



# Different strokes *for different folks*

**Dr Terry Mabbett discusses the relationship between trees and turf**





PREVIOUS PAGE: Trees are important delineators for separating fairways

LEFT: Trees should not disrupt important ecosystems like the fast flowing stream shown here

BELOW: Herbicide application around trees should be carried out with specially designed shrouded sprayers (Picture courtesy Micron Sprayers)



**Articles about trees in turf invariably introduce concepts of conflict, 'survival of the fittest' and winners and losers. In reality trees and turf should be considered together, complementing each other and adding to the design, structure and environment of the golf course as a whole.**

Trees and turf clearly have varying requirements each impacting on the other at various stages in growth cycles and at different times of the day and year. Provided individual needs can be catered for without prejudicing the other 'party' there is no reason why trees and turf should not get along perfectly well together.

Trees and turf are green plants competing for the same type of resource although for how much, when required and how they secure it sets turf and trees apart from each other. Dual positive growth and development of trees and turf essentially comes down to compatibility and compromise, ensuring tree planting enhances the environment with minimum effect on turf quality which after all is the basic requirement for a good all round game of golf.

Trees and grasses are clearly 'not all things to all men'. Grass is the biggest weed enemy of foresters who spend a great deal of time and money rescuing newly planted trees from grass competition. Trees springing up as seedlings or suckers in professional turf of parks and gardens are nightmare scenarios for groundsmen.

Greenkeepers will have planted their own trees or inherited them, and providing planting pattern and

choice of species was well thought out any negative impact on turf should be minimal, and rectifiable allowing greenkeepers to focus on broad-leaved herbaceous plants which are the common enemy of turf and trees on golf courses.

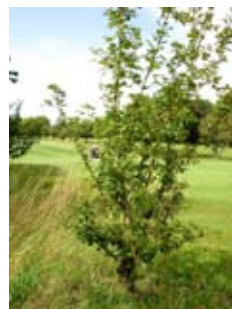
**Why plant trees on golf courses**

Trees add to the golf course environment by enhancing the landscape, improving playability and broadening biodiversity. By the same token tree planting should not be carried out in environmentally sensitive areas at the expense of biodiversity.

**Some key specific functions of trees on golf courses are:**

- **Definition and delineation of the course including defining and dividing fairways, indicating the line of play and delineating out-of-bounds from playable areas.**
- **Guarding greens, providing markers for locating 'lost' balls and generally enhancing challenges presented to golfers**
- **Protecting the privacy of golf courses and providing shelterbelts and wind breaks especially in exposed locations and situations.**
- **Improving and complementing course character and aesthetics both visually and intrinsically through new and improved micro climates and ecosystems for extended biodiversity**

Overall success will ultimately depend on tree species selection and planting position. Trees are clearly planted around rather than inside main playing areas of fine and professional turf, but natural forest



Young trees like this field maple require constant care



Exposed tree roots present real dangers during mowing

trees like oak, ash, beech and lime can eventually impact both aerially and underground on greens, tees and fairway, even if planted well away from these key playing areas. Potential problems may not become reality until decades later so should be borne in mind and factored in at planting.

**Subterranean impact of trees on turf**

Calculations show 10 per cent of total tree biomass is underground as root tissue. Feeder roots of large forest tree species like oak (*Quercus* sp), common ash (*Fraxinus excelsior*), lime (*Tilia* sp) and beech (*Fagus sylvatica*) stretch many metres beyond the edge of the tree canopy. Turf adversely affected by trees is persistently weak, off colour and will develop 'dry spots' from which grass has disappeared but broad leaved weeds will grow.

Trees and grass compete for the same resources (sunlight, water and nutrients) with trees usually at an advantage in the normal course of events. Tree feeder roots will be deeper underground exploiting water and nutrients that turf grass roots cannot reach. That said trees may expose large roots at or above the soil surface having arrived there by migration, or incidentally due to soil erosion. Hard roots protruding above the surface add a potentially dangerous dimension for mowing machinery.

