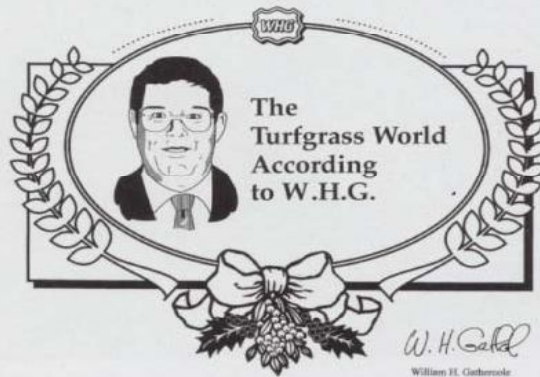


# Selection and use of protective turf covers

**T**HE winter kill of golf putting greens will be reduced if the turf manager considers all cultural practices that will maximize turf resistance to cold temperatures. The use of covers alone is not an effective solution for protecting turf subjected to unhealthy conditions. The best solution for promoting turf resistance to cold temperatures involves maintaining turf in healthy condition throughout the summer and fall. The installation of a winter cover is only one part of the solution to avoid winter kill.

For the purposes of maximizing turf resistance to cold temperatures, a healthy turfgrass plant can be defined as possessing the following characteristics: large crowns; deep, thick and white roots; and minimal thatch.

The crown is most vulnerable to winter kill caused by cold temperatures when the mass of crown tissues is small. However, a large mass of crown tissue subjected to the same amount of cold temperature injury will not be as vulnerable. In essence, it is more difficult to kill a large crown than a small



one.

On most golf course putting greens, turfgrass roots will tend to be small, thin and shallow. Preferably, roots should be deep, thick and white—such characteristics are signs of health and also an indication of greater plant resistance to cold temperature injury. A program should be implemented in summer and fall to increase root depth, and should include practices such as:

- adequate soil drainage
- appropriate fungicide use to control root and crown diseases
- decreased mowing frequency
- increased mowing height

- reduced soil compaction
- the use of effective biostimulants

Excess thatch will decrease the plant's ability to survive from winter injury. Thatch is an organic layer that develops between the plant and the soil surface, and is composed of living and dead stems and roots. On putting greens, an excessive layer of thatch consists of a thickness greater than 10 to 15 millimetres or 0.40 to 0.60 inches.

The rate of thatch accumulation can be effectively decreased with the appropriate cultural practices. Throughout the growing season, the most effective practice is topdressing alone, or topdressing in combination with other mechanical practices.

Physically removing thatch by mechanical interventions may lead to unwanted side effects. According to the classic report by Dr. Jack Eggens, vertical mowing performed throughout the growing season significantly increases winter injury unless combined with topdressing. In fact, vertical mowing alone creates more damage than performing no operations at all.

Reduced nitrogen fertilization will also

## Examples of ideal specifications used for the selection of permeable turf covers

Characteristic	Specification and description
Function of the cover	Cover material must be produced with an open weave in order to allow water and air to penetrate from the top.
Chemical absorption	A permeable cover must be inert to all sprayable chemicals, such as a soluble fertilizer. Examples of cover materials that may retain chemicals include canvas, felt, and carpet-backing.
Colour	In order to avoid etiolation, a permeable cover must be transparent, or semi-transparent, to allow sunlight to penetrate the cover. Dark-coloured covers will obviously block sunlight.
Coverage	Cover must be one-piece construction. See text.
Seams	Stitching is adequate. See text.
Stabilizers for UV light	Absolutely required. See text.
Water penetration	Open weave materials will allow water to penetrate the cover from the top. Spun-bonded material, such as Typar, may be difficult to re-wet after severe drying.
Weight	Less than 2.0 ounces per square yard. See text.

decrease the plant's ability to survive from winter injury. An adequate level of nitrogen fertilization must be continued on putting greens until almost the last cut. In most circumstances, this level is considered at up to one pound, or more, of available nitrogen per 1,000 square feet per growing month.

The months of October and November may be deemed as partial growing months only.

It should be noted that fall (September and October) applications of nitrogen may increase annual bluegrass invasion in a creeping bentgrass putting green, depending upon the timing and type of fertilizer appli-

cation.

Inadequate amounts of potassium will further decrease the plant's ability to survive from winter injury. Although many turf managers continue to use high potassium fertilizers, many more use ratios such as 2-to-1, or 3-to-1, to ensure the highest degree of cold temperature resistance. If the putting green root zone consists of high-sand soils and high-leaching conditions, turf managers may prefer a 1-to-1 ratio, or may select a ratio based upon soil test results only.

Since most putting greens are composed primarily of annual bluegrass, the threat of winter injury is considered high. Even creeping bentgrass will be subject to risk. Once all cultural practices have been implemented in order to maximize turf resistance to cold temperature, the use of protective turf covers is now an optimally effective solution for protecting turf from winter injury.

