

Bird strikes- how are viticulturalists dealing with them?

Oliver Richardson.

Abstract

In many parts of the world, wildlife may present major problems to the viability of the vineyard industry. Not all viticulturalists have found it so, but where it does cost heavily, they are having to make major financial decisions as to how they combat these problems, the outcome of which will determine future profitability. These measures may involve either working with nature, evicting the predators from the grapes, or trying to keep them apart. This paper looks largely at the way in which viticulturalists deal with birds.



Multiple row netting at Bodiam Vineyard- (photo : Roy Cook)

There is a story that during the building of the Crystal Palace in 1851, a flock of sparrows got in and became a nuisance. Shooting was impossible because it was a glass building. At their



wits end, the builders called for the elderly Duke of Wellington who stumped in, looked round, uttered the words 'Try Sparrowhawks' and left. Even when not hungry, the raptor will scare the birds away from the crop. However, there is not an inexhaustible supply of them, and other methods need to be examined. Given that world-wide, the loss of unprotected grapes to predators is estimated at 43%, it might be advisable to look at possible solutions before predators in the UK learn to love the grape.

Not all vineyards regard wildlife as pests. Several UK websites boast of their nature trails. Glyndwr keep their hedges wild to encourage wildlife, while Three Choirs have a trail which features nesting boxes as well as badgers and rabbits. The Pritchards at Exmoor also gain pleasure from their abundance of badgers, deer, foxes and other species that elsewhere are considered a nuisance. Several too put local wildlife on their labels.

What are the main problems?

In a 2016 survey, only a few of Britain's 400 vineyards admitted to having problems with predators, and most of these had either managed to combat them with simple methods or had invested in long term solutions.

Pest	Vineyards
Badgers	Albourne Estate, Bothy, Commonwood, Melbury, Eastcott
Birds	Bearley, Bothy, Camel Valley, High Clandon, Melbury, Eastcott, Rathfinny, Bearley
Deer	Albourne Estate, Eastcott, High Clandon
Foxes	Commonwood, Melbury
Pheasants	Melbury, Breaky Bottom, Westfisher, Dunleavy, Yorkshire Heart
Rabbits	Albourne Estate, Bride Valley, Oatley
Slugs	Commonwood
Wasps & Cluster flies	Albourne Estate, Commonwood, Melbury, Eastcott, Nutbourne, Bearley

Rabbits, deer and slugs tend to nibble the green shoots so preventing vine development. The birds, badgers, foxes and wasps appreciate sweet food so either eat or damage the ripening fruit. They managed without grapes for a long time, but in the last 20 years, many, especially birds, are beginning to adapt to this new food that we are so generously providing. As humans realise, safe foods taste nice, potentially poisonous foods taste foul so we avoid them. Birds too may have to taste some foul foods (and die) before the remainder settle on a selection of food that is nutritious, safe and palatable.(1) Thus most of the measures that viticulturalists take are aimed at keeping birds and grapes apart. This can be difficult when a neighbouring estate is keeping birds such as pheasants, and releasing them en masse for shoots. In cases of litigation, claims have been made that pheasants are 'wild birds' the moment they are released. However, Peter Hall at Breaky Bottom notes that the law states that a landowner cannot bring something onto his or her land and allow it to escape and do damage to neighbour's property (see Rylands v Fletcher 1868).

How much damage is done?

Little research seems to have been carried out in Britain though individual reports quote substantial damage. Peter Hall reported losing the equivalent nearly 30,000 bottles of sparkling wine as a result of a neighbour releasing pheasants for a shoot. It was settled out of court. Albourne Estate put badger damage at about 2 tonnes a year. However In Canada (2) research has shown that the sweeter varieties are more likely to be attacked than those that are sour. Researchers there also discovered that the birds that are the most common predators are robins, starlings and finches. These tend to feed in the early morning and late

evening and most noticeably, when safe places are nearby. Thus vineyards near to woodlands may be more likely to be attacked than those in open areas. However, this is not something that can be guaranteed, as starlings will travel over 25km to feed. There has also been extensive research in both New Zealand and the United States on the subject. In New Zealand, it is estimated that 10% of grapes are lost to birds, though, without preventative measures, this would probably rise to 25%. Seventy-five percent of vineyards are netted. (2) In the United States, 4 species of bird have been identified as causing the most damage. These are the wild turkey (not a great problem in Europe!), finches, robins and starlings. Research by Mark Tobin(3) involved releasing species of birds into netted areas and counting the amount and type of bird damage resulting. This was as follows.

