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Cover

Our land is girt by sea says our national anthem and it’s right – we are very girt. So much so that the sea has a profound effect on our weather. Scientists are carrying out deep water surveys as they keep a weather eye on just what is happening. See article page 21.
THE winners of the SRDC Innovation Awards for 2012 were announced at the ASSCT Conference dinner in Palm Cove. The awards recognise leading research scientists across a number of categories.

The Research Scientist Award was won by Dr Nader Sallam from BSES Meringa for his work in developing sugarcane pest management plans – and we take a look at some of his work on cane grubs in this issue.

At the awards ceremony reference was made to the innovation and passion of Australian researchers. I think most would agree that these are qualities needed to ensure the future of both research and development – and our industry.

There was certainly passion in the air at the conference – passion arising from the disquiet felt by many of our researchers with regard to the proposed future structure and direction of Research, Development and Extension in the Australian sugar industry.

And let’s face it, we’re talking about researchers here – it’s their role in life to question. So yes, any evidence put forward to support such a significant proposal will be subject to strong scrutiny. And any perceived shortcomings will cause disquiet, particularly when there is a feeling of irresistible inevitability about the outcome.

Change is not necessarily a bad thing, nor is it necessarily a good thing, but on issues as important as this one obviously is, it should necessarily be an inclusive thing.

It was interesting to note that one of the invited papers delivered at the conference addressed the critical – if not quite yet terminal – decline in agricultural science training. The decline is in both the availability of courses and the bodies undertaking the courses.

Neil Menzies, Dean of Agriculture and Professor of Soil and Environmental Science at University of Queensland, spoke very fervently about the harsh reality of the decline. But he was equally as animated and compelling when asking us to consider ways we as an industry – and as a nation – might make a career in agricultural science more attractive to students.

He believes that we need to start very early in the process. Neil gave the example of a popular ABC television show for kids called ‘Dirt Girl World’ – an intriguing title for all ages and apparently with intriguing content. Well Neil was intrigued to learn how long an earthworm sleeps for – and I know I would be!

The R,D&E debate is not confined to the sugar industry. Primary industries ministers from around Australia and New Zealand recently met to consider issues affecting Australia’s primary production sectors. It was the first meeting of the Standing Council on Primary Industries, which was launched in late 2011.

Amongst other matters the council reaffirmed its belief that “Australia’s primary industries cannot afford a fragmented or duplicative RD&E system, and that Australia’s $1.6 billion annual RD&E investment in primary industries needs to be focused, used efficiently, effectively and collaboratively.”

The council and its predecessor organisations have consistently endorsed the concept of ‘National R with Regional D&E’. This recognises that “basic and strategic research (R) can be provided from a distance, with regional adaptive development (D) and local extension (E) required, improving the uptake of innovation by industry.”

We need to ensure we have the personnel at hand to contribute to the delivery of these goals at all levels. Rather than attracting the best people to make a career in our industry we seem to be disillusioning many of the personnel we currently have.

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In this issue...

**Extended cane grub protection**

Planting is a major expense in the sugarcane crop cycle, so it makes good economic sense to set your crop up for several productive ratoons.

An important aspect of this establishment phase is to protect the crop for as long as possible against canegrub damage.

See articles starting ........ Page 9

**Plants use their rhythm**

Rice University biologists Janet Braam, Danielle Goodspeed and Wassim Chehab, have worked with colleagues to show that plants use circadian rhythms to both anticipate raids by hungry insects and to time the production of defensive hormones that fend off such attacks.

See article ................. Page 13

**The good gear**

Seven months after placing the order, I recently took delivery of a diesel fuelled European car equipped with one of these new high tech twin clutch semi-automatic transmissions. I have to admit, the brochure was right! The seamless gear changes can often only be detected by a close scrutiny of the rev counter.

See article .................. Page 23
suSCon Maxi is now registered for 3 year control of Southern species of cane grubs.

Addition of Southern one-year cane grub to the label (3 year control)

Dual row planting recommendation (using conventional planting methods) - Greyback and Childers cane grubs

Minimum tillage planting systems recommendations (double disc opener planter) in single or dual rows - Greyback cane grub

Yield and profit maximised

Secure greater protection of your investment by incorporating suSCon Maxi into your grub control program.

Maximise
- Protection
- Yield
- Return on investment

Minimise
- Environmental Impact
- Labour

Maximum long term protection.

*suSCon Maxi is now registered for 3 year control of Southern species of cane grubs. suSCon Maxi is a registered trademark of Crop Care Australasia Pty Ltd. ABN 80 061 362 347
Avalanche of change proposed in sugar RD&E causing lots of unease

President’s address 34th ASSCT Conference, 2012 – Dr Nils Berding, SCII Consultancy Pty Ltd

There currently are many aspects of change in our industry that I could address in my short speech today, but because of my long-term involvement in R&D in our industry I wish to focus on the avalanche that the industry faces in terms of the RD&E restructuring now underway. While those triggering the avalanche may sense a consensus in the change I understand there still is considerable disquiet, unease, and puzzlement amongst many of those in the path of the proposed change.

There have been consultant and implementation reports presented and a submission on the formation of an Industry Owned Corporation (IOC) to the Federal Minister. The initial report signalled little appreciation of agricultural science and the nature of RD&E. The implementation reports was strange in its inclusion of fragments of submissions, many of which could be refuted or debated if referred to a knowledgeable panel. The bottom line of these reports undoubtedly was an aim to reduce investment in R&D and relocate the bulk of extension with other parties in the industry.

A comparison of the contributions of six IOCs to R&D with that made by our industry at the same time (Table 3, Welsman), on a per cent gross product basis, reveals that the pork IOC was at the bottom of the list at 0.107 per cent and the grains IOC at the top at 0.850 per cent. Sugar at that stage was contributing 0.895 per cent of gross product. The accepted investment level in R&D in low-risk general industry has long been regarded as 2 per cent of gross product value, but literature now indicated this has increased to 4 per cent. None of the Australian agricultural industries approaches either of these thresholds.

Premise of restructuring appears suspect

Concerns expressed about current RD&E in the implementation report included:

- Inequitable allocations among regions;
- RD&E performance;
- Poor priority setting;
- Lack of transparency; and,
- Lack of control of RD&E.

Nowhere are these concerns quantified. Certainly the benefits from RD&E enjoyed by the industry, and they are considerable, are not considered. In fact, acknowledgements of the return on RD&E investment from the industry are difficult to recall. Experience with the industry in setting programs of work for RD&E is generally poor.

So without quantification of these key points of concern the premise of the restructuring would appear suspect. Certainly, they provide a poor rationale for dismembering an iconic, international-respected, highly-regarded, sugarcane research institute.

Industry parallels with South Africa

A consideration of overseas models of funding appeared to be summarily dismissed in the reports. But I suggest that strong parallels exist between the Australian and South African industries. Currently Australia has some 4000 producers delivering around 28,000,000 tonnes cane for processing at 24 mills. South Africa has 30,000 growers producing 20,000,000 tonnes cane that is processed by 14 mills, but just 1,550 growers account for 85 per cent of the tonnage. There are two research institutes. The South African Sugar Research Institute is funded 2/3 – 1/3 by growers and millers. The current budget for SASRI is ZAR90,000,000 on a gross product of ZAR8,000,000,000. The Sugar Milling Research Institute currently has a budget of ZAR30,000,000, 53 per cent of which is derived in the Republic.

So we have two dedicated industry institutes, funded to the tune of 1.48 per cent of gross product value, and which rely on government funding for less than five per cent of their budgets. The industry is highly self-reliant in terms of funding.
The offer to end all offers
Ends June 30 2012

The summer’s biggest blockbuster will be even bigger in autumn. From April through to June 2012, you can take advantage of an unbelievable offer across our entire tractor range – from our utility TT through to the broadacre powerhouse T9 4EWD. You’ll marvel at the standard 3-year warranty – be awed by our 3% finance rate*. Critics say the styling, ergonomics and technology of our range is ‘inspiring’, ‘award winning’, ‘the best yet’. But there’s only one way to find out for yourself. Visit brightfuture.com.au/3Dsuperdeals now and see how you can take part in all the action. But hurry, these must-see super deals are only around for 3 short months.

*30% deposit, 3-year term monthly repayments. Offer is available to business customers only and subject to credit approval. Terms and conditions apply. Contact your local dealership for full details.
I gratefully acknowledge Dr Carolyn Baker, the CEO of SASRI and Dr Janice Dewar, CEO of SMRI, for detailed responses to my queries. Carolyn indicated their budget is in close alignment with a Program of Work developed in conjunction with regional RD&E committees of growers and millers.

Improved communications in recent years have improved the development of the Program of Work and hence eased budget approvals. Carolyn also stressed that SASRI is under constant pressure to reduce costs and optimise activities. Millers are less generous than growers yet mills are under constant pressure to secure adequate cane supplies. She did note that their industry is strongly legislated and that there is a strong framework governing their activities. In addition, SASRI maintains a strong and respected extension service.

