Appointment of Crop Nutrition Specialist

Iron deficiency in a table grape leaf

Improving fertiliser use efficiency and better understanding of the role of nutrients and their uptake in crop production has been much more intensively researched in recent years. Agrisearch Services has become increasingly active in fertiliser research in both broadacre and horticultural crops and is excited with the appointment of Dr Mark Sargeant as our crop nutrition specialist. Mark comes from a research management background in the general fertiliser industry and is able to offer sound advice in the development of traditional or novel fertiliser products.

Mark is based at our Melbourne office but is able to offer services nationally throughout our field research units across Australia. Mark has been involved in studies looking at general fertiliser usage in pastures, improving micronutrient uptake in cereals, alleviating problems associated with nutrient uptake in grapes in high pH soils, as well as improving calcium nutrition in apples. For more information please contact Mark on 0418 320 886 or mark.sargeant@agrisearch.com.au

Fertiliser trial in sorghum on the Darling Downs

Fertiliser trial in cotton near Narrabri

Foliar fertiliser trial in pear trees near Shepparton
Improving Stem Retention in Sweet Cherries to Meet Quality Specifications

Quality parameters set by retailers of cherries, require fruit to be received with the stems intact, and for the stems to remain in place whilst on display and following handling by consumers.

Cherries on which stems are not retained are deemed to be of lower quality, and as a result attract a discount on the price received by growers.

In 2008, the cherry industry identified fruit stem retention as a major quality issue for both the domestic and export markets. Agrisearch Services were part of a team, put together by the ‘Cherrynet’ group with support from Horticulture Australia Limited, to investigate management options which may help to alleviate this problem.

Historical data collected by ‘Cherrynet’ has indicated that the stem pull force (or the pressure which is required to remove the stem from the fruit) was significantly different between the northern and southern regions of Victoria, and that in some of the drought affected seasons, where trees were under severe heat and moisture stress, the problem was worse. Stem pull force appears to be higher in the softer environments of southern Victoria than in the harsher climate of the Goulburn Valley, and in seasons where heat and moisture stress during the critical ripening phase, are lower. A stem pull force of 500 g is considered to be the minimum required to achieve premium quality. In northern Victoria whole crops are often below this benchmark at harvest.

With this in mind a literature search was conducted by Ken Gaudion of Cherryadvice to determine whether the impact of chemical or fertiliser treatments had been previously evaluated to overcome this problem. From this review a number of leads were uncovered and, based upon the author’s knowledge a further list of possible products which are currently available to industry, were selected for screening to determine if a positive impact upon stem retention following standard application would be evident. In addition, the effect of all treatments on fruit size and firmness was also measured.

In the project’s first year (2009) field trials were conducted at Tatura only in Lapins and Van cherries. These varieties were selected as they are important commercially and both often have stem retention problems. A large number of treatments were screened. These included:

- hormone growth regulator products
- foliar organic and non-organic growth promotants
- sunburn protectants
- fungicides.

Different rates and application timings were investigated. In addition to the sprayed products, the effect of a reflective tarp was also included.

In 2010 a much more extensive field trial program was undertaken. Sites were established at Silvan, Yark and Tatura with Lapins being used at each location and Ulster, Van and Bing also being included. Products which had provided a positive improvement in stem pull force in 2009 were included at each location. In addition, some of the treatments were combined together on full spray programs, in order to investigate whether additive or synergistic effects would be seen.

In both seasons, all orchards received the normal maintenance (agronomical practices, irrigation, diseases and pest management) program used in the farm, excluding any treatment which was included in the trial.

The trials were laid out as randomised experiments with each plot being a single tree. The treatments were applied using a backpack mist blower and a motorised hand gun, using an application volume of 1000 to 1800 L/ha (point of runoff) depending upon the product type being evaluated. Application timings ranged from full bloom (approximately end of September – early October) to a week before commercial harvest (first half of December).

