WHAT MAKES A SUCCESSFUL TURF WEED?

By Dr Terry Mabbett

Common daisy with its fleshy rosette leaves divides quickly to produce new plants and a matt of weed growth.

Turf is a man-made ecosystem, exploiting differences in height between growing points of broad-leaved weeds and turf grasses which escape the mower's blades.

Optimum-height, correct frequency cutting should eliminate all broad-leaf weeds but some species have a naturally prostrate habit and escape to survive and thrive in the turf environment. Over the long-term, mowing selects out weed biotypes best suited to turf, even though the species may not be naturally prostrate. Weed management requires an optimum height cut, because a cut too low can be just as damaging as a cut too high. Weeds like common daisy (Bellis perennis) and greater plantain (Plantago major) thrive in turf that is 'shaved' and compacted.

Many common and successful turf weeds display a completely different growth habit when not growing in turf. Creeping buttercup (Ranunculus repens) hugs the ground, its runners slipping unobtrusively through the turf to root at regular intervals. Contrast this to 'natural' growth situations where creeping buttercup grows up to 45-60 cm high. Self-heal (Prunella vulgaris) is one of the most prostrate of turf weeds but grows up to 30 cm high in long meadow grass. Bird's foot trefoil (Lotus corniculatus) behaves in the same way, often using long grass stems for support.

The spectrum and frequency of broad-leaved weeds in turf clearly depends on status (e.g. professional or amenity) and corresponding management profile. That said turf weeds invariably display one or more characteristics of growth habit, reproduction and response to chemical control which allow them to successfully invade and compete in turf.

Growth habit

Common turf weeds including dandelion (Taraxacum officinale), common daisy, plantains and self-heal display leaves in rosettes at or just above soil level. Rosette growth avoids the cut while the leaves shade out and kill adjacent grass plants. For instance, the large toothed leaves of dandelion are super-efficient light blockers, shading out and smothering short fine leaves of turf grasses.

Weed niches created by rosette forming weeds are exploited and expanded through daughter plants produced directly at the fleshy rootstock and stem (e.g. daisy and plantain) or more efficiently by running stems (runners) or stolons e.g. self-heal and white clover (Trifolium repens). These are major features of the matt forming weeds that create patches in turf over a short period of time.

Asexual reproduction

Runners that root provide weeds with an efficient and effective means of asexual reproduction and spread. Runners may be severed during mowing or raking but the new plant, now independent via its own root system, survives to form a new focus of

Dandelion. The long toothed leaves of dandelion are super-efficient light blockers.

The lance-shaped leaves of the ribwort plantain (Plantago lanceolata) in rosette formation.

weed infestation. Weeds with running stems that root include white clover, self-heal and creeping buttercup. Slender speedwell (Veronica filiformis), regarded as the United Kingdom's worst turf weed, owes its wide spread to tiny pieces of runner rooting and establishing where they fall during mowing, or elsewhere if mowers are shared between sites.

Survival organs

Some turf weeds are equipped with food storage organs to survive drought and low temperature. Examples are the tap roots of dandelion and close relatives like cat's ear (Hypochaeris radicata) and bulbs of the bulbous buttercup (Ranunculus bulbosus). Perennating (survival) organs also play a part in asexual reproduction. For instance, the underground part of the dandelion appears to be a swollen root but any attempt to dig out individual plants reveals another function. Pieces of tap root left in the soil form fibrous roots and develop into new plants, causing a cluster of small dandelion plants to grow from the failed attempt to dig out a single plant.

Another successful weed in this respect is the lesser celandine (Ranunculus ficaria). The weed is not widespread in turf but one of the most difficult to shift. Lesser celandine causes protracted problems in wet, shaded turf adjacent to grassy banks and woodland which is its natural habitat. Underground at the base of each plant is a cluster of tiny bulbils each with the capacity to produce a new plant, especially if detached and spread by digging.

