

Fertilizer is often not necessary, since many wildflowers perform well in soils with moderate fertility. Adding high levels of fertilizer may in fact encourage weed growth. Test the soil, and add fertilizer, only if the soil is very infertile. If you do decide to use a fertilizer, consider adding Milorganite to the seed as sowing time. This will help bulk up the seed mixture, making it easier to spread as well as adding nutrients.

Water the seed to hasten germination, and irrigate the young seedlings to help them establish quickly. Once established, many wildflowers require little or no irrigation beyond rainfall.

FLOWERING

Wildflowers can provide color throughout the season, year after year. The annuals will produce color within weeks after seeding, but some perennial seeds will not germinate until the second spring, and may not produce flowers until the third season.

Annuals that are often included in wildflower seed mixes for the North include bachelor's buttons, which re-seeds and germinates each spring in most locations; pot marigold, which produces golden yellow flowers during the first season, and which may come back in subsequent years; and California poppy, a golden-yellow annual that generally re-seeds year after year. Annual baby's breath produces small

white flowers.

Perennials found in many mixes include white yarrow, which flowers in early summer, and butter-and-eggs, which produces small snapdragon-like flowers in midsummer. Yellow evening primrose, the white ox-eye daisy and the black-eyed susan flower in midsummer. Coreopsis, which produces golden yellow daisy-type flowers and the purple coneflower both bloom from midsummer to frost.

How colorful a wildflower planting proves to be depends on many factors, as discussed above. If you purchase a mix with twenty-five species in it, it is unrealistic to expect all of them to flower. Some will outcompete others, and over the years a few will become dominant. To ensure a good mix of color, it is advisable to overseed lightly every one or two years.

ON THE GOLF COURSE

Why not establish a wildflower planting in the rough? Many golf courses in the Upper Midwest have had prairie plantings for years, and many courses around the country are establishing meadows and even whole plantings of single species such as black-eyed susans. Golfers like the splash of color. Even though wildflowers require a good deal of work in the establishment years, they are less work in the long run than more formal annual beds.

FOR MORE INFORMATION

The National Wildflower Research Center, a nonprofit research and information organization, is located at 2600 FM 973 North, Austin, Texas 78725. NWRC offers a \$25 membership which includes a newsletter and fact sheet about wildflowers.

The New England Wild Flower Society, Garden in the Woods, 180 Hemenway Road, Framingham, Massachusetts 01701, is a source of excellent information about wildflowers. The Society offers several publications about wildflower propagation, production and landscaping.

The Soil Conservation Service has long been concerned with erosion on cropland, along highways and shorelines, and at minespoils. Local SCS offices can supply information about many conservation cultivars of plants, such as 'Golden Jubilee', a reseeding black-eyed Susan which SCS released in 1985. Write to the SCS National Plant Materials Specialist, P.O. Box 2890, Washington, DC 20013, for a list of recommended plant materials which are best suited for growing in Wisconsin.

Editor's Note: Be sure to read Dr. Stack's excellent article in the March 1988 issue of "Golf Course Management." Readers of THE GRASS ROOTS have been very fortunate to profit from her writing for over two years now. Thanks, Lois!



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The following letter says it all:



April 6, 1988

Mr. Monroe S. Miller
Editor
Wisc. Golf Course Superintendents Assn.
200 Bishops Way, Suite 270
Brookfield, WI 53005

Dear Mr. Miller:

We are pleased to inform you that your entry, *The Grass Roots* has been selected for Overall Excellence in the 1987 Harry C. Eckhoff Award competition for excellence in golf journalism.

The National Golf Foundation received more than 130 entries for this prestigious award, which recognizes outstanding journalistic efforts among local and regional golf publications. The calibre of entries was extremely high this year, indicating a continuing high standard in golf journalism.

We offer you our congratulations on your selection for the 1987 Harry C. Eckhoff Award, and we wish you continued success in the coming year.

Sincerely,

William A. Burbaum
Vice President
Communications

BB:kw
Enclosure

There were ten categories in the 1987 competition for the Harry Eckhoff Awards: Club Publications, Professional Association Magazines, Professional Association Newsletters (we won this category), Amateur Association Magazines, Amateur Association Newsletters, Tournament Programs/Publications, State/Regional Newspaper, State/Regional Magazines, Directories and Books.

There were 130 publications entered in the 1987 contest. Conducted by the NGF each year, the awards are designed to recognize the contributions of local and regional golf publications to the continuing growth and popularity of the game. The entries are judged on their content, appearance and service to golf.

The award was initiated in 1979 by Mr. Eckhoff. He is still an active NGF staff member and is marking his 30th year with the Foundation this year. He currently serves as a special consultant for golf course development.

The broad base of the competition makes the award even more meaningful. And it belongs to all of us — the advertisers who pay the freight; our wonderful writers who put their thoughts and knowledge and emotions on paper to share with others; the Kramer Printing staff who are in their fifth year of dedicated work on *The Grass Roots*; and our own staff volunteers.

The prestige of the NGF Harry Eckhoff Award is something that will inspire continued hard work in reporting on and writing about the wonderful world of golf and golf courses in Wisconsin.

