

Benefits and Limitations of Fraze Mowing

Fraze mowing is gaining popularity in the United States. Fraze (also spelled frase, fraise, or fraize) mowing is an aggressive cultural practice that can be very effective when renovating both warm-season and cool-season turfgrass areas.

Fraze mowing was invented in 1996 by Ko Rodenburg, parks superintendent for Rotterdam, Netherlands. In an effort to renovate cool season turfgrasses, he created a machine that successfully removed 100 percent of the thatch and organic matter that would build up over the course of a growing season. Since only the top layer was removed, roots, rhizomes, and crowns remained to allow for Kentucky bluegrass and perennial ryegrass to regenerate.



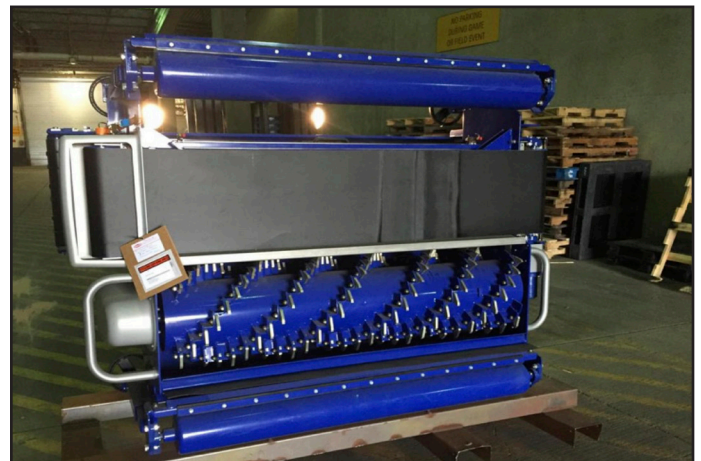
Fraze mowing Cincinnati Bengals practice facility – Photo courtesy of Darian Daily

The Process

Aggressive renovation on an athletic field typically means removing sod, core aerating, tilling, verti-cutting, leveling, sweeping, topdressing, and/or seeding. Although effective, these cultural practices take time to remediate issues. Fraze mowing immediately relieves problematic issues that can occur in the top ¼-1/2 inch of a turfgrass system.

Thatch, black layer, incompatible soil layers, shallowly rooted weeds, and weed seeds can be completely removed to leave turfgrass roots, rhizomes, and crowns.

Fraze mowing machines utilize a rotary tiller that can remove up to 2 inches of the turfgrass surface. The original fraze mowing machine consists of hundreds of small metal teeth on a rotary shaft that spin and shear off the tops of turfgrasses.



Underside of a fraze mower – Photo courtesy of Darian Daily

A variation is made up of L-shaped blades that swing around a shaft to cut turfgrass at the desired height. Fraze mowing machines are adjustable and may be more or less aggressive depending on the depth setting. Debris removed by the machines comes out on a conveyor belt located on the side of the machine and is loaded into a utility vehicle equipped with a bed. Fraze mowing removes a very large amount of plant material, which can be discarded or used for compost. Reapplying the material to the field as topdressing is not recommended because of the weed seeds, thatch, and other problematic components it contains. Alternatively, since there are a

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great number of living stems in the debris, it might also be transplanted (i.e. sprigged) into a prepared soil as a means of vegetative establishment. This is commonly done with debris generated from fraze mowing bermudagrass.



