

RED BROME, *BROMUS RUBENS* L. - A WEED OF CEREALS
ON SOUTH AUSTRALIAN MALLEE SOILS

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Summary. Red brome, *Bromus rubens* L., is most prevalent on mallee sands of South Australia. It is not considered a major problem in other states. Red brome differs from the more widely distributed species great brome, *Bromus diandrus* Roth., in morphology, germination characteristics, and phenology. These differences have implications for control.

INTRODUCTION

Annual brome grasses are recognised as an increasing weed problem in dryland cereal production throughout S.A. The problem is being aggravated by the current practice of reduced tillage and the use of ryegrass specific herbicides (6). Although considerable resources are being allocated to research work with great brome, little attention is being given to red brome.

DISTRIBUTION AND IMPORTANCE

Red brome is an extensive problem in cereal crops throughout much of the wheat growing area of S.A. Personal observations indicate that both red brome and great brome are important weed species on Eyre and Yorke Peninsulas and throughout the mid-north of S.A. Both species are also found throughout the Murray Mallee region (G. Fromm, pers. comm., 1987). In these regions, red brome infests cereal crops growing on a range of soil types, but predominates on infertile sandy rises. It is most commonly found on the highly alkaline calcareous sands and neutral siliceous sands which formerly supported mallee vegetation.

Research workers in W.A. and Victoria have indicated that in these states, great brome is more important than red brome (G.A. Pearce, pers. comm., 1983; R. Velthuis, pers. comm., 1983). Great brome is also a major problem in Tasmania (6).

TAXONOMY

The morphological characteristics of red brome and great brome are compared in Table 1. The main differences between the two species are that great brome has a longer, looser panicle and longer spikelets with awns usually twice as long as the lemma, while red brome has a shorter, more compact panicle and shorter spikelets with awns only slightly longer than the lemma. In the field it is difficult to differentiate between the two species prior to late tillering. The hairs on the leaf blade of red brome are shorter and finer than those of great brome. The leaves of both species may be purplish when very young. When grown together, great brome is slightly larger than red brome.

The taxonomy of *Bromus* is poorly defined. Based on floral characteristics Rumball (5) placed both red brome and great brome in the section *Eubromus*. The section is typified by florets with a sharp callus, and barbed lemmas and awns (3). Characteristics of this section include erect habit, multi-tillering, coarse tillers, many heads and winter growth.

Table 1. A comparison of the morphological characteristics of red brome and great brome

	Red Brome	Great Brome
Panicle	Dense, stiffly erect. Generally purple or sometimes straw-coloured when mature. Branches clustered in half-whorls, each branch bearing 1-2 spikelets. Fine.	Loose, nodding. Straw-coloured or sometimes purple when mature. Branches in clusters of 2-4, each bearing 1 spikelet. Very rough.
Culm	Densely pubescent beneath the panicle. Loosely tufted or solitary. Erect or spreading. Slender. Unbranched. 2-4 nodes.	Usually hairy near the panicle. Loosely tufted or solitary. Erect or usually spreading. Slender to relatively stout. Unbranched. 3-6 nodes.
Leaves	Green, turning reddish-purple when mature.	Green.
Blades	Finely pointed, 3-20 cm long. Flat, 2-5 mm wide. Hairless or with short hairs.	Finely pointed, 10-25 cm long. Flat, 4-8 mm wide. Some long hairs; scabrous.
Sheaths	Tubular but soon splitting. Lower sheaths softly hairy; upper sheaths hairless.	Tubular but soon splitting. Loosely hairy.
Ligules	Membranous, jagged, 1.5-4 mm long.	Membranous, jagged, 3-6 mm
Spikelets	Shorter than 3 cm including awns. Awns a little longer than lemma.	6-10 cm including awns. Awns usually twice as long as lemma.

Variation within the species makes the identification of *B. rubens* even more difficult. Some taxonomists have suggested that there are several species under the name *B. rubens*, yet there is no satisfactory way of dividing them (J.P. Jessop, pers. com., 1984). I have collected plants identified as red brome with a relatively open panicle, although not nodding as is the characteristic of great brome. I have also found a much shorter, more tufted ecotype, which was also identified as red brome. This ecotype is sometimes referred to locally as "Pussyfoot brome". Subsequent generations of this ecotype grown under standard conditions retained their phenotypic characteristics.

Red brome is predominately self-pollinating, with an outcrossing rate of less than 1% (7). This may be an important factor in the perpetuation of these different ecotypes.

GROWTH AND DEVELOPMENT

While there is evidence that the after-ripening period of great brome varies between regions, and is under genetic control (2), the after-ripening period of great brome on Upper Eyre Peninsula is about 100 days (1), compared with a period of 200 days for red brome (Anderson, unpublished data). The practical implication is that the germination of red brome is likely to be more protracted than that of great brome (1), and hence will be more difficult to control in the cereal phase of cropping rotations.

Red brome matures earlier than great brome. Under standard conditions, red brome matured in 96 days while great brome took 112 days to mature. Thus, pasture-topping may not be successful in controlling both species in a mixed grass sward.

CONCLUSION

The lack of research in Australia involving red brome may be due to its minor importance on a national scale and its relative geographic isolation. Red brome has been identified on the poorer mallee soils in the more marginal cropping areas of S.A. These regions are not unique to S.A. and red brome could be considered a potential weed of other mallee areas in Australia. The specific differences between red brome and great brome may necessitate different control methods.

Other *Bromus* spp. have been reported as weeds in S.A., but have not been reported as serious weeds in dryland cereal production. These include sand brome, *B. arenacarius*, prairie grass, *B. catharticus*, soft brome, *B. hordeaceus*, mediterranean brome, *B. lanceslatus*, madrid brome, *B. madritensis* and rigid brome, *B. rigidus* (4).

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