Trees in focus

APN 13

Arboricultural Practice Notes

Girdling, Constriction and Ring Barking

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Arboricultural Advisory and Information Service

Summary

Trees can be damaged by many living (biotic) and non-living (abiotic) agents and the symptoms may be very similar. When the damage is caused by a mammal, including man, removing the bark from around a part of a tree diagnosis should be relatively straight forward. The commoner causes of girdling and constriction and possible preventative measures are reviewed.

Introduction

Trees are sometimes ring barked intentionally, but more frequently as a result of negligence or ignorance. This Note looks at the causes and responses of trees to mutilation of the trunk and reviews treatments for damaged trees.

What is Ring Barking?

'Ring barking', which may also be described as girdling, is the removal or severance of a complete band of bark from around a stem or branch of a tree. The shoots above and beyond (distal) the debarking will usually die, but if the ring is incomplete and strips of bark remain intact the distal parts may survive. However, as with any bark wound the flow of fluids, (sap), from the foliage to other parts of the tree will be disrupted causing the tree to become stressed. This in turn can result in dieback in the crown and root system and colonisation by wood decaying organisms (e.g. fungi).

A wound to the bark will stimulate the production of callus tissue, but the speed of its growth may be insufficient to repair or bridge most ring barking wounds. The resultant dead wood developing distal to the ring barking may become a potential safety hazard to people and property.

Any break in the bark can allow the entry of decay causing organisms, but wound size is important. The larger the wound is the greater the severity of decay (Pawsey and Gladman 1965). Also, the severity of decay may be further increased if the xylem tissue is broken (Strobbe *et al* 2002). Therefore damage to the bark may reduce the safe life expectancy of the tree despite the wound being closed (occluded) eventually by the callus.

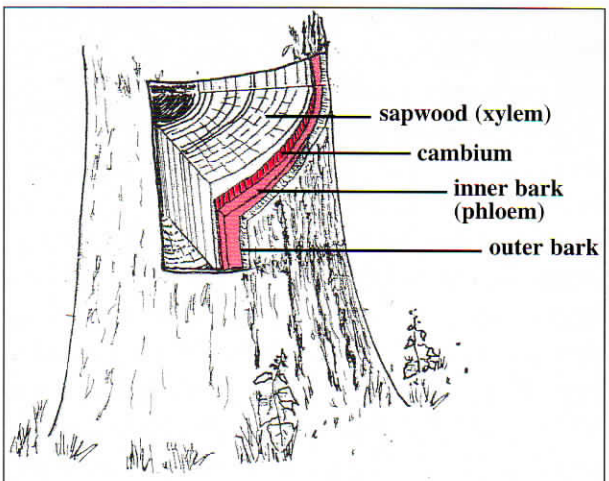

Figure 1. The stucture of woody stems.

The term ring barking generally refers to more than the removal of just the outermost layer of protective bark as occurs in harvesting cork from the Cork Oak (*Quercus suber*). Ring barking will generally involve removal of all the tissue from the outer bark through to the sapwood (xylem). This includes the outer bark,

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the inner bark (phloem) and the cambium, (figure 1). The cambium is a thin layer of living cells that, through cell division, differentiates to produce xylem on the inside and phloem on the outside. Destruction of the cambium, therefore, prevents the production of both new wood (xylem) and phloem tissue.

The phloem or inner bark performs the important function of transporting synthesised carbohydrates down from the leaves to other parts of the tree including the roots. Roots depend on leaves for the food (energy source) they need to grow and absorb water and nutrients. The outer bark is the layer that protects the stem and branches from desiccation, extremes of hot and cold weather and physical impact damage. It also acts as a barrier to attack from insects and pathogens. The outer bark is formed as new phloem cells produced by the cambium push the inner bark phloem cells outwards. As the old phloem becomes remote from the cambium it dries and hardens. The inner and outer bark together, are generally referred to as Bark.

Ring barking may occur as a result of a single event or an accumulation of events over a period of time and the consequential death of stems and branches may not be apparent for a long time. These events may be caused by domesticated or wild animals, disease- causing organisms or by man accidentally or deliberately. Deliberate damage may take the form of planned tree management, vandalism or criminal intention to kill a tree or trees.

