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Looking back on 2010

Editor's note: In April this year the 7th IHSG conference was held in Dallas, ash clouds from an Icelandic volcanic disrupted travel across much of Europe and both Chile and Christchurch New Zealand were hit by severe earthquakes. As we prepare for the new decade we farewell the last everyone will have their own memories of 2010. However we are all part of IHSG family and I would like to take this opportunity to wish all of you a merry Christmas and a safe new year.

This is issue number 44 of the newsletter. 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 the 44th edition of the IHSG newsletter. While herbage seed research focus on increasing yield and quality often combined with reducing input factors for the benefit of farm economy and environmental concern, I find it very encouraging to consider the various uses of herbage crops and the importance of grasses and legumes in the global ecosystem.

UNESCO defines grassland as "land covered with herbaceous plants with less than 10 percent tree and shrub cover". Grasslands, including rangelands, shrublands, pastureland, and cropland sown with pasture and fodder crops, covered approximately 26 percent of the world land area in 2000 and 70 percent of the world agricultural area (FAOSTAT 2009). Grassland is a multifunction ecosystem, and is both a source and a sink.

The main source is forage production – often the use as grassland is the most sustainable use in areas with unfavourable climatic and/or geographic conditions. Biomass from grasslands can also be used as a renewable source of energy for biofuel or biogas. Further grasslands can be a source of biodiversity and play a role in landscaping and ecotourism.

Grassland is a sink for CO_2 and approximately 34 percent of the global stock of carbon in terrestrial ecosystems is stored in grasslands, while forests store approximately 39 percent and arable ecosystems 19 percent. Grasslands may therefore play an important role in mitigating climate change effects, and it seems that the more productive grasses and clovers are grown the larger the mitigating effect.

Another use of grasses and partly also clovers are as turf for sports establishments, recreational areas, parks and lawns. Although the financial crisis has currently decreased the use of turf in the construction industry, this is still a very important market for the high quality grass seed.

Recently another use of grass seed has been added to the above mentioned – namely for green roofs. Historically green roofs have been used in Scandinavia, and the "sod roof" has a very long tradition. A number of different grass species have been used. Now green roofs are being used in larger cities for various benefits: Water retention, improved air quality, cooling the building during summer and visually enhancing the quality of life in the cities.

There may not be a large need for grass seed for green roofs, however, I find it very inspiring to see so many different uses of the traditional 'herbage species'. I would like to invite IHSG-members to send information for the next issue of the newsletter on the different uses of grasses and legumes in your country and region.

With this I would like to thank you all for the collaboration in 2010, and I wish you an exciting and successful 2011.

Happy new year!

President
Birte Boelt

Post-harvest residue management of tall fescue [*Lolium arundinaceum* (Schreb.) Darbysh.] seed crops

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Abstract

Post-harvest residue management in tall fescue seed crops affects the production of autumn tillers which originate harvestable seed in the following season. In Pergamino, during the periods 2006-07 and 2007-08, an experiment was carried out in order to compare three different residue managements: 1-residue chopping and its removal from the field, 2-residue chopping without removal, and 3-non postharvest residue management. The trial was carried out on two tall fescue seed crops: cv. Brava INTA and cv. Palenque Plus INTA. Each treatment was located at random on 20 x 100 m plots. Chopping was done with a chopper, and residue removal was done with a side discharge rake. The effect of the three treatments was evaluated by measuring panicles per area unit, seed production per panicle, and thousand seed weight. Results obtained in both periods and varieties showed that residue chopping, with and without removal, increased seed yield. The convenience of removing residues in those tall fescue varieties exhibiting an intermediate growth habit has also been suggested.

Dell´Agostino, E., Defacio, C., y Llera, A. 2010. Manejo de los residuos postcosecha en cultivos de festuca alta de semilla [*Lolium arundinaceum* (Schreb.) Darbysh.]. Revista Argentina de Producción Animal Vol 30 (1): 15-21

Use of Infra-red reflectance sensing devices to assess leaf disease in ryegrass seed crops

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Fungal disease assessments e.g. stem rust, in ryegrass are time consuming and prone to variation. NDVI tools are being used to assess N uptake (see papers by Flowers *et al.*; Gislum & Boelt; Chynoweth *et al.* in the 7th IHS Conference, Dallas 2010). NDVI readings with a handheld "Greenseeker" were compared with traditional visual assessments of stem rust disease in a turf ryegrass fungicide trial during the 2009/10 season. There was a strong correlation between NDVI readings and visual assessments of stem rust severity recorded 4 weeks before harvest (Fig. 1).

