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IHSG

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Forages and Milestones!

Editor's note: The northern hemisphere is busy with the summer harvest while in the south, the wet weather gear is being well used. In this issue we look at forage research in Argentina, defoliation of perennial ryegrass from the IHSG workshop demonstration site and weed control in white clover. This is also a newsletter of milestones and congratulations. Firstly, this is the 50th issue of the IHSG newsletter so well done everyone. Secondly, congratulations to Phil Rolston who celebrated his 40 yr work anniversary and Birte Boelt for her25 yr anniversary. Details of the contact person in your area are listed on the back page of the newsletter and on the IHSG website http://www.ihsg.org/. Please continue to send articles, updates or short papers to your area contact person to be included in future newsletters.

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President's Column

Welcome to our 50th Newsletter which represents a milestone for the IHSG. The first Newsletter was published in September 1979, a year after the IHSG (or IHSPRG International Herbage Seed Production Research Group as it was known) was formed. I found a file box in my office of old Newsletters starting with # 1 published in September 1979 with Paul Hebblewaite as Chairman & editor. Our IHSG website has back copies to Newsletter 33 (June 2001). By December 1983, with David O. Chilcote of Oregon State University as the IHSPRG Chairman and Editor of Newsletter #6 which was enclosed with the first issue of Journal of Applied Seed Production (JASP) which ran for 17 volumes until the cost of production became excessive. I still lament the passing of JASP 20 years ago in 1994. I miss not having a range seed production research papers in one volume. However if cost had not been an issue the trend for staff promotions to be linked to journal impact factors would have killed a small circulation journal like JASP. What our Newsletter and website can do is bring titles/abstracts of publication written by our members. But this will require members to be proactive in sending this information to our Newsletter editors. That is my challenge to Newsletter readers.

This issue includes a call for papers and posters for our 8th IHSG Conference to be held from the 22 to 29 June 2015 in Lanzhou, Gansu Province, China. This will be the first Conference outside the established herbage seed production counties of Europe, USA and New Zealand/Australia. It is an exciting opportunity both for our Chinese colleagues but also for members. Our successful 7th Conference at Dallas, Texas in 2010 also highlighted for me, that we don't have to be in the heart of a seed production area to have a great conference. Lanzhou is based at the southern end of the Hexi Corridor, a 500 km long, but narrow seed production belt that straddles the "silk road". The post conference tour will visit seed crops and historic sites along the Hexi Corridor. In early May while working in China I was able to visit with the conference hosts, the College of Pastoral Agriculture Science and Technology (CPAST), Lanzhou University to meet with Prof Wang YanRong and Dr. Zhang JiYu to discuss conference preparations. It was good to see these old friends again and to receive an update on plans for the Conference.

In April following three weeks work in Uruguay I visited Pergamino, Argentina to meet the team hosting our 9th Conference 2017 and spent an afternoon meeting with a group of 12 to discuss Conference preparation. With INTA and the local University I also visited local seed production and processing sites. Pergamino sits in Northern Argentina and work in the wider region includes seed production on both temperate as well as tropical/sub-tropical species.

For those in the northern hemisphere we wish you well with the upcoming harvest and associated data collection. For my colleagues in the southern hemisphere you will be hunkering down for winter. In Canterbury, New Zealand the Southern Alps which I see most mornings on my drive to Lincoln are glimmering with fresh snow.

Phil Rolston

President IHSG

Mt Cook area, New Zealand

8th IHSG Conference, Lanzhou, Gansu, China
22nd to 29th June 2015

22nd June (Monday) Conference registration

23rd to 25th June (Tue-Thur) Conference papers and posters, and dinner

24 June (Wed) Half day visit to field research area and afternoon free for sight seeing

25th to 29th June (**Thur-Mon**): Post conference tour to Hexi Corridor, with the tour ending at historic Dunhuang.
30th June. (Tue) Depart Dunhuag for Beijing and other elsewhere.