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TECHNIQUES FOR PREGERMINATION OF COOL SEASON TURFGRASS SEEDS

By Mark Grundman

Turfgrass managers have been looking for methods of establishing turf areas in other ways than normal seeding procedures. Sodding has been used for several years. However, there are some situations where sodding turf areas would either be logistically or economically infeasible. Pregermination techniques seem to fit a niche here. With the exception of the initial set up cost and space requirements, pregermination techniques would most likely be a less expensive way to establish turf areas in certain situations. Those situations include a.) a need for quicker germination in inclement weather such as cold, and b.) when a turfgrass stand is needed before it is possible by normal seeding methods. The objectives of this paper are to review various procedures for pregermination of cool season turfgrass seed and to give some procedures which have been successful for the distribution of pregerminated seed on the turf areas to be renovated.

Dr. Kent W. Kurtz and Nicholas R. Spardy reviewed several procedures for pregerminating seed. These procedures will give a good cross section of the various procedures used in the United States. The following procedures will be presented in this review:

1. Northrup King Method
2. Candlestick Park Method
3. Kansas City Method
4. Milwaukee Brewers Method
5. Cal Poly-Pomona Method
Developed by Kurtz and Spardy
6. Kansas City and Cal Poly-Pomona Method with the use of Aqua-Gro
7. Modified Northrup King Method
Developed by Casnoff

I would like to cover each of these methods separately.

1. Northrup King Method

- a. Seed placed in small burlap bags.
- b. Seed soaked for 12 hours.
- c. Remove seed from soaking tank.



- d. Hang bags up to dry for 12 hours.
- e. This 12 hour (dry/soak) procedure is continued for 7 days.

2. Candlestick Park Method

(Basically used to repair field divots from ball player shoe traffic, etc.)

- a. Incorporate the following ingredients for large scale field repair
 1. 150 lbs. of Turface (calcined clay and clay).
 2. 100 lbs. of Lapid sand.
 3. 50 lbs. of seed.
- b. Water layers thoroughly and allow to drain excess water.
- c. After watering the mixture is pushed into mounds and checked daily to make sure the seed/soil mixture is moist.

3. Kansas City Method

- a. Seed is soaked with water
- b. Water is changed every 12 hours (to replenish oxygen that is necessary for seed germination).
- c. Water changes could also periodically reduce the amount of exudates apparently produced by the seed during the germination process. These exudates seem to inhibit germination.

4. Milwaukee Brewers Method

- a. Aqua-Gro is used at a rate of 2 ounces per 55 gallons of water.
- b. The water/Aqua-Gro solution is changed every 4 hours.
- c. On the 3rd day after seed has become swollen, they are spread out and mixed with milorganite fertilizer (6-2-0).
- d. Mixture is left until it becomes semi-dry.

5. Cal Poly-Pomona Method

- a. Soak seed in water every 12 hours.
- b. Small aquarium pump is used to continuously aerate water.
- c. This process is continued until maximum germination is achieved.

6. Kansas City and Cal Poly-Pomona Method with the use of Aqua-Gro

- a. Both methods are the same as previously described.
- b. Aqua-Gro is added on the third day of soaking.

Kurtz and Spardy showed that all the above procedures were very effective in terms of pregerminating seed. The highest amounts of germination of perennial ryegrass after seven days were seen in the Kansas City and Cal-Poly-Pomona methods.

The modified Northrup King method was modelled after the Cal-Poly Pomona Method. In this method the seed is put into canvas bags. The seed is continuously soaked and during this period the water is changed every 12 hours. The water is continuously aerated using a small aquarium pump. The only change from the Cal-Poly method is the use of the circulator immersion heater which is hung from the side of the soaking tank. The tank was built out of fiberglass and measures 3 feet wide by three feet long by 2 feet deep. The water temperature and aeration status were found to be major keys in realizing quick germination. In experiments using perennial ryegrass it was found that 90 percent germination (measured by emergence of the radi-

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cle) was reached in 8-9 days when the water temperature was kept at 68° F and was reached in 3-4 days when water temperature was kept at 77° F.

A study was conducted using two species of cool season grasses to investigate the number of days to the 90 percent radicle emergence when the water temperature in the soaking tank was held at 77° F. It took an average of 3-4 days to get 90 percent of the seed of various perennial ryegrass varieties to germinate and it took an average of 7-9 days to get 90 percent of these several Kentucky bluegrass varieties to germinate. These data suggest that 77° F is a favorable temperature to pregerminate perennial ryegrass. More research is needed to see whether higher or even lower temperatures are needed to germinate Kentucky bluegrass more rapidly.

