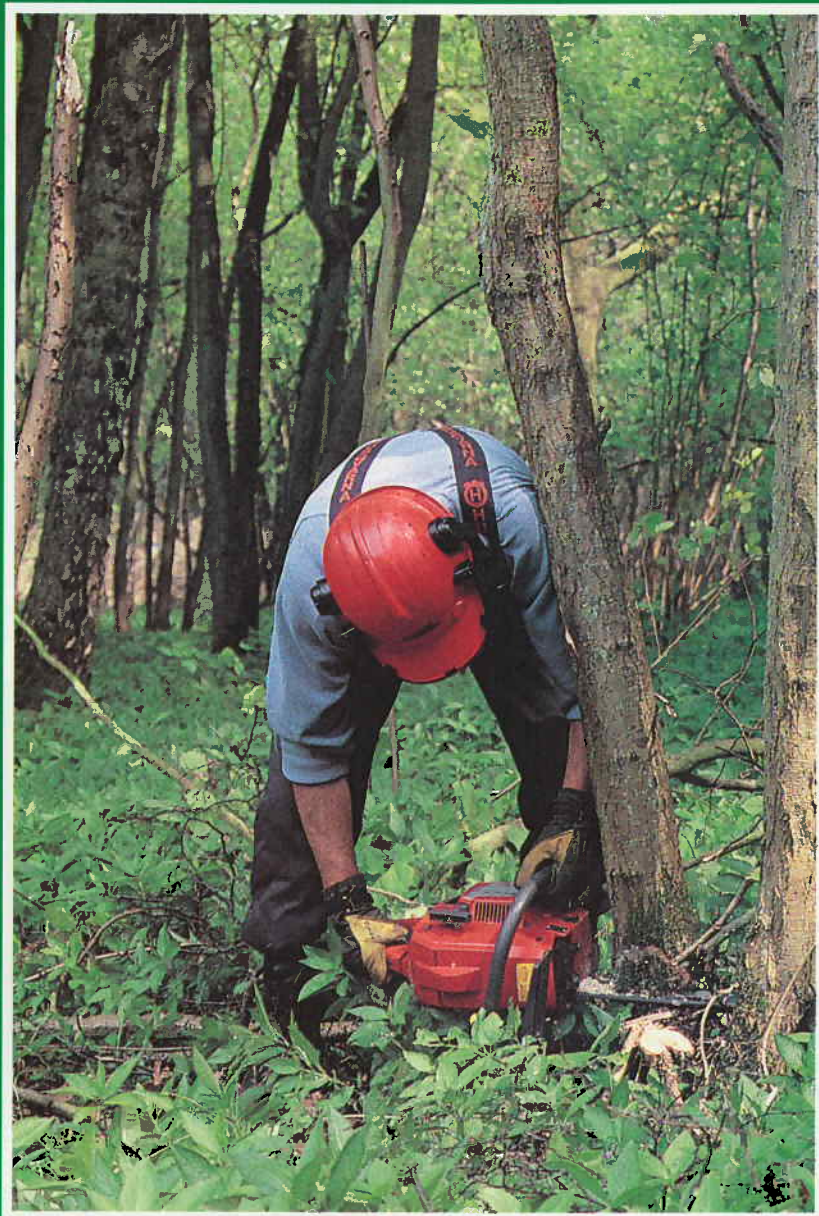


Research Information Note 259
Issued by the Research Division of the Forestry Authority

MANAGEMENT OF COPPICE STOOLS

by Ralph Harmer



Abstract

Coppice is a traditional method of woodland management in which stools are cut on a regular cycle; this provides a valuable supply of small-wood and a variety of habitats for wildlife. This Note describes management of the stools which make up traditional,

mixed-species coppice. The information presented includes establishment, method of cutting, position and timing of cut, protection from browsing and management of standards.

