

Organic lawnmowers & crop fertilisers – the use of animals in vineyards

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Abstract.

Mixed farming was once commonplace in agriculture. However, the development of specialisms, such as viticulture, has meant that fertilisers and machines are now needed in order to replace the nutrients once provided by animals and to keep the grass between vine rows at a reasonable height. This trend is slowly being reversed in many countries with the use of various animals. Several species have been tried, but sheep appear to represent the most popular, promising and economic way of integrating animals and vines. However, they do require looking after and anyone looking into making use of them will need to consult widely and to invest in stock control methods such as fencing and animal husbandry skills. Provided that the infrastructure (fencing and water supply) is in place, and that the animals do not graze areas subject to copper-based sprays, then all parties should benefit.



Wiltshire Horn rams grazing at Davenport Vineyards, East Sussex. Photo. Will Davenport

1. Why use animals in the vineyard

According to Kristine Bader (1), the interaction of animals and vines in a vineyard was once very common. With increased specialisation, they tended to be kept apart from the crops until, in recent years, experiments were carried out to find out whether animal limited access to vineyards could be allowed. This access is for a number of reasons. The most obvious is that low grazing animals (e.g. sheep) can keep down the level of grass and to remove weeds. In addition, animal manure can

reduce the amount of fertiliser needed on the soil. Obviously certain types of animals need to be discouraged. I once went picking in a run-down vineyard in Shropshire and often found it difficult to avoid putting my foot into rabbit holes. Badgers also need discouraging as their interest is mainly in eating the grapes. All the animals need to be discouraged from grazing high branches (and the buds and grapes) so their use has either to be limited to certain times of year or kept under control by means of fencing or the use of high training systems.

What type of animals can be used

Sheep are mentioned in most reports and articles on the use of animals in vineyards. They have the advantage of being relatively small and ruminant, therefore their diet consists mainly (but not entirely) of grass and weeds. **Horses** and **cattle** have also been used at certain times of year. The horses have been used on organic farms for pulling ploughs and harrows between the rows. In Chile, **llamas** have been used to graze the vineyards while in Patagonia, **armadillos** are encouraged to eat the grubs and insects.(2) However they have also been found to be partial to the grapes.

Montes Wines in Chile for example have been using **llamas** and sheep in their Marchigüe vineyards since 2010 to reduce the weeds. By 2013 there were 350 animals controlling 200 hectares of vineyards, which results in a 40% savings in the use of herbicides during the winter.

In New Zealand, one vineyard experimented with using **giant Guinea Pigs** for grazing. This was not a great success as it encouraged the local hawks to believe that lunch was being laid out just for them! French estates, including Domaine Laroche, are calling on the help of ravenous moth-eating bats to help them tackle the issue of grey rot in their vineyards via bat-friendly habitats. **Pipistrelle bats** are great night hunters with an insatiable appetite, so are being used to Hoover up European grapevine moths that cause grey rot, in order to help to eradicate the vine pests.

Pigs have been used in New Zealand and have been experimented with in France. (9) Fabrice Privat's estate in Bordeaux obtained some **kune-kune pigs** and used them to keep down the grass between the rows (with fencing to stop them digging up the vines) *'They are still young and we haven't put them out in the vineyards yet, but on the 200 m² plots where we keep them, they feed on weeds such as mallow, ryegrass and nettle that also grow in our vineyards. They still need to be supplemented with pellets to grow well and then we will take them out into the vineyards after the harvest at the end of September'*, said Fanny Gizardin, head viticulturalist. However, one respondent to the article noted that *'I've had pigs on and off in the vineyard for some years, but they dig way too many holes and make driving the tractor up and down really unpleasant. If they get scared and run off they are more than happy to run straight through dripper tubes too. Basically they are way too destructive and not a good idea.'* Despite these problems, many vineyards persist with pigs. In 2009 German papers wrote about the Menger-Krug family in Deidesheim taking assistance of pigs to loosen the soil in the vineyards.

"The pigs were my mother's crazy idea," says Marie Menger-Krug. *"It proved to work well. The pigs loosen the soil with their snouts and eat plants and insects. Then the hens come and pick smaller delicacies."*

The pigs are let out in the vineyard in autumn, after harvest. At that time they have a lot of treats to feast on, not least the deliciously sweet grapes, left by the harvesters. While heavy machines would compact the soil, these four-legged workers go with light steps. They work independently in all kinds of weather, loosening the soil with their big snouts. Oxygen is let down in the soil at the same time as nutrition is added in the natural way.