Ring barking in cultural history

Ring barking has been used for centuries as a means of clearing woodland. The dead standing trees are allowed to disintegrate and so removing the need to clear vast amounts of lop and top. For similar reasons it was a technique advocated when harvesting coppice poles. The useable poles were cut for market and the remainder were left uncut, but ring barked to encourage the production of new basal shoots (figure 2) (Tansley 1968).

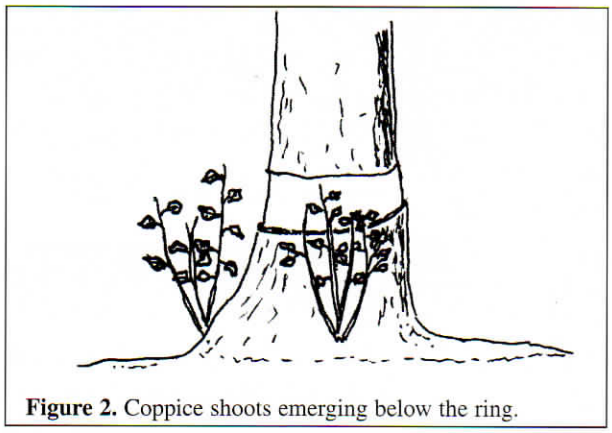


Figure 2. Coppice shoots emerging below the ring.

Between 1650 and 1830 European settlers in North America cleared vast areas of trees by ring barking their stems (Rackham 1986). The settlers discovered that American species were more susceptible to this treatment than European species.

In the 1960s and 1970s ring barking the lower part of the main stem was used extensively in southern England as a cheap method of clearing, for replanting, what was then classified as scrub broadleaved woodland. The larger trees were ring-barked and to prevent coppice growth from below the ring the wound was treated with chemicals. The ring was cut to form a girdling 'frill' (figure 3) into which a mixture of the herbicide 2,4,5,T and oil was sprayed or poured. 2,4,5,T disrupts the metabolism of the tree, but not all tree species are susceptible to it. This treatment no longer has approval[1] 2,4,5,T is therefore no longer available although the application of a highly soluble systemic herbicide whilst the tree is still alive could be an effective alternative.

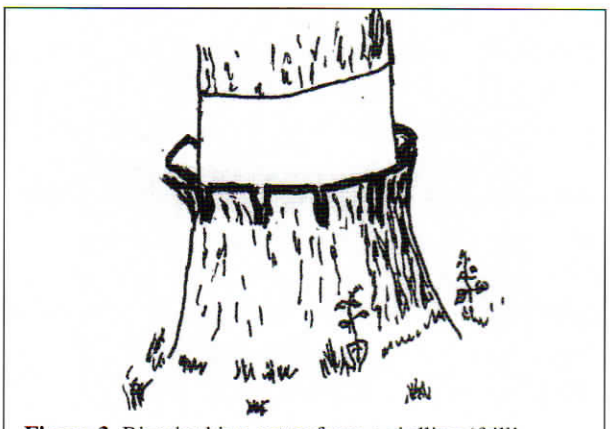


Figure 3. Ring barking cut to form a girdling 'frill'.

[1] *Control of Pesticides Regulations* 1986 and the *Plant Protection Products Regulations* 1986

In more recent times the practice of ring barking large trees to create a reservoir of dead standing wood to enhance wildlife populations and species diversity has become fashionable and is actively encouraged by wildlife conservationists.

Tree Management

A tree that is ring barked on the main stem will not sustain its roots which will survive only until the stored carbohydrates are used up – this may be several years in a mature tree. Therefore ring barking, before felling and preferably during the growing season, is a technique sometimes used to reduce the often-intractable problem of root sucker formation. This practice of depleting roots was also tested as a pre-felling treatment with the aim of controlling the spread of Honey fungus (*Armillaria* spp.). The hypothesis was that post felling the stump and roots of a healthy tree, that had been depleted of carbohydrates, were less likely to become colonised by Honey fungus and therefore act as a reservoir of infection to other or replacement trees. Also, ring barking could possibly result in the roots being more easily colonised by other saprophytic fungi, which in turn would reduce the volume of material available to Honey fungus. The results of ring barking trials in Britain showed that a more rapid decay of roots occurred in treated than untreated trees, but this did not provide the expected benefit of reducing the mortality of trees planted subsequently (Redfern 1968).