Another problem is suckering where tree roots bear buds which develop into shoots and eventually self-supporting trees. Suckering is not common to all trees but prevalent nevertheless in a number





LEFT: With shelter comes shade across the turf

BELOW: Smaller stature trees like the maples shown here are a popular choice



of popular amenity trees. Common lime (*Tilia x vulgaris*) is a major culprit along with aspen (*Populus tremula*) and to a lesser extent common alder (*Alnus glutinosa*) and wild cherry (*Prunus avium*). Several exotic species, such as false acacia (*Robinia pseudoacacia*) and tree of heaven, (*Ailanthus altissima*) are notorious for suckering and should be avoided at all costs even though attractive trees.

Suckers can spring up a good distance from the tree increasing as the old tree 'fades away' and continuing to appear for many years after a tree is nominally dead. Not only are they unsightly and disruptive to turf but cause even more damage when attempts are made to physically remove them. The only effective way to eradicate sucker growth, without causing massive turf damage, is to use dedicated stump killers which contain systemically acting total herbicides used to kill woody species).

'Biggest sucker' in the tree world is the English elm (*Ulmus procera*) neutered by Dutch elm disease in the 1970's. Its suckers still appear forty years later where large elms once stood.

Continual production of suckers from fragments of root tissue left behind when trees were felled has allowed the English elm to remain as an integral part of hedgerows, and as 'poles' growing up to around 8 metres high until scythed down by Dutch elm disease carried and spread by bark beetles.

Greenkeepers faced with large trees causing damage to turf are essentially 'between a rock and a hard place'. No option is ideal and all essentially last ditch responses.

- **First is radical and severe pruning of the canopy then waiting for the root system to react and retreat accordingly**

- **Dig a trench between the tree and the at risk turf to sever the feeder roots.**

- **Fell the tree and deal with the stump in a way that causes least disruption and damage to surrounding turf.**

Best option is prevention rather than control. If a tree species has the growth and development potential to subvert turf with its root system or shade out turf under the canopy then don't plant it in the first place.

### Aerial impact of trees on turf

Aerial impact of trees is easier to assess and deal with because you can actually see what is going on. Trees may be planted to provide shelter especially on exposed golf courses, but with shelter comes shade, lower light levels reaching the turf and reduced air circulation with higher humidity and more prolonged surface wetness.

Water stress in turf caused by tree roots is well known but large spreading and dense canopied trees also add to water stress by filtering out falling rain. Turf grasses as a group do not respond well to shade and overall effect is to compromise growth rate, turf strength and grass colour. Shade reduces grass root length and density thereby decreasing tolerance to traffic wear and tear.

Experienced greenkeepers will tell you that morning sunshine is essential for turfgrass health and quality and which is difficult to achieve and maintain without it.



Lombardy poplars are tall but narrow and therefore have minimal shading impact

Shade and soil water imbalances brought about in turf by trees bring a range of 'biological baggage' not normally seen in on well drained sites and soils. This may include growth of moss, algae and a number of moisture loving broad leaved weeds, as well as a heightened threat of turf disease such as Fusarium patch (*Microdochium nivale*).

Greenkeepers need to think long and hard before planting trees around greens and tees. If shelter is the prime reason then evergreens and especially conifers including pines, firs and spruces are the obvious choice to provide shelter in winter (as well as summer), when clearly it is most needed. On upland courses with poor acid soil these conifers may be the only realistic tree planting option, but year round foliage and shelter means year round shade and higher humidity. This may prove critically damaging during mild and moist spring and autumn seasons when Fusarium patch and other moisture loving diseases are most active.

Deciduous trees in full leaf for summer months only, when light and temperature are highest, may prove positive but when effects of leaf fall are factored in a different problems may arise. Fallen leaves encourage surface-feeding and casting earthworms and aggravate problems with thatch.

Fallen leaves with a high tannin content are especially damaging because they will persist throughout winter and beyond without measurable decomposition. Such leaves include pedunculate oak (*Quercus robur*) and sessile oak (*Quercus petraea*) and beech (*Fagus*

sylvatica) although pear (*Pyrus* sp) is the worst offender.

