INTEGRATED WEED MANAGEMENT.

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The integrated weed management was a GDRC funded project to investigate weed suppression through cultural management practices and various crops and cultivars. The trials both in Condobolin and Wagga wagga were conducted through collaboration with Graham Centre and CWFS. This report summarises results from these trials.

Certain crop species and cultivars can suppress weeds effectively at standard establishment rates. This may be due to their ability to compete effectively with weeds for valuable resources, or their potential to exhibit allelopathic effects associated either with the crop or remaining residues following harvest. Rotational crops noted for their weed suppressive effects were evaluated together with key cultural practices, including herbicide application, stubble burning, and tillage for their impacts upon subsequent weed growth and weed seed viability on the soil surface or in upper layer of soil under cultivation.

Treatments include various crops and cultivars established in replicated plots. Crop and weed biomass per plot were assessed by visual ratings, stand counts and biomass collection. Weeds evaluated will include annual ryegrass, fleabane, witchgrass, windmill grass.

CROP CULTIVAR TRIALS

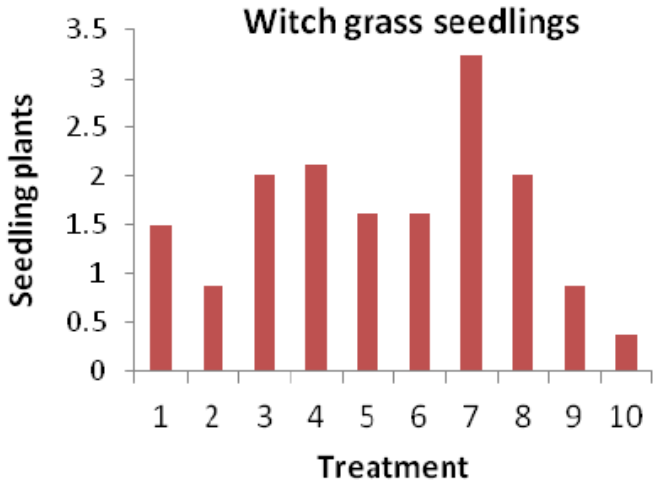
For a second year trials were established at Wagga Wagga and CWFS Condobolin to investigate the impact of various crops and their stubble type on summer weed emergence. Plots were designed in a randomised complete block design with four replicates, with plot size 2 x 14 m in Wagga Wagga 4 x 12 m in Condobolin. Plots were sown 21st May (Wagga Wagga) and 30th May (Condobolin).

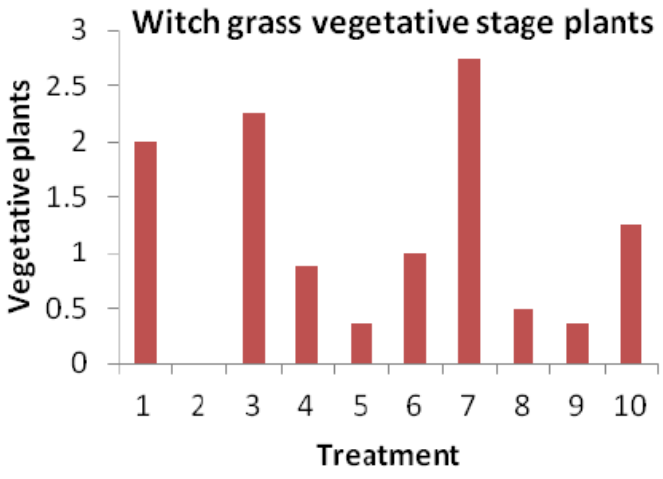
Treatment	Crop	Variety
1	Grazing wheat	Wedgetail
2	Wheat	EGA Gregory
3	Grazing oats	Graza
4	Oats	Mitika
5	Grazing barley	Urambie
6	Barley	Buloke
7	Triticale	Tobruk
8	Cereal rye	Grazer
9	Grazing canola	cb Taurus
10	Canola	Hyola 50

Table 1. Wagga Wagga 2012 and 2013 Crop Cultivar Treatments.

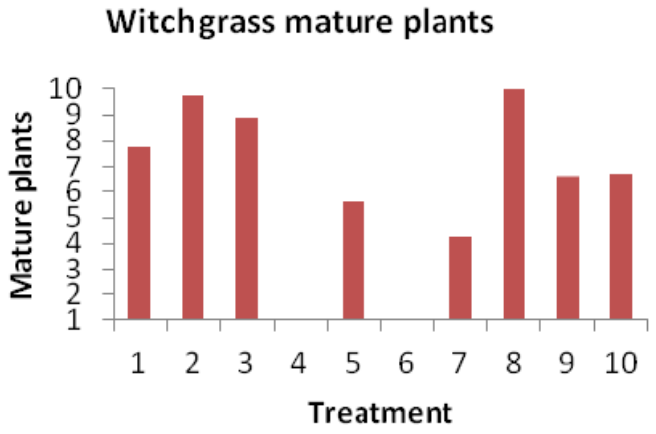
Witchgrass data was taken in Wagga Agricultural Institute on March 2013 on the 2012 Crop Cultivar harvest plots to determine any weed suppression by crop type and stubble type or loading. The number of witchgrass plants and the growth stage along with biomass cuttings were recorded from a 0.25 m2 quadrat and the results are presented in the graphs below based on the treatments in table 1.