Selective thinning of woodland and in particular plantations by ring barking unwanted trees (Reque and Bravo 2007) is practiced in North America, but it has not found favour in Britain. The main advantages of this technique are that the risk of wind blow is reduced due to a gradual opening of the canopy and an increase in wildlife species density and diversity due to an increase in volume of standing dead wood. The disadvantages are that there is no marketable thinning material produced and the ring barked trees might sprout vigorous coppice shoots from below the ring. There is also a safety issue when the public have access to the woodland.

Negligent or wilful damage

Poor tree management practices and careless green space management are frequent causes of accidental damage to trees. Impact damage to roadside trees from motor vehicles and from mowing machines (figure 4) to trees growing

Figure 4. Mowing machine damage.

in amenity grass is unfortunately all too common as is damage to the lower stems of young amenity trees from 'strimmers' (Patch and Denyer 1992). The latter should be well known and readily identified. It is also not unknown for a tree to be inadvertently ring barked when severing ivy. These incidents are all avoidable with care and skilled workmanship. They should not be tolerated!

Trees are ring barked wilfully, often in anger by a third party, with a chain saw, hand saw, axe or even a knife. The tool is drawn around the tree severing the bark and often cutting deep into the sapwood (xylem) creating a full or complete ring around the circumference of the tree. The tree may not be fatally wounded if the ends of the saw cut do not meet or the cut fails to extend through the natural flutes in a stem. A high level of skill is required to achieve a closed ring, especially on a tree trunk that is heavily fluted or buttressed. A complete

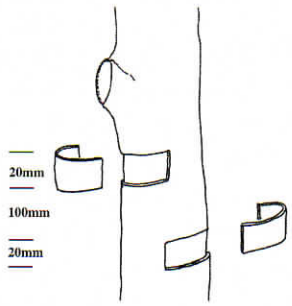
encircling cut will usually not only kill the tree, but because of damage to the wood may also leave the tree standing in a potentially dangerous and unacceptable condition.

Beware

Deliberately ring barking, with the intention of killing a tree that is either protected by a Tree Preservation Order (TPO) or within a Conservation Area (CA) is a criminal offence. Even if the tree does not die, the offence of 'damage in a manner likely to destroy' is the same as that of 'destruction' of a protected tree and carries the heaviest penalties available to Courts in respect of TPOs. Killing trees by ring barking does not negate the requirement for a felling licence

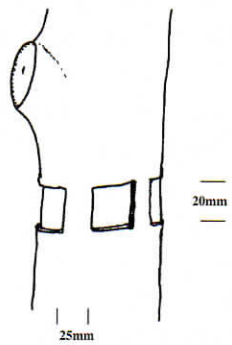
Box 1: Controlled Ring Barking method for apple and pear trees:

This involves cutting out two strips of bark each approximately 20mm wide and extending at least half way round the trunk. These are made on opposite sides of the tree in a way that the flow of sap is deflected but not interrupted completely. The effect of the ringing on the tree can be intensified if the ends of the cut bark strips are overlapped slightly, but there must be a minimum vertical gap between the semi circles of 100mm.



Controlled ring barking.

A less severe approach is to remove 20mm wide sections of bark in a ring from around the trunk. There should be at least 25mm of untouched bark left between each section.



Section ring barking.

Ring barking and harvesting

Tree functions may be manipulation by ring barking (Bush 1946). Fruit bud production in apple and pear orchards is sometimes encouraged at the expense of shoot and foliage growth by the practice of 'controlled ring barking' (**Box 1**). An alternative method used by fruit growers to reduce shoot extension growth on young vigorous trees is often referred to as 'bark ringing' (**Box 2**). This involves excising with a sharp knife a narrow strip of bark around a trunk at a height of approximately 1m from the ground – that is above the root buttresses and remote from major flutes in the trunk.

Box 2: Bark ringing method for young vigorous apple and pear trees:

- First measure out the width of the band (a useful aid is to stick adhesive tape around the trunk to guide the two parallel cuts).
- The band must be only 3mm wide on a small tree, graduating to no more than 10mm on a very large tree.
- Score the band with a knife.
- Cut through the bark and the cambium layer and remove the bark within the band down to the sapwood all the way round. Do not damage the underlying wood.
- Finally seal the wound immediately with several layers of water-proof adhesive tape. The tape must cover the wound without touching the cambium layer.

Bark ringing should be done in spring to enable the wound to callus over by the autumn when the waterproof tape may be removed with care. The following year the tree should produce much more blossom and consequently a much heavier crop of fruit

This technique has not been used on ornamental trees, but there is no reason why similar effects should not be achieved. May also be used for temporary slowing of the growth of trees that are too vigorous for their location.