Proposed Australian Industry Owned Organisation model

One can contrast this with the proposed Australian IOC. Funding will be on a 50:50 basis grower miller, and at the proposed 70c per tonne will yield AUD20,000,000 on a 28,000,000 tonne crop, or one per cent of gross product value. The expectation is this will be supplemented by AUD9,000,000 contributed by governments, Federal and State.

In the proposed budget about AUD8,000,000 is proposed for development operations, such as cultivar development, biosecurity, and experiment stations and AUD18,000,000 for a ‘competitive realistic research program’. This implies that there will not be a dedicated research institute left in the industry. Competitive granting encourages a vitality in RD&E, but the implication that no core R&D institute will remain in the industry is scary, to say the least.

Interestingly, the proposal suggests that within two years of the launch of the IOC a 30 per cent increase in productivity, worth AUD150,000,000 will result from ‘research based actions’ and a further 10–20 per cent increase from ‘modernisation’, but regretfully no details are given.

Details of the process for determination of RD&E priorities does not appear to be detailed in the submission but a recent interview in the ABC Country Hour suggested a committee of some 48 persons would be involved in these deliberations.

The Iowa experience

Extension is vital to the industry, and this sector is destined for radical change. The March issue of the Crop Science Society of America Newsletter featured an article on “Public – Private collaboration to advance agronomy”. Such collaboration for crop improvement in the US is well advanced.

The reason for this article was the increasing difficulty the private sector is experiencing in finding professionally-trained agronomists because of the declining funding of the land grant colleges. The article gave details which I think, are of interest to our situation.

In Iowa, in 1982 there was a University-based extension agent in each of the 99 counties for 9,300,000 hectares of area producing maize and soybean. This underwent a radical change so that today just 11 University extension field agronomists cover the state.

In 2004, a survey of 400 growers confirmed University extension was no longer the primary source of information, but rather private sources served this purpose. But of the 100 Certified Crop Advisers surveyed more than 80 per cent indicated the University was their primary information source.

The difference between Iowa and here is that there is no such resource as Certified Crop Advisers. The AUD2,000,000 being thrown into the one year Sugar Advisory Services Development Program will be unlikely to bridge the gap between the Extension and Communication Unit and the growers.

Where does that leave our industry? A lag in the fulfillment of a full extension service seems inevitable. My interpretation of the submitted budget suggests that only a skeleton of a core R&D Institute committed to sugarcane research will remain, with the bulk of the funding possibly being granted to a distributed R&D community not necessarily committed to the crop or fully knowledgeable of it. I deliberately referred to the impending change as an avalanche, and they go but in one direction. Need that be our future?

Good agricultural R&D

The industry appears rather prescriptive of the how and what of R&D, as though one can go to a doctor for a diagnosis and then a pharmacist for a cure. Good agricultural R&D is best conducted by adequately-resourced, skilled, competent scientists, knowledgeable of their crop, and working in close contact with it.

Good research is a gamble. Good research is not fostered in a bureaucratic, prescriptive environment. I am afraid I, along with many others, question the RD&E option being placed before our industry.

In conclusion, I leave you with a quotation from Albert Einstein: “If we knew what we were doing, it would not be called research, would it?”
Forecasting greyback canegrub damage

From a paper by Nader Sallam (BSES) and Gail Lowe (DEEDI)

The greyback canegrub is the principal pest of sugarcane crops from Mossman in Far North Queensland to Sarina in the Central District. Adult beetles emerge following the onset of rainfall around October–December, and lay eggs in the soil in December–January.

Growers are all too aware that the grubs feed extensively on the root mass, causing reduced growth, stool tipping and ultimately plant death. By the time damage symptoms are apparent in the field in May–June, it is too late (and also unfeasible) to conduct chemical treatment. The sugarcane crop usually becomes too large to treat by about December, and machinery use at that stage will be destructive to the crop.

Growers need to make a decision on chemical treatment well before the commencement of beetle flight, and, because it is not easy to predict where adult beetles will lay their eggs, this needs to be based on a risk assessment to ensure vulnerable crops are protected and to avoid treatment where fields are unlikely to attract infestation.

**FIGURE 1: Comparison of grub numbers in 2008 and 2009 in monitoring plots that received insecticides in 2008**

![Graph showing comparison of grub numbers in 2008 and 2009](image1)

**FIGURE 2: Comparison of grub numbers in 2008 and 2009 in monitoring plots that did not receive insecticides in 2008**

![Graph showing comparison of grub numbers in 2008 and 2009 without insecticides](image2)
‘GrubPlan’ program

Twenty Mulgrave growers participated in a ‘GrubPlan’ Integrated Pest Management (IPM) program where the risk of potential greyback infestation on selected fields on their farms was assessed. This was based on monitoring grub numbers and damage levels in 2008 to predict grub densities in 2009 using previously developed prediction models.

Growers were advised whether or not to treat these fields according to the predicted level of risk. The same fields were sampled again in 2009 to validate predictions. Data showed a significant reduction in grub numbers where growers applied a chemical treatment following our recommendations.

Grub numbers did increase in fields that were not treated – but where growers were advised to refrain from treatment, grub numbers were still well below economic levels.

Two types of prediction models that are currently available were evaluated in the process:

■ A discriminant model, which predicts the likelihood of grub densities being either low, medium or high; and,
■ A regression model, which predicts actual grub number/plant in the following year.

Results showed that the discrimination model was more reliable, while more work is needed to improve the regression model.

Grower survey

Answers to the survey questions were provided by 15 participating and nine non-participating growers. Table 1 (A and B) show amounts that growers estimated as savings in fuel, pesticide application or labour, as well as estimated gain in increased yield as a result of following (or possible future implementing of) the BSES risk-assessment program.

Not all surveyed growers replied to all aspects of the questions. But estimations of annual savings ranged from a few hundred dollars to thousands of dollars.

These are encouraging results and demonstrate the benefits as well as the feasibility of establishing a regional forecast system in Queensland sugarcane fields.

The success of this project confirms the value of BSES extension programs and demonstrates the importance of research-based extension in pest management.

Contact: Nader Sallam; Email: nsallam@bses.com.au

| TABLE 1: Estimated savings (or potential savings) resulting from this project by (A) 15 growers participating in the grub monitoring program and (B) nine non participating growers |
|---|---|---|---|
| No. of growers providing answers | Activity | Estimated savings ($) | No. growers |
| (A) | | | |
| 5 | Insecticide | 1500–2000 | 4 |
| 3000–5000 | 1 |
| 5 | Fuel | 100–300 | 2 |
| 500–600 | 2 |
| 1000–2000 | 1 |
| 4 | Labour | 300–1000 | 2 |
| 2000–3000 | 2 |
| 2 | Increased yield | Y | 1 |
| 8000 | 1 |
| (B) | | | |
| 5 | Pesticide | 1500–2000 | 3 |
| 10000–20000 | 2 |
| 4 | Fuel | 300–500 | 2 |
| 1000–2000 | 2 |
| 3 | Labour | 400–1000 | 2 |
| 6000 | 1 |
| 1 | Increased yield | Y | 1 |
The on-farm consultancy cost of a cane grub prediction service?

From a paper by P.R. Samson and A.N. Eaton – BSES Limited

A monitoring and prediction system for greyback cane grubs was implemented on ten farms near Mackay during 2008–2010. This report looks at the reliability of the predictions, and the effectiveness and cost of this system.

Farms were monitored for cane grubs and damage in 2008 and 2009 and management advice given accordingly. Follow-up monitoring to check on the correctness of predictions was done in 2010. Records were kept of the time spent on each activity.

The program included:

- **Rating beetle activity (January–February)** – Symptoms of beetle feeding on trees near cane fields were rated on a scale of 0 (nil) to 4 (heavy damage, trees almost defoliated).
- **Pre-season consultation (February–April)** – Growers were visited individually and we recorded the treatment history of all fields on the farm and plans for the future (e.g. plough-out at the end of the year). We also asked growers for their priority fields for monitoring in that year.
- **Canegrub monitoring (April–May)** – A selection of fields (usually fields that were unprotected by insecticide and being considered for ratooning) were monitored by a team leader and three assistants using either of two different systems:
  1. ‘Full sampling’ where grubs were counted under 20 stools per field, four in each corner and four near the middle. The entire plant was dug up and a block of soil about 40 x 40 x 30 cm checked for grubs; the cane was then replanted. The field was characterised as having the calculated average number of grubs per stool.
  2. A ‘rapid sample’ where sampling was stopped as soon as a grub was found to a maximum of 20 holes dug, with holes in the middle of the field dug last; the field was then characterised as having grubs ‘present’ or ‘absent’.
- **Grub disease assessment (April–November)** – Grubs collected during monitoring were reared and assessed for diseases at BSES Tully or Meringa.
- **Damage survey (May–July)** – Each farm was photographed from the air and images examined for signs of damage. Ground surveys were then conducted in 2008–2010 just before harvest. The whole of each farm was inspected from headlands, tow paths and available vantage points, and we walked to any parts of fields that looked suspect in the aerial photographs. Damage was intended to reflect infestations in the current year, as evidenced by yellowing leaves and by stools sprawling or tipping and being easily pulled from the ground. Damage was rated as:
  0. No visible damage;
  1. Small patches of yellow or stressed cane;
  2. Stool tipping and yellow leaves, stools easily pulled from ground; and,
  3. Extensive patches of dead cane, no roots remaining.
- **Gap survey (October–November)** – Gaps in ratoons after harvest were checked for evidence of cane grub damage to stubble.
- **Mapping, prediction and reporting (June–November)** – Maps were produced showing the insecticide protection of fields and the location of cane grub infestations and damage using Mapinfo Professional Version 8.5 (Mapinfo Corporation). Detailed predictions were developed for the monitored fields using predictive models. A summary sheet was prepared for each farm with a risk profile and treatment advice for individual fields. Maps and farm reports were delivered to each grower and treatment recommendations were discussed with them.