Sexual reproduction

With proper management turf grasses and broad-leaved weeds rarely get the chance to flower and set seed. That said many broad-leaved weeds in turf have been selected out (by mowing) to flower just above ground level. This together with long flowering periods, including ephemeral (year-round) flowering, short seed-maturation times, minimum germination requirements and ability to exploit tiny germination sites in turf means sexual reproduction does play a part in weed establishment and spread.

Most broad-leaved turf weeds readily exploit other habitats to generate large seed banks from which plants like the wind-borne 'pappus' of the dandelion migrate into turf. Successful turf weeds can exploit small germination sites including tiny patches of bare soil caused by wear and tear, or holes left by physical removal of individual weeds. Worm casts provide ideal and ready-made germination sites, especially when the seed has been ingested by the worm during burrowing under the turf, and deposited intact inside the cast.

Drought resistant weeds

Predicted effects of climate change on UK turf due to hotter and drier summers and the need for drought resistant turf grass species and varieties is widely discussed. Relatively little attention is paid to how turf weeds will behave and fare, and especially those which are naturally drought resistant. At the end of dry summers white clover, bird's foot trefoil, lesser trefoil/yellow suckling clover (Trifolium dubium) dandelion, cat's ear and yarrow (Achillea millefolium) will be thriving in drought stricken turf. They persist throughout the drought and then fast off the mark in autumn when rain starts to fall, forming large

Successful turf weeds can exploit tiny germination sites like worm casts. Dock (Rumex) shown here.

A major weed of turf that spreads by creeping stems which root at intervals.

weed patches in the still struggling turf. Bird's foot trefoil, dandelion and cat's ear have deep tap roots, while the finely divided waxy leaves of yarrow have low transpiration potential.

Resistance to chemical control

Selective herbicides have revolutionised turf weed control by allowing managers to overspray the turf and kill broad leaved weeds without harming turf grasses. Some weeds are more susceptible than others even with the same herbicide product. Recommended application rate (litres of product per hectare) and stage of weed growth up to which the herbicide can be applied differs between weed species. Product labels may additionally cite specific weed species for which only moderate control can be achieved with recommended rates.

There are no hard and fast rules but yarrow and slender speedwell are among the most difficult weeds to control with the current range of approved herbicides. A particular weed species may be hard to control because the foliage is difficult to wet, for example yarrow with finely divided and waxy leaves, or because the weed's metabolism is inherently resistant to herbicide action. This appears to be the case for slender speedwell which has only ever been adequately controlled by one or two specific herbicides.

Grass weeds

In theory other grasses should be the most successful and most difficult to control weeds in professional turf. Selective herbicides will solve most broad-leaved weed problems but can do nothing about coarse grasses like timothy (Phleum pratense), Yorkshire fog (Holcus lanatus), meadow foxtail (Alopecurus pratensis) and cocksfoot (Dactylis glomerata), all regarded as weeds of professional turf. Perhaps the most interesting in this respect are various Poa species. Poa can be a legitimate and valued component of turf in some situations but a weed in others, depending on turf status and nature of the soil base on which it grows.

White clover is one of the most drought resistant weeds of turf.

The only real option is to exploit any differences in soil, water and nutritional requirement between turf grasses and weed grasses. Poa can be marginalised using a so-called 'starving-out' strategy. Some managers squeeze out Poa by 'turning a blind eye' to anthracnose disease (Colletotrichum graminicola). Poa is measurably more susceptible than bents and fescues to anthracnose thus allowing natural biological control to reduce the incidence of Poa in professional turf.

Field woodrush (Luzula campestris) looks like a grass but belongs to the family Juncaceae. However, like true grasses (Graminae) field woodrush is a monocotyledon and is mostly resistant to the action of the selective herbicides designed for use in turf.

About the Author

Dr Terry Mabbett has experience in grassland agronomy, and tree protection in forestry, horticulture and amenity. He has worked as consultant and technical writer in these fields for 20 years with a strong focus on pest, disease and weed management.

Creeping buttercup spreads unobtrusively through turf on runners which creep over the ground and root.