# WEEDS OF TURF IN EASTERN AUSTRALIA AND THEIR CONTROL

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*Summary*. Weeds are a problem in turf by reducing aesthetic appeal, giving an uneven playing surface, reducing its usefulness, increasing the difficulty of maintaining the area and by harbouring pests and diseases. The increased labour and machinery input required for prevention and control of weeds in turf is an added cost. Reported relative phytotoxicity of thirty two herbicides on eight warm season turf grasses is shown in a table.

## INTRODUCTION

Reduction of the aesthetic appeal is of major importance in intensively managed areas. The presence of weeds interrupts the even colour and texture of the turf. The disharmony caused by weeds may be because they have a different:

(a) shape, e.g. flatweed (*Hypochoeris radicata*) in a fine leafed turf grass e.g. Queensland blue couch (*Digitaria didactyla*);

(b) colour, e.g. red caustic creeper (*Euphorbia prostrata*) in a couch (*Cynodon dactylon*) lawn;

(c) rate of growth, e.g. nutgrass (*Cyperus rotundus*) in couch.

An uneven playing surface can be important in such games as bowls, golf and cricket. The speed of travel and direction of the bowl is very important in bowls and this can be altered by coarse weeds e.g. paspalum (*Paspalum dilatatum*). Reduced usefulness of a turf area may be the result of the presence of prickly weeds, e.g. jo jo (*Soliva pterosperma*) or weeds in flower that may attract stinging insects, e.g. white clover (*Trifolium repens*). The use of a sports field for active games may also be reduced by the presence of stolons of weeds that trip or hinder players, e.g. kikuyu grass (*Pennisetum clandestinum*). Increased difficulty in maintaining an area may be the direct result of the presence of some weeds, e.g. seed heads of crowsfoot grass (*Eleusine indica*) can be cut off with a slasher type mower only. Harbouring pests and diseases can be a major problem both in actively used turf areas and in the surroundings from which alternative hosts can spread insects and diseases to the managed turf areas e.g. sugarcane mosaic virus is common to both broadleaf carpet grass (*Axonopus compressus*) and Queensland blue couch (Teakle and Grylls 1973) and felted grass coccid (*Antonina graminis*) is found on Rhodes grass (*Chloris gayana*) as well as couch and Queensland blue couch (Brimblecombe 1968). The extra cost of weed prevention and control can be large e.g. up to $4000 was spent to control winter grass (*Poa annua*) on one 18-hole golf course but an outlay of $300 to $500 for weed control on a leading public golf course in Hobart is a normal budget (Hyde-Wyatt 1978).

## WEED CONTROL

Both weeds and desirable species have periods in their growth at which they are more susceptible to mechanical, chemical, physiological or other forms of retardation or control than others.

The turf grass must be identified so that when a selective herbicide is used the desirable grass will not be killed. Table 1 gives the reported degree of tolerance of 8 warm season turf grasses to 32 herbicides. Weeds that are botanically close to the turf species tend to be difficult to control by selective herbicides or other methods. The turf manager must use either chemical or managerial methods (or both) to modify the local environment so as to put the turf grass at a competitive advantage.

## MANAGEMENT METHODS

*Competition.* A well adapted turf species growing vigorously is a good weed control measure in itself, in that it competes successfully for light, nutrients and water to the partial exclusion of the weeds. In areas where there is no turf grass suited to the proposed use then either a mixture can be grown or special management procedures can be taken to reduce weed problems.

*Watering.* The supply of adequate water will enable the turf to grow vigorously and so compete successfully against the weeds. Excessive watering, especially in poorly drained or shaded areas may give some weeds an advantage, e.g. winter grass (*Poa annua*). Water with a high salt content will favour salt tolerant weeds over salt susceptible turf species even if they are well adapted to all other local conditions.

*Fertilising.* An adequate supply of nutrients is needed for a vigorous turf but the fertiliser must be applied at the correct time in the grass's growth cycle. Excessive fertiliser may be deliberately used as spot treatments for weed control. e.g. sulphate of ammonia against white clover. Phosphate fertilisers should be used sparingly on turf as they encourage clover and trefoil growth and flowering. Excessive use of lime and fertilisers can give an advantage to shallow rooted weeds that can utilise the fertiliser before the deeper rooted turf areas.

