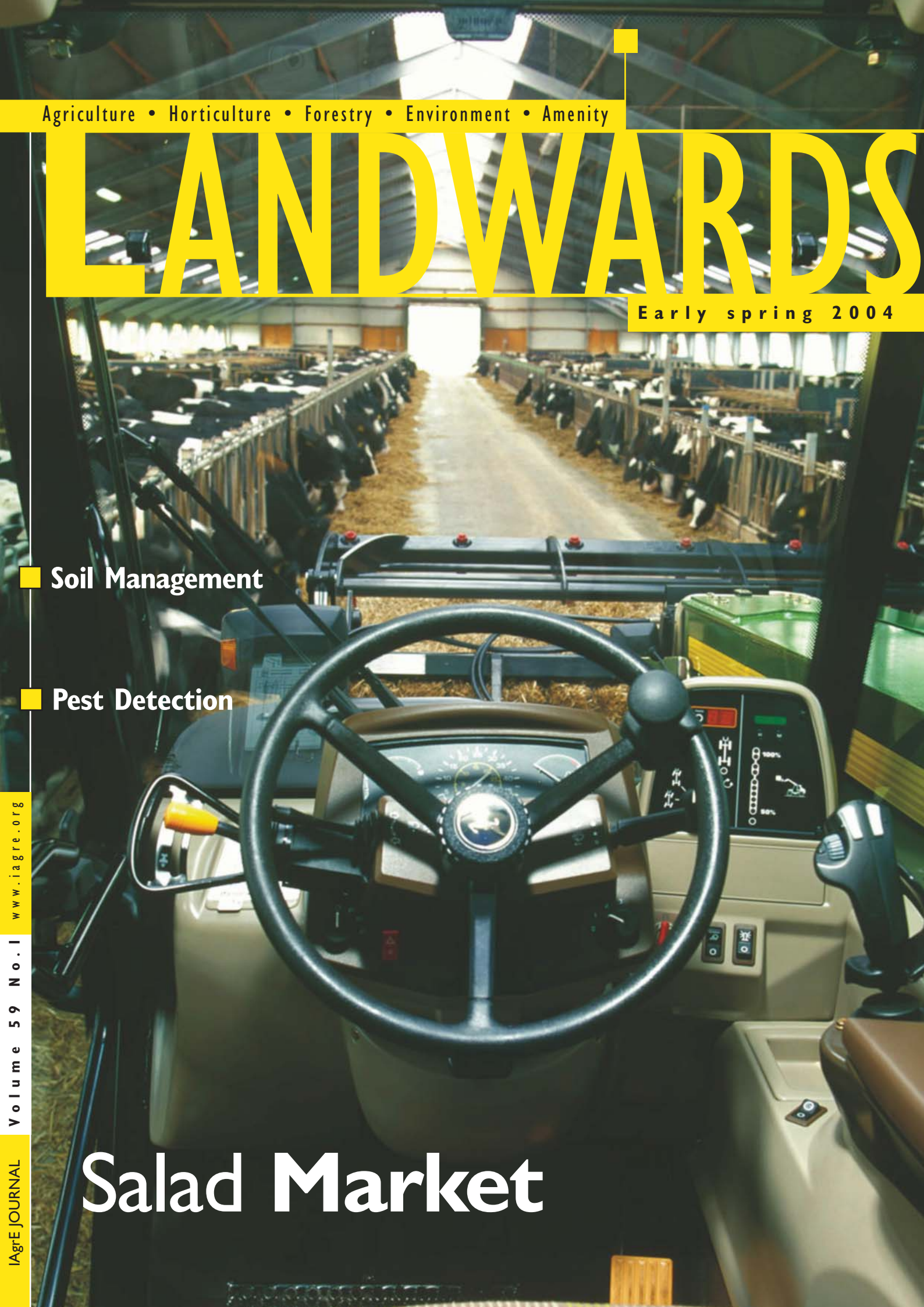

Agriculture • Horticulture • Forestry • Environment • Amenity

LANDWARDS

Early spring 2004

- Soil Management
- Pest Detection

Salad Market

IAgrE JOURNAL Volume 59 No.1 www.iagre.org

DIARY of EVENTS

MARCH 2004

Wednesday 3 March - Scottish
Branch Annual Conference "Quality Cropping" and AGM
Venue: Moredun Institute, Bush Estate, Penicuik
A hot buffet will be served before the AGM – full details will be forwarded nearer the time.

Monday 8 March 19.00 h - East Anglian
Branch AGM
Venue and Speaker to be arranged

Monday 8 March 19.15 h - West Midlands
Branch AGM followed by technical talk by Presidential Representative
Venue: AGCO, Banner Lane, Coventry
For more information email: westmids@iagre.biz

Tuesday 9 March 18.30 h - Herts & Essex
Branch AGM followed by technical meeting entitled "Whole Body Vibration on Agricultural Vehicles"
Speaker: Andy Scarlett, Silsoe Research Institute
Venue: Writtle College

Tuesday 9 March
IAgrE Young Engineers Competition
To be held at the JCB Compact Products Factory, Cheadle, Staffordshire
For further details contact the IAgrE Secretariat or email competition@iagre.org

Wednesday 10 March 18.30 h - Herts & Essex
Branch AGM and Talk
Venue: Royal Agricultural College, Cirencester
Further details tba

Wednesday 10 March 19.00 h - Southern
Branch AGM and Annual Dinner
Venue: The Swan, East Ilsley, Newbury

Monday 15 March 19.00 h - Northern Ireland
Branch AGM and Technical Meeting entitled "Innovation and Engineering at JCB Ltd"
Speaker: Paul Hemingway, JCB
Venue: Glenavon Hotel, Cookstown

Monday 15 March 10.30 h
Preceding the SEM Branch Mini Conference the Soil & Water Management Specialist Group have organised a morning visit entitled *"Development and Management of Natural Sports Surfaces"*
Venue: Wisbech St Mary, Cambridgeshire
Speaker: Mike Hann, Cranfield University Silsoe
Further details tba

Friday 19 March 19.30 h - East Midlands
Branch AGM and Annual Dinner
Venue: The Red House, Kelham, Nr Newark, Nottinghamshire
Further details to be advised.

Monday 22 March 19.30 h - Wrekin
Branch AGM followed by technical meeting entitled "Opportunities in Agricultural Engineering"
Speaker: Dan Mitchell, President of IAgrE
Venue: Harper Adams University College

Provisional Date
Wednesday 24 March - Yorkshire
Branch AGM and Technical Meeting/Visit
Speaker: Geoff Freedman – Forestry Civil Engineering Forest Enterprise
Further details to be announced.

MINI CONFERENCE

SOUTH EAST MIDLANDS BRANCH
to be held on **Monday 15 March** from 15.00 h - 19.00 h at NIAB Cambridge – Conference Rm

Potential Change in the Agricultural Use of Water in Eastern England

Speakers to include:
Keith Weatherhead, Cranfield University
Steve Dines, Regional Licensing Officer
Lindsay Hargreaves, Elevedon Farms
Jerry Knox, Cranfield Unversity

Conference Convenor: David Pullen

For further details contact the IAgrE Secretariat

APRIL 2004

Monday 19 April 19.30 h - South East Midlands
Development of Fordson and Ford Tractors
Speaker: S Gibbard
Venue: Bar Function Rm, Cranfield University Silsoe

Wednesday 21 April - Southern
Latest Technology from Japan - Visit to Kubota (UK) Ltd
Speaker: David Roberts
Venue: Kubota (UK) Ltd, Dormer Road, Thame, Oxon

Monday 26 April 19.00 h or earlier - West Midlands
Visit to Bomford's salad crop growers
Orchard Farm, Off School Road, Salford Priors
NOTE: Change of Venue
Further details to be advised.
For more information email: westmids@iagre.biz

April - East Midlands Branch Meeting
Technical and Demonstration - AEA Sprayer Testing Legislation
Date and Venue to be advised.

MAY 2004

Tuesday 13 May - *IAgrE Annual Conference, AGM and Awards Ceremony*
"Land Use and the Environment – Delivering Solutions"
Note: Please make a note in your diary

Saturday 20 May 16.00 h – South East Midlands
Visit to LEAF Farm
Contact Branch Secretary for further details

ANNUAL CONFERENCE

"Land Use and the Environment – Delivering Solutions"

Tuesday 13 May 2004
Royal Agricultural College, Cirencester

This Conference will highlight technologies and practices that can bring real and immediate benefits to all aspects of the environmental resource – soil, water, air, bio-diversity, landscape and amenity value – that are impacted by land use.
Following the opening address by **Baroness Young** of the **Environment Agency**, there will be presentations reviewing the key opportunities for responding to the challenges facing the three main sectors – crop production, livestock production and forestry. Speakers include:
Tim Rollinson – Director, Forestry Group
Professor Christopher Wathes – SRI
Professor Dick Godwin – Cranfield University

For further details contact: secretary@iagre.org

Volume 59 No 1, **2004**

LANDWARDS

The Professional Journal for Engineers, Scientists, and Technologists *in* Agriculture, Horticulture, Forestry, Environment and Amenity

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Feature Articles

Front cover: *Livestock feeding operation from the tractor cab (Courtesy: John Deere Ltd)*

ISSN 1363-8300

UK SALAD MARKET REPORT 2003

A digest compiled by **Sara Witney Scholes**

Salads have been one of the UK's fastest growing food categories in the last decade, but this is just the tip of the iceberg! To prove the point, an array of relevant facts, figures, information, views and predictions about the UK Salad Market has been assembled by The Greenery, Europe's leading grower owned fresh produce specialist.

The *UK Salad Market Report 2003*, is designed to stimulate people in the food and food retailing industries, the media, health, education, financial and business sectors to think more about the potential for even more dynamic market growth. It also serves as an invaluable handbook for anyone that requires or desires reference data and background on the market.

Salad days

Introducing the report, Sophie Grigson, who has been writing about food for over two decades makes the observation that the salad has "gradually come of age". Sophie says: "It began, I suppose with the incursion of 'designer salad leaves' back in the 1980s. The thing is that nowadays we've come to realise this once apparently simple culinary category is a marvellous portmanteau term that encases a world of possibilities.

"As the 21st century begins to unfold, the salad vista is ever expanding. This is something that pleases me enormously. I'm delighted to spot a Middle Eastern influence sneaking in – Tabbouleh, for instance, is almost common place (though transformed mightily from the original), while the use of generous handfuls of herbs, or of aromatic spices is no longer considered totally outlandish. How wonderful it is that practically any vegetable, not to mention a fair number of fruits, can find a place in a salad. It's heartening to see the successful return of both the Caesar and Waldorf Salad, a brace of absolute classics that lost their way for a while in the welter of designer chic."

Making salad history

The word **salad** comes from the vulgar Latin *salata,* which in turn comes from the word *sal,* meaning 'salt'. It is normally used with the word *'herba'* to mean 'salted herbs'. The word appears in old French as '*salade'* and then in 14th century English as salad or *sallet.*

The heart of the salad

There is a core range of raw fresh produce that consumers, retailers and foodservice operators in the UK regularly use and expect to see either as single ingredients or in combination when preparing or buying a salad.

This core range, which forms the **'heart of the salad'**, is: tomatoes; peppers; cucumbers; salad leaves; spring onions; celery; and radishes.

- **Tomatoes** originated in what is now Peru. They spread to Mexico where the Aztecs used them as part of their staple diet, and were introduced to Europe by the Spanish conquistadores. The word **tomato** comes from *tomatl*, which in Nahuati (the language of the Aztecs) meant 'plump fruit'. The first to arrive in Europe were golden in colour, and became known in Italy as *pomo d'oro*, and in France as *pomme d'or*, whilst in Britain an alternative name was *pomme d'amour* (love apple), due to its connection with plants with

Various salad products [Source: UK Salad Market Report 2003/The Greenery]

aphrodisiac qualities.

- **Peppers** acquired the pepper part of its name from Columbus and his crew. They had hoped to find pepper when they set off in 1492, and thought this hotter member of the Capsicum family a reasonable substitute. The sweet part was added later to distinguish these peppers from the chilli varieties, as these became more and more popular in the English-speaking world over the last fifty years.
- **Cucumbers** were called cucumer in English during medieval times, which in turn came from the Latin for the vegetable *cucumis*. It gained the 'b' towards the end of the 15th century, then gradually became cowcumber during the 17th and 18th centuries, before settling down to become the word we know today. Cucumbers have been cultivated for over 4000 years and were popular among ancient Egyptians, Greeks and Romans as a vegetable and also an effective skin-care product.
- **Lettuce** comes via old French from the Latin *lac*, meaning milk, a reference to the liquid that oozes out when the stem is cut. Cos was developed in Turkey and neighbouring Aegean islands (including Kos) while Romaine, which is the American word for Cos, is so named because of the vegetable's popularity with the Romans. Iceberg is so called because when it was first sold commercially it was covered in ice to keep it fresh on the journey from grower to retailer. Lettuces were revered in ancient Egypt, where they were sacred to Min, the god of fertility and harvest, and also popular in Greece and Rome for both its culinary and medicinal qualities, as early varieties had soporific properties that helped diners to have a good night's sleep.
- **Spring onion** describes what the vegetable originally was: an onion harvested in Spring before its bulb had had a chance to mature. Up to the 19th century they were called scallions (and still are sometimes in the USA). This comes from the same root as the shallot, which is a relative. The ancient Middle Eastern city of Askalon is thought to be the place where both originated.
- **Celery** is related to parsley and its leaves are vaguely similar to that herb, which may be why both words are from the same root - the Greek *selinon*, meaning parsley. This word was used to describe them both in the ancient world.
- **Radish** comes from the Greek word *raphanos*, 'something that rises quickly', a reference to the speed at which it grows. Radishes were probably part of the staple diet of the workers who built the pyramids in ancient Egypt. They were also popular with the Greeks and Romans, who introduced them to Britain. There are many stories of radishes grown to mythic proportions, including a medieval one recorded at 40 kg. White oriental varieties (called daikon in Japan and mooli in India) are grown much larger than in Europe, and are also used in sauces and soups.

Although these are the seven core fresh products that you would expect to find in a salad, the different varieties of these basic ingredients available today add up to well over fifty choices.

There are also numerous options and combinations of different vegetables, fruit, meats, fish and seafood, dairy products and eggs, potatoes, rice and pasta, nuts, grains, pulses, watercress and herbs, spices, bulbs and beans that can be added to the heart of the salad according to personal preference and circumstance.

Famous salads

Some combinations, have become classics, such as these examples.

Caesar Salad

Based on a mix of lettuce and green leaves with a garlic vinaigrette dressing, it gets its name from restaurateur Caesar Cardini, who invented it in Tijuana, Mexico in 1924 during a busy Fourth of July weekend when he was running low on food and put together a salad with the ingredients he had left in the kitchen. The original recipe had Romaine (or Cos) lettuce, garlic, croutons, Parmesan cheese, boiled eggs, olive oil and Worcestershire sauce, with the lettuce leaves coated with vinaigrette dressing.

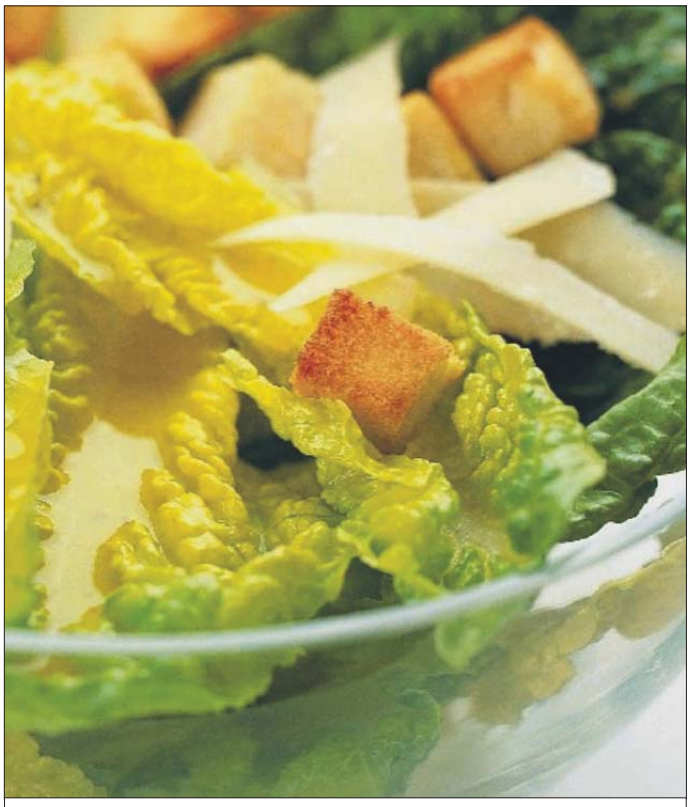
Waldorf Salad

Also called Waldorf Astoria Salad, this is a classic dish combining celery with apples, walnuts, lemon juice and mayonnaise. Its creation is credited to Oscar Michel Tschirky, the maître d'hotel, for a society dinner to mark the opening of the Waldorf Astoria in New York in 1896. Oscar went on to work at the hotel until he retired in 1943.