Better to go for trees like ash and lime with leaves that decompose and disappear quickly after fall. As a general rule best choices for turf sensitive situations are native species small in stature. Avoid species with spines and prickles such as hawthorn (*Craetagus* sp), blackthorn (*Prunus spinosa*) and holly (*Ilex* sp). Gorse is popular for shelter around greens on highland golf courses but tends to raise humidity levels as well as being particularly unpleasant to tangle with.

### Selecting and planting trees

**Trees planted in turf should tick the following boxes:**

- **Small in stature**
- **Non-suckering**
- **Deciduous or evergreen depending on situation**
- **Fallen leaves of deciduous species to decompose quickly**
- **No prickles, thorns or spines**

Types of trees commonly seen on well-established golf courses show how greenkeepers know from experience those which can add to the course without impacting negatively on turf. Commonly seen trees include the smaller native species like field maple (*Acer campestre*), mountain ash (*Sorbus aucuparia*) and whitebeam (*Sorbus aria*), as well as exotics like red maple (*Acer rubrum*) and red Japanese maple (*Acer palmatum atropurpureum*). Ash and lime are popular but are

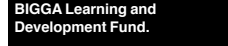
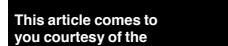
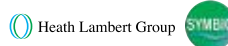
usually as smaller stature types like *Tilia cordata* (small leaved lime) and ornamental ash species. Very tall trees are normally avoided but one exception is Lombardy poplar (*Populus nigra var.italica*).

Trees shoot straight up tall and narrow to give correspondingly slim shade with minimal impact on turf.

Using larger container-grown and root ball planting material, including 'standards', or smaller bare-rooted trees as 'whips' or 'feathers' is very much a 'horses for courses' choice. Larger container grown and root ball trees will establish more or less straightaway and reach the required size in a much shorter space of time. However, they are more expensive, require more disruptive planting methods and secure staking and tying adding further to costs.

Even when afforded with protection and growth encouragement from tree shelters small trees take much longer to establish and reach an adequate size. On the plus side they are cheaper to buy (and replace if they fail), cause less disruption and damage to turf at planting do not generally require staking and tying.

All newly planted trees require good routine care and maintenance including weed control, fertiliser application and of course watering especially during summer. Tree guards of appropriate height are required if the course is home to bark gnawing and foliage browsing wild mammals like rabbits and deer.



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### Meeting dual needs of turf and trees

Routine course maintenance, including fertilizer application, chemical weed control, irrigation and grass cutting, is when need to satisfy dual requirements of turf and trees becomes abundantly clear.

Turf fertilizer regimes are clearly inappropriate for trees in composition and dosage, while fertilizer regimes recommended for trees may scorch the turf around the base of the tree. This can be avoided by using slow release formulations.

Type and level of irrigation used on shallow rooted turf grass in summer is inappropriate for trees. Water will evaporate from the topmost layer of soil before it can reach deeper seated tree roots, while standing water may build up around the base of the tree causing physiological damage and encouraging disease. Newly-planted and establishing young trees must be watered regularly. Well established and mature trees are unlikely to require irrigation except during really severe drought. Trees tend to benefit from fewer high volume well targeted applications of water.

Situation regarding surface 'cover' on the soil immediately around trunks of large mature trees is complex and vexed. Turf grass cover close to large trees is difficult to maintain because broad leaved weeds will readily invade and take over. Mulching material (e.g. bark or gravel) or mulch structures such as mats that eliminate all growth, turf or weeds, may be used. Downside is disruption of fertilizer application and uptake by trees, which means leaving the soil bare and controlling broad leaved weeds as they appear. But weeds are a year round problem even in winter when fast growing ephemerals (flower most of the year) like chickweed, speedwells, shepherd's purse and red dead nettle quickly colonise bare ground. Best, most satisfying and neatest option is to persevere with shade tolerant turf grasses.

Careless use of mowers or strimmers around trees inflicts bark damage, leaving unsightly scars and paving the way for entry of bark infecting pathogenic fungi and bacteria. Likewise any use of herbicides around trees must be conducted with care, using shrouded (covered) applicators dedicated to this task. Herbicides used to control broad-leaved weeds under trees will invariably be 'total' in action which means any turf grass will also be killed.

BELOW: Felling may be the last resort if trees get too big for their location