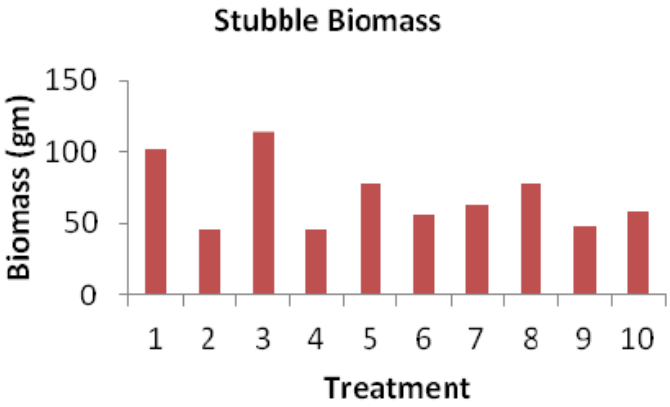
In 2013, due to the late sowing date, the two canola cultivars were not sown in Condobolin. Instead, treatments 9 and 10 were replaced with black barley and a blank control treatment, respectively. Plots were harvested November 26, 2014 in Condobolin. In Wagga Wagga where maturity was easier to moni tor the crops were harvest at intervals with canola harvested on November 19th, wheat, oats and barley on the 21st and the other cultivars on December 12, 2013.





Graph 1 & 2. 2012 Crop Cultivar Trial – Wagga Wagga

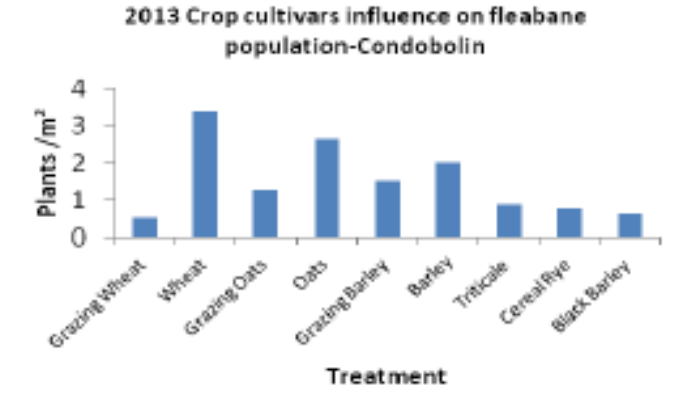


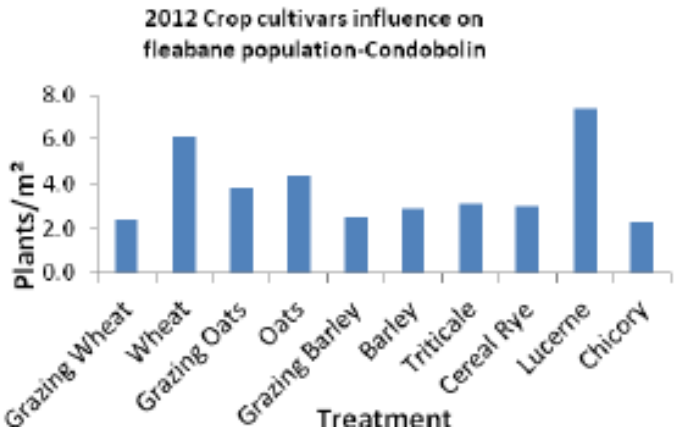


Graph 3 & 4. 2012 Crop Cultivar Trial – Wagga wagga

The predominant weed in summer fallow plots following harvest of cereals was witch grass, with up to 20-40 seedlings per square meter by March 2013. Interestingly, witch grass predominated in cereal plots post harvest, but grazing canola and canola plots contained very few if any witch grass seedlings or mature plants. Interestingly, slightly increased numbers of flea bane emerged in canola plots than in any cereal plots in Wagga wagga. There were no discernible differences between grains only and grazing cultivars of the three cereals examined in terms of control of either flea bane.

Oat and barley cultivars appeared to suppress witch grass infestation post harvest in comparison to other cereals, and yields of these crops were also higher than other cereals, indicating suppression was noted both before and after harvest. Graph 5 and 6 shows a similar pattern in flea bane numbers being suppressed by the grazing varieties of wheat, barley and oats in Condobolin. Fleabane counts were conducted in September (Graph 5) and October (Graph 6) in 2013.





CULTURAL TRIAL

Cultural Practices in Stubble Management trials were again established at Wagga Wagga (demonstration strips only) and Condobolin to investigate the impact of crop stubble management techniques on summer fallow and in-crop weed emergence in 2013. The Condobolin trial was conducted in 2012 but not repeated in 2013, due to lack of uniform weed infestation. Short stubble treatments were imposed at harvest to imitate the result of using technology such as a Harrington Seed Destructor. Rolled stubble treatments were imposed shortly after harvest. Tilled stubble and burnt stubble treatments were imposed later in the pre planting season.

Yield was taken on the trial established in 2012 at Wagga that was planted into barley in 2013. Plots were harvested on December 10, 2013 (Table 2.). Barley yields were not significantly different post treatment. The Condobolin site was not harvested.

Treatment	Treatment	Barley t/ha
1	Stubble retained	2.53
2	Stubble burnt	2.36
3	Stubble tilled	2.60
4	Stubble rolled	2.43
5	Stubble short	2.58

Table 2: Cultural Practices in Stubble Management - Wagga Wagga

At Condobolin in October 2013, fleabane count in the cultural practices trial shows reduced counts where stubble was burnt, followed by stubble retained and tilled. This shows that cultural practices on stubble management may significantly reduce fleabane counts.

CONCLUSION

These trials demonstrate that certain crop species and cultivars such as barley, oats and grazing wheat, can suppress weeds effectively at standard establishment rates. This may be due to their ability to compete effectively with weeds for valuable resources, or their potential to exhibit allelopathic effects associated either with the crop or remaining residues following harvest.

For further information, please contact Jamie Thornberry at CWFS on (02) 6895 1050.