Bird	Variety	No of grapes damaged or eaten
Finch	Ruby Cabernet	46.1
	Zinfandel	66.1
American Robin	Ruby Cabernet	206.8
	Zinfandel	194.4
European Starling	Ruby Cabernet	246.6
	Zinfandel	177.3

In an article on the economic impact of bird damage in the USA (9), the following figures emerge

California	Michigan	New York	Oregon	Washington	US Total
\$49m	£2.6	\$3.4m	\$2.26m	£12.8m	\$126m

So what do we do about it?

World-wide, bird predation can represent a serious problem so the vineyard industry needs to be aware of the methods of dealing with it. An article on Bird Scare Devices (4) divides the methods available into 3 groups, the Good, the Bad and the Ugly. In the Bad, it classes non-poisonous sprays and chemicals, even when they are supposedly non-toxic to humans and which may break down naturally.



The 'ugly' section includes propane cannons, poisons and shotguns. Under 'good', it includes static scare devices (e.g. balloons with eyes, models of raptors), netting, dogs, some noise devices and scarecrows.

A number of these devices are described below.

- i) Noise. Bird-scarers can be effective, but are not popular, especially when there are neighbouring houses. The central Europe, Austrians and Slovaks make use of a Klapotetz, or 'rattler' .It

consists of a wind turbine with shaft and mallets , which should keep the birds from the vineyards at the time of ripening by its rhythmic clatter. (5) These have been used since the 18thC and traditionally are erected from the 25th July to the

beginning of November. They do however, require a fairly solid permanent concrete base

Picture Miko Thiessen 21st June 2008 Creative Commons CC-BY-SA-2.5)

Some scarers emit the distress calls of common birds in order to frighten them. However, for the noise to be heard across a large vineyard involves installing tower-based speakers which emit sounds of between 100-130db. The human pain threshold is around 120db. (Rather like being up a church tower when the clock strikes noon!) Ear plugs would be needed.

ii) Physical deterrents. Some companies market **flashing tape** or "terror eyes' balloons



which can be installed in the vineyard around harvest time. It is debateable for how long this system will work. One agricultural engineer in Ontario commented that it may work for a few years before the birds get used to it and its harmlessness will become part of bird folklore. (6) Other research has put this figure as low as 4 days.(10) Dogs are also reported to be effective. Bob Neilson at Brightwell reported that his dogs proudly bring their trophies home. Liz Robson at Kingfisher's Pool has also invested in a

Pointer which will be trained to seek out the enemies of the grapes.

Photo: Kite at Kingfishers' Pool Vineyard (Liz Robson)

iii) **Netting.**

Netting needs to be carried out before veraison as birds begin to get interested in the grapes as soon as any colour appears on them. The simplest type that I have seen on-line



was presented by an American horticulturalist, who claimed that tying a small mesh bag over each bunch of grapes would stop bird damage. I don't *think* he was proposing this method for commercial vineyards...

Three main types of netting for commercial vineyards seem to be available. These are **multiple row (or overhead) system**, the **single row netting** and the **zone netting**.

Full Overhead Netting

This needs serious investment in terms of posts ,high wires and net laying equipment. In Australia, the problems are significant and specialist equipment suppliers, such as Crendon (www.crendon.au.au) market net-laying machines designed both for tall fruit trees and for rows of vines. These can lay a roll of netting 500m x15m across 2 rows at a time. The netting will automatically tension and the same machine can either lay it or roll it up onto the rolls which can be easily stored. The machine illustrated is called a 'Netwhizz)

In Britain the multi-row system is used both at Bodiam vineyard, and at Camel Valley. At Bodiam, this involves a separate top cover well clear of the vines and supported by high posts. This can be installed in sections of up to 4 rows at a time, with the sections clipped together. The side netting is installed separately. **Bob Lindo's net laying machine (pictured overleaf)** can lay net over 4 rows at a time.