Cattle are also in favour in some vineyards. Brightwell use 2 cows in winter to keep the grass short and to fertilise the soil. In Nahe, Felix Prinz du Salm also had these goals in mind when he decided to use cattle in the vineyards grazing animals on. *"The concentrated and short grazing stimulates root growth. The cattle only stand on the same area for a few days. The remaining grass further promotes*

root growth. The manure input promotes living organisms in the soil such as mycorrhiza and increases metabolism and soil fertility," However, another aspect was even more important to him: "They produce the most valuable fertiliser. They are also invaluable for biodiversity. The dung of a cow feeds countless insects - and these insects also feed about three storks and 350 skylarks per year".(1)

2. What are the advantages of sheep

Sheep would appear to be the animal favoured by most vineyards, so the remainder of this paper will concentrate on their usage. One of the main research facilities for studying their effects in vineyards is that of the University of Vermont. Professor Meredith Niles has studied practices in local vineyards and in New Zealand, where she has found that 59% of vineyards studied integrate animals and vines. (3) One of the results of the research was the discovery that sheep manure pellets take time to dissolve in the soil and provide one of the best natural fertilisers throughout the year. This results in far less artificial nitrogen being used.

The obvious use of sheep is to mow the grass, discourage weeds and even to trim the leaves from the vines when the grapes reach the stage where they need maximum sunlight to ripen. Featherstone vineyard in Ontario describes this as 'ewe-nionised labour'. The only problem with their use for leaf stripping is that sheep can stand on their hind legs and thus can reach high-trained vines and their grapes as well as the leaves.

3. Different types of sheep



For a decade now, the Austrian winery of Ernst Triebaumer has been cross-breeding sheep to develop traits that are explicitly geared to vineyard use. These traits are robustness, reliability, and that the sheep shed their fleeces naturally. Most vineyard surveyed by Schoof et al (4) found a range of range of sheep being used, of which the most common were Ouessant and Shropshire. Others include Babydoll Southdowns and Suffolks. Among the vineyards studied, some

practiced all year round grazing, either with the use of electrified wire alongside the canopy, or by using high-training. It was noticeable from the European survey that most summer grazing of vineyards was done in Germany, where the canopy is high. In Southern France, with the use of low **goblet-trained** vines, only winter grazing is possible.

The **Ouessant** has been found to be particularly useful in Europe, and several breeding herds are appearing in the UK.

Ouessant sheep are a rare breed of heritage sheep originally from the island of Ouessant in Brittany. The island, off the coast of Brittany, is swept by the full force of Atlantic weather, and its hardy sheep have adapted to survive in all weathers on poor grazing. As a result, the Ouessant is the smallest recognized breed of sheep in the world, with a ram's shoulder height up to 49cm and ewe's up to 46cm (around 18 inches). The sheep are intelligent, inquisitive and full of character and their highly-prized wool may be black, brown or white, with some variation of these basic colours. The nearest British breed is possibly the Hebridean – an endangered species that needs little attention

and is recommended as a mowing machine. They do however have a number of disadvantages, being semi-wild, able to forage on 2 legs and, being small, do not eat a great deal.



The **Shropshire** has also found favour. Shropshires are the most northerly of all the British “Downland” breeds. Shropshire sheep are hardy and versatile and thrive in a wide range of conditions, adapting to every soil and climate and to rough grazing. They flourish throughout the British Isles, from the English lowlands to the highlands and islands of Scotland. Flocks are also kept successfully in the high rainfall areas of Ireland and at altitudes of more than 300 metres (1000 feet) in the mountainous areas of Wales. Shropshire sheep are now used widely throughout the UK and Europe to control grass in conifer plantations, orchards and amongst other deciduous trees. Apart from the advantage of reaping “two crops from one acre”, in the modern

world the reduction in the use of pesticides and herbicides and associated labour savings are a key benefit. (5)