Ring barking procedures on Apples (*Malus* spp) should be done only in April and May between the pink bud stage and petal fall. Controlled ring barking must be carried out skilfully and carefully otherwise the tree may die or be seriously harmed. It should therefore only be used with caution and it should never

be used on stone fruit trees (Cherries (*Prunus* spp) etc'), as they are not tolerant of this type of treatment and will almost certainly be killed. Partial ring barking is used in some regions of the world to harvest sap flow for example to tap for rubber, maple syrup and birch sap.

Ring barking in nature

Several species of wild mammal remove bark from trees, but the effect is usually dieback distal to the damage and is the same as that following man-made damage. Ring barking by mammals is a deliberate form of damage as it is always associated with or triggered by a specific behavioural activity such as feeding, social interactive aggression between individuals or boredom. It is never accidental. With the exception of damage by **Beavers** (*Castor fibor*), which is made with the intention of killing the tree, death of the tree or part of the tree is always secondary to the original cause. Ring barking may occur on a single occasion or it may be the result of the accumulation of more than one damaging event over one or more years.

Where on the tree the ring barking occurs depends on the species of damaging animal and in some situations the weather conditions at the time (Hodge and Pepper 1998).

Field voles (*Microtus agrestis)*, for example, are common residents of rough grassland and will frequently girdle the roots and lower stem of any young conifer and broadleaved trees present. The damage will be up to the height of the surrounding vegetation. They remove and eat the bark at any time of year; the most likely time is late winter and early spring when animal numbers are high and their main food, green grass, is in short supply. **Bank voles** (*Clethrionomys glareolus)*, unlike Field voles will climb pole-stage trees within woodland and hedgerows and ring bark their stems and branches. However, this form of damage is rare.

Rabbits (*Oryctolagus cuniculus*) will ring bark the lower stem (up to a height of 500mm) of most tree and shrub species of most ages (figure 5). Thin barked trees such as Beech (*Fagus sylvaltica*) and Ash (*Fraxinus excelsior*) are particularly vulnerable as are apple trees. Cox's Orange Pippin is probably the most extensively and severely damaged variety. Ring barking occurs during winter and early spring and especially during periods of prolonged snow cover. Deep snow around trees will enable rabbits to ring bark further up the stem than normal.

Figure 5. Ring barking by rabbits.

During May, June and July **Grey squirrels** (*Sciurus carolinensis*) will ring bark the stem and branches where the bark is relatively thin on most broadleaved and conifer species. Bark is removed as a result of aggressive social behaviour and this activity is high in years when squirrel numbers are high and when there is a large proportion of juveniles in the population. There is also a link between bark removal, phloem thickness and tree vigour (Kenward *et al.* 1988). The thicker the phloem the easier it is for a squirrel to peel off the bark. The most vigorous trees, those that have the thickest phloem layer, are at greatest risk of being ring barked.

Fraying by male deer, that is the rubbing of antlers to remove the covering of velvet, often results in the loss of bark around the entire

circumference of a young whippy 'sapling' tree. **Roe deer** (*Capreolus capreolus*) bucks mark territory by similarly rubbing the gland between their antlers against a young tree. This is a less violent activity than antler cleaning and seldom ring barks the tree.

Large farm animals such as **sheep** and **horses** will bite off the bark from unprotected trees. The latter will ring bark trees, particularly in hedgerows, for food in late winter in some years or as a displacement activity, at any time of year, as a result of boredom. **Cattle** utilise trees as rubbing posts and repeated rubbing over a period of time may wear away the bark from around a tree. Deep flutes in the trunks of mature trees may retain channels of bark avoiding a complete ring of bark being rubbed away allowing the tree to survive and possibly eventually recover provided protection is given.

Root infecting fungi can kill trees. When an infection spreading along a root reaches the root collar it can girdle the stem.

Note: Occasionally the foliage on small twigs, particularly those of Yew (*Taxus baccata*), may brown and die. Examination often reveals a narrow strip around the twig where the bark has been removed during the maturation feeding of adult weevils.

Constriction

Strangling or constricting a stem or branch of a tree does not physically remove a ring of bark, but it can damage the cambium layer to an extent that it can have the same effect as ring barking. The parts of the tree distal to the point of constriction may die. Alternatively, a constricted stem or branch may not be able to develop sufficient diameter growth to counteract bending forces as the tree continues to grow upwards and outwards. This often leads to stem breakages during high winds or under the weight of snow (figure 6).