**Cost of the monitoring and prediction service**

The average time for a person to sample one stool for cane grubs was about 12 minutes (201 team-hours x 4 persons/3939 stools). This included not just the time to physically dig out a stool and replant it but also travelling time between BSES and the farms, between fields within farms and between sampling points within fields, as well as time to meet the grower on arrival, identify and collect grubs, wash and sterilise shovels between farms, and take a rest when required.

Given the intensity of sampling in this project, the average cost to monitor each farm would be $1100 per year for an average of seven fields per farm with 20 stools sampled in most fields. We concentrated on sampling high-priority fields – fields unprotected by insecticide which were intended for ratooning.

We were unable to sample every such field on each farm in the time available. But we believe that we sampled sufficient fields to develop a good idea of the overall grub abundance across the farms each year, and a serious grub problem would have been detected if one were developing.

Given the grub monitoring times and costs above, the estimated costs for a full cane grub monitoring and management consultancy service are given in the accompanying Table.

Times for two grower consultations, one at the start of the year and one to deliver recommendations after the farm report is

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**TABLE 1: Estimated times and costs for a commercial service to deliver grub management recommendations for farms, assuming an average sampling intensity of seven fields per farm and a consultancy charge of $90 per hour**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time (hours)</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultation with growers</td>
<td>2.5</td>
<td>225</td>
</tr>
<tr>
<td>Ground survey: damage</td>
<td>2</td>
<td>180</td>
</tr>
<tr>
<td>Grub monitoring*</td>
<td></td>
<td>1100</td>
</tr>
<tr>
<td>Mapping and prediction</td>
<td>Unknown, est. 3 hours</td>
<td>270</td>
</tr>
<tr>
<td>Report preparation</td>
<td>1</td>
<td>90</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1865</strong></td>
<td></td>
</tr>
</tbody>
</table>

*With three assistants, each at $25 per hour

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**IN BRIEF…**

With the move towards ‘user-pays’ consultancy services now well underway it is appropriate that we take a look at the anticipated per farmer cost of a cane grub prediction service.
developed, and for a damage survey from the ground are based on actual times recorded in 2008.

The time for mapping and prediction is unknown.

Electronic data entry was extremely time-consuming using available systems in this project and a stream-lined system would need to be developed for a commercial service to be economically viable.

Report preparation once maps and predictions were developed was fairly quick and should take no more than 1 hour per farm.

The total cost per farm is estimated at about $1900 annually. An aerial survey would be an additional cost.

The uptake of consultancy-based monitoring systems by individual growers will need to be on a user-pays basis and will be driven by demand. This is likely to differ between regions and will vary depending on the severity of canegrubs as a production constraint and on the cost of the different management options relative to the cost of monitoring. With experience, it may be possible to reduce the amount of sampling effort to make canegrub-management decisions.

Generally predictions based on less information are less reliable, but there is a trade-off with cost.


— Australian Sugarcane

April–May 2012
PLANTING is a major expense in the sugarcane crop cycle, so it makes good economic sense to set your crop up for several productive ratoons. An important aspect of this establishment phase is to protect the crop for as long as possible against canegrub damage.

Crop Care business manager Kerrie Mackay says that while registered liquid treatments only protect the crop for one year, suSCon Maxi granules are registered for controlling greyback canegrub for two years in central and northern Queensland, and for three-year control of Childers, Negatoria and Southern one-year canegrubs in southern Queensland.

Following on the heels of last spring’s updated registration of suSCon Maxi for new farming systems (including minimum tillage and dual rows), Crop Care has applied for the registration of suSCon Maxi to be extended to even longer term control of Childers canegrub.

Technical consultant to Crop Care, Glen Tucker has been closely involved in these long-term trials.

“Control of Childers canegrub with suSCon Maxi was similar to suSCon Blue and suSCon Plus in first ratoon crops – but generally better in second and third ratoon crops,” explains Glen. “In young fourth ratoon cane there was still a significant reduction in grub numbers at several suSCon Maxi- treated sites, compared with untreated plots – indicating that control had extended into the fourth year (third ratoon) of the crops treated with suSCon Maxi.”

An application for suSCon Maxi is currently before the APVMA for extended control of Childers canegrub. This application is expected to be approved in spring 2012.

**Tips for best results from suSCon Maxi**

**Application options**

- Treatment with suSCon Maxi granules at sett level at planting is generally the most effective and convenient method, particularly for two-year life-cycle canegrubs such as Childers and Negatoria grubs.
- Of the open-furrow application options, treatment ‘at or near first working’ is more reliable than ‘at fill-in’ for medium to shallow planting. But for deep planting (30cm or greater), application at drill fill-in is best, particularly for greyback canegrub. BSES trials show that either method gives the same result, as long as granules are at least 10cm (4inches) below the consolidated soil surface.

**Importance of the right equipment**

- Precise metering equipment is important, to evenly distribute the relatively small amount of suSCon Maxi used.
- The recommended rate is 10–15 kg per hectare – which is only 150–225 gms (less than a cupful) to apply per 100
metres of row. This volume is half that of a suSCon Blue application, so requires greater application precision.

To adapt an applicator previously used to apply suSCon Blue, replace the fluted rollers with new stainless steel rollers with smaller, finer scallops to get a consistent flow at the correct rate.

Contact: Kerrie Mackay, National Business Manager, Horticulture/suSCon, Crop Care Australasia, Ph: 07 3909 2008; Mob: 0413 458 069; E: kerrie.mackay@cropcare.com.au
Plants use circadian rhythm to prepare for battle with insects

Rice University biologists Janet Braam, Danielle Goodspeed and Wassim Chehab, have worked with colleagues to show that plants use circadian rhythms to both anticipate raids by hungry insects and to time the production of defensive hormones that fend off such attacks.

In recent years, scientists have begun to apply powerful genetic tools to the study of plant circadian rhythms. Researchers have found that as many as one-third of the genes in Arabidopsis thaliana – a widely studied species in plant biology – are activated by the circadian cycle. Rice biochemist Michael Covington found that some of these circadian-regulated genes were also connected to wounding responses.

“We wondered whether some of these circadian-regulated genes might allow plants to anticipate attacks from insects, in much the same way that they anticipate the sunrise,” said Michael, now at the University of California, Davis.

When plants and predators get out of sync

Danielle Goodspeed, a graduate student in biochemistry and cell biology, designed a clever experiment to answer the question. She used 12-hour light cycles to entrain the circadian clocks of both Arabidopsis plants and cabbage loopers, a type of caterpillar that eats Arabidopsis.

Half of the plants were placed with caterpillars on a regular day-night cycle, and the other half were placed with ‘out-of-phase’ caterpillars whose internal clocks were set to daytime mode during the hours that the plants were in nighttime mode.

“We found that the plants whose clocks were in phase with the insects were relatively resistant, whereas the plants whose clocks were out of phase were decimated by the insects feeding on them,” Danielle said.

Wassim Chehab, a Rice faculty fellow in biochemistry and cell biology, helped Danielle design a follow-up experiment to understand how plants used their internal clocks to resist insect attacks. Wassim and Danielle examined the accumulation of the hormone jasmonate, which plants use to regulate the production of metabolites that interfere with insect digestion.

Plants own chemical defense is by the clock

They found that Arabidopsis uses its circadian clock to increase jasmonate production during the day, when insects like cabbage loopers feed the most. They also found that the plants used their internal clocks to regulate the production of other chemical defenses, including those that protect against bacterial infections.

“Jasmonate defenses are employed by virtually all plants, including tomatoes, rice and corn,” Wassim said. “Understanding how plants regulate these hormones could be important for understanding why some pests are more damaging than others, and it could help suggest new strategies for insect resistance.”

For more information: http://www.seedquest.com

From left, Rice University biologists Janet Braam, Danielle Goodspeed and Wassim Chehab worked with colleagues to show that plants use circadian rhythms to both anticipate raids by hungry insects and to time the production of defensive hormones that fend off such attacks. Photo by Jeff Fitlow
ALLE Pedersen, PhD, seed care technology manager for Syngenta, said recently that “roots are an important aspect to future crop productivity advancements. Presently, in most cases we are only getting 50 per cent of the genetic yield potential. The root system is critical to maximizing yield.”

Pedersen attributed the ability to maximize yield to four factors. One revolves around timing, which includes when a farmer can plant crops and when he controls pests; activities that are often impacted by weather. Exposure to solar radiation is another factor impacting yield that growers are unable to control.

