Variation in growth, yield and quality of wheat cultivars on the South Coast

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Abstract

Experiments were conducted to study the variation in growth, yield and quality of 16 wheat cultivars in the South Coast environment of Western Australia. Sowings were made on three occasions from mid May to mid June on the Esperance Sandplain (high rainfall > 450 mm) and Mallee soils (low rainfall <350 mm). Early maturity, medium maturity and late maturity cultivars were used. Experiments were monitored for growth assessment, foliar diseases and yield. In addition, grains were also analysed and assessed for quality including protein, moisture content, screenings, hectoliter weight, thousand grain weight, sprouting, staining and falling numbers.

Camm, the triple rust resistant cultivar, has performed extremely well in both environments for growth, yield and quality including protein, sprouting, staining and falling numbers. Perenjori, Stiletto, Karlgarin, Carnamah and Cascades performed reasonably well in spite of heavy leaf diseases at anthesis on both sites. Quality issues such as grain sprouting and staining have greatly downgraded some of the high yielding cultivars on the Sandplain compared to Mallee soils. Brookton, Carnamah, Cunderdin, Krichauff Tincurrin and Westonia yielded well but have been downgraded because of sprouting (low falling number) and fungal staining.

Keywords:

Wheat, agronomy, sowing date, time of sowing, cultivars, varieties, yield, quality, harvest index, falling number

The South Coast environment is considerably different from the more traditional grain growing areas of the Western Region (3, 4). Progress in yield and quality improvement can best be made by simultaneous introduction of suitable cultivars and appropriate agronomic practices tailored for each cultivar. Research is being undertaken to provide improve cultivar-specific agronomic information that will speed up adoption, simplify choices and keep cultivars in the system longer (1).

Materials and methods

During 1999, wheat cultivars of different maturity were sown at three sowing dates at 75 kg/ha in high rainfall (Sandplain) and at 50kg/ha in low rainfall (Mallee) soils on the South Coast. The first sowing was done just after the break of the season on May 18 and then at the interval of two weeks. Sixteen wheat cultivars were used as follows (2):

- Early maturity (short season): Ajana and Westonia
- Medium maturity (average season): Arrino, Bt-Schmbrk, Carnamah, Cunderdin, Karlgarin Perenjori, Tincurrin and WAWHT2179
- Late maturity (long season): Brookton, Calingri, Camm, Krichauff and Stiletto

Data on crop growth, disease, yield and grain quality was collected. No foliar sprays were applied during the growing season.

Results and Discussion

Generally wheat yield was lower due to the foliar diseases (leaf rust and Septorias and stem rust late in the season) on the South Coast. On the Sandplain, the early maturity Ajana and Westonia yielded relatively less but the medium maturity Cunderdin, Perenjori, Karlgarin and Tincurrin, and the late maturity Camm and Krichauff were the highest yielding cultivars (more than 3 t/ha) at mid May sowing (Figure 1).

On the Mallee soils, the early maturity Ajana, the medium maturity Carnamah and Cunderdin, and the late maturity Brookton, Camm and Krichauff were the highest yielding cultivars (more than 3 t/ha) at mid May sowing (Figure 2).