Reviewing the health benefits

There is convincing evidence that eating fruit and vegetables is associated with a decreased risk of cardiovascular disease, especially stroke (Cardiovascular Review Group, 1994) and some types of cancer (Working Group on Diet and Cancer, 1998). This evidence is derived from studying the eating habits of individuals and then following them up for a period of up to 30 years to observe which individuals become ill or die from these disorders and see if there is a relationship between food intake and health.

A high consumption of fruit and vegetables helps maintain blood pressure within healthy limits. High blood pressure is the major factor in causing strokes and also contributes to causing heart attacks. Studies have shown that a daily intake of 10 portions of fruit and vegetables lowers blood pressure by 3-7 mm Hg depending on the initial blood pressure (Appel *et al.,* 1997; John *et al.*, 2002). It is believed that much of the

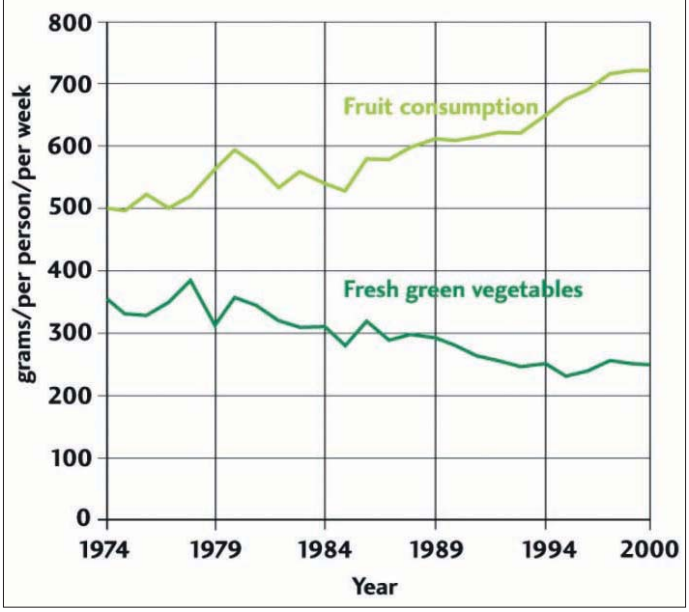


The Caesar Salad [Source: UK Salad Market Report 2003/The Greenery]

benefit would be achieved by eating five portions a day. Almost half of the adult population over the age of 50 years have elevated blood pressure. A reduction in average blood pressure by 5 mm Hg would reduce the incidence of stroke by 22%, coronary heart disease (CHD) by 16% and may prevent some 75,000 deaths a year in the UK as well as much disability (Law *et al*., 1991). This conclusion has been supported by recent studies in the USA which show that the risk of stroke is strongly related to the regional variations in fruit and vegetable consumption (Bazzano *et al*., 2002).

Estimates of intakes of fruit and vegetables in the UK are available from the National Dietary and Nutrition Survey of Adults published in 2002. These show that the mean number of portions of fruit and vegetables consumed is about three portions daily (men are eating 2.7 and women 2.9 portions on average per day), but almost half the population consume fewer than two portions a day. Until recently, there has been a lot of confusion over what is described as a portion of fruit and vegetables. The Department of Health has recently provided a description of portions of fresh, frozen or processed fruit and vegetables. Current government advice is to consume five portions daily. Emphasis is put on consuming fruit and vegetables that are not high in salt, fat and sugar i.e. fresh fruit and vegetables such as salad vegetables. A recent review (Hu & Willett, 2002) of all dietary interventions to prevent cardiovascular disease concluded that the risk of heart disease was reduced with increasing consumption of fruit and vegetables, particularly green leafy vegetables and vitamin C-rich fruits and vegetables, but potato consumption was not associated with benefit.

Consumption of fruit and vegetables [Source: UK Salad Market Report 2003/The Greenery]



The UK Government is spending over £52 million to publicise the benefits of increased intakes of fruit and vegetables. However, the main emphasis in this programme has been on promoting fruit through the School Fruit Scheme. Fruit consumption has been increasing anyway in the UK population. What is more worrying is the decline in the consumption of vegetables.

Tom Sanders who is Professor of Nutrition & Dietetics at King's College, London believes that encouraging people to eat a salad at least once a day is one of the easiest ways of increasing the intake of healthy vegetables. Salad vegetables provide important amounts of potassium and magnesium that help lower blood pressure. They are also low in fat, salt and sugar. A high intake of potassium and magnesium from vegetables also appears to have beneficial effects on bone health by altering the acid-alkali balance in the body so that calcium, which is needed for healthy bones, is conserved. This may be important in guarding against osteoporosis, a disease that afflicts many women after the menopause and is a major cause of bone fractures in older people.

Vegetables contain carotenoid pigments that can be used to make vitamin A, which is needed for a healthy immune system and good vision. They also contain vitamin C which is needed to support normal wound healing and to maintain healthy gums. Spinach and other leafy vegetables are an excellent source of folate. A high dietary intake of folate is important for women planning to have a baby because it helps protect against neural tube defects. A high intake of folate may also help protect against cardiovascular disease by decreasing the level of homocysteine in blood.

Besides these nutrients salad vegetables contain other compounds that may be beneficial to health. This has been recognised by herbalists for many years, but is now widely recognised as being important by nutritionists. For example, studies have shown that lycopene (a natural pigment that helps give tomatoes their characteristic red colouring) is associated with decreased risk of cancer of the prostate. It is a powerful antioxidant, and there is ample scientific evidence to support the view that lycopene helps prevent damage to cells and tissues, and actively contributes to the prevention of cardiovascular disease and cancers.

Lutein, which is a pigment found in dark green leafy vegetables such as spinach, is believed to help protect the

retina of the eye against damage and to be useful in protecting against age-related macular degeneration, which is the major cause of blindness in older people.

Developing the future

The Salad Shopper Survey

Taylor Nelson Sofres research of a 1,000 plus national sample during March 2003 commissioned by The Greenery provides an up-to-date view of what consumers think and do when it comes to buying and consuming salads.

- On average, the healthy/nutritionally beneficial qualities of a salad are the most appealing characteristic to 24% of the respondents. This is much higher for the youngest age group (43%) and for singles (32%). It is also the top choice (29%) of people in Scotland, which is the largest percentage of any region.
- Taste is the second most appealing characteristic to the respondents. This is more so for men, respondents from Greater London, the 'middle' age groups (25-64), families with children and social classes AB and C1.
- The third most appealing characteristic (visually enticing) is mentioned more by the 55-64 age group, social class C2, and in Scotland and the Midlands.
- The fact that salads are low in calories is more appealing than average to women, older age groups (55-64 and 65+) and respondents from Yorkshire/North East/Humberside and North West.
- The ease of preparation is more appealing than average to respondents from Greater London and to singles.
- Every day salad consumers think healthy/nutritionally beneficial is the most important attribute, but those who consume 2-3 times a week or 4-6 times a week are more appreciative of taste.
- The low calorie content is more appealing than average to 'once a month' salad consumers.
- Speed of preparation is more appealing than average to the very light salad consumers (less than once a month).
- Among the less obvious responses were fills me up, nice and cold and for the extras (e.g. dressing and creams) that go with it.

Salad demographics

Differences in lifestyle, age, motivation and food preferences affect purchase choices – understanding these can be used to stimulate increased expenditure from different households. The report presents various influences including the following.

Household size

In-line with the changing housing demographics whereby 63.6% are households with one or two people, 63% of all households buying salads are households with one or two people. Two people households are 'heavy' salad buyers.

Social classes

46% of all households buying salads are social classes ABC1 now, against only 35.6% ten years ago. D and E social classes are the lightest salad buyers. The Government is keen to educate lower income households about fresh produce, so there are opportunities for suppliers and retailers in this area.

Housewives' age

Over 65s now account for 24.7% of the population and 24.4% of all salad expenditure. Ten years ago they only constituted 16.9% of salad sales, so whilst they continue to be only average purchasers, their effect on the market is increasing, making them a prime target group for salads marketing.

Households with housewives aged 45-64 years are the heaviest salad buyers; under 35 year olds are the lightest salad buyers.

Children

The percentage of households with children is decreasing and now only represents 27.6% of the total household population, but they have increased their share of expenditure on salads from 25.4% in 1992 to 26.8% in 2002. However, they are lighter purchasers than households without children. Much has been said and written about food education for children/in schools, and whilst there are many worthy and worthwhile educational schemes to promote fruit and vegetables to children. These seem to have relatively little effect on expenditure.

Ranking of salad attributes

Ranking	*Attribute*	*Importance, %*
1	Healthy/nutritionally beneficial	49
2	Taste	46
3	Visually enticing	17
4	Freshness	14
5	Low in calories	13
6	Easy to prepare	12
7=	Wide choice of ingredients	10
7=	Natural part of a healthy diet	10
8	Quick to prepare	9
9	Crunchiness/texture	6
10=	Good for dieting	5
10=	Light meal	5

Streamlining supply

Over the past two decades the supply chain to the UK salad market has undergone dramatic rationalisation in order to enhance the offer to its customers and consumers. The changing retailer landscape, vertical integration and consolidation of functions have resulted in an ever decreasing number of increasingly larger companies in a shorter supply chain.

The reduction in the complexity and length of the chain between production and consumption has led to increased time and cost efficiencies. At the same time, investment in knowledge, understanding and responding to consumer requirements has led to a greater choice and availability of tasty, safe and better quality products that have helped fuel market growth.

According to The Greenery, growers will increasingly have to make a choice of which of the three main market segments they wish to supply:

- getting the highest possible yield per square metre, and competing to supply at the lowest possible price to the price-conscious customer base;
- dedicating supply to one or a small number of customers, and focusing on meeting and anticipating their specific needs and requirements for products and services; or
- growing high quality, exclusive and niche products, and using networking and innovative sales and marketing approaches to identify and develop these niches with, and for, the appropriate customers.

Dynamic display

The fresh produce section in a supermarket is often the first area you walk into as a shopper. For the retailer it is a profitable area, which also helps drive and dictate choices for many other food and drink products and

Shortening of the supply chain [Source: UK Salad Market Report 2003/The Greenery]

provides 'Retail Theatre'. For the consumer, it is the starting point for what will hopefully be a pleasurable shopping experience.

Currently the fixtures in the fresh produce area are either against walls or are island sites. This has as much to do with shopper flow and best use of available (valuable) space as anything else. Within this context, innovative retailers are looking at different fixture shapes that can provide more shopper benefits and increase the appeal and experience of the supermarket environment.

Here are The Greenery's suggestions about some possible developments in terms of the shape, nature and features of salad fixtures in the future.

The Salad Wheel

As with many theatres and advanced entertainment complexes, the attractions (or sales offerings) above ground are serviced from below ground. Where the site allows, the supermarket of tomorrow could receive stock and store it below the shop floor and re-stock using vertical systems rather than the current horizontal transfer systems that can interrupt shopper flow.

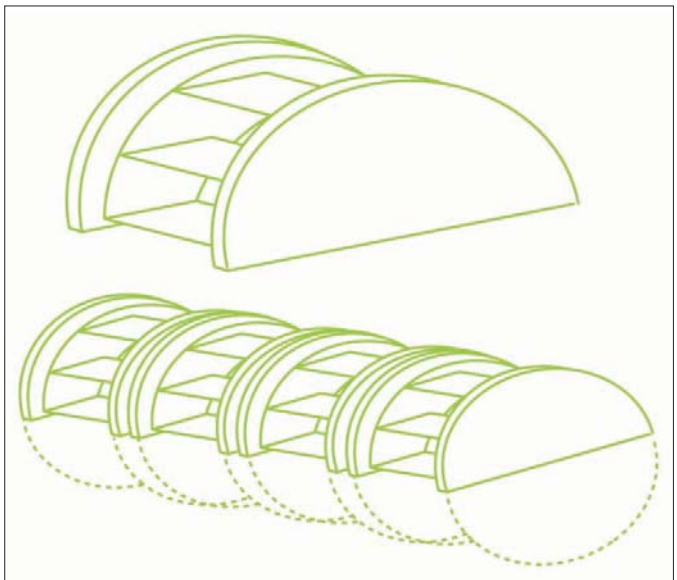
'The heart of the salad' section would be like a can on its side with half of the area below floor level, the other half being like a long tube at shopper level, all of which can rotate through 360 degrees.

This 'can on its side' has numerous rows of shelving, graphic panels, selection aids, *etc.*, that cover all of the long side surface area displaying a variety of core salad products and convenience offerings. It then rotates as produce is sold so that full shelves take the place of empty shelves. Such a system, which could display both ambient and chilled products, would also allow the salad selection to be easily changed to create new sales opportunities at different times of the day.

The Octagon

- An eight-sided island unit that can be designed to accommodate ambient and chilled core and convenience salad products, enhanced by a variety of features such as:
- eye-catching surfaces (reflective glass, light panels, lit graphics);
- interactive monitors (with web cams to talk directly to the 'Store Salad Chef' about meal ideas, or to growers about their produce);
- complementary products, such as salad dressings, croutons, herbs and spices, plus recipe books, relevant utensils and equipment;
- recorded film loops (about varieties, growing, growers, serving ideas of food personalities and star chefs presenting their choices, tips and recipes to camera);
- 'market fresh' and 'best buy' chalkboard panels;
- triangular rotating 'today's recipe ideas' panels (like the large, constantly changing high street poster sites);
- nutritional/health information panels.

Alternatively, the Octagon could also be used as the basis for more personal rather than hi-tech interaction, where service and advice are channelled through a friendly resident Greengrocer.



The dynamic display concept with a rotating salad wheel serviced below the shopper level [Source: UK Salad Market Report 2003/The Greenery]

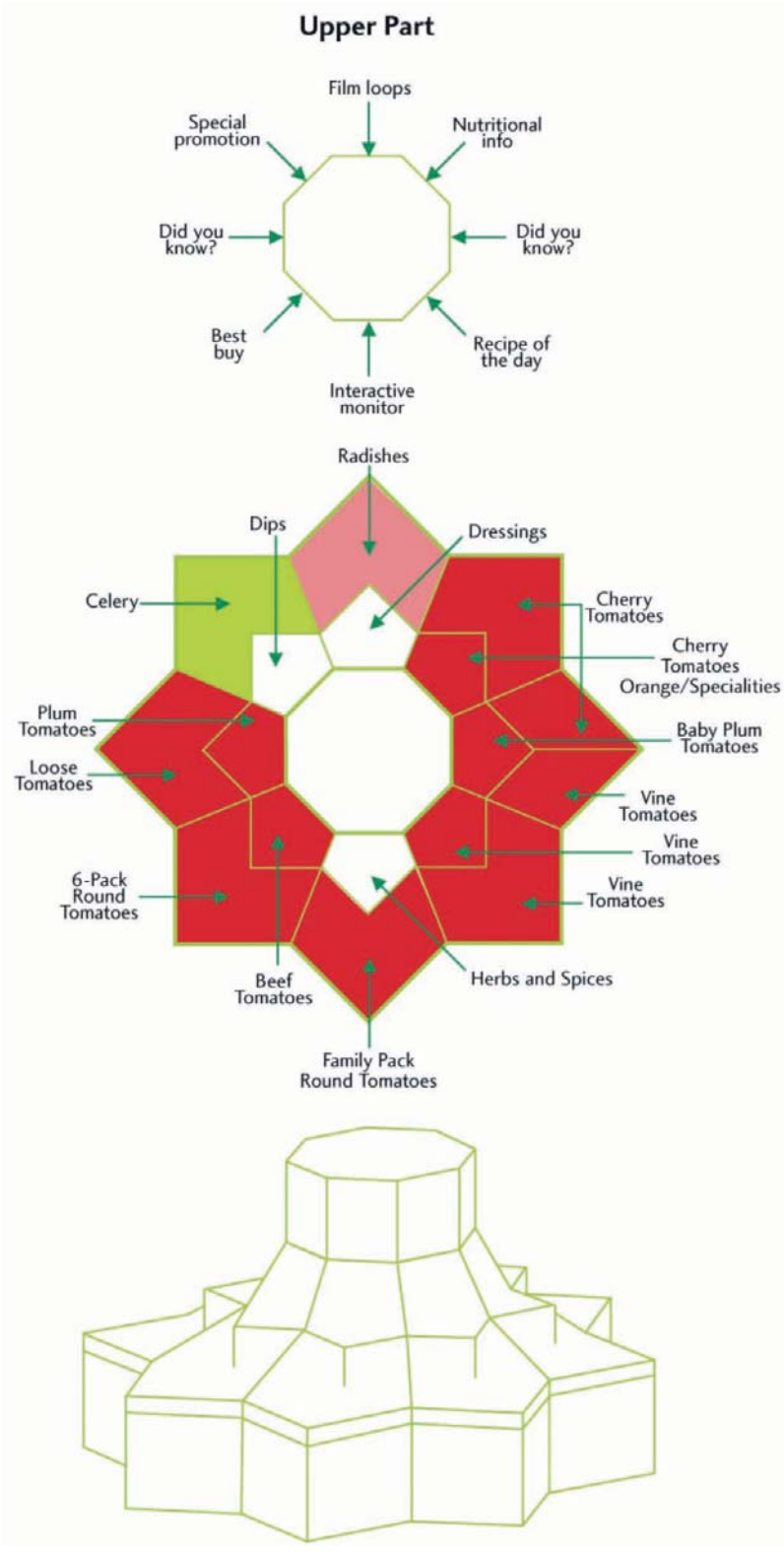
Developments and initiatives

The salad market has benefited from a progressive policy of continually increasing and improving the offering to consumers in terms of availability, choice and variety, sensory appeal, convenience, health, safety and environmental care.