It starts at the roots

The last two are nutrient and water intake, which start at the roots. By protecting roots and allowing them to establish healthy root systems, growers are able to help the crop better utilize nutrient and water resources.

And to assist with our understanding of plant roots, researchers from the University of Nottingham in the United Kingdom have designed an innovative technique to study the underground world of plants. Presented in the journal Plant Physiology, the results of this study will lead to improved breeding techniques for crop varieties, as well as better yields.

The novel approach is based on the same X-ray technology used in hospital computed tomography (CT) scans. It integrates new image analysis software that can automatically distinguish the roots of plants from other soil-based materials.

The researchers, from the Centre for Plant Integrative Biology (CPIB), tested this approach on the roots of maize, wheat and tomato. They studied the architecture, what experts refer to as the shape and branching pattern, of roots in soil by using X-ray micro computed tomography (micro CT). The team then entered the information into the new RooTrak software, which enabled them to differentiate between roots and other soil elements.

“This technique is a hugely important advance,” says Dr Sacha Mooney, an expert in soil physics in the School of Biosciences. “The application of X-ray CT for visualising roots has been limited because we simply couldn’t see a large portion of the root structure. RooTrak has enabled us to overcome this and has opened up the use of the technology for exploring the key questions regarding how we can manipulate plants and soils for improving our food security.”

Virtual soil slices

The innovative software works by obtaining a stack of virtual slices through the root-bearing soil. According to the researchers, RooTrak treats each slice as a movie frame. The slice’s static roots are treated as moving objects that can be tracked. So the software can tell the difference between root and water or organic elements in the soil, doing away with any glitches resulting from other techniques. This latest technique offers a three-dimensional (3D) detailed and accurate root architecture.

“Thinking of micro CT data as a sequence of images allows us to solve the problems caused by variations in the appearance of plant roots and the similarity of some roots to the surrounding soil,” says Tony Pridmore, head of data at CPIB and an expert in tracking and analysis software. “This is important because we can now extract descriptions of root architecture quickly and objectively.”

Adds CPIB’s Professor Malcolm Bennet, an expert in root biology: “Root architecture critically influences nutrient and water uptake. A key impediment to genetic analysis of root architecture in crops grown in soil has been the ability to image live roots. Recent advances in micro CT and RooTrak software at Nottingham now make this possible.”

The Nottingham team has clinched a European Research Council grant that will see them use this software to image the roots of wheat, and choose new varieties with optimal water and nutrient uptake efficiencies.

The CPIB will lead this new project, supported by experts from Australia, Europe and Mexico.

For more information, please visit:
Centre for Plant Integrative Biology (CPIB): http://www.cpib.ac.uk/
Plant Physiology: http://www.plantphysiol.org/
European Research Council (ERC): http://erc.europa.eu/
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IT'S an underlying issue for many farming businesses around Australia – how best to access finance into the future, whether for expansion or just continued operation of the farm.

Corporate investment in agriculture has been on the agenda for some time in Australia, and WA Nuffield scholar and Bruce Rock graingrower Michael Foss decided to tackle the issue during his scholarship, explaining “I looked at alternative forms of investment into agriculture, rather than just the traditional way of bank financing.

“In particular I wanted to see what the future holds for 25 year old farmers that come home from university and want to expand their operations as compared to the opportunities that I had back in 1994, with a comparison of where land values were back then and comparing them with what we could produce per hectare to where they are now,” Michael says.

He decided to head to eastern Europe, an area he understood to have great agricultural potential and visited Hungary, Serbia, Romania and the Ukraine to have a look at what opportunities there were and why investment was being driven into those areas.

“In a lot of the places I travelled, investment decisions were based on entering into land that was undervalued and could be converted into highly productive agricultural land with modern technology and a lot of the money that was being invested into those areas was coming out of the UK,” Michael observed.

He also spent time in Canada and the US where he saw some big players in the corporate agriculture world.

“The two main companies in the US are Hancock and Westchester TiAA-CREF. Between them they have acquired over two billion dollars worth of land around the globe, including Brazil, the US and Australia. Having spent time with Westchester, it was evident that aggressive strategic global land acquisitions continue,” he says.

Michael believes that government policy has a big impact on company investment decisions, observing that “one of the main reasons corporates invest in Australia is because they actually can – even though our production is a long way below a lot of other countries, our costs in relation to that production are quite reasonable.”

“Looking at many of the corporate models I studied, most of them were based on capital growth, but there were several that I analysed that were more involved in the production side, which was where I had the interest.”
Michael, whose scholarship was supported by supported by the Grains Research and Development Corporation, says he understands corporate investment may not be for all farmers.

“Definitely – there are different ways farmers can look forward to the future and obviously bank financing will continue to be one of the main forms,” he explains. “Also, with an aging agricultural population, a lot of growers are now looking at what their alternatives will be in the future, but they don’t necessarily want to divest out of agricultural ownership – perhaps they can form alliances with young growers to benefit both parties.”

But Michael also believes there are corporate models with value to farmers, saying “just looking at recent trends, and the number of corporates being involved in agriculture, there will be more models coming out that will favour the family farming operation.”

Nuffield Australia provides opportunities to Australian farmers between the ages of 28 and 40 to travel the globe investigating a research topic important to them and Australian agriculture. Applications for 2013 open on April 1, 2012.

For more information please head to www.nuffield.com.au and follow us on twitter @nuffieldaust

**ZERO PER CENT INTEREST ON MODERN MACHINERY FINANCING**

Farmers could potentially save tens of thousands of dollars by choosing machinery finance with a lower interest rate, says Chris Favotto, State Finance Manager for Case IH finance.

Chris says many farmers negotiate on the price of their equipment but don’t pay close attention to the finance rate they’re able to lock in.

“Say, for example, that a farmer was buying a machine worth $250,000. With the Case IH Five Star Deal, which includes zero per cent interest, they could pay just a few hundred dollars in loan establishment fees and no interest at all.”

“By comparison, that same machine could end up costing them over $50,000 more if they signed up for finance with an interest rate of seven per cent.”

Chris’s scenario is based on a five year loan term and a deposit of 30 per cent which could include dealer discounts, trade-ins or cash deposits.

“The actual figure would of course depend on the amount borrowed and the individual circumstances of the customer, but whichever way you look at it, the savings are going to be very substantial.”

**Put to the test**

One customer who has put the theory to the test is cotton grower James Kahl, who at first thought he must have miscalculated the costs.

James, whose family operates a 2500 hectare irrigation farming operation near Wee Waa, sought three finance quotes when purchasing two new Case IH Magnum tractors recently. He was amazed when he discovered the Five Star Deal had no catch.

“I always run the numbers myself when I get a quote. Usually, when I compare quotes I find that at least one and sometimes more of them turn out to be a lot of smoke and mirrors. The rate looks good initially but when you do the sums and work out the true interest rate over the whole term it can be up to two per cent higher than advertised, between introductory rates and fees in front and fees at the back.”

“In this instance, the deal was so much better than the other quotes offered that I thought I must have made a mistake. I decided I’d go to bed and try again in the morning, but I went right through the quote again and didn’t find any error.”
CSIRO oceanographers recently left Brisbane on a 10-day, $2 million research voyage they believe will generate the most complete profile yet of one of Australia’s most influential environmental features, the East Australian Current.

Working from the national marine research vessel, Southern Surveyor, the scientists will deploy five deep water moorings across the current, extending 240 kilometres east of Brisbane to gain specific insights into the characteristics of the largest ocean current in the Australian region.

Principal investigators for the voyage are Hobart-based scientists, Ken Ridgway and Dr Bernadette Sloyan, specialists in currents in the Australian region with CSIRO’s Wealth from Oceans program. Bernadette said the East Australian Current impacts our climate and east coast ocean conditions, and so understanding its physical and chemical characteristics as recorded through the mooring network will be important for future natural resource management.

The mooring network is the latest addition to the Australian Government funded Integrated Marine Observing System (IMOS), which has a strong focus on how offshore conditions influence our coasts via the major boundary currents like the East Australian Current.

Bernadette said IMOS has provided $2 million in funding to support this mooring network, which will complement existing IMOS observations being taken off the Great Barrier Reef, the New South Wales coast, and the east coast of Tasmania.

“With this final piece of the jigsaw in place we now have the ability to accurately measure transfer of water, heat and salt from the tropics to the Tasman Sea, to see how it is changing over time, and to understand what these changes might mean for marine ecosystems and coastal populations along the eastern seaboard,” she said.

The moorings consist of sensors recording temperature, salinity, and velocity of the current, spanning the region from the

Feeding out the mooring  the long process of delivering a deep ocean mooring. (Photo: Danny McLaughlan, CSIRO)
Southern Europe/Mediterranean (Aug–Sep)

Canada (Calgary Stampede)/New England (USA) (July)

Africa and Argentina Four Nations Rugby (September/October)

Asian Odyssey – Indochina/China/Tibet (Jul–Aug)

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Deploying a highly specialised ocean measuring instrument that captures water at varying layers between the surface and the sea floor. (Photo: CSIRO)

continental margin to off-shore in water depths of nearly five kilometres.

Ken said scientists have been studying the East Australian Current for perhaps 100 years, although for the first 60–70 years the focus was on the biology and how it may be influenced by the current.

