

De-risking broadacre cropping in northern Queensland

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Abstract

Northern Queensland is relatively new to dryland cropping, so the need to identify best crop and management options that bridge gaps between present and achievable yields. Here we present results from two years of participatory on-farm research to identify best fit sorghum cultivars that maximise yields and profits and provide diversification options to primarily rangeland grazing businesses. Results show that new experimental red, white and high digestibility grain sorghum hybrids produced grain yields that were similar or higher than the yield of well-known commercial hybrids

Keywords

sorghum, integrated cropping and grazing systems

Introduction

In Northern Australia multiple constraints create complex problems requiring partnerships between farmers, researchers, and agribusinesses to adapt known practices and build skills into profitable and low risk broad acre cropping options. Given that Northern Australia is relatively new to dryland cropping, the need to identify best crop and management options that bridge gaps between present and achievable yields remains highly relevant. This research program (Fig 1) aims to provide diversification options to primarily rangeland grazing businesses of northern Queensland by identifying sorghum cultivars better adapted to tropical north Queensland climate, soils, and farming system. Only results from objective 1 and the first season of trials are presented here, this is, identifying sorghum cultivars better adapted to tropical north Queensland climate, soils and farming system.

An approach to de-risk agriculture in Northern Queensland

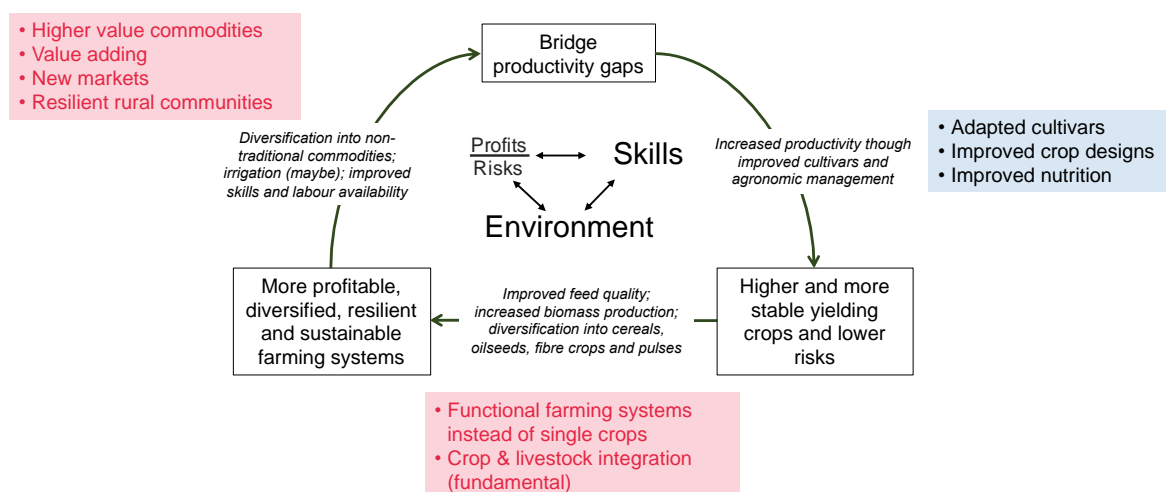


Fig 1. Framework to de-risk broadacre cropping in Northern Queensland by sustainably managing profits and risks while building skills in cropping.

Methods

Adapted summer grain varieties: Forty commercial and experimental sorghum hybrids were sown at three sites in the Fitzroy (Capella), Burdekin (Kilcummin) and Gilbert (Georgetown, Photo 1) catchments during the 2020 season. Trials were replicated and hybrids included red and white sorghums and high digestibility waxy type sorghum hybrids, as well as a number of commercial grain sorghum check hybrids. Two out of

the three trials were harvested in 2020 (Fitzroy (Capella), Burdekin (Kilcummin)), one trial was lost to drought (Georgetown). All trials were repeated in 2021.

Results

At both “Curra” Kilcummin and “Manar” Capella (Fig 2), experimental red, white and high digestibility grain sorghum hybrids produced grain yields similar or higher than the yields from the commercial check hybrids. Yield differences of up to 4 t/ha were recorded. Figure 2 also shows that six of the experimental hybrids coincided as the highest yielding hybrids (top yielding tercile) at both sites (these hybrids were 100404, 100481, Rex013, 100412, 100477 and Rex012), all yielding over 4 t/ha at Kilcummin, and over 3.7 t/ha at Capella. At Kilcummin, the two highest yielding commercial hybrids were Agitator and Brazen from Radical Seeds Australia (yielding just over 4t/ha), these are hybrids were selected for Central Queensland environments. At Capella the highest yielding commercial hybrids were A75 from Pioneer and MR Buster from Pacific Seeds. Caution should be exercised as these are results from the first year of trials. These trials will be repeated this coming season to help build a more robust understanding of best performing hybrid types and yield drivers across sites and seasons.