Availability

Development of ever better growing facilities and techniques in North West Europe and in the Mediterranean countries have improved the level and consistency of quality of the crops considerably, as well as made it possible to increase the outputs/yields per square metre:

- seed breeding (*e.g.* seeds with in-bred resistances against pests and diseases and better quality and taste characteristics);
- quality control in the greenhouses, thanks to computer-aided climate control and water and nutrient distribution to the plants;
- registration and monitoring systems (*e.g.* for the detection and treatment of pests and diseases);
- introduction of crop prediction and harvest planning systems;
- introduction of overhead lighting systems to produce also in the dark periods of the year in North West Europe;
- increased focus and co-operation between retailers and fresh produce supplier to better anticipate and meet consumer requirements.



An eight-sided island unit for convenience salad products [Source: UK Salad Market Report 2003/The Greenery]

Choice and variety

There has been an enormous increase in the choice and variety of salad products on offer to the UK consumer over the last 15 years. Examples of the variety among core salad products include the following products.

- Tomatoes on the vine were introduced in 1996, and now account for 22.3% of total tomato sales.
- Plum tomatoes were also introduced in 1996 when only 131 tonnes were bought compared to 7,879 tonnes in 2002.
- A recent innovation is tomatoes that naturally contain three times as much lycopene as standard red tomatoes.
- Since the introduction of green and red peppers grown in the North West of Europe during the 1970s, more colours were added in the 1980s and 1990s, most notably (in terms of popularity) yellow and orange peppers.
- The mini cucumber was introduced in the mid 1990s.
- Iceberg lettuce was introduced in the late 1980s and soon took over the leading position in Salad Leaves from Round or Butterhead lettuce.
- The nineteen nineties saw the (re)introduction of a series of lettuce types, such as Little Gem, Lollo Rossa, Lollo Bionda and Oak Leaf lettuce.
- Most recent introductions in the lettuce sector include 'Salanova'. a head of lettuce which falls apart into single leaves with one cut of a knife and 'Salatrio', three types of lettuce grown in one pot together and sold together in one pack.
- The biggest development for Salad Leaves was the introduction of 'Bagged Leaves' in the mid-nineteen nineties. In the past 5 years, Bagged Leaves more than quadrupled their sales, and by 2002 accounted for 57% of total Salad Leaves expenditure.

Bumblebees were introduced to pollinate tomato flowers and eliminate a labour intensive operation [Source: UK Salad Market Report 2003/The Greenery] [Credit: Koppert Biological Systems]

Convenience

The introduction of many new products has been complemented by innovation in packaging materials and product options over the past decade:

- modified atmosphere and/or 'intelligent' packaging to increase products' shelf life;
- pre-packs and pre-prepared products (washed, sliced, diced, mixed, *etc.*);
- produce pre-selected by sizes and pack contents, to service small households/individual preferences; and
- usage friendly produce, *e.g.* mini and snacking varieties, and varieties with less seeds.

Health and safety

Increasingly stringent practices and standards have been introduced to guarantee safe and healthy food for the consumer, and a safe and healthy working environment for the grower.

- Bumblebees were introduced in the early 1980s to pollinate tomato flowers, a job they took over from the growers and their staff who had to do this by hand.
- The majority of the chemical crop protection agents were replaced by biological crop protection methods, employing useful insects against pests and disease as much as possible.
- A formal system for Environmental Conscious Cultivation was introduced in The Netherlands in the mid 1980s.
- Integrated crop protection has become the standard in Dutch greenhouse production. Many chemical pesticides have been forbidden for use in salad/fresh produce production, contributing to grower and consumer health and safety.
- The major UK multiples have their own standards and specifications, usually based on guidelines provided by the Hazard Analysis of Critical Control Points (HACCP), International Standards Organisation (ISO) and British Retail Consortium (BRC), and their own certification schemes for fresh produce production.
- The Greenery introduced its Greenery Safety Assurance System (GZS), which is compulsory for all Greenery growers.
- EUREPGAP, the standard agreed between major Europe retailers and suppliers/grower organisations, which was introduced in 2000 and forms part of this system, aims at safe production of fresh produce with the least possible use of chemicals, reduction of waste, highest standards of responsibility and care for the protection of nature.
- Organic production is increasing annually, whereby no fertilisers and chemical crop protection agents are used, and genetically modified seeds/plants forbidden (as is the case for production of all fresh produce for fresh consumption). However, it is still a small market segment (3% of fresh produce sales).

Environmental care

In addition to the health and safety measures that also benefit the environment, growers have invested heavily in measures and systems for energy saving and reducing pollution.

- The use of energy saving screens, storing excess heat (on hot days in greenhouses) in heat buffer systems, computer-aided climate control and the use of high-efficiency heating systems are the standard nowadays.
- Carbon dioxide, which is produced when burning gas, is fed back into the greenhouse via special tubes with openings, so that the plants can use it for assimilation purposes and to help prevent the 'greenhouse effect'.
- Many growers have started to collect rainwater in large quantities and mix it with nutrients in order to feed to their plants.
- Seed companies and breeders have built resistances into the seeds/plants, so that they are naturally protected against all kinds of diseases and pests.

Salad market opportunities

Margreet van Harn, Marketing Director for The Greenery, sums up the potential benefits of the *UK Salad Report 2003*. "Sales of salads have increased by 90% in value and 18% in volume over the last decade, despite the fact that there has been very little brand or generic activity to support this. We believe that providing the relevant information and stimulation to the widest possible audience will help to highlight the enormous potential for salads in the next decade, and also act as a call to action among the diverse interests that will benefit from continued market growth."

Information Sources

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Taylor Nelson Sofres PhoneBus
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GfK Germany 'Frische-Panel'
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MORE INFORMATION

This article has been compiled from extracts and illustrations from the UK Salad Market Report 2003 with full acknowledgement of source. Copies of the full report are available (free of charge). The Greenery Information Office, 26 Fitzroy Square, London W1T 6BT, England. Tel: +44 (0)20 7388 7421. Fax: +44 (0)20 7388 7761. E-mail: thegreenery@richmondtowers.com Web: www.thegreenery.com

National Dietary and Nutrition Survey of Adults, 2002. Web: www.foodstandards.gov.uk/science/101717/ndnsdocuments

The Department of Health fruit and vegetables portions. Web: www.doh.gov.uk/fiveaday/portions.htm

NON-FOOD CROPS DATABASE

New centre to link scientists, farmers and industry

Car parts, lubricants, beauty creams and shirts are just a few of the hundreds of products that can contain plant material and a long list of other products, such as starch-based plastics, renewable construction materials, and solvents free of toxic chemicals, are being developed.

Awareness will be raised among industry, scientists and farmers of the emerging non-food uses of crops by the National Non-Food Crops Centre (NNFCC), which has been launched by Food and Farming Minister Lord Whitty.

The York-based centre will provide a database for non-food crop products and technologies, uniting the experience of the farmers who produce them, the scientists who research their potential, and businesses which generate demand for them. It will disseminate scientific and technical information as widely as possible to raise the profile of non-food crops. The centre is also expected to play a role in delivering the Government's strategy for non-food crops, due to be published this year.

The development of this sector will benefit farmers looking for new markets in the wake of reforms to the Common Agricultural Policy (CAP); some non-food crops will be grown on set-aside land and there will be financial help for energy crops and biofuels.

Lord Whitty said: "Non-food crops can generate new markets for mainstream crops and opportunities for new crops, many of which have barely begun to be developed. Capitalising on these potential markets is a major challenge which I believe farmers are ready and able to meet.

"We also have a world-class science base to provide the underpinning research and develop new products and applications, as well as the industries to produce, transform and market the materials. Diversifying the range of crops grown is one of the keys to a sustainable future for farmers and fits into the new direction agriculture will take after reform of the Common Agricultural Policy."

As well as indicating how farmers can diversify into new markets, the development of non-food crops can, in many cases, contribute to a cleaner environment:

- they are renewable, so reduce the need to deplete fossil fuels and other finite resources;
- through replacing petrochemicals in energy production, they can help reduce carbon emissions;
- their use helps to reduce the volume of non-biodegradable waste going to landfill; and
- they can help to meet society's demands for sustainable products.

NNFCC chair Peter Lillford said: "We are very excited by this new opportunity. There is a great deal of enthusiasm for the increased use of renewable raw materials in our daily lives. We know how and where to grow new crops or produce existing ones for industrial use, and our scientists and technologists are never short of inventive new ideas.

"Now the issue is to turn good ideas and production capabilities into real ingredients that the industry can afford and products with real consumer appeal. That is the challenge for all associated with the centre and we are looking forward to it."

Agricultural company Springdale Crop Synergies, based in Driffield, Yorkshire, is one of the leading companies developing markets for non-food crops. Managing Director Clifford Spencer said: "This is an important landmark; it will mean people working full time to help this development of the rural economy. We are looking forward to working closely with the centre."

Essex-based Hemcore manufactures hemp for fibre which is used in cars and building insulation. Managing Director John Hobson said: "We welcome the emphasis that the Department for the Environment, Food and Rural Affairs (Defra) is placing on non-food crops. Our business is right in line with Government thinking to increase the awareness of industrial crops."

Vic Jordan indicating a healthy crop where soil management has been given priority

CONSERVATION TILLAGE

FOR IMPROVED SOIL MANAGEMENT AND CROPS ESTABLISHMENT

Vic Jordan

BIO NOTE

Dr Victor Jordan FIAgrE, is Chief Executive of UK Soil Management Initiative and was invited to provide this article when he was elected recently to the IAgrE membership grade of Fellow through the eminence route. Contact the UK Soil Management Initiative at: 1, The Paddocks, Powey Lane, Mollington, Chester, CH1 6LH. Tel: +44 (0)1244 881815 E-mail: smi@smi.org.uk Website:www.smi.org.uk

Introduction

Past environmental policies have taken soil for granted but now there is increased recognition to protect the soil as a resource, with research directed towards soil quantity, quality, structure and resilience. The soil ecosystem has been defined as a life support system composed of air, water, minerals, flora, fauna and microorganisms, all of which interact and function together. These play a major role in many natural processes which ultimately determine agricultural productivity, however these processes are influenced and affected by different soil cultivation practices.

Less intensive soil cultivation

Therefore, for some time now, the intensity of soil cultivation has been the subject of much debate. Problems resulting from intensive cultivation practices are:

- soil erosion by water and wind;
- silting and capping of the soil surface;
- soil compaction at depth hindering water infiltration and root growth; and
- increasing problems of emissions of nutrients and agrochemicals to controlled waters.

Recent research indicates that these negative effects could be reduced, or even avoided, if the intensity of cultivations is reduced.

Whilst the most common commercial practice is to plough, followed by subsequent cultivations to form a seedbed (a most efficient method of burying crop residues), many of the potential environmental

benefits of returning crop residues to soil are lost due to an anaerobic deeply buried soil layer. Alternative soil conservation tillage systems for cultivation and crop establishment, that maintain or increase the potential benefits of these crop residues, are being introduced and increasingly used.

Establishing arable crops with surface soil crop residues is very different from the more traditional practice of drilling into clean-tilled (ploughed) land with a fine soil tilth.

As a result, learning to farm with crop residues may take time as it is considered far more challenging and more knowledge-intensive to both farmers and advisors. Nevertheless, many UK farmers have found different ways to farm with crop residues by selecting and developing systems appropriate to their own farming needs.

Better soil management

Improved soil management, whether better plough practice or minimum tillage systems, must be urgently addressed, for intensive soil cultivation results in:

- loss of soil fertility;
- soil erosion by water and wind;
- deep soil compaction;
- reduced water infiltration and root penetration;
- reduced organic matter content; and
- increased CO_2 emissions through oxidation of organic matter.

Whilst 20% of CO_2 released globally is estimated to come from soil processes or changes in land use, soil conservation tillage systems for crop establishment helps to reduce CO_2 emissions, as they can sequester carbon and operate as a sink for CO_2.

Maintenance of healthy soil and water, and waste minimisation, are fundamental to future agricultural production. Thus, structural stability is most important for maintaining quality and resilience of soil and reducing off-farm costs, e.g. nitrate leaching and diffuse pollution, from agricultural activities. Soil cultivation disturbs and aerates the soil, stimulates microbial activity in warm moist soil and increases nitrogen available for volatilisation and leaching. Complete soil inversion by the traditional plough and subsequent cultivations, to prepare a suitable seedbed for sowing, leaves bare soil which increases nitrogen volatilisation to the atmosphere and the potential for nitrate leaching. With the non-inversion method of soil conservation tillage systems, on the other hand, crop residues are chopped and incorporated immediately after harvest; the resultant weed and volunteer growth during the inter-crop period provides 'green cover' which is chemically destroyed and incorporated at sowing with one-pass. This not only reduces nitrate emissions but also offers opportunities for later utilisation of N-offtake from the incorporated residues. In addition, reduced autumn cultivations maintain continuity

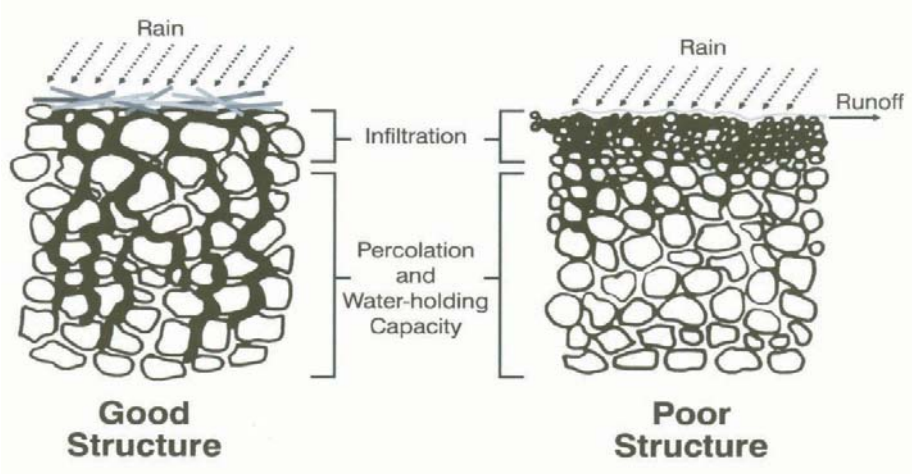

Fig. 1 Diagrammatic representation of good and poor soil structure

Cereal roots growing through a well structured soil

Worms play a major role in decomposition of organic matter and soil formation; they help to aerate the soil, dragging nutrients from the surface downwards through the soil as they go

of channels connecting topsoil to subsoil. These channels assist drainage that may bypass nitrate held in parts of the soil between the channels (see Fig.1 for comparison of soil structures).

Research into the long-term effects of soil conservation tillage systems, based on conditioning the soil and incorporating crop residues in one pass without inverting the soil, has shown, over time, considerable ecological and environmental benefits and may well form part of future agri-environmental measures/schemes in both UK and EU.

Such systems:

- foster soil biota;
- provide a food source for survival of earthworm populations;
- create semi-natural habitats that favour increased numbers and species diversity of beneficial soil surface fauna;
- conserve nitrogen in the system;
- decrease soil erosion through improved aggregate stability;
- minimise emissions of nutrients and agrochemical into controlled waters; and
- increase the integrated control of some pests and diseases reducing both synthetic inputs and costs and protecting wildlife.

Set against these advantages, is the perceived increase in weed problems from more synchronous germination of weed seeds concentrated in the uppermost soil layers which require alternative strategies for control.

Managing crop residues

Managing crop residues is the key to total resource management systems. Previous year's residues benefit the current crop because when they decompose they add both nutrients and organic matter to the soil. In time, incorporation of crop residues in the topsoil layers will lead to improvements in soil structure and a better soil tilth. Topsoil profiles are the most biologically active, containing many microorganisms and earthworms, which lead to improvements in nutrient recycling and soil porosity.