Fraze mowing Patriot bermudagrass – Photo courtesy of Dr. Mike Goatley

Benefits

Remove thatch and organic buildup. Thatch is the undecomposed or partially decomposed layer of living and dead grass stems (rhizomes, below ground stems and stolons, above-ground stems), roots, and other organic matter that is found between the soil surface and grass blades. For most athletic fields, thatch layers up to 1 inch in depth can benefit playability, footing, and safety. However, when thatch layers exceed an inch in depth, the layer becomes a desirable environment for insects and disease organisms, promotes shallow rooting of turfgrass plants, decreases turfgrass stress tolerance, and negatively affects water infiltration and chemical/fertilizer penetration into the soil. These fields also tend to have poor mowing quality due to scalping. Turfgrasses that produce large amounts of thatch due to having an extensive network of lateral stems and an aggressive growth habit (traits associated with grasses such as bermudagrass and Kentucky bluegrass), benefit from fraze mowing. Frazze mowing removes the thatch and organic matter buildup so grass can regenerate nearly thatch and organic free. Research is currently being conducted on bermudagrass to determine if thatch removal by fraze mowing could potentially reduce spring dead spot occurrence. Controlling thatch has been a recommended practice for reducing potential of this disease. Results should be forthcoming in the near future.

Effective when transitioning fields. When transitioning from warm season grass to cool season grass, fraze mowing improves ryegrass overseeding durability. By removing thatch, ryegrass seed grows in the soil instead of a thatch layer. One precaution is that the fraze mowing of the warm-season grass should be done early enough in the summer so that the turfgrass has the opportunity to properly harden off for the pending winter months. Removal of the thatch and organic material a few months in advance of overseeding with ryegrass is very beneficial to ryegrass establishment, and should allow for ample recovery of the bermudagrass. When transitioning from cool season grass to warm season grass, fraze mowing removes perennial ryegrass to allow bermudagrass to green up and fill in competition free. Additionally, the need for herbicides may be reduced or even eliminated during the transition process because perennial ryegrass and other undesirable weeds are removed in the top layer.

Removes weeds. Frazze mowing can effectively remove shallowly rooted weeds and undesirable grasses such as *Poa annua*. Annual weeds tend to build a seed bank in the upper profile of the soil. Frazze mowing at the proper depth can remove most of this seed. At the University of Missouri's Women's soccer field, fraze mowing removed 99 percent of *Poa annua* throughout the field. In outer edges where fraze mowing was not completed, *Poa annua* remains as up to 20% of the turfgrass cover.

Promotes new growth. Frazze mowing is a very effective turfgrass rejuvenation strategy when used on turfgrasses that have rhizomatous growth habit, such as bermudagrass and Kentucky bluegrass. Bermudagrass and Kentucky bluegrass are both notorious for having such high density that they literally begin to shade themselves out from the competition within their canopies. When fraze mowing is complete, the growing points on the new exposed rhizomes and stolons initiate new growth, producing a much healthier, faster growing turfgrass. This process also promotes horizontal growth instead of vertical growth.

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Exposed rhizomes and stolons following fraze mowing – Photo courtesy of Pamela Sherratt

Improved seed germination. If a field is seeded following fraze mowing, seed germination increases because of improved seed to soil contact. To compare, when thatch is present, lower seed germination can be expected. Seed germination is also successful because there is little competition from weeds or other vegetation. Seeding is also desirable following fraze mowing because a denser stand of grass can be achieved from existing roots, rhizomes, and crowns growing in along with new seedlings.

Improved field safety. Athletic fields should have a smooth, uniform, consistent surface. If there are surface irregularities, high spots, or clumpy turfgrass growth, fraze mowing can improve these problem areas and help with leveling the surface over time.

Limitations

Field appearance. The appearance of a field that has just been fraze mowed can be alarming to those not familiar with the process. Although it appears that the field has just endured extreme scalping, with the correct maintenance regimen, grass can regenerate quickly and successfully depending on the species of grass. To promote healthy regeneration, it is essential that the fraze mowed area receives adequate water. Irrigate to keep the soil persistently moist during recovery. If seed is also being applied to assist in the recovery process, frequent irrigation will be needed to keep the seedbed moist. Based on soil test recommendations, apply a starter fertilizer to enhance growth and development. Although shallowly rooted

weeds and weed seeds were removed with fraze mowing, some weeds may appear during the recovery process. If an herbicide is necessary to control weeds, be sure to refer to the label for specific instructions for effective application. Mowing may begin when new plants reach 1-2 inches tall.