Introduction

Coppice is an ancient system of woodland management which has its origins in prehistory and has often been used to provide regular supplies of small-wood with many uses, including fuel, building, fencing, charcoal, tan-bark, turnery and crafts. However, the active management of coppice woodlands has been declining for more than a century and many of those remaining are neglected. Over the past decade a growing awareness of the importance of coppice for conservation and a revival of traditional country crafts have led to a resurgence of interest in these woodlands. Current government policy is encouraging the development of community forests and stimulating public participation in woodlands; this will probably lead

to the creation of new areas of mixed coppice that are managed for their wildlife interest, suitability for community involvement and potential to yield produce for local use. Although this traditional type of woodland has a different role from that of short rotation coppice crops of clonal willow and poplar, which are currently being promoted as a source of non-fossil fuel, the principles of stool management are often similar.

The declining experience and knowledge of coppice management was recognised in 1902 by Nisbet, who suggested that *'we need simply to try and revert to the better manner in which these operations seem to have been carried out in the days of Stevenson and Evelyn'*. This recommendation is even more appropriate today.

What is coppice?

Coppice is a word that has often been used rather loosely to describe silvicultural systems, woodlands, the stools and shoots which make up the crop, the action of cutting the crop and the process of regrowth after felling. This section defines the terms which are used in this Note.

Coppice is a forest stand composed of **stools** that produce **coppice shoots** which form the major part of the crop. The stand may be **simple-coppice** or **coppice-with-standards**. In simple-coppice the crop is clear felled to give even-aged stands which may be of a single species such as hazel or sweet chestnut. Coppice-with-standards is a system in which selected stems are retained at each felling to form an uneven-aged overstorey of **standards** which are removed selectively on a rotation which is a multiple of the coppice cycle.

The **coppice stools** consist of the roots and stumps, which give rise to the coppice shoots that are cut at regular intervals. New coppice shoots can develop from two types of bud. Most commonly they originate from **dormant** buds at the base of the stump. Less frequently they grow from **adventitious** buds which develop from callus tissue formed between the bark and wood at the cut surfaces (Figures 1a and 1b). Although this type of development has been reported for poplars, willows, elms, hornbeam, lime, horse chestnut, cherry, alder, red alder, birch, beech and sycamore, adventitious shoots are relatively uncommon, and often short-lived.

To **coppice**, or **coppicing**, describes the process of felling or the production of new shoots by stools. The part of a woodland coppiced is called a **coupe** but is also known as a sale, fell, cant, panel or burrow depending on locality. In well managed coppice the coupes are cut on a regular cycle of 5–25 years depending on species and product required.



Figure 1a: New shoots growing from dormant buds on recently cut hazel.



Figure 1b: Adventitious shoots growing from cambium on stump of 60-year-old beech.

Establishment of new coppice stools

Many broadleaved species regenerate from cut stumps by coppice shoots but there are a number of species which are especially suitable for use in coppice woodland including ash, oak, chestnut, willow, lime, field maple, rowan, hazel, alder and hornbeam.

On unwooded sites new stools are best established from robust transplants planted at 1.5–2.5 m spacing. The initial cut to stimulate the formation of coppice shoots can be made after 1–2 seasons' growth but it may be better to allow 5–6 years for establishment.

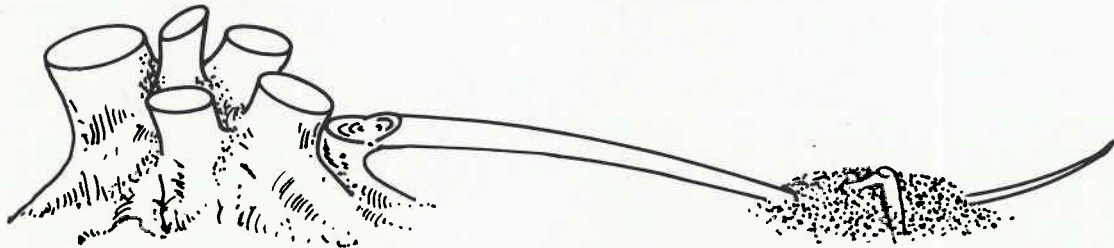
In existing coppice woodlands new stools can also be established by **layering** shoots on existing stools (Figure 2). Select shoots 2.5–5.0 cm diameter at their base, cut through almost completely, peg the shoot flat to the ground and cover with 10–15 cm of soil where rooting is required. This is probably best carried out during the winter. A single stool can be used to produce