The parameters evaluated in the trials were stem pull force (g), fruit firmness (g/mm²) and fruit size (mm). The assessments were conducted at 7 days before harvest, at commercial harvest and 14 days after commercial harvest, following a period of cool storage. A sample size of 25 fruit was assessed on each date.
The results from the 2009 trials clearly showed that some of the treatments significantly improved the stem pull force as well as size and firmness on either Lapins or Van. However, other treatments showed a variety related effect, or improved only one or two of the parameters assessed. The treatments that improved stem pull force or considerably increased fruit size and firmness only were taken to a second year of experimentation during the 2010 season. The reflective tarp did not show any positive results on either stem pull force, fruit size and firmness, and was excluded from further testing.

During the 2010 trial period abnormal weather conditions were experienced at each of the sites with below average temperatures and above average rainfall, especially approaching the harvest period. These weather conditions had a major impact on the results as the majority of the fruit was damaged by cracking, brown rot and hail. The trial on Van in Yarck was not sampled due to the high level of damage caused by a hail storm which occurred in early November.

The results on stem pull force, fruit size and firmness were characterized by high variability both within the trials (assessments dates) and across the trial sites. Despite this variability positive effects on stem pull force were seen on at least two of the sites on Lapins. Once again several of the treatments which gave a positive improvement in stem pull force in 2009 were again effective in 2010. Of particular interest was the result seen with the ‘program treatments’ where improvements in stem pull force of up to 30% were measured.

In conclusion, despite the high variability of the results, some of the treatments applied do show a positive effect on stem pull force. The development of an effective program including several different treatments is being evaluated in 2011 to determine the optimum products, application timings and rates which will provide the maximum improvement in cherry quality to meet market specifications.

For further information on this project or for advice in developing products for the cherry industry please contact Les Mitchell or Marco Montagna.

We all know the best way to wake the kids up and get them out of bed is to throw a bucket of cold water over them, but what happens if you do that to a dormant apple tree? The short answer is: not much. But there are ways to get trees and vines up and running after their winter sleep-in.

Most of the fruit crops grown in Australia originate from the northern hemisphere, where many plants go into a state of winter dormancy and defoliation to prevent frost damage to the foliage. The plants then require exposure to winter chilling to stimulate uniform spring budbreak. In areas of poor winter chill, such as the Sunraysia, the Riverina and the Riverland districts of southern Australia, budbreak can be very uneven, late and protracted in crops such as apples, grapes and kiwifruit.

In such areas, dormancy breakers, including hydrogen cyanamide, and mineral and vegetable oils, are often applied to initiate uniform and early budbreak.

Hydrogen cyanamide (Dormex) has been the most commonly used dormancy breaker in Australia for over 25 years, but it has a number of toxicological and environmental drawbacks.

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dormancy breakers can also increase the number of emerging buds, which, in turn, leads to a considerable increase in harvest yields. Dormancy breaking may advance fruit growth resulting in earlier harvest of fruit, particularly in warmer districts. However, this may also reduce red coloration of apples if temperatures are high at harvest.

Rising winter temperatures into the future may see an increased reliance on dormancy breakers in Australia and New Zealand to interrupt winter dormancy and induce more uniform and earlier budbreak.

Les Mitchell and Bill Frost have between them more than 40 years experience in the evaluation of plant growth regulators, including dormancy breakers, in a wide range of fruit crops. Give Les or Bill (see details back page) a call should you wish to discuss any aspect of plant growth regulation.

## NVT Victorian Program 2011

The National Variety Trial program is one of the premier GRDC Projects that provides independent information to growers and advisors on the performance of newly released varieties of winter field crops relative to the current commercially grown varieties in their area. The NVT Program involves conducting replicated yield trials in all five mainland states through independent service providers. Data are gathered and results made available to farmers through the Australian Crop Accreditation System (ACAS).

Agrisearch Services’ association with the NVT Program in Victoria started in 2005 with the company contracted to conduct the field trials in the North East and North Central regions. In 2010 the regions covered by Agrisearch were extended to the Wimmera region and South Western Victoria.