“In the last 25 years real advances have been made in understanding the East Australian Current, its physical structure and seasonal changes, and more recently its influence on the biodiversity of the east coast.

“What we have also seen in that time is a strengthening of the winds in the Pacific that have intensified ocean circulation and are pushing the current around 350 kilometres further south in the Tasman Sea.

“This research voyage is a terrific opportunity to study the current, and to understand its wider influences on our natural marine resources and for many Australians living on the eastern seaboard its influence in their lifestyle,”

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www.csiro.au

BACKGROUND…

The EAC is the largest ocean current close to the coast of Australia. What scientists already know is that the East Australian Current:

■ Transports up to 30 million cubic metres per second, with a strong influence to 1000 metres depth and 100 kilometres width.
■ Is strongest in summer, peaking in February, and weakest (by as much as half the flow) in winter, when its energy dissipates east of Tasmania.
■ Generates ocean eddies as broad as 200 kilometres across, rotating mainly anti-clockwise at up to four knots at the edge – these can be more than one kilometre deep and have a life of up to a year.
■ Frequently crosses onto the continental shelf and moves close inshore.
■ Causes upwelling where it moves away from the coast at places like Cape Byron, Smoky Cape and Sugarloaf Point, drawing nutrient-rich water from a depth of 200 metres or more.

By comparison, the Leeuwin Current, originating off the north-west coast of Western Australia carries a fifth as much water, peaking in May-June.
A CLEAR change in salinity has been detected in the world’s oceans, signalling shifts and an acceleration in the global rainfall and evaporation cycle.

In a paper published in the journal Science, Australian scientists from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Lawrence Livermore National Laboratory, California, reported changing patterns of salinity in the global ocean during the past 50 years, marking a clear fingerprint of climate change.

Lead author, Dr Paul Durack, said that by looking at observed ocean salinity changes and the relationship between salinity, rainfall and evaporation in climate models, they determined the water cycle has strengthened by four per cent from 1950-2000. This is twice the response projected by current generation global climate models.

“Salinity shifts in the ocean confirm climate and the global water cycle have changed. These changes suggest that arid regions have become drier and high rainfall regions have become wetter in response to observed global warming,” said Paul, a post-doctoral fellow at the Lawrence Livermore National Laboratory.

With a projected temperature rise of 3ºC by the end of the century, the researchers estimate a 24 per cent acceleration of the water cycle is possible.

Scientists have struggled to determine coherent estimates of water cycle changes from land-based data because surface observations of rainfall and evaporation are sparse. However, according to the team, global oceans provide a much clearer picture.

“The ocean matters to climate – it stores 97 per cent of the world’s water; receives 80 per cent of the all surface rainfall and; it has absorbed 90 per cent of the Earth’s energy increase associated with past atmospheric warming,” said co-author, Dr Richard Matear of CSIRO’s Wealth from Oceans Flagship.

“Warming of the Earth’s surface and lower atmosphere is expected to strengthen the water cycle largely driven by the ability of warmer air to hold and redistribute more moisture.”

He said the intensification is an enhancement in the patterns of exchange between evaporation and rainfall and with oceans accounting for 71 per cent of the global surface area the change is clearly represented in ocean surface salinity patterns.

In the study, the scientists combined 50-year observed global surface salinity changes with changes from global climate models and found “robust evidence of an intensified global water cycle at a rate of about eight per cent per degree of surface warming,” Paul said.

Paul said the patterns are not uniform, with regional variations agreeing with the ‘rich get richer’ mechanism, where wet regions get wetter and dry regions drier.

He said a change in freshwater availability in response to climate change poses a more significant risk to human societies and ecosystems than warming alone.

“Changes to the global water cycle and the corresponding redistribution of rainfall will affect food availability, stability, access and utilization,” Paul said.

Dr Susan Wijffels, co-Chair of the global Argo project and a co-author on the study, said maintenance of the present fleet of around 3500 profilers is critical to observing continuing changes to salinity in the upper oceans.

The work was funded through the Australian Climate Change Science Program, a joint initiative of the Department of Climate Change and Energy Efficiency, the Bureau of Meteorology and CSIRO. Paul is a graduate of the CSIRO-University of Tasmania Quantitative Marine Science program and he received additional support from CSIRO’s Wealth from Oceans Flagship.

Work undertaken at Lawrence Livermore National Laboratory is supported by the U.S. Department of Energy under contract DE-AC52-07NA27344.

Contact Dr Susan Wijffels (BSc (Hons I), PhD) Stream Leader, Australian Ocean Observing System and Operational Modelling, Ph: 61 3 6232 5450
E: Susan.Wijffels@csiro.au

Deploying an Argo float in the Tasman Sea.

April–May 2012

At Dinner Plain the pace is easy going...

Dinner Plain is the place where the family can be together by the fireside or miles apart exploring the cross-country trail network. Where you stroll the treelined streets simply for the sights or to meet friends for a restaurant dinner or drinks at the bar. The village itself helps set the community atmosphere, natural building materials and earthy tones blur the line between man made and alpine environment. Over 200 lodges and chalets with all the conveniences of a modern resort.

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Australian Sugarcane — 21
Our GM partner commits to increasing China’s ag productivity

The challenge of global food security should be the top priority of all nations, companies and individuals, according to DuPont Vice President and General Manager of Pioneer China William S. Niebur. He told attendees at the 5th International Biotechnology and Agriculture Summit in Beijing that it will take everyone – working collaboratively – to ensure every person has enough nutritious and safe food to eat.

“With nearly 1.4 billion people in China, a population base that is migrating to large cities, and arable land that is stable to declining – it is imperative that we work together to sustainably increase the productivity of every area of land, every hour of field labour, and every unit of water and fertilizer,” said William. “Without question, China will play a critical role in achieving global food security.”

China has one of the fastest growing economies in the world and has vowed to renew its efforts to improve agriculture through science and technology. DuPont had its first business connection with China in 1863.

“DuPont and its Pioneer seed business are committed to working with China – through collaborations with the government, academia and others in the industry, as well as working directly with millions of China’s farmers, to address challenges,” William said.

The company believes that sustainably increasing agricultural productivity requires a comprehensive approach to plant breeding that includes: breeding specifically for local environments; using molecular markers for gene selection; developing plants with more resistance to diseases and insects, as well as tolerance to herbicides; improving nutrient use and nutritional content; and making plants better able to withstand environmental stresses such as drought.

International Flower Port

Pioneer will use its global research network and experience to help to bring leading molecular breeding and biotechnologies to China. In February, DuPont announced that it had signed a multi-year lease agreement with Beijing International Flower Port to build a state-of-the-art Technology Hub.

Established in 2007, Beijing International Flower Port is a state-owned enterprise intended in part to provide strong support for a high-end agricultural brand and seed industry in China’s Shunyi district. The new facility will be used for developing new high-yielding maize hybrids.

The Technology Hub will leverage Pioneer’s proprietary matrix of molecular breeding technologies called the Accelerated Yield Technology system. This system uses doubled haploids, laser assisted seed selection, precision phenotyping methods and other leading technologies to identify superior gene combinations earlier in the breeding process compared to traditional methods alone.

For additional information visit: www.dupont.com

The Beijing International Flower Port is to be the site of a state of the art Technology Hub.
Seven months after placing the order, I recently took delivery of a diesel fuelled European car equipped with one of these new high tech twin clutch semi-automatic transmissions. I have to admit, the brochure was right! The seamless gear changes can often only be detected by a close scrutiny of the rev counter.

Mind you, I have been subjected to ridicule from a handful of my car club alleged mates, who persist with the belief that a real driver prefers to change gears manually. Yet put them in a 1940s Austin truck, or my old 1928 Talbot, or better still – a 1920s Fordson Model F, with their soul destroying crash gearboxes and my car club compatriots would likely be in a state of extreme trepidation. But of course, no problems for we ageing tractor folk!

Frankly, in the year 2012 I am surprised that anyone desires to own a modern family car with a manual-change gear box. After all, automatic transmissions have come a long way since the chewing gum autos of the 1960s.

So having vented my views relating to car transmissions, predictively my thoughts now turn to tractors and the 20 forward and 12 reverse gears that I originally thought was an overkill in my Landini. But guess what – I use every one of them!

But I can assure you, there were some wacky transmission designs in many of the early tractors.

In the beginning

Apart from a few experimental machines, internal combustion engine tractors commenced their irrevocable march across the rural landscape during the first decade of the 20th century. In the main they were obstreperous, clattering and often dangerous contraptions of mammoth proportions. The philosophy inherited from their steam powered cousins prevailed. In other words, it was believed the new generation oil powered tractors had to equate the weight and size of steam traction engines in order to be capable of pulling the broadacre implements of the era.

For example, a tractor weighing around 10 tons with a huge but inefficient engine (by today’s standards) producing a mere 20 hp, required at least half its power to simply propel the unit without a load.

The transmissions of these first tractors were crude in the extreme. Rough castiron gears were exposed to mud and grit, with the resultant rapid deterioration one would expect. Few manufacturers considered the frivolous idea of encasing the gears and having them running in oil!

