

Sites with large old oaks, not pollards in Botkyrka parish (with Håkan Slotte)

Sturehof Castle near to Botkyrka

Close to sea level on the edge of the fjord is an area that was formerly a wooded meadow but now it is part cereal fields, part moist woodland with large *Quercus robur* trees, probably over 200 years old. The cultivation of the cereal fields was very close to the trees but most looked very healthy. Håkan thought that the ploughing was not a problem for the trees as long as it did not go any deeper than previous ploughs.

The *Quercus* were generally owned by the admiralty in Sweden and thus protected for use in ship building but here, on nobility land, the *Quercus* were owned by the owners of the land.



General views of *Quercus robur* in amongst cereal fields with the outskirts of Stockholm in the background



Tree on the other side of the motorway protected as a Natureminne with details of the mark



Ekholmen [oak small island]

Ekholmen is close to Tumba and can be accessed via a path leading from the riding stables across wet woodland. It is designated as a Natura 2000 site.

The *Quercus* trees are on an 'island' joined to the mainland by a region of wet, winter flooded woodland. It was possibly a wooded meadow a very long time ago. There are no pollards but some very large old *Quercus robur*. In recent years these have become surrounded by many younger trees some of which have been felled to let light into the older *Quercus* trees. The work was quite sensitively done and not too dramatic, the old trees were looking healthy.



Notes on oak tree management and wooded meadows in Sweden from Håkan Slotte

Quercus trees where branches have been cut up the sides is an indication that an area was formerly a meadow as the branches were cut to stop them shading the hay. Spreading branches on the oaks indicate a former pasture as the branches were not cut, the animals just browsed them. Old apple (*Malus sylvestris*) and *Crataegus* trees are also good indicators that the area was meadow. *Acer platanus* trees appear about 30 years after wooded meadows are abandoned. On land owned by the nobility pollards were not common as they had more hay and so needed the foliage from the trees less.

General comments on pollarding in Sweden

Notes from Jan Karlsson, Micheal Michaelson & Håkan Slotte (with additions from publications)

Frequency of cutting

Traditionally *Fraxinus* trees were cut every 3-6 years and *Betula*, *Alnus* and *Populus tremula* every 4-6 years. They could be cut every second year if they HAD to because of shortage of hay, however, they could not be cut every year as this killed them.

Now the trees are mostly cut every five years, with the older, bigger trees cut every 7 years as they grow slower. Larger/bigger branches are more likely to get snow/wind damage and smaller trees are easier to cut. Generally all the branches are cut off the trees but when restoring trees it may be better to leave a few sucker type branches.

Time of year to cut

When on nature reserves and as part of restoration projects the trees have been cut in winter when thinning was carried out, but now they are cut in August and September (the traditional time). Sometimes the trees were cut after the winter, but before the sap starts rising in March, but this is not good for *Betula* and *Acer*. Cutting in July/August was reported as best for all trees.

Trees cut in winter could perhaps be cut every year but not those cut in summer. If they are cut in the growing season there is usually some dieback but only 2cm or so. If cut in winter the tree takes longer to form the barrier (to compartmentalise) and therefore there is more die back and drying out. Cutting in August/Sept into October is ok but not cutting between sap rising and mid summer.

In theory the ideal time to cut the trees is when it is 'alive' so it can plug the xylem flow and not dry out in the winter.

Starting new pollards

Jan said that the ideal size for starting young pollards should be 5-10 cm. They should be cut on a slant with the slant facing south. But Michael said that 10cm is too early to cut, a new leader starts but a proper pollard does not form. The ideal is thickness of man's arm. Michael was also shaping trees intended as new pollards before pollarding by cutting side branches to encourage strong top branches then these were cut leaving stubs rather than just a simple single stem to get good pollard shape. He also had some interesting observations on some young pollards he had created.

First that some young trees cut with a chainsaw were growing well from the base and not from the top. Secondly he had cut a young pollard on the same root stock as a sucker that was not pollarded. The result was that the tree put all its resources into the one stem that was intact so the cut one died.

An old Swedish book says to cut 3-5 decemetres (i.e. 30-50cm) above the previous cut but after three cuts the tree would become very tall so the principle used now is to cut a little above the branch collar.

Slotte 1997 suggests the following guidelines for creating new pollards:

- ◆ They should be started in the traditional way where possible
- ◆ Top cut small trees above a fork in the branches.
- ◆ Aim for a trunk diameter of 4-8cm in diameter and no more than 12cm.
- ◆ To ensure continuous management pollards should be cut at moderate heights
- ◆ Larger trees may also be cut if they would otherwise be felled.

