**Notes**

**Evolution of Plants**

Land plants have probably existed for over 41 million years. Early plants had no roots e.g. mosses and reproduced either asexually or through eggs and motile sperm. Ferns and mosses have a two stage life cycle producing both sperm and eggs in one generation which develops into the adult that we are familiar with and this goes on to produces spores which in ferns grows into small, flat heart shaped plants that produce the sperm and eggs. The spores are wind dispersed.

Conifers produce cones. They have different male and female cones. Some species have both types of cone on the same tree others have only one type. Male pollen is windblown from the male cones to the female cone where it grows a pollen tube into the egg (ovule) in order for fertilisation to take place. The seeds produced are described as being “naked”, i.e. they are not protected inside an ovary.

Flowering trees develop their ovules inside an ovary. The other obvious difference is that they have “broad leaves” unlike the needle and scale-like leaves of conifers. Many are wind pollinated and attract no insects. Some have developed nectar and other, more advanced species, petals in order to attract insects.

**Native or introduced and does it matter?**

During the last Ice Age between 22,000-11,000 years ago the ice sheet spread down from the Arctic to cover most of Great Britain progressing as far as the Midlands, and at its coldest, London. During this time it would have been too cold for trees to survive anywhere in Britain. Due to the amount of water held in the ice sheets sea levels fell and a land bridge existed between Britain and the rest of Europe. As the ice retreated sea levels rose but it would take 3000-4000 years for the land bridge to disappear. In that time it can be imagined that plant and animal life could re-invade Britain until it was eventually cut off.

Any other species of trees were either deliberately introduced or accidentally brought across the sea in the form of seeds. Here is a list of trees that were thought to have made it without human interference and are referred to as our **Native Trees:** Alder, Alder Buckthorn, Ash, Aspen, Beech, Birch (both Silver and Downy), Blackthorn, Purging Blackthorn, Box, Bird Cherry, Wild Cherry, Crab Apple, Dogwood, Elder, Wych Elm, Guelder Rose, Hawthorn (both Common and Midland), Hazel, Holly, Hornbeam, Juniper, Lime (Small-leaved, Large-leaved and Common), Field Maple, Oak (both Penduncular or English and Sessile), Plymouth Pear, Scots Pine, Black Poplar, Rowan, Wild Service Tree, Spindle, Whitebeam, Willow (Bay, Crack, Goat, Grey, Osier and White), Yew.

There are obvious reasons why non-native trees were introduced into the British Isles; they may have produced good quality wood, faster growing, their fruits were either valuable as food for humans or domesticated farm animals. In time they might become naturalised and play an important part in our rural landscape. They might also be deliberately hybridised with native species to “improve” the tree or they might accidently hybridise with native trees. The resulting trees might produce fertile seeds thereby perpetuating the line. Mutations happen in nature and these are seized upon if they are thought to be useful and cuttings can be taken to produce many more of these cloned individuals. Growers can also selectively breed from individuals that demonstrate useful characteristics. These are called cultivars.

**Introducing “foreign” trees. For and against.**

The Field Elm became a well loved, almost iconic, tree of our hedge rows across Britain and it spread by sending roots through the soil producing suckers some distance away from the parent tree. It was thought that in some hedgerows all the trees were connected and were therefore clones. The timber was very useful. Dutch Elm Disease, a fungus, carried by a wood boring beetle practically wiped out all Field Elms in the 1960s and 70s. Some resistant “strains” are thriving in one or two places in England.

To improve the quality of the wood from our native Black Poplar similar species were brought into Britain and deliberately crossed with it. The Eastern Cottonwood from the USA was one such species. The hybrids from this cross are fertile and therefore are able reproduce and produce further hybridisation. There is a real risk that our native Black Poplar will be hybridised out of existence.