SUFFOLK TRADITIONAL ORCHARD GROUP

Advice Note 3 (STOGAN3)

PLANNING AND PLANTING NEW ORCHARDS

Version 4 April 2012

Fig 1. A small farm orchard - one tree of each of about 20 varieties of apples, pears, plums, cherries and cobnuts.

CONTENTS

PLANNING AND PLANTING NEW ORCHARDS

(WITH SPECIAL REFERENCE TO SUFFOLK AND THE EAST ANGLIAN CLAYLANDS)

Version 4 March 2012

INTRODUCTION

This document is a new version of a set of recommendations written in 2007 for planting new "traditional orchards", especially those under Higher Level Stewardship in the East Anglian claylands, and in amenity orchards planted by communities.

Since 2007 we have seen the planting of a number of new amenity and community orchards in Suffolk and Norfolk, and as a result of the start of the Suffolk Traditional Orchard Survey in 2009, have had a number of invitations to advise on new schemes. These are a mixture of new community orchards for amenity use, Stewardship restorations and new plantings, conservation sites, schools and private projects.

Fig 2. An Amenity orchard planted about 25 years ago with well-spaced standard trees, branching at 1.6m. These trees are convenient for picnicking underneath, yet they are all easily harvested, without ladders, with long handled pickers. The tree spacing of about 10m is more than is really needed and could have been much closer. Smaller trees do not allow seating under the trees and low branches make grass mowing extremely hazardous.

A considerable number of existing orchards have major problems. Most commonly this is a result of planting trees that have been propagated onto dwarfing stocks into existing grassland. Most of these trees, which are struggling or fading away, are apples on MM106 stock, the rootstock sold routinely for garden planting rather than orchards, by garden centres and many nurseries. Pears on Quince A, again the most available rootstock, can only survive to make tall trees in grassland if the grass surround is removed for the first few years, the tree is well mulched, and the pear variety is particularly vigorous. An additional problem is that trees on dwarf rootstocks are not only weak growing, but are also relatively short lived.

Another problem occurs if trees are protected only by short spirals. Some fruit trees, and apple varieties in particular, have very succulent bark, so they are regularly stripped by rabbits, deer and hares.

HIGHER LEVEL STEWARDSHIP PLANTINGS

Higher Level Stewardship (HLS) is a Department for Environment, Food and Rural Affairs (Defra) conservation management scheme for farmers and other landowners that defines an agreed management plan for an entire farm holding in exchange for grant aid. The scheme is managed for Defra by Natural England. Traditional orchards already in existence are one of the many habitats that are targeted, with capital funding available for restoration and replanting. In some cases new planting of traditional orchards can be funded. The definition of a traditional orchard as understood by Natural England for HLS is discussed in **STOGAN 1: Orchard traditions in Suffolk.**

Any replanting or new planting must be on rootstocks approved by a Natural England Land Advisor. The range is, in general, restricted to only those rootstocks that produce the largest standard trees; M25 for apples, Wild Pear for pears, Brompton for plums, and F12/1 for cherries. If any changes to this list are proposed Natural England must give their consent.

STOG considers that this is over-prescriptive and has requested changes in some circumstances.

Pears on Wild Pear rootstock, also sold as *Pyrus communis*, eventually make very large trees indeed, up to 18m high. Although they can be heavily pruned back, and several East Anglian orchards have pear trees managed by pollarding, there may be a case for using smaller growing rootstocks such as Pyrodwarf that are still more vigorous than using the dwarfing Quince A.

Brompton makes a very large plum tree but does not seem to have been a traditionally used rootstock in East Anglia. It is reasonably easily recognized when grown out as a dense upright multi-stemmed stool or tree with small round almost sessile black fruit. In Suffolk several other rootstocks were widely used, as seen by the grown out rootstocks remaining in old orchard sites. These include cherry plum, *Prunus cerasifera*, similar to the currently available Myrobalan B; Mussel, a small oval damson-sized plum; and one of the St Julien-type gages similar to the currently used St Julien A.

Sweet cherries on F12/1 make large trees that cannot be protected from birds, but probably no real alternative exists.

AMENITY ORCHARDS, FARM ORCHARDS, AND PRIVATE PLANTINGS

Introduction

Existing old orchard sites are extremely variable in character across Suffolk. Most are large old trees on vigorous rootstocks, but there are usually a few modern dwarf trees that do not do well in such a setting. Many old orchard trees seem never to have been pruned, beyond an initial procedure to check the growth of a leader* and to keep the branching at a level that can be picked reasonably easily. Without any training most fruit trees make conical trees, with a single tall leader trunk. This “leader suppression”, carried out when the tree is young (see below for a method easily carried out today) can be seen on many old trees, and was probably done once, and then only the simplest “pruning for convenience” was subsequently carried out.

Old orchards can be very emotive landscapes, and most are not heavily managed, and have got to their relaxed picturesqueness by a considerable degree of non-intervention! These orchards are the antitheses of modern commercial orchards whose primary reason for existence is to maximize production, as quickly as possible, of a consistent market-driven high value crop. When many of our old farm and house orchards were planted the expectation was that they would generate food for the family and the farm workers and that a small cash crop would be taken to a local market.

* The "leader" is the primary stem of a plant, usually the top stem

Planning an orchard

There is a great interest today in planting new orchards, and STOG’s aims include helping groups and individuals to do just that. A good starting point is to consider what the orchard will look like and how it will be used in 10 years’ time, and say, 30 years’ time, and to keep that visualization in mind.

Fig 3. This very ancient (and romantic) orchard has a tall pear on wild-pear rootstock (background), and several "phoenix" apples (fallen, but still alive and productive). Pruning has clearly not been a priority, in common with many Suffolk farm orchards.

These are some of the possible alternative plantings; first described after 10 years and then after 30 years (page 9).

1. **After 10 years - neat rows of bush trees, say 2m apart, and 2m high, in cultivated strips of bare soil (Fig. 4)**

Fig 4. Apple trees about 8 years old on M26 and/or M9, 2m apart with 4/5m between rows.

Fig. 4 illustrates option 1 after about 8 years showing a narrow grass path and 4/5m between rows. It will not be possible to cut close to the trees because of low branches. At 10 years old these trees could have been cropping for 6 or 7 years. They need to be pruned every winter which requires some skill to do well. Rabbits on the site will mean protection must be provided up to 70cm height. Deer protection is best done by high, 1.5m at least, fencing round the entire orchard. There could be up to 200 or more trees to the acre. (This would be similar to the commercial orchards planted after WW2, and similar to a number of current commercial orchards, for example at Braiseworth). The trees would give little, if any, shade and the site would provide little attraction for visitors other than the fruit produced. Typically apples would be grafted onto M9 or M26 rootstocks, pears on Quince C, plums on Pixie and cherries on Giselle 5.