Strangulation is generally the result of bad practice, (e.g. sometimes ignorance), or poor maintenance or a combination of the two.

Figure 6. Tree stem snapped at the point of constriction by tree tie.

Occasionally, recently planted large ball-rooted trees suffer poor growth or dieback because the main stem had been constricted during the planting process. In such cases the tree had been lifted using a sling secured in a strangle around the lower stem at the approximate balance point between the aerial parts and the root ball of the tree. Such action is bad practice and should be avoided because the considerable weight of the tree supported on the sling can crush and kill the cambium or slough the bark.

Trees are sometimes used inappropriately as straining posts for temporary fencing. The fence line wire or wire mesh netting is secured in place by winding it around and stapling it to the stem of an established tree. All too often the temporary fence is left in place long after the need for one is past and it becomes embedded in the tree. This is a problem that is particularly associated with hedgerow trees. Farmers will close a gap in a hedge by tensioning one or more strands of barbed wire between two trees – one on either side of the gap. Not only is this bad for the tree it also renders a significant hazard when the tree has to be felled and cut up.

Other causes of strangulation include tree ties (figure 7), guy ropes and wires that have not been loosened or removed and spiral guards that have been left in place long after the risk of damage has passed (Figure 9). Tie-on labels

Figure 7. A neglected tree tie.

Figure 8. Damaged tree as a result of incorrect choice of guard

if not removed from planted fruit and amenity trees can have the same growth inhibiting effect as controlled bark ringing. Also, loops and collars used to secure lights or CCTV cameras and their associated cabling can, if neglected, become increasingly tightly wound around an expanding tree trunk or limb. Bracing used to support structurally weak branches in the crowns of over mature or veteran trees, if not constructed and maintained in accordance with approved guidelines (BS 3998), may cause strangulation. Similarly in parks, gardens and play areas, collars fitted around trunks and branches as anchoring points for observation platforms, climbing frames and tree house structures must have a built-in ability to be opened out to allow for natural expansion of the tree's circumference. In fact anything that is placed around the tree and not maintained may result in damage.

Note: Pathogens that affect the shoots and twigs of trees cause dieback. The junction between live and dead tissue may have the appearance of a constriction.

Prevention is better than cure

Damage prevention is always better than cure and therefore the risk of ring barking should be either avoided or, at least, reduced as far as possible. In order to achieve these aims it is necessary to understand what leads to the damage in the first instance. Psychologists would probably explain ring barking by vandals as being indicative of boredom and /or frustration. There have been occasions when ring barking has been the result of wilful damage to a tree in a third party's property that is seen to be a nuisance, but about which the owner will not cooperate. So the question is why and how can these emotions be countered? Deliberate, malicious ring barking usually results from disputes and is considered unreasonable by the vast majority of people. It therefore can be best prevented by good neighbourliness and open dialogue. However, some people will always be frustrated enough to pursue direct action to achieve their selfish desires.

Damage caused by wild and domesticated animals may also be triggered by boredom or frustration although the need for food may also have some validity. Therefore an awareness and understanding of existing circumstances and potential threats is important when preparing tree management plans.

Fully trained operators properly supervised and equipped with the appropriate tools will reduce the risk of wild animal damage by reducing the animal population, providing alternative food sources or installing barriers (Pepper *et al* 1985). Damage to trees by domesticated

animals is generally the result of poor husbandry.

The provision of guards, particularly around immature street and parkland trees, should reduce the risk of accidental damage from strimmers, mowers, pushchairs, cycles and motor vehicles. Well planned and executed maintenance procedures should be in place to ensure that tree ties, guards and anything that could form a tight collar around a branch or stem, are loosened in spring to accommodate tree growth (Patch 1989). Also, they must be removed as soon as they are no longer performing a useful purpose. Stakes, ties and guards for example, must be removed once they are no longer required or effective. If they cannot be removed because the tree is still at risk of being damaged, but to leave guards may result in them causing damage to the tree, there is likely to have been a deficiency in the cultural practices and/ or the chosen design or possibly the construction of the support or guards (Pepper *et al* 1985).