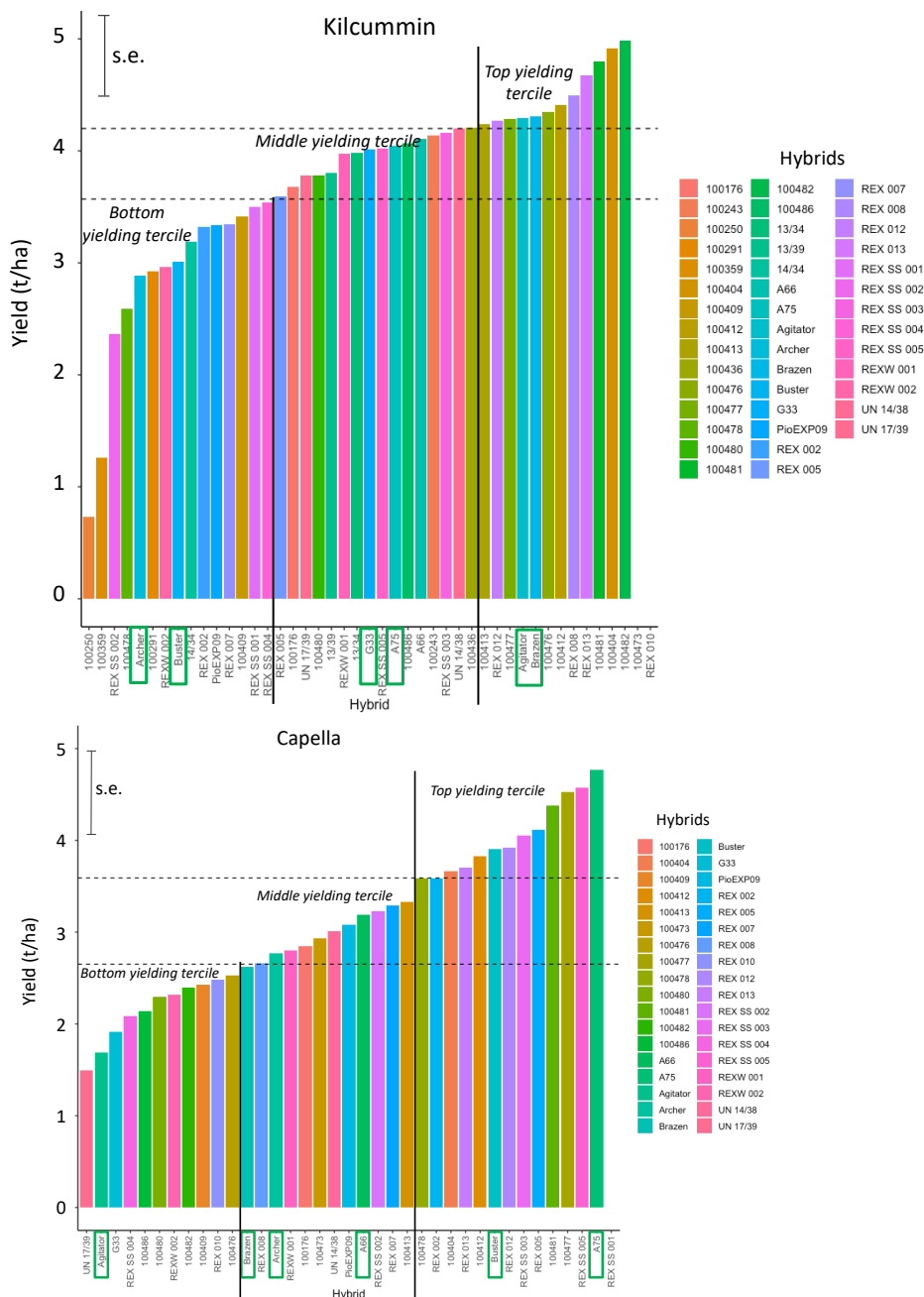


Fig 2. Mean yields for the different hybrids tested at Kilcummin and Capella, Qld during the 2019/20 season.



Photo 1. Sorghum variety trial near Georgetown, Qld.

Conclusions

In the western Burdekin yield differences between tested commercial and advanced sorghum hybrids was up to three-fold between from less than 1 and more than 4t/ha (during a very dry season). The yield of the commercial hybrids varied largely between sites, though at both sites six of the experimental hybrids yielded in the top tercile with yields over 4 t/ha at Kilcummin and 3.7 t/ha at Capella. Some new experimental red, white and high digestibility grain sorghum hybrids yielded similarly or higher than the commercial hybrids. The participatory nature of these trials means that farmers are benefiting from having a better understanding of the best commercial cultivars for the growing conditions and markets of Northern Australia, and participating companies are obtaining quality data on best performing experimental materials. It is expected that Northern Queensland will benefit from an increase in economic activity, employment opportunities and the diversification of source of income for traditionally extensive grazing enterprises.

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