2. **After 10 years - neat rows of trees with short 1m trunks, 3-4m apart in bare soil circles (Fig. 5)**
   Apples can be picked from the ground and from short ladders. The trees will be 4m apart with 6m between the rows. Very little management will be needed other than leader suppression and ensuring adequate individual tree protection, depending on the site location. There could be up to 120 trees to the acre. These could be tree grafted on semi-dwarfing (garden-type) rootstocks, with an expected life of about 20-30 years, perhaps more if diminishing returns are acceptable. Bare ground must be maintained round each tree (probably by spraying with Roundup) as these rootstocks do not enjoy competition from grass. First fruit protection will be after about 4 years, and peak production after 15 years.

Fig 5. Apples about 12 years old on MM106, a semi-dwarfing stock. They do not grow well in grass and a bare ground circle round the trunk is required for their whole life. Low branching makes for easy picking, but difficulties in mowing, and the orchard is not very picnic friendly!

This type of orchard is actually quite rare, as the apple rootstock (MM106) was only widely used after WW2 and the similar cherry rootstock (Colt) even more recently. The Walled Garden at Thornham is a nicely maintained example (and probably needs a lot of maintenance). Pears would be on Quince A, and plums on a number of rootstocks, but especially St Julien A which can in time makes large trees. These can be controlled by pruning.

3. **After 10 years - rows of trees with 1.2m to 1.7m trunks well-spaced in grassland (Fig. 6)**

   Apples can be picked from the ground and from 3-4m ladders, especially if pruning prevents excessively high growth. Trees will be 6-9m apart with 6-9m between the rows, and with grass right up to the trunks (and may be grazed by sheep). The first serious crops took 6-8 years. This is now becoming an attractive shaded site for picnics under the trees and general laziness!

   Very little management will be needed, except leader suppression and ensuring adequate individual tree protection from wildlife. Grass can be cut with a ride-on mower up to the tree protection. There could be 80 plus trees to the acre. This type of orchard has been traditional in Suffolk for centuries. These trees would be grafted on vigorous rootstocks, with an expected life of up to 100 years for apples and cherries and over 150 years for pears and quince. There would be a wide range of life expectancies for plums depending on variety and rootstock, but well in excess of 40 years. Apples will be on M25 rootstock (perhaps MM111 on sandy sites), pears on Wild Pear or Pyrodwarf, plums on St Julian A, Brompton, cherry-plum (often called myrobalan when used as a rootstock) and others, cherries on seedling sweet cherry, “mazzard” or F12/1.

Fig 6. LEFT: leader suppressed apples on M25 with 1.5m trunks, which will get no other major pruning. RIGHT: pears allowed to grow without pruning into a natural tall pyramid shape. These are all about 10 years old, and already cropping. The apples will eventually reach 4-5m in height and any leader that arises will be cut out. The pears will be pollarded when about 15 years old, and re-pollarded every 5-10 years.

Of course “neatness”, which depends on lots of similar tree shapes and sizes, never really comes about in most old orchards as there many widely differing fruit, and maybe nuts. See also **STOGAN 6 Cobnuts in Suffolk Orchards**. Quince, for example, are often grown as, or have become, multi-stemmed trees or may be on short massive trunks; and medlars can make very large and wide trees.

These are the possibilities for the above three options at **30 years**:

1. **Neat rows of bush trees, say 2m apart, and 2m high, in cultivated strips of bare soil.**

   Commercial growers would have removed these trees after 12 years or earlier. If the trees survive to 20 years old they will be tired and probably suffering from disease. Although they may be good hosts for epiphytes and wildlife, they are really just dying slowly. Dwarfing rootstocks accelerate death in the varieties grafted onto them. The National Fruit Collection at Brogdale near Faversham, Kent, has apple orchards on these rootstocks that are 25 years old and were scheduled for replacement 10 years ago. They are still producing, but require heavy chemical control and skilled pruning. They were never very attractive, and certainly aren't now.

2. **Neat rows of trees with short 1m high (approximately) trunks, in bare soil circles.**

   It may be a surprise, but we just do not know what these trees will be like after 30 years. The walled garden at Thornham was only planted 15 years ago. Most management policies of sites with these rootstocks have allowed grass right to up to the trees, and since the trees cease to grow well once this occurs fruiting falls off very quickly. Several sites have replaced their apples on MM106 with M25, and are pleased to find the trees thrive. Also, in most old orchards there are always some trees that are on large growing rootstocks and in 30 years these will dominate and overshadow the rest. In Thornham Walled Garden two mulberries, two quince and two medlars are already doing that after just 15 years.

3. **Rows of trees with 1.2m to 1.7m trunks on vigorous rootstocks, well-spaced in grassland.**

   At just 30 years old these will have most of their life still ahead, and they will be still extending and producing massively (e.g. 100kg or more per Bramley's Seedling apple), and increasing. They are still to reach their best as a landscape, but have been a choice place to picnic for more than 15 years. It is this traditional orchard habitat that STOG is trying to preserve and create.

Fig 7. Two orchards with standard trees. LEFT about 50 years old at Thornham Parva. RIGHT much older with a range of ages, the largest about 100 years old.

Compromise planting – interplanting to make the best use of both extremes

Despite the long term benefit of low input, a fine landscape in perpetuity, a picnic place, and lots of crop, waiting for the first crop to appear is one clear problem with large tree orchards. Having to start all over again in 10 or 12 years' time is a problem with dwarf trees, as is the greater effort in ground clearance and pruning. Taking the middle road has the problems of both: keeping bare ground round the trees (probably using weed killer to do it), putting up with the low branches when mowing, having to start again in 15 or 20 years' time, and never achieving a relaxed place to visit.

There is a compromise which was practiced locally in the past, which can offer the best of both extremes and in the end yield a traditional orchard with all its benefits. This is to interplant the rows of large standard trees with dwarf trees which will yield a fruit crop very quickly, maybe within two years. In time, the large trees will shade out the dwarf trees which by that time, say in 12-20 years, will be at the end of their useful life, and the greater crops of the large trees will more than replace the small bush tree crops.

In orchards all across Europe, rows of orchard trees were often alternated with rows of other crops, and the intercropping was continued until the large trees shaded out the intermediate rows. In eastern England cabbages, cut flowers such as Shasta daisies, black currents and gooseberries are known to have been grown; in Eastern Europe cereals can still be seen; and in Spain saffron crocus! Also in England and widely described in 16th century and later literature, some orchards were planted at double the density in the rows. After some years the canopies started to meet and the intermediates would be removed, leaving the remaining trees to continue to grow, a technique to achieve maximum crossing with the old vigorous rootstocks, and also reach the old favoured quincunx, or diamond, layout by starting with a square grid layout.

Our suggestion is to intercrop within the rows in this manner, but use alternating vigorous and semi-dwarfing grafts, or perhaps two dwarves to every one vigorous graft. These techniques will certainly increase the work needed, maintaining the bare ground in particular. It is good practice to maintain bare ground round even a vigorous rootstock tree for its first year, but this will be needed for the whole life of a semi-dwarf or dwarf tree.

