

PUBLISHED BY THE NATIONAL ASSOCIATION OF CIDER MAKERS

# growers update

Spring 2007

## Apple Ermine Moth

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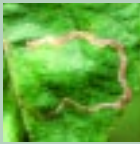
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# First Impressions of using a Gwazae Deep Probe Aeration Machine in Orchards

For several years contractor Tony Brazier had been looking for a machine to de-compact soil by injecting compressed air into the ground.

He had seen a simple machine, the Robin Dagger, using this technology working in ornamental trees, but it was a single shot device, far too slow and consequently uneconomical for orchards.

What was needed was this same technology but working continuously behind a tractor. Such a machine did not exist on the market so Tony was thinking seriously about designing and making one.

Then one day a friend visiting the Irish Golf Course show in Dublin saw a video of what appeared to be just the machine that Tony was looking for.

This turned out to be the Gwazae Deep Probe Aeration (DPA) machine from New Zealand which, ironically, had originally been developed for

orchard work before being re-packaged as a golf course machine!

Promising results were being reported by the users in New Zealand, including improved tree vigour and increases in yield. Deep pans were being broken and all by a machine working at the rate of several acres per day.

Following a timely call to the European importer of the equipment, Keith Kensett, a demonstration was arranged in April 2006 at Lower Hope Estate where the prototype machine was used for the very first time in England. Several growers were in attendance, including cider fruit producers who nearly all expressed a keen interest in the DPA technology after seeing the machine demonstrated.

This was the sign that Tony needed, so, following that demonstration, he placed an order for the Gwazae DPA machine and set about

forming a company, Underbuster Ltd, to contract the use of it out to local growers.

Following the demonstration at Lower Hope, Bulmers invited Keith Kensett and the newly formed Underbuster Ltd to show the prototype machine at their Open Day at Martley in June 2006. This they did and several growers expressed interest in trying out the de-compaction and drainage ability of the DPA technique in their orchards. Promises were made to these growers to follow up this interest when the new machine would arrive in the autumn.

The Gwazae arrived in October and was quickly put to work in the cherry orchards at Lower Hope. The ground was rock hard following the very hot dry summer. Some difficulty was encountered in penetrating the hardest parts of the compacted soil.

However, following a visit by the designer of the machine, James Elliot, the Gwazae was fine tuned after which it performed excellently. After discussions with James the machine was modified so that the down stroke can be recycled where the ground is too hard to penetrate first time. In this way even the hardest pan can be broken through.

The machine was then put through its paces during the months of November and December at the various cider orchards belonging to the growers who had approached

us at the Bulmers open day. In general the areas treated with the machine were those with problem trees, or areas which were either too wet or too dry.

Most of the results of treating these areas will not show until, at least, next summer, and we all await these results with great interest. However even now, in February, growers are already reporting improvements in dryness in the treated areas.

Another area where almost instant results can be seen is in the treatment of standing water. We have treated wet areas on headlands, flooded football pitches, golf putting greens, etc, where quite surprising results can be achieved.

As an example of this see photos fig.1 and fig.2. These show one of the headlands of

an apple orchard just before passing over it with the Gwazae machine. The second photo shows the same area four hours later.

The machine has now been fitted with an additional liquid /granular injection unit, which will allow us to place nutrients, beneficial fungi, seaweed extracts, etc, immediately around the roots of trees, bushes, etc. at the same time as aeration.

Trials with these materials, especially mycorrhizal fungi to combat phytophthora will be started at Lower Hope early in the spring.

Other areas in which the machine has worked over the last four months include raspberries, blackcurrants as well as golf courses, racecourses and football pitches.

All in all, a versatile and fascinating new technology.

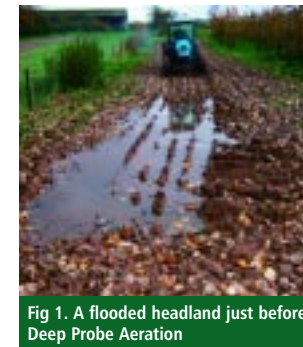


Fig 1. A flooded headland just before Deep Probe Aeration

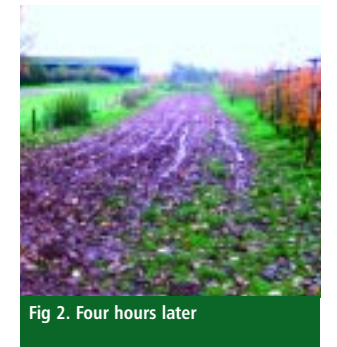


Fig 2. Four hours later

To contact Underbuster Ltd, please use the following:

For sales telephone **Alf Ganderton** on **07836 083053**, or for technical assistance telephone **Tony Brazier** on **07974 526836**.

If you know of someone who may be interested in receiving Growers Update, please email Katie Phipps at [Katie.Phipps@s-n.com](mailto:Katie.Phipps@s-n.com) or call 01432 294258

We are pleased to send a copy to anyone with an interest in cider and orchards, so please put forward their name and full postal address.

