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Weeds – a major problem for Guam lawns

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Weeds are plants that grow where they are not wanted. In turf-grass situations, a plant is usually considered a weed when its size, shape, growing habit, or color disrupt the uniformity of the turf area. Broad-leaf weeds are a serious problem in agronomic crops but in turf pose less problems. Their growing points are at the top of the stem and their new growth can be removed at each mowing. Therefore, many broad-leaf species can be removed from the lawn by frequent regular mowing (Figure 1). On the other hand, "grassy" species (grasses and grass-like plants) can cause profound problems. Because these plants, like desirable turfgrasses, have growing points close to ground level, mowing does not eliminate them effectively. In some instances even chemical weed control is insufficient.

Non-chemical weed control

Healthy and vigorous turf is often free of weeds. Because weeds encroach mainly on weak or damaged turf, proper management of the lawn can stop or reverse weed infestation. Cultural practices, predominantly mowing, that encourage robust and healthy turf are a very important, but often neglected way of keeping turf free of weeds. All other cultural practices that promote vigorous growth of turfgrasses, such as proper soil moisture, adequate fertilization and good aeration, help to make turf resistant to invasion by weeds. By the same token, any major stresses such as excessively low mowing height, insects, diseases, or excessive shade, reduce turf density and allow weed encroachment. Other significant means of weed control are tillage before turf establishment and hand pulling. Tillage, or cultivation, is usually conducted before turfgrass establishment. Weeds are removed or buried by the process, or are uprooted and die of desiccation. Weed desiccation is the greatest when tillage is performed when the soil surface is dry and is repeated several times. Manual weed control, that is hand pulling, has been practiced on small residential lawns. Besides being very labor intensive, hand pulling is inadequate when weeds are well established. Many broad-leaf and grassy weeds produce underground reproductive parts such as bulbs, tubers, or rhizomes that remain in the soil and can quickly regenerate. Proper mowing practices are the most effective tool of weed control. When weeds are mowed frequently, their reproductive organs are cut off before maturation, and their existing food reserves are depleted in the continuous regeneration of cut-off stems, causing the plants to eventually die. Most tall broad-leaf weeds can be completely eliminated by mowing and flat-growing broad-leaf species and those that form rosettes can be strongly suppressed. Many flat-growing weeds have primary growing points located close to the soil surface. In these plants, mowing removes the oldest portion of the leaves but does not injure the growing point, so new growth can resume. Many of these weeds must be controlled chemically; otherwise their eradication from turf is virtually impossible.

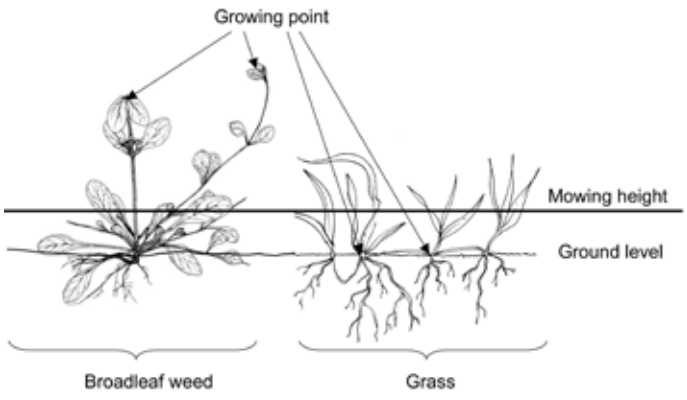

Figure 1. Mowing cuts off stems and growing points of broadleaf plants and continually regenerating them depletes food reserves, where grasses lose only leaf area and are little affected.

Weed control with herbicides

Cultural control can be effective in many situations, but under some circumstances chemical control becomes necessary. Because the major goal is the best control of unwanted weeds with the least harm to the natural environment, chemicals and the processes used to apply them should be chosen carefully and preferably with the help of professionals. Basic information regarding proper use of herbicides is printed on the pesticide label that was discussed in previous publication (General information on usage of pesticides).

Herbicides are chemicals that kill or alter the normal growth of weeds. On the basis of their selectivity, herbicides are usually divided into two main groups: **selective** and **non-selective**. Selective herbicides control target weeds without harming desirable turf-grass species. Non-selective herbicides kill all vegetation, including turf-grasses. The majority of herbicides for use on turf are selective. Non-selective herbicides are generally used in the establishment of new turf areas or as spot treatments of isolated weed patches.

Herbicides can be either **contact** or **systemic**. Contact herbicides affect only these parts of the plant that they touch and are not translocated through plant's vascular system to other portions of the plant. In contrast, systemic herbicides are taken up by roots or foliage and translocated throughout the plant, so they can affect parts of the plant that were not directly exposed to the herbicide. Contact herbicides kill plants quickly, often within a few hours of application, whereas systemic herbicides kill slowly and usually require several days or sometimes a few weeks to be fully translocated and effective. Contact herbicides require complete coverage of the weed foliage for effective control, and repeat applications are usually needed to kill regrowth from underground parts of the plant. In contrast, systemic herbicides do not require complete coverage of weed foliage; if any portion of the weed receives the spray, herbicide molecules are translocated throughout the plant.

Chemical control of broad-leaf weeds

The selective herbicides most commonly used to control broad-leaf weeds on Guam include chemicals that are relatively harmless to turfgrasses but can damage trees, shrubs and flowers either because of spray drift or because can be taken up by roots. They must be applied strictly according to the label recommendations on calm days when rain is not expected. Once broad-leaf weeds are eradicated, properly conducted cultural practices, especially frequent mowing can prevent their re-establishment for many years.

Chemical control of grassy weeds

The most troublesome grassy weeds on Guam are crabgrass, goosegrass, and nutsedge. Their control in residential lawn is possible but needs surgical precision. It requires knowledge and skills that a typical homeowner does not usually have. Eliminating grasses from desired turf is routinely done by professionals on golf courses, athletic fields, etc., but when attempted by non-professionals, the end result is often the killing of both weeds and the lawn or at best severely injuring the desired turfgrass.

In recent decades, substantial amounts of research have been conducted to develop genetically engineered turfgrasses resistant to non-selective herbicides. Just like genetically engineered agricultural crops, turf-grasses have been modified to tolerate otherwise lethal doses of glyphosate (Roundup). When such turf is sprayed with non-selective glyphosate, only genetically modified plants survive. This type of weed control allows eradication of all weeds and makes turf absolutely weed free and extremely uniform. However, genetically modified turfgrasses just like other agronomic crops are not considered safe by part of the public. Presently the biotechnological industries are concentrating their efforts on environmentally harmless herbicides but their future is still unknown.

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