Fig 8. The trunk of a 2m high, 20 year old apple on M9, a dwarf rootstock, protected by rabbit netting and with a supporting post for its entire life, rarely more than 20 years. The ground is kept free of weeds and grass (by glysophate weedkiller at least annually).

In many commercial orchards this tree would have been replaced some years ago, as its productivity is diminishing.

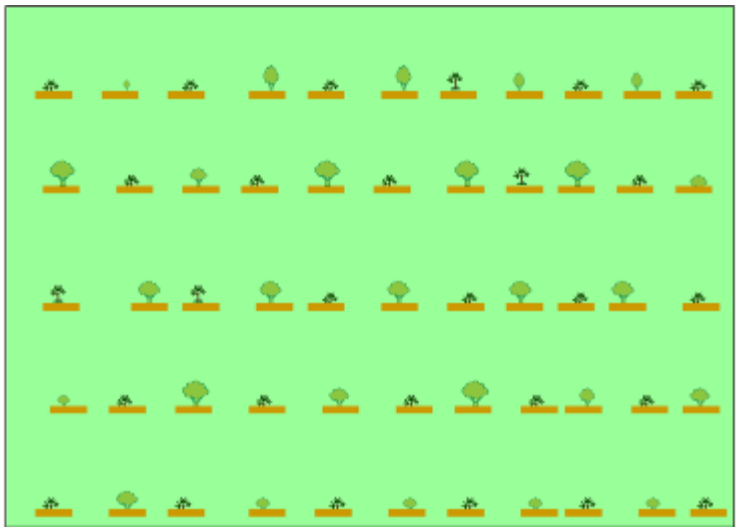
Fig 9. This 50 year, or more, old tree is a half-standard on vigorous rootstock (probably M2) retained at this height by annual pruning. Now considered to be at the end of its useful commercial life it is being retained and allowed to grow much older gracefully for its landscape value. For its entire life the ground below was annually weed-killed or cultivated to maximise the crop.

Planting a Traditional Orchard on large growing rootstocks, with an intercrop.

Avoid a long wait for cropping.

STEP 1 Interplant trees on vigorous rootstocks with trees on dwarf rootstocks which will be removed later.

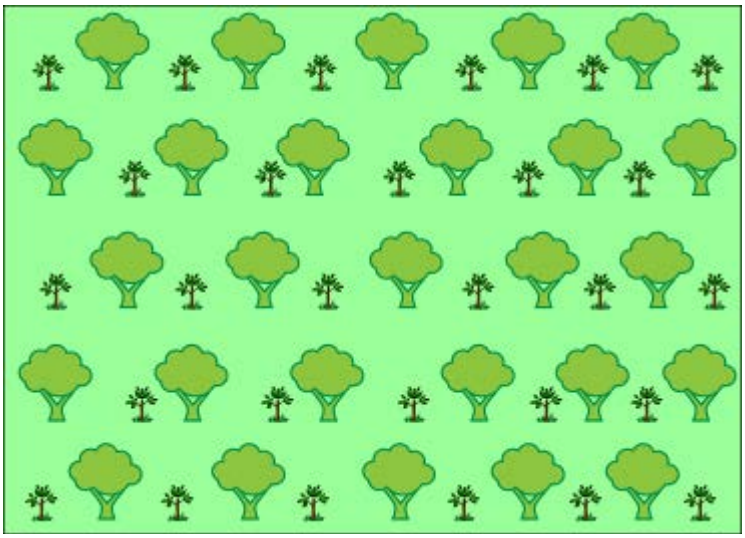
Keep 2m of bare soil around all the trees for two years.



STEP 2 Trees on dwarf rootstocks will crop after about 2-3 years.

1-2m of bare ground must always be retained beneath all dwarf stocks.

Grass can be allowed under the large trees after two years, and they will crop within 4-8 years.



STEP 3 Remove the dwarf trees as the large trees shade them out (in about 10 – 15 years).

They may not need to be removed all at the same time.

Once the dwarf trees are removed grass can be allowed to grow throughout the orchard.

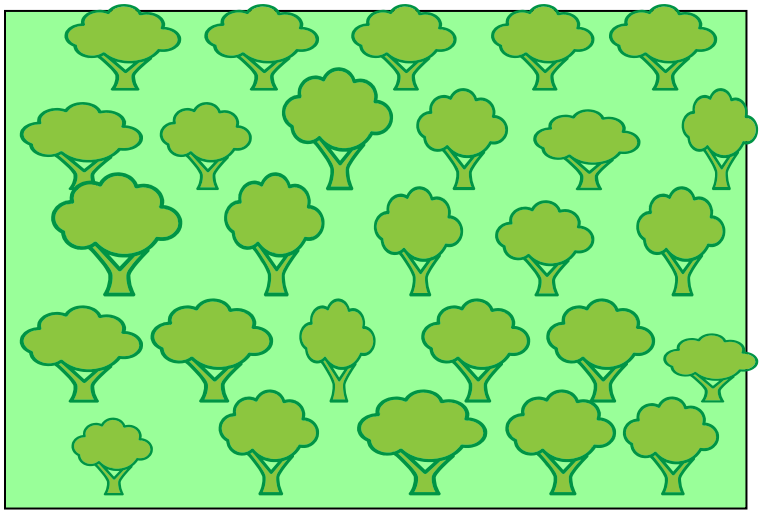


Fig 10 Sequence of planting an orchard with standard trees with a lifetime of over 70 years interplanted with dwarf trees that crop earlier and will be removed as the large trees start to crop.

SOURCING THE RIGHT TREES; THEIR PROPAGATION AND PLANTING

Rootstocks

Almost all apple, cherry, pear and many plum varieties are clones and for centuries have been propagated by grafting (using a short young twig of the selected variety in early spring) or budding (using just a bud in late summer) onto a seedling or a sucker. Some plums and most damsons, bullace, and cobnuts were propagated from suckers and therefore the varieties were on their own roots. Some plums and many damsons, bullace and cherry plums are seedling grown, are not therefore clonal varieties, but are populations of separate individuals and can be quite variable.