# Apple Ermine Moth

## *Yponomeuta malinellus*

This species of moth is commonly found throughout the UK and can be tolerated in low numbers, especially in heavy crop years as, even though the webbing tents are very obvious, few fruit are affected unless populations and the number of webbing tents are very high. The 'normal' level of pests-versus-pest predators/parasites in a cider orchard is fairly well balanced, and there are predators for this moth. Where 'extra' broad spectrum-insecticides are used to control a specific problem species, such as blossom weevil, rosy apple aphid, sawfly, leaf miner or scale insect, this balance of pest predators/parasites can be upset, leading to a 'population explosion' of one or more pests. Apple ermine moth is a pest that will exploit such an imbalance, and numbers can build rapidly requiring careful control until the pests-versus-predators/parasites balance has recovered. It is interesting to note that the pest is seldom seen in commercially sprayed dessert-apple orchards, as regular applications of insecticide for other pest species incidentally control this moth species.

Before any specific additional insecticide is used, you should

carefully assess pest levels and only apply controls if thresholds are reached or, as in the case of apple ermine moth, history dictates; that is if levels were high during 2006 it is fairly safe to assume that the problem will be worse in 2007. This assessment of pests must take into account crop levels, likely returns, and the economics of treatment generally, both to the value of the crop and the 'natural balance' of the orchard. If you are in any doubt, advice should be sought from a BASIS registered top fruit advisor.

The adult moths emerge from pupa concealed in the protective webbing in July/ August, and eggs are deposited on the tree bark in rafts, often on second year wood, in high numbers—up to 80 in a single raft or egg mass. The eggs are yellowish at the time of laying but quickly fade to the colour of bark, making them almost impossible to detect. The egg mass is covered with a protective gelatinous coating, making control almost impossible during this stage.

Eggs hatch in the autumn, although the emerged larvae over-winter below the remains of the egg mass, finally emerging to feed on leaf tissue at bud-burst,

during which time they will enter the leaves and feed in 'blotch' type mines. Soon after, when they reach the second instar stage, they feed externally on leaves and flower tissue within a communal silken web spun over the tips of branches. Successive webbing occurs, forming a large area of web, which can cover the entire branch in severe infestations. The larvae pupate around June in groups within the protective web and the resultant pupa are protected by a whitish cocoon.

Damage from larger populations can result in defoliation, in turn leading to a cessation of fruit development and loss of fruit. Defoliation can also lead poor bud set for the following season and to a general loss of tree vigour in subsequent years after an attack. Moderate populations can result in some loss of crop from larvae feeding directly on the developing fruit.

The accurate timing of control is vital and should be applied when the larvae are at a vulnerable stage of their life cycle. Insecticide would be best applied as early in the season as possible, when the larvae are smallest and before many predator species return to the



© Kevin Workman

orchard from their over-wintering sites, such as hedgerows, windbreaks and woodlands, etc. Controls can be applied at either bud-burst, and can coincide with insecticide applications for blossom weevil, as the larvae feed on developing tissue but before they enter the leaf; or applications of insecticide can be applied around flowering, at pink bud or petal-fall, before webbing protects the larvae. With careful pesticide choice, applications made either side of blossom may also be useful in controlling sawfly, aphid or other caterpillar species. Once a webbing tent is formed, the developing larvae are well protected from pesticide applications.

Insecticide choice will depend greatly on the levels of other pests present needing control and application timing. Broad

spectrum insecticides such as Cleancrop Pylchlores (chlorpyrifos) are best used early in the season, as they will give some control of blossom weevil and they are also most likely to impact predator species. Specific insecticides such as Runner (methoxyfenozide) or Dimilin (diflubenzuron) can be utilized later as they are generally safer to beneficial insects. Pyrethroid insecticides such as Gyro/Talstar (bifenthrin) or Decis (deltamethrin) should be avoided, as these products are very harmful to beneficial insect species. Application of insecticides should always be avoided during the blossom period to protect beneficial insects, such as bees.

As this pest can be difficult to contact with pesticide due to its association with silky webbing throughout its life cycle, higher

water volumes should be used during application and the addition of a wetting agent, such as Paramount, would prove beneficial.

With careful reasoned product choice and application, 'newer' pest species can be maintained at a tolerable level while preserving and promoting the biological diversity of an orchard environment, economically safeguarding maximum yields.

**Kevin Workman** 07802 981080



# Effects of water on pesticide performance

The goal when applying any pesticide is to optimise its effects – applying the correct rate at the correct time.

The tools to achieve this aim are basically the pesticide, the application machine, the operator and water as the carrier. Normally a great deal of attention will be given to the first three elements, but often, the water is neglected, even though mineral content and pH can have a significant effect on many herbicides and some insecticides.

Natural waters usually contain ions of calcium, magnesium and iron. The degree of water ‘hardness’ is a measure of the concentration of these ions in the water, usually expressed as parts per million (ppm). Water with less than 50 ppm is considered ‘soft’ whereas 50-100 ppm is medium and 100 ppm plus is ‘hard’. Water with a level above 250 ppm is considered too objectionable to drink.

Where hard water is used in the spray mix it may affect certain salt-formulated herbicides, for example Glyphosate, and where ponds are used as a water source,

these generally have high levels of dissolved solids and organic matter which may further reduce the activity of such as glyphosate and paraquat, and contribute to excessive nozzle and pump wear.

Water conditioners can be added to the tank before the pesticide, to ‘lock up’ the ions which may interfere with the pesticide performance.

Measurement of acidity or alkalinity of a solution is by way of a scale 0 to 14, whereby a pH 7 is considered neutral; any level above 7 is alkaline (high pH) and any level below is acidic (low pH).

