Variation among spring wheats in winter feed production : an apparent association between growth and floral development

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Inadequate pasture growth rates during winter commonly limit stocking rates and farm incomes in the colder agricultural regions of Australia, particularly the southern tablelands of NSW. If wheat could be grown there profitably for winter feed, the subsequent grain harvest would represent additional income. One objective of our work was to identify the most useful types of wheat for this environment.

Methods

A selection of the world's wheats, including 13 spring wheats, chosen for their contrasting flowering responses to vernalization and daylength (1), was grown on the southern tablelands at Canberra and at a somewhat colder location at Bombala, with early (mid-March) and late (mid-May) sowings. Dry matter levels were recorded for each genotype on reaching floral initiation, ear emergence and maturity.

Results and Discussion

Following the early sowing, the post-emergence growth rate of Sunset, the earliest maturing genotype, averaged 5 kg/ha/d, with floral initiation being reached at about 80 kg/ha on March 31. From this time, growth rates during the vegetative stage were remarkably constant for all spring genotypes (Canberra 23, Bombala 32 kg/ha/d), the effects of decreasing temperature perhaps being offset by increasing leaf cover.

During reproductive development, Sunset grew at 220 kg/ha/d at Canberra and 105 kg/ha/d at Bombala, to reach about 8 t/ha of dry matter at ear emergence on May 6 and June 5 respectively. By the end of June, Yecora, Gabo and ES Insignia at Canberra, and Yecora at Bombala had produced ears and 6-10 t/ha of dry matter, while those spring wheats still in the vegetative stage had only reached 2 t/ha at Canberra and 3 t/ha at Bombala.

The earliest of the winter wheats reached floral initiation at about the same time as the latest of the spring wheats, and at similar levels of dry matter, while the latest winter wheats remained vegetative until early August.

Sunset sown in mid-May grew at about 1 kg/ha/d, to reach floral initiation on September 5, with only 70 kg/ha of dry matter. Much earlier sowings are therefore essential to produce useful amounts of winter feed.

There is some evidence to suggest that an association, either direct or indirect, exists between rapid growth and reproductive development in winter wheats, e.g. (2). Our results suggest that the more rapid development of spring wheats may be responsible for their higher productivity, and hence may offer a means of countering winter feed shortages. Varieties insensitive to vernalization and daylength can be sown alone or in mixtures with winter wheats. Low temperatures will prevent any seed formation during winter, and from such mixtures, mainly winter wheats will remain after grazing.

References

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