crop off to a good healthy start. Healthy crops should be less prone to bacterial infection.