Some pesticides can decompose rapidly in water with a high pH (greater than 7). If a spray mix stands for several hours before use, much of the active ingredient may be neutralised by a reaction called Alkaline Hydrolysis, whereby the pesticide molecule is converted to an inactive form. Generally, the more alkaline the solution, the faster the rate of decomposition, in fact every pH point increase can multiply the rate of hydrolysis by a factor of 10. The susceptibility of the pesticide, the length of time the

pesticide is in contact with the water and the temperature of the solution, will also affect this process.

A pH meter is probably the most accurate method of determining water pH although a test kit such as those used for swimming pools or even litmus paper can give a useful indication.

Invariably the ideal pH for spraying pesticides is slightly acidic at pH 4-6, but there are exceptions and care should be taken to read the product label fully to establish whether there are pH restrictions.

As a guideline: -

**pH 3.5-6.0** is satisfactory for most spraying operations and storage of the solution for up to 24 hours in the spray tank.

**pH 6.1-7.0** is acceptable for immediate spraying of most pesticides, however the solution should not be left in the tank for more than 2 hours as there is a risk of loss of efficacy.

Above pH 7.0 problems can be

Name	Half-life at different pH		
2 4-D	Stable at pH 4.5 – 7		
Captan	pH 5 = 32 hours	pH 7 = 8 hours	pH 8 = 10 minutes
Chlorothalonil (eg Bravo)	Stable over wide pH range		
Chlorpyrifos (eg Equity)	pH 5 = 63 days	pH 7 = 35 days	pH 8 = 1.5 days
Dimethoate	pH 4 = 20 hours	pH 6 = 12 hours	pH 9 = 48 minutes
Fluazifop-P-butyl (eg Fusilade)	pH 4.5 = 455 days	pH 7 = 147 days	pH 9 = 17 days
Paraquat (eg Gramoxone)	Not stable in pH over 7		
Pendimethalin (eg Stomp)	Stable over a wide range of pH		

Source; Loveland Industries Inc. 11/91 and Wilbur-Ellis 3/94

expected with some materials. Where high pH is a problem it can be reduced by addition of a ‘buffering’ or acidifying agent. It gets to work immediately at time of mixing, continues whilst held in the spray tank and does not stop until the water has evaporated from the spray droplet. The buffering does not normally affect the residual activity of the pesticide.

‘Half-Life’ is the time taken for one-half the amount of pesticide mixed in the water to degrade. Each half-life that passes reduces the amount of pesticide in the water by one-half, ie. 100% to 50% to 25% to 12.5% and so on. Above are examples of commonly used pesticides and their half-life values. These values are generalised estimates but give a good indication of performance variability.

To summarise, it is important to know the pH and mineral content of water used with a pesticide and the susceptibility of the pesticide to hydrolysis. Where necessary the water pH should be adjusted to the optimum level.

Whenever possible, pesticides should be mixed just prior to application, and only the volume that can be used at any one time.

Always read the pesticide label.

**Brian McCarthy  
H L Hutchinson**

*Hutchinsons fruit agronomists advise cider growers in the West Midlands, Wales and the South West and can be contacted via their Ledbury depot on 01531 631131 or ledbury@hlhld.co.uk*

## ANNOUNCEMENT

# New Arrival

Congratulations to Bulmers' Fruit Office Manager, Gill Turner, who gave birth to baby Tara Grace on 21st January.

We are sure you will join us in sending your very best wishes to Gill, husband Mike and Tara.

# Leaf Miner a Major Worry?

*UAP agronomist Kevin Workman reports on a new threat to Cider apple production.*



© Kevin Workman  
Phyllonorycta blancardella adult on a trap

Leaf miners have been a common sight in British orchards for years, however, a newer arrival is giving rise to some concern. The micro moth species *Phyllonorycta blancardella*, or Spotted Tentiform Leaf Miner (STLM) is a common pest in the apple production areas of the USA. More recently this pest has caused problems in some English orchards and with a limited range of effective pesticides available coupled with minimum spray programs commonly used in cider trees, it could become a major pest of cider orchards in the future.

STLM appears in all the major apple production areas of England and is regularly spotted in the Cider orchards of Herefordshire and surrounding counties, but as yet it has only been a problem on a handful of sites in East Anglia and Kent. The main concern is that, with ever increasing pressure to use specific insecticides, previously unknown or minor nuisance pests will become more of an issue in years to come. STLM excavates a relatively large area,

giving rise to a brown patch in the leaf, unlike other species of leaf miner such as *Lyonetia* and *Liriomyza*, which cause a narrow winding 'leaf mine'.

*Phyllonorycta blancardella* overwinters as a pupa in fallen leaves. The resultant adults from the over-wintered stage emerge around May and lay singular eggs on the lower leaf surface. These hatch and quickly enter the leaf where they remain, feeding on the cells, until they pupate some 4-6 weeks later and emerge from the leaf, as an adult after 2-3 weeks. Usually a second generation occurs during July, with a final stage occurring during September. The pupa casing is left protruding from the mine after emergence.

Damage may not look significant - a brown 'dead' patch on a leaf where the inner cells have been removed during feeding, often with a darker area which is a frass deposit. In low numbers on a tree, this is not significant, but where high numbers of the moth exist, there can be in excess of 8 mines in a single early leaf which will seriously affect photosynthesis processes and the leaf's function as an energy factory during early fruit development. Later generations do revisit leaves used at an earlier stage and, in areas of high populations, it is not uncommon for some leaves to be almost entirely brown around harvest time, inhibiting the

development of this season's fruit and affecting the leaf's ability to feed next year's fruit bud. Where high numbers of mines exist in a single leaf, premature leaf drop is common and is likely to be worsened by hot, dry summers, as experienced in recent years.