Agrisearch is conducting seventy five replicated yield trials in cereals (wheat, barley, triticale and oats), canola and pulses (chickpea, lentils, lupins, field pea and faba beans) across 20 trial sites. The trial sites have been spread throughout the major cropping regions of the state and are managed from the Agrisearch offices in Shepparton, Horsham and Melbourne.

With the continued expansion of the breeding trial work in Victoria, Agrisearch has strengthened its resources in all of the Victorian offices. The teams at Horsham and Shepparton operate independent sets of machinery/equipment to successfully manage large scale field trial projects. In Horsham, Office Manager Jeremy White is ably supported by Technical Officers Mathew Burns and Tony Ryan. This team covers all of the research work done in the Wimmera and South-West Victoria. This team has managed not only large breeding trial projects in cereals, canola and pulses...
over the last three years, but also has conducted canola blackleg screening trials around Horsham and Lake Bolac. The team at Shepparton, Dr Harpreet Gill and Cyril Tricarico, have more than ten years of experience in conducting large scale breeding trials and covers North East and North Central Victoria. The office in Melbourne has been strengthened by the appointment of Dr Mark Sargent, whose valuable experience in agronomy adds value to Agrisearch’s capabilities in Victoria.

The 2011 cropping season got away to a difficult start with a mouse plague forecasted for all the cropping regions in Victoria. The shortage of mouse bait further dampened the spirits of the broadacre farmers despite good soil moisture for planting. The impact of mice damage on the breeding trials was more localised and was managed likewise. Despite the best control measures put into place, one canola site near Shepparton was lost. Some cereal trials were also affected, but were compensated with an ideal growing season thereafter. Some trials in South-West Victoria were affected to a small degree by biotic and abiotic forces with waterlogging, earwigs, slugs and snails all having to be dealt with. Despite some minor setbacks, the majority of the breeding trials are in good shape and progressing towards a bumper harvest. Fingers crossed, Agrisearch is looking forward to a rain-free harvest season.

Wheat at Diggora

Wheat yield trial

Lupins at Elmore

Pulse Breeding in Southern Australia

Agrisearch Services is currently working with Pulse Breeding Australia (PBA) to increase grower returns through the development of improved varieties. The PBA Chickpea Program is a GRDC and state government funded project that is co-ordinated from New South Wales Department of Primary Industries, working with various collaborators throughout Queensland, New South Wales, Victoria, South Australia and Western Australia.

PBA aims to deliver agronomically superior pulse varieties quickly to Australian growers, with food and feed traits developed through using reliable market signals. The improved traits sought by the Chickpea Program specifically include:

- Disease resistance traits to ascochyta blight (Ascochyta rabiei), phytophthera root rot (Phytophthora medicaginis), root lesion nematode (Pratylenchus thornei and Pratylenchus neglectus) and botrytis grey mould (Botrytis cinerea).
- Agronomic improvements such as early maturing, chilling tolerance (increased ability to set pods in cool weather)
- Salt tolerance traits — currently being explored to improve yield stability and increase the area grown to chickpeas in Australia.

There are currently four sets of germplasm being developed and evaluated, one of which is a desi chickpea stream adapted for Western Australian, South Australian, Victorian and southern NSW regions. There is also a kabuli set which is being evaluated nationally.

Jeremy White inspecting chickpeas for signs of disease.
These two germplasm streams are being evaluated at three Victorian Wimmera and southern Mallee sites and are being managed by the Agrisearch Services Horsham team.

The PBA chickpea program has traditionally used collaborations with state agencies to conduct breeding evaluation trials, but has this year looked to Agrisearch to carry out their Victorian evaluation work.

Dr Kristy Hobson, leader of the PBA Chickpea Program says that the move toward using Agrisearch Services “allows our program to expand the number of traits, which will result in better varieties and help develop the southern chickpea production area”.

Dr Hobson sees the southern region as a key chickpea area and with improved varieties being developed, she hopes the region can regain the significant chickpea production of the 1990s. The role of Agrisearch Services in this project is to “provide efficient, cost effective evaluation so that more funding can be directed towards expanding our breeding objectives” said Dr Hobson.