Initially most tractors were only offered with one forward and one reverse gear, providing a plough speed of around two mph. Eventually two forward speeds became the rule.

Three examples of the more idiosyncratic early tractor transmissions are examined hereunder.

International friction drive

International Harvester’s first tractor was based on a design patented in 1903 by an engineer named Morton, who had established a factory in Chicago specialising in the design of tractor chassis and transmissions, to which customers could add an engine of their choice.

The International marketing team saw this as a rapid way of entering the tractor business, thus bypassing much of the design development. All that was necessary was to adapt their well accepted single cylinder open crankshaft 15 hp Famous engine to the Morton chassis. The massive engine featured an 8 inch bore and 14 inch stroke and developed its 15 hp at 240 rpm, the speed being regulated by a hit-and-miss spark governor.

But what made the big tractor technically fascinating was the method of delivering the power from the engine to both the forward and reverse drives. The operator was required to manipulate two large levers positioned by his left hand, the first of which actually moved the engine either forward or backward along the chassis, thus engaging the flywheel by friction to the
forward drive. The second lever smoothly engaged the reverse drive.

Surprisingly the Friction Drive was a pleasure to operate, requiring very little physical effort compared to conventional power trains utilising the heavy clutch designs of the period. The action could be likened to that of a modern hydraulic shuttle control, such was the ease and smoothness of the operation.

**Ronaldson Tippett Super Drive**

The Victorian Ballarat firm of Ronaldson Bros. & Tippett introduced their Super Drive 18-30 in 1924. The design was based on the Illinois 18-30 produced in America by The Illinois Silo and Tractor Company of Bloomington. The unit was powered by a 30 hp Wisconsin engine, featuring four cylinders in two banks of two.

Operating in Australia's torrid summer weather the tractor immediately encountered over heating difficulties. The problem was overcome by increasing the capacity of the radiator. The modified tractors were instantly recognisable by the profile of the heightened radiator header tank.

Interestingly, Australian engineers designed a special manifold which enabled the engine to be run on crude oil fuel, following the initial warm up with petrol. This added considerably to the appeal of the tractor, as crude oil was cheaper than petrol and even kerosene.

But undoubtedly the most interesting feature of the Super Drive was its 96 speed gearbox! Well – potentially 96 gears.

You see ostensibly the gear box provided two forward and one reverse speeds. But this could be augmented by first removing a cover on the left side of the transmission and swapping the position of two ‘pick-off’ gears. This now offered the choice of four forward and two reverse speeds.

But that is not all. Ronaldson Tippett could supply an extensive range of ‘pick-off’ gears which, according to the operator's manual, could provide no less than 48 speeds under 6.6 mph (The mind boggles!)

But wait – there is more. A choice of two rear wheel diameters was also available. So if one does the maths, there were theoretically 96 forward and 48 rear speeds. Undoubtedly a world record for any type of transportation.

The control of the clutch was also interesting. As the clutch was engaged, the engine revolutions were automatically increased. This was supposed to overcome the problem of the engine stalling when the clutch picked up the load. The downside was, the operator who was perched on a narrow wooden platform at the rear of the machine, had to really hang on as the machine jerked forward or be in serious risk of being jolted off – right in the path of the plough!

Fortunately most of the Super Drives were sold to grain farmers whose agricultural land was relatively flat and accordingly seldom had to apply the horrendous braking system.

If a gear was disengaged the brake would not operate! Think about it. Imagine a Super Drive negotiating a hill, either up or down, and it became necessary to change down to the lower gear. The perilous procedure would be to firstly apply the foot brake (there was no hand brake) with the hand clutch disengaged but the gear still engaged. Then, presumably with the aid of an offside, a block would be placed against the wheel, preventing the tractor from taking off whilst the operator moved the gear shift through neutral and into the other gear. Scary stuff!

**Fowler rein drive**

In the 1920s the horse still reigned supreme on Australian farms. Even the bargain basement price of a Fordson was not a sufficient inducement for the average farmer to retire his team to back paddock and invest in one of these new fangled intimidating tractors. I mean to say, one would have to comprehend the incomprehensible gearbox-clutch routine whilst wrestling with a steering wheel! And then there were all these levers and do-dahs to worry about!

On the other hand, it is a well known fact that the only controls necessary for the horse is a pair of reins. Such was the reasoning of the many farmers who were nervous of tractors.

Then up sprung Cornelius Murname, a design engineer from Melbourne. He had a weird but clever idea of how to overcome this farmer resistance to the complications of driving a tractor. He presented his patents to John Fowler and Company of Leeds, England, who were in the business of manufacturing very large heavy weight tractors and thus were losing business to the multitudes of lighter machines that were becoming increasingly popular.

In 1924 the Fowler Rein Drive was unveiled at The Royal Agricultural Show at Leicester, where it won a gold medal. But that was its one and only day of fame. It turned out that, in fact, farmers were not enamoured by the prospect of driving...
a tractor solely by means of a pair of reins, because whilst the
driver was obliged to be perched on a sort of trailing buggy or
astride a trailed implement, a rope rein was the only contact he
had with the tractor. Different tugs on either the left or right rein
controlled the clutch, gearbox and steering.

Considering the overall dimensions of the rig, it was powered
by an engine of somewhat alarming proportions. It was a liquid
cooled V twin configuration with a 5.75 x 7.5 inch bore and
stroke and developed 32 hp at 1000 rpm. Designed by Fowler,
it was virtually half an engine that was originally deployed for
propelling a military tank.

The accompanying illustration is of possibly the sole remaining
Rein Drive and is on public display at the Pioneer Park Museum
at Parkes, NSW. This rare exhibit was restored by Stewart Nash
and is but one of scores of magnificent tractor artefacts lovingly
cared for by a team of dedicated enthusiasts.

A few years ago I was offered a drive of the Parkes Rein Drive.
Despite the fact that I have been privileged to have operated
untold numbers of weird old tractors around the world, this was
the scariest I have ever encountered. I mean – a pair of reins!!!
What if the rope broke?

It is no small wonder that the Fowler Rein Drive was a
commercial flop.

IAN’S MYSTERY TRACTOR QUIZ

Question: Can you identify this popular tractor of the 1930s?
Clue: The colour is significant.
Degree of difficulty: They don’t come any easier than this!
Answer: See page 32.
ome of 680,000 tonnes is forecast – a five per cent increase on 2011. Although the area for harvest is similar to last year, crop yield is superior at 95 tonnes per hectare. The 2012 season is expected to kick off during the last week of May.

With the area of smut resistant and intermediate varieties now exceeding 80 per cent, the Tableland industry is in an excellent position to deal with the smut outbreak.

With the release of some new varieties over the past four years, the dominance of Q200A is waning with the area dropping from 44 per cent in 2010 to 33 per cent this year. Of the new varieties, Q208A is the growers’ choice and now makes up 25 per cent of the crop area. Three other new varieties proving popular are Q231A (nine per cent), Q183A (six per cent) and Q228A (three per cent). Now that Q228A has reached the point where there is more planting material than required, it is likely that a significant area will be planted this year.

Season to date rainfall (July to April) of 904 mm (Mareeba Airport) is close to the long term average and nearly half the 1582 mm received for the 2011 crop during the same period. With 90 per cent of this rain falling during December to March, irrigation was not required during the summer months.

But outside the traditional wet season, irrigation has been essential to maintain crop growth resulting in significant water use (Table 1) especially for early plant/ratoons. Although late ratoon crops have received little irrigation to date, they should receive another 5 ML/ha during the coming six months before harvest in November.

With no rain since the last week of March, growers are back irrigating again to ensure their crops carry through to harvest.

With inflow in to Tinaroo Dam continuing, capacity is holding at 100 per cent.

| TABLE 1: CSIRO WaterSense irrigation estimates (ML/ha) for sugarcane grown in the MDWSS |
|-----------------------------------------------|-----------------|-----------------|
| Crop class                                   | 2011 crop (Jun–Apr) | 2012 crop (Jun–Apr) |
| Early plant                                  | 7                | 9.6              |
| Early ratoon                                 | 5                | 7.3              |
| Mid-season ratoon                            | 2                | 4.0              |
| Late ratoon                                  | 0.5              | 1.3              |
| Average                                      | 3.6              | 5.55             |

Well the first few months of 2012 have been and gone, and overall the weather has been kind to us. The wet season finally started to arrive in the last two weeks of February and the Mossman region received around 390 mm of rain. The February total for 2012 was 413.5 mm with 1536 mm falling in 2011 and the 2012 March total was 962 mm with 684 mm recorded in 2011. With the rain and at times wild winds there appears to be evidence of grub damage starting to surface in areas around the North. The areas of damage are isolated and I expect it to have a minimal effect on the 2012 crop. With the cyclone season drawing to an end and a relatively dry summer, the crop in all the northern areas is looking like a better than average season.

Another issue that some growers may not be aware of in the northern regions is that Orange Rust has been detected in Q208
INNISFAIL/TULLY

Maryborough Sugar Limited (MSL) and Tully Sugar have bought up large parcels of forestry land, in order to return it to sugar cane production. The two companies have been land banking to secure their perimeters of supply and will lease or corporate farm this land to protect their respective patches. A wet March–April has caused lodging with some stool tipping due to cane grubs. Crops around Innisfail look set to achieve around 80 tonnes per hectare. Cane is starting to arrow and orange rust is evident but mild to date.

