A COMPARISON OF RYEGRASS CULTIVARS IN SOUTHCANTERBURY

1. Perennial Cultivars

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Abstract

The seasonal and annual production of New Zealand perennial ryegrasses were compared with that of a number of overseas cultivars. Several imported tetraploids established much more quickly than the New Zealand standards. R.V.P. Melle, Barlatra, S23 and New Zealand Mangere showed good summer drought resistance. At Waimate Mangere gave the highest seasonal and total production while at Timaru, where Mangere was not included, Grasslands Ruanui and Grasslands Ariki gave the highest autumn, spring and total yields. White clover was usually higher yielding when with the less productive ryegrasses. This often meant that ryegrass plus clover yield differences were less than those of the ryegrass cultivars alone

INTRODUCTION

OF APPROXIMATELY 270 000 ha of sown pasture in South Canterbury, about 95% is Grasslands Ruanui dominant with cocksfoot (*Dactylis glomerata*), dogstail (*Cynosurus cristatus*), white clover (*Trifolium repens*), Montgomery red clover (*T. pratense*) and subterranean clover (*T. subterraneum*), singly or in combination, the associated species.

The most common mixture is Ruanui perennial ryegrass and Huia white clover sown in February/March at the rate of 20 kg/ha ryegrass and 3 kg/ha white clover. Quite often the ryegrass in this mixture is saved for seed in the first year and white clover in the second year, the pasture being kept almost exclusively for stock grazing in the third and subsequent years.

Such pastures prove very persistent, some being dense and vigorous after more than 20 years, and provide yields of good quality feed varying from 5 000 to 14 000 kg DM/ha/year depending on age, climatic and soil fertility conditions. Usually, however, because many South Canterbury farms have cropping rotations, grass/clover swards are cultivated after five to eight years.

Despite its good performance, this pasture mixture has certain limitations, probably the most serious from the grazing point of view being that the ryegrass runs to seed in early summer. This leaves a stemmy, much less palatable ryegrass and, in the absence of leafy grasses, a more open, clover-dominant sward which is very susceptible to desiccation in the dry weather of January/February.

Although a considerable amount of work has been done comparing the yields of New Zealand ryegrasses, there is little information on the relative performance of New Zealand and overseas perennial cultivars. In the mid-1960s, two trials, the results of which are presented in this paper, were sown in South Canterbury to compare the persistency, seasonal and annual production of a number of New Zealand and imported perennial ryegrass cultivars.

WAIMATE TRIAL

METHOD

This was conducted on a flat alluvial soil, Templeton shallow silt loam, the site being of medium fertility and susceptible to drought. The area had been in grass for many years followed by swedes for winter feed and then a summer fallow. New Zealand Grasslands Ruanui and Ariki ryegrasses were compared with the New Zealand cultivar Mangere and eight imported perennial ryegrasses. All cultivars were broadcast in mid-February 1964 at the rate of 22 kg/ha with 3 kg Huia white clover and 250 kg DDT-superphosphate per hectare. Annual maintenance dressings of 125 kg/ha superphosphate were 'applied.

Measurement of dry matter production took place whenever each cultivar reached suitable sheep grazing height (6 to 8 cm) a mowing and clippings returned technique (Lynch, 1966) being used. Dry matter yields were determined on dissected grass/legume samples.

Because of continued dry conditions and limited production, particularly of Pelo and Combi, the trial was closed after three years of measurement.

RESULTS

Excellent establishment took place in almost all cultivars with Sceempter outstanding and R.V.P. Melle initially thin owing to poor germination.

Over the three-year trial period, Mangere, R.V.P. Melle, Ruanui and Ariki gave the highest mean spring production (Table 1). In addition, Mangere outyielded other cultivars in the autumn and gave, 'the. highest annual production. Under the very dry conditions prevailing in each of the three summers, Mangere and R.V.P. Melle stood out as being very drought resistant, remaining green in each December/January period.

TIMARU TRIAL

METHOD

The trial was conducted on the Timaru downlands (Claremont silt loam), the site being of medium fertility. The area had been in grass for seven years followed by a crop of swedes and choulmoellier for winter feed.

Of the eleven cultivars compared, six were overseas tetraploids* and five were diploid. Two of the latter were the standard New Zealand perennial ryegrasses, the other three† being imported lines.