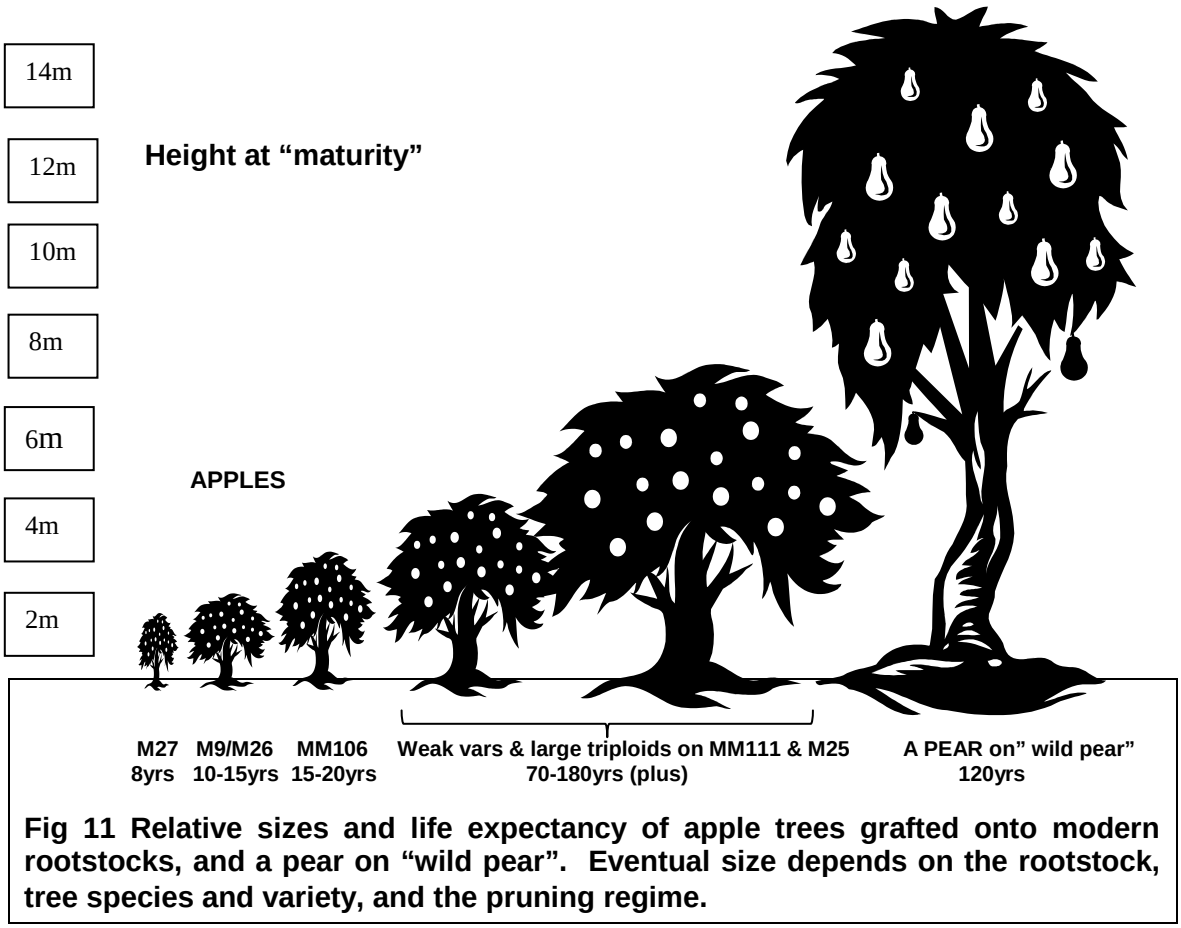


Fig 11 Relative sizes and life expectancy of apple trees grafted onto modern rootstocks, and a pear on "wild pear". Eventual size depends on the rootstock, tree species and variety, and the pruning regime.

Dwarf apple, plum and quince rootstocks have been used for centuries, but were generally restricted to gardens rather than used in orchards until the 20th century. In the early 20th century, reliable and consistent clonal rootstocks or all vigours were introduced. Today **all** fruit trees sold by garden centres and most by mail order are dwarf rootstocks. All dwarf trees, including the semi-dwarf apple rootstock MM106, the most widely used today for garden sales, grow poorly in permanent grass. Even if the grass is cleared for 1m round the trunk annually for the first few years, eventually, when the grass returns, the tree will struggle.

Today the best methods for generating the large growing trees for planting a new traditional or amenity orchard that has a permanent grass sward are:

1 **Apples:** trees should be grafted on the large growing rootstocks **M25, MM111**, or **M2** (now rarely offered). M25 is widely used and is more widely available. MM111 is a good choice as it has some resistance to collar rot, woolly aphid and aphids generally, is drought resistant and good for dry soils and heavy clay soils. MM111 is said to produce a slightly smaller tree than M25, but where they are grown together this isn't obvious. **(Despite widespread reports to the contrary, MM106, M9 and M26, which are smaller stocks, do not compete with grass at all well and should not be used for traditional orchards or if the aim is to grow a standard tree).**

Fig 12. This old apple tree on a coastal sandlings farm may be over 100 years old and produce over 200kg of apples each year. It shows no signs of any pruning for many years and may have only been leader suppressed when first planted.

2 **Pears:** Quince has been widely used as a rootstock since the 18th century – some pear cultivars produce quite large trees on the modern **Quince A**. This stock is not recommended by Natural England for traditional orchards, but can make a pear tree similar in size to an apple on M25 or MM111, that will crop within five years. If the orchard is a mixture of fruit, this could be used for vigorous pear varieties. Before the 1830's pears in England were always grafted onto seedling "**wild pear**" stock, also called by nurseries **Pyrus** or ***Pyrus communis***[1], and the current form now available produces a large tree that will require greater spacing than apples (7-10m) and may

[1] There are some concerns over these modern pear seedlings termed "wild pear". It seems the seeds usually originate from the European pear juicing industry and may actually be seed from specific small juicy pears grown for juicing, commonly a German pear "Kirchensaller". These seedling trees are variable and have varying degrees of thorniness and overall vigour.

require up to 12 years to fruit. However routine pruning can keep the height to a practical level (see section **PRUNING).** Pears on wild pear are best planted together, and to the north of apples to prevent shading other trees. Several old pear stocks used in the USA, such as ***Farmingdale*** and ***Old Home***, are slightly dwarfing and early fruiting and therefore might be ideal, but are not yet available in the UK. The German origination rootstock **Pyrodwarf** is similar**.** This has just started to be used in the UK, especially for perry pears, and makes, ultimately, a tree half the height of a pear on wild pear (see below). That is still a large tree; many old pears in Suffolk are 18-21m (60-70ft) high.

All pears are "compatible" with "wild pear" seedlings and with selected pear clones, but not all pear varieties are compatible with quince rootstocks, and after a few years the graft or bud position may become weak and breaks. This is particularly true of many old, and probably most, culinary varieties. To counter this, a technique of making a double graft (or bud), using a variety that is compatible as a short "bridge" (just a few centimetres) between the rootstock and the required variety. ***Doyenné du Comice*** and ***Beurré Hardy*** are two varieties widely used for this. If in any doubt, buy a graft onto "wild pear", and not Quince.

Pears were once grafted onto hawthorn (*Crataegus monogyna*) which produces a large tree, but for the first few years numerous hawthorn suckers have to be regularly removed.