A third popular breed is the **Southdowns** and the smaller version, **Babydoll Southdown**. The breed was first developed in about 1800 at Glynde in Suffolk. Short-wooled and small in stature, they are most used in New Zealand where they are also bred for lamb. **Wikipedia** notes that they are used to keep down the grass and weeds because they are too short to reach the grapes. This may be an optimistic statement. They only reach 39 inches high and do not eat the bark on the vines. One vineyard owner in Southern Missouri uses them for keeping his vineyard clear of weeds, making sure that he has extra pasture for them when spraying his vines. He commented that *‘In the spring during bud break, the sheep will consume everything they can possibly reach. ‘New vegetation is very tasty to them. So any new vines not up to the cordon wire will quickly be eaten. In fact, any new vines are very attractive to them, so these sheep should only be put into an established vineyard’.*(6) *The other time they need to be moved out is when the grapes start to ripen. Believe me, they will know the minute they start to taste good, and they will be good at pulling bunches lower so more can be eaten’.* Of the Babydolls, the owner of Murrumbateman vineyard in Australia said that *‘They are too short to damage the vines and can graze most of the year in the vineyard. They also improve vineyard soil health by providing natural fertiliser and reducing the need for heavy machinery, which means less soil compaction and improved soil fertility and structure.’* (11)

Requirements

The primary requirement for any animal used in the vineyard is a supply of water. However, this is not the only need. Sheep have a habit of going where they are not wanted, and often need rounding up. This a sheep dog is often necessary for larger flocks. Fencing and sometimes electric wires keep animals off the grapes. **Hanzell** vineyard in California has fencing between each row. The sheep are driven into a different enclosure each day, thus ensuring that that row is well grazed and fertilised. This the owner describes this as ‘mob grazing’. Where the sheep are set loose after harvest, a close eye needs to be kept on the weather. It was often said that in sloping areas, if snow fell, a sheep

would search out the shelter with the most likelihood of it being buried, and go there. If sheep or other animals are to be used throughout the year, then Schoof et al (4) suggested that it would be unwise to use low training wires or Goblet training as the grapes and buds could be easily nibbled.

This need to move the sheep means that they are only suitable for vineyards that are constantly monitored and where experienced sheep handlers (and dogs) are available.

4. Case studies in the UK

Surveys on the use of sheep and other animals in vineyards were done in Britain in 2011 and in 2022

a) 2011

In 2011, the wine guru **Stephen Skelton** was pessimistic *I used my sheep in the '70s and yes they work, but tend to rub against posts and vines. In the summer they will de-leaf but again, put their hooves up on the wires and push posts over. They need fencing up tightly and moving on regularly. Not really worth the aggravation and extra work moving fences'*

In 2011, **John Worontzak**, for a long time the winemaker at **Stanlake Park**, commented that **John Leighton**, the vineyard founder, had used sheep in the 1990s and found that they tended to rub themselves against the vines and cause damage. His favoured types were Texel and Southdown. He stressed that sheep are fine in a winter vineyard, provided that there was sufficient grass and sheep licks.

Giffords Hall in East Anglia

We have successfully overwintered Hebridean on the vineyard for the last six years. The advantage are one less herbicide spray, the ability to put organic matter back into vineyard, two less mowing passes and shorter grass than you would ever be able to achieve with a topper at a time when you really need to heat up the soil.

Another comment was that *'Having kept sheep since 1980 I can confirm that the first wish of any sheep is to die. The shepherd's job is to postpone that moment for as long as possible!'* A similar comment came from, **Bob Nielsen** at **Brightwell** *'Everyone I've talked to says looking after sheep is a hassle. They spend all their time finding new and imaginative ways to kill themselves. Not easy care like pigs who need nothing more than an electric fence and never get ill. However pigs are not recommended for a vineyard unless you're grubbing up - in which case they are excellent! They are also excellent at digging out brambles - they love the roots.'* Brightwell now use cattle in winter. At **Camel Valley**, success was mixed. Bob Lindo commented that *'We had 300 ewes here and the main problem is they rub themselves up against posts etc and loosen them. The secret is to set graze them in smaller areas and rotate them quite quickly with a judicious use of electric fencing.'*

The suggestions from English and Welsh producers who responded to the 2011 survey included the following