Residue management should start at harvest with the best possible distribution behind the combine. If distribution is uneven poor establishment may follow, due to poor seed to soil contact. Weed control may also then be unsatisfactory due to herbicide interception. The period between harvesting and drilling operations - the intercrop period - is the key to soil management for crop production in harmony with a quality environment. The prime objective being to incorporate and mix in crop residues (approx. 5 - 10 cm deep) as soon as possible after harvest and consolidate to conserve moisture and encourage weed seeds and volunteers to chit. Systems are available for both residue management and drilling operations with minimum soil disturbance and passes. These also have the flexibility to establish crops well over a range of soil types and conditions. For primary cultivation in general, medium/heavy disc and press is most effective on heavy land, whereas tine cultivation is faster and cheaper on lighter land. Discs provide high penetration, low soil movement, require a relatively low power requirement and appear to work better on stony land. Tines, on the other hand, are very effective in high trash/crop residue situations, have a high cultivator action, require relatively low maintenance but have somewhat low penetration in hard ground. Nevertheless, often discs are preferred for light land with a good rotation of cereals and break crops where straw is mostly baled, whereas tines are most effective working heavy land in cereal dominated rotations and successive cereal crops with chopped straw.

Maintaining soil structure

With these non-inversion, soil conservation tillage systems, the majority of the crop residues is incorporated in the upper soil layers – the most biologically active – with some 30 - 40% of crop residues left on the soil surface. This provides some surface soil structure stability and protection against rain impact, helps to reduce soil erosion and provides numerous other crop protection and environmental benefits.

Soil structure depends on the way the available physical, chemical and biological elements in soil interact. Soil components are mixed or separated creating a structure in which water and nutrients can circulate or be stored so that ecological functions can take place. The role of organic matter is most important, as its decomposition mainly produces simple forms of nutrients from complex organic molecules that may be used by plants and soil organisms, or may be lost through leaching or gases. These nutrient exchanges between organic matter, water and soil represent soil fertility that must be maintained for efficient crop production.

Large soil organisms, e.g. earthworms, that are enhanced by conservation tillage aid these functions by mixing plant material into the soil.

Earthworms that live in the superficial soil layers feed on undecomposed plant litter, others forage below the surface in horizontal connecting burrows and ingest large amounts of soil rich in organic matter. The larger earthworms, e.g. *Lumbricus* spp, build permanent vertical burrows that extend deep into the soil and not only do they feed on surface debris or litter but play a major role in decomposition of organic matter and soil formation. The burrowing activity of earthworms also provides channels (macro pores) for water and air circulation and oxygen diffusion in the root zone.

Thus, structural stability is most important for maintaining quality and resilience of soil and reducing off-farm costs from agricultural activities. The impact of intensive plough based cultivation methods on soil erosion is well documented, whereas comparative research has clearly demonstrated that soil erosion and sediment associated phosphate loss is substantially reduced, where conservation tillage systems are used for crop establishment. In addition, there are further gains to be made in helping to reduce diffuse pollution. Substantial and consistent reductions in total oxidised nitrogen (> 82%) and soluble phosphate (> 52%) emissions were obtained from fields that were non-inversion tilled for crop establishment compared to traditionally ploughed fields.

Implementing management strategies

Much component research has been done on different tillage systems in UK and Europe, and knowledge of the comparative effects, environmental implications and benefits accruing from soil cultivation and the management systems associated with them has been provided. This should provide robust information of the effects of soil management practices on soil structure, fertility and resilience, and on the effects on the soil ecosystem, using selective biological indicators. It should also enable implementation of management strategies that minimise soil degradation and losses of soil, nutrients and pesticides from farmland.

FORESTRY ENGINEERING

HRH Duke of Kent opens forest industries technology centre

His Royal Highness the Duke of Kent has opened the Scottish Forest Industries Technology Centre (SFITC) at Barony College, Dumfries. The Duke met staff, students and guests in the high specification forestry engineering workshop and the state-of-the-art technology centre before officially declaring the facility open.

HRH also tried out his operating skills on a harvester simulator, but only after he had bravely taken control of a real life forwarder and moved a cut log – much to the delight of the assembled audience. His visit to Barony College reflects the importance of the £500,000 Scottish Forest Industries Technology Centre to the region and to the forestry market north of the Border.

The Duke was greeted on arrival at the centre by the Vice Lord Lieutenant of Dumfries, the Rt Hon the Earl of Annandale and Hertfelle who then introduced the Royal visitor to Russell Marchant, Principal of Barony College, Mr Colin Williamson, Chief

Executive of Scottish Enterprise Dumfries and Galloway, and Gordon Hill, Forestry Development Manager at Barony College.

HRH unveiled a plaque naming the forestry engineering workshop the Andrew Livingstone Workshop in honour of the late Barony College tutor who was involved in the establishment of the centre. Andrew died of leukaemia earlier this year.

Said Russell Marchant: "We were honoured to receive a visit from HRH Duke of Kent and delighted that he was able to officially open our new centre. It was particularly poignant that Andrew Livingstone's contribution to the creation of the facility was recognised."

"The Scottish Forest Industries Technology Centre is an ambitious project to develop a National Centre of Excellence for Forest Industries Technology at Barony College which will serve the industry locally, nationally and internationally. Through partnerships with industry, contractors and educational institutions, the SFITC will become a dominant provider of forestry education and training in Scotland. Barony is now the only college in the UK to offer a forestry machine operators course."

The SFITC has received considerable assistance from Scottish Enterprise Dumfries and Galloway at feasibility study and Business Plan stages as well as support with infrastructure. The local enterprise company has also assisted the college in securing Objective 2 and Objective 3 European funding.

Colin Williamson, Chief Executive of Scottish Enterprise Dumfries and Galloway, commented: "The new centre is unique in the United Kingdom and is an outstanding example of how partnership working can best benefit our region.

"The centre will help address skills gaps in the forest industries and overcome recruitment problems by providing access to relevant lifelong learning for those starting their careers, those in employment requiring further training and qualifications and those wishing a career change into the forestry sector."

WILDLIFE PROTECTION

Ythan squirrels take the high rope home

Native red squirrels living in the Gight Woods alongside the River Ythan at Methlick have been thrown a lifeline in the form of a rope bridge across the river. The Forestry Commission Scotland and the Scottish Wildlife Trust (SWT) have strung a heavy rope between the treetops on opposite banks of the river to enable the squirrels to get to and from a supply of hazelnuts in the woods on one side.

It is thought to be the first such rope bridge in Britain erected to enable red squirrels to cross a river – all the others cross roads. And, in squirrel terms, it is a super-highway – thoughtful foresters chose two parallel ropes with a central zig-zagged 'island' of thinner rope, to allow enough space for two squirrels to pass each other after experience elsewhere showed that single ropes caused 'traffic' problems.

The squirrels previously had to cross the river on a footbridge to get from the Commission's Norway spruce plantation on the south bank to the hazel bushes in the Scottish Wildlife Trust's Gight Wood Reserve on the north bank, but Buchan District Forester Ewan Reid explained, "Linked with the Ythan Project to enhance the river environment, we have been improving the floodplain area at Gight and will soon be upgrading the footpath network, and we anticipate there will be more people using the footbridge. The likely increase in human traffic across the bridge will probably inhibit the squirrels from using it as much as they do at present, so we thought a rope bridge would help compensate for that.

"It will also mean they can still cross the river if the footbridge is under water when the river is in spate. In any case, red squirrels prefer to remain in the trees as much as possible rather than come down to the ground, so the rope bridge should suit them. Experience with rope bridges elsewhere has shown that they adapt to them quickly."

Lisa Rigby, SWT's conservation manager for Aberdeenshire and Moray, said, "The Scottish Wildlife Trust is especially pleased to be working with the Forestry Commission Scotland to help red squirrels, a species that is under increasing pressure from habitat fragmentation.

"The rope bridge will meet the squirrels' needs, minimising the disturbance to them from visitors. Just as importantly, it will give them easier access to SWT's Gight Wood reserve, which is a rich source of hazelnuts."

MORE INFORMATION

Web: www.swt.org.uk

MARINE IMPACTS

Mapping the hidden depths of Tobago's reefs

For the first time, a UK marine environmental-research company has collaborated with the Caribbean island of Tobago's authorities to map and record the island's coral reefs. Tobago is considered the 'jewel of the Caribbean' but, unlike neighbouring islands, little is known about its flourishing marine life and its interaction with changing climatic conditions and human pressures. The opportunities for discovering new species, such as gorgonians (soft corals), which have only recently been recorded, are high.

Now, Southampton-based ABP Marine Environmental Research Ltd (ABPmer), has joined forces with the Tobago House Assembly and the island's Buccoo Reef Trust to lead the way in developing a marine park-management plan for Tobago, which could be used as a blueprint for the whole of the Caribbean.

Using Geographic Information Systems (GIS) and remote-sensing equipment the team, led by Dr Steve Freeman of ABPmer, mapped and documented the habitats and species of the largest and best-known reef on the island, the Buccoo Reef. The GIS contains a comprehensive database of marine and human activities that will help the island's authorities to conserve and protect the threatened coral reefs. With funding obtained from the United Nations Development Programme, ABPmer has been able to train Tobago's local government and NGOs (non-government organisations) in the application of GIS to marine park management.

Like many rich marine environments, Tobago's reefs are under threat from habitat degradation caused by the impact of waste water discharge, tourism, sedimentation, over-fishing and, more recently, oil and gas exploration activities in its coastal waters. By obtaining further funding, the team hopes to reach their goal of formulating a management strategy for Tobago that will be a blueprint for the rest of the Caribbean, as Steve Freeman explains:

"We are now applying for funding from DEFRA to enable scientists from ABPmer to transfer their experience and skills to Tobago, an island rich in biodiversity, but lacking in resources and expertise. With this support, our work on the Buccoo Reef could be extrapolated to other priority habitats in Tobago. The project's success is attributable to ABPmer and the Tobago authorities' ability to work closely together, despite scientific and cultural differences."

MORE INFORMATION

Claire Rampton/ Margie Collins, ABP Corporate Communications. Tel: +44 (0)20 7430 6845. Web: www.abpmer.co.uk

Bimonthly EARLY SPRING 2004

MEMBERSHIP MATTERS

THE NEWSLETTER OF THE INSTITUTION OF AGRICULTURAL ENGINEERS

ENGINEERING SQUEEZED OUT BY AN OVERLOADED CURRICULUM

Teachers believe an overloaded curriculum and constant exam pressures prevent school pupils from understanding and exploring engineering and developing the skills they need to pursue a career in the field, according to new research published by the Engineering and Technology Board (ETB).

At a time when the number of students taking Science, Technology and Maths (STM) subjects at school and university is declining, the key findings from the *Tomorrow's World, Today's Reality* research show that:

- there is not sufficient time within the curriculum to develop many of the skills associated with engineering such as 'thinking outside the box';
- the links between STM subjects and engineering are not explicit in the National Curriculum, making it hard for students to understand the relevance of these to engineering;
- students believe technology links more logically to engineering than maths and science yet university entry requirements for engineering focus on maths and science subjects;
- teachers assume university is the only route into engineering; and
- knowledge of technician and technologist careers was limited among those surveyed.

Dr Sa'ad Medhat, Director of Education at the Engineering and Technology Board said: "Engineering is central to our lives and an exciting career choice. But the majority of schoolchildren are not given an opportunity to explore engineering within the confines of the national curriculum. Science, Technology and Maths are intrinsic to engineering and the links between these subjects and an engineering career need to be made clearer. "The introduction of General Certificate of Secondary Education (GCSE) Engineering and Engineering Specialist schools by the Government is a welcome development, but more needs to be done to attract the best and brightest, if we are to continue Britain's engineering heritage and ensure the supply of these skills better matches and stimulates market needs. The industry also has a role to play. Teachers are not clear about what engineering is. If we fail to communicate to them the breadth and scope of engineering as a career and the opportunities within it, we will continue to see a decline in the number of engineers."

Barry McGregor, Engineering Colleges Subject Leader at the Specialist Schools Trust and a design and technology teacher, said: "Securing a skilled workforce requires constant innovation in the way that science, technology, engineering and maths are taught in our schools. Teachers must be allowed to use their imagination and creative instinct to inspire pupils in these subjects. "In one specialist school, understanding of science has been enhanced by the use of drama, with children acting out chain reactions, for example. Curricula must be broad and flexible enough to allow teachers to go that extra mile, building an enthusiasm that will rub off on those that they're teaching."

MORE INFORMATION

A copy of Tomorrow's World, Today's Reality: teachers perceptions, views and approaches (University of Bath) is available from the ETB. Tel: +44 (0)20 7240 7333. Web: www.etechb.co.uk

DOES ANYONE KNOW THE WHEREABOUTS?

Name	Last known address
Sarah Dawn Clark	Flat 2/1 Dalhousie Street, Glasgow G3 6RG
Robert William Yardley	School Row, Brauncewell, Sleaford, Lincolnshire NG34 8RH

MEMBERSHIP CHANGES

Admissions

– a warm welcome to the following new members

Fellow
D Leaver
(Gloucestershire)

Member
X Canton-Lamousse
(Papua New Guinea)
L D Dube (Surrey)

Associate Member
J O Nyangon (Kent)
S J Shakespeare
(Gwynedd)
T L Smith
(Pembrokeshire)

Student
Harper Adams University College:
R J Atkinson
M Ball
C J Barry
K J Batty
D A Beattie
M W Boaler
M A Booth
A Bowes
C Bowman
P Buttimer
C R Byass
S E Cannell
C R Davies
G W Davies
M C Davies
O W Denning
G M Dennison
A J Dunne
J E Evans
P I Evans
D N Fisher
A Getachew
J Goodfellow
N D Griffiths
S W J Hamilton
J C C Harris
W E C Helliwell
J J Hoare
R J G Hodson
M J Johnson
D Ling
D C Matthews
D T Meadows
J W Morgan
D P Mould
J Murphy
E A Nicholson
S C Nicholson
A Palmer
A W Parkinson
H Percival
T J Pike
J Pocock
J Ralph
E Robb
B A Roberts
G A Roberts
A T Sweeting
R Vaughan
M G Williams
J R Wofford
D Wreathall

Walford North Shropshire College:
S P Davies
D Thompson
M J Watkins

Wiltshire College Lackham:
R Arneil
T Boagourd
A Bye
A P Vernon

Writtle College:
A Alapati
N Apikos
S Bachu
M C Coronel
J C De Carvalho Preto
D Hapase
A Kargbo
K A Kumar
A A Massusunean
L Nuryati

S P O Nyalala
M E Owen
A Patel
J Perrott
J J Smith
H-H Tsai
M Yu
E S Zainuddin
E Zhao Ran

Death

– with great sadness, we record the death of
M E Kershaw
(Hertfordshire)

Transfers

– congratulations to members achieving a further phase of their professional development

Member
P D Fisher (Berkshire)
G P Higginson
(Shropshire)
D L Sandars
(Bedfordshire)

Associate Member
S Hanney (Dorset)
D E Shenton
(Staffordshire)
J Wheeler
(Northamptonshire)

Engineering Council

– congratulations to the following members who have qualified as Chartered Engineers or as Incorporated Engineers, entitling them to use the designatory letters CEng and IEng, respectively, after their names

Registrations

CEng
M StJ Carr-West (Essex)
P D Fisher (Berkshire)
N J Paul (Wiltshire)
D Price (Staffordshire)
J M Sparrey
(Bedfordshire)

IEng
G P Higginson
(Shropshire)

Transfers

CEng
K J Hawken
(Cambridgeshire)
M A Zoebisch
(Thailand)

ACADEMIC MEMBERS

Askham Bryan College
Askham Bryan
York
YO23 3FR

Barony College
Parkgate
Dumfries
DG1 3NE

Cranfield University
Silsoe
Bedford
MK45 4DT

Duchy College
Rosewarne
Camborne
Cornwall
TR14 0AB

Harper Adams University College
Newport
Shropshire
TF10 8NB

Oatridge Agricultural College
Ecclesmachan
Broxburn
West Lothian
EH52 6NH

Pencoed College
Pencoed
Bridgend
CF35 5LG

Reaseheath College
Reaseheath
Nantwich
Cheshire
CW5 6DF

Scottish Agricultural College
SAC Ayr Campus
Auchincruive Estate
Ayr
KA6 5HW

Sparsholt College
Sparsholt
Winchester
Hampshire
SO21 2NF

Wiltshire College - Lackham
Lacock
Chippenham
Wiltshire
SN15 2NY

COMMERCIAL MEMBERS

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Heddington
Calne
Wiltshire
SN11 0PS

Douglas Bomford Trust
44 Drove Road
Biggleswade
Bedfordshire
SG18 8HD

Bomford Turner Limited
Salford Priors
Evesham
Worcestershire
WR11 5SW

John Deere Ltd
Harby Road
Langar
Nottinghamshire
NG13 9HT

FEC Services
NAC
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2LS

G C Professional Services for land-based and related industries
Highdown Cottage
Compton Down
Winchester
Hampshire
SO21 2AP

Law-Denis Engineering Ltd
Millstream Works
Station Road
Wickwar
Wotton-under-Edge
Gloucestershire
GL12 8NB