many layers which can be transplanted when well rooted. Alder, ash, chestnut, hazel, lime and willow respond well to layering.

Coppice stools of many broadleaves can also be established by felling older trees with single stems but success varies with species, age and vigour.

Although mixed coppice woodlands are likely to be the most diverse, the differences between species in growth rates and lengths of coppice cycle will make intimate mixtures more difficult to manage than either single species woodlands or large groups of separate species. The final distance between stools will depend on species and length of the coppice cycle; the longer the rotation the wider the spacing. Hazel stools grown on a seven-year rotation may be about 2.5 m apart, those of chestnut with a fifteen-year rotation spaced at 3–3.5 m, and ash or oak coppiced over 15–25 years at 4–7 m.

Figure 2: Layered shoot on recently cut stool.



Management of coppice stools

Despite the historical importance of coppice as a method for managing woodland, and the increasing desire to reintroduce coppice working for both productive and conservation purposes, there have been very few systematic studies of different methods of managing stools. Most techniques have been derived from practice rather than experiment.

Methods of cutting

'Cut not above half a foot from the ground, nay the closer, the better, and that to the south, slopewise' Evelyn.

The quality of the cut is more important than the tool used; cuts should be clean with no separation of the bark from the wood. Traditionally, small diameter coppice shoots were cut with a billhook using a sideways stroke, finishing with an upward pull to avoid splitting the wood and letting water into the stool (Figure 3). Larger shoots were cut with an axe or saw. Chainsaws have no adverse effects on coppicing. For unskilled workers a sharp bowsaw is probably the safest and simplest tool to use.

The choice of tool depends on the skill and preference of the worker, the size of the coppice shoots and the ease with which they can be used.

It is often suggested that shoots should be cut to ensure that water drains away from the centre of the stool; the cut face of shoots should have a sloping surface to throw off water and be south-facing to dry more quickly. Whether this has a significant effect on the prevention of decay is not known.



Figure 3: Poorly cut, split hazel stump.

Position of the cut

When felling maiden stems cut as close to the ground as possible; on established stools leave short stumps, felling close to the height of the previous cut.

Although tall stumps produce more shoots than those of low cut stumps (Table 1), shoots which originate below ground are more stable than those developing high on the stump and may develop their own root system.

Species	Height of cut above ground		Month of cutting			Month of felling		
	5cm	15cm	February	April	June	February	April	June
Ash	6.1	9.5	7.8	10.4	7.3	1355	1326	334
Beech	2.0	4.0	—	—	—	—	—	—
Oak	5.2	8.7	8.1	6.7	7.8	860	760	304
Sycamore	6.5	10.3	6.4	9.0	11.6	1276	1213	653

Table 1. Number of coppice shoots† produced during first season by 100 stumps of six-year-old maidens growing in Alice Holt Forest. Trees were felled using a bow saw in early spring 1993 and shoots counted in late autumn.

Table 2. Number of coppice shoots produced during the first season by stumps of six-year-old maidens felled at different times during 1993. Trees were growing in Alice Holt Forest, 40 trees were felled each month and shoots counted in October.

Table 3. Length (mm) of longest coppice shoot produced during first season from stumps of six-year-old maidens growing in Alice Holt Forest. Each value is the average of 40 stumps measured in October.

† For beech and oak the figures in Tables 1 and 2 are number of shoot clusters.