3 **Plums:** Natural England recommends using plums grafted onto **Brompton** rootstock. This produces a very large upright tree that is difficult to pick when full grown, and requires a wider spacing (8m) than is common in our old local orchards. The American **Marianna** rootstock which makes a very large tree similar to Brompton is sometimes available here.

Alternative stocks producing smaller trees more suited to our Suffolk tradition are St Julien (a small fruited gage) and today the selected clone **St Julien A** is used, and cherry plum seedlings. **Myrobalan B,** a cherry plum variety is still used in northern Europe today. All these produce trees that suit similar spacing to apples on M25 or MM111, and vigorous pears on Quince A or Pyrodwarf, and will fruit within a few years. There a number of new dwarfing rootstocks such as **Pixie,** only suitable for dwarf trees.

Damsons and bullace in old orchards or orchard hedges are often on their own roots and may have been grown from seed. They propagate easily onto St Julien A and they too fit into a mixed orchard well, although bullace grown this way may suffer from large and wide spreading branches that break easily.

Cherry-plums, *Prunus cerasifera*, are very common in Suffolk, in hedges and orchards, and particularly in hedges round orchards. Most are on their own roots and were planted as seedlings.

Plums on their own roots. These are easily propagated from suckers (and some nurseries specialize in damsons and bullace grown this way). A number of plum varieties, such as ***Yellow Egg***, ***Greengage*** and ***Cambridge Gage*** were traditionally grown from suckers; these varieties trees sucker easily, were often grown as half standards or multi-stemmed trees, and in hedges. In some other parts of England other plum varieties were grafted onto ***Yellow Egg***.

4 **Sweet Cherries:** Wild Cherry, *Prunus avium,* sometimes called **Mazzard[2] or Gean**, were seedling rootstocks that produce large trees (now considered under Health and Safety regulations too large to be picked safely without major scaffolding!). In Suffolk, these trees were generally "pole grafted", i.e. the scion was grafted, or budded, at 1.8-2m above the ground on a mazzard sapling. These large trees are virtually impossible to protect from birds without employing the traditional small boys with rattles to scare them off! A modern similar and available large rootstock is called F12/1. Sweet Cherries are relatively uncommon in the clayland area, but very traditional in south Suffolk. Old varieties grafted onto the modern semi-dwarfing **Colt** rootstock will give trees up to 5m high eventually (but these are not acceptable in Higher Level Stewardship) and are largely untried in permanent grassland. There is an even more dwarfing rootstock, Giselle 5, used for garden and some commercial cherries.

5 **Sour or Acid Cherries:** these are *Prunus cerasus,* and include Morellos and Amarelles and a number of other small tree cherries with acid fruit very much in demand for cooking, but which become sweeter as they ripen. They were also grafted onto the same seedling sweet cherry rootstock as sweet cherries. In the past this was Small Black Mazzard, today F12/1 is an alternative, but makes much smaller trees and are in Suffolk all half-standards on short 1m stems with widespread branches. They are only found in a few south Suffolk commercial orchards, or on old garden walls. Hybrids between the sweet and sour cherries, called Dukes, have been seen, but only in old gardens.

6 **Quince:** Quince are never very tall trees, but on their own roots, and as long as the suckers are removed, produce a massive short trunk, and a 4-5m tree within 10-15 years, and even on Quince A can be trained into a short standard. It is thought that quince trees were originally grown on their own roots, and it is easy to root cuttings. Today most quince are available grafted onto Quince A, probably producing a smaller tree than if the scion was on its own roots. The resulting size fits well with apples on M25, but takes much longer, up to 20 years, to reach the same size. Quince grafted onto "wild pear" makes a larger tree and is also suitable. Scion rooting (see below) is another possible technique. Very old quince trees on old sites are often multi-stemmed, sometimes with trunks growing along the ground.

7 **Medlars:** medlars today are generally available on Quince A and are substantially smaller in growth than old trees which can be up to 8m. Some of these were grafted onto "wild pear" or hawthorn, *Crataegus monogyna,* or were on their own roots.

[2] The term Mazzard has been used for any sweet cherry, *Prunus avium*, but in south Suffolk it is used for a small black fruited cherry (also called Small Black Mazzard or SBM!) used as a rootstock for sweet and sour cherries and grown from seed.

8 **Cobnuts:** in old sites these are always on their own roots and propagated from suckers, and this is the only method recommended. Most are sold by nurseries on their own roots but some plants are available grafted onto C. *maxima* (cobnut) or hazel seedlings. These should **not** be used, as any coppice suckers will be from the seedling rootstock, and unless removed will eventually over-come the required clonal variety (see **STOGAN 6: Cobnuts in Suffolk**).

9 **Walnuts:** any selected named cultivar walnut purchased from a nursery will be grafted onto seedling walnuts, which are variable in growth. Most make very large trees in time, and because they are out of scale with other top fruit they should planted separately away from apples and plums, which they overshadow and stunt by competing for water.

10 **Scion rooting**: young trees that are grafted or budded just above the rootstock's roots may be planted lower into the ground so that the graft junction is buried. In time most scions will root into the soil from above the graft and make a larger tree on its own roots without influence from the rootstock. This can be encouraged by deep mulch of straw, FYM or wet sawdust. Scion rooting is hit or miss for some species and varieties. Quince, cherry plums, damsons, bullace, and many plum and gage varieties scion root easily in about two years. Some apple varieties such as Bramley's Seedling, Catshead, Harvey and varieties like Burr Knot and Nonsuch that have adventitious stem roots, root quickly too.

Buying trees

Only a few specialist nurseries in the UK are a source of trees for planting traditional orchards on large rootstocks; these are listed in the appendix. *In many cases* their catalogues and /or web sites do not carry their entire range and contacting them directly is essential for the most uncommon varieties. The current RHS Plant Finder lists smaller nurseries with fewer, but often a more diverse range. Small nurseries, including most of those in East Anglia, rarely propagate on vigorous rootstocks, and if they do most only graft or bud on large rootstock to orders made up to a year in advance.

Most of the major national companies will also propagate varieties they do not have in their own collection, if provided with the scion wood, or if the scion wood is available from the National Collection at Brogdale, Kent, from RHS Wisley, or from private sources. As a consequence, buying from a small local nursery, even one that does its own fruit tree propagation, rarely provides access to a different range of varieties. Many local nurseries, as well as major garden centres, buy in fruit trees from major national suppliers and these are almost always dwarf or semi-dwarf trees suitable for gardens. They may be suitable for dwarf tree interplanting but as the rootstock name is rarely stated on the label, best avoided. Many small nurseries and garden centres, and also supermarkets, that sell plants import from the continent, principally from Holland.

Note: if a new traditional planting is funded under a Higher Level Stewardship agreement, all trees **must** be on the vigorous rootstocks listed above, unless previously agreed with Natural England.

