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The place for annual brome grass

By G.W. Anderson, CSIRO*

Grasses in the annual pastures of southern Australia are particularly important early in the growing season — the animal can get green feed more readily than from prostrate plants such as subterranean clover. Probably the other main value of grasses is in providing an alternative component in highly oestrogenic pastures or in areas subject to the disease clover scorch.

The main grass sown, annual ryegrass, is a valuable species for livestock production but “annual ryegrass toxicity” has been a serious concern in recent years. The other major problem with ryegrass is that it is likely to compete in the crop phase and reduce cereal yields. This is because its seed dormancy breaks down more slowly than that of other common grasses such as barley grass, silvergrass and rip-gut brome, and this allows repeated germinations of ryegrass after each cultivation. The cost of the reduced crop yields and the control of annual ryegrass has been estimated at almost $10 million annually in Western Australia alone.

Barley grass, silvergrass and rip-gut brome are easily controlled in crops but they are not acceptable, partly because their awned seeds pose livestock problems and partly because they are nutritionally inadequate.

Some soft brome species have been present in certain areas for many years and were augmented by others brought in by American interests at Esperance in the 1950s. In many drier areas they may be absent or contribute very little. Twenty or more years ago, Eric Bailey of CSIRO introduced his brome collections into Western Australia and tested them in rows and small plots. Unfortunately the resources were not available to extend this work into grazing trials with the more promising lines except for one or two field sowings of Bromus carinatus near Northam.

In 1967 Graham Arnold and I planted a dozen of these better brome species at Bakers Hill as single species swards. When grazed by sheep, some of them produced similar liveweight gains to annual ryegrass without creating any stock problems, and they were easily controlled by normal cultivations. In 1970 the six best bromes, annual ryegrass and Daliak sub clover were planted, all in separate 0.4 ha plots which were replicated three times and fenced to allow separate grazing of each species. The grasses were sown in a brown sandy loam, which had been cropped but not pastured, at the CSIRO Yalanbee Experiment Station, Bakers Hill.

At sowing the grasses received 200 kg/ha of each of single superphosphate and single superphosphate with cobalt. Thereafter a rate of 240 kg/ha of single superphosphate was applied annually.

Annual applications of ammonium nitrate were also necessary for the grasses as the previous history of the site had not included a legume. The subterranean clover treatment had the same applications of superphosphate as the grasses but only one application of ammonium nitrate, in June 1970. After three years the percentage of total feed made up by the sown species was recorded in October. The bromes had not done well. The best was Bromus danthonia which made up 70 per cent of the feed on offer, but the remainder only comprised 12 to 54 per cent, well below the 89 per cent contribution from annual ryegrass.

The main volunteer species was silvergrass but some annual ryegrass and a little capeweed and erodium had also appeared in most of the brome plots. Only one brome pasture exceeded annual ryegrass in total feed on offer and that was Bromus macrostachys, a species which had not persisted well. When the plots were grazed that year however, the liveweight and greasy wool cuts were higher on the Bromus oxyodon, Bromus carinatus and Bromus macrostachys than on the other pastures.

This raises an interesting point. It is known from other studies that silvergrass has less nutritive value than annual ryegrass for sheep. Therefore how can pastures containing more silvergrass and annual ryegrass than brome be better for sheep production than a straight annual ryegrass pasture?

The logical implication is that the brome present was markedly better than annual ryegrass and more than compensated for the silvergrass component. In fact some bromes were better than annual ryegrass when tested in pen feeding trials but only marginally so.

The other possibility is that much more brome had been present before sampling but it was selectively grazed and the silvergrass was avoided. Obviously what is left in a grazed pasture is what the sheep have not eaten.

After the pastures had been grazed for three years, the whole area was ploughed, worked back, and sown to oats to check the extent of grass competition in the crop. It was clear that the bromes posed no problem in this regard; in fact it would be necessary to re-sow them after a crop. However, there was enough annual ryegrass on some plots to reduce oat yields by up to 350 kg/ha.

The bromes therefore have advantages and disadvantages. Some appear suitable for sheep production but their lack of persistence discounts their value for permanent pastures. They may be preferred by sheep and therefore prone to be eaten out, or they may merely succumb to pressure of competition from volunteer species. They are unlikely to pose problems in crops but would need re-sowing from time to time. Possibly there is a place for brome grasses in short rotations or if the costs of controlling ryegrass increase dramatically. They are easily grown and most of them set a lot of seed which can be readily harvested. It would therefore be no great problem to provide seed if a market developed.