# EARLY SILAGE MAIZE FOR COOL SUMMERS?

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## Abstract

The paper examines the potential value of irrigated maize for forage and silage in Southern Victoria through the use of extra-early cultivars. Early composites from the breeding program, based at a farm near Ballarat (elevation 441 m) in the Victorian Central Highlands have been tested for yield and maturity type against the control commercial early hybrid cultivar SR73 for over 10 years of cool summers. The lower temperature reduced growth and yield both in composites and control, compared with the good yield of the latter in northern Victoria. However, the composites reached the "milky ear" stage faster than the control and therefore could provide a short-term crop for quality forage and silage.

*Key words: Temperature/flowering time/silage maize/cool summers/maize yield silage*

The success of irrigated maize for summer forage and silage in northern Victoria suggests that very early cultivars could extend its use to farmers in the cooler south. Little is known, however, about the relation of temperature in the field to the expression of the yield potential of the various maturity types of maize (1). To this end, my breeding program for early maturing composites (2) based at a farm at Bungaree near Ballarat, Central Highlands of Victoria provides a comparison of the early composites against the control early hybrid cultivar (SR73) in replicated handsown and drilled trials.

## Results and discussion

At Ballarat, the summer growing season (November to April) is about 4oC cooler each month than at Shepparton in northern Victoria (Table 1). Nearby at Kyabram, the farm yield of 22 t DM/ha of silage maize (3) greatly exceeds the best drilled test yields near Ballarat where both the control and best composites achieved 9 t DM/ha in the 1990/91 season (Table 2). Because of more rapid development, however, the composites could be cut at the milky grain stage (late February) and for that reason produced silage of higher nutritive value than the later control which had only begun to flower.

?Table 1. Temperature variation of two summer growing seasons in Victoria: location and year

| ? | ? | Mean daily temperature after sowing (oC) | | | | | | Heat sum |
|---|---|---|---|---|---|---|---|---|
| Location | Year | Nov | Dec | Jan | Feb | Mar | Apr | >15oC |
| Ballarat (a) | 94/95 | 12.7 | 18.3 | 19.6 | 18.4 | 14.4 | 9.7 | 380 |
| | 95/96 | 13.1 | 13.3 | 17.5 | 16.2 | 15.3 | 10.3 | 121 |
| Temperature difference (oC) | | | 5.0 | 2.1 | 2.2 | | | |
| Shepparton (b) | 94/95 | 17.9 | 23.1 | 23.4 | 22.8 | 18.5 | 13.2 | 1321 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 95/96 | 17.4 | 17.6 | 21.1 | 19.6 | 18.4 | 13.0 | 569 |
| Temperature difference (oC) | | | 5.5 | 2.3 | 3.2 | | | |

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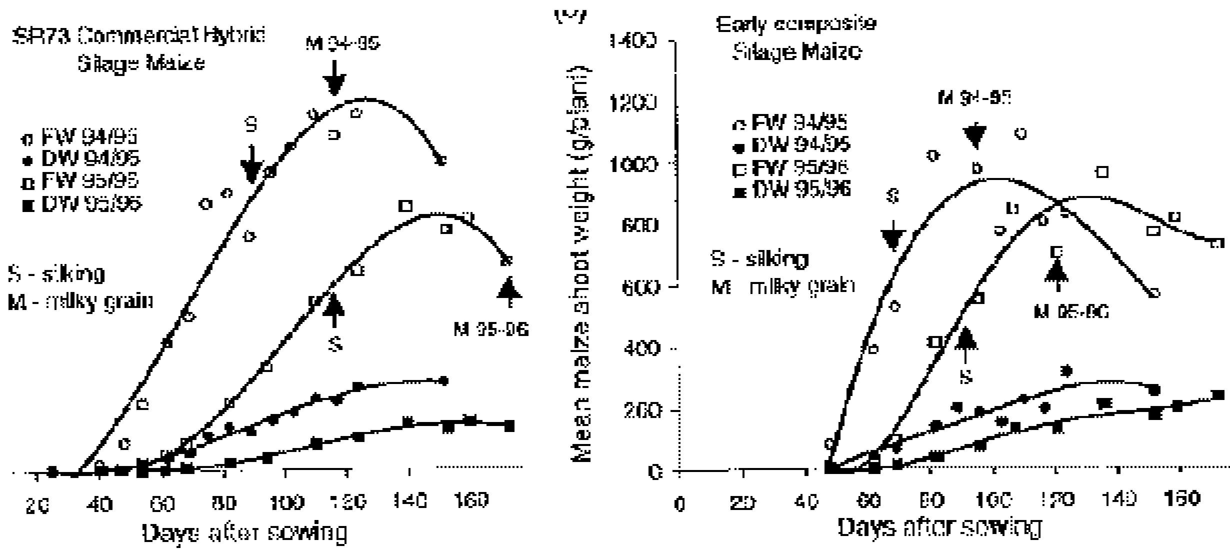
(a) South central highlands: elevation 441 m
(b) NE Victoria: elevation 113 m