Call for Papers and Posters

1. Genetics and physiology for understanding seed yield potential;
    - germplasm
    - stress responses
    - environmental and/or developmental triggers
    - gene expression
2. Breeding for seed yield in herbage/turf species
    - Omics (MAS/GWAS) vs conventional
3. Agronomic management to achieve high seed yields
    - systems inputs (PGR, N; water etc) and timing of inputs; defoliation, etc
    - applications of Precision Agriculture in Herbage Seed Production.
4. Managing input restriction to meet environmental regulations and achieve sustainability
5. Plant protection: Weeds, pests and disease's
    - agrichemical responses
    - organic seed production
    - IPM (integrated pest management)
    - Biosecurity
6. Seed production in developing countries: issues and models for production
    - environmental limitations– erosion, salinity etc
    - tropical seed production
    - infrastructure;
    - village based seed production
7. Seed quality impacts from the field
    - Vigour, seed purity and germination,
    - endophyte
8. Seed technologies to enhance seed performance
9. Extension, tech transfer & training the next generation of seed researchers and seed agronomists

Paper and poster titles and abstracts (500 words maximum) and preferred session area to Phil Rolston (phil.rolston@agresearch.co.nz) by 30 September 2014.

Forage research interests at Rafaela Experiment Station (INTA) in Argentina

By Maria Andrea Tomás

(email: tomas.maria@inta.gob.ar)

In Argentina, increases in the area devoted to extensive crops like soybeans have displaced, in the last few decades, the beef-cattle production and other related activities to regions with less productive soils or with a certain degree of limitation to plant growth. This phenomenon has carried out an increased interest in forage species specially adapted to this type of conditions. For this reason, several institutions and local seed producing companies are committing efforts both in the search of foreign species with the desired qualities and to the development of new cultivars of the species already available in the market.

INTA is the National Institute of Agricultural Technology in Argentina with expertise in the development and release of new cultivars of forage grasses and legumes to the market. In particular, INTA has initiated in the last few years several breeding programs in an attempt to provide ranchers with new varieties that allow them to cope with the emerging situation described before. One of the species that is currently under research for new cultivar development is *Panicum coloratum*. It is a warm-season perennial grass native to South Africa that has been previously introduced to the country in the ´90s. It is constituted by two botanical varieties: var. *coloratum* has been spread in the US by means of its most well-known cultivar "Kleingrass", and var. *makarikariense*, less used in America but developed in Australia; its most common cultivar is "Bambatsi". One of the first steps in developing a breeding program is to acquire as much of the variation as possible in order to have the rough material to perform selection. For that reason, a collection of the available germplasm was organized to attain and preserve the genetic variation that has been previously introduced and has been exposed to a process of adaptation to local conditions in different regions of the country. This

collection has been characterized morphologically (Armando *et al.* 2013) and it is currently on the process of being through molecular characterization by means of different genetic markers (Armando *et al*. in preparation).

P. coloratum produces good quality forage in reasonable well quantity but its use has been neglected by difficulties in seedling establishment. Looking for alternatives to overcome the detrimental effect of low seedling vigor, cycles of recurrent phenotypic selection have taken place with the objective of generating more vigorous seedlings by increasing seed weight. Increments in seed weight over 17% were obtained with no related increase in seedling emergence but with a clear improvement in seedling weight and general seedling performance (Giordano *et al.* 2013). Variation in seedling vigor in the collection was also evaluated and genetic parameters were estimated in order to further predict genetic gains through selection targeting in seedling characters (Dreher *et al*., in preparation).

Other issues that prevent the generalized use of *P. coloratum* in the region are the limitations imposed to consistent seed production by seed shattering and non-uniformity of seed ripening. These problems have been considered major restrictions to reliable seed production of adequate amount and quality. The determinate development of the panicle, the non-uniform maturation of seeds within the same panicle, and seed shattering make it impossible to maximize both seed quality and quantity in the species. With the aim to quantify seed shattering, a study was conducted to evaluate seed shattering variability in the germplasm collection (Tomás *et al.* 2010). In addition, preliminary results demonstrated differences in seed production among populations from the same variety consistent along years with different environmental conditions (Barrios *et al.* 2010); this information could be used later to generate materials with greater seed production. Besides, the change in seed germination to increasing temperatures was also tested in a growing chamber obtaining the maximum and minimum and the optimal temperatures for seed germination in the two varieties of *P. coloratum* (Giordano *et al*, in preparation). Further studies were conducted in a subset of plants expressing differences in seed shattering to estimate genetic parameters such as genetic variance and heritability of this difficult measurable trait. The outcome of the studies allowed the calculation of possible genetic gains through selection using the existing

material (Maina *et al*., in preparation). Results showed that, although shattering is a character quite influenced by environmental variation, genetic improvements could be expected if selection is performed.

