

varying population of rotational wheat crop on wheat grain yield, weed types, weed population and soil water storage in profile in an irrigated cotton-wheat farming system.

A range of wheat seeding rates (30, 60, 120, 180 kg/ha and fallow) in a randomised complete block design with 3 replications were planted in the wheat phase of a cotton-wheat rotation in a furrow irrigated field at the Australian Cotton Research Institute, Narrabri in 2014 and 2015. Soil volumetric water was measured at least four times at monthly intervals (using a neutron probe at 20, 40, 60, 90 and 120 cm soil depths) in 2015. Weed biomass at anthesis were recorded. Wheat biomass and yield were recorded in 2014. Preliminary data showed that wheat grown in spring at higher seeding rates can suppress weeds. The data from 2014 wheat crop showed that the weed dry biomass at anthesis was highest in fallow plots (1374 kg/ha) followed by plots planted with 30 kg/ha of wheat seed rate (165 kg/ha of weed dry biomass). The 120 kg/ha wheat seed rate was effective in weed control with zero weed population at anthesis; however, the highest grain yield (4 t/ha) was recorded in the 60 kg/ha seed rate. Although the 120 kg/ha wheat seed rate recorded higher plant biomass, the economic yield was lower (3.3 t/ha).

The preliminary findings reveal a trade-off between maintaining wheat yield and good weed control. The soil water storage data will be monitored in 2015 to provide additional information to optimize the wheat seed rate in a cotton-wheat rotation. A conclusion will be drawn upon the completion of second year field experiment in 2015.

## PO48

### Breeding program for dual purpose wheat in Brazil

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In Brazil, dual purpose wheat produces forage with very high nutritional value and still produces grains for human consumption, generating benefits to the production system. Among the benefits, we can cite early forage production in autumn, early soil coverage (controlling erosion and enhancing water retention), chemical, physical and biological improvement of soil properties, biodiversity conservation, income diversification, risk reduction, human labor occupation and improvement of cattle productivity. Being aware of this importance, Embrapa Wheat develops specific breeding program for dual purpose wheat cultivars. In this program, the selection process includes dairy cows grazing. In the first stage, populations are selected for forage purpose, evaluating habit of plant growing, trampling resistance, regrowth capacity and

forage production. In the second stage, plants are selected for grain purpose, evaluating plant architecture (lodging resistance), disease resistance, grain yield potential, natural threshing resistance, pre-harvest sprouting resistance and grain quality. As a result of this program, Embrapa Wheat released the wheat cultivars BRS Figueira, BRS Umbu, BRS Guatambu, BRS Tarumã and BRS 277. It is estimated that approximately 150,000 ha were cultivated with BRS Tarumã dual purpose wheat in South of Brazil, in 2014.

## PO49

### Designing wheat ideotype for Portugal – understanding and reducing yield gap under mediterranean climate

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The main region for bread and durum wheat production in Portugal, which is located in the Center and South of the country, is under a strong Mediterranean influence where rainfall occurs on a high unpredictable way and heat stress occurs during wheat grain filling. Cereals are sown in autumn, after the first rains, when daylength is still long and the vegetative phase develops during winter. Heading occurs in the beginning of spring when photoperiod and temperature increases and wheat reaches maturity, during the first two weeks of June. The introduction of irrigation systems enabling to supplement precipitation, during the most wheat critical phases, will increase grain yield and quality and the profit for farmer. To better explore all advantages of supplementary irrigation, the agronomic options followed during the growth cycle should be adjusted in order to integrate the vital relations established between the crop and the environment. The definition of a wheat plant ideotype for the South of Portugal able to face environmental constraints related to climate changes, it is paramount for the Portuguese Cereal Breeding Program to breed (creation and selection) the best crop phenotype to grow under the target environments with defined cropping systems and end uses. In this context, to promote adaptation plasticity of wheat genotypes, important traits must be addressed, such as: tiller survival, adequate biomass at heading time and stay green of flag leaf, in order to guarantee and maximize number of grains/m<sup>2</sup>. Additionally, high grain filling rate, to compensate the short grain filling period, test weight higher than 82kg/hl, high 1000 kernel weight, heading time occurring between 20 March and 10 April are a combination of traits that confers to the crop a satisfying adaptation to this target environment. Resistance/tolerance to most important diseases and pests are also