David Ritchie (Implements) Ltd
Carseview Road
Suttieside
Forfar
Angus
DD8 3EE

Shelbourne Reynolds
Shepherds Grove Industrial Estate
Stanton
Bury St Edmunds
Suffolk
IP31 2AR

Silsoe Research Institute
Wrest Park
Silsoe
Bedford
MK45 4HS

White Horse Contractors Ltd
Lodge Hill
Abingdon
Oxfordshire
OX14 2JD

Willowdene Farm Training Centre
Willowdene Farm
Chorley
Bridgnorth
Shropshire
WV16 6PP

Long service certificates

Name	*Grade*	*Date of Anniversary*
50 years		
Anthony John Smith **Armitage**	MIAgrE	12 Jan 2004
Keith Field **Mather**	AIAgrE	12 Jan 2004
Sameraweera Arachige Gunapa **Perera**	IEng FIAgrE	12 Jan 2004
35 years		
Terence John **Duggleby**	IEng MIAgrE	16 Jan 2004
Paul Charles Harvey **Miller**	FIAgrE	16 Jan 2004
Hugh Gerald **Stirling**	IEng FIAgrE	16 Jan 2004
Charles Cecil Beauchamp **Walker**	IEng MIAgrE	16 Jan 2004
Peter Joseph **Hull**	CEng MIAgrE	16 Jan 2004
William **Beattie**	MIAgrE	16 Jan 2004
25 years		
Alan John **Casebow**	MIAgrE	10 Jan 2004
Robert J **Nicholson**	MIAgrE	15 Jan 2004
Robert William **Oakey**	IEng MIAgrE	19 Jan 2004
John Hunter **Park**	IEng MIAgrE	19 Jan 2004
Stephen **Smithee**	IEng MIAgrE	19 Jan 2004
David Arthur **McDougall**	IEng MIAgrE	19 Jan 2004
Bruce **Morgan**	IEng MIAgrE	19 Jan 2004
Henry Edward **Johnson**	MIAgrE	4 Feb 2004
Peter Clive **DeVillez**	MIAgrE	15 Feb 2004
Malcolm William **Raggett**	IEng MIAgrE	20 Feb 2004

NEWS OF MEMBERS

After 28 years in South Africa and 25 years with Kongskilde SA, **Geoff Freed** is returning to the UK to join his family who left South Africa some years ago. He will be taking up a position in the Industrial Division of Kongskilde UK on 1st March 2004. The majority of Geoff's experience in South Africa has been in the field of grain handling, drying and cleaning. He intends to keep up to date with the agricultural engineering side and is looking forward to active participation again in area meetings.

Tony Chestney

Write to Tony with your news! His address is: 32 Beverley Crescent, Bedford MK40 4BY

NEW LEARNING CENTRE

Harper Adams at forefront of sustainability initiative

A new learning resources centre recently opened at Harper Adams University College, Shropshire, is at the forefront of a new government initiative for 'environmentally friendly' buildings. The pioneering building, which houses Harper Adams' library, open access IT facilities and a JCB sponsored Engineering Design Centre, fulfils many of the recently established government criteria for improving the environmental performance of new buildings.

These criteria include better environmental performance in water usage, energy usage, the use of timber and other construction materials and waste reduction. In a speech to the Better Buildings Summit, The Rt Hon Margaret Beckett MP, Secretary of State for the Environment, Food and Rural Affairs, laid down the criteria for a new Sustainable Buildings Task Group which will look at incentives for environmental innovation and spread best practice among designers, builders and other professions.

Learning resources centre

Harper Adams' building features a computer-controlled environmental management package that operates a natural ventilation system and other energy saving measures to reduce electricity and gas consumption. In addition, the building uses rainwater harvesting to supply water to the lavatory system, while excavated soil from the construction site was re-used to build an off-road vehicle test track for Harper Adams' Engineering Department rather than being disposed of in landfill. But where this building is different is in its use of timber, which has been extensively employed in the construction of the first floor structural frame.

A spokesman for Harper Adams University College said: "We are pleased to think that the innovative mix of new technology and traditional materials in our Learning Resources Centre comprehensively reflects the best-practice building approach set out by the Government. This is also a timely development in the light of the recent publication by the Department for Education and Science of the Sustainable Development Action Plan for Education and Skills, and shows how the Higher Education sector is actively addressing sustainability issues."

RESEARCH AND DEVELOPMENT

Funding for soil vehicle test facilities

The National Soil Resources Institute (NSRI), part of Cranfield University, has won over £1.25 million of funding to build a new off-road Vehicle Dynamics Laboratory on its Silsoe site. The facility, which will be completed by early 2005, will be at the only remaining centre of its type in the UK to study the relationship between machines and the soil environment in controlled conditions. This will provide important research information to the agricultural sector and a number of other industries, including utilities, aviation, automotive and defence.

With an international reputation for its expertise, the new laboratory will expand upon the NSRI's existing soil implement dynamics facilities. Funding comes from the Higher Education Funding Council of England, boosted by ten per cent from industry.

"We're delighted that this important new development has the go-ahead," says NSRI's head of engineering, Professor Dick Godwin. "This facility will help the agricultural industry to optimise the performance of its vehicles and equipment. For example, it will help develop tyres, traction systems and machinery that can minimise soil compaction and improve soil management techniques.

"Examples in other sectors include new studies of sub-sea cable-laying to minimise both the energy requirement and sea-bed disturbance."

Innovative research equipment planned for the laboratory includes two whole-vehicle controlled moisture soil bins, the first in the UK. One wide and shallow bin (5m x 0.75m) will be for the evaluation of whole vehicles and tillage trains, while a deep narrow bin (2.5m x 2.5m) will test a large range of machine components from sea ploughs to aircraft tyres. Each 45 metres long, the water level in these two vast bins can be controlled to simulate a range of conditions from the saturated sea-bed encountered in sub-sea cable laying, through to hard compact dirt roads and airstrips. A sophisticated single-wheel test apparatus, designed to accurately control the torque or slip of a single test wheel in any environment, will measure tyre performance and the effectiveness of different traction control techniques, while a variable plane four-wheel traction plate can simulate undulating ground surfaces.

With the laboratory design in its final stage, NSRI has just initiated an industry consultation phase. Professor Godwin is inviting comment and discussion from companies in the agricultural sector. "We want to know how the site could best meet their requirements, both now and in the future," he says.

"Our long-term research aim is to create a virtual environment for the evaluation of any machine or vehicle configuration in a controlled manner. This will improve the accuracy, repeatability and cost-effectiveness of tyre and vehicle dynamics research for off-road vehicles and equipment."

MORE INFORMATION

Companies who wish to take part in consultation should contact Professor Dick Godwin or Dr James Brighton at NSRI Engineering Group on 01525 863053. For more details of their work please see http://www.silsoe.cranfield.ac.uk/caee/the_centre.htm

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MULTI-SPECIES ATTRACTANT FOR INSECT MONITORING IN STORED GRAIN

Terry Mabbett

Early detection of infestation is essential for effective sampling and decision led control programmes in stored grain. Representative sampling in grain bulks is difficult and aggravated by deep location of beetles and weevils. Standard sampling programmes generally lack required detection sensitivities and regularly fail to identify infestations requiring corrective treatment.

The perforated probe and pitfall traps can be adapted for use in grain bulks and do provide more effective, reliable and user-friendly options. The traps are capable of multi-species detection during the same monitoring period but different insect behaviour patterns may adversely affect overall trapping and pest monitoring efficiency.

Use of specific insect pheromones improves detection rates but is complicated by coexistence of many species at different population densities in most grain stores. Increased international marketing of grain and use of temperature controlled stores means most insect pests are now cosmopolitan. But use of multi-species attractants (parapheromones), based on natural plant extracts, can overcome these constraints.

Wheat and maize

Scientists from the Agricultural University of Athens, the Benaki Phytopathological Institute in Athens and AgriSense-BCS Ltd in the United Kingdom have evaluated a multi-species attractant based on natural plant extracts. They tested the mixture at different levels (doses) for response from a wide range insect species typically occurring in bulk grain.

Studies took place in two

The Pitfall Cone (PC) trap from AgriSense-BCS Ltd

BIO NOTE

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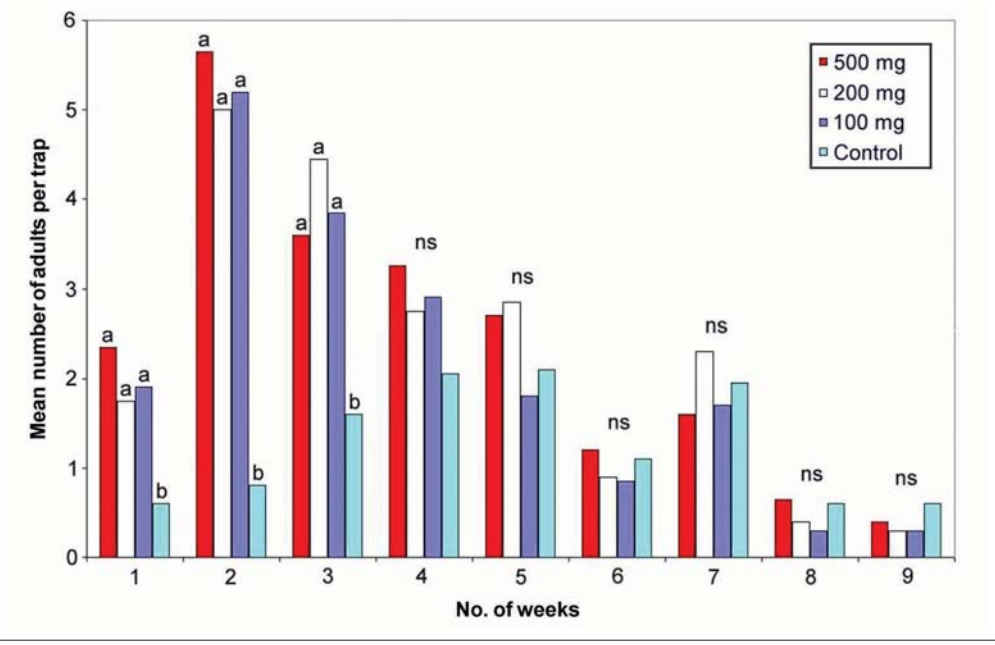
For further information contact: David Judd, AgriSense-BCS Ltd, Treforest Industrial Estate, Pontypridd, Glamorgan, South Wales CF37 5SU. Tel: +44 (0)1443 841155 Fax: +44 (0)1443 841152 E-mail: Djudd@agrisense.demon.co.uk

Fig. 1 Tribolium in wheat; mean number of adults/trap over nine weeks, for the three levels of attractant and the control. Means of the same week having the same letter are not significantly different using HSD test at 0.05; ns - no significant differences recorded.



low (horizontal-type) warehouses in central Greece. The stores were separately loaded with locally grown durum wheat and maize, 190 t at 1.8 m deep and 300 t at 1.5 m deep, respectively.

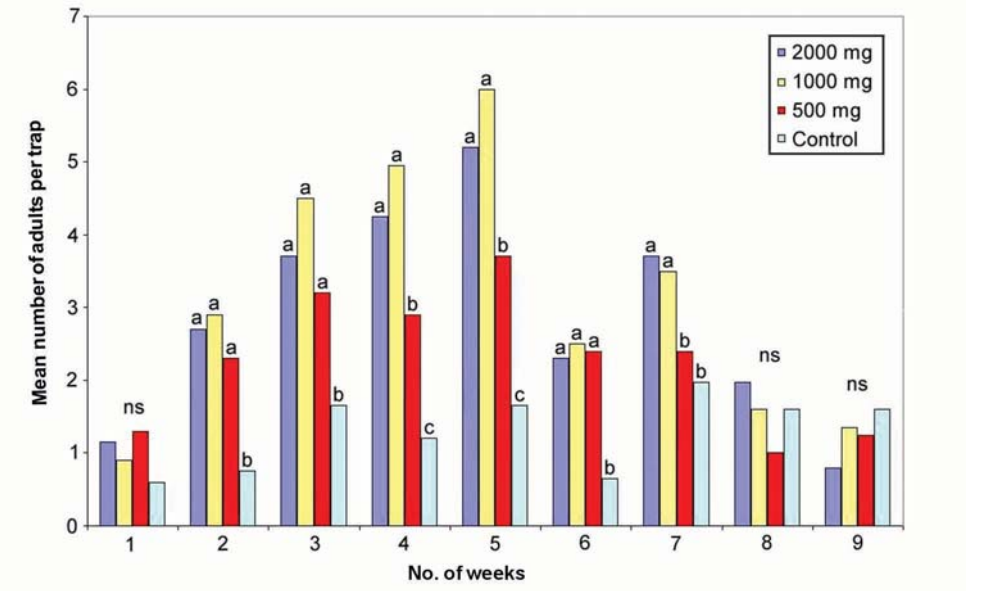
Pitfall traps, designed and manufactured by AgriSense-BCS, were placed at five locations randomly located over the surface of the bulk, but no nearer than 1 m to the outside walls. These 'conical' traps are 10.7 cm high with a base diameter of 9.3 cm and are made of transparent plastic for easy interior visibility. The distinctive green domed lid is equipped with perforations arranged in 9 concentric circles. These cover all except the peripheral (0.6 cm) and central zone (2.2 cm).

Traps were loaded with a mixture of natural plant extracts at 100, 200 and 500 mg for the wheat trial, and 500, 1000 and 2000 mg for the maize trial. Extracts were dosed on cellulose fibre pads to form the parapheromone lure.

Four traps were placed at five random locations, three with a parapheromone lure and one unbaited control. Replicates were spaced at least 2 m apart with 1.2 m between traps in the same replicate. Traps were set on July 22nd and September 21st in, respectively, the maize and wheat just below the grain bulk surface.

Traps were checked weekly over a nine week period and the contents collected in alcohol containing vials for laboratory identification and counts. On the same days, grain samples were taken with a non-partitioned grain trier adjacent to each four trap replicate and to a depth of 20 cm. These were taken to the laboratory and examined for live insects only.

Fig. 2 Sitophilus oryzae in maize; mean number of adults/trap over nine weeks for the three levels of attractant and the control. Means of the same week having the same letter are not significantly different using HSD test at 0.05; ns - no significant differences recorded



Pandora's box of insects

Twenty different species of insect were trapped including established pests of grain, insect predators (carabid beetles) and parasitoids (wasps) and fungal feeders (e.g. *Cryptophagus* sp).

Pest insects included *Sitophilus* sp (grain weevils), *Tribolium* sp (flour weevils), *Cryptolestes* sp (red and rust red flour beetles), *Oryzaephilus surinamensis* (saw-toothed grain beetle), *Rhizopertha dominica* (lesser grain borer) and lepidopterous larvae of the - *Ephestia* sp (warehouse moths) and *Plodia interpunctella* (Indian meal moth).

The largest number of different species was detected in maize. Most species were detected by grain sampling and trapping. Non-detection by grain sampling was significant for some species and more insects were invariably found in traps than grain samples. High ratios, for insects in traps to samples, were recorded for *Cryptolestes* adults in wheat (25:1), maize (10:1) and *Tribolium* adults in maize (18:1). However, ratios were low for *Sitophilus oryzae* adults in maize (2:1) and *R. dominica* adults in both wheat and maize (1:1). Attractant effect lasted between three and seven weeks, depending on the:

- insect species;
- grain type;
- attractant dose; and
- environmental conditions.

Ninety percent of the insects found in wheat were *Tribolium confusum, T. castaneum, O. surinamensis* and *R. dominica*.

For *Tribolium* and *O. surinamensis* there were more insects in unbaited control traps than grain samples, more insects in attractant loaded traps than control traps but no significant differences in insect numbers for different doses of attractant. Relatively small populations of *R. dominica* did not respond to either trapping on its own (control) or addition of the attractant lure.

Oryzaephilus surinamensis and *S. oryzae* at 30.9% and 21.2% of the total, respectively, provided biggest trap catches in maize. Addition of attractant enhanced trap catches for *S. oryzae* and *O. surinamenis* in maize with significant differences between treatments (doses).

For the future

Most major beetle and weevil pests of stored grain responded to the parapheromone, made from a mixture of different plant extracts and formulated as a lure on cellulose fibre pads. The exception was *R. dominica*, with very small numbers appearing to adversely affect the results.

Loss of attractant effect, indicated by a fall off in catches during the last few weeks of the wheat trial, may be due to the onset of lower temperatures affecting attractant release profile from the lure.

Increased dose rate in the maize trial from 500 mg to 1000 mg or 2000 mg extended attractant effect of the lure.

Results from the wheat trial showed the attractant to be active at 100 mg for *Tribolium* and *O. surinamensis*, while the maize trial indicated 1000 mg as the optimum for good response from *S. oryzae* and *O. surinamensis*.