*Changes in pH.* Most turf grasses are tolerant of a pH of 5.5 and so can resist weeds that have an optimum pH that is higher. The type of fertiliser used can influence the speed and direction of a soil pH change, e.g. sulphate of ammonia will lower soil pH fairly rapidly but calcium ammonium nitrate has little effect on soil pH at normal rates.

*Mowing.* When a turf area is first established there is often a wide range of weeds present. Mowing will rapidly eliminate the tall growing weeds since they cannot tolerate the frequent defoliation of a large amount of their photosynthetic area, e.g. blady grass (*Imperata cylindrica* var *major*). Too frequent mowing, or mowing too closely to the ground, defoliates the turf in addition to the weeds, and weakens both.

*Thatch removal.* Removal of thatch by vertical mowing aids water, pesticide and fertiliser penetration into the root zone of the turf grass. The vertical mowing also cuts the turf rhizomes and stolons and so promotes shooting and side branching.

*Soil aeration.* Soil compaction and layering restricts gas exchange and water movement so reducing turf growth. Weeds tolerant of low soil oxygen, e.g. winter grass, are then at an advantage. Spiking, drilling or coring will relieve surface compaction.

*Correct choice of turf species.* The locally adapted turf species most suitable for each particular use should be used, e.g. racecourses need a turf that can rapidly grow back over the area cut out by the horses hooves.

*Use of clean planting material.* To reduce the number of weed propagules being planted, only clean turf seed of high germination and quality or weed free vegetative turf material should be used.

*Remove or reduce weeds in surroundings.* The surroundings should be free of weeds, or the weeds should be kept under control, so that the turf area is not contaminated by seeds or vegetative weed parts from outside the managed area. Weeds can be carried into the turf area by wind, e.g. dandelion (*Taraxacum officinale*), by water, e.g. couch, on players shoes, e.g. doublegee (*Emex australis*), on clothes, e.g. cobbler's pegs (*Bidens pilosa*), or on dogs, e.g. khaki weed (*Alternanthera pungens*).

## CHEMICAL CONTROL

Herbicides used can be either selective or non-selective. The repeated use of only one herbicide may cause resistant weed species to predominate.

*Selective herbicides.* Herbicides can be applied to turf as pre-plant, pre-emergence or post-emergence treatments.

Normally only areas of high value such as bowling and golf greens warrant the expense of pre-plant fumigation. Where soil is brought onto a new site it should be treated to destroy any weed propagules such as seeds or nut-grass tubers. Methyl bromide is commonly used for this purpose.

Pre-emergence herbicides are used to kill the germinating weed seeds in the soil. Care must be taken to use a herbicide that has little or no effect on the turf grass variety or species used. The herbicide used should be one that is suitable for that climate, soil type and temperature at that time of the year, e.g. Reilly (1971) reports that chlorpropham causes damage to couch when the application is followed by rain within 24 to 48 hours.

Post-emergence herbicides are most commonly used against broadleaved weeds, especially those in the phenoxy group. The condition of the turf will affect its tolerance to post-emergence herbicides; turf that is growing rapidly is more susceptible to herbicide damage than is slower growing turf.

*Non-selective herbicides.* In situations where weeds become uncontrollable by other means, the whole area of turf and weeds may need to be killed and replanted with new turf, e.g. use methyl bromide. The relatively high cost of this operation limits its use to high value areas or to spot spraying the infested area. Soil sterilant herbicides are used to control weeds in hard-to-reach areas, especially if they have the potential to spread onto the managed area, e.g. from under fences or beside roads going through the turf area.