In America, control is achieved by using a fully systemic soil-applied insecticide containing *oxamyl*. This product is not approved for apple crops in the UK. With a lack of suitable systemic insecticides for lepidoptera pests opportunities for control are limited. The usual insecticides utilised for moth control during the season, *chlorpyrifos* (Cleancrop Pylchlorex), *methoxyfenozide* (Runner), etc. have limited efficacy but can give a useful reduction in overall pest numbers as can some of the newer translaminar aphicides, such as *acetamiprid* (gazelle), *thiacloprid* (Calypso), etc. The best timing for control, however, would appear to exist just prior to blossom, when the newly emerged moths are laying the first eggs. A suitable product would need to be effective on eggs and early larval stages such as *diflubenzuron* (Dimilin), and an application would be required when the majority of eggs had been deposited, but before they had hatched and entered the leaf tissue.

In some cases, where a



© Kevin Workman  
Phyllonorycta blancardella affected shoot pre-harvest

population has got out of control during the season giving rise to concerns for fruit bud quality the following year due to imminent excessive leaf loss around harvest, pyrethroid products such as bifenthrin (Brigade, Talstar, etc.) have been used to give a rapid 'knockdown' of adults. This should only be considered in extreme cases as pyrethroid products are not generally known to be predator friendly or Integrated Farm Management (IPM) compatible,

and such use can seriously reduce numbers of *typhlodromus pyri*, in turn leading to rises in populations of other problem pests such as spider mite and or rust mite.

Pheromone traps are now available for STLM and these can act as an effective indicator of the pests presence, especially early in the season to gauge over-wintered emergence and accurately time the application of a pre-blossom insecticide spray, although later in the season one trap caught over

1500 adults in a single weekend!

Natural predators do exist for most leaf miner species and preservation of these predators will give some level of control, however, the wide variety of pests present in an orchard and the various controls utilised mean that it is not always possible to safeguard a specific predator species by stopping the use of a particular pesticide or cultural practice, especially if doing so gives rise to a different pest problem.

It is interesting to note that the majority of Horse Chestnut trees, *Aesculus* species, in some counties are being attacked by a similar leaf miner species, also a micro moth, *Cameraria ohridella*. It is feared that this pest will severely reduce a trees ability to function with up to 700 mines in a single leaf and no practical method of control in amenity situations. Premature leaf drop often begins in August.

With consumer and environmental pressure dictating a reduction in pesticide, especially broad spectrum insecticides, new or previously ignored pests are likely to give future apple production new challenges outside that posed by current market forces.

**Kevin Workman 07802 981080**





Biodiversity has many definitions, but essentially it encompasses all variety of life on earth, from the smallest flea to the largest whale, from the common plant to the rarest bird. It also includes the complex network of eco-systems in which these live and genetic variations. We rely on it for a whole host of reasons – food, clothing, fuel, tourism, medicine, cultures and the way it shapes our daily lives.

The Herefordshire Biodiversity Partnership is co-ordinated by Nicky Davies and her main role is to co-ordinate

the delivery of the Local Biodiversity Action Plan (or LBAP). The LBAP was first published in 2000 and set targets for biodiversity conservation and enhancement across the County with co-operation from a range of partners who are in the position to assist in this delivery.

A distinctive feature of Herefordshire that contributes to the local character is the orchards and here in our

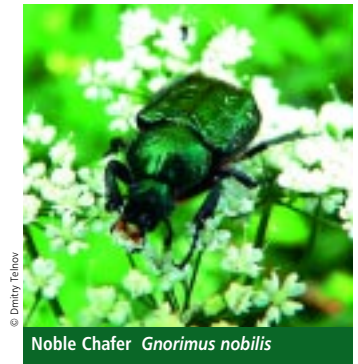
county, we have more of this habitat than any other county in the UK. Herefordshire is symbolised by the apple and we have a long history of cider making, as well as them being an integral feature of folklore and traditions. In recent decades, orchard intensification across the UK has fluctuated due to the commercial market for cider being less than predictable. Within the LBAP, we have a dedicated plan for safeguarding our orchard habitats, namely a Habitat Action Plan (HAP) and within that plan is a list of actions and targets that outline ways that we can mitigate threats and maintain the presence of this habitat for future generations to harvest, whilst protecting the landscape and biodiversity value. Each habitat or species action plan within the LBAP has a plan lead and in Herefordshire, Bulmers has taken this lead responsibility. Other partners in the delivery of this plan include the National Trust, Marchers Apple Network, FWAG, the Big Apple, Natural England, Herefordshire Council (Parks & Countryside and the Conservation Section), Bulmer Foundation, and Sustain.

Orchards support a wealth of biodiversity and several studies have been undertaken exploring the intrinsic biodiversity value of this habitat. By having the Habitat Action Plan in the County, we can monitor progress of achievements by partners and this in turn offers organisations the chance to take more responsibility for the conservation of this part of our living landscape. Grassland

habitats are usually associated with traditional orchards, and these can potentially be abundant in wildflowers due to grazing regimes, nutrient input and low chemical use. Many species are associated with orchards, and many of these are given UK priority BAP species status. One in particular is the Noble Chafer beetle; a nationally rare beetle associated with old standing fruit trees. This species appears to have been in considerable national decline since the 1940's, although recent surveys have found this species occurring in at least four orchard sites in Herefordshire and so hence our County being somewhat of a stronghold.

