Vine Establishment Using Polypropylene Proves Effective in the Field. By Graham Due.
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Vine establishment using polypropylene shelters proves effective in the field.

Graham Due

Introduction

A previous paper (Due, 1990) describes a trial using polypropylene tubes as an aid in vineyard establishment. Following that paper, twelve growers have tried the shelters in numbers ranging from several hundred to several thousand. In all, about 8,000 tubes were tested under field conditions in the growing season 1990-1991. This paper discusses the practical use of shelters in the light of that experience.

History and principles of shelters

Shelters were first used as an establishment aid in forestry and are now used in large numbers (Tuley 1983, 1984). They protect young trees from wind and vertebrate pests and also allow the safe use of herbicides. In addition, shelters were found to increase height growth two to threefold compared with well weeded but unsheltered trees.

Rapid establishment is vital for profitable viticulture. Furthermore, weed control and rabbit control are major establishment problems in Australia. A trial involving sites in the Barossa Valley, the Adelaide Hills and Euroa (reported in Due, 1990) demonstrated that shelters had the same effect on vines as has been reported for trees by Tuley (1983, 1984).

In particular:

1. Height growth is increased, amount varying up to threefold, depending on the site.
2. Shelters increased survival on unirrigated rootlings from less that a few percent to more than 90%.
3. Shelters are effective in protecting vines from glyphosate herbicide.
4. Lateral growth is suppressed and there is no need for summer pruning in most cases.
5. Shelters offer complete protection from rabbits, and some protection from wingless grasshoppers.
6. No fungus diseases, and few pests survive the high temperatures inside the shelters (which are about 10°C above ambient). Problems do, however, occur if shelters are applied at the end of the season when conditions are cool.
7. Vines in shelters continued growing later into the season.
8. Nutrient deficiencies seemed to be slightly exacerbated when shelters were applied to vines which were heavily irrigated.
9. The stem of vines grown in shelters is thinner, and internode length is increased.
10. Different coloured tubes produced different effects ranging from etiolation (yellow shelters) to deep green colouration (blue and green shelters).

To this it can be added that vines which were established in shelters in the 1989-1990 season performed normally in the 1990-1991 season.

Practical application of shelters

In many cases, shelters can be added to existing management procedures. However, it is likely that establishment practices can be simplified overall. The single constraint in the use of shelters is that they must be given structural support. This can be done either using a trellis wire or by attaching the shelter to an individual stake which could become a permanent part of the trellis or be discarded. Individual growers will develop different approaches to the use of shelters depending on their special circumstances.

Planting and installation

Soil preparation need not include elaborate weed control measures since herbicide can be sprayed freely over sheltered vines. The procedure at Euroa has been to plant directly into pre-existing pasture with no attempt at weed control, cultivation or ripping. Seedling weeds are sprayed as they germinate after each rainstorm. This minimalist procedure has proved successful at Euroa but different sites may require different procedures; the example demonstrates one possibility.

Vines should be planted early if possible. Detailed data from Euroa shows that growth under unirrigated conditions is fastest between October and late November. Growth rates of 30mm/day were not uncommon during this period (the maximum was 70mm/day). It follows that vines should be planted earlier than normal, because sheltered vines tend to begin growth earlier. Poorly drained soils may prevent early planting.

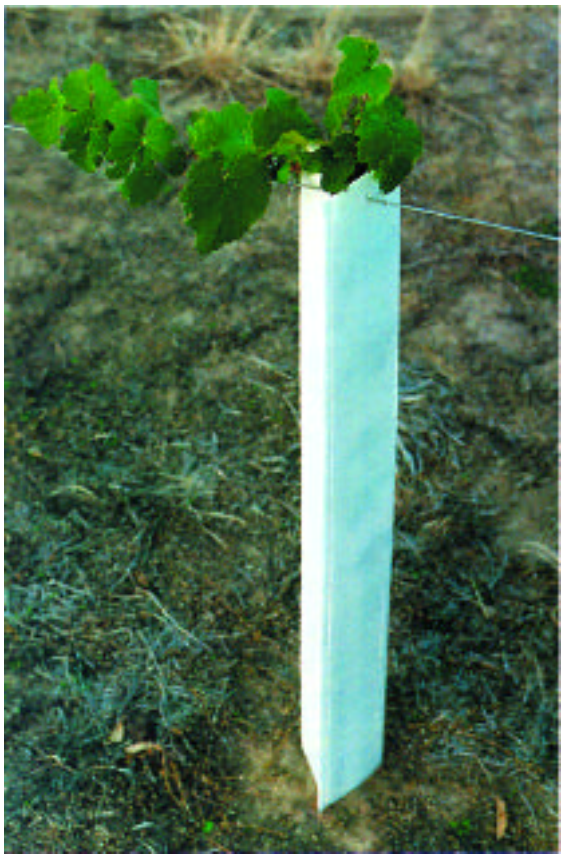

Fig. 1. Bakator vine near the end of season 1 at Euroa (Vic.). The vine was trained along the wire but there has been no other training and no watering. Weed control was ULV Glyphosate. The rootling was planted directly into pasture with no cultivation, no ripping and no fertiliser. Shelters are easily removed.