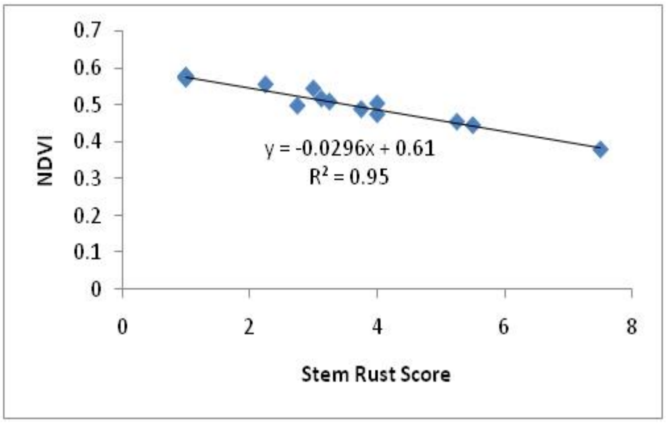

Fig. 1. Correlation between NDVI and stem rust scores on 18 January 2010. Stem rust assessed on a 0-9 score where 0=nil and 9 = very severe incidence.

The final machine dressed seed yield was highly correlated with the NDVI readings (Fig 2).

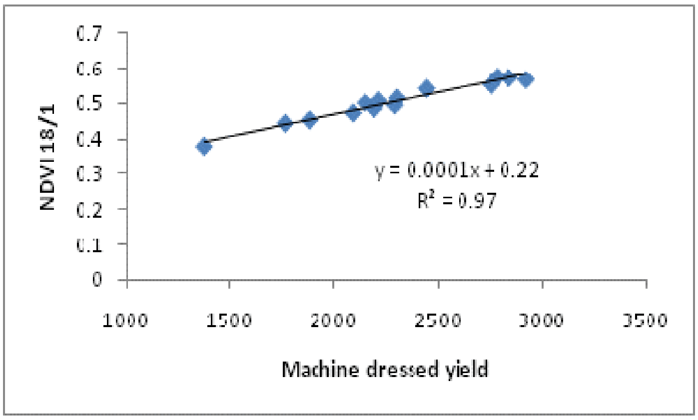

Fig. 2. Correlation between NDVI scores and seed yield (kg/ha).

Conclusion. NDVI from Greenseeker or similar remote sensing devices offer opportunities to more quickly assess the effectiveness of fungicide treatments. Current work is exploring if infra-red reflectance methods have a role in early disease detection.

Application and utilization of ^{15}N in red fescue for herbage seed production

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Uptake and utilization of nitrogen (N) applied in red fescue for herbage seed production has been studied for several years in Denmark. The main reason is the strict legislation we have on the use of N in agriculture as described in the *Actions plans for the aquatic environment* in 1987, 1998 and 2004, a *Plan for Sustainable Agriculture* in 1991, and an *Action Plan to reduce Ammonia Emission* in 2001. These plans are administrated by the Danish Plant Directorate and the overall purpose is to reduce nitrate leaching from fields. Currently the application rates in red fescue is 118 kg N/ha. Economical optimum N application rates (ECO-N) in red fescue has been calculated in Danish field experiments to be 136 kg N/ha. Based on the difference between N application rates set by the Plant Directorate and ECO-N there is a solid economical reason to increase the utilization of the applied N in red fescue.

Calculation of uptake and utilization of applied N has usually been done from field experiments where different N application rates and different N application strategies has been applied as ammonium nitrate. The N content at harvest was measured in seeds and straw and the utilization of N was calculated based on the application rate. This is a standard method but this method has some limitations. The most obvious one is the fact that we do not know if the N measured in seeds and straw actually comes from the applied N or from soil N sources.

The used of stable isotope ^{15}N is a common technique to follow utilization of labeled N. This method was used by Williams, Rowarth and Treguatha back in 1995 to 1998 at a farm near Lincoln in the Canterbury region of New Zealand. In their experiment they used perennial ryegrass, tall fescue and brown top and found that grass straw and seed contained 34 to 47% and 6 to 15 % of the applied N, respectively; and 27 to 35% remained in the soil at 0 to 150 mm depth. More results and experimental set up can be found in *Journal of Agricultural Science 2001, 137, 17-25*. Nitrogen application strategies differ between New Zealand and Denmark and especially N application strategies from 1995 to 1998 in New Zealand are different from current strategies used in Denmark. Nitrogen application for red fescue in Denmark is divided between an autumn N application to establish a high seed yield potential and a spring N application at initiation of spring growth to utilize the seed yield potential. We know from field experiments that there is a strong interaction between autumn and spring N application on seed yield. In order to see the effect of the two different application strategies in the two countries it was decided to establish a field experiment using red fescue and spring barley as cover crop in 2005 with first year seed harvest in 2006. The experiment was replicated for three years with first and second year seed harvest. Labeled ^{15}N was applied in tubes placed in the 20 m^2 plots in the field (Fig. 1).