Booklets produced in the Swedish series also give guidelines on cutting new pollards:

- ◆ Cut 3m up and at 3-8 year intervals.
- ◆ Traditionally cut in August/September between the hay and the corn harvest.
- ◆ Figures show taking the top off and leaving the upper branches intact, then coming back 5 years later when the tree has grown to take off the side branches but leaving long stubs. [NB This would create candelabra shaped trees but the illustration is of an *Fraxinus* which doesn't usually appear to be shaped like this]
- ◆ Cut at 5-9cm diameter, the thickness of a forearm
- ◆ Recommends removing the top by tying the top of the tree to another then part cutting and then pulling the top off with a rope. Illustrates leaving few if any branches on the tree.

Reasons for cutting trees other than for fodder

Some trees were cut for fuel in Southern Sweden, including *Fagus*, e.g. Skane where there is less woodland. Trees were not pollarded for fuel in Småland. *Populus tremula* was cut and bundled for fodder but not pollarded. In Småland the *Tilia* was cut for rope, the best quality gained from 2yr old stems. Harvesting of *Betula* was often combined with bark tanning and use of wood for fuel wood.

Many of the pollards in Sweden are growing on heaps of stones. Was the heap of



stones created first or were the stones piled round the trees? It is thought by Jan & Michael that the stones were piled round the trees, possibly during the Middle Ages before the black death when there was a high population and an explosion of agriculture. After this the trees regenerated in the stone heaps.

Restoration of wooded meadows

Restoration work is usually done in March, just before sap rising and when it is a quiet time for the foresters and their equipment. Often the restoration phase uses forestry harvesting equipment as well as by hand. Usually in Sweden the clearance work for ground flora is done first and as a result the very young trees get strimmed while this is being done. Then the pollarders come in and the only trees they have to work with are too big. Håkan is trying to encourage them to think about trees needed as future pollards while restoring the grassland but it doesn't usually happen (a similar situation was seen in the Åland Islands).

Restoration of lapsed pollards (information from Slotte 1997)

- ◆ Cut above the last pollarding cut and preserve old stubs and these are most likely to produce new shoots.
- ◆ The cutting of thick branches and trunks should be avoided as these are unlikely to produce new branches and the risk of fungus attack is higher. The cutting surface is seldom grown over if the branches cut are greater than 10-15cm in diameter.
- ◆ Small branches or parts of branches should be retained if possible
- ◆ Shading of a cut tree inhibits growth but strong light on formerly totally shaded trunks can also be harmful.
- ◆ The ability to form new shoots depends on the tree species so there are species specific differences. *Alnus glutinosus*, *Betula* spp. *Populus tremulus*, *Fagus* and *Quercus* suffer after the hard cutting of large branches. *Tilia*, *Fraxinus* and *Ulmus* are more durable and will sprout easily.
- ◆ Re-pollarding should be done between mid summer and early August.
- ◆ Do not cut in spring and early summer

Guidelines for cutting lapsed pollards from the two booklets (also included are several diagrams):

- ◆ Shows clearing away all surrounding trees in one hit and then cutting off all the branches leaving 20-40cm stubs.
- ◆ Cut in August and September.
- ◆ *Fraxinus* and *Tilia* are suitable to do in this way.
- ◆ Illustration of an old *Salix* type pollard is shown leaving two small branches on.
- ◆ Make sure that any suckers are not retained intact but are cut as new pollards.
- ◆ Observe various health and safety requirements, for example tie the ladder to the tree with a strap and tying off the branch to a nearby tree to hold it while cutting.
- ◆ Proposes cutting the branches once to remove the major part of the branch and then making another cut to tidy it up and leave a shorter stub.
- ◆ The use of forestry harvesting equipment to remove large branches from pollards may be appropriate.

The restoration of a Kandelaberträd (candelabra shaped pollard) is illustrated but the cutting proposed to restore a tree like this doesn't look very sensitive. The suggestion is to leave long stubs but just one branch completely intact. Then to return in three years to remove the branch that was left.

An illustration shows a dead *Tilia* after a dry summer but it also looks like this tree was cut very hard and possibly below the previous cutting points.

Cutting of Fagus in Sweden (from Bergendoff & Emanuelsson 1996)

In Scania (southern Sweden) *Fagus* occurs and has traditionally been both coppiced and pollarded. Generally the coppices were in the infield and the outfields had both coppice and pollards. With *Fagus* being the most widespread outfield woodland type and an important as a fuel source.

Fagus were often cut by 'topphugging' a form of pollarding in which some small branches were left on the bolling and these were then cut, thus forming 'secondary pollards'. *Fagus* cutting is also described as being a 'diffuse' type of pollarding, possibly meaning that selected branches were removed high in the canopy, however they state that, 'It is obvious that the coppicing capability of *Fagus* is higher in central Europe than in Southern Sweden'. This may be because of more favourable climatic factors.

Many outfield *Fagus* woods in Skåne were Ollonskogor or mast woodlands for pigs. *Fagus* was considered the best of all the Swedish trees for firewood and this was partly produced by outfield pollarding. In central Europe *Fagus* was rarely used as leaf hay but was eaten fresh by cows. In Skåne there is some information on foddering with *Fagus* but it was probably not of great importance. For the leaves to be used as fodder they must be harvested in the first few weeks after leafing. *Fagus* was sometimes used as leaf hay, the leaves were stripped off the branches and the twigs were not used as they were not tasty. *Fagus* leaves are most palatable when cut early in the year, for example in June. Normally *Fagus* were kept out of the meadows as they cast too much shade.