Use of this multi-species parapheromone attractant shows promise for enhancing trap catches and improving pest monitoring for major beetle and weevil insect pests of bulk stored grain.

HEALTH & SAFETY

Consultation on new vibration regulations

The Health and Safety Commission (HSC) has published two consultative documents on proposed new regulations and guidance implementing the European Physical Agents (Vibration) Directive. Hand-arm vibration is a major cause of occupational ill-health. Around 3,000 new claims for Industrial Injury Disability Benefit are made each year in relation to vibration white finger. The Courts have also awarded large sums of compensation for the disease in recent years including an estimated £3 billion for 165,000 ex-miners, and most recently £212,000 for a railway employee.

The Control of Vibration at Work Regulations will require employers to take action to prevent their employees from developing diseases caused by exposure to vibration at work from equipment, vehicles and machines. Two distinct types of vibration hazard are covered by the proposed Regulations.

- Hand-arm vibration affects people who use hand-held or hand-guided power tools and those workers holding materials that vibrate when fed into machines. Long-term exposure to high levels of hand-arm vibration can lead to a range of disabling conditions including vibration white finger, permanent loss of feeling in the fingers and painful joints in the hands, wrists and arms.
- Whole-body vibration occurs when people are sitting or standing on industrial machines or moving vehicles which transmit vibration and shocks into the operator. Long-term exposure to high levels of whole-body vibration is associated with pain in the lower back.

The proposed Regulations will specify daily levels of vibration exposure where employers will be required to take action to control risks (the exposure action values) and where they must prevent further daily exposure (the exposure limit values).

The Regulations must come into force by July 2005 to implement the European Directive on time. UK negotiators played a significant role in developing a much more practicable Directive than was originally proposed, particularly with regard to the following points.

- The original proposal included a whole-body vibration exposure limit value which would have placed severe restrictions on industry. The UK negotiated a substantial increase in the exposure limit value to a more acceptable and workable level. HSE is working with industry to collect more data on whole-body vibration levels but initial indications are that most agricultural and industrial work activities should be able to comply with the exposure limit value.
- The UK also negotiated a transitional period for the exposure limit values up to 2010 (with a further four years to 2014 for the agriculture and forestry sectors), for work activities where older machinery may be an obstacle to compliance.
- The UK also insisted on an option for averaging exposure over a week to allow high exposure on one or two days to be offset by low exposure on others. Substantial HSE guidance on the Regulations is also being put out for consultation. Much of the guidance reiterates messages in HSE's existing publications and stresses the importance of simple, common sense control measures to reduce exposure.

HSC Chair, Bill Callaghan, said: "We believe that the proposed regulations and accompanying guidance will provide a practicable and effective framework for eliminating vibration-related diseases. We have set out in the Consultative Documents some important questions on what the regulations and guidance say. We want to get this right and are keen to hear what employers, unions and others think. I hope people in the many industries affected by vibration will let us have their views on these proposals."

CONTACT

There are two separate consultative documents as the two forms of vibration affect distinctly different work activities. People are invited to comment by the closing date of March 31st 2004.
The documents are available, free as hard copies, from HSE Books, PO Box 1999, Sudbury, Suffolk, CO10 2WA. Tel: +44 (0)1787 881165. Fax: +44 (0)1787 313995. Web: www.hse.gov.uk/consult/index.htm
'Proposals for new Control of Vibration at Work Regulations implementing the Physical Agents (Vibration) Directive (2002/44/EC), Hand-arm Vibration (ref no CD190)' and, 'Proposals for new Control of Vibration at Work Regulations implementing the Physical Agents (Vibration) Directive (2002/44/EC) Whole-body vibration (ref no CD191)'.

APPRENTICESHIP CELEBRATIONS

High level apprenticeship take-up

Claas UK is celebrating a record take-up of its Agricultural Technician Apprenticeship, run in conjunction with Writtle College at Chelmsford, Essex. Now in its third year, a total of 10 students started the four-year Modern Apprenticeship in Agricultural Engineering course this autumn. The programme includes time spent working not only at the Claas UK headquarters at Saxham but also the opportunity to train at the Claas factory in Germany and, during the final year, work for three months in Australia or New Zealand.

The new intake of apprentices come from Claas dealers throughout the UK and it is especially notable that Seward Agricultural in Yorkshire have entered one student from each of their three branches, whilst R W Marsh and Southern Harvesters both have two students involved. Other participating companies this year include G.A. Vowles, Kirby Agricultural and J. Mann & Son.

"It is encouraging to see that we have students from Devon to Yorkshire," comments Jane Broomhall, Personnel Manager for Claas UK. "There is a shortage of skilled service staff in the UK and we are pleased that our dealers have taken the initiative to look to the future and make an effort to bring youngsters into the business by placing students on this course."

At the end of the course, the successful students will gain an NVQ Level 3 for an Agricultural Technician, aside from the experience gained not only from working in the UK and Germany, but also spending three months 'down-under'.

Ten students from six Claas dealerships have joined this year's Claas Agricultural Technician Apprenticeship run in conjunction with Writtle College at Chelmsford, Essex. With the ten above are their sponsoring dealers, plus Writtle College principal Professor Mike Alder (left).

FURTHER DETAILS

Jane Broomhall, Claas UK Ltd, Saxham Business Park, Saxham, Bury St Edmunds, Suffolk IP28 6QZ. Tel: +44 (0)1284 763100.

PUBLICATIONS

Timber for bridges and piles

The Building Research Establishment (BRE) is the leading centre of expertise on building and construction, and on the prevention and control of fire. One of the regular series of publications is the BRE Digest, partly funded by the Forestry Commission.

The most recent issue No 481 by Tim Reynolds, Geoff Freedman, and others is entitled: *Timber Bridges*. Timber is a highly versatile construction material, strong and lightweight, with tremendous ease of handling and workability. It is both attractive in its appearance and in its environmental credentials. Correctly selected it has good durability, particularly in relation to de-icing salts. Bridges made from wood also tend to exhibit a natural empathy with the landscape. For the bridge designer, using timber offers a multitude of possible bridge forms ranging from simple beams to glue laminated arches, trusses and space frames. Timber can also be used in conjunction with other materials such as natural stone, stainless steel and glass.

A previous publication, BRE Digest 479 *Timber piles and foundations* by Tim Reynolds, covers the use of natural conifer poles and sawn material for building supports, bridges and other flood prone purposes, and beach protection.

CONTACTS

Tim Reynolds, BRE, Garston, Watford WD25 9XX
or
Geoff Freedman, Forestry Civil Engineering, Forest Enterprise, Greenside, Peebles EH45 8JA

CROP PROTECTION

Tender trap set for pests in quest for new defences

Scientists are turning to sex as a weapon in the war against pests which damage millions of pounds worth of fruit and vegetable crops.

The government has approved a £1 million package of new research projects aimed at finding more natural alternatives to chemical pesticides for farmers and growers – several pesticides are being withdrawn in the UK following a European Union review.

Researchers in one project will target the apple leaf midge, a widespread pest which attacks orchards and nurseries, by designing traps containing female midge pheromones – substances given off to attract the opposite sex. This will lure male midges to a sticky end so that growers get an early warning of an impending invasion and can take measures to protect their apples.

Other projects include a study to combat clubroot, a disease which ruins plants like turnips, brussels sprouts and oilseed rape and costs industry around £30 million a year in lost crops. Lettuces, cabbages, leeks, blackcurrants and herbs are among the other crops which scientists hope to protect through new alternative pesticides and defence mechanisms which involve using natural enemies of particular pests and biological controls.

Food and Farming Minister Lord Whitty said: "Reducing reliance on pesticides is a priority, and we want to find alternative, more environment-friendly pest controls for farmers and growers. Science is important to improving the performance of our horticulture and agriculture industries, and the results of this new research should give them a competitive advantage and save valuable crops."

All the research is backed by money from the Department for Environment, Food and Rural Affairs (Defra), with some financial support from industry. Defra spends almost £13 million a year on research into alternative pesticide and plant protection.

FURTHER DETAILS

The projects were chosen for funding by Defra in an open competition seeking research proposals. Further information on these and other projects is available online at www.defra.gov.uk

ENERGY EFFICIENCY

Sustainable buildings task group

A high-level group of builders, developers, planners and environmental advisers will spearhead efforts to raise the environmental quality of buildings, Environment Secretary Margaret Beckett has announced.

The new Sustainable Buildings Task Group will pinpoint ways in which industry and government can work together to promote sustainable development through better environmental performance in new and existing buildings, and improve significantly performance on key issues including water, energy, waste and building materials such as timber. The group will look at incentives for innovation and how the planning system can help to spread best practice among designers, builders and other professions.

Mrs Beckett also launched a major new skills and training programme for heating installers to boost progress on energy efficiency highlighted in the government's Energy White Paper. Up to 70,000 people will be trained to ensure that when new, higher standards are introduced for more energy-efficient boilers in 2005 there will be a workforce able to fit them. The scheme will be run in partnership with the heating industry, Energy Saving Trust, and the Learning and Skills Council.

Mrs Beckett told a Better Buildings Summit that everyone in the construction industry, the financial sector and those who commission public and private buildings must play their part. "Everyone must be clear that business as usual is not an option. Most of us live in buildings erected long before we were born and our successors will have to live with the environmental consequences of the buildings we construct today," said Mrs Beckett.

"It is vital that we minimise harmful impacts for those who come after us. Buildings contribute almost half of the UK's carbon dioxide emissions and more than half of water supplied is used by households. The government's Energy White Paper sets out the energy efficiency and carbon reductions we need over the next 20 years, and the importance of better building standards to meeting our goals."

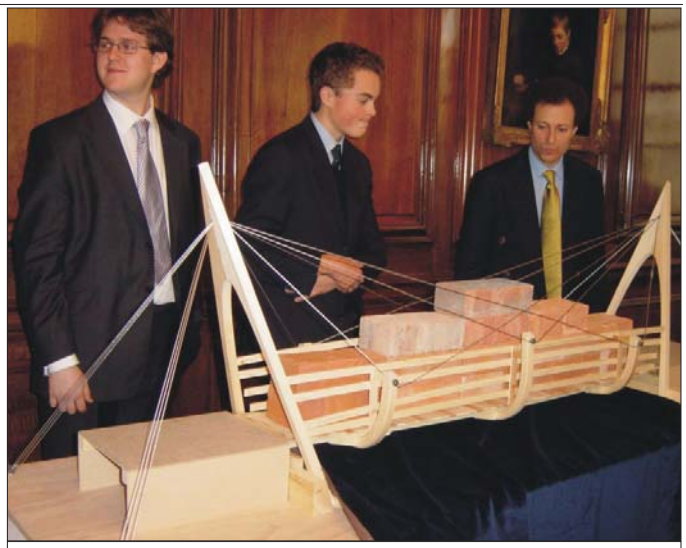
Mrs Beckett welcomed Deputy Prime Minister John Prescott's announcement that higher national standards on water conservation will be set – aiming to bring them into effect by 2005, alongside the review of energy efficiency provisions in the Building Regulations. "We want to ensure that the highest environmental standards are applied more widely," she added.

"Clients must demand more sustainable buildings. Financial institutions must back developers. We need sustainability at the heart of our skills and professional training. We need architects and designers to incorporate sustainability in their designs. Manufacturers must deliver efficient buildings services and fabric components. Builders must develop and market sustainable buildings, and we need consumers to demand those higher standards."

Mrs Beckett also welcomed the Carbon Trust's call for new proposals to find a cost-effective solution to the problem of solid wall insulation.

DESIGN AWARDS

Timber bridge design competition

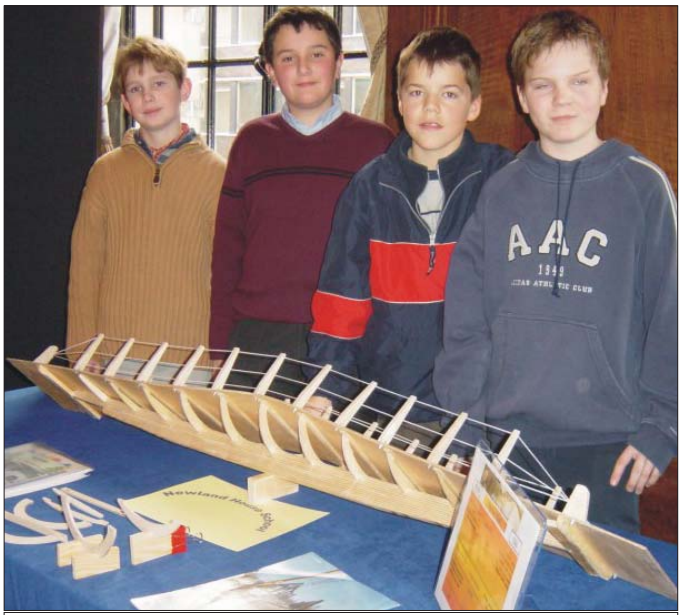


The overall competition winner and winning design for the 16-19 years old category with two of the three team members from Eton College, Berkshire and one of the judges.

To prosper, the UK timber industry needs high value markets for its increasing production. New uses are most likely to exploit timber's structural properties rather than its fibres. For too long, good, whole wood has been chipped up and stuck back together with toxic glues to form boards for use in building. As a natural laminate, timber has very good resistance to bending and shear and excellent bearing and compression capacities. These properties need to be utilised to add high value to this abundant raw material.

Unfortunately, the Engineers needed to spearhead this exploitation do not exist in abundant numbers, so one of the important parallel activities of this exploitation of timber is to train a new generation of competent Timber Engineers. Wood for Good, as an organisation, has spent the last three years promoting the virtues of timber for all sorts of uses and recently put its sponsorship weight behind a competition for schoolchildren to design a timber bridge. The intention was to encourage young people to utilise timber and thus take an interest, which may lead them to a career as a Timber Engineer.

The winning design in the 12-16 year old category with two of the four team members from Bishop Perowne CE High School, Worcester, and a surcharge loading from a judge's hand!



The winning design in the 12 year or under category with the team from Newland House School, Twickenham and the bridge tilted to show the underside construction

There have been many competitions of this kind over the years, run by many different organisations but this one was to be a little special and indeed it turned out that way. The competition was inspired by a 500 year old bridge design by Leonardo Da Vinci. It was to be a timber bridge of hundreds of feet span to link Turkey and Europe. Although it was never built, the Norwegians recently build one to a similar design in a place called Ås. It was hoped such a story would inspire youngsters to want to do the same. Another difference from the many other competitions was that, on this occasion, a judging team made up of professionals was invited, who would not only judge well but would interact in a constructive way with the entrants.

The team comprised, Kate Bellingham, President of the 'Young Engineers Club' and of Tomorrows World fame and Anthony Oliver, Editor of New Civil Engineer as the generalists, who were interested in the entrant's organisation and the interaction of the teams. The other three judges were specialist timber engineers: Ken Jones, a very experienced structural designer with the

consultancy Bernard Happold responsible for the impressive timber gridshells; Andrew Lawrence from Arup, the world famous consultancy renowned for the Sydney Opera House and the Millennium Bridge; and Geoff Freedman, from the Forestry Commission, a designer of small rural bridges and a specialist in Timber Engineering.

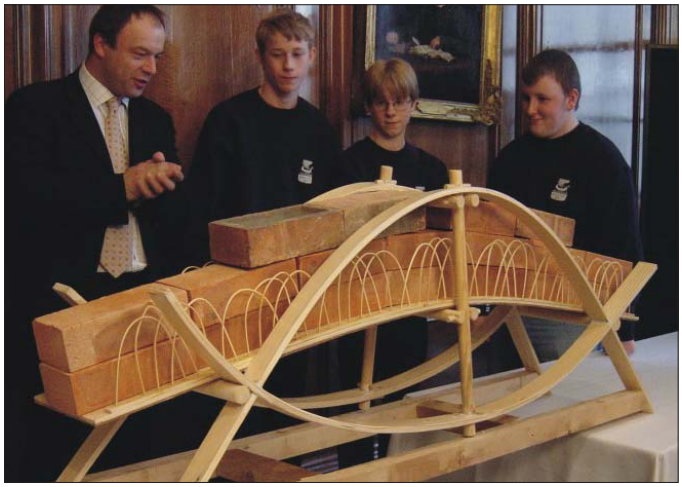
The runnerup design in the 16-19 year old category from St Cuthberts, Ampleforth

The competition rules were set out to make the entrants think full size although they would actually be building a 1/10th scale model of their design. They were instructed to go through the process of research and design and finally to build a model to be load tested. They were given the site credentials, the bridge span and width and a number of guidance notes on the materials which could be used apart from timber. There were three age groups ranging from 11 to 19 years and the rules were slightly less rigorous for the youngest entrants.

Of the130 sets of entry forms posted out, over 40 schemes were finally submitted. The Grand Final was held in the Brunel room of the Institution of Civil Engineers, 1 Great George Street, London on 16th December. The finalists were very excited to be in the home of Civil Engineering, under the watchful eyes of Telford and Macadam, some of the greatest Engineers and past Presidents of the Institution.