Once the seed is germinated the problem exists as how to distribute the seed onto a turf area to be renovated. A few ideas will be presented here. In two areas at Radnor Valley Country Club in Radnor, PA a practice tee renovation project and an experimental ryegrass plot areas were being planted late in the fall (mid-October). A way to establish these areas before the onset of winter was needed. Pregermination techniques were an excellent alternative to the normal seeding procedures or to the expense of sodding. It was felt that normal seeding procedures would not produce healthy, vigorous turf plant before winter set in. On October 10th, 10 lbs. each of 7 experimental ryegrasses were pregerminated using the modified Northrup King Method with the soaking water held at 77° F. On the 13th of October the seed was emptied into plastic flats for 24 hours. This allowed excess water in the seed to drain. On October 14th it was observed that the seven perennial ryegrasses averaged from 80-90 percent radicle emergence. Each of these varieties were separately mixed with vermiculite. We used vermiculite due to the fact it was available to us in large quantity (mixed 1:1, volume:volume). Interestingly enough the seed/vermiculite mix was moist enough to travel 100 miles to the renovation site without drying out. Secondly the mix was dry enough that a Gandy drop spreader could be used to distribute the seed without any major problems. The experimental plot area was seeded by hand. The remnant seed was then mixed and spread over the practice tee area using a Gandy drop spreader. The experimental plot area

was rolled to get good seed to soil contact. No supplemental water was available at this site. In contrast the practice tee area was irrigated for 5 minutes to moisten the seed bed. No other supplemental water was used. No rolling was done at this site. In both cases turf areas were 100 percent covered with what seemed to be vigorous seedlings. The weather during this establishment period was less than optimal. The temperatures averaged 45-50°F highs with frost on several mornings during the three week period. These results were well above expectations of the club membership as well as myself and the superintendent (Tom Dale). These results suggest that pregermination techniques can work to the benefit of the turfgrass manager in certain situations. The key is *planning*. These procedures take time and good preparation to get everything to run smoothly.

One other experiment planned to investigate another method for seed distribution will be performed in early spring of 1988. This experiment will use pregerminated bluegrass seed and will be conducted with the cooperation of

Sporting Valley Turf Farms. It is believed that if seeding of turfgrass sod areas can be achieved earlier in the spring than usual, turfgrass plants can be better established before the onset of the summer drought as compared to those plants established using normal seeding methods. We plan to spray pregerminated bluegrass seed out of a spray rig set up with a 15 foot long boom with 5, #10 flood jet nozzles evenly spaced on the boom. The spray rig will operate using a hydraulically actuated centrifugal pump. A half-acre area will be established using this sprayer and a half-acre area will be established using a Brillion Cultipacker Seeder. A Cultipacker will be used over the spray seeded area to get good seed to soil contact. We should get some good data by May of 1988.

As time goes on, more information will be gathered that should assist both in improvements in technique for pregerminating seed as well as distributing pregerminated seed over turf areas to be renovated. Warm season turfgrass pregerminating techniques will also be evaluated.

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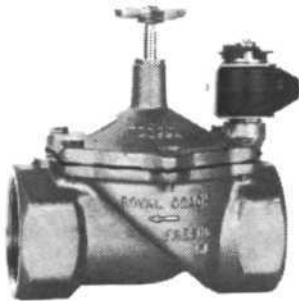


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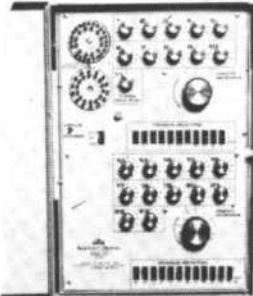
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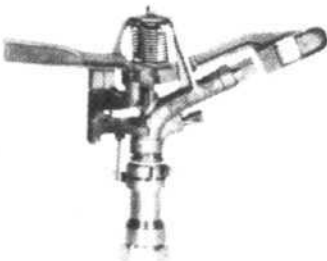
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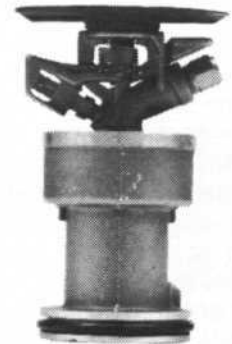
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ANTICIPATION — 1988

By James M. Latham, Director
Great Lakes Region
USGA Green Section



After the many difficulties experienced in 1987, an air of optimism seems to pervade the golf turf management groups throughout the Great Lakes Region. After all, how could things get worse? The growing season is already shorter than last year. The folks out west had another dry winter, so there may be more water woes and winter injury again this year. Elsewhere, superintendents say the winter was so-so, which indicates that few problems were anticipated this spring. We can, however, expect a pretty weedy year unless good, dense turf coverage can be developed before warming sunlight reaches the soil and triggers seed germination — especially crabgrass and goosegrass.

The USGA/GCSAA Research project is beginning to produce results. Superintendents were helped last summer by some of the stress management techniques. Others are making good use of the management studies in successful programs of *Poa annua* suppression in bentgrass fairways. Still others have made use of the Turf Grass Information File in writing reports and in project proposals. New grass varieties are approaching the production pipeline which will benefit golf turf in southern and western areas. Up here, we hope to see limited field evaluation of *Poa annua* this summer. The status of the projects will be described in the next issue of the *Green Section Record*.

The issue will include all presentations made at the Green Section's educational session during that fantastic GCSAA International Conference and Show in Houston. Of particular interest to every superintendent (except Ed Fischer and Bruce Williams) is the discussion on women's golf by Judy Bell, the first lady to serve on the USGA Executive Committee. It is must reading, particularly at this time of the year. Her comments on yardage could be valuable references in certain instances, