

From dense swards to biodiverse roughs - Methods to diversify existing rough areas



Summary

Golf courses can have substantial contributions to biodiversity and ecological processes in their neighbourhood, given proper design and management.

Key actions are to establish a more diverse vegetation on parts of the golf course, primarily in rough areas and edges towards forests, and follow up with targeted management through cutting.

Here we present simple guidelines to how this can be achieved by seeding and reducing the strong competition from grasses. We also address where and on which soils a higher success rate is expected.

Motivation to diversify

A more diverse vegetation is required for rough areas to provide resources for pollinators and biodiversity in general, have higher aesthetic appeal, and contribute to the environmental profile of the golf course.

To achieve a diverse flower rich vegetation is simple when establishing new rough areas using nutrient poor, slightly drought prone and weed-free soils that are seeded with a target vegetation.

For older roughs with a dense grass cover it is more of a challenge. There are two limiting factors: a low input of seeds and strong competition from grasses that prevents establishment. Here we present approaches to overcome these limitations for both golf course roughs and other amenity grasslands.



Methods to diversify rough areas may also improve playability.

Develop objectives and a strategy

To start, identify the most important reasons you want to diversify your rough area (biodiversity, aesthetics, playability, reduced management, environmental profile or others?) This will be the foundation for your objectives and priorities. Then make a stepwise strategy to get there. These transformations often takes longer time than planned, and you may need to provide information to club members and other people using the area.

A good advice is to seek contact with local organisations such as botanical clubs, entomologists and similar, but also nature and park managers in the local municipality, to understand the local setting, exchange experiences and benefit from parallel activities. A targeted workshop could take you a long step in a good direction.





Open flowers provide resources for many insects. Here *Dianthus*, *Pilosella*, and *Achillea*.



Plants with more closed or deeper flowers are popular among bumblebees and butterflies, here *Centaurea*, *Succisa*, *Trifolium* and *Centaurea* again.

Define your target vegetation

Based on your objectives, you can define the target vegetation. This can be a copy of specific systems based on what is present in the landscape or the use of a more generic seed mixture to reach your aims. Make sure the species composition match the soil conditions at your site (pH, nutrients, moisture).

Use caution not to introduce unwanted species (aggressive weeds and invasive species). Best practice is to use species and seeds sourced from your region. Such local seeds are available from some seed companies. Avoid seed of agricultural varieties that usually grow larger and are more competitive.

A good strategy is to go for a diverse seed mixture without grasses, that includes plant species with contrasting flowering periods and different types of flowers. Plants with open flowers provide resources for many species, while flowers with long and narrow corolla tubes require some type of specialisation as found in for example long-tongued bumblebees and butterflies.

It is also important to consider the whole life cycle of the insects. As an

example, some butterflies depend on certain plants for their larvae to feed on. Some plant species are however important as they provide resources for many organisms. Good examples of such species are *Achillea millefolium*, *Centaurea jacea*, *Knautia arvensis* and *Succisa pratensis*.

Plants such as red clover are important food sources for bumblebees and should be included. Keep in mind that some “weeds” such as *Taraxacum* species provide plenty of resources for insects.



Keep in mind that some “weeds” such as *Dandelion*, *Taraxacum* species, provide plenty of resources for insects.

Preparing for seeding

To reduce grass cover, cutting with removal of the cut material is the most critical measure to succeed. If possible, a hard approach with 2-3 cuts per season for a year or two before seeding the targeted wild flower seed mixture is a good approach. Cut material should be removed right away and with time, this will contribute to removal of nutrients from the system. It is essential that all fertilisation be stopped. Just prior to seeding, the vegetation is cut to 2-3 cm and the soil surface and litter layer disturbed as much as possible.



Grass cut at 2-3 cm height to disrupt and weaken cover and litter layer before seeding.



Seeding target vegetation

There are two main strategies for seeding; either you seed large areas where the grass vegetation is cut hard and the soil surface disturbed, or you allocate seeds to smaller patches and strips of exposed soil. A combination is an even better approach, as some species are better able to establish in dense vegetation than others are. Plants established in strips and small plots will later start to spread into the surrounding vegetation.

Slit-seeders are useful for seeding. They provide good soil contact and add some extra disturbance to the surface. If seeds instead are distributed on the surface, measures to establish good soil contact such as raking or rolling are required. Seeding rates of 1-2 g per m² are recommended. If seeds are scarce, a blend with dead grass seeds will give a more even seeding over larger areas. In cases where seeds of target species are not available, it is also possible to plant plug plants of the most important species to ensure a certain level of establishment. Species can also be supplemented later using this approach.

As summer drought can be mortal to seedlings, the preferred seeding time is early spring or late summer. Some species need a cold period of a few months to germinate. Hence, seeding in late August is a good alternative.



A slit-seeder in operation.

Management by cutting

We recommend that cutting with immediate removal of the cut material continues throughout. When target species are established, you continue with a single cut in late summer when most of the vegetation has ripe seeds. This can vary from late July to late August, depending on your location.

The cut is done in dry weather and the cut material allowed drying on the ground for a couple of days before it is collected and removed. This allows for release of seeds, a process that is important for the long-term dynamics of the vegetation.

Some species are dependent on recruitment from seeds on a regular basis.

You will also experience that a number of the forbs present in the rough before you started, will benefit from the cutting regime. Species will also establish spontaneously from the seed bank in the soil or from seeds arriving from the surroundings. Your actions will benefit more species than just the ones you seeded. Such grasslands are dynamic systems and you will observe that growth and flowering will vary with weather conditions.

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Handling of cut material

It is important to have routines for handling the cut grass. It must not be dumped in the nearest forest edge where it will leach nutrients and support aggressive weeds. A simple system for composting for later use of the compost on the course area, or offering to club members or others is perhaps the best alternative.



Checklist

1. define objectives
2. select and source target vegetation
3. prepare roughs for seeding by cutting and removing cut material
4. establish routines for handling of cut material
5. seed target species and provide good soil contact
6. continue management by cutting in late summer and remove cut material

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This fact sheet is based on the project *From dense swards to biodiverse roughs*. You find more information about the project, reports and articles on www.sterf.org