Table 1. Safety of use of thirty-two herbicides on eight warm season turf grasses (Source of information is in brackets)

| Herbicide | Couch | Qld. blue couch | Hybrid couch | Kikuyu grass | Buffalo grass | Zoysia | Bahia grass | Centipede |
|---|---|---|---|---|---|---|---|---|
| asulam | - | - | D (23) | - | T (23) | TI (23) | D (23) | D (23) |
| atrazine | D (31)<br>TI (4) | D (25) | D (4) | - | T (4) | TI (31) | D (4) | TI (31) |
| benefin | TI (31) | - | TI (4) | - | TI (31) | TI (13) | TI (31) | TI (31) |
| bensulide | TI (31) | T (25) | I (26)[a] | - | TI (31) | D (27)<br>TI (13) | TI (31) | TI (31) |
| bromoxynil | T (6) | T (6) | - | T (6) | T (6) | - | - | I (30) |
| cacodylic acid | T (28) | - | - | - | - | - | T (28) | - |
| chlorthal | TI (21) | T (14) | I (26)[a] | T (3) | - | - | - | - |
| dicamba | T (31) | T (25) | D (17)[b] | ID (17) | ID (31) | T (31) | T (31) | TI (31) |
| diphenamid | D (22) | - | - | - | - | - | - | - |
| DNOC | T (25) | T (25) | T (25) | T (25) | T (25) | - | - | - |
| DSMA | T (25) | D (25) | D (16)[a] | D (25) | D (6) | T (32) | D (32) | D (15) |
| endothal | T (1) | T (25) | - | - | D (19)<br>T (1) | - | - | - |
| fenoprop | T (25) | T (25) | - | T (25) | D (25) | T (32) | T (32) | D (32) |
| glyphosate | D (28) | - | ID | D (20) | - | D (28) | D (20) | - |
| MCPA | T (25) | T (25) | T (25) | T (25) | I (25) | - | T (28) | T (28) |
| mecoprop | T (31) | T (25) | - | T (25) | T (31) | T (31) | T (31) | D (32)<br>T (31) |
| metribuzin | T (31) | - | TI (18)[a] | - | I (31) | I (31) | I (31) | I (31) |
| MSMA | T (18) | - | T (18)[c] | - | D (6) | I (13) | D (32) | D (32) |
| napropamide | T (11) | - | D (13) | - | - | D (13) | - | - |
| oxadiazon | D (5)<br>T (31) | - | T (8)[c] | - | - | T (13) | - | T (9) |
| picloram | T (25) | T (25) | | - | - | - | - | - |
| propyzamide | TI (25) | T (28) | I (25)[b] | T (18) | T (28) | TI (18) | - | - |
| siduron | D (4) | - | ID (4) | D (25) | D (25)<br>T (31) | T (31) | T (31) | T (31) |
| simazine | ID (4) | D (25) | D (4) | T (6) | TI (31) | TI (31) | D (4) | TI (31) |
| sodium arsenate | T (25) | - | T (4) | - | D (4) | T (25) | D (4) | D (4) |
| trifluralin | T (25) | D (25) | - | - | - | - | - | - |
| 2,4-D amine | T (4) | T (25) | T (4) | T (25) | D (4) | T (4) | T (4) | TI (4) |
| 2,4-D ester | T (25) | D (25) | D (25) | D (25) | D (25) | T (25) | - | - |
| 2,4-D sodium | T (25) | T (25) | T (25) | T (25) | - | - | - | - |
| 2,4,5-T amine | T (25) | T (25) | T (25) | T (25) | D (25) | T (25) | - | - |
| 2,4,5-T ester | D (25) | D (25) | D (25) | D (25) | D (25) | - | - | - |
| 2,2-DPA | D (10) | - | - | D (10) | D (32) | D (32) | D (32) | D (32) |

Key
T = tolerant at recommended rate (on mature grass)
TI = intermediate tolerance with possible short term damage
I = intermediate tolerance
ID = intermediate damage
D = severely damaged or killed
- = unknown
a = Tifdwarf )
b = Tifgreen ) Hybrid couch cultivars
c = Tifway )

Botanical names of the turf grasses -

| | |
|---|---|
| Couch | *Cynodon dactylon* |
| Queensland blue couch | *Digitaria didactyla* |
| Hybrid couch | *Cynodon dactylon x C. transvaalensis* |
| Kikuyu grass | *Pennisetum clandestinum* |
| Buffalo grass | *Stenotaphrum secundatum* |
| Zoysia | *Zoysia* spp. |
| Bahia grass | *Paspalum notatum* |
| Centipede | *Eremochloa ophiuroides* |

## CONCLUSION

There are many different methods of controlling weeds in turf. The methods used will depend on the level of intensity of management, the cost of control methods and the availability of herbicides that are suitable considering the weeds to be controlled and the species of turf grass present.

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