#### Types of protective turf covers

Protective turf covers are most commonly used to protect high-quality turf, such as golf course putting greens, from the effects of winter injury. These covers are usually less

### Examples of ideal specifications used for the selection of impermeable turf covers

Characteristic	Specification and description
Function of the cover	Cover material must not allow water and air to penetrate from the top.
Color	In order to avoid etiolation, an impermeable cover must be semi-transparent in order to allow sunlight to penetrate the cover material. During mid-winter thaws, or in early spring, dark-coloured covers will rapidly attract lethally-high temperatures from the direct exposure to the sun.
Coverage	Cover must be one-piece construction. See text.
Seams	Seams must be heat-sealed. No stitching must be used since stitching holes are avenues for water leakage. See text.
Weight	Less than 2.0 ounces per square yard. See text.

than two millimetres (1/12th-inch) thick, and consist of two basic types of materials: permeable and impermeable.

Permeable materials are composed of an open weave that will allow water and air to penetrate the cover from the top. On the other hand, impermeable materials will not

allow water or air to enter from the top.

The ideal specifications for either material may be based upon the following characteristics:

Examples of characteristics for permeable and impermeable turf cover materials:

- chemical absorption

- colour and transparency
- construction and coverage
- debris and grass sticking
- excess heat venting
- function of the cover
- stitched or heat-sealed seams

### Construction

Both permeable and impermeable covers must be a one-piece construction to allow full and uniform coverage of the turfgrass surface. Those covers that are only available in 10 or 12 foot widths may need to be installed as overlapping pieces, which normally is not desirable.

Since most cover materials are originally produced in 10 or 12-foot rolls, a fully-constructed cover must consist of rows of pieces that are joined together by either stitching or heat sealing. As a rule, permeable covers are stitched. Impermeable covers must be heat-sealed and not stitched, since the stitching holes will allow water to leak through the seams.

### Debris grass sticking to cover

Both permeable and impermeable covers must always remain inherently clean. Some cover materials will tend to "attract" twigs and leaves that remain stuck quite easily within the fibres. Examples may include covers made of canvas, felt, or carpet-back-

ing. Additionally, these materials may represent an additional problem. When turf begins actively growing in early spring, turf leaves may become joined into the fibres. When the cover is removed, new turf may be ripped from the soil.

### Heat venting

Some materials used for the construction of permeable and impermeable covers are designed to actually vent excess heat quite readily. Heat venting by a cover is dependent primarily on its weight. When a cover is properly venting excess heat, wind rippling between the cover and the turfgrass surface can be observed. This venting is important so that, during mid-winter thaws or in early spring, lethally high temperatures may develop from the direct exposure to the sun.

Materials that will not easily vent excess heat are relatively heavy and/or stiff. These include many of the dark-coloured covers and bubble covers. Permeable covers that are deemed as safe and light for turfgrass use weigh less than two ounces per square yard. Impermeable covers are preferably less than four ounces per square yard.

### UV stabilizers

The expected life of a permeable or impermeable cover is considerably reduced by its exposure to ultra-violet (UV) sunlight. A UV-light stabilizer should be added to any cover during its production in order to protect it from photo-degradation. Adding a stabilizer usually allows the supplier to provide a guarantee on material defects from three to seven years, depending on the amount of stabilizer used.

Without a stabilizer present in the cover material, signs of significant degradation will likely occur in the second year of use. It will become more subject to severe wear and tear, and will easily crack or tear when handled.

### Storage

During storage, the expected life of any

cover is considerably reduced by its exposure to direct ultra-violet sunlight. This can only occur if the cover is left unprotected outside, throughout the spring, summer and fall seasons. Even with a stabilizer that will protect the cover from UV light degradation, all cover materials will be unable to survive beyond the current season. Overexposed portions of materials will become brittle, and will easily disintegrate when handled.

Whether a cover is stored indoors or outside, it must be placed in a high-quality coated polyethylene storage bag. Such storage bags will provide three advantages: further protection from light, protection from dirt accumulation, and some protection from rodents. In the latter case, rodenticide use must be a consideration for cover storage. This is especially true of wood-shaving mats, which are particularly vulnerable to rodent damage.

**Author's note:** All products mentioned should be used in accordance with manufacturer's directions and according to provincial, state or federal agency. Information presented here is for preliminary planning only. For the use information, precautions and restrictions, rely only on the directions supplied by the manufacturer. The mention of trade names does not constitute a guarantee or warranty of use of the product by the author of his affiliated companies.

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**Personal note:** Bill is still recovering from his serious motor vehicle accident of a year ago. Prior to the accident, he had begun several articles, which he now completes with his co-author and assistant Jenny Gilbert.

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