Most nurseries using **budding** (in summer) as their preferred propagation technique and these require 24 months of production. A rootstock is planted into the ground in the new year of year 1 and is budded with the required variety in August of year one; the bud grows out in spring of year 2, and is delivered as a bare root plant from November in year 2 onwards. A few nurseries **graft** in early spring and sell a smaller tree, sometimes pot grown, the following November, a minimum of 9 months. These are known as **maidens** and are usually unbranched because any side braches are removed. **Feathered maidens** are maidens with side branches and are usually on dwarfing rootstocks destined to be bush trees. **Straight leads** are the tallest single stemmed trees (often well in excess of 2m), and may be two years old.

Trees sold as **half-standards** usually have had their tops cut off ("topped") to encourage branching below the cut, and may, or may not, be already branching. However the height of the cut, and therefore the height at which the first branches occur, varies from nursery to nursery and in general the cut is higher in the west-country than in the east of England. This is due to the difference in terminology. In the west-country, a half-standard's first branches may be at 1.2-1.8m, whereas in the east the same term is used for a tree with initial branching as low as 30cm. A **standard** tree in the west country is a single trunk to 2m or more before branching, in the east anything with first branching over 1.5m (even 1.2m) is termed a standard.

Tips for buying

Buy maiden trees if possible, they establish more quickly than larger plants, and are economical. These have one season's growth after being budded or grafted.

If at all possible, buy trees that have not been "topped", that is cut off to encourage branching before the cut. This allows you to decide when the first branches will occur (see leader suppression below).

Most trees will be sold bare-root, and these must be healed into soil unless they are immediately planted, or can be kept in a sack or large polythene bag with well soaked wet hay or straw for a few days, even a week or two in winter, before planting. Ensure they are protected from rabbits when healed into garden or allotment beds.

Some fruit trees are pot grown, especially 9 months old grafts, and these are usually smaller than open grown ground budded trees. In theory they can be planted out at any time but winter is the best time to establish quickly Some nurseries sell much larger and older bare root feathered trees, 2.1-2.4mhigh or even larger. These should be avoided as they take longer to establish than smaller trees.

See also **STOGAN 2: Fruit varieties for Suffolk traditional and amenity orchards.**

Planning and planting a traditional orchard with standard trees.
The following are step by step suggestions to start a project:

1 Select the site.
2 Decide on any pre-planting work: subsoiling, fencing, hedges, ploughing, re-seeding, harrowing, mowing, labeling and costing.
3 Prepare a schedule.
4 Decide on the pruning regime – remember that most orchards require considerable effort to maintain and that rigorous pruning regimes always require more time and labour than anyone expects!
5 Draw out a planting plan: spacing arrangement, decide how many trees; little or no pruning other than leader suppression will require a larger spacing and fewer trees.
6 List the varieties and their rootstocks and place them in the plan.
7 Contact tree suppliers with a list of varieties, numbers and rootstocks.
8 Decide on the supplier and order the plants.
9 Decide on the tree support and protection needed. If the orchard site is not going to be grazed, and the entire area can be fenced against deer, then young trees will require wide spiral protection (600mm x 38mm is the most usual) against rabbits and voles, or the taller 1m spirals for protection against hares. Attempting to fence an entire orchard site against rabbits, muntjac and hares is not recommended, and is almost impossible to achieve, and maintain over many years. (See also **STOGAN 4: Protecting new and old standard orchard and parkland trees**).
10 Carry out work on the land while waiting for the plants (can be as long as 18 months), and planting may be done over two years or more if some varieties have to be ordered.
11 Plant as follows in a single operation between mid November and end February/Mid March. The earlier in that window the better as the soil settles better and the trees does make some growth early in the year.
12 Check the tree before planting. Remove branches that will be within the tube and any branches from the rootstock.
13 Ram in a stout 1.8m stake or post (many planters do this first and dig the hole to one side of the post).
14 Remove turf in a 1m wide circle round the tree site, and dig a hole large enough to more than include all the tree roots without bending them and set the tree at a level roughly similar to the original soil mark on the tree stem, with the graft scar above the soil level.
15 Plant the tree infilling carefully so that no air spaces are left and tread the soil down firmly round the trunk. Provide initial protection immediately (if in doubt use a 1.2m Tubex tree shelter attached to the post, and do not tie the tree to anything).
16 Mulching the bare soil circle round each tree with straw or FMY helps conserve soil water.
17 Attach a label immediately (to the post is a good idea) AND make a written record of the planting layout.
18 Over the next year; check tree protection and post fastening, remove suckers, and remove all side shoots inside the tube (plums in summer, other fruit in winter), renew any mulch, remove any weeds in the bare circle (a glyphosate spray can be used as long as the tree tube protection is a solid tube and not a mesh).

19 Repeat annually until leader growth is well above tube top. The bare ground circle can be allowed to grass over after year one or two.

20 Cut off leader about 20-40cm above top tube (plums in summer, other fruit in winter) using the leader suppression technique, see below.

21 If a no-prune regime is intended, check annually and any remove broken branches and cut back or remove any branches that might seriously unbalance the tree (only a very occasional requirement). Otherwise follow a selected pruning policy from the Defra TIN's (see Appendix).

Planting smaller bush dwarf trees as temporary interplants

Planting is carried out in exactly the same manner as for standard trees, except a different protection system is required, and the bare ground circle needs to be maintained for the lifetime of the tree. If the site is prone to grazing by deer, or is to be grazed by sheep, it is almost impossible to protect small trees such as these without a major post, rail and stock-fence construction round each tree or fencing the whole area.

Small growing trees are vulnerable to grazing as they are lower than standard trees (a major reason for using standard trees was to keep the foliage and fruit above the grazing animals). In addition, they require to be isolated from grass and other ground cover which reduces growth and cropping. Eventually the tree ceases to grow at all.

The hedge tree spiral on its own is inadequate, and a post support will be needed for the lifetime of the tree. A suitable post of 50-60mm diameter round, pointed and pressure treated is rammed in vertically beside the tree and strapped to the tree with a "tree tie" (we use tied strips of old inner tube). The top of the post needs to be about 1.2m above the ground and the tree will be tied to it as it grows. It is possible that this can be dispensed with after some years with strong growing triploid apples on MM106, Bramley's Seedling, Lady Henniker etc., and large growing sweet cherries on Colt.

A practical system to protect dwarf trees from rabbits and hares is 70-80cm high rabbit fencing in a 40cm circle. This requires a 1.40m length of netting overlapping by 15cm, supported by three or four hammered stakes, at least 20mm square and 1.2m in length (these can be purchased in bundles). Bamboo canes are inadequate and do not last. This netting protect will be required for the lifetime of the tree, and will need to be checked especially in the first few years. In time the stakes may rot away but by that time the trees post and trunk will support the wire.