Fagus are also described as being sown by caching animals so that several separate trees grow together forming a multiple stem that looks like a tree cut once.

In Scania pollarding ceased in many places in the 19th century but resumed temporarily in dry years where there was not enough hay and also continued near houses and roads for decorative reasons.

Spectacular *Fagus* pollards can be seen in three places in Skåne today: Norra Svartskulle and Getryggarna in Baldringe parish and Borstbäcken in Öved parish. Formerly pollarded *Fagus* outfields have high conservation values and may contain the only genetically Scanian *Fagus*. (I did not discover this information until after leaving Sweden so was unable to visit these sites.)

Studies of tree rings from pollarded trees (Slotte 2000)

The mean annual ring width of pollarded trees is narrower than unpollarded ones. Tree ring studies were made in Ire and Steneryd.

Ire - The average ring width of pollarded *Fraxinus* was 0.47-1.23mm. Unpollarded trees nearby had rings of 2.29-4.83.

Steneryd - The ring widths of *Ulmus glabra* were significantly narrower than unpollarded *Ulmus* nearby but the oldest trees were rotten in the middle so counting was not possible.

Tree rings are thinner for 1-2 years after pollarding. When the trees are cut regularly (every 2-6 years) it is not possible to distinguish variation in the ring width due to other factors such as weather and thus the rings are narrow every year.

Pollards have a relatively high age and slow growth rate.

Reasons to pollard today (from Slotte 2000):

- ◆ Small trees often removed today could be pollarded.
- ◆ Focusing on this sort of management results in a varying structure of trees and shrubs in wooded meadows.
- ◆ Pollards are important for species that depend on old trees in light or semi shade.
- ◆ There is a cultural importance for establishing new pollards.
- ◆ In second half of 1990's several thousand trees in the Swedish landscape and reserves were pollarded and repollarded.

Incentives for encouraging farmers to pollard trees

There are 60 farmers in Småland that get money from the EU for pollarding. However the subsidy paid (150 SEK per pollard) is dependent on the tree being close to an arable field (so for example 90% of the trees at Råshult do not qualify). Jan and a few other people run day courses on pollarding for farmers. This year they have 20 people wanting to do the courses. They concentrate mostly on pollarding younger trees or those in cycle, not restoring lapsed pollards. When devising pollarding techniques/teaching people the Health & Safety authority were consulted prior to a booklet being produced and the courses being run. They agreed to allow cutting trees from ladders if the ladders have a foot and are tied to the tree. Hand tools only are used and the shorter the better. In Sweden it is not permitted to use chain saws from ropes, only from access platforms. Long stubs are sometimes left but then shortened afterwards.

Numbers of pollards in Sweden

There are currently estimated to be over 70 000 pollards in Sweden (Slotte 2000) and several hundred thousand abandoned fodder trees (Slotte 2001). This is thought to be only a fraction of the number in the 19th century (Slotte 2001). Pollards were found across southern Sweden but were especially abundant on the east coast and very large numbers were found on the island of Gotland as well as the Åland Islands (see later). A meadow in Gotland that was studied in detail had 153 pollards to the hectare and Gotland may have 50% of the Swedish pollard population, in total 4000,000 trees. However, they were generally small and 100-200 years of age.

Summary of pollarding in Sweden

Pollarding was very widespread, at least in southern Sweden. Almost all the pollards were found in wooded meadows and the trees were cut to produce leaves for winter fodder. *Fraxinus excelsior* and *Ulmus glabra* were the most common species cut but a variety of others were probably used as well, depending on what was available locally.

Today there are only in a few places where pollarding is still practiced as a farming method and the leaves fed to the animals. It is much more widespread on nature reserves and cultural reserves for reasons of conservation. Thus many of the sites with pollards are protected and are therefore not generally at risk of being lost. However the pollards may be at threat due to lack of management if enough resources are not available to maintain a cutting regime. It is also important that the health of the trees should be checked regularly and management adapted if necessary. Most people seemed to be fairly confident that the trees would survive well when cut and this may not be true in all situations. In addition more care may be needed when

restoring wooded meadows with pollards not to focus entirely on the meadow in the early stages.

Take home messages

In Sweden many pollards are protected within cultural reserves as well as nature reserves. There is no equivalent in Britain but it could be a good way of protecting traditional farms and landscapes. The Swedes can also protect individual trees for nature conservation reasons, these are clearly marked and under stronger protection.

The need for many people to be pollarding trees on farms and in wooded meadows in Sweden has led to the development of courses in pollarding. This has been subjected to various comments regarding health and safety issues but a small booklet with guidelines in has been produced along with the equivalent of the Health and Safety Executive and shows safe ways of working from ladders.