- 2 ewes per acre.
- Remove for one week after post-harvest copper spray.
- Dispatch tree eaters to the butcher immediately although in reality they only nibble at the shelter belts; we have never encountered vine eaters and judicious use of salt licks has solved the shelter belt problem in the past.
- Electric fence off new planting (also puts off any deer).
- VAT deductible costs if a fleece, or carcass or two are sold.

b) 2022

Since 2011, more viticulturalists have started to experiment and to try out sheep in their vineyards. One of the most enthusiastic advocates of sheep usage is **Will Davenport** at his organic vineyard in East Sussex. *'We put our Wiltshire horn sheep in the vineyard from November to February. It's very beneficial as they save us a couple of mows in the spring, leaving the grass tidy, spread manure, etc.'*

You do need fencing and a water supply for them. They might rub on posts and vine trunks so trellising needs to be in good condition.

We have our own sheep flock which makes things easy. We can remove them when needed. If you are relying on a local farmer to provide the sheep, make sure he looks after them and you can tell him if you need them removed. Sheep will need daily checking to make sure they are alive and healthy. If you've not had sheep on the field for years your grazing will be very valuable because it will be free of intestinal worms, so it is worth asking the sheep owner to worm the sheep before they arrive – this will help to keep your pasture worm-free in future.

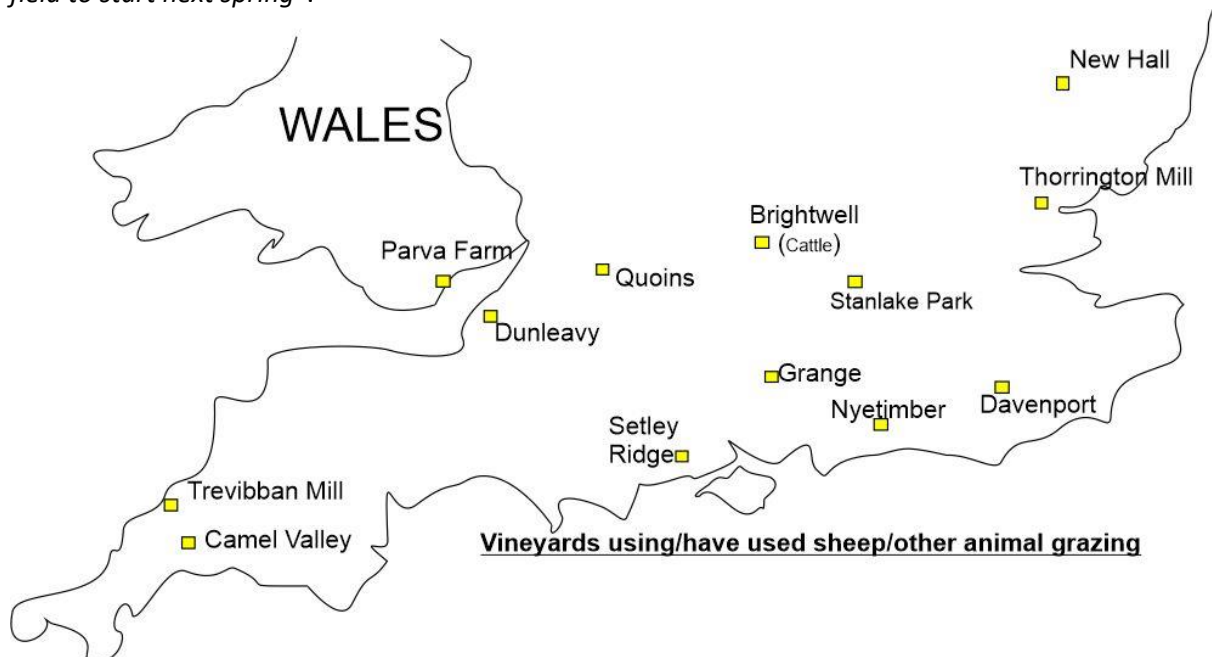
They will eat almost everything, so if you have a green manure or young trees, they may not survive! I don't put them in over the summer as they might eat the vines and also sheep are sensitive to copper.

My only other point is that you do need a method of recovering the sheep. It is tricky rounding up sheep in a vineyard because of the trellising, so it's worth thinking about how they will be gathered up with needed. This could be when you want to remove them, or if they need medical treatment. We have a permanent pen in the corner of the vineyard and can use electric netting to funnel them into the pen.