**Historical data gathered from England show that, over the whole country, orchard area has declined by 57% since 1950. This estimate of loss was made by comparing the agricultural census figure of 108,555 ha of orchards in 1950 with the current ordnance survey figure of 47,000 ha.**

*Natural England - Form A. 2005 Review of priority habitats: proposed new priority type.*



© Dmitry Terinov

**Noble Chafer *Gnorimus nobilis***

Because of this, the Noble Chafer is also an LBAP priority species.

It is hoped that Orchards will be offered UK BAP priority habitat status in April 2007 and this is good news as it recognises orchards as distinct habitats, and organisations at a national level will afford time and money to ensure the sustainability of this habitat.

If you would like to know more about the Herefordshire Local Biodiversity Action Plan, or the Orchard Habitat Action Plan, please contact Nicky Davies (Herefordshire Biodiversity Partnership Co-ordinator) on (01432) 383026 or email [ndavies2@herefordshire.gov.uk](mailto:ndavies2@herefordshire.gov.uk)

The Herefordshire Biodiversity Partnership website can be visited at [www.herefordbap.org.uk](http://www.herefordbap.org.uk)

# Orchards and their biodiversity in Herefordshire

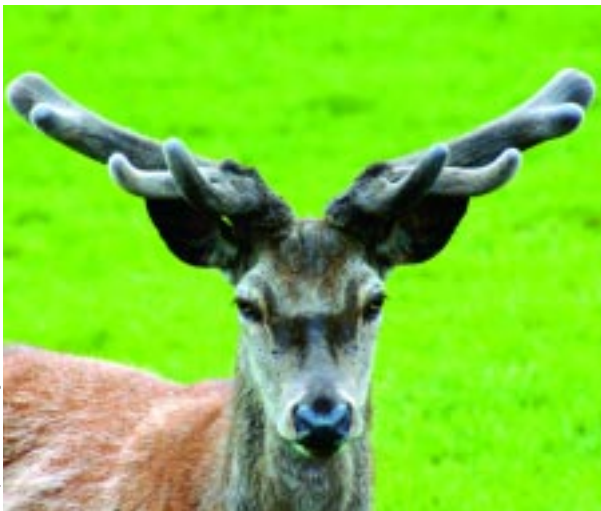


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Fallow deer

# Deer damage



Roe deer

Deer populations are increasing in the UK and deer related damage is becoming widespread and economically significant. Agricultural crops, in particular fruit trees, are an attractive food source for deer and unless control measures are taken damage can occur. Herefordshire and surrounding counties are populated by fallow, roe and muntjac deer. All three species of deer will browse young orchards, however, roe and muntjac are relatively small deer and are often solitary animals rarely being seen in groups larger than 3 or 4. Damage can still be severe if allowed to continue unchecked. Fallow deer, on the other hand, can live in large herds and being relatively large deer can cause severe damage very quickly to both young and established orchards. Fallow tend to live in wooded areas but will travel surprising distances to find their diet of preference.

**Further information and practical help is available free of charge from local fruit grower Andy Hunt who has many years experience of growing trees and managing deer.**

Contact details:  
Tel no: 07974 126139  
Email:  
sidnallfarm@lowerhopefarms.co.uk



Muntjac deer

## The Woolhope Dome Project

There was good attendance on Saturday 25th November at Woolhope village hall when 'Dome' area fruit growers came to a traditional orchard day, which concluded, on a local farm, with a demonstration of standard tree planting, pruning and maintenance.

Chris Stubbs, Woolhope Dome Project Officer, gave the background to the project and the wildlife value of orchards. Chris Fairs, of Bulmers, explained varietal selection, rootstocks, planting, management tips, and pruning theory. Janet Lomas, of Herefordshire FWAG, described the work of her organisation and the assistance available to members in grant application. She spoke further on the encouraging and maintaining of wildlife on the farm.

Local farmer, Norman Williams, kindly allowed those attending the use of his orchard for the afternoon practical work.



Woolhope Dome growers with Norman Williams and Chris Fairs

## Herefordshire Cider Fruit Growers Association Celebrates 25 Years

Set up to promote support for commercial growers of cider apples, its aims are to promote cider and its products and to advance the growing, production and sales of cider apples.

**Members pay an acreage levy of 50 pence per acre of cider apples grown, plus a levy of 25 pence per tonne for R&D work involving cider orchards and growing.**

**New members are welcome to join and should contact:**

**The Secretary  
Hereford Cider Fruit Growers Association  
Upper Home Farm, Tillington  
Hereford, HR4 8LD**

The Environment Agency

### Disposal of Prunings

Growers who chose to dispose of their orchard prunings by burning on the farm, will need to apply for an 'exemption' by 15th May 2007. This is just one of many disposal practices that might apply to you on your farm. Don't leave it too late and get caught in the rush.

To register, there is a dedicated telephone line **0845 603 3113** to order a pack. Alternatively you can register online using Defra's Whole Farm Approach. For further information call Defra on **08459 335577** or e-mail [wholefarmhelp@defra.gsi.gov.uk](mailto:wholefarmhelp@defra.gsi.gov.uk)

### Meanwhile:

The search for an alternative use for our orchard prunings through the precision chipping and burning in a commercial, domestic or industrial heat and power generation unit, continues. Bushmaster Fabrications Ltd has produced a tractor-mounted prototype chipper that is already at work in an orchard.