Fig. 1. Pipes in field plots where ^{15}N was applied

Other aims were to test the effect of using increasing ^{15}N application rates and furthermore to test the effect of year as the experiment was replicated for three years.

There was no significant differences in percentage utilization of ^{15}N in seeds or straw between application rates of 60 or 120 kg N/ha in autumn. For application of 30 or 90 kg N/ha there was a difference in percentage utilization of ^{15}N in seeds and straw. The average seed yield in the experiment was 1380, 1700 and 2340 kg/ha in 2006, 2007 and 2008, respectively. The large difference had an effect on the percentage utilization of ^{15}N with a higher utilization especially in autumn in related to seed harvest in 2008. Based on this we conclude that utilization of N in autumn for red fescue is very important to achieve a high seed yield. The reason for this must be closely linked to establishment of seed yield potential and vernalisation demand in red fescue. We will continue this work and results will be published in an international reviewed journal.

Top seed yields

What are the highest commercial farm seed yields for different herbage species? We would like to receive input and feedback from members on verified seed yields for future newsletters. For starters Murray Kelly from PGGW Seeds in New Zealand reports on a client growing Certified annual ryegrass who has broken the 4000 kg/ha barrier. The seed was grown as First Generation Certified and the seed quality testing was by the national seeds laboratory AsureQuality Seed Laboratory. If IHSG members have data sets for other crops send the information to Phil Rolston (phil.rolston@agresearch.co.nz) for the next newsletter.

Species	Cultivar	Region /Country	Total (kg)	Area (ha)	Yield (kg/ha)	Germ (%)	Certified
Lolium multiflorium	Winterstar II	Canterbury, New Zealand	170,500	42.1	4050	96	1st Gen

Water stress and perennial ryegrass seed yield

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Is the timing of water stress critical and what is the yield cost of water stress on perennial ryegrass? Recent New Zealand research suggests that it is the amount of stress and not the timing that is critical. In a field trial at the FAR Chertsey trial site (2009/10), if water stressed occurred before flowering or after flowering the effect on seed yield was the same (Table 1). Seed yield response was 2.3 kg seed per mm applied water (Fig. 1). This trial is being repeated for the 2010/11 harvest.

Table 1. Seed yield responses to eight different irrigation treatments

Treatment	Applied irrigation (mm)	Seed yield (kg/ha)	Homogeneous groups	
nil	0	2000		b
Replace 33% ET[1]	102	2070		b
Replace 66% ET	205	2520	a	
Replace ET	310	2500	a	
Nil until flower (early Dec) then full	165	2050		b
Nil until flower (early Dec) then half	83	1980		b
Full until flower (early Dec) then nil	145	1940		b
Full until flower (early Dec) then half	227	2580	a	
	$LSD_{0.05}$	290		

[1]ET evapotranspiration; full irrigation replaces ET; half irrigation replaces 50% ET

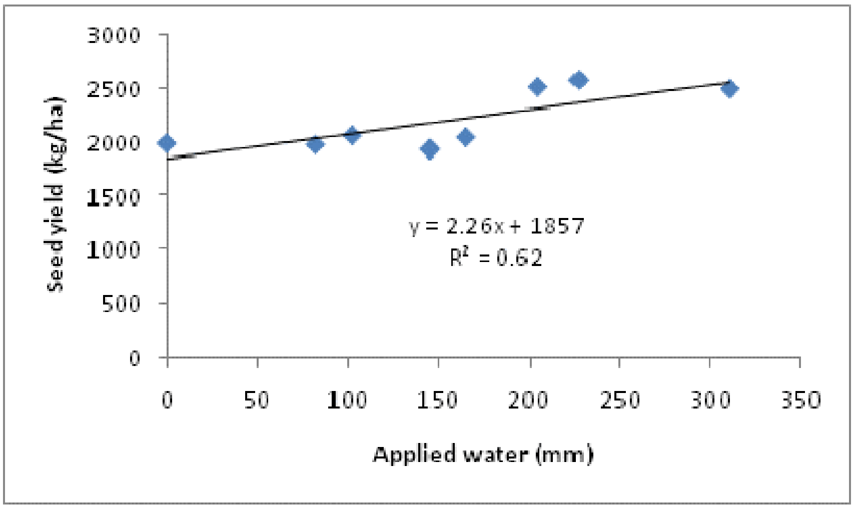

Fig. 1. Seed yield response to applied water

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