We don't use sheep in our Horsmonden vineyard because I wouldn't be able to check them daily, there is no water or fencing and there are too many people walking dogs round the vines.'

Parva Farm vineyard have been grazing sheep in their vineyard for since 2000 but only in winter - after the vines have dropped their leaves until the end of March. *'They don't do much damage apart from knocking down the occasional post. They use wooden stakes which rot in time and sheep sometimes rub on them and knock them down. Can't really blame the sheep if the post is rotten! They also usually use the lambs that they are keeping as they are not too big and can get under the bottom wires. With a vineyard of about 3acres they use about a dozen sheep which do a good job at tidying up the grass plus a bit of manuring.'*

Quoins vineyard at Bradford on Avon noted that *"We have just let in the neighbours sheep. Be sure to electric fence any faulty barriers as they can be inventive in finding holes in fences They will also nibble anything green so guard any young trees. Good to keep vineyard in condition and have a clean field to start next spring"*.



From **Two Beacons vineyard** in the Malvern Hills came the comment that 'I've been looking into it and have so far concluded that Shropshire sheep seem like a safe bet as they as used extensively in

Christmas tree plantations, orchards & vineyards mainly in Europe. There has to be grazing for the sheep when not in the vineyard . Someone has to look after them although the stocking rates aren't that high even a few sheep will need attention. Two Beacons uses the high wire Scott Henry system which keeps noses out of the grapes!

Setley Ridge vineyard reported that *'We graze sheep every autumn after harvest for a couple of months throughout the vineyard. We currently have about 50 lambs grazing .We find it removes the need to mow and weed vineyard mechanically saving time and cost.*

This starts the next season with a tidy vineyard and a bit of natural fertiliser thrown into the bargain but be sure that any young vines have guards around them or they may be nibbled but with plenty of grass they should leave the vines alone . We "borrow " the sheep from a local farmer who is delighted to have the extra grazing. At this time of year no need to provide water trough as they should get all the moisture they require from the grazing.

Take account of any sprays you have used and let the farmer know.

Finally , sheep are not very bright . Try and remove areas of brambles around perimeters as they will get stuck in their fleece and they could get cast and die and ideally fence off areas of open water if you have any . Best to remove by January if like us you have lots at spring bulbs and bluebells that they will eat as they emerge .'

From **Cornwall**, some success was also noted. Engin Mumcuoglu at **Trevibban Mill** grazes a specially designed small breed of sheep at his Padstow vineyard and has seen many years of success. He even features it on his wine labels.



Mark Baines at **Thorrington Mill** discovered the benefits of ovine grazing accidentally when sheep escaped into the vineyard. *"The sheep ate leaves in the 'fruit zone' neatly doing the job of a mechanical leaf stripper,"* Mark recalls. *"This is a job that is essential, and normally done either mechanically or by hand to ensure light and air can reach the fruit, giving it the best opportunity to achieve optimum*

yield and quality. Removing the need for mechanised leaf removal saves around £150 – £200/acre.' Fortunately the grapes were at a hard berry stage, so escaped attention! (8)



5. Discussion

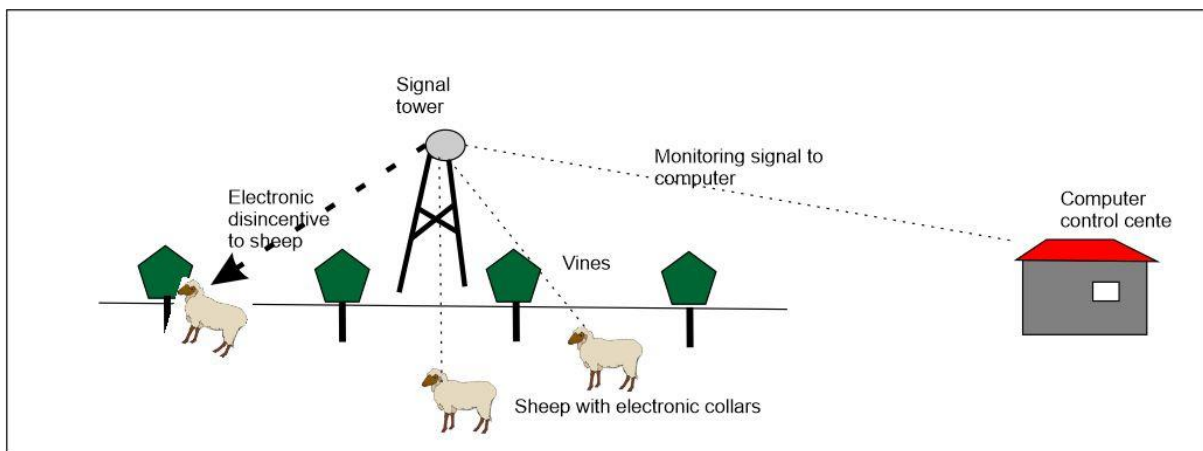
Anyone considering grazing animals in a vineyard must ensure. If the area to be grazed is to be further restricted, then fencing or electric wires need to be installed (and moved) before changes in grazing areas are carried out. A sheep dog is also a vital part of the system. Another problem is that is copper based sprays have been used, the sheep will suffer liver damage.