Field observations over more than 15 years have established that the patterns of leaf appearance and reproductive development of the early composites and the later control are strongly related to the temperature. A recent study of plant response to temperature (Figure 1, Table 1) compared growth rate as well as development rate in two contrasting seasons (1994/5 and 1995/6). In 1994/5, the growing season November to April was warmer with a total heat sum of 380 days/degrees (> 15oC, DD) which was less than one third of that at Kyabram. In 1995/6, by contrast, with a heat sum of 121 DD, dry weight yield was reduced by half in both composites and control. Development was also affected from tassel initiation onwards, but differentially (1). The early composites therefore reached the milky stage by March 18 (120 days from sowing) instead of late February (95 days) but the control was much slower, May 15 (176 days) instead of March 20.

?Table 2. Shoot yield and silage quality of early flowering composites, compared with the later flowering commercial silage hybrid SR73: Sown Nov. 18 1990 and harvested Feb. 28 1991.

| Genotype | Code | DW (%) | FW (t/ha) | Code | DW (t/ha) | Milky ears/ sample (%) | DW ear/ shoot (%) |
|---|---|---|---|---|---|---|---|
| Control SR73 | 3 | 17.5 | 51.9 | 3 | 9.0 | 0.0 | 1.2 |
| XL45xPalermo | 2 | 19.5 | 48.4 | 1 | 9.0 | 89.3 | 27.9 |
| Guajira x Conico | 6 | 20.0 | 47.9 | 5 | 8.9 | 85.8 | 29.8 |
| Guajira x Carmine | 7 | 18.5 | 46.4 | 7 | 8.7 | 83.2 | 26.1 |
| Morocho x Polar Vee | 1 | 17.8 | 46.4 | 2 | 8.6 | 75.7 | 22.2 |
| Guajira x Carmine | 5 | 17.5 | 45.0 | 6 | 8.4 | 75.3 | 17.9 |
| Guajira x Carmine | 4 | 18.5 | 42.4 | 4 | 7.9 | 77.4 | 18.0 |
| LSD at P=0.05 | ? | ? | 6.3 | ? | 1.7 | 9.5 | 7.2 |




Conclusion

The early composites can provide short term crops for quality silage in the southern Highlands which can be cut some weeks earlier than the commercial hybrid, but the variability of the thermal regime means the farmers must expect lower yields of both types in the cooler, more cloudy growing seasons.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Reference


1. Aitken, Y. 1977. *Z.Pflanzenzuchtg* **78;** 216-237

2. Aitken, Y. 1988. *9th Aust. Plant Breeders Conf.*, Wagga Wagga, p. 251.

3. Pritchard, K.E. and Reid, R. 1994. *2nd Aust. Maize Conf.,* Gatton College, p. 30.