Breakeven profitability targets for genetic improvement of perennial wheat and intermediate wheatgrass

Anne E. Weir[1], Scott M. Swinton[1] and Richard C. Hayes[2]
[1]Michigan State University, East Lansing, MI, USA; [2]E.H. Graham Centre for Agricultural Innovation, Wagga Wagga, NSW, Australia

Introduction

Perennial wheat (PW) and intermediate wheatgrass (IWG) are environmentally beneficial crops under development. For most farmers, earning as much profit as annual wheat (AW), the alternative crop, is a necessary condition for the adoption of PW and IWG. This research explores the changes in yield, price, costs and subsidy payments that would be necessary for PW and IWG varieties to attain comparable profitability to a major Australian AW variety.

Objectives

1) Evaluate profitability of PW and IWG varieties under Australian conditions, compared to a standard Australian AW variety.
2) Establish the changes in price, yield, costs and subsidy payments that would allow the PW and IWG varieties to achieve comparable profitability to AW.

Materials and Methods

The management and production data came from Hayes et al. (2011).

•3 wheat trials: 2 in Cowra, 1 in Woodstock. Both locations are in New South Wales (NSW).

•The 1st Cowra trial = 4 years, the 2nd Cowra trial = 3 years and the Woodstock trial = 2 years.

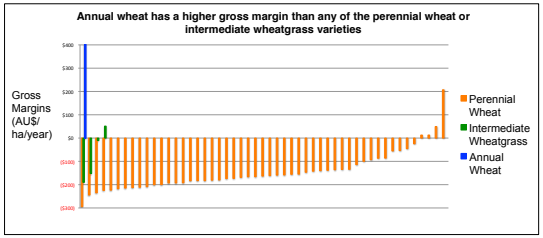
•There were 43 varieties of PW, 2 varieties of IWG and 1 variety of AW grown in the 3 trials.

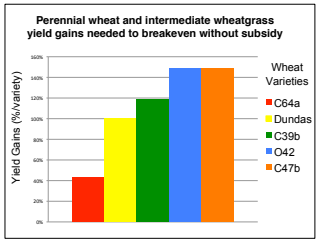
Enterprise budgets were generated for every AW, PW and IWG variety.

- Gross margin = Total revenue – variable costs.
- Feed quality wheat price assumed for PW and IWG.
- Net present value (NPV) = Gross margins summed over planning horizon (2, 3 or 4 years) and discounted at an 8% rate.
- Breakeven prices, yields, and subsidy payments calculated at the levels that equalize the NPV of PW and IWG with that of repeatedly planted AW.
- Subsidy of Aus$74/ha/year found through valuing soil conservation, one of PW and IWG's environmental benefits.

Results

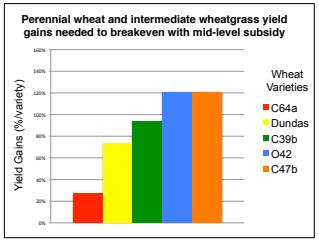
4 varieties of PW and 1 variety of IWG had positive gross margins. None of these varieties had gross margins as large as the gross margin of AW. So, none of the PW or IWG varieties tested in New South Wales would be adopted without changes in price, yield, costs or subsidy payments.





An increase in the grain yield of PW or IWG could help the wheat varieties become as profitable as AW. However, without a subsidy, the yield gain expectations are unrealistically large.

A mid-level subsidy of Aus$74/ha/year would decrease the yield gains that would be necessary to make PW and IWG as profitable as AW.



Conclusions

Current varieties of perennial wheat and intermediate wheatgrass generate returns that fall well short of those from annual wheat.

- 4 varieties of PW, 1 variety of IWG and 1 variety of AW had positive gross margins (so covered their costs), but none were as profitable as AW.
- Yield gains needed for the PW and IWG varieties to breakeven with AW were 40-145% for most promising lines and much higher for others.
- Price gains due to improved grain quality could improve profitability, but they could not achieve the magnitudes needed to equal AW profitability without major yield gains as well.
- A moderate environmental subsidy for soil conservation benefits of PW and IWG could reduce the breakeven yield gain needed to match the profitability of AW.

References

Hayes, R.C., et al. 2011. 'The development of perennial cereal crops for marginal environments – The first Australian case study using wheat derivatives.' *Submitted for publication*, 1-47.

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