SUBSEQUENT MANAGEMENT

Pruning

The Defra TIN's contain information on pruning, but tend to imply that pruning was, and is, an essential part of fruit tree management. In fact, in many parts of the UK in the past, and on

East Anglian small farm orchards, little or no routine pruning was carried out, especially on plums and cherries, other than leader suppression, with just the occasional adjustment to reduce the risk of unbalance and wind-blow.

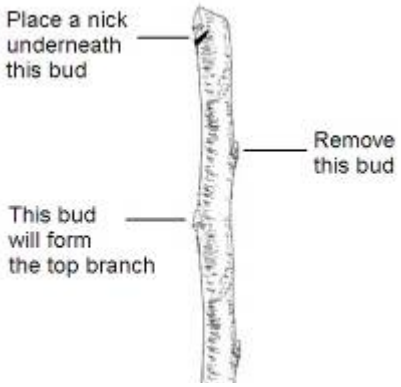
In some other areas, elaborate pruning methods were developed that are not mentioned in the TIN's. One such is the excessively wide and low branching half-standard apples of the Fens, including a few orchards in the extreme north west of Suffolk, with branches pulled down to a horizontal form. This is an exaggerated form of the low apple trees on vigorous M2 (called then Type 2) rootstocks of the 1930's to 1970's, and just hanging on in a few old commercial Suffolk orchards.

Fig 13. These apple trees are the only remaining trees of the largest commercial fruit farm in Wickhambrook, probably planted in the 1930s. They were leader suppressed at 1.8m and pruned annually in winter to maximise spur production and have been maintained by this method ever since!

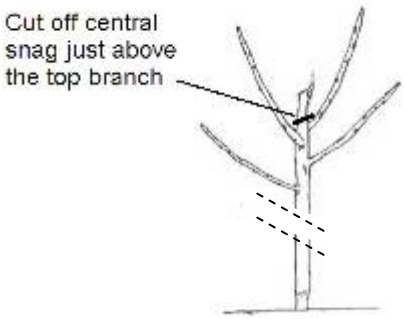
Leader Suppression

Most fruit trees left unpruned produce a tall conical tree with a single dominant trunk off which the side branches arise and spread outwards. This simple bud treatment method inhibits the natural tendency (induced by a hormone called an "auxin" produced by a terminal bud) for the tree to have a single leader, and encourages wide branch angles and an open-centre, suppressing the inclination for a single tall leader. It works well on apples, cherries and pears and (unpredictably) on some plums. The following is a description and diagram of the process prepared by Bob lever, a consultant orchardist and lecturer specializing in traditional orchards.

- Cut the leader back to two buds above the point where you want the top branch to form; this is the topping cut.
- Use a sharp blade to place a deep nick underneath the top bud.
- Remove the second bud completely.
- The following winter, remove the stunted centre leader, cutting cleanly just above the top branch.



1st winter



2nd winter

This method can be used with little or no subsequent pruning. It reduces the overall tree height to create a more or less cup shaped tree, It does not work as well if only the terminal bud is taken out and is best if the tree is allowed to grow 60cm beyond where the topping cut is made.

The effect is retained for some years, and if a new leader appears this is cut out at its base. In many old orchards these trees with their flat-topped or cup-like shape are still recognizable after decades of neglect. In south Suffolk, some cherry trees retain this shape, with perhaps the last leader suppressed in the 1930's.

Just an acre of orchard might have 30 - 50 trees, and the time, labour and cost of annual pruning will be considerable. However in the Suffolk claylands, farm orchards were often maintained on a minimal prune regime. Big old trees and badly shaped trees do need restorative work, and thinning of dense growth and the opening of a crowded crown can help cropping, but large orchards take a long time to prune and once regular pruning becomes a routine it must be continued. However minimal pruning is both a perfectly acceptable policy, and a traditional and local practice. It should also be recognized that unpruned trees on standard rootstocks will be high and wide in time and require ladders to pick the fruit, which may have health and safety implications.

Pollarding

Although not recorded in manuals of fruit cultivation, throughout Suffolk and Cambridge and probably elsewhere very tall growing trees were maintained almost as pollards. Pears on wild pear rootstocks can be up to 20m high and some were subjected to a pruning policy that approximated to pollarding with trunk height of about 2m. Carried out at 5-10 year intervals it

reduced the risk of wind-blow, reduced the height for picking, and extended the tree's life (and probably produced uneven cropping). It is not considered a practical policy for quince grafted trees.

In Suffolk, a number of large cherry-plums in orchards or close to houses are pollards, probably last re-pollarded over 50 years ago, perhaps longer. Most of these are the locally appreciated red-black fruited form, the same as, or similar, to the variety known as Burrell's Early Red.

Herbicides and pesticides

The Defra TIN's do recognize that some spray regimes will be carried out in many orchards, even those in Stewardship. However, all pesticides have adverse effects on quite harmless invertebrates as well as those harmful to fruit. Winter washes in particular also reduce or eliminate epiphytes, some of which are local or rare and may be characteristic of orchard trees, and should not be used. Lichens are quickly eliminated on trees sprayed with fungicide. Probably the least damaging control action to wildlife is the use of pheromone traps for apple codlin moth and plum moth, plus an attempt to educate the customers into acceptance of some blemishes and defects. Old apple trees sprayed with seaweed foliar sprays have extensive bryophyte flora.

See Appendices for more information.

Paul Read
April 2012

APPENDIX 1
ADDITIONAL READING

Many old books on gardening carry instructions for planting country house orchards, but few describe the traditional, often grazed, commercial orchards, or the farmhouse orchard. The most complete are now out of print:

Hoare, A. H., *The English Grass Orchard*, Ernest Benn, London 1928
Seabrook, W. P., *Modern Fruit Growing*, Ernest Benn, London,1st ed 1918, to 8th ed 1947 (which also describes the old bush apple orchards).

Most recent books on tree fruit cultivation are irritatingly repetitive and derive their material from each other, and from previous RHS publications and are very small garden centred. No modern books detail the planting of standard or large half-standard trees. Many books with orchard in the title lack accurate detail, repeat well-worn mistakes, and are disappointing. All Common Ground books on orchards are interesting and thought provoking and the one below is worth reading if you are planning a local community orchard. It is less a how-to-do-it book, more a how-to-organize-it-and-ideas book.