One model had been transported from Unst, the most northerly island of the Shetlands. The atmosphere was tense as the models were unwrapped and set up for display and the entrants prepared themselves for their interviews with the judges. While interviews were taking place the others were escorted around the Institution to sample the famous history. All of the contestants were treated to lunch and a ride on the millennium wheel while the judges made their decisions.

There were three category winners from the seven finalists and one overall winning team which would receive the prize of a visit the Ås Bridge in Norway. We were looking for originality and creativity and good design. We were confronted with a very high quality entry each deserving bonus points in certain categories. However the final design did stand out and, although there were technical reservations about how the towers and 'U' frames would be made, the entrants answered every question put to them in a way that proved they had not only thought about design and construction difficulties, but also planned for them.



The two runnerup designs in the 12-16 year old category from Baltasound Junior High School (top) and from Ampleforth College(bottom)

The overall winning design, and 16 to 19 year old category winner was from Eton. They used two sloping 'A' frames acting as suspension towers for cables fanning out towards the centre of the deck, providing an interesting cable pattern. The winner of the youngest group – under 12s – was from Newland House School in Twickenham and used a single laminated spine beam. The 12 - 16 year old winners were Bishop Perowne CE High School, Worcester with an ingenious double arch, one for dead load and another for live. The entry from Shetland was a very interesting double arch, featuring a right and upside down one. The structural action was difficult to understand but all of the structures stood up to the load test which took place in front of all competitors and judges.

All of the prizes, were presented by Nigel Griffiths the Construction Minister. This took place at a reception in the Institution during the evening of the Competition, to which 200 distinguished guests were invited. The models were well scrutinised and praised by some of the most important names in the construction industry, to the delight of the contestants. The competition was such an outstanding success that the sponsor, Charles Trevor of Wood for Good immediately announced that it will run again next year.

To sum up, the essence of the competition was captured by a team from Malvern Young Engineers Club, led by Richard Thornton. The team designed their bridge and then went to the forest, cut down a tree, made the cutting and planing tools themselves and produced their bridge in situ. They were Highly Commended and certainly captured the spirit of the day.

CONTROLLED SUSPENSION

Service creates added pressure for gas spring struts

A re-pressurising service for gas spring struts has been established by Midlands based Status Fluid Power Ltd. Designed as a cost-effective operation, the service is claimed to be much more economical than unit replacement.

The company can supply new gas struts if required or refurbish units for commercial operations e.g. transport companies, where their same day turnaround can prove invaluable by ensuring minimum off-road periods. They also offer a walk-in service where members of the public can have motor vehicle bonnet and tailgate struts re-pressurised while they wait.

Used widely for both domestic and commercial applications, the self contained power unit in gas spring struts provides controlled lift, lowering or counter-balance force wherever a cover, door or panel is either opened or closed. Loss of pressurisation can lead to safety or security breaches, and immediate rectification is recommended to prevent avoidable accidents or other losses.

A typical gas strut product that can be re-pressurised by Status Fluid Power Ltd as part of a full service

Typical applications include covers and guards on machinery, all aspects of the transport industry, including aircraft, boats, trains and all motor vehicles including farm equipment. Office machines, adjustable furniture, automatic opening windows and orthopaedic beds are also among high volume original equipment manufacturer (OEM) applications which utilise struts.

The strut must be removed from the host equipment and sent individually to Status Fluid Power' workshop. Work is carried out in a pressurised tube which can accommodate gas struts up to 1000 mm in length and 50 mm diameter. The level of pressure can be increased or decreased from an original pressure setting to provide operating conditions to suit customers' requirements. Pressures up to 1.8 kPa can be achieved for heavy-duty applications.

Status Fluid Power is also equipped to carry out repairs or modifications to gas struts. Rod length adjustments can be undertaken and a selection of rod end terminations, such as ball joints, can be fitted. The Company also operate a nationwide service with mobile engineers for the service, maintenance, inspection, repair and replacement of pneumatic and hydraulic equipment.

MORE INFORMATION

Further information is available on request to: Status Fluid Power Ltd, Unit 2, Coburn Place, Newland Street, Derby, DE1 1JT. Tel: +44 (0)1322 366552 Fax: +44 (0)1322 366232 E-mail: sales@statusfluidpower.com Website: www.statusfluidpower.com

PUMPS

New Trucraft dirty water pump

Spaldings have recently introduced a quality stainless steel dirty water pump into their extensive range of workshop equipment.

The pump is ideal for the fast movement of water around many farm applications including emptying pits, tanks and supplying emergency water supplies to livestock.

The unit has a maximum flow rate of 350 litres/min through two inch British Standard pipe thread (BSP) bore fittings and will draw water a maximum head of 6.5 m.

The pump is designed to pump solid material in suspension up to 35 mm diameter and for long life and durability the pump casing is manufactured from corrosion resistant stainless steel, with a stainless steel shaft brass impeller and durable cast iron impeller housing.

The powerful motor is water cooled and protected by a double lipped seal to prevent water ingress. Powered from any 230 V power source, the pump is supplied with a long 1 m cable for easy reach. The pump is also fitted with a float valve to prevent the pump running dry in shallow water.

Dirty water pump; ideal for movement of water around the many farm applications for which it is required

CONTACT

Contact: Spaldings (UK) Limited, Sadler Road, Lincoln LN6 3XJ. Tel: +44 (0)1522 500600 E-mail: marketing@spaldings.co.uk Website: www.spaldings.co.uk

LERAP 3 star rating for new air infusion nozzles

Sprays International, the international designer and manufacturer of innovative, high quality spray nozzles, has received Local Environmental Risk Assessment for Pesticides (LERAP) approval at the three star rating for its latest Pneu' Jet XL air infusion nozzle. LERAP low drift three star rating has been awarded to the six mainstream nozzle sizes in the Pneu' Jet range at the respective operating pressure range shown in Table 1. They are 015 green, 02 yellow, 025 lilac, 03 blue, 04 red and 05 brown, which are colour coded according to the International Standards Organisation (ISO) convention.

Table 1 Pneu' Jet air infusion nozzles; LERAP low drift 3 star rating recommended pressures

Pneu' Jet XL nozzle	*Operating pressure, bar*
PXJL - 015 (green)	2 only
PXJL - 02 (yellow)	2 - 2.5
PXJL - 025 (lilac)	2 - 2.5
PXJL - 03 (blue)	2 - 5
PJXL -04 (red)	2 - 5
PJXL - 05 (brown)	2 - 5

The PJXL 025 (lilac) is a brand new nozzle size appearing for the first time in this latest and upgraded Pneu' Jet XL range. The PJXL 01 (orange) is also available in the range. Farmers, growers, foresters and groundsmen using these high-spec, high quality nozzles, achieve that extra accuracy required to spray as close as allowable to sensitive field and plot margins, thereby maximising productivity without jeopardising the integrity of water sources and wildlife.

Pneu' Jet XL is Sprays International's latest air infusion nozzle. It retains the same application data as the original nozzles, but features a number of updates and improvements. These changes meet with the demands of Sprays International's customers around the world, who use Pneu' Jet air infusion nozzles to achieve maximum, cost effective application and control.

Salient features of the updated and improved range of low drift air infusion nozzles are:

- manufactured in polyacetal for maximum effective life through excellent wear and compatibility and stability in the presence of the widest range of sprayed chemicals
- full range of nozzles that extend from 01 to 05 sizes
- all ISO colour coded for easy recognition and appropriate use
- internationally recognised and used nozzle sizes for compatibility with all international nozzle holders and nozzle caps
- shielded air holes to reduce the potential for blocked jets in dusty application environments
- shorter overall length of nozzle body (26.5 mm) compared with nozzles in the original Pneu' Jet range.
- removable insert to allow for quick and easy cleaning.

A comprehensive website with detailed extensive information on pesticides can be found at www.pesticides.gov.uk, the home site of the 'Pesticides Safety Directorate'.

MORE INFORMATION

For more information contact: David Inseal, Technical Director, Sprays International Ltd, 29-31 High Street, Shoreham by Sea, West Sussex, BN43 5DD. Tel: +44 (0)1273 464449 Fax: +44 (0)1273 464277 Email: sales@sprays.co.uk Web site: www.sprays.co.uk

Disc option for Flatlift toolbar

Spaldings have launched a disc option cultivation toolbar to fit the company's market leading Flatlift subsoiler

The new toolbar option consists of four pairs of angled discs fitted to the same heavy duty spring loaded tine assemblies, as used on the existing toolbar these are independently suspended for accurate depth and contour control.

New toolbar option, using four pairs of angled discs fitted to same spring loaded tine as existing toolbar; cuttaway discs for greater cutting, mixing and inversion action in heavier conditions

The cuttaway 450 mm angled discs give a greater cutting, mixing and inversion action on stubble,.chopped straw and crop residues in heavier conditions than standard tines.

As the Flatlift legs shatter the plough pan across the machine's full working width and depth, the addition of the new toolbar, when used in conjunction with a spiked packer roller, enables the Flatlift to perform a complete single pass soil conditioning operation and cultivation system.

This saves a considerable portion of the costs, time and labour requirement of ploughing or other cultivation systems and also removes the need for further cultivation.

Users are then able to move from bare stubble or previously cultivated land, to a stale seedbed with drainage restored in one pass, optimising both cost control and timeliness of fieldwork. This ensures the immediate germination of volunteers and weed seeds. The new disc options can be ordered as a new toolbar, or separately to fit an existing Flatlift toolbar.

CONTACT

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SOIL TREATMENT

Mercedes-Benz Unimogs boost Chandler's lime spreading

A new Mercedes-Benz Unimog U300 is helping agricultural lime spreaders Peter H. & J. Chandler to meet challenging changes in their industry and remain profitable.

Changes within agriculture, including the diminishing number of farms and use of different soil treatments and growing aids means that only those contractors with fast, efficient and reliable vehicles are able to tackle the full range of work.

The Chandler business which has been using Unimogs since it was formed over 25 years ago, handles tasks up to 64 km from their Staffordshire/Derbyshire base. Fast on-road speeds, good fuel economy and an excellent track record of reliability mean that Peter Chandler and his son David are able to accept work on smaller farms that would not be viable using tractors or heavy trailers.

The family design and manufacture their own spreaders and hoppers, based on the Unimog chassis. Although it is a compact vehicle the new U300 is able to take upwards of a 5 tonne load of lime, which maximises efficiency.

"Customers like the vehicles we use," says Peter Chandler. "They are compact and manoeuvrable and the potential to damage land is greatly reduced, compared to the heavy tractors and trailers used in the lime spreading business."

The new U300 is being used as a replacement for a 14 year old U1150, and in tandem with a U140. "We were going to keep the U1150 because it has never let us down and it would have been brought in to service if we had a problem with the new U300 but there have been no problems at all. I think we will end up selling it, but I will be sad to see it go, it's been a loyal and reliable servant," Peter adds.

Off-road capability is vital; the new Unimog U300, whilst it is a completely new design compared to the U140, has proved to be exceptionally stable on all types of ground and has coped with the wettest conditions faced by the Chandler family. "It's a remarkable vehicle and a valuable part of the business in all weathers and on all ground conditions," David Chandler adds.

The Unimog U200's fast on-road speeds, good fuel economy and excellent track record of reliability mean that Peter Chandler and his son David are able to accept work on smaller farms that would not be viable using tractors or heavy trailers

CONTACT

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CONTROL SENSORS

The Sentinel-ESi Hydr02 combustion trim system from Marathon Sensors accurately measures oxygen concentration in the high moisture gas streams of fuel fired furnaces used in ethanol, food and feed drying applications

Improve combustion efficiency in fuel fired drying furnaces

In Cincinnati, Ohio, Marathon Sensors introduced the new Sentinel-Esi Hydr0_2 combustion optimising system for fuel fired drying furnaces. This extractive sensing system measures and controls oxygen content in gas streams with high moisture content, reducing fuel costs and harmful emissions. Good management of the combustion process can be critical in ethanol, food and feed drying applications.

The system optimises the drying furnace combustion processes by maintaining the most efficient air to fuel ratio. >

Accurate oxygen control delivers two important benefits: maximum energy yield from the fuel, and complete burning of both fuel and waste to minimise harmful combustion products such as NO_x compounds.

The $Hydr0_2$ sample preparation unit draws sample gas from the furnace and dries the sample before sending it to the Sentinel-ESi for analysis. The unit is capable of removing water from gas streams with dew points as high as 72°C while maintaining sample integrity. The Sentinel-ESi measures oxygen content from parts per million levels up to 12% and converts these measurements to industry standard 4 - 20 mA signals. These signals are then routed to the process control system where they are used to control oxygen concentration to the desired set point.

Depending on the application, typical extractive sensor life ranges from 12 to 24 months. Combustion trim systems from Marathon, extend product lifetime with a unique modular design that allows the sensing element to be replaced quickly and easily. Coupled with the system's low maintenance and operating cost, this design gives the Sentinel-ESi $Hydr0_2$ combustion trim system a lower life cycle cost than comparable units, without compromising performance.

Marathon Sensors, an ISO 9001:2000 registered firm, is a leader in the development of atmosphere sensors and instrumentation for the heat treating, power generation, glass and ceramic, chemical and petrochemical, steel reheat, and incineration industries. A member of the worldwide Halma Group, the company is based in Cincinnati, Ohio, USA, and has representatives and distributors around the world.

CONTACT

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SEED DRILL

Disc coulter Seedline drills for conventional and min-till drilling

Lynx Engineering has developed two new 3 m and 4 m disc coulter drills suitable for both minimal tillage (min-till) and conventional seedbed drilling. Designed to operate with a new or used Accord DA drill hopper and metering unit, the drills are compact and have a low draft requirement; in 24 coulter/3 m form it can be operated by a tractor of around 75 kW.

Both drills comprise hydraulically adjustable front levelling tines, two rows of staggered disc coulters, Lynxpaka tyre packer and adjustable following harrow tines. The coulter seed boots are hard faced for durability and designed to reduce the wear associated with fast min-till operating speeds. Hydraulic bout markers are also fitted.

In work, the weight of the drill rests upon the closed spaced triple braid Otico tyres of the Lynxpaka unit. The tyres are extremely robust and made to withstand operating speeds as high as 10 km/h. This is of importance to those seeking to use a 'Seedline' drill in min-till applications.

From the outset, the drills design brief was to offer flexibility and economy, but not at the expense of seed placement accuracy. Good consolidation, to remove the need to roll post drilling on most soils, was also a priority.

New Seedline 24DC disc coulter drill from Lynx Engineering; designed to operate with a new or used Accord DA drill hopper; compact with a low draft requirement

Of equal importance, the ability to use a popular hopper and metering unit can mean existing power harrow drill combination owners can use part of their existing system with the new drill.

Lynx Engineering is a rapidly growing specialist agricultural company, working with farmers throughout the UK. Its offers front linkages to fit all tractors front pto facilities. It also offers an extensive range of presses for use in front or rear of tractors and in conjunction with other implements. Lynx is also an importer for the 'Stoll' range of front loaders. Working from a new industrial unit near Rugby, it supplies equipment through a UK distributor network.

CONTACT

Contact: Nick Ewbank, Lynx Engineering, Wharf Works, Long Buckby, Northampton, England, NN6 7PP. Tel: +44 (0)1327 843215 Fax: +44 (0)1327 844341 E-mail: info@lynx-engineering.co.uk Website: www.lynx-engineering.co.uk

HEALTH & SAFETY

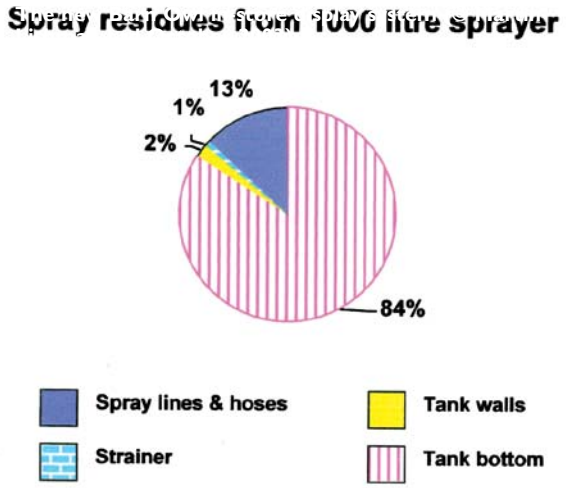
‘Hardi Clean’ ensures thorough wash down

John Wesley stated that ‘Cleanliness is next to Godliness’, a comment that could be seen as particularly apt at present when so much attention is being paid to sprayer cleanliness and the role this has within ensuring that the ‘Voluntary Initiative’ is a success.

Recent research conducted by Professor Paoio Balsari of the University of Turin indicates that typically when finished spraying, an ‘empty’ sprayer will still contain up to 4% of its tank capacity. As the chart alongside shows, a 1000 litre sprayer could have as much as 77 g of residue left in it, with as much as 65g remaining in the lines and hoses.