For more information on plant breeding trials in the Wimmera, please call Jeremy White on 0428 552 002 or email jeremy.white@agrisearch.com.au

First Southern Regional Team Meeting

With the wide variety of research undertaken by Agrisearch Services and the large geographical spread of personnel, the Company has decided that regional team meetings held several times each year will benefit both staff and clients by providing a good platform for information exchange and an opportunity to discuss research projects in common. The first of these meetings was held recently for the southern region where all Agrisearch staff from the southern Australian offices (Adelaide, Horsham, Melbourne and Shepparton) gathered in Shepparton with Managing Director Martin Collett and business consultants DeConstantin and Associates.

This group of consultants has been appointed to assist Agrisearch in a range of business related areas including performance optimisation, human capital, financial planning and business development.

Internal issues covered included processes that can be implemented to improve efficiency and the quality of projects and how management of projects between the various Agrisearch offices can be further improved. Recent client feedback was also considered and suggestions taken on board which will be implemented.

The gathering also provided the opportunity for staff to meet with Senior Project Biologist, Dr Harpreet Gill, to discuss the logistics of the winter crop harvest in the southern region. Many participants also took the opportunity to look at the National Variety Trial site located at Wungnu.

In the coming months the Central Regional Team Meeting (Gosford, Wagga Wagga, York, Orange) and Northern Regional Team Meeting (Narrabri, Toowoomba, Bundaberg, Innisfail) will be held.

Regulatory Affairs Workshop Held in Orange

In September, Agrisearch staff members Marco Montagna, Joel Gorman and Greg Murdoch, undertook a regulatory affairs workshop at our Orange office led by Kathryn Adams. The aim of the workshop was to develop their skills in the Australian Pesticide and Veterinary Medicines’ Authority (APVMA) requirements.

The participants worked through Ag MORAG (Agricultural Manual of Requirements and Guidelines) which provides information on data requirements and guidelines for applications to register or approve agricultural chemical products, labels, active constituents and permits.

The workshop trained staff in:

- the 25 different application categories so that clients can select the correct category for their application
- details of the requirements and guidelines for each of the 10 data parts which might apply to different types of applications
- guidelines for applications to register specific types of products
- the Ag Labelling Code which sets out requirements and best practice for product labels

The workshop was a great success and has now better equipped the participants with greater knowledge and understanding of the APVMA requirements. For further information on product registrations, label changes, permits and other APVMA applications please contact Kathryn Adams in the Orange office on 02 6362 4539 or email kathryn.adams@agrisearch.com.au.
Ben Vlaming
Ben has a colourful background having grown up in a remote rural community in the Golden Bay area of the upper South Island and spending a lot of time with hippies and alternative lifestylers. He studied animal science at Massey University gaining a BSc and a postgraduate diploma. Following the time at university, Ben started in a job studying hot air (livestock methane) with the New Zealand CRI, AgResearch Ltd, before doing a PhD on the same subject. After completing his PhD in 2008, Ben did a bit more work on methane before shifting to Lincoln, Canterbury to undertake a post-doctoral position studying grass endophytes and their effect on the livestock. In June of this year Ben joined the team at Agrivet to manage the Animal Health research section. Ben is enjoying the collegial atmosphere at Agrivet and interacting with our AH clients to assist them with their research needs.

South Island Staff Update
Sean Lange resigned in June of this year after 15 years working with initially Geelen Research and then Agrivet Services Ltd. We wish him well in his new venture in software development for the agricultural sector. David Williams then joined us in August. He holds a BSc in animal science, majoring in biochemistry from Lincoln University and is currently completing a one year post-graduate course in agricultural life-science. David hales from a dairy farm in the Waikato and after several years of doing heavy machinery farm contract work and overseas travel, decided to study.
He is used to dealing with farmers and since September last year, used to dealing with earthquakes (over 8,000 of them). David spent the first three weeks at Agrivet head office receiving training and attended the NZ Plant Protection Conference in Rotorua as well. He is beginning to settle into the new Christchurch office which is located in Hornby, a mostly industrial suburb which has not experienced any earthquake damage so far. David has already visited Nelson and Marlborough, sorting out trial sites and is keen to get into the practical side of the job. We are sure that he will do well, especially with the backing, support and training from other Agrivet staff. He has settled well into his new office and has several trials in apples, grapes, cereals and broadacre crops going and coming up.