Ted Rieger Writing in Wine Business listed 4 main factors that also need consideration:

- Irrigation drip lines--Sheep want to go over or under drip lines to pass between rows. Drip lines should either be at ground level, or attached high at cordon level on the trellis.
- Pruned canes left in the vineyard can tangle with electric fence netting and are best removed during pruning operations.
- Livestock need water, so it needs to be hauled to the grazing location, or a water system/facilities can be installed for regularly grazed locations if feasible.

- Refuge area--Another area is needed for sheep when they are not in the vineyard. Think about adjacent lands, forage and fencing requirements. (13)

Most users of sheep in vineyards seem to agree that winter grazing presents few risks, especially with commercial sheep and knowledgeable management of the flocks. Summer grazing is more problematical, unless fencing is used and high-wire training methods are the norm. Even in the case of low bottom wires, grazing is not impossible. The Australians developed a muzzle called a **Winebaa** which lifts to allowed low grazing but which dropped by gravity to prevent munching of grapes if the sheep lifts its head. It does not seem to have been a great commercial success and is no longer available, but the principle is there. Hannibal Lector may have been the inspiration! In Portugal research has taken place on a system called **SheepIT** (12) which transmits information from a collar on each sheep to a transmitter beacon, and then to a computer. If an animal raises its head too far, (e.g. stands on 2 legs to reach grapes) or strays into grape growing zones then an 'electrostatic stimulation' is transmitted to it. The system is at early stages of development.



The sheep themselves can come from two sources. The vineyard may be part of a mixed farm in which case they can be pastured elsewhere on the farm during the grape growing seasons. Shepherds and local ovine knowledge would also be available. They could also be obtained from other farmers, especially those in upland areas who are often keen to obtain winter pasture for their flocks (exclude Herdwicks and other similar thick-coated breeds that are 'hefted' on their mountain pastures). In Shropshire, not a sheep-breeding area, many of the farmers rent out their winter pastures to sheep farmers from Wales etc. as an additional source of income. There is no reason why the vineyards could not involve themselves in such deals provided that the sheep do not bring infections to the land. A survey of vineyards using sheep grazing in the Barossa Valley of Australia in 2016 showed that the majority of users regard rotational grazing and the timing of the grazing to the key factors. In addition, the value of good fencing was also emphasised. (10)

As for other animals, such as cattle and pigs (and even hens) summer grazing is more problematical, since fencing is often needed in order to prevent damage to the vines. However they could form part of the winter ground clearing and help keep weeds down.



A disadvantage mentioned in surveys is that sheep may damage posts and vines by rubbing against them to relieve itching or to remove moulting fleeces.

A final point is to make sure that, if summer grazing is used, then the grapes must be kept away from the sheep, either by high wire training or by ensuring that the grazing area is strictly controlled by temporary fencing of some type. This may also include restricted paddocks within the vineyard between which the animals can

be moved. This will ensure that all the area is grazed and manured, not just the bit that the animals favour!

There seems to be increasing usage of animals in the vineyard, especially with the increasing cost of fuel and herbicides. They are not cheap to obtain and manage but once the infrastructure is in place, they will undoubtedly provide savings – and indeed a source of meat!

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