Other lines of research in *Panicum coloratum* include the search of variability in tolerance to salt conditions, one of the major limitations to plant growth in the area. Differences in germination in seeds exposed to an increasing range of salt solutions were apparent among populations of the two varieties of *P. coloratum* (Cardamone et al, in preparation). Research interest is going forward to search for differences at the seedling stage to identify individuals with increased salt tolerance with the final objective of selecting materials that could be eventually used in a breeding program.

Phenotypic plasticity is the capacity of a genotype to generate different phenotypes in response to differential environmental conditions. One of our recent lines of work wants to demonstrate the genetic basis of phenotypic plasticity. In other words, we claim that there would be differences in the degree of phenotypic plasticity expressed by individuals with different genetic backgrounds. We are carrying this research in seedlings of *P. coloratum* that are exposed to environments with differential water and nutrient availability. Possible outcomes of this research will also allow the identification of characters as reference of their degree of plasticity. Both plastic and stable genotypes could be of interest to breeding depending on the environmental conditions prevailing at the sites where the new material is intended to be utilized.

Research is also carried out in a forage legume species, *Melilotus albus*: a breeding program with the aim to concentrate flowering time and to increase forage quality through increasing leaf proportion is currently under way. Additionally, interest has been focused on the differentiation in salt tolerance among different ecotypes collected in Argentina. This species has a wide range of adaptation to diverse environmental conditions and could provide forage of relatively good quality in situations where plant growth is limited.

These projects are being carried out in collaboration with researchers at the National University of the South and the National University of Buenos Aires as well as researchers from other INTA experiment stations.

Bibliography

Armando, L., A. D. Carrera and M. A. Tomas (2013). "Collection and morphological characterization of Panicum coloratum L. in Argentina." Genetic resouces and crop evolution **60**(5): 1737-1747.
Barrios, C., L. Armando, G. Berone and A. Tomás (2010). Seed yield components and yield per plant in populations of Panicum coloratum L. var. makarikariensis Goossens. 7th International Herbage Seed Conference, Dallas, Texas, USA, International Herbage Seed Group.
Giordano, M., G. Berone and M. A. Tomas (2013). "Selection by seed weight improves traits related to seedling establishment in Panicum coloratum L. var. makarikariense." Plant Breeding **132**(6): 620-624.
Tomás, A., G. Berone, C. Barrios, N. Dreher and M. Pisani (2010). Variation in seed shattering in a germplasm collection of Panicum coloratum L. var. makarikariensis Goossens. 7th Interantional Herbage Seed Conference, Dallas, Texas, USA, International Herbage Seed Group.

Defoliation of perennial ryegrass under New Zealand conditions – Results from the IHSG workshop demo site

Richard Chynoweth[1] and Bede McCloy[2]

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[2]NZ Arable, Christchurch

Introduction

Defoliation is seen as an important management tool for the production of seed from cool season grasses in New Zealand. In recent years New Zealand growers and industry representatives have become experts at estimating the ideal defoliation dates for a wide range of genetic material and interpreting the subsequent management requirements resulting from such decisions e.g. PGR and N input. In 2013 an experiment was set up to demonstrate various defoliation dates on perennial ryegrass to delegates of the IHSG workshop held during September in Methven, 2013 (Figure 1). This article outlines the seed yield results from this experiment.

Figure 1. Defoliation of perennial ryegrass experiment as viewed by delegates at the IHSG workshop, September 2013 near Methven, New Zealand.

Key results

A demonstration trial investigating five dates of final defoliation on perennial ryegrass cv, 'Arrow' under a dryland scenario was set up for the International Herbage Seed Group Workshop near Methven in the 2013/14 growing season. The trial showed a 35% increase in seed yield when the closing date was optimised during late September/early October compared with no grazing (Figure 22). Grazing was simulated using a ride-on lawn mower at approximately two week intervals. Each treatment was sprayed with 1.6 l/ha of Moddus at GS 32 for lodging control. This trial demonstrated

the disadvantages of closing too early, in this case crop unevenness and potential shedding (in the absence of lodging differences (figure 3)), and closing too late, demonstrated by the removal of the larger seed heads.