New Office Complex at Havelock North

The crammed conditions are over. For the past year, the staff have been two to an office, some only with a temporary desk, while a new office complex was being constructed. It took a whole year from the initial approach to the draughtsman to completion of an 8 metre by 10 metre single storey building comprising three offices and a toilet. We could not adjoin it to the existing building as this no longer complies with the current building regulations (even the shower area is now too small) and so it became stand alone – except that this went right over the existing septic tank. Besides a whole new septic tank system, we had to provide a full list of all current buildings with their size and purpose. Things seemed to just go on and on. Construction finally started nine months later. Now it’s the envy of other staff with air-conditioning, plenty of shelving and generally spacious offices. The Animal Health team occupy two offices and Tim the third.
Fertiliser Research

In June 2008 a company approached Agrivet to undertake a series of trials with their sustained release organic boron fertiliser based on hydroboracite (OrganiBOR). This product is produced in Argentina and in spite of it being sold for many years no actual trials had been carried out, except for a few small forestry trials in New Zealand. To launch the product into horticulture the company wanted some basic information – how long did the product last in the soil, did soil responses translate into foliage and fruit effects, did the calcium and magnesium ingredients in the product also generate a soil and foliage response, and also did extensive rates cause crop damage?

This began an exciting three year project evaluating two rates (a standard and an extra high dose rate) in apples (in a conventional and organic orchard) and two vineyards in Hawke’s Bay as well as a kiwifruit and avocado orchard in the Bay of Plenty.

The results of all the analyses over the three year period have finally been gathered together into a report with the client happy that the answers have concurred with his predictions.

Amongst the many findings in the report several clear results were common to all sites.

- OrganiBOR at the standard rate lifted soil boron levels by an average of 200% after 12 months and then slowly decreased through to 30 months after application, when it was still 50% higher than the untreated control. Applying OrganiBOR at three times the recommended rate resulted in a 500% increase at 12 months at which stage boron response peaked (see Fig 1). No sign of toxicity was observed in these plants at any stage.
- Foliage boron levels were lifted by an average of 125% the following spring where the standard rate was used and by 175% with the 3x rate. Foliage levels remained higher than the untreated control throughout the 26 month trial period (see Fig 2).
- There was no consistent effect on soil or foliage calcium or magnesium levels, even at the 3x rate.
- Boron levels in apples were elevated by OrganiBOR in the first, second and third season.

- OrganiBOR had no effect on soil organic matter, pH or CEC levels.
- Even at 3x the standard rate it had no adverse effect on total or active bacteria or fungi, and soil protozoa levels were unaffected in conventional and organic apple orchards, in vineyards or in kiwifruit.
- Neither rate caused any flower, foliage or fruit damage.

Agrivet has now embarked on trials in pasture to look at responses in soil and clover and to see if this translates into improved soluble solids and dry matter. Preliminary data indicates that this is the case.

It’s been exciting to be at the forefront of research with OrganiBOR and the client now has even greater confidence as he moves into marketing OrganiBOR in Australia, South Africa, South America and parts of Asia.

![Fig 1: Boron response in soil from OrganiBor applied at the recommended and 3x rate (mean of five trial sites)](image1)

![Fig 2: Boron response in foliage from OrganiBor applied at the recommended and 3x rate (mean of five trial sites)](image2)
Changing of the Guard

They say that all things come to an end and it must be true as our long-serving Managing Director is stepping down. Ross and his wife Fiona are moving to Hamilton, New Zealand where Ross will take up a new position in our laboratory there.