Tree guards come in a wide range of designs, shapes and sizes and are fabricated in a range of different materials. It is therefore important that the guard used is chosen carefully (figure 9) and maintained so that it has a design life that will be effective against the identified damaging agent or agents and for as long as those agents pose a risk to the tree. Some guards are designed for a specific purpose, for example, those that protect against damage by 'strimmers'. The choice may then be limited, but neglect of the guard can still result in constriction damage to the tree. Alternative methods of vegetation control should be sought if timely removal of a strimmer guard cannot be guaranteed.

Young trees are protected from **Field voles** with split plastic tube tree guards. The top of the guard must extend above the height of the immediate surrounding vegetation. If it does not a vole will be able to climb up the vegetation and damage the tree above the guard. Tree shelters can give protection against **Field voles** provided the shelter is pushed into the ground to ensure that there are no gaps between the bottom of the shelter and the ground and the top of the shelter is above the surrounding vegetation. Any **vole** inside a shelter will, under the protection the guard gives against predators, almost certainly ring bark and probably completely gnaw off the enclosed tree.

Figure 9. Neglected spiral tree guard.

Effective weed control, intended primarily to reduce competition with young trees (Davies 1987), by creating bare ground conditions, also reduces the incidence and severity of bark stripping damage by **voles** and coincidentally the need for strimmers etc. However, it should be remembered that when mulch mats are used to control vegetation the mats must be secured to the ground around their perimeter to prevent voles tunnelling beneath the mat and, out of sight of avian predators, ring barking the tree roots.

Because of their ability to climb there is no reliable way that trees can be protected from ring barking by **Bank voles**.

Wire mesh and plastic mesh or tube guards with a minimum height of 0.6m are the principle method of protecting trees from **rabbits**. Spiral plastic guards are frequently used to protect trees against **rabbits** and were

originally intended for use on feathered trees where the spiral can be wound around the tree stem between the branches. Unfortunately, because they are cheaper than most other types of guard, and can be applied without any particular skill, they are frequently applied to the clean pruned stems of standard trees and whips. On a clean stem and without the support of branches spiral guards collapse in warm weather or as they degrade over time and loose their rigidity. The collapsed guard, with overlapping spirals that bind on themselves, can form a constriction around the stem. As a consequence all the parts of the tree above the constriction are likely to die. When death occurs, coppice shoots often sprout from below the constriction creating a multiple stemmed tree (figure 9) and that is unlikely to be acceptable in an amenity planting of single stemmed trees.

An alternative to guards is to paint or spray the vulnerable area of the tree with the chemical repellent 'Aaprotect' (Pepper *et al* 1996). This product repels by irritating animal tissue particularly that of the nose and mouth of the gnawing animal. However, Aaprotect[2] should not be used in areas of public access because it may cause skin disorders such as dermatitis.

Controlling **squirrel** numbers is the recommended method of preventing ring barking of stems and branches by Grey squirrels. Arboricultural Practice Note 7 *Grey squirrels in parks, urban woodlands and amenity plantings* gives details of the methods available.

Repairing/remedial action

There are accounts of severely ring barked trees repairing themselves naturally by closing the wound with callus growth from above and below. Callus may also develop over the whole wound surface, in wounds caused during the growing season, from exposed and undamaged cells (ray parenchyma) and young differentiating xylem cells (Stobbe *et al* 2002). There is some evidence that species of Lime (*Tilia*), for example, may be able to grow new bark from a debarked area provided drying can be restricted. Wrapping black polythene sheeting over the wound can be unsightly but it may be beneficial on a valuable tree. Natural repair in this way is however extremely rare and should not be expected to occur. Once damage has occurred some repair using fresh bark may be possible (Garner 1958) but the success will depend on tree species, habitat, time of year and the period since the damage happened. The sooner remedial action is taken after the damage has occurred the greater the chance of success. Narrow wounds, such as those caused by a hand saw blade, may heal naturally.

Repairing girdling wounds with bark implants or scions (bridge grafts) may in some situations be possible (**Box 3**). It is known that fruit tree growers have used bridge grafts successfully to save trees that have been ring barked by **rabbits** (Bush 1946).

Bridge grafting is a labour intensive operation and there is a low probability of it being successful. It should therefore only be considered as a last resort action to save a rare or high value amenity tree.