Stephen Skelton's comment on the overhead system was that *'it has been shown to increase substantially the heat summation in wind-exposed vineyards making for riper grapes and better wines. The netting overhead must be chosen so that it does not block too much light and has a mesh sufficiently large enough so that it does not block snow.'* (6) This snow problem is certainly true in Canada, where overhead netting is becoming increasingly necessary. (8) Researchers are finding that birds are migrating south later each year because global warming allows them to feed in the Arctic for longer periods. This means that they migrate over the vineyards when the crops are ripe, rather than when they are not. To cope with this, full overhead netting is often used. In this system, an

additional wire is strung from post to post down the row of vines, and the net rests like a roof on top of the wires. In a new vineyard, longer posts can be installed to carry the wire and the netting 12 or more inches above the vines. The side netting can be removed to allow machinery in. The top netting has to be strong enough to support a murder of crows and needs careful maintenance to stop small holes developing through which smaller



birds can creep. Roy Cook at Sedlescombe estimates that even with care, full netting will last only 2 years before needing replacement, which adds substantially to the cost of the wine. However, holes can soon develop as illustrated.

Single row (over the top) netting involves covering the whole of one row of vines and pegging it at the bottoms, so enclosing each row in a tent of mesh. This can cause

problems if the mesh gets too near grapes and the birds can just sit on it and eat away happily.

Zone netting involves netting only the fruit growing section, leaving the leaves free as illustrated. The nets can then be pegged top and bottom to create a long tent. Oregon State University specialist Dr Patty Skinkis suggested that 'single row' netting had largely been replaced by zone netting since the turn of the century as it is easier to apply and allows for continuous canopy management. (7) This system is used at both Bothy in Oxfordshire (shown right) and at Lily Farm in Devon.

Skelton (6) commented there is a danger that the build-up of heat within the netting could lead to the increased possibility of mould developing, though Trevibban Mill actually use the side netting to create a micro-climate. (trevibbanmill.com/gallery) albeit netting only on one side of each row.

Faye Pratt of Lily Farm estimates that 3 men (plus a tractor) can do her 5 acre vineyard in a morning before the crew tie up the linking tags. The local garage rigged up the winding gear for them at either end of the roller and they fitted sheep lick tub lids. They then use a 1 metre wide net applied to each side of a row, clipped at the top onto the fruiting wires and pegged at the bottom creating a cage around the grapes. They have used this system now successfully for 6 years.



Above – A roll of wire before installation and afterwards on the vines at Lily Farm.

iv) Ultrasonic sound machines

Ultrasound is defined as a signal exceeding 20000Hz. (20KHz) Humans can generally hear up to 14KHz. Birds have about the same hearing frequencies. Tests in the late 1990s- especially carried out to try to deter bird strikes at American military airfields, proved singularly ineffective. The emitted sounds were 'shadowed' by intervening trees, meaning that, in order to get a clear, all-round signal, there was a requirement for a clearing of vegetation below the transmitter level. Pigeons were found happily nesting within 20m of transmitters, and other birds soon got used to the noise (14) Tests done on other frequencies found that Pekin Ducks were sensitive to low frequencies and starlings to frequencies in the 1 to 1000Hz range. This is a possible solution and has some scientific backup. However, the case for ultrasonics have yet to be proven.

Case Studies- dealing with multiple problems

Alan and Corinne Goddard at Commonwood, in Shropshire work with nature to combat any wildlife problems. They plant fruit and wayfaring trees (viburnum lantana) which produce red berries before the grapes ripen. Badgers, foxes and squirrels concentrate on these and largely leave the grapes alone. Wasps are dealt with by means of plastic traps and cheap strawberry jam. Birds are also discouraged by the presence of native raptors in the area.

Eastcott vineyard in Devon have spiral tree guards to stop badgers, electrified fences to keep out deer and badgers, helikites and a large number of wasp traps.