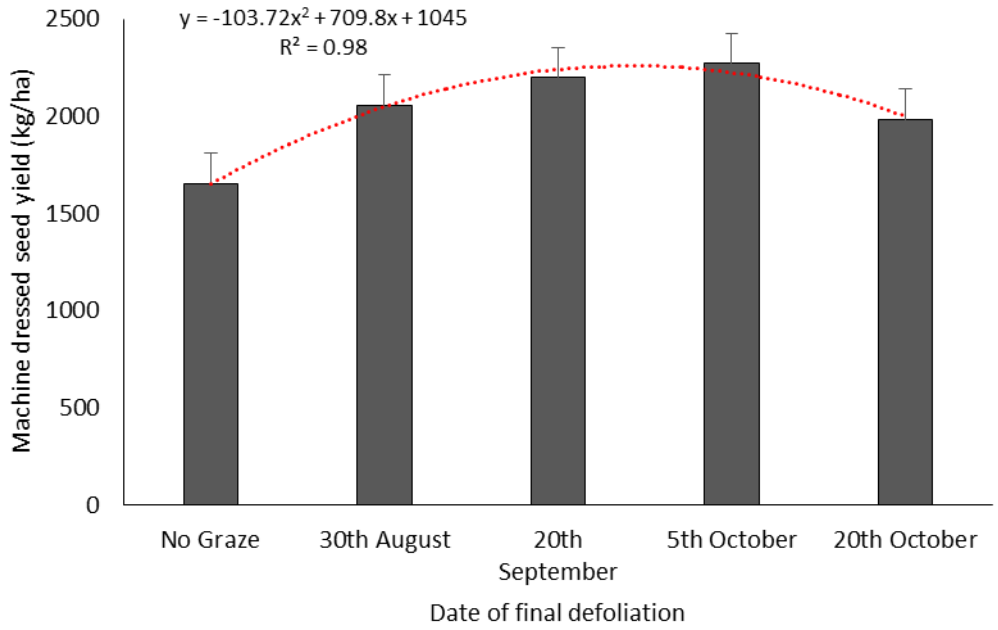


Figure 2. Machine dressed seed yields of perennial ryegrass, cv. 'Arrow' under five defoliation treatments when grown under dryland conditions near Methven, Canterbury in the 2013/14 growing season, $LSD_{0.05}$ = 155, CV% = 4.9.

Figure 3. Harvest time with the non defoliated plots windrowed/swathed for seed drying prior to pickup and threshing, 27th December 2013, Methven, New Zealand

Investigations of Phenoxy Herbicides for weed control in White Clover – a trial update

Murray Kelly[1], Richard Chynoweth[2] and Richard Merrilees[1]

[1]PGGWrightson Seeds Limited,
[2]Foundation for Arable Research.

Background

In New Zealand (NZ) growers of white clover for seed production face decisions on herbicide products, rates and timings to control a number of challenging weeds. It is well known that an essential element to achieving high seed yields is to minimize (i) in-field competition and (ii) seed cleaning losses by achieving high level of field hygiene. The roles of base herbicides such as flumetsulam and/or imazethapyr are quite well understood. Control of some difficult weeds such as thistles, (*Carduus*, *Cirsium*, *Sonchus* spp.), hawkweeds (*Crepis* spp.) and groundsels (*Senecio* spp.) have been a longtime challenge. Herbicide options include the phenoxy herbicides, of which the range commonly used in NZ are an MCPB/MCPA mix, various forms of 2,4-D: 2,4-DB, 2,4-D amine in SC (Suspension concentrate) and WG (water dispersible granules) forms, and 2,4-D Ester. These products have different levels of efficacy and selectivity on the clover crop. The MCPB/MCPA mix has high crop selectivity but is effective on a narrower range of target weeds and they need to be at early growth stage, whereas at the opposite end 2,4-D Ester has greater weed efficacy but causes a high level of crop growth damage.

To assist growers in the decision processes, and to demonstrate these herbicides to visitors to the September 2013 IHSG Workshop a trial was established at Creeside Farm near Methven to demonstrate the effect of phenoxy herbicide products and rates, used in conjunction with a proprietary herbicide Jaguar® (bromoxynil + diflufenican), applied at two timings July 22 and August 22.

Methods

The crop of white clover cv. Merlin was sown in 30 cm row spacing at 2.5 kg/ha during March 2013. Early herbicide flumetsulam as Preside, at 65 g/ha was applied on 15-April 2013. The main weeds escaping this treatment were sowthistle (*Sonchus arvensis*), hawkesbeard (*Crepis carpillaris*), cotton fireweed (*Senecio quadridentatus*) and hairgrass (*Vulpia bromoides*). The latter was well controlled by an application of propyzamide (Kerb) at 3 L/ha applied on -16-June 2013. To assess control options, treatments of Select (MCPB 375g/l + MCPA 25g/l), Baton (2.4-D amine WG 800g/kg), Sprinter (2,4-D amine SC 700g/l) and RelaySuper (2,4-D Ester EC 680g/l) were applied at various rates in combination with Jaguar® at two timings (Table 1) though a CO2