Installation of the shelters presents few problems in most soils. Normally, the bottom of the shelter is buried, and the top is prevented from sliding along the wire by means of a plastic clip supplied with the shelter. One grower had installed a plastic mulch, and simply sat the shelter on it. Another suspended the shelter from the wire, securing it by a string tied from the wire to the vine. Both these alternative methods proved adequate for the purposes at hand. Note that shelters placed in soil should be made airtight at the bottom. If not, considerable winds will develop in the tubes and draw in large amounts of dirt. The shelters used were strong enough to allow normal "hilling on" of soil.

Wind rarely dislodges the shelters if the top and bottom are made firm initially; no growers experienced difficulties with properly installed shelters, even in windy sites. Ideally, the wire must bear down on the tube and the bottom must be buried 25mm or more. This demands that the distance between the wire and soil is suitably constant.

Irrigation

Since vines in shelters remove little water from the soil, care must be taken to avoid over-irrigation. The roots of weeds and vines must compete for oxygen, and many successful weeds can grow at low levels of soil oxygen. The use of soil moisture measuring equipment is recommended to avoid over-irrigation.

Establishment was attempted without irrigation at Euroa. As stated above, Euroa has a dry growing season and is hot (mean January Maximum 30.2°C). Unirrigated establishment would not normally be considered. Even so, it is clear that vines of some varieties can consistently reach the wire before February. Given appropriate management it is likely that in milder climates (such as Coonawarra) vines could be established without irrigation. Considerable capital and/or operating cost savings would result.

Establishment using rootlings

Establishment from rootlings is normal practice and is well accommodated by shelters. Only one shoot is produced in most cases and that shoot produces inconsequential laterals. Shoots grow rapidly to near the top of the tube, and then more slowly as they emerge into less sheltered conditions; internode length decreases and leaves become thicker and smaller. Topping the vine at this stage produces laterals which can be trained along the wire in the usual fashion.

Some growers remove the shelters in the first season, while others prefer to leave them for the following season to allow continued spraying of weeds. It should be remembered that leaves grown in shelter will be too soft to perform well out of the shelter. A severe setback could occur if the shelter is removed as soon as the vine reaches the wire. Instead, the shelter should be left on until there are several fully expanded leaves outside the shelter.

Establishment using cuttings

Shelters simplify training enough so that the unevenness of a stand grown from cuttings ought not to present a management problem. Once again, Euroa was the only site where a trial was conducted and once again no irrigation was applied. Uncallussed Viognier cuttings of normal quality were planted in late September. They were inserted into a hole made with a crowbar, and watered in with about one litre of water. Growth was slow, and although survival rates were initially encouraging, setbacks through the summer reduced the survival rate to 66%. A few cuttings had, however, reached the wire by 25 March.

There are four ways that growth and survival could be improved. First, callussed cuttings could be used. Secondly, by planting earlier; budbreak was only just under way at 24 October. Thirdly, a water jet could be used for planting to

ensure good contact with the soil. Fourthly, fertilisers could be applied. Further trials implementing these improvements are planned. Trials in milder climates, and/or under irrigation could prove successful.

Incidental use on sluggish vines and replacements

Several growers used shelters on vines which had been slow to establish, and on replacement vines scattered throughout the vineyard. Shelters have proved very effective in these situations.

Overview

The results reported for the previous trial (Due, 1990) have been borne out in the field. In all but one case growers noted increases in growth. The exception was drip irrigated vines on a poorly draining soil, there was weed competition, and nutrient deficiencies were observed. The overall situation suggests poor soil oxygen levels and is similar to the one site which did not perform well in the 1990 trial (Lyndoch; Due, 1990). No growers reported difficulties with fungus disease, and none reported difficulties with lateral growth.

Application has been simple, and several adaptations of the expected procedure have already emerged demonstrating that shelters can be applied in conjunction with plastic mulch and in stony soils. Several growers achieved good results under conditions which had previously proved intractable.

Cost savings could be expected to result from earlier establishment and cropping, decreased weeding costs, decreased training costs, decreased irrigation costs, and possibly decreased expenditure on planting material. Trials are recommended to develop optimal establishment procedures and assess the associated cost that shelters have immediate application in difficult establishment situations.

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Literature cited

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