*Barvestra — early hay type

*Barlatra — late hay type

*Barenza — pasture type

*Petra — leafy type

*Reveille — early hay type

*Taptoe — late hay type

†R.V.P. Melle

†S23

†S321

Grasslands Ruanui

Grasslands Ariki

All cultivars were sown in early March 1966 with 125 kg/ha superphosphate. Because of their large seed size the tetraploids were sown at 33 kg and the diploids at 22 kg/ha. All were sown with 3 kg/ha Huia white clover. The aim of the trial was to compare the establishment, seasonal and annual production of the different ryegrasses. Plots were 5 x 1.2 m with three replicates. Measurements were similar to those used in the Waimate trial. The trial was closed at the end of its third year because of grass grub (attack which affected all cultivars and allowed *Poa annua* to become dense.

TABLE 1: MEAN SEASONAL AND ANNUAL RYEGRASS PRODUCTION FOR THE THREE-YEAR PERIOD
FEBRUARY 1964 TO APRIL 1967 (kg DM/ha)
Mean grass plus legume production and country of origin in parentheses.

<i>Cultivar</i>	<i>Spring</i>	<i>Summer</i>	<i>Autumn</i>	<i>Annual</i>
Mangere (N.Z.)	2 230 aA (3 690)	550 abA (580)	290 aA (440)	3 070 aA (4 710)
R.V.P. Melle (Belgium)	2 050 abcAB (3 810)	570 aA (680)	250 abcAB (470)	2 870 aAB (4 610)
Grasslands Ariki (N.Z.)	2 110 abAB (3 490)	420 bcBC (500)	230 bcABC (420)	2 760 aAB (4 410)
Grasslands Ruanui (N.Z.)	2 050 abcAB (3 520)	300 cdeCD (350)	220 bcABC (400)	2 570 abAB (4 180)
S23 (U.K.)	1 740 bcABC (3 430)	530 abcAB (570)	260 abAB (450)	2 530 abAB (4 450)
Heraf (Netherlands)	1 720 bcdABC (3 360)	470 bcABC (510)	260 abAB (470)	2 450 abcAB (4 340)
Sceempter (Netherlands)	1 760 bcABC (3 480)	430 bcBC (470)	210 bcBC (390)	2 400 abcAB (4 340)
S101 (U.K.)	1 610 bcdBC (3 280)	530 abcAB (560)	260 abAB (440)	2 400 abcAB (4 280)
Combi (Netherlands)	1 560 cdBC (3 550)	450 bcBC (520)	210 bcBC (400)	2 220 bcBC (4 470)
Pelo (Netherlands)	1 550 cdBC (3 270)	440 bcBC (470)	200 bcBC (330)	2 190 bcBC (4 070)
Barenza (Netherlands)	1 490 cdeBC (3 370)	370 bcdBC (420)	210 bcBC (350)	2 070 bcdBC (4 140)
c v %	18.9	14.3	24.6	15.5

Treatment means do not differ when they have a letter in common; a 5% level of significance is denoted by small letters, 1% by capitals.

RESULTS

Excellent establishment took place in all cultivars except Reveille and Taptoe which had poor germination. This initially reduced the vigour of these two cultivars but good tillering later allowed them to produce well. The tetraploids established very quickly and for the first four to five weeks were more vigorous than the paler green, less leafy diploids. After this establishment period the diploids became high producing.

Spring Production (Table 2)

Ruanui and Ariki ryegrasses gave the highest grass and total yields and were much more vigorous than either the tetraploids or imported diploids. Usually all mixtures were very grass-dominant during this vigorous growth period.

Summer Production

R.V.P. Melle, Barlatra and, S23 ryegrasses gave the highest summer production though differences were generally small. These three cultivars showed to advantage in late summer when Ruanui and Ariki in particular had largely run to seed. In December/January all plots became very clover-dominant with most production coming from the legume.

Autumn Production

Ruanui and Ariki gave the highest grass and Ariki the highest total autumn yield. In the autumn none of the tetraploid cultivars was as vigorous as the New Zealand standards.

Winter Production

Because of the usual cold conditions, none of the cultivars grew in the mid-winter June/July period.

Annual Production

Over the three-year trial period, annual ryegrass production was greatest from the two New Zealand cultivars, Ruanui for example, yielding 215% more grass than R.V.P. Melle, the best of the imported cultivars. However, high clover yields frequently compensated for relatively low ryegrass growth so that the total yields of many of the mixtures became more even. Despite this trend, Ruanui and Ariki continued to dominate.

TABLE 2: MEAN SEASONAL AND ANNUAL RYEGRASS PRODUCTION FOR THE THREE-YEAR PERIOD
MARCH 1966 to FEBRUARY 1969 (kgDM/ha)
Mean grass plus legume production and country of origin in parentheses.