Ross has been the MD of Agrisearch Analytical from its inception in December 2000. He has seen the company grow from a single employee at Rozelle to 21 employees at 3 locations. Despite the growth in numbers, Ross retains close ties with the staff and he will greatly miss the camaraderie of his work colleagues and contact with the many loyal Agrisearch Analytical customers in Australia.

The Board of Agrisearch Analytical has identified opportunities in NZ and it will be among Ross’ responsibilities to grow the NZ business. Ross will be replaced as Managing Director by Susan McKeon, the current Laboratory Manager. Susan has worked for Agrisearch Analytical for 6 years and has held her current position since 2009.

GLP News

IANZ Accreditation for Hamilton Laboratory

Our laboratory in Hamilton, New Zealand, has been up and running for almost a year now and continues to grow, providing GLP recognized residue analysis in the areas of crop protection and animal health. Our experience in this regulatory area for over a decade has meant that we were able to ‘hit the ground running’ in Hamilton and GLP accreditation was granted to this facility in May this year by IANZ (International Accreditation New Zealand), without condition.

Andrew Westcott, Senior Project Chemist for New Zealand, has worked hard this year to establish the laboratory and maintain the high standards required for GLP with the help of Project Chemist Siyuan Yang. The lab, which was custom built for Agrisearch Analytical, has plenty of room to accommodate growth which we are looking forward to in the years to come.

GLP Training

As part of Agrisearch Analytical’s commitment to GLP and continuing education for all staff, a one day GLP course was held in-house in Rozelle in July. Run by NATA (National Association of Testing Authorities) the course was attended by all staff from all three facilities – Rozelle, Orange and Hamilton. While the day served as a refresher course for many staff, it has brought our entire staff into our GLP scope. This paves the way for many of our project chemists now being qualified to act as Principal Investigators or Study Directors and promotes the application of a ‘GLP culture’ to all the services we provide.

Meet our new staff

2011 has seen continued growth for Agrisearch Analytical and the addition of several staff members to our teams in both the Orange and Rozelle laboratories.

Amy Drewett joined us in Rozelle in May this year as a Project Chemist. Amy has a Bachelor of Science (Hons) degree in Applied Chemistry in Forensic Science and has come to us with research experience as well as experience in analytical chemistry.
Kristina Pham joined the Rozelle team in August this year, also as a Project Chemist. Kristina has a Bachelor of Science degree as well as a postgraduate Diploma of Science, both from the University of Waikato in New Zealand, majoring in chemistry. Kristina has experience in analytical chemistry in both Australia and New Zealand. Her connection to the Waikato area may come in handy if we ever need a secondment to our Hamilton laboratory but in the meantime Kristina is happily settled in Sydney while still supporting the All Blacks and all things Kiwi.

Carmen King joined our Orange laboratory in April this year as a Project Chemist and has extensive experience in chemistry. Carmen works in a permanent part-time capacity usually three days a week and with the flexibility to work more days when required. With almost all of our growing product testing being GLP and conducted in Orange, Carmen has been a real asset to the laboratory in helping the team there keep up with the increased work load.

The Cancer Council’s Relay For Life is an overnight team marathon event that raises vital funds for cancer research, prevention, education and patient support programs. The Inner West of Sydney held its first ‘Relay For Life’ in October this year and our Rozelle staff entered a team to join in the fun and fundraising as well as contribute to our local community.

The team was rostered throughout the 24 hour period to make sure we always had someone walking the track at King George’s Oval and our thanks go to everyone who participated along with their friends and family, especially Susan McKeon who coordinated our participation and those keen people like Ross Shields and David Carter who walked through the night!

With 1 in 2 Australians expected to be diagnosed with cancer before the age of 85 we hope that our participation in the Relay For Life this year and in years to come will help the Cancer Council reduce the impact cancer has on our community. For anyone interested in joining us next year or registering your own team for this event, which is held all over Australia, more information can be found at www.relay.cancercouncil.com.au
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