
AN ANALYSIS OF TURF WEEDS AND THEIR CONTROL

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ABSTRACT

*The goal of every amateur and professional turf gardener is to have a completely weed-free lawn. Turf weeds' dislike is warranted due of their unappealing colour and texture contrasts. In addition, certain species, such as crabgrasses (*Digitariaischaemum* and *Digitariasanguinalis*), have the unintended consequence of weakening or killing cool-season turf grass stands. Turf weeds cause expensive and extensive harm, but they are no longer as feared as they once were since better management techniques exist. Because to better management techniques and pesticides, many weed-free regions have become feasible. Fundamental knowledge and exact craftsmanship are required for grass weed control expertise. Weeds were formerly thought to be plants that served no use as cultivated plants. Weeds have lately been described as plants that grow where they are not desired. This is the definition that turf experts favour. Turf weeds are discussed in depth in this article.*

KEYWORDS: Grass, Herbicides, Seed, Turf, Weed.

1. INTRODUCTION

Understanding why weeds grow on grass is crucial to weed management success. Weeds are most often caused by thin grass and exposed areas. There are many causes for insufficient turf coverage. Drought destroys or thins turf, making it more susceptible to weed invasion. Excessive water damages grass and often promotes weed growth or spread. Big areas of grass may be killed by extreme heat or cold, allowing the first few weeds to grow large and reseed before the turf is restored. Grass diseases, insects, and tiny animals often damage small patches of turf, exposing the region to weeds. Any usage pattern or practice that decreases grass cover, such as high traffic, overuse of herbicides or fertilizers, incorrect fertilizing, mowing below the optimal cutting height, and eliminating too much growth at once, encourages weeds. Many of them cast doubt on man's involvement in grass weed issues[1].

Turf weeds and their seed may seem to be everywhere to the inexperienced. This isn't completely accurate, and people worried about weeds should be aware that preventing weed sources and spread is an essential part of most weed management methods. Weeds, on the other hand, are often found in soil. Weed seed abounds in most soils, and perennial weed rootstocks are often present. In a study of weed seed abundance in Minnesota soil, 37 of 144 samples contained more than 2,000 viable seeds per cubic foot of topsoil tested to a depth of 6 inches. Another source said that one acre of weed seed contained 1112 tons of weed seed. The number of weed species in topsoil is often high, and seed of turf weed species is frequently present. Fresh subsoil locations are the only ones that are generally free of weed seed. The soil holding rootstocks and subterranean structures of quack grass, sedges, and Bermuda grass may be the source of turf weed invasion. With the increasing usage of sod, such vegetal sources of pollution need consideration. Another method of spreading weeds via seed or vegetative components is the use of stolons and rhizomes in turf grass

establishment. Turf grass seed lots have been known to be a source of turf weeds in the past. A total of 179 of the 309 batches of Kentucky bluegrass seed tested positive for weed seed. Twelve distinct turf weed species occurred nine or more times in this research. While weed seed by weight is often less than 2%, this amount is more than enough to introduce an undesirable species or create an unsightly lawn. Although many turf soils may contain just a trace of problematic weeds, this is seldom a long-term barrier to a severe weed infestation since most weeds generate a large amount of seed. A study of 101 annuals found that each plant produced an average of 20,832 seeds. Many of them, of course, never grow into full plants. One stray turf weed of certain species, on the other hand, may quickly become a significant issue in 1 to 3 years. Weed seed is easily dispersed in most instances, thus preventing unnecessary spread is a good precaution. Wind, water, turf grass products (propagating materials and topdressing), turf grass equipment, man, birds, and other animals may all disseminate weed seeds. Dandelion seed dispersed by the wind and crabgrass and annual bluegrass seed movement on wet shoes or equipment are two typical instances[2].