We will be reporting on progress in a future edition of Growers Update.

# Cut spray drift problems down to size

Fruit growers face an uncomfortable dilemma – between meeting their customers' demands for top quality, disease-free crops and growing public hostility to spraying.

Yet with a little thought and planning – and using the correct equipment – spray drift from orchards can be effectively controlled, the added benefit being that these changes also help achieve significant operational benefits.

Nowhere is this more evident that with orchard air-blast sprayers, which at first appearance seem to send spray solution everywhere, but with a bit of management can achieve highly accurate application.

These sprayers have to use considerable volumes of air, especially when they are applying products designed to control pests hiding deep within the vegetation or on the trunk of trees, bushes and vines.

And they can send the spray high into the air, as might be necessary to achieve pest control in a mature orchard. But where this coverage is not needed it makes sense to manage the spray more closely to ensure that application is efficient, and over-application is avoided.

So turn off the nozzles on top of the machine if they are not needed. If the machine has an air scoop system, which directs part of the air from the

fan into a separate outlet so it can be used to direct the spray solution, then that can ensure greater spraying accuracy.

In this situation "air scooping" – which effectively uses a separate directional jet of air to direct the airflow carrying the spray solution to its target – is preferable to using deflectors, as spray solution tends to deposit on these and dribble onto the ground – which is both an economic loss and an environmental problem.

This is important from both economic and environmental standpoints, as it will ensure you are applying the spray rate you selected to the crop, and at the same time ensuring minimal spray misses the target and risks causing environmental problems.

Choosing a sprayer that enables you to keep accurate control over application rates is also important. If the sprayer's application rate is governed by the tractor engine speed then your application rate can vary, especially on undulating ground or where wheel-slip occurs.

A more reactive control system – one that measures the tractor's forward speed rather than engine speed – will enable you to achieve consistent spray application, as it should be able to adjust spraying application and settings 'on the move'.

One of the great pressures is to reduce spray application rates. If you can replace a



Illustration of air scoop directional system



Partial spray application

machine that achieves effective crop coverage by applying 1,000 litres/ha with one that achieves the same result by applying 500 lts/ha more accurately you achieve far better environmental performance, and knock a large hole in your crop protection bill.

The quality of the spray pattern has a direct effect on the efficiency with which the target plant will be covered. Nozzle choice is crucial, with the development of ceramic

diffuser disc nozzles being a major step forward, as they greatly improve application accuracy.

Air intake position is another issue: side or bottom intakes tend to draw in leaves and other ground debris. Sprayers with intakes on top of the machine are not prone to this problem, so optimum air-flow and spraying performance are maintained.

You also need to ensure that spray operators are also well protected from exposure to the products they apply, both when they are doing the job and when they are servicing the machine before and after spraying.

Some innovative features are available that make these operations easier and safer, like tanks that drain to a central point, which minimises the risk of spray solution remaining in the tank and makes cleaning much easier and more effective.

Removing the stopper to drain a tank is a horrible operation – with a high risk of contact with spray solution – if done from underneath the machine, but some machines release the stopper via a remote link from the top of the tank. It's hardly rocket science, but it avoids a significant risk!

## Equipment Supply Services

New Business Address:  
Unit 15  
Milland Road Industrial Estate  
Neath  
West Glamorgan  
SA11 1NJ

Contact:  
Sean Reilly 07768 762012  
Jon Wheeler 07879 428540

**For Sale**  
3-year old Berthoud  
air-blast sprayer  
(1500 ltr. tank)  
in excellent condition  
Contact  
**Mark Capper**  
**01886 884202**

**For Sale**  
Brand new, heavy-duty web belting for  
SFM Mini-Scamp  
pedestrian harvester  
Contact  
**Colin Hinksman**  
**01981 500248**

**WANTED**  
**AUTOMATED  
APPLE PRESS**  
Automated press to make cider  
and juice on a breakeven/hobby  
making basis as well as offering a  
community apple press facility for  
local villagers.  
Contact **Paul on**  
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**For Sale**  
1) SFM fruit  
blower  
Only 1 year old.  
2) Tuthill-type  
(centipede  
action) apple  
windrower  
Contact  
**Andrew Burton**  
**01544 340592**  
OR  
**07977 434434**

**Are your trees  
suffering deer  
damage?**

*Then I can help you!*

I am experienced and qualified with many years of deer management behind me. I am a Herefordshire fruit grower, experienced in growing and managing fruit trees.

All advice and services are given free of charge.

Please contact:  
**Andy Hunt**  
**Tel 07974 126139**  
Email:  
sidnallfarm@lowerhopefarms.co.uk

# Help your plants to help themselves

Agrovista UK Ltd, the national agronomy and consultancy company has entered the fruit sector with 4 established and experienced agronomists. Between them, Agrovista's fruit team has a wealth of experience in all aspects of top and soft fruit production. The advice is based on thorough monitoring of crops and on the use of up to date computer modelling techniques to ensure the most efficient, timely and effective use of plant protection products.

This advice will specifically target plant protection and nutrition programmes and also allow conformation to all assured produce schemes, as well as complying with the latest demands from consumers to minimise residues.

The new fruit team will cover the whole of the UK and be led by Mike Stoker who joined the company from Yara Phosyn's fruit division.

Also on the team is Paul Bennett, formally from FAST, and James Dick

formally from Solufeds. The fourth member is Gavin Mutch, who is based in Scotland and has been in soft fruit production and previously with FAST.

In this article, we look at the effects pH will have on the nutrition regimes of cider orchards.

Pome fruit, and especially cider apples, prefer a slightly acidic to neutral soil (pH between 5.8 and 7.0). Extreme soil pH values result in nutrient lock-up (unavailability) or toxicity, resulting in poor fruit and tree development (see table). It is important to amend the pH in acidic soils by incorporating lime before planting to allow regular and unrestricted growth for the developing trees.

In older and established orchards, it is difficult to maintain the soil pH due to the spread and maturity of the roots. The pH in the root-zone however can be maintained by the choice of nitrogen fertiliser used through the season.

Nitrate (NO<sub>3</sub><sup>-</sup>) based fertilisers, as the only source of nitrogen, are likely to cause the pH in the immediate area around the roots (rhizosphere) to become alkaline. This will in turn reduce the availability of certain key nutrients and elements (iron, manganese, copper and zinc) resulting in deficiencies within the crop.

Ammonium based (NH<sub>4</sub><sup>+</sup>) nitrogen has the opposite effect and will therefore reduce the pH in the rhizosphere, but Excess NH<sub>4</sub><sup>+</sup> in the fertilisation programme can result in a decrease in calcium, potassium molybdenum and magnesium absorption. NH<sub>4</sub><sup>+</sup> also strongly competes for negative charges in the plant cells.

It is therefore recommended that a portion of the nitrogen (15-0%) be applied as NH<sub>4</sub><sup>+</sup> during the growing season to provide a balance.

Ammonium nitrate (50% NH<sub>4</sub><sup>+</sup>) is a good option for the post harvest nitrogen fertiliser.

NH<sub>4</sub><sup>+</sup> as a source of nitrogen fertiliser can contribute to a higher rate of reproductive growth (flower bud formation and fruit number) through its effect on plant hormones (CYT and ABA). Nitrate nitrogen should not be excluded from the fertilisation program because of its effect on cellular pH regulation.

Through the season, a regular supply of soluble calcium is important in protecting the plant against low pH stress. Calcium acts as buffer and prevents a drastic decrease in pH in the root zone. Calcium also has oxidative properties that might also improve fruit quality and reduce leaf abscission. A gypsum (calcium carbonate) application in the autumn is a cheap alternative to calcium nitrate. The low solubility of the gypsum will ensure that there is sufficient calcium during the spring root-flush. Young roots absorb calcium more easily than older, more mature trees can.

It is important that a season-long nutrition programme takes into account all the effects different fertilisers have on the root-zone, as well as their effects directly on the trees. There is no simple answer to plant nutrition as each orchard will be starting from a different level. Soil sampling is a good start to look at the available nutrients and pH, only then can a plan be put together to maximise the yield.



L-R Gavin Mutch, Mike Stoker, Paul Bennett and James Dick

For more information and to discuss individual nutrition plans please contact:

**Mike Stoker** 07860 345147  
**Paul Bennett** 07917 596280  
**James Dick** 07768 944133

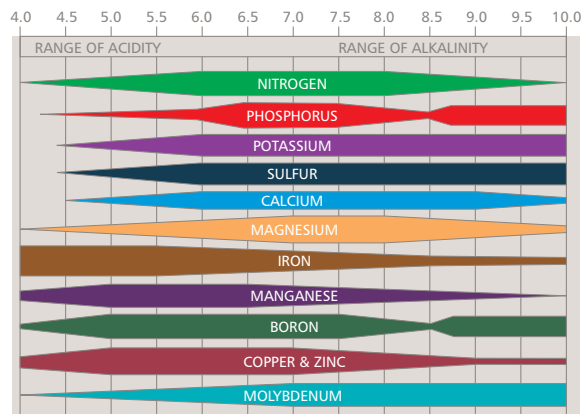
# Revolutionary new source of nitrogen

**Twin N** is a revolutionary new product that can dramatically improve soil fertility, boosting crop yields and quality. It is a carefully selected array of nitrogen fixing micro-organisms: some are free living and some work inside the plant to make nitrogen available – hence the name Twin N.

The product is unique in being freeze dried which assures a consistently reliable product that is simply mixed with water and sprayed on the crop to supply about 100Kgs of nitrogen per hectare at a price competitive with ammonium nitrate and without the problems of storage, transport and disposal of plastic bags. Twin N does not leach in the soil making it very attractive in NVZ's. It is also registered for organic use in the UK with OF&G as well as being registered abroad with NASAA and IFOAM; and being environmentally benign it is completely safe to nature. Using it will help reduce emissions of greenhouse gasses and enhance the development of sustainable farming, as well as being cheaper than fertiliser N.

For further information contact Tom Nellist, Farm-Fos Limited, Hereford.

Tel. **01432 851 822** or **tom@farmfos.com**



# Maccani provides robust scab control

Apple and pear growers are better equipped to control scab this season thanks to PSD's approval of a new fungicide from BASF. Maccani's introduction is very timely because scab threatens to pose a much greater threat than normal this year due to the large amount of overwintering inoculum following the unusually widespread infection of orchards last autumn.

The UK is the first country in which Maccani, formulated as a wettable granule, has been registered. A combination of the powerful strobilurin, pyraclostrobin and dithianon, the mainstay of growers' early scab spray programme for many years, the product has undergone very successful trials in numerous EU countries including the UK.

BASF horticultural product manager David Marris explains that pyraclostrobin has the significant advantage of dissolving in the wax coating of leaves and fruit. This ability, together with its translaminar activity, enables it to diffuse through the leaf and to spread over the fruit so that the fruit's whole area is protected.

Maccani's two components provide multiple site activity that helps prevent the development of resistant scab strains. As a further safeguard BASF advises growers to follow the Fungicide Resistance Action Committee's guideline of not applying more than two

Maccani sprays in succession. (Four sprays of the product are allowed per year.)

The product's recommended dose rate is 2.5 kg/ha applied in 250 to 1,500 litres/ha of water at 10 to 12-day intervals. Ideally the first dose should be applied at apple's pink bud stage and pear's white bud stage, advises David Marris, following several Dithianon WG or Dithianon Flowable treatments starting at bud break. If scab infection pressure is very high dithianon should be tank-mixed with Scala (pyrimethanil), which has a 72-hour kickback. This treatment provides an ideal lead in to Maccani.

In several years of European trials with Maccani, applied as a 10 to 12-day programme at 2.5 kg/ha, the average level of scab control was 97.6%. The untreated infection level was 45%. These results are in line with those obtained in 2006 trials, one in an over 20 year old Golden Delicious orchard in Herefordshire with an exceptionally high level of scab infection and the other in a Bramley orchard at the research station at Loughgall, County Armagh, Northern Ireland.

Maccani proved the most effective in the trial at Loughgall where the wetter climate means that the scab infection pressure is almost always higher than in England. The level of leaf scab in the Maccani plots in June was below 1% and just under 3% in July.



Untreated



After treatment with Maccani

The product also has some activity against mildew. David Marris reckons that if secondary mildew infection is relatively low a Maccani programme will protect the developing crop, but if mildew is building up then a specific mildewicide spray would be necessary.

Maccani has a 35-day harvest interval and is compatible with 33 other single pesticide and tank mixes. It comes in 10kg plastic lined paper bags.

Dithianon Flowable and Dithianon WG are BASF trademarks. Maccani and Scala are registered trademarks of BASF.

**ALWAYS READ THE LABEL. USE PESTICIDES SAFELY.**

## Dithianon Flowable and Dithianon WG

- BASF are making both formulations of dithianon available for 2007

The table below summarises the differences between the formulations

Product	Dithianon Flowable (750 g/LSC)	Dithianon WG (700 g/kg WG)
Formulation	750 g/l SC	700 g/kg WG
No. of Applications	8	12
Label rate	Maximum individual dose 1.1 l/ha i.e. 825g ai/ha	Maximum individual dose 0.75 kg/ha i.e. 525g ai/ha

- Dithianon does not move within the plant therefore it is important that good spray coverage is achieved
- Water volumes should be based on the size of the trees and leaf area at application and be sufficient to ensure good coverage
- A tank mix of 0.75 kg/ha Dithianon WG + 0.75 l/ha Scala will provide added persistence of control under heavy disease pressure. We would recommend the Scala mix at the start of the season.
- Use a maximum of 12 applications of Dithianon WG per crop.

### Recommendations for dithianon use under high disease pressure

- If scab infection periods have already occurred prior to application consider a tank mix with a product which has curative activity – tank mixing Scala with either formulation will improve persistence of control and provide a level of curative activity where there is significant disease carry over from the previous season.
- Apply from beginning of bud burst. It is essential to begin scab programmes as or just before the buds begin to move.
- Under high disease pressure (susceptible varieties when disease carry over is high or when there is rapid crop growth) - apply 1.1 l/ha Dithianon Flowable at 10-day intervals. For robust disease control or a level of curative activity use 0.75 – 1.1 l/ha Dithianon Flowable plus a minimum of 0.5 l/ha Scala. 0.75 l/ha Scala brings added robustness. We would recommend the Scala mix at the start of the season.
- Use a maximum of 8 applications of Dithianon Flowable per crop.

### Dithianon WG

- Under high disease pressure (susceptible varieties when disease carry over is high or when there is rapid crop growth) - apply 0.75 kg/ha Dithianon WG at 7 day intervals, for robust disease control.
- If a 10 day spray interval is required use 0.75 kg/ha Dithianon WG with a tank-mix of a MINIMUM of 0.5 l/ha Scala. Spray intervals longer than 10 days may result in compromised disease control.

### Dithianon Flowable

- Under high disease pressure (susceptible varieties when disease carry over is high or when there is rapid crop growth) - apply 1.1 l/ha Dithianon Flowable at 10-day intervals. For robust disease control or a level of curative activity use 0.75 – 1.1 l/ha Dithianon Flowable plus a minimum of 0.5 l/ha Scala. 0.75 l/ha Scala brings added robustness. We would recommend the Scala mix at the start of the season.
- Use a maximum of 8 applications of Dithianon Flowable per crop.

Dithianon WG and Dithianon Flowable contain dithianon. Scala contains pyrimethanil.

Dithianon WG, Dithianon Flowable are trademarks of BASF. Scala is a registered trademark of BASF.

**ALWAYS READ THE LABEL. USE PESTICIDES SAFELY.**

[www.agriCentre.co.uk](http://www.agriCentre.co.uk)

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View over the orchards at Bulmer Penrhos Farm



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