Seasonal labour for farms, harvest and mills is in short supply, while mills have been investing strongly in maintenance programs.

In 2012, cane north of Babinda is set to go to Mulgrave, while preparations are in tow for Tableland mill to have a crystal sugar backend added.

Low banana prices are encouraging farmers to switch to cane but mill incentives aimed at this are annoying dedicated cane suppliers who feel that they should receive a loyalty bonus.

Coastal mills are looking to commence early to mid-June while the Tableland mill should start in May.

On the negative side, farmers are concerned about embedded costs and collateral effects of the upcoming carbon tax. They are also concerned about the RD&E issue and in particular the BSES issue.

On Monday 30 April a strong showing of farmers and community members attended a Farming for the Future forum in Babinda, entitled ‘Waste to Profit’. The forum addressed the latest developments in primary production innovation occurring throughout North Queensland. The majority of the topics were on profitable innovations using cane fibre and other biomass.

There were presentations from Ethtec, NQBE, Envirofibre, GS Energy, KFSU, Biomass Technologies Limited and Aquapax Australia.

Farmers are looking forward to a successful season matched by a strong price.

John Blanckensee
ACFA Innisfail Director
May 7, 2012

HERBERT

The estimate for the 2012 crushing season is between 4–4.2 million tonnes. There is some really good plant cane out there but there is concern that the ratoon cane will let the crop down, as it is still recovering from cyclones, flooding and stool damage from high speed harvesting. In addition, there is concern that some of the newer varieties mightn’t have the weight and may be pithy.

This could change of course if the weather stays fine and we get a decent cold snap, so we can start off with a higher CCS.

Stand out areas in terms of yield are Abergowrie, Lannercost and Halifax. Bambaroo has been struggling this year as the rainfall has been light.

Growers are getting ready to plant but once again the rain has stopped too much from happening.

Precision agriculture is going ahead, but the question is will it increase production and give more bang for the bucks?

Feral pigs are still an ongoing problem, but the baiting and trapping program is having an impact in some areas.

Grubs are surfacing again and are now becoming a major concern.
The Productivity Board is in negotiation with the BSES to lease the BSES building in the Herbert for the short to medium term.

Sucrogen Mills have been putting above average capital investment into the mills for the forthcoming season. They assure us that they will be making more effort with plant breeding and will be working in collaboration with CSIRO developing new varieties, opening up the old Macknade plant breeding station.

It looks like crushing will commence around the middle of June depending on the weather

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**BURDEKIN**

After ideal growing conditions during the wet season in the Burdekin district, the planting has been progressing across the district when and where conditions are favourable.

Mill meetings and industry meetings are on in earnest in preparation for the mid-year harvest. Most issues have been addressed and hopefully all will be resolved in the near future.

The season estimates have now been completed and are open for grower input or discussion. The total district estimate for the harvestable cane has been estimated at 8.2 million tonnes with agreement that the cane has potential for further growth at this stage. The cane has so far shown little indication of ‘arrowing’ as it has in recent years. The weather has shown a definite trend towards cooler temperatures although the crop still appears to be growing.

<table>
<thead>
<tr>
<th>Mill</th>
<th>Area to be harvested</th>
<th>Tonnes</th>
<th>TPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invicta</td>
<td>27,989</td>
<td>3,027,295</td>
<td>108.16</td>
</tr>
<tr>
<td>Pioneer</td>
<td>16,143</td>
<td>1,869,942</td>
<td>115.84</td>
</tr>
<tr>
<td>Kalamia</td>
<td>13,746</td>
<td>1,630,341</td>
<td>118.60</td>
</tr>
<tr>
<td>Inkerman</td>
<td>15,551</td>
<td>1,787,460</td>
<td>114.94</td>
</tr>
<tr>
<td>Total</td>
<td>73,429</td>
<td>8,315,038</td>
<td>113.24</td>
</tr>
</tbody>
</table>

The mills report that factory maintenance is on schedule, aiming to have the mills ready for crushing to commence on 5th June and an anticipated finish date of 21st November, 2012, with 19 wet days.

Discussions are underway between mill and grower representatives on what considerations will be forthcoming from the mill to compensate growers for the start a week earlier than the traditional mid-June start.

This year, the cultivated area under cane will be 90,419 hectares, an increase of 795 hectares on the 2011 season.

With the late season finish in 2011, it is expected that late cut ratoons will have been impacted and will not be matured sufficiently to produce optimum results. But favourable wet season conditions have given the ratoons ideal growing conditions.

Growers are hoping that cut to crush results and mill reliability in 2012 will be a vast improvement on past years and will compare more favourably with other industry averages.

The expectation is that CCS results will be an improvement on recent years, especially with a much reduced standover crop. There is approximately 40,000 tonnes of standover expected to be harvested in the district.

With representative meetings with mill staff happening on a regular basis and issues such as grouping, wet weather guidelines, workplace safety and CSAs being negotiated, it is important to acknowledge the benefit to the whole district when all areas of the production chain are given a fair go. Ultimately, if any sector of the chain is detrimentally affected through legislation or otherwise, that link in the chain will impact on the remainder and the district as a whole is the loser.

There have been major changes at both local and state government levels in recent months. I urge both the state ACFA committee and local industry representatives to meet with the relevant ministers and local members and put our industry issues front and centre before them.

If we don’t present our case well we cannot expect government at any level to fully understand the challenges we face.

Margaret Menzel  
ACFA Burdekin Director  
May 7, 2012

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**CENTRAL REGION**

The growing season has been good with total rainfall generally exceeding 1200 mm about the district. There was only the one very heavy rain period which was towards the end of March. The rest of the falls were around plenty of sunshine and made for good growth.

The annual AgriServe Field Day was held 19th April. This was later than usual but the weather was in favour. The release of four new varieties Q242, Q244, Q246 and Q249 was announced. Growers were able to take bus tours of the farm and view these varieties.

The smart setts tissue culture cane was on display along with a planter which makes the process look easy. There were displays of new soy beans and peanut varieties. On the subject of plant diseases, pachymetra appears to be on the increase. Best management practices are choosing resistant varieties and not planting varieties back to back.

Due to heavy rain in March the ASA information meetings were postponed but the changes at BSES indicate that some of the rollout is already happening.

CRSG, the Central Region Sugar Group has a meeting after being in recess for some time. These groups were formed about 10 years ago to identify industry issues closer and more specific to regional areas.

Mackay Sugar Mills are to have a staggered start to the harvest in late May and early June. The estimate is for about 5.5 million tons of cane and this is encouraging after the past couple
of years. Due to the good conditions there is a lot of planting currently taking place. There is a concern that the CCS rises too high in Q208 by August and effects germination. Q208 has been the main variety planted recently.

ACFA sponsored three growers to go to the GIVE conference at Yamba in March. These people enjoyed the opportunity and it is pleasing to see many younger people interested in the industry.

There was concern that there was an outbreak of Orange Rust on again, noticeably in Q208. It was determined that the rust was found in the lower leaf section – the important growing points were clear. This is evidence again that planting good clean resistant varieties is the way forward.

Rain again, just 39 to 49 mm but welcome for the cane. April had recorded only five mm compared to a 59.5 mm average. April 28 saw an overnight rain event giving everyone relief from an expected wallow from the new irrigation electricity tariffs. ALL consumers will have to form another vigilante committee to oppose this turn for the worse in our business. In regions such as ours, irrigation is equal to any expense in our cost of production and we simply have no options.

While not liking this style of activity, campaigns by various groups during recent local Government elections seem to have the ability to draw commitment from candidates on the serious issues. Single issue lobby groups drawing from all the community seem to be necessary to bring any particular issue into focus.

At a local level Regional Councils now enter their second four year term of existence. ACFA members are finding this system of local government as remote as state and federal. We will, as an organisation, have to work towards getting Regional Councils back in touch with cane farming. Road funding will be an issue where Regional Councils require our visible support to gain essential funding from Federal level.

The recent roving Field Day from BSES was very well received. Two busloads of farmers attending cannot be a bad outcome. BSES support from farmers was also an obvious point. Reef Rescue funding for machinery, irrigation and drainage was showcased. Advanced variety trials showed the real difficulty in reducing plant breeding investment. BSES presence in the region will be stronger than was first proposed by the BSES internal reshuffle, although at this time just what BSES will look like in the Southern Region is still not 100 per cent clear.

Farming is about to take on a bigger corporation style in the ISIS area, as the land previously occupied by tomato enterprise SP Exports comes back to the sugar industry. No small effort by ISIS Central Mill has seen a proposal to have this land available for lease for sugarcane production. It may be the way of the future as older farmers retire.

From our participation at SRDC’s GIVE Conference; we learned similar operations have been in place for many years in New South Wales.

To the forthcoming harvest, crop estimates across the region are high and early starts are all the go.

Mike Hetherington
ACFA Southern Region Director
May 7, 2012

The sun has been shining on the crop in NSW for the last couple of weeks and this is something we have not had for some time.