<i>Cultivar</i>	<i>S p r i n g</i>	<i>Summer</i>	<i>Autumn</i>	<i>Annual</i>
Grasslands Ruanui (N.Z.)	3 400 aA (4 230)	5 5 0 bcAB (2 050)	1350 abA (2 020)	5 3 0 0 aA (8 300)
Grasslands Ariki (N.Z.)	3 100 abAB (4 130)	550 bcAB (1 870)	1 530aA (2 570)	5 180 abA (8 570)
R.V.P. Melle (Belgium)	2 300 bcB (3 630)	670 aA (2 080)	1230 bcAB (2 430)	4 200 cB (8 140)
S321 (U.K.)	2400bB (3 470)	570 bcAB (2 100)	1 200 bcAB (2 400)	4 170 bcB (7 970)
Barlaha (Netherlands)	2 230 bcB (3 230)	630 abA (2 220)	1 130 bcdAB (2 380)	3 990 cBC (7 830)
S23 (U.K.)	2 270 bcB (3 700)	630 abA (2 170)	1070 cdBC (2 300)	3 970 cBC (8 170)
Barvestra (Netherlands)	2 300 bcB (3 570)	470 cdBC (2 000)	980 cdeBC (2 280)	3 750 cdBCD (7 850)
Petra (Netherlands)	2 000 cdBC (3 600)	570 bcAB (2 130)	1 100 cdBC (2 370)	3 670 cdBCD (8 100)
Barenza (Netherlands)	1 700 dC (2 930)	600 abcAB (2 080)	1 180 bcdBC (2 450)	3 480 cdCD (7 460)
Taptoe (Netherlands)	1 900 cdBC (3 600)	450 cdBC (2 280)	520 dCD (1680)	2 940 dCD (7 560)
Reveille (Netherlands)	2 000 cdBC (3 400)	350 dC (1 900)	400 dD (1 600)	2 750 dD (6 900)
c v %	14.4	23.3	21.3	11.1

DISCUSSION

In the Waimate trial, Ruanui, Ariki, Mangere and R.V.P. Melle ryegrasses had similar spring growth. However, because the latter two were more drought resistant and had higher summer production, their annual yields tended to be higher than the two New Zealand standards though this reached significance in only one of the trial's three years.

In contrast to the Waimate trial, the investigation on the Timaru downlands had particularly good growing conditions. In terms of dry matter production Ruanui and Ariki were the outstanding cultivars in the trial. They gave the best autumn, spring and annual production and appeared well suited to the South Canterbury environment. Their main disadvantage for grazing, but an advantage in seed production, was their early maturity, flowering in November/December resulting in very limited late summer production.

Overseas cultivars appeared to have only two advantages over Ruanui and Ariki: the speed of establishment of the tetraploids and the superior mid- to late summer growth of the diploids. Barletra, R.V.P. Melle and S23 ryegrasses, in addition to Mangere, were later in flowering and relatively superior summer producers. However, in South Canterbury, late maturity and an inherent ability to grow in January/February would be restricted by the usual dry mid-summer weather. Consequently in relation to Ruanui and Ariki these three imported ryegrasses and Mangere would probably be of limited use in the dry coastal belt but could provide useful late summer feed in the higher rainfall downlands and foothill areas.

In the South Auckland area, Cumberland and Honore (1970) compared Mangere with Ruanui and Ariki and concluded that, in giving far higher seasonal and annual production, the local ecotype had many characteristics markedly superior to the two New Zealand standards. In 1973 when they compared Mangere with Grasslands Nui ryegrass, a selection of the former, they found that Nui gave the highest yields and both cultivars produced more than Ariki. Although, because of completely different climatic conditions, these results may not be applicable to the whole of South Canterbury, they do indicate that Nui could be a promising ryegrass in parts of the district.

For seed production, early flowering Ruanui and Ariki would be much less difficult to manage than late flowering cultivars which produce seed during periods of more difficult harvesting,

for example in the wetter late summer/early autumn, or fail to yield well owing either to dry weather if ripening in January/February or early frosts if flowering very late in the summer.

Compared with Ruanui and Ariki, the ability of overseas tetraploids to establish quickly from late summer/early autumn sowing could be useful in providing extra early feed, for example in flushing ewes. However, this advantage appears to be rather temporary as the diploids show superior production after becoming well established and a large bulk of autumn feed could be provided by an annual ryegrass such as Grasslands Tama.

In both trials white clover usually produced less when associated with the more vigorous ryegrass cultivars and this tended to make total grass plus legume annual yields more even. However, despite this trend, 'several ryegrass/white clover mixtures stood out as being particularly productive at different seasons of the year, for example, Ruanui, Ariki or Mangere plus white clover in the spring.

It was unfortunate that, because of adverse circumstances (weather and insect attack), the trials had to be closed earlier than intended and more accurate indications of the different cultivars' longevity could not be obtained.

REFERENCES

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