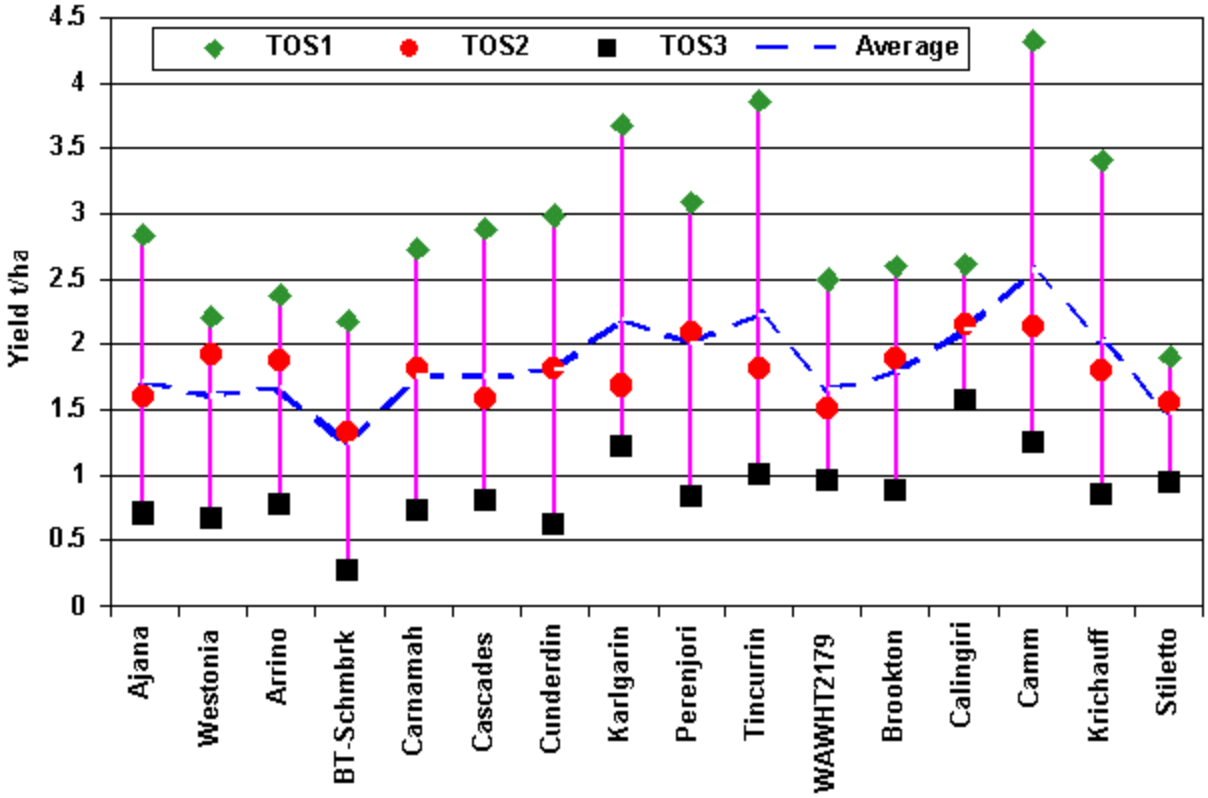

Figure 1. Influence of sowing date on grain yield of wheat cultivars at the Esperance Sandplain (high rainfall >450 mm).

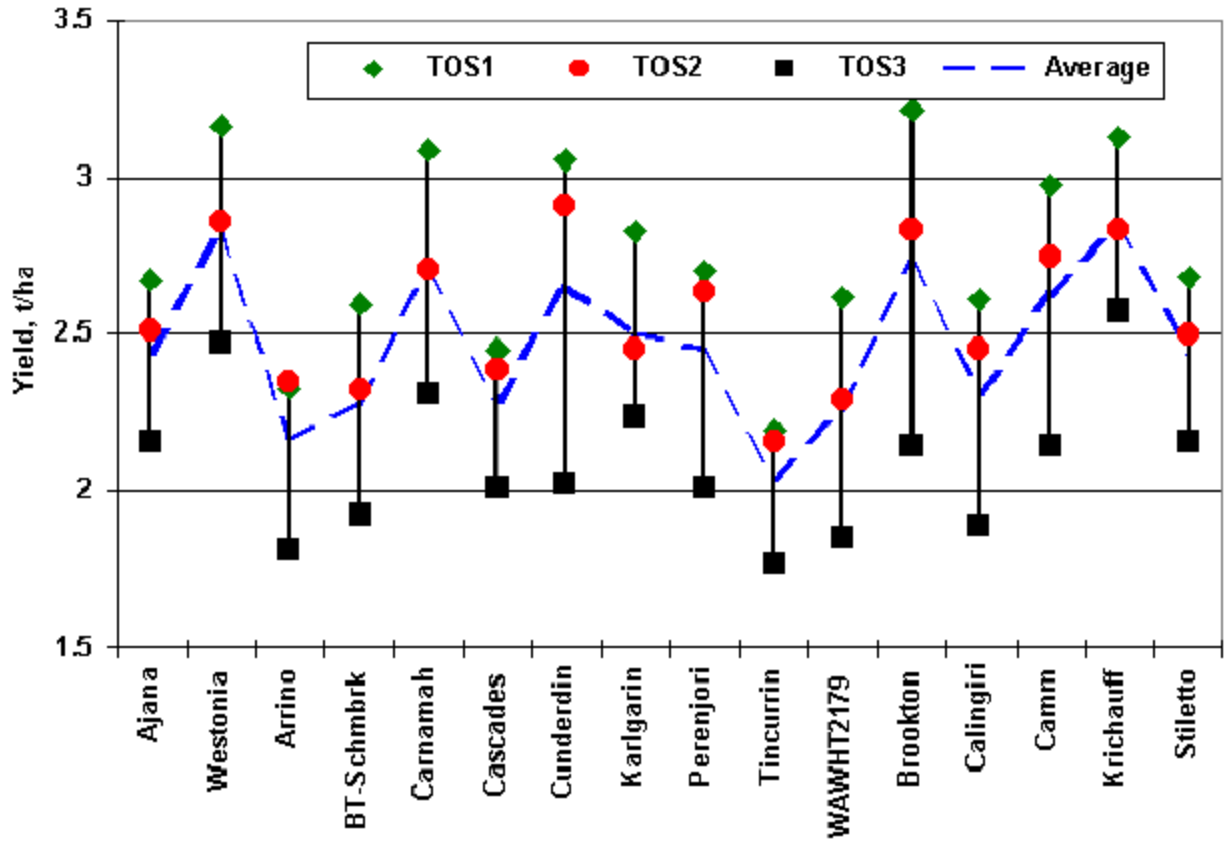

Figure 2. Influence of sowing date on grain yield of wheat cultivars in the Esperance Mallee (low rainfall <350 mm).