The Fruit Garden Displayed, RHS, 8th Ed 1991
Community Orchard Handbook, Common Grand, publ. Green Books, revised ed. 2011

APPENDIX 2
NATURAL ENGLAND'S TECHNICAL INFORMATION NOTES

Natural England has provided a set of invaluable Technical Information Notes (TIN's) on "Traditional Orchards", prepared during 2007 and since updated, which can be downloaded from http://publications.naturalengland.org.uk/category/9001 on the following subjects:

TIN012 - Traditional orchards: a summary
TIN013 - Traditional orchards: site and tree selection
TIN014 - Traditional orchards: planting and establishing fruit trees
TIN015 - Traditional orchards: an introduction to pruning
TIN016 - Traditional orchards: formative pruning of young trees
TIN017 - Traditional orchards: maintenance pruning
TIN018 - Traditional orchards: restoring and managing mature and neglected orchards
TIN019 - Traditional orchards: fruit tree health
TIN020 - Traditional orchards: orchards and wildlife
TIN021 - Traditional orchards: glossary

The information and illustrations have a distinctive west-country flavour, but overall is extensive and covers new orchard planting, and existing orchard management in Higher Level Stewardship, Community orchard schemes using large standard and half-standard trees, and orchards being managed for wildlife generally. Much of the information is relevant to both farmhouses, private and commercial orchards.

APPENDIX 3
OTHER SUFFOLK TRADITIONAL ORCHARD GROUP ADVICE NOTES

Many revised Advice Notes are being drafted and will be ready to download from the website (www.suffolkbiodiversity.org.orchards.asp) during the summer of 2012 including**:**

STOGAN 1: Orchards and the orchard tradition in Suffolk.
STOGAN 2: Fruit varieties for Suffolk traditional & amenity orchards. (including a supplier list).
STOGAN 4: Protecting new & old standard orchard & parkland trees.
STOGAN 6: Cobnuts in Suffolk.
STOGAN 8: Propagating fruit & nuts trees for Suffolk orchards.
In addition **STOG Mini-Monographs**, describing local Suffolk fruit and nut varieties, are in draft.

APPENDIX 4
GRAZING ANIMALS IN ORCHARDS

Protection methods for grazed orchards trees

Older orchard trees do not need such complex (and expensive) protection from grazing animals as the tree trunk itself becomes large enough to support the protection materials and no posts and rails are needed. In some old orchards the remains of split chestnut post and wire fencing round trees still exists, but by far the most common protection was, and still is, a 1.5m or 2m high galvanized rabbit wire circle round the tree, wired together with a 15cm overlap.

Fig 14. Not the best solution!

Today, plastic mesh versions are easier to erect, fastened by nylon pipe- or wire-straps such as those used by electricians. Some of the best plastic meshes are those made for ground reinforcement on grass car parks, and come in 1m and 2m wide rolls which can be placed round a tree trunk when the Tubex tree shelter finally splits.

Once tree trunks reach about 20cm in diameter they are far less interesting to many grazing animals, but this is when the risks are greatest. In late winter or early spring when the sap pressure increases and it is at its sweetest, is the most dangerous time. Most apples and some plum species have appetizing bark and need some protection almost indefinitely, or, as happens in some areas, a number of trees will be partially bark-stripped each year, and this has to be accepted unless permanent protection is given.

In orchards with a wide variety of cultivars, some will never make large trees (e.g. apple Cox's Orange Pippin or pear Williams Bon Chretien) and will always need protection, whereas other cultivars of the same age on vigorous rootstocks will be large and beyond interest to most grazing animals within about eight years (e.g. apples Blenheim Orange and Bramley's Seedling, most pears on "wild pear", and the largest plums, like Monarch, especially on Brompton).

However under no circumstances should horses or ponies be allowed into orchards, almost no protection will prevent a determined horse from eating apple bark in winter!

Fig 15. Standard apple trees grazed by cattle, which browse low branches, leaving an obvious browse line. The trunks are protected with expensive removable parkland tree guards.

STOGAN 4: Protecting new and old standard orchard and parkland trees describes a permanent method of protecting fruit trees

Grazing animals in orchards

The following was written for the Grazing Animal Project (now the Grazing Animal Partnership) to assist graziers and contractors to graze their animals without damaging the trees.

1 All sheep, goats, cattle and horses eat apples, damsons and plums, and some cultivars are clearly tastier than others - some animals seem to actively dislike pears until the grass is in short supply. Hazel/cob leaves are also liked, although only the smallest coppice stems of hazel are regularly bark stripped. Walnuts are left to the last. Cherry leaves are really liked... but old cherry trees are rarely bark stripped. Some cherry-plum, *Prunus cerasifera,* are never touched. **Muntjac** and **horses** will eat **anything** (except elder!). **Roe deer, red deer** and **rabbits** mainly eat leaves and bark strip in severe winter weather, or only small stems.

2 Apples and plum trees up to a foot in diameter are bark stripped, especially in winter, but any bit of peeling bark will be given great attention at any time. (Sheep are curious and will also chew the plastic pipe straps used to hold tree protectors to posts).

3 Even in old orchards where the large trees are unprotected sheep were always considered the only "relatively safe" grazing animal, and even then some trees were occasionally lost by bark stripping. Sheep were not grazed in winter - the risk was, and is, too great - nor when spraying took place (orchards were not the healthiest places in the late

19th/early 20th century!). In Rummers Lane Orchard, near Wisbech in Cambridgeshire (with some of the biggest trees in the area, all apples, mostly Bramleys, where grazing has been reinstated in summer in the last few years, some trees have been targeted, and even with this age of tree you cannot simply push the sheep in and walk away.

4 Some sheep breeds can reach higher than others. Primitive breeds can put their feet on the top of a 1.1m post and reach another 20cm. Downland breeds, Southdowns, Hampshire and Ryeland for example, rarely lift their front legs off the ground, but can do, using wire netting to reach higher. Most downland breeds are less of a risk than primitives. Primitives were probably never given the run of orchards - they came from different parts of the country. The taller meat breeds like Leicester and Suffolk can reach to 1.2m without effort. Some primitive sheep breeds (and most goats) will climb trees to browse. We got rid of our Icelandics because they could reach anything they wanted (and were prepared to fight us for it!)

5 All sheep breeds rub on rough posts used to support tree protectors, and some posts will inevitably be snapped off - once that happens there is little time to save the tree before it is eaten. Rams are a greater risk as they like rubbing even more than ewes (and occasionally take a dislike to a tree or a post and "ram" it until it gives up - then they eat it!)

6 If an animal can't see (or smell) the tree it is less likely to be targeted. Impervious rigid Tubex tree shelters seem to give the most protection; mesh Acorn shelters are worried till they break!

7 Pigs in orchards are rare in East Anglia, but some instances have been recorded where pigs have been let in for a few weeks to feed on the wild-falls. They too strip bark and if pigs are left too long in the orchard, the ground is turned up until it resembles a WW1 battle field, resulting in such uneven ground levels that sometimes no vehicle can be used to cut or top the sea of nettles.

8 The greatest risk to old orchards is ponies and horses. A horse can strip the bark from the largest apple tree in a single day, and across England many magnificent old orchards are being destroyed completely by becoming pony paddocks. To see this just drive down the M20 in Kent.

9. Chickens and geese are no trouble at all.

Fig 15. Very few orchards look like this in East Anglia. This is a 6acre Worcestershire cider apple orchard, cattle grazed, with trees branching over at over 2.2m.

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