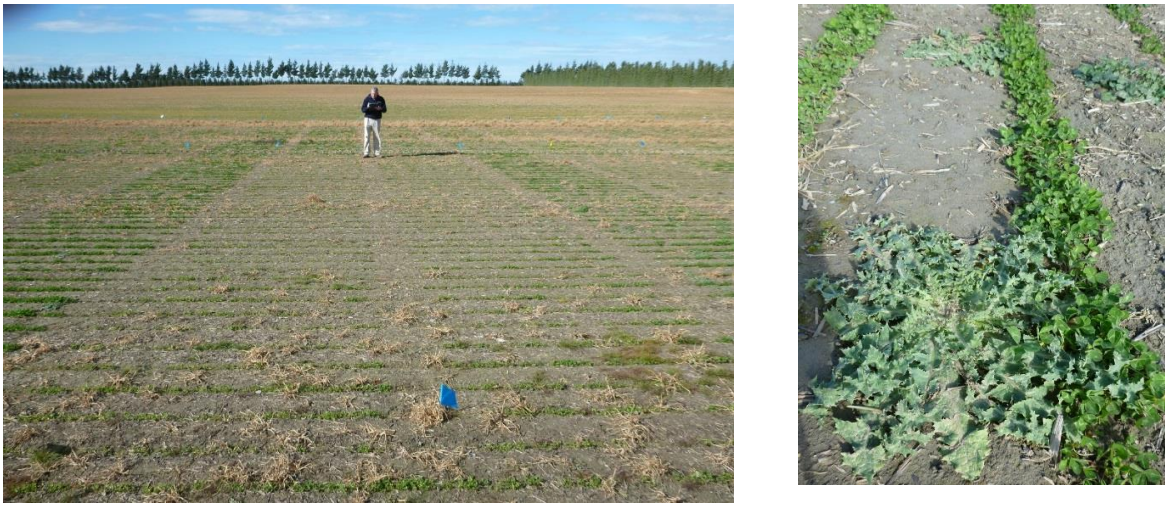
powered small plot sprayer. At harvest the grower applied MCPA as Maestro at 1.25 l/ha on 3-Feb 2014 followed by diquat as Reglone at 3.5 l/ha on 13-Feb 2014. Harvest occurred on the 28th Feb 2014 using of a Wintersteiger plot combine.

Table 1. Herbicide treatments applied to white clover cv 'Merlin' for the control of sowthistle and hawkesbeard near Methven in the 2013/14 growing season

Treatment	Product	Application timing
1	Control	-
2	Jaguar 1.5 l/ha + Select[1] 4.0 l/ha	22nd July
3	Jaguar 1.5 l/ha + Baton[2] 2.0 kg/ha	22nd July
4	Jaguar 1.5 l/ha + Sprinter[3] 2.3 l/ha	22nd July
5	Jaguar 1.5 l/ha + Relay Super[4] 2.35 l/ha	22nd July
6	Jaguar 1.5 l/ha + Select 4.0 l/ha	22nd August
7	Jaguar 1.5 l/ha + Baton 1.5 kg/ha	22nd August
8	Jaguar 1.5 l/ha + Baton 2.0 kg/ha	22nd August
9	Jaguar 1.5 l/ha + Sprinter 1.7 l/ha	22nd August
10	Jaguar 1.5 l/ha + Sprinter 2.3 l/ha	22nd August
11	Jaguar 1.5 l/ha + Relay Super 1.75 l/ha	22nd August
12	Jaguar 1.5 l/ha + Relay Super 2.35 l/ha	22nd August

[1]Select= MCPB 375g/L + MCPA 25g/l,
[2]Baton= 2.4-D amine WG 800g/kg
[3]Sprinter= 2,4-D amine SC 700g/l,
[4]RelaySuper= 2,4-D Ester EC 680g/l

Results. Large differences in white clover seed growth were observed during the IHSG visit to the trial site in September (e.g. Photo 1a). Generally 'Select' showed less reduction in clover growth compared with the 2,4-D treatments while RelaySuper provided the largest check on clover growth.



(a) (b)

Photo 1. Photo showing growth regulation from July herbicide applications compared with no treatment (a) and the size of problem weeds when waiting until August for treatment (b) Photos taken 22 August.