The 1999 harvest on the South Coast was comparatively wet. Grain quality problems such as grain sprouting; staining and low falling numbers greatly downgraded some of the high yielding cultivars on the Sandplain (Figure 3) compared to Mallee soils. Brookton, Carnamah, Cunderdin, Krichauff, Tincurrin and Westonia yielded well but were downgraded because of low falling number particularly from mid May and Early June sowings. The late sowing of Mid June produced comparatively better quality grains for most of the premium-paying cultivars. No grain quality problems were found in the Mallee soils at all three sowing dates with all 16 cultivars.

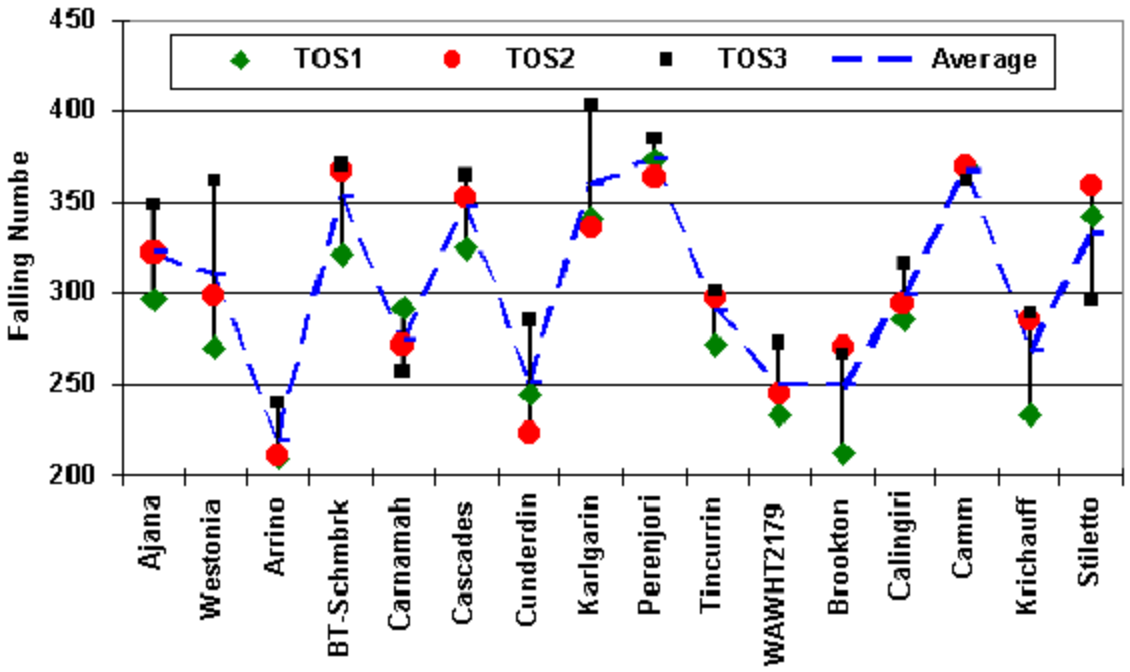

Figure 3. Influence of sowing date on the grain quality (falling numbers) of 16 wheat cultivars at the Esperance Sandplain (high rainfall >450 mm).

Conclusions

Weather and climatic conditions and high foliar diseases have generally reduced yield on the South Coast. The wetter than usual harvest conditions in 1999 also caused the major problem of grain sprouting (low falling number) and fungal staining (including blackpoint) particularly on the Sandplain soils compared to the Mallee soils. Selecting two or three cultivars with varying maturity, disease resistance, and quality characteristics may reduce weather and climatic risks.

Acknowledgments

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References

1. Amjad, M., Dooley, V. and Anderson, W. 2000. Wheat performance in a high disease season on the South Coast. 2. Leaf area, disease and yield at Gibson and Salmon Gums. Crop Updates Western Australia, Rendezvous Observation City, WA, 15-16 Feb.

2. Garlinge, J., Portman, A. and Hedland-Thomas, R. 1999. Crop sowing guide 1999. Agriculture Western Australia. Bulletin 4351 (Agdex 102/30).

3. Perry, M. and Hillman, B. 1991. The Wheat Book: A technical manual for wheat producers. Department of Agriculture Western Australia. Bulletin No.4196 (Agdex 112/01).

4. Stoneman, T. C., Overheu, T. D. and Muller, P. G. (1990). An introduction to the soils of the Esperance Advisory District – descriptions, illustrations and notes on seven common soils. Department of Agriculture Western Australia. Bulletin No. 4230 (Agdex 524).