Oatley too maintain a balance with nature, leaving long grass for mice and voles to run in. This attracts the sharp eyed raptors, which in turn deter the birds that would actually eat the grapes. They have dealt with the badger problem by high training at the bottom of their vineyard so that the badgers coming from a nearby sett cannot reach the fruit.

Melbury Farm in Dorset use wasp traps, netting and tape. **Albourne Estate** in West Sussex are looking to install netting against wasps on their Ortega. They are also looking for a solution to the increasingly extensive badger problem. **Bearley in Worcestershire** manually net their Pinot Noir Précoce and wasp trap. Their Rondo produce so many grapes that there is enough fruit for the wine and for the wasps! By growing the 650 vines in 40 metre rows, they can manually put a net over 4 rows at a time without difficulty. They also believe there is a need for a research student to develop a device for fitting to a wasp, so that it can be tracked back to its nest!

The problems are not unique to Europe and North America. **Packwood Vineyard** in South Africa (photo below) has a huge problem with Cape White Eyes which plague them throughout the ripening season. They have many deterrents in place including sonar radar, rotating mirrors, kites and zone nets. However they have found that the best deterrent is



the forest buzzard (the Duke of Wellington would have been delighted!). They are plentiful and, as the vineyard is surrounded by the forest, food is plentiful for them. Their presence in the skies keeps the White Eyes on their toes. White Eyes are tiny and they manage to find all the holes in the nets and once inside the nets the damage is caused by flying up and down pecking odd berries on the bunches which causes sour rot. They cannot always get out once they are in, so the vineyard crew spends hours walking up and down taking them out.

Photo: Side netting at Packwood Vineyard with owner Vicky Gent

Is it worth spending money on a solution?

As to the financial loss, there are no figures available for the UK, but Cornell University research estimates that current world grape losses represent between 3 and 9% of production. Without preventative measures, they estimate this figure at around 43%. As to effectiveness, their research in the USA has produced the following figures for dealing with birds.

Method	Effectiveness
Chemical repellent	4%
Shooting	28%
Trapping	8%
Netting	72%
Sonic devices	10%
Visual scarers	4%
Nesting boxes for raptors etc.	11%

Source: Cornell University quoted at (9)

Netting seems to be the most effective method, though as Packwood Vineyard have noted, birds have sharp beaks and sharp eyes, and a lot of them puts a great strain on the top nets! Tracey & Saunders (12) suggested that drape-over netting pays for itself over 10 years if damage is over >10% of crop. The increased cost of permanent netting with high posts becomes economically viable if damage levels average > 25%. For Australian growers, the decision as to whether to net or not has to be set against the 2015 figure that 85% of grape producers in New South Wales grow grapes at a loss (13) so netting could be the final throw of the dice.

Research in New Zealand is concentrating on the use of falcons and harriers (10) as



experience in South Africa has already shown its effectiveness. By feeding them, they stay loyal to a specific area and frighten off other birds just by their presence. During 2008 and 2009, virtually no bird damage was recorded around test sites. The problem in Britain is that some unscrupulous game keepers might possibly accidentally shoot them in order to defend their pheasants or pigeons (11) and one gamekeeper has recently won a court case with a plea that he was defending his livelihood. Brock University in New Zealand are also looking at a new visual scarer using polarised light invisible to the naked human eye, but

which creates a visible pulse that affects birds. (8)

What is certain is that there is no 'silver bullet' for the problem but whatever solution or solutions are used, they must have economic benefit. The answer is probably a combination of methods, tailored to each vineyard. What is certain is that we cannot go back to the

method cited in the BBC's Victorian Farm series, that made use of children (paid 5d a day) standing in the vineyard and waving their arms!

Oliver Richardson is a member of the Welsh Vineyards Association and former Secretary of the MVA and the TCVA.

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Other useful papers

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<http://maxa.maf.govt.nz/sff/about-projects/search/L06-061/bird-scaring-the-natural-way.pdf>

Outsmarting the birds the natural way – Dr Valerie Saxton Lincoln University, NZ

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