
INTEGRATED WEED MANAGEMENT IN GOLF COURSES AND RECREATIONAL AREAS

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ABSTRACT

This paper provides an updated list of major weeds in some golf courses, recreation gardens, parks and football fields in Kuala Lumpur, Petaling Jaya, Shah Alam and Kampung Kuantan, Selangor from 1994 to 2004. Many broadleaf weeds, grasses and sedges are recorded, particularly in the roughs, collars and fairways of golf courses. In general, more weeds were observed on golf courses planted with Bermuda grass/Serangoon grass than carpet grass (*Axonopus compressus*).

In golf courses, some of the major weeds of fairways are *Borreria latifolia*, *Lindernia* spp., *Desmodium* sp., *Axonopus compressus* (a weed on fairways and aprons which have Serangoon grass or Bermuda grass), *Chrysopogon aciculatus*, *Digitaria fuscescens*, *Eleusine indica*, *Paspalum conjugatum*, *Paspalum vaginatum*, *Cyperus brevifolius*, *Cyperus rotundus* and *Fimbristylis miliacea*.

In recreation parks and football fields where carpet grass (*Axonopus compressus*) is the major turf species cultivated, the major weeds include *Asystasia gangetica*, *Borreria* spp., *Desmodium* sp., *Cleome* spp., *Euphorbia hirta*, *Mimosa pudica*, *Eleusine indica*, *Imperata cylindrica*, *Cyperus* spp., and *Fimbristylis miliacea*. In waterlogged areas, *Panicum repens*, *Cyperus aromaticus*, *Cyperus brevifolius* and *Fimbristylis miliacea* tend to dominate.

Integrated weed management (IWM) must start at the pre-planting stage and there should be a long-term action plan to manage the weeds in the turf itself and in its vicinity since weeds

spread from their seeds, tubers, rhizomes and fragments. IWM includes preventive, cultural and mechanical approaches. Frequent mowing is the most popular method used in golf courses and sports fields, and it is in line with holistic management of turfgrasses today. Chemical control and biological approaches are also discussed. A list of 26 foreign weeds to watch is included as some of them may be capable of establishing a foothold in turfgrasses in Malaysia.

INTRODUCTION

Turf is defined as a covering of beneficial vegetation plus the matted upper stratum of earth filled with roots, rhizomes and stolons. Turfs are usually low growing perennial vegetation which are uniform in growth.

Turf grasses in Malaysia include Serangoon grass or Australian blue couch (*Digitaria didactyla*), Tifdwarf and Tifgreen (both hybrid Bermuda grass - *Cynodon dactylon* x *C. transvaalensis*), Creeping bent grass (*Agrostis stolonifera* sub sp. *stolonifera*), carpet grass (*Axonopus compressus*), common carpet grass (*Axonopus affinis*), Manila grass (*Zoysia matrella*), Japanese lawn grass (*Zoysia japonica*) and Korean velvet grass (*Zoysia tenuifolia*) (Beard, 1973; Vengris and Torello, 1982; Lam, 1992). Bentgrass (*Agrostis tenuis*, *A. palustris* and *A. canina*) has also been used in golf courses.

A weed is defined as a plant growing where it is not desired. Unwanted plants in golf courses cover the turf species in the greens and fairways

and caused beneficial turf grasses to be suppressed during their establishment stage. Weeds are undesirable because they disrupt turf uniformity and compete with desirable grass species for moisture, light, and nutrients (Chee, 2000; Anon, 2004a).

The flight of the golf ball is deflected by the unwanted plants while placement of golf ball in the greens has to be repeated or re-localised when certain weeds are present in the locality. The roll of the golf ball is altered if the surface of a putting green is affected by disease, injury or weeds, and this influences the outcome of the match (Anon., 2004a).

Weeds or their stumps that remain after mowing affect the pathway of the golf ball as it rolls along the mid-section of the fairway. If the speed of the golf ball is reduced, there is greater deflection by the stumps of weeds like Love grass, Nutsedge grass and lalang.

The threshold level for golf putting greens is extremely low. The threshold levels for golf course fairways and roughs, however, are usually much higher than for greens since a smooth, blemish-free surface is not as important for play on these portions of the course (Anon., 2004a).

Some weeds have purple leaves or red-brown stems, and such colours do not blend with the green background of Bermuda grass/Serangoon grass/*Zoysia* grass. There are weeds which are light yellow in colour and they show up as patches against the green colour of the golf grass or turf. A uniform green colour for turf is expected by the majority of golfers.

The seeds of Love grass adhere to the long pants of golfers and are a nuisance as the golfers have to remove each spiky seed by hand. Some weeds are harmful to people because they attract bees, cause skin irritation, or cause poisoning if ingested (Anon., 2004a). Thorny weeds like the sensitive plant (*Mimosa pudica*) have sharp spikes that hurt the bare hands of human weeders.

TYPES OF WEEDS

Broadleaves, grasses and sedges are the main types of weeds found in golf courses and recreational areas.

Broadleaf weeds can produce a fibrous root system or a root system dominated by a large, fleshy taproot. Broadleaf weeds often bear colourful flowers of different sizes and shapes. They may have noded stems like *Asystasia*, or several trailing stems like *Mimosa*, and bunchy bases as seen in *Elephantopus*.

Grass weeds can be bunch-type (e.g. Goosegrass), rhizomatous (e.g. lalang) or stoloniferous (e.g. *Paspalum*). Bunch-typed grasses produce tillers, which are stems that arise from buds in the crown bud region (Anon., 2004a). Some spread by means of creeping above-ground stems called stolons. Stolons are horizontal creeping above-ground stems, and they originate from buds in the crown that break through the outer leaf sheath. Stolons produce nodes that can give rise to new tillers. Stolons are usually green or yellowish-green, whereas rhizomes are usually white or pale yellow.

Rhizomatous grasses can spread by their seeds or by underground stems that have nodes. Most nodes have buds that can give rise to new shoots. Fragments of rhizomes from weeds like lalang can regenerate new plants (Lee, 2003).

Sedges have stems that are triangular in cross-section; their narrow leaves have pointed ends, and they reproduce by seeds, underground tubers and rhizomes. They generally prefer moist and waterlogged habitats. Examples of sedges are *Cyperus* spp. and *Fimbristylis* spp.

Life cycles of weeds

Turfgrass weeds can be grouped into one of three life cycles: annual, biennial, or perennial. Annuals are plants that complete their life cycle in one growing season. Examples include *Hedyotis* spp. and *Ageratum conyzoides*. Biennials require two growing seasons to complete their life cycles. They usually produce