In addition, research conducted at Harper Adams shows that when spraying, up to 600 ml/h of spray can collect on the sprayer for every 1 litre/ha applied. If the sprayer is stored outdoors, this could wash off in a rain shower and is an indication of how thorough and effective sprayer operators have to be, when it comes to cleaning their machinery.

Recent research indicates that a sprayer with a ‘spent’ load will still contain up to 4% of its tank capacity



To aid this Hardi has introduced a new cleaning agent, ‘Hardi clean’, that is designed for use both on the inside and outside of the sprayer. Added to the clean water tank at a rate of 500 ml per litre, it is specially formulated to remove pesticide deposits and other debris, including oily substances, from the tank, booms, hoses and nozzles.

By ensuring the sprayer is thoroughly clean both inside and out, ‘Hardi Clean’ not only reduces the, risk of residue pollution from rainwater run-off, but will also help prevent cross contamination between non-compatible chemicals when the sprayer is next used, and prevent downtime caused by blocked nozzles.

‘Hardi Clean’ is available from all Hardi and Cooper Pegler dealers and costs £30 per litre.

CONTACT

Contact: Chris Hagen, HARDI Ltd, Unit 1 Europark (A5), Watling Street, Clifton-upon-Dunsmore, Rugby, CV23 0AQ. Tel: +44 (0)1788 861144 Fax: +44 (0)1788 860450 E-mail: cah@hardi-uk.com Website: www.hardi.co.uk

FLAIL CUTTERS

New long reach Heron

BOMFORD Ltd has introduced a new long reach flail cutter, the Heron, designed to meet the specific needs of those involved in waterways’ maintenance and other situations necessitating this size of machine.

The new Heron has a nominal reach of around 9.2 m from the centre of the tractor (dependent on make). A particular feature of this machine is its reduced weight when compared to other machines in the market. This is important, if tractor and cutter stability is to be maintained and also to ensure that PUWER 98 and tractor gross loading regulations are fully complied with.

New long reach flail cutter designed to meet increased requirements for waterways’ maintenance, embankments and other uses involving a reach of up to 9.2 m

The Heron features a telescopic second arm for extra reach and stability, which incorporates Bomford’s well proven wear pads, that can be adjusted from the outside. It is fitted with the Bomford Pro Cut flail head, the cowl of which is manufactured from high tensile steel for durability and has a spiral rotorshaft that can be fitted with a variety of flails.

The rotor is powered by a piston drive hydraulic pump developing 54 kW and a load sensing secondary pump which powers the remaining hydraulic circuits. The hydraulic system is powered by a 2.8 ratio cast gearbox driven by a 1000 rpm pto. The hydraulic system is served by a 250 litre hydraulic oil tank which is fitted with an oil cooler, to ensure optimum operation in all conditions.

All the main machine functions are controlled using an armrest mounted digital control unit (DCU). This provides fully proportional joystick control over the arm lift, reach and head angle. The slew and tele-

scopic functions are controlled using fingertip buttons on the top of the joystick and remaining functions such as, rotor stop/start, head float, etc, are all on a separate unit that can be suction pad mounted wherever is most convenient.

The Heron is simply mounted on the tractor using a subframe connected at mid-points on both the side frame and rear axle of the tractor. This subframe incorporates a pivot point, so that as the reach arm moves, any transitional loadings to the tractor's engine or transmission are eliminated. When not required, the Heron can be quickly dismounted at the Kingpost, leaving the subframe in place, and a jacking system is fitted under the Kingpost to simplify this task. Likewise all the hydraulic connections are also disconnected at this point.

CONTACT

Contact: Chris Tucker, Bomford Turner Ltd, Station Road, Salford Priors, Evesham, Worcestershire, WR11 8SW. Tel: +44 (0)1789 773383 E-mail: ctucker@bomford-turner.com Website: www.bomford-turner.com

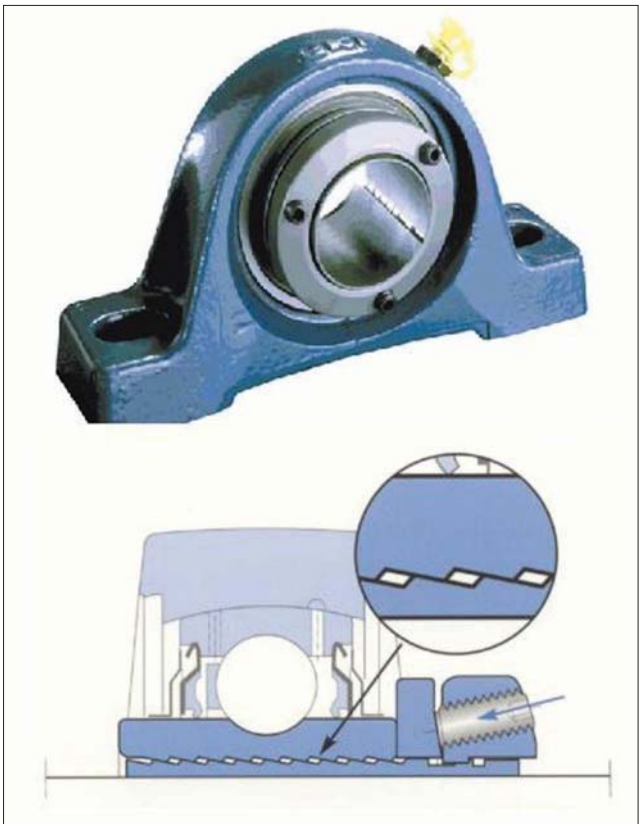
LOCKING SYSTEMS

Faster field servicing with SKF ConCentra locking systems

SKF has developed a locking device called SKF ConCentra that can be used for locking rolling bearing units and other components that are to be mounted on a shaft. This unique locking method combines simplicity with reliability and minimises the potential for incorrect fitting. This results in a longer bearing lifespan and reduces the chance that components loosen and damage adjacent parts.

Unlike other fastening systems, when using SKF ConCentra products, the selection of high precision shafts is not necessary. SKF ConCentra can be used on standard, cheaper shafts, yet still delivers the same operational quality.

Supplied with each unit, an intelligent Allen key, with a built-in torque indicator, allows SKF ConCentra to be quickly assembled with a predetermined torque. As the assemblies are locked concentrically, there is almost no surface corrosion which makes it easier to loosen the locking device when components need to dismantled from the shaft. This makes SKF ConCentra ideal for the growing demand to reduce the time needed for field servicing.



SKF has developed a unique locking device called SKF ConCentra which combines simplicity with reliability when fixing components on shafts; sawtooth locking principle (above)

SKF ConCentra utilises a thin walled sleeve, where the profile on one side resembles the teeth of a saw. A corresponding sawtooth profile in the bearing bore, or in the component which is to be attached to the shaft, ensures that when these two sets of saw teeth mesh together, the locking function is achieved.

The saw tooth profile has allowed SKF to make the sleeve so thin walled that the products can be fitted according to the original boundary dimensions i.e. a 'drop-in' replacement. This also gives downsizing possibilities for original equipment manufacturer (OEM) customers, as competing sleeve designs usually require a higher dimensioned size to complete the fitting.

Initially, two SKF ConCentra units will be available, the SKF ConCentra Roller Bearing Unit, fitted with SKF Explorer bearing and the SKF ConCentra Ball Bearing Unit, a ball bearing unit with a slightly spherical capacity. For many applications, both these units can be regarded as being lubricated for life.

CONTACT

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PEST CONTROL

Allman grain store liquid pesticide applicator

Dust formulations of insecticide were traditionally used to treat cleaned grain going into store however, dusts are difficult to apply evenly, hazardous to handle and leave inert solid residues on the grain. Insecticides formulated as liquid are easier to handle and offer superior coverage as sprays, with deposits and residues that will eventually disappear. Attempts to treat grain after it has been loaded into store will result in superficial protection only, allowing infestations inside the bulk or grain heap to escape. Treatment of the grain while 'spread out' on the conveyor during loading is the only way to ensure effective coverage and protection.

The Allman 'Grain Store Liquid Pesticide Applicator' has been custom-designed for easy and effective treatment of conveyor-borne grain going into store. This portable spraying equipment comprises a viton diaphragm pump, with in-line filter, driven by a single-phase electric motor. It is designed to apply liquid formulations with a range of viscosity and over relatively low but steady flow rates of 0 - 200 litres/h.

The applicator is fitted with pressure gauge and a calibrated flow meter, the latter ensuring easy and automatic calibration of the unit. Purchasers are asked to identify the flow rate to be used, so that the appropriate flow meter can be provided. Incorporation of a flow meter as well as a pressure gauge also means that the operator is immediately alerted if the system or nozzle becomes blocked, when the flow meter immediately drops back to zero.

Portable spraying equipment; designed for easy and effective treatment of conveyor-borne grain going into store

Application is via a 10 m delivery hose, which is attached to a single swivel nozzle mounted on a supporting bracket. The applicator is placed on the ground and the bracket mounted nozzle unit secured to a suitable frame or mini scaffold displayed above the grain conveyor. The applicator is supplied with a range of small flat fan nozzles to provide a uniform screen of spray across the conveyed grain. Three metres each, of suction hose with suction filter and return hose, provides a steady supply of product simply sucked into the unit. The return hose ensures constant agitation and mixing, in the product supply container. The unit is easy to move around, using a built-in carry handle and can, therefore, be re-sited with minimum disruption.

Use of pesticides in enclosed storage situations is particularly hazardous. Recommended and stipulated full protective clothing and safety equipment, including coveralls, chemical resistant gloves, footwear and aprons, face masks, face shields, goggles and respirators, must be worn and used when handling, mixing and applying all chemical pesticides.

CONTACT

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Britain's hardest working handler?

A John Deere 3200 telescopic handler has clocked up more than 4000 hours during its short two year working life at Cornwall Farmers' feed blending plant in Truro. In that time it has handled an incredible 140,000 tonnes, mixing and loading a variety of different ingredients.

The feed mill currently uses two of the 75 kW 3200 handlers to handle an annual output of about 35,000 tonnes. At busy times, both machines work 12 hour days on average, moving each tonne of material a total of four times before the blend emerges from the unloading elevator. The whole mill and blending plant relies entirely on the handlers - if they stop, production stops too.

Since its arrival in May 2001, the original machine has never missed a beat. It has never broken down and, despite handling nearly 35 tonnes every engine hour, it has an impeccable repair record. Both handlers are totally standard apart from being fitted with 50 cm wheels and industrial tyres.

"Total maintenance costs (excluding routine services) for the two year old 3200 are just over £1385. This includes a bill for £810.65 for one repair and replacement to the bucket's front Z linkage", explains Brian Tripcony, Cornwall Farmers' Machinery Manager.

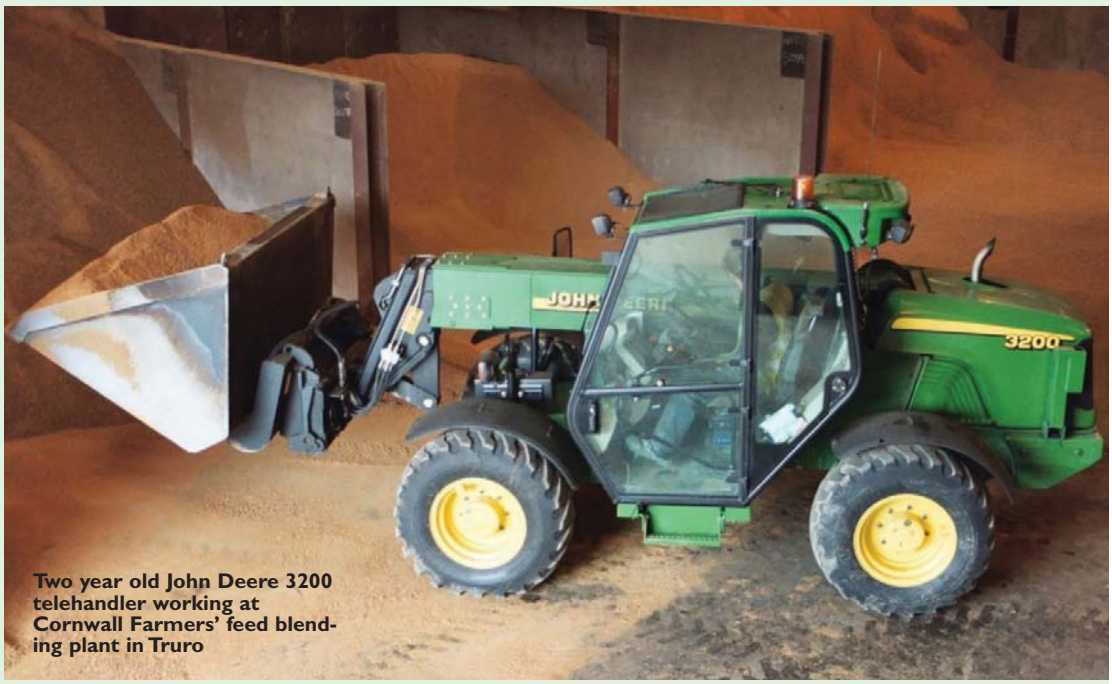
"Both handlers are fitted with one tonne capacity buckets and work continuously with full loads and fast cycle times. It is inevitable that in such demanding conditions they will wear. The mill management takes health and safety issues very seriously and requested that we replace the linkage, bushes and some pins to return them to as new condition. This kind of work greatly accelerates wear and it would be unfair to consider this as normal - the workload is extraordinary.

"Also, we must put this bill for two years' work in context with the machine it replaced. That cost more than £11,000 for repairs in a single year on exactly the same work. The mill manager simply could not tolerate that kind of expenditure."

"Admittedly the handlers are meticulously maintained and rarely go outside the mill. Nonetheless, the operators clean them every week and book services early, so they are carried out at the correct hourly intervals. The machines are spotless - there is not a mark or a nick on them."

"The handlers are a real credit to their operators," says Angela Williams, production manager at the Truro mill. "It is amazing to watch them at work, tip-toeing the machines around each other - they are extremely skilled. There is no doubt the handlers and drivers are vital to our operation."

All the blend ingredients come in bulk lorries that tip their loads directly into separate bays in a vast warehouse building at the site. As orders for feed come in, the operators are given a list of ingredients - like a large scale recipe - and use the loaders to scoop up the one tonne bucketfuls that are dumped in the mixing area. Ingredients are precisely measured using the handlers' on-board RDS weighers (RDS are manufacturers of electronic measuring equipment). With all the feed ingredients in the mixing bay, the handler then lifts and turns them over. Following this, the feed is loaded into the mollassing and mixing system, where it is mixed again before being transferred to another bay from where it is relocated into one of 14 finished feed bays. The handlers then put the feed into a holding bin, ready to be transferred to the farm delivery lorries.



Two year old John Deere 3200 telehandler working at Cornwall Farmers' feed blending plant in Truro

MORE INFORMATION

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Land Use and the **Environment -** Delivering Solutions

Opening address - Baroness Young, CEO Environment Agency

Chaired by **Professor Brian Legg**, *Director of NIAB*
Morning plenary session speakers include:

- **Professor Dick Godwin** - *Cranfield University - Silsoe*
- **Professor Christopher Wathes** - *Silsoe Research Institute*
- **Tim Rollinson** - *Director Forestry Group - Forestry Commission*
- **Chris Bourchier** - *Head of Rural Estates - Crown Estates* - will sum up the morning session

The afternoon sessions (two each in parallel) will allow more detailed consideration of the solutions proposed. There will be three twenty minute papers in each session.

Parallel Session 1
- **Livestock**
- **Amenity/Sport**

Parallel Session 2
- **Crop Production**
- **Forestry**

Chairman
- **Prof Christopher Wathes**
- **Peter Redman**

- **Prof Dick Godwin**
- **Geoff Freedman**

IAgrE Annual Conference May 13th 2004

Venue: Royal Agricultural College, Cirencester

***The Conference*:**

For most of the last century land use systems were focused on meeting the needs of society through the economic production of food, timber and other raw materials. During the closing decades there was an increasing realisation that this policy brought with it some negative consequences for the environment in all its forms.

However science, technology and engineering in particular have been used to both to alleviate and eliminate environmental damage through the development of new technologies and by informing improved practices.

This Conference aims to highlight the most significant of these developments as applied to the production of crops, livestock and forestry in the United Kingdom in response to the challenge from Baroness Young who will set out the areas of most concern in the opening address. Chris Bourchier will conclude the morning session by assessing the solutions proposed from the perspective of a major land owning interest.

In the afternoon delegates will be able to join more specialist groups to work on the concepts in more detail.

Under the chairmanship of Professor Brian Legg, this conference will provide a unique opportunity to be informed about the full spectrum of developments and hear the reaction from a broad cross-section of interests and expertise. It will point the way forward to the most environmentally sensitive systems of production from the land and the technologies that can be used to create and enhance its amenity value.

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