Fraze mowed bermudagrass (left) compared to non-fraze mowed bermudagrass (right) – Photo courtesy of Dr. Mike Goatley

Recovery time. Frazze mowing is very destructive to aboveground plant parts and recovery time is longer than conventional cultural practices. Little research has been conducted testing the re-establishment rate of fields that have been fraze mowed. Time of the year, depth of the tines, and turfgrass species and cultivar are the factors determining recovery time.

In April of 2014, Iowa State University conducted research testing recovery potential of fraze mowed grasses. The site for the study was the football team's main practice field, a native soil field infested with perennial ryegrass, *Poa annua*, and other unwanted species. In addition to fraze mowing, the field was also aerated to relieve compaction and improve seed to soil contact for the seedbed.

Test plots consisted of a control plot (which was not overseeded) and plots that received 5-10 pounds per 1000 square feet of Kentucky bluegrass seed. Additionally, grow covers were utilized for the first 26 days on half of the plots (with the exception of the control plot) to observe their effect on plant recovery and seed germination.

Benefits and Limitations of Fraise Mowing

The study revealed that, under these conditions, complete recovery time and 100 percent turfgrass coverage could take 12-15 weeks on Kentucky bluegrass seeded fields. The quickest recovery (12-13 weeks) took place on plots that were seeded with 10 pounds per 1000 square feet of Kentucky bluegrass and utilized a grow cover for the first 26 days.

Quicker recovery rates have been observed with perennial ryegrass and bermudagrass at sports facilities experimenting with fraze mowing. It obviously depends on the time of year the fraze mowing is conducted and the cultivar being mowed, but bermudagrass recovery from fraze mowing is anticipated to be much quicker than for Kentucky bluegrass when done properly. On average, almost complete recovery of the playing surface is anticipated within 4-6 weeks under ideal growing conditions. On sand-based bermudagrass fields at the University of Missouri, recovery time can be much faster than seeding Kentucky bluegrass into native soil. Fertilizer applications immediately after fraze mowing can produce 90 to 95 percent recovery in three weeks. On test plots at the University of Missouri Turfgrass Research Center, similar results are seen with bermudagrass on native soils. Recovery of fields following fraze mowing is very species dependent.



Patriot bermudagrass recovery 6 days following fraze mowing at Cincinnati Bengals practice facility – Photo courtesy of Darian Daily

Conclusion

To date, fraze mowing has been successful at improving health of turfgrass systems through the removal of thatch, organic buildup, weeds, and weed seeds. Field managers that have the time and resources to dedicate to fraze mowing may find it will benefit their field maintenance regimen and result in a healthier environment for turfgrass growth.

Fraze mowing is an innovative practice that is just being introduced on sports fields in the United States. More research is needed in different locations of the country, at various times of the year, and with different turfgrass cultivars to study re-establishment rates and successful recovery practices. Research is also being conducted to see if fraze mowing can be used as a cultural control for such diseases as spring dead spot in bermudagrass. The end result may be that fraze mowing is the latest and greatest renovation practice of the day. Ideas and applications are popping up initiating research nationally. Time will tell the limitation of this new practice.

Resources

2015 STMA Information Outreach Committee
Fraise (fraise, fraize, frase) mowing – T. Carson – Golf Course Management
Establishing Kentucky bluegrass after fraze mowing – Kevin Hansen and Nick Christians, Ph.D. - <http://gcmdigital.gcsaa.org/i/532236-jul-2015/90>
Fraise Mowing – Pam Sherratt - http://buckeyeturf.osu.edu/index.php?option=com_content&view=article&id=1225&catid=1:latest-news&Itemid=170
Concept to active practice: frazee mowing bermudagrass makes debut – Jerad Minnick and Allen Reed - <http://sturf.lib.msu.edu/article/2013aug26a.pdf>
To the Extreme – Guy Cipriano - <http://www.golfcourseindustry.com/gci1114-fraze-mowing-benefits.aspx>