There are no alternative options available, including chemical formulations, which will enable a tree to recover from ring barking. On the occasions where ring barking is incomplete it should be possible, in theory, to treat chemically the vertical edges of the remaining bark to encourage an increase in callus growth and therefore a more rapid increase in the volume of tissue capable of transporting liquids down the tree than would otherwise occur naturally. Unfortunately, in practice, although there is some evidence that there are chemicals that may have this property none are currently available for use. Therefore restoration of the phloem must rely on natural callus growth. However, the site of an incomplete ring barking wound is likely to remain an entry port for decay causingorganisms and a structurally weak point that may fracture during periods of strong wind or heavy snow.

[2] Aaprotect may, under the EU *Plant Protection Products Directive*, be withdrawn at sometime in the future. Therefore, its current status under the *Control of Pesticides* Regulations 1986 must be checked before it is used.

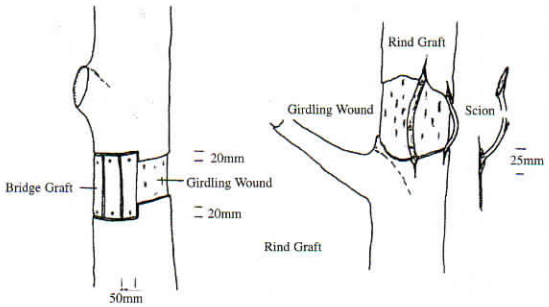
Box 3: Bridge Grafting

Bridge grafting is the reconnection of the upper and lower edges of the debarked ring using either strips of fresh bark or scions. The principle upon which the technique is based is that the tree does not die immediately following girdling. Water continues to pass up the xylem, the leaves continue to function but the movement of carbohydrates down the tree is prevented. The starved roots take some time to die so allowing time for the reconnecting graft to become established.

1) The technique of bridge grafting with bark involves:

- Cutting away a length of bark, 20mm wide from above and below the girdling wound.
- Patches of bark 50mm wide and as long as the newly enlarged girdle are cut from elsewhere on the tree.
- The patches are placed to cover the newly exposed wood and secured with small nails.

It is important that during and after the repair procedure the girdle and patch area are kept moist. They should be immediately covered by tape to prevent drying out.



Bridge grafting with bark Bridge grafting with scions

2) Bridge grafting with scions is preferred when the area to be bridged is wide. It involves:

- Cutting sufficient length of dormant scions to bridge the damage and to enable ease of manipulation. If dormant scion material is not available freshly collected defoliated shoots of the past season's growth may be used.
- At each end of the scion a diagonal cut is made below a bud.
- The lower end of the scion is inserted into a 25mm incision made with a pruning knife in the bark below the girdle.
- The bark is eased away from the cambium on either side of the incision so that the cut surface of the scion can be positioned in contact with the exposed cambium of the stem. The scion is secured with a nail.
- The upper end of the scion is attached in a similar fashion whilst ensuring that the scion is bowed out 40 to 50mm away from the girdle.
- The upper and lower grafts (rind grafts) are sealed with tape or petroleum jelly to prevent water entering them.
- Sufficient scions are prepared to allow one bridge for every 25mm of stem girth.
- In the event that the girdle is very wide two scions can be joined together with a whip and tongue graft.

It should be remembered that after grafting the tree should be protected if it is still vulnerable to the debarking agent/damage.

Is action worse than the cause?

Mention has been made of the animal repellent Aaprotect and this may suggest the use of anti vandal paint is acceptable. Unfortunately the principal ingredient of these products is usually grease and that can clog the bark and kill the underlying cambium creating girdling damage.

From time to time bands are painted around the trunk of a tree for identification or as a marker. Use of oil-based paint can prove damaging to the tree. Equally problematic can be attempts to correct the error by using paint stripper. Only specifically formulated 'tree paint' should be applied to trees.

A colleague has experienced one incidence where horses were damaging an avenue of trees. The wife of the owner recognised the cause of the damage and instructed the gardener to paint the trunk of each tree from ground level to a height of 2.5m. Fine in theory but disastrous in practice because creosote was used! The consequence was that the avenue was lost.

Conclusion

On very rare occasions, in the management of trees and orchards, ring barking may be considered a legitimate management technique. However, it is mostly an unplanned and unwanted occurrence of nature, or man's negligence and complete ring barking generally results in the death of all living tissue beyond the ring. Furthermore there are no reliable treatments available that will repair or mitigate the after effects of ring barking. Therefore, prevention of ring barking through good husbandry and sound tree management practices must be the primary objective.

Acknowledgements

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Derek Patch supplied photographs and drawings are by the author.

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