SUMMER FORAGE PRODUCTION FROM FIELD PEAS

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ABSTRACT

The potential of field peas as a summer forage crop was assessed in three trials. They were spring-sown in two seasons at Gore (2) and Lincoln (1). Several cultivars and selections were sown in each trial at seed rates calculated to give 100 plants/m². The crops were managed using standard farming practices. Samples were harvested to measure dry matter yields about 90 and 120 days after sowing. Mean yields ranged from 4.7 to 13.7 t/ha. Several of the lines tested, particularly Whero and CR2-353, produced high yields consistently, and are potentially useful summer forage crops.

Additional Key Words: forage peas, cultivars, yield

INTRODUCTION

In many areas of New Zealand, pasture growth is often limited by insufficient summer rainfall creating a need for annual greenfeed crops to supplement pasture production in mid to late summer. There is also a need to conserve forages for supplementary winter feeding.

Traditional summer crops often require high fertiliser inputs and can be limited to areas of suitable climate, for example maize and millet. Therefore there is scope for the expansion of new or previously under exploited forage crops.

For many years forage peas have been used in Europe and North America to augment summer forage production and they are conserved as a winter feed supplement (Brundage *et al.*, 1979; Johnson, 1979). Recently, forage peas have been the subject of intensive development programmes in the U.K. and Europe with forage cultivars now commerically available. Two such cultivars, Progasil and Columba are characterised by long fleshy stems, large leaves and high yields of green material. Some semi-leafless pea types have also proved suitable, being of medium height with good standing ability, fleshy stems, large stipules and a profusion of tendrils. Forage peas can be grown with cereals such as oats to reduce lodging. This has no marked effect on DM yield but the organic matter digestibility and crude protein concentration is reduced (Potts, 1982). The forage pea crop is fast growing, requires low fertiliser input and is largely free of pests and disease once established.

The trials described were designed to determine the potential dry matter yields of forage peas under New Zealand conditions using a range of cultivars and advanced breeding lines.

MATERIALS AND METHODS

Several field pea cultivars and advanced breeding lines were tested in three trials at Gore (2) and Lincoln (1). Details of treatments, sowing and harvest dates are presented in Tables 1 and 2.

All harvests were made as close as possible to 90 and 120 days after sowing.

TABLE 1: Trial site and treatment details.

Cultivar[2]	Season[1] Gore	Lincoln	Straw Length	Cultivar Description
Whero	1,2	2	long	Maple pea cultivar
Progasil	1	—	long	European forage pea
Columba	1	—	long	European forage pea
CR2-352	1,2	—	medium	Semi-leafless maple pea
CR2-353	1,2	2	medium	Semi-leafless maple pea
WXK 389	1	—	medium	Maple pea breeding line
Morehu	2	2	long	Leafy blue pea cultivar
FWV*WH	2	—	medium	Maple pea breeding line
CR2-351	—	—	long	Semi-leafless maple pea
CR2-357	2	2	medium	Semi-leafless blue pea
CR3-359	2	2	medium	Semi-leafless maple pea

[1] 1 = 1982/83 spring sown
2 = 1983/84 spring sown
[2] numbered lines are advanced breeding lines

TABLE 2: Sowing dates and days to harvest.

	Sowing dates	Harvest (days from sowing) 1st	2nd
Gore	19.10.82	92	122
	18.10.83	93	122
Lincoln	21.09.83	105	120

Gore

Trials were sown in two seasons into a Waimumu silt loam. Experimental design was a randomised complete block with four replications. Plots were 10 m long consisting of nine rows 0.12 m apart. About one hundred plants/m² were established with 250 kg/ha NPK fertiliser (13:15:10) and 1.2 kg/ha a.i. trifluralin pre-plant incorporated. A post emergence weed spray comprising 1.0 kg cyanizine and 0.75 litres MCPB per hectare was applied at the 6-8 node growth stage.

A 3.3m² area was hand harvested at ground level from each plot, the herbage weighed and a subsample oven dried to determine dry matter content.

Lincoln

This trial was sown into a heavy Templeton silt loam as a randomised block with six replications. Plots were 10 m long consisting of nine rows 0.15 m apart. Trifluralin at 1.2 kg/ha a.i. was incorporated into the seed bed and the seeding rate established 100 plants/m^2. A post emergence weed spray comprising 0.35 kg/ha a.i. metribuzin was applied at the 6-8 node growth stage. The trial was irrigated with 25 mm water on 2nd December.

