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Perennial pasture measures up

Capeweed dominant annual pasture (left) and perennial grass pasture (right) under comparison in the Manjimup trial

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In a trial at Manjimup, a pasture based on the perennial grass, Currie cocksfoot, gave substantially more production than a comparable annual pasture.

For many years West Australian farmers have sown perennial grasses in an area south-west of a line joining the towns of Harvey, Kojonup and Manypeaks. The sowings were prompted by the loss of clover either through adverse seasonal conditions or disease, and the failure of other species such as annual grasses to consistently produce adequate feed. It was hoped that perennial grasses would be a more reliable source of feed.

The site selected for the trial had been cleared and sown to oats in 1970, and to a mixture of subterranean clover and grasses in 1971. There were two treatments, each of two plots:

- Annual pasture. Annual ryegrass and a mixture of sub clovers.
- Perennial grass pasture. Currie cocksfoot was added to the annual pasture mixture.

To ensure good performance from the perennial pasture, particular attention was given to:

- Species. Currie cocksfoot was known to persist and produce well locally.
- Soil. A well drained, loamy gravel originally growing redgum, jarrah and karri was chosen for the site.
- Establishment. Currie cocksfoot and annual ryegrasses were sown at 3.3 and 5.5 kg/ha respectively in September of 1972 following

would reduce the invasion of weeds, and would extend the period of green feed.

On the debit side perennial grasses are costly and often difficult to establish. Furthermore, for successful persistence in the south-west, perennial grasses have a dormant period in their growth cycle during the hot summer. Little growth is therefore made outside of the normal growth period of the annual species.

An experiment was begun at the Department of Agriculture's Manjimup Research Station in 1972 to investigate the relative production of annual and perennial grasses under grazing. The Research Station is 50 km from the south coast, has a typical mediterranean climate with an annual average rainfall of about 850 mm, and a growing season of seven and a half months — from early April to late November.

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herbicide spraying and cultivation to kill the existing pasture. To supplement the regenerating annual grasses and clover, further ryegrass and clover at 5.5 and 22 kg/ha respectively were lightly disced into all plots in the following autumn.

- Fertiliser. Superphosphate, potash, and trace elements (copper sulphate and zinc oxide at 2.24 and 1.36 kg/ha respectively) were applied. The average annual rate of superphosphate used was 335 kg/ha.

- Grazing. Annual pastures produce well under continuous or rotational grazing, but in West Australia poor persistence of perennial grasses has been associated at times with the continuous grazing by sheep. In an attempt not to disadvantage the perennial, rotational grazing by cattle was used over the whole trial — one week grazing, two weeks spelling during the green period.

The weights of steers grazing the plots were used as a measure of pasture productivity. Six steers per plot were introduced in early December as 7 to 9 month old weaners and stocked at 2.3 per hectare for 12 months, after which they were slaughtered. A new group of steers was introduced every 12 months. In addition to changes in bodyweight, carcase measurements were recorded in some years.

The steers were a variety of crossbreds, but usually were based on a Friesian dam, resulting in a maturity type about a month later than a typical Hereford.

A portion of each treatment was conserved by closing up a third of the area in early September. In 1974 and 1975, hay was cut in the spring and fed back to the steers in the following winter. In 1976, following work at Mt Barker Research Station which compared conservation as hay or as standing pasture, the third
was conserved as standing pasture for feeding back during the summer. Additional handfeeding was found to be necessary in the severe winter of 1977 and therefore conservation in 1977 and 1978 was altered to one sixth cut for hay and one sixth as standing pasture.

**Pastures**

Both annual and perennial pastures established well and at the end of 1973 all pastures were a mixture of clover and grasses with some weed, mainly sorrel. The cocksfoot made a significant contribution to the total feed produced throughout the trial and maintained a density of about 20 plants per square metre. Changes in botanical composition were rapid (Fig. 1). On the annual pasture capeweed replaced some of the grass and clover, and by the winter of 1977 dominated the pasture. On the perennial plots capeweed remained a minor constituent of the pasture.

The proportion of annual grass present fluctuated from year to year but from 1975 onwards, similar proportions were present in both annual and perennial pastures. In winter, cocksfoot made up on average one-third of the feed available, but in spring this had been reduced by half because of the rapid growth of the annual species.

The amount of feed in the grazed paddock was assessed at various times (total pasture production was not measured). Yields in winter were slightly higher on the annual pastures which contained more capeweed, however in spring yields particularly of hay, were greater on the perennial pastures (Fig. 2). Only in 1978, a year when pastures dried off prematurely in October, did hay yields on the annual pasture match those of the perennial. Visually the difference in spring appeared greater than the hay yields showed because of a misleading impression given by the tall flowering heads of the cocksfoot.

At the end of summer the soil surface disturbed by the grazing cattle, while on the perennial pasture crowns of the cocksfoot plants were clearly evident and some straw cover remained.

The bare disturbed surface of the annual plots probably offered a much better seedbed for the windblown capeweed seeds, so allowing a rapid invasion to take place.

**Animals**

On the annual pastures the steers gained weight at the beginning of summer, but as quantity and quality declined, they lost weight until the beginning of the green feed in April or May. Weights then remained steady for a variable length of time depending on the severity of the early winter period. From July or August steers gained weight rapidly, at about 1 kg a head each day, until slaughtered.

On the perennial grass plots the steer's initial weight gain in summer was consistently greater, and subsequent loss of weight in late summer was usually less than on annual pasture. Over the rest of the year results were variable, but the weight difference established at the beginning of the green period was at least maintained and sometimes increased by the end of the year.

Animals gained more weight on the perennial pasture every year (Fig. 3).

**Conclusion**

Previous work in the south-west with perennial grasses had been carried out with sheep in areas of shorter growing season and no clear advantage over an annual pasture was shown. However this trial has shown that under moderate to high grazing pressure in an area with a long growing season, a pasture including the perennial grass Currie cocksfoot, can give greater animal production than a pasture based on annual species only. Increases of 65 kg/ha of liveweight and 500 kg of hay per conserved hectare were recorded.

Establishment costs for such a perennial pasture — chemical spray, cultivation and seeding — would amount to about $60 a hectare at current prices. In addition, production would be sacrificed while the new pasture was being established. However, once established and if well managed, such a perennial pasture should last at least eight to 10 years. Some pastures have remained productive for over 30 years.

To be successful with perennial grasses such as cocksfoot, phalaris or perennial ryegrass, careful attention must be paid to soil type, establishment method and grazing management. Also such grasses are usually only successful when planted in areas with a long growing season — at least seven and a half months.

Although the trial reported has given encouraging results more work would be needed to define for particular areas the best stocking rate, the effect of different classes of stock such as sheep vs cattle and grazing management, and the relative value of other grasses — particularly cultivars of phalaris.

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