Seed yields were high, with the untreated at 900 kg/ha compared with many herbicide treatments which achieved greater than 1050 kg/ha. Good weed control was achieved by products which contained 2,4-D while Select (MCPA and MCPB) struggled to control Sow thistle in the cool temperatures of July. Generally treatments which provided a strong check of clover growth provided better weed control and in this season greater seed yields.

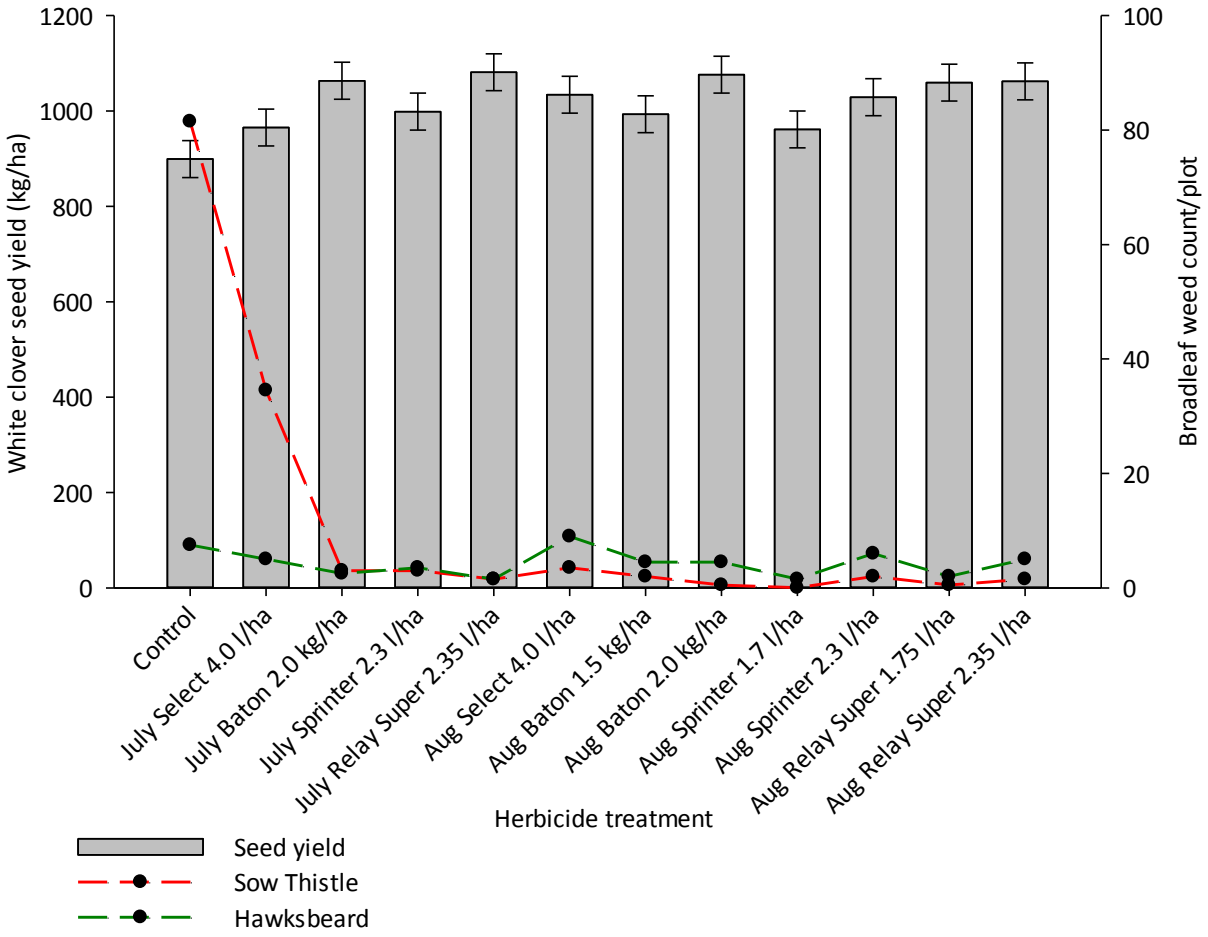


Figure 1. Machine dressed seed yields of white clover and weed counts for plots treated with 12 herbicide combinations grown near Barrhill, Canterbury, New Zealand in the 2013/14 growing season. Note. All treatments (except for the control) were tank mixed with 1.5 l/ha of Jaguar (bromoxynil + diflufenican).

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