A 2.5 m^2 area of each plot was hand harvested at ground level, the herbage weighed and a subsample oven dried to determine dry matter production.

RESULTS AND DISCUSSION

All trials established well. Wet and cool conditions in January and February provided excellent growing conditions in both seasons.

The optimum harvest time for forage peas is considered to occur when the lower pods are fully formed but not completely swollen. This optimum fell between the two harvests at approximately 100 days from sowing with senescence beginning in the conventionally leafed plants by 120 days. Vines of the conventional leaf types were approximately 1.2 m long and prostrate. The semi-leafless types were upright, compact and vines were 0.6 m and 0.8 m in length with no senescence occuring. Mean dry weights for each harvest are given in Table 3.

TABLE 3: Mean dry matter yields for both harvests at Gore and Lincoln (t/ha).

	GORE				LINCOLN	
Year	1982-83		1983-84		1983-84	
Days to harvest	92	122	93	122	105	120
Cultivar						
Whero	5.6	11.7	4.9	8.1	8.0	17.4
CR2-352	7.4	10.7	4.6	6.3	—	—
CR2-353	7.8	12.2	5.1	6.4	9.6	17.8
Progasil	6.8	13.2	—	—	—	—
Columba	6.5	11.5	—	—	—	—
WXK 389	6.6	10.3	—	—	—	—
Morehu	—	—	4.6	4.8	7.6	15.4
CR2-351	—	—	—	—	9.6	15.7
CR2-357	—	—	4.9	6.2	—	—
CR3-359	—	—	5.4	7.5	9.5	13.6
FWV*WH	—	—	5.0	7.3	—	—
L.S.D. 5%	1.6	2.7	0.6	1.3	0.7	1.9
C.V.%	19.7	19.3	8.1	14.1	6.6	9.9

Gore

In the 1982 trial, CR2-352 and CR2-353 were found to be significantly higher yielding than Whero at 92 days from sowing. The second harvest in the same year showed Progasil to be significantly higher yielding than WXK389 and CR2-352. Dry matter content of lines ranged from 12-15% at 92 days to 19-22% at 122 days.

In the 1983 trial, CR3-359 significantly out yielded both Morehu and CR2-352 at 93 days from sowing with CR2-353 again yielding greater than average dry matter. At the second harvest at 122 days, Whero significantly outyielded CR2-352, CR2-353, CR2-357 and Morehu with CR-359 and FWV*WH showing greater than average dry matter production. Dry matter content ranged from 10-13% and 17-21%.

Lincoln

The semi-leafless line CR2-353, which has medium vine length, yielded similarly to CR2-351 and CR3-359 at the 105 day harvest but after 120 days was equalled only by Whero. Mean dry matter yields for the Lincoln trial were higher than those recorded at Gore, the result of an exceptional pea growing season. Rainfall during December to February was 240 mm, much greater than the 9 year average of 169 mm. This led to a doubling in dry weight of Whero and Morehu cultivars between the first and second harvests. Dry matter content at Lincoln was also higher than at Gore, increasing from 20-22% at the first harvest to 36-42% at the second harvest.

In the trials described, dry matter yields obtained compared favourably with other summer forages in use in New Zealand. Trials conducted by Mortlock (1975) showed that spring-sown rape in South Canterbury gave an average dry matter yield of 5 t/ha DM. The dry matter yields recorded at Lincoln were from an exceptional season for growing peas. In a typical dry Lincoln summer, yields this high would be unlikely.

There is no consistent yield advantage of conventional over semi-leafless lines, or of long over shorter strawed lines. The medium semi-leafless line CR2-353 was high yielding in all trials whereas a similar plant type in CR2-352 gave relatively low yields at Gore in both seasons. Whero and Morehu, both long strawed conventional cultivars, differed widely in yield.

The data from different harvest dates suggest that a medium strawed semi-leafless line with rapid dry matter accumulation would be preferred for early (90 days) harvest. The longer strawed cultivars "catch up" in dry matter accumulation for a later (120 days) harvest. Of the lines tested, Whero, Progasil and the local breeding line CR2-353 seem capable of producing satisfactory yields under New Zealand conditions.

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