Size of stump

For trees of the same age, larger stumps often produce more vigorous coppice regrowth than smaller stumps. However, this varies with species and vigour, and stump size can be confused with age effects.

Age of stump

The ability of stems to regenerate coppice shoots following cutting often declines with age and some stumps older than 50 years may fail to produce any coppice shoots. However, a survey of maiden oaks felled in Alice Holt Forest found that 75% of stumps 100 years old produced coppice shoots and 40% of those 160 years old sprouted.

Individual stools of species such as lime, hornbeam, oak, hazel, ash, field maple and chestnut, that are regularly coppiced, may survive several hundred years.

Time of cutting

'The underwood may be cut from January, at the latest, till mid-March or April; or from mid-September, till near the end of November' Evelyn.

Coppice is best cut during the dormant winter period: the absence of foliage makes working easier; the bark is less likely to tear from the wood; stump mortality is reduced; new shoots are likely to grow better and suffer less frost damage than shoots formed after a summer cut; and for hazel the quality of the crop is better.

Season of cutting can influence the number of shoots produced by a stump during the first season (Table 2).

Shoots produced following a summer cut have a shorter first growing season than those formed after a winter cut and the length of shoot is shorter (Table 3). However, these differences in length are likely to disappear in subsequent years.

Browsing damage

'By the statute, men were bound to enclose coppices after felling' Evelyn.

Protection of stools from excessive browsing damage is the most important practice necessary in the management of coppice.

All species are susceptible to browsing by deer, rabbits, hares or livestock, although alder may be less affected than most.

Appropriate fencing is the only sure way to eliminate browsing.

Brush may be piled over stools (Figure 4a), but its protective value is uncertain and it may adversely affect the straightness of new coppice shoots: it may also be used to construct dead hedges (Figure 4b).

To minimise browsing damage cut large coupes (greater than one hectare), preferably with one or more sides at field boundaries; extend the size of these coupes in subsequent years to give large open areas. Do not clear and tidy the area; leave all branch wood, lop and top, etc., to deter deer.

Control numbers of deer and rabbits.



Figure 4a: Regrowth from hazel stool protected by a pile of lop and top.

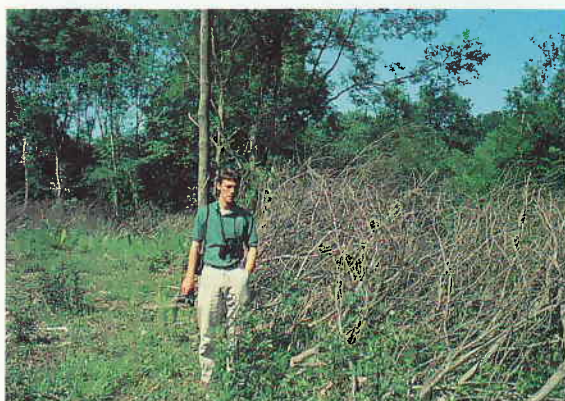


Figure 4b: Thick dead hedge surrounding coupe of mixed coppice.

Management of standards

Growth of coppice shoots is depressed when the shade cast by standards is too great (Figure 5).

The amount of shade cast is more important than the number of standards per hectare; the canopy cover of standards should be reduced to about 30% at the start of each coppice cycle.

Standards should be of a range of age classes, with young trees predominating. They should be evenly distributed over the site.

The most common standard is oak, but in practice most species are acceptable providing that they do not cast too dense a shade (e.g. beech and lime).

Figure 5: Poor hazel coppice stools growing in dense shade cast by large oak standards.



Conclusion



For successful management of coppice stools:

- Prevent excessive browsing damage.
- Cut coppice during winter dormancy.
- Cut stools close to the ground leaving short stumps.
- Use sharp, well maintained tools.
- Limit shade cast by standards.

Figure 6: Hazel coppice stools in a deer and rabbit fenced area at Herriard five months after cutting.

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