While the crop is not great the cane that survived the floods is very healthy and will give growers a much needed income in 2012.

The prospects for 2012 – while not as good as we would have hoped – will be the basis for a recovery in 2013. The two southern mills have very large areas of stand over already allocated for harvest in 2013.

A few of the crops of soy beans have survived the floods even though they were under water for some days and the harvest of these paddocks has already begun.

Of the fields that had total losses, some of these were replanted very late. This will be used for nitrogen input into the plant cane crops that will follow.

There are still ongoing talks on the Tweed about harvester group amalgamation. We can only hope that these talks come to something as harvester security may otherwise be a problem in the future – there will not be enough harvesters to supply the mill’s requirement for each and every hour of the day.

The Richmond and Clarence will be facing the same problems that the Tweed faced last year with a lot of area to be harvested and very little crop coming off the fields. One harvesting group cut 300,000 tons last year and will harvest 100,000 this year from a similar area. The economics of this will have an enormous impact.

The orange rust in Q208 must be of concern to all Australian cane growers. I believe that the recommendation from BSES that growers should consider restricting their planting to any one variety of no more than 40 per cent of their farm is excellent advice. I think we can all recall what happened to Q124.

NSW will have at least five new varieties to be released this year. Hopefully this will help with raising our production levels back to historic heights.

NSW was very proud to host the AGM of ACFA this year following the GIVE conference in Yamba. Our chair Don Murday gave a very comprehensive report on industry matters to the meeting and has been re-elected unopposed as Chair.

I wish all growers a successful harvest and although it may not be as we would wish, it is what we have, and let us hope that the season will be kind to us so we can have better returns in 2013.

Robert Quirk
ACFA New South Wales Director
May 7, 2012

April–May 2012

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Steve Fordyce
Southern Qld
May 7, 2012

New South Wales

Mike Hetherington
ACFA Southern Region Director
May 7, 2012
Phil’s sacred lure – a secret no more!

By Phil Jackson — Fly, Tye and Tackle

If you’ve ever driven around Brisbane – especially now with the city’s traffic controlling rabbit-warren of one way streets – you’ll drive past the Supreme Court building. This building has always reminded me of a venue for the performing arts – not for its austere and functional architecture but its pomp, ceremony and theatre.

Like all great theatres from the colosseum to the Sydney opera house it has its own labyrinth of passages, lifts and holding cells. Deep underground and out of sight the protagonists – the mad, the bad and the sad – are kept locked and hidden away until they are to be produced on demand.

Amongst this subterranean labyrinth of passages and caged cubicles are a number of interview rooms. The air-conditioning has to be experienced to be believed. Any would-be arctic traveller looking for somewhere to acclimatise could do no better than to spend an hour or to in one of these rooms.

The colour scheme always reminds me of taking my kids to the RNA show. I recall how we’d lined up to go on a ferris wheel when a child getting off projectile vomited what looked like a lime milkshake all over the ticket booth. The colour scheme of Slice lures have been around since fish first fell to a fake feed.

the interview rooms looks exactly the same colour of that milkshake.

On this particular occasion I sat across from a miscreant who was about to make a new entry into a criminal history that already looked like a telephone book. He held the statement in manacled hands and nodding his head in obvious agreement until he finally looked up.

“Yep,” he said.

I handed him a pen, he signed, and handed me the sheath of paper. I placed his paperwork in his file and extended my hand, palm up.

“What,” he said with all the innocence of a choir boy.

“The pen,” I reminded him.

“Sorry, thought it was mine.”

Never let a chance go by, I thought to myself.

“That all,” he asked. I looked at him for a moment collecting my thoughts and asked,

“Why did you do it?”

“Dunno. He was so weak and pathetic so I just flogged him. I guess because I could.”

In another era or even another culture his sociopathic tendencies would make him a tribal chief or war lord but in Australia’s most liveable city inflicting grievous bodily harm – or GBH in the vernacular – is far from being leadership material. I crossed the courtyard to the cab rank and the autumn sunshine never felt so good. It was Friday.

Sunday morning, we anchored the boats in Swan Bay and walked over the dunes to the sea. The sun looked like a Pharaoh’s tribute as it broke free of the horizon east of Stradbroke.

Right in front of me, literally under the tip of my surf rod the tailor were massacring a school of bait fish they had herded into a narrow gutter. The carnage was massive. Pieces of baitfish littered the surface as the marauders lashed the shallow water to foam. The oily surface glistened with millions of tiny silver scales ripped off in the carnage.

The fish we landed regurgitated lumps of fresh flesh and the carnage far exceeded the needs of the rampaging hoard. Why did they kill far more than they needed? How would my hero and all round good guy David Attenborough explain the wastage? The tailor didn’t just hunt down, herd up and kill their prey they did it with extreme prejudice, they terrorised them.

Why? I guess because they could.

I’ve often seen similar events both on land and sea. Mobs of sheep decimated by a pack of dogs just for the blood lust and chook runs strewn with carcasses from the night’s fox raid.

I suppose, if there’s a lesson to be learned from these social and natural parallels, it’s that the weak get attacked and if you want to be attacked, look vulnerable.

As a fisherman I prefer lures to bait. Compared to bait, lures are clean, odourless, easy to carry and store. Clients, especially women, like lures because they’re not ‘icky’ and they ‘look cute’.

One thing all lure fishermen agree on is the strike on a lure is always more aggressive than bait. Fish take dead baits as if it’s a...
dead creature. They know it’s not going to fight or run away so they pick and nibble and sometimes they swallow.

Lures on the other hand are moving so they must be alive.

**The secret is movement**

The secret to successful lure fishing is movement. Based on my mediocre experience I think fish believe movement is proof of life. It’s this simple principle that turned a piece of recycled front bumper from my granddad’s ’63 Falcon ute into a lethal fish magnet and hooked me on lure fishing for life. Yes, the old adage lures are designed to catch fishermen not just fish is true, but if you understand the precept of the concept a well chosen lure will always put fish in the fridge.

For the benefit of those disbelievers – yes, I did say always.

As I tell my TAFE class on day one of my nine week Adult Enrichment Course. If you aren’t catching fish now, I guarantee you will. If you are catching fish now but want to catch more, I guarantee you will. But if you put into practise everything I tell you over the next nine weeks I guarantee, not only will you catch the species of your choice but you will know your going to catch them before you leave home. And it all comes down to fundamentals.

I’m not going to back track over past issues and reiterate the philosophy of ‘lure-ology’, but I would like to deal with just one lure in particular. This is my all time favourite, first choice, go-to default lure.

This lure is so cheap to buy and so simple to make it’s almost a sin to tell you about it.

This lure is so versatile you could fish it from Iceland to Ingham and catch everything from trout to tuna.

The secret to its success is not so much in the design because it’s so simple – the secret is in the versatility of fishing styles this lure is suited too.

Let me extol the virtues of the simple chrome slice.

**Chrome slice**

Slice lures have been around since fish first fell to a fake feed. Scrimshaw on ancient walrus tusks depict Inuit fishermen throwing a flat bone lure across the current in arctic salmon rivers. Aboriginal and Islander cave paintings show slab lures made of coconut shell being dragged behind canoes. The success is all in the way it’s fished.

A common misconception with the slice or slab lure is its lack of action and that’s usually the result of a fisherman with a poor imagination.

I’m not going to waste a lot of print space when graphics can do a better job, but I will spend some time on basic technique. Your objective is to make the lure’s movement erratic. Think hurt, injured and vulnerable.

To keep the lure high in the water keep the rod tip up, drop the tip and run the lure deeper.

Light lures need a rod with a ‘flicky’ tip to cast – heavy lures need a rod with a blunter, stiffer tip.

Moving the rod from left to right while you retrieve will make the lure dart horizontally.

Moving the rod tip up and down will make the lure dart vertically.

Doing both at the same time isn’t easy and will exhaust you in no time.

Both trebles and single hooks work well but I prefer singles on big lures, preferably with the barbs filed off.

A red patch of paint or plastic on the lure will add to the strike rate and a piece of red wool trailing from the hook is a must.

Slabs or the bigger 15cm, 18cm and 25cm version called bars are the ultimate bottom jigging lure. Minimum water resistance...
makes them easy to lift off the bottom and the flat sides insure they flutter on the drop.

Strikes will happen at any stage of the retrieve so don’t get complacent.

Any reel is suitable for throwing slice and slab lures but I prefer a TSS4 for surface and cast and retrieve and one of the TLD’s for bottom jugging.

Line choice and strength is up to you but I prefer braid from about 8 to 15kg, depending on the situation because it sets the hook instantly.

Where to buy? I like to support the tackle industry whenever I can, but the specials bin in Woolworths is the best place to find your slabs, slices and slugs. Why Woolies? Just put it down to a dysfunctional national buying policy.

Two things to remember:

■ To bring out the aggression in any predator think injured, hurt and vulnerable; and,
■ It’s not the rod or reel that outsmarts the fish – it’s the nut holding them.

Best of luck with my secret sacred lure!

ANSWER TO IAN’S MYSTERY TRACTOR QUIZ

The tractor is a 1936 International W 30, possibly the top selling grain farm tractor of the period. (IMJ collection)