1.1 Methods of Attacking or Preventing Turf Weed Problems:

Turf weeds are seldom eradicated by a single method. The majority of weed control strategies emphasize turf maintenance and herbicide usage. Using weed-free seedbeds and propagation materials, preventing weed germination or emergence with pre-emergence herbicides, reducing weed growth and development with management or herbicides, regular mowing to destroy weeds intolerant of mowing, preventing seed set, and destroying established plants are all examples of turf weed control methods[3].

a) Weed-Free Seedbeds;

For certain turf areas, obtaining a weed-free seedbed is possible. Knowing which weeds are present helps in determining whether or not this technique is effective. Observation of the natural site may sometimes provide this information fast and readily. Some areas may be virtually weed-free, while others may have an excessive amount of weeds or weed seed in the soil. Weed populations may be reduced by one to multiple tillage operations performed between rainstorms prior to turf installation. On weedy areas, the decrease in weed competition is frequently enough to allow strong grass species to develop successfully. Due to seed dormancy and insufficient light or aeration for germination, tillage alone seldom removes all viable weed seed. Furthermore, certain subterranean reproductive components may be difficult to eradicate via culture. Sterilization or fumigation of the soil is a good method to management when highly problematic species are known to be present even in tiny numbers. It is theoretically desirable to use temporary sterilises to kill weeds or weed seeds before to installing grass. Their application in turf grass production, however, has been restricted. Sod farms, turf nurseries, putt-putt greens, and show lawns all utilize this kind of chemical treatment[4]. Chemicals used for temporary sterilization should, in theory, have a strong effect for a short time before disappearing or deteriorating, allowing the grass to be planted rapidly. The most frequent kinds include alciumcyanamide, methyl bromide, dazomet, and metham. Methyl bromide necessitates a 24-48-hour wait between chemical treatment and seeding, but it also necessitates the injection of the gas beneath a sealed cover. This raises the cost significantly and restricts general usage to very limited grass patches. In a warm, wet soil, calcium cyanamide, a dry substance, degrades to hydrogen cyanimide and numerous intermediate nitrogen compounds. Seeds, plants, and creatures are all harmed by them. In around 3 to 6 weeks, areas treated with cyanimide may be planted. It's impossible to estimate how long it will take for the residues to break down and be safe to plant, but the residues include calcium and nitrogen, which are plant nutrients. Metham and dazomet may be mechanically injected into the soil during tillage or sprayed on the soil surface and transported downward with watering. The gas escapes less when a loose soil is sealed by rolling or watering. The chemical's breakdown and departure are very unpredictable, and it may take several weeks or more. Before sowing or planting with calcium

cyanamide or metham, it's a good idea to evaluate the soil with a test seeding of turfgrass or a sensitive plant like a tomato. Friable soils have greater control than soils with big clods, a tight seal, or extensive air holes[5].

b) Preventing Germination and Seedling Establishment:

Turf weeds' ugliness and devastation may be prevented by removing weed seeds or seedlings before they grow into full plants. Because management methods are focused at the weakest point in the life cycle of weedy plants, this strategy is sound and very successful. Herbicides or shadow (or smother) crops are two popular methods. The creation of thick, high-cut Kentucky bluegrass to kill crabgrass seedlings as they sprout is an example of the smother or shade crop. In recent years, the use of pre-emergence herbicides has become increasingly significant. On putting greens, some golf turf producers top-dress extensively with weed-free soil. Part of their reasoning is that they believe that covering the weed seed with a thick layer of soil prevents it from germinating. While this method does not eliminate weed seeds or seedlings, it does have the potential to decrease weed emergence[6].

c) Avoiding Maintenance Practices that Encourage Growth and Spread of Weeds:

Watering beyond a turf grass's requirements is a common source of severe weed issues. Excessive water may suffocate the turf grass's capacity to grow and live. In addition, when competing with a mature grass cover, weed seeds need a lot of water to develop and become entrenched. High soil moisture has been found to have a role in crabgrass invasion in both study and practice. Weeds like crabgrass flourish in hot weather when there's plenty of water, particularly if turf species' competition is decreased by summer hibernation. Crabgrass and chickweed, weeds that crawl over the surface by roots at the nodes, thrive in wet conditions. The majority of ineffective weed control methods add to the weed issue. Weed populations may be increased by cutting too near to the ground or thinning the grass. Rapidly reducing the regular mowing height during a season when the turf grass is weak may promote the fast emergence of a serious weed issue. In the hot, rainy conditions of late spring or early summer, a dramatic lowering of the mower on a Kentucky bluegrass lawn or a bent grass fairway may result of a spectacular growth in white clover. Excess fertilizer usage may exacerbate turf loss during disease outbreaks and times of severe heat or cold, as well as creating gaps for weed growth. Fertilizing turf grasses that are dormant or developing slowly due to bad weather encourages the development of hardier weeds. The significance of a thick grass cover for weed control is shown in a variety of ways. A study on turf damage induced by inorganic mercury fungicides, which resulted in a 100 percent rise in crabgrass, is one example. Pre-emergence crabgrass treatments that reduced crabgrass but not goose grass demonstrated how improper herbicide usage on turf may grow rather than decrease weeds[7].

Seed production is a frequent need for the survival and spread of annual, biennial, and certain perennial weeds. Annual weeds are particularly susceptible at this stage of their life cycle since their sole means of spreading and survival is via seed production. A weed seed crop may be avoided by removing the plant, stopping seed head development, damaging the flower, killing the seed head, or promoting rank foliar growth by removing top growth abruptly before seed develops. Some turf producers utilized the latter technique in the past to minimize the crabgrass seed production that would otherwise spread over the turf plot[8].

d) Destroying Established Weed Plants Without Killing Turf:

The most frequent and oldest technique of weed control is to remove established plants. It works best with annuals, which have a limited and short-lived seed source in the soil. The simplest plants to remove are seedlings. Cutting the roots of annual weeds at the soil surface is a simple way to get rid of them. It's best to do this before the seeds develop. Cutting near the soil surface discourages biennials and perennials, although many come back from different subterranean plant

sections. By depleting reserve carbohydrates, persistent removal of top growth will eventually kill these latter two kinds of weeds. The amount of effort and attention required to use this technique limits its use. Hand weeding's most beneficial function is to prevent all seed development by quickly removing any plants discovered in a virtually weed-free grass. For example, after crabgrass has been eradicated from the lawn, failure to eradicate stray plants may lead to fast re-infestation[9].

e) Destroying Both Turf Cover and Weed:

Established turf may degrade into a weedy mess that lacks a viable turf grass stand. Reintroducing desirable turf grasses via overseeding is slow and difficult without redigging and decreasing weed competition. A thorough weed and turf vegetation kill followed by turf grass re-establishment is a reasonable next step. This can be done via cultivation, but it's more common to utilize a chemical. In previous years, soluble fertilizer, sodium arsenite, and potassium cyanate were employed, and the first two chemicals are still used on certain golf courses today. Cacodylic acid, dalapon, and paraquat have been utilized more recently. Prior to the intended cultivation process, this set of compounds is utilized. They accelerate the elimination of vegetation and assist in the early preparation of a suitable seedbed. Furthermore, the soil sterilants calcium cyanamide, methyl bromide, and metham, which were previously mentioned for weed seed destruction, may kill both weeds and old grass. However, they are most frequently applied after first tillage to destroy weed seed in the tilled soil's surface layers. Chemical selection will be influenced by residue issues, cost, availability, and application methods. The efficacy of these herbicides varies depending on moisture, temperature, soil type, and plant species. The chemical response to these circumstances must be taken into account. Growers must also be aware of the time required for slow-to-decompose pesticides, which will cause planting schedules to be delayed[10].

1.2 Control vs. Eradication:

The aim of completely eliminating a weed from a lawn is desirable, but it isn't always feasible. With the introduction of 2,4-D, dandelion eradication from a turf area seems to be a possibility. It is feasible to eliminate all plants of this species on the site, although airborne seed may lead to reinvasion on certain locations. Crabgrass can be effectively managed or eradicated. Extermination occurs when a healthy grass cover is maintained and seed set is prevented for many years. If there isn't a handy supply of seed in the region, keeping the crabgrass-free state is simple. Where Kentucky bluegrasses do poorly in warm, wet parts of the temperate zone, eradication of crabgrass is more difficult. Warm locations in colder climates with thin grass, on the other hand, pose serious difficulties in the spring and summer. Few efforts are made to eradicate all annual bluegrass plants using existing management and materials. The aim is to reduce annual bluegrass to prevent large-scale turf loss during times when this species is at risk of failing. Even with weed issues that fall under this category, more comprehensive control techniques are required. Knotweed is a weed that may be controlled with the appropriate use of herbicides. With the development of better herbicides, weed eradication will become more frequent. Nonetheless, in managing and eradicating turf weeds, persistence in avoiding weed development and seed set will be critical.

1.3 Weeds of Turf and Their Control:

Because of their widespread prevalence, noxious behavior, or potential danger, a few number of grass weeds need particular attention. This isn't to say that certain weeds are the most dangerous. Kikuyu grass, which is often used as a coarse turf grass in warmer climates, is poorly recognized in the United States due to its restricted availability. Where this grass is adapted and encountered, however, it is considered an unsightly weed menace. White clover, which is described in depth, is a common weed, although due to excellent herbicidal management, it is seldom a significant issue. The Veronica species mentioned in the table, on the other hand, are less widespread than white

clover, but they are frequently a worse issue since very effective treatments have yet to be discovered. Furthermore, personal views differ on whether weeds should be included in one or both of the lists. Fans of bent grasses, Bermuda grasses, and tall fescue may object to their species being listed as weeds. Despite their unwelcome and unpleasant look in many turf regions, these grasses must be recognized as weeds as well as turf grasses. Many regionally important weeds are unlikely to become a problem in various climate zones. However, there is evidence that certain warm-climate weeds may expand their adaptability range by developing winter-hardy races or ecotypes. Similarly, certain cool-climate weeds may emerge as autumn, winter, and spring weeds in warmer climates. With changes in the distribution of both weeds and turf grass species, it's probable that more plant species may be added to turf weed lists.

2. DISCUSSION

As turf grasses are planted on poorer sites and exposed to increasing traffic, weed management will become more of a concern. Turf will be more vulnerable to weed invasion and pesticide damage as a result of this. Herbicide treatments that are extremely specific and selective for each type of problematic weed may be developed in the future. Treatments will also become more successful in dealing with the wide range of herbicide usage circumstances as well as differences in plant sensitivity. With the introduction of new turf grass types, the demand for better herbicide specificity will grow. Chemical controls for many of the more aggressive turf species that will act as weeds on certain locations will be beneficial with pure stands of these more specialized turf grasses. The necessity for understanding the herbicide's mechanism of action will grow as a result of a number of advancements. Residues from long-lasting chemicals will be a growing source of concern. Herbicide application will become more accurate, complex, and beneficial to turf grass productivity.

3. CONCLUSION

Turf grass creates lovely green spaces in our city and suburban environments. Turf grasses have been used by humans to improve their surroundings for over a thousand years. The intricacy and breadth of turf grass's environmental advantages that enhance our quality of life are just now being established via study. In addition to the physical and emotional advantages of outdoor exercise, a well designed and managed turfgrass facility, such as a golf course, provides a variety of functional benefits to the entire community. To enhance turf health, a range of cultural practices, fertilizers, and pesticides may be employed, depending on the pest complex that affects turfgrass. Turfgrass has been proven to be an effective way to decrease surface water runoff and may be used in combination with vegetative filter strips to create a barrier against pesticide and nutrient pollution of surface and groundwater. Increased use of "reduced risk pesticides," post application watering, pesticide application to restricted parts of the turf ecosystem, and reentry intervals after pesticide treatments will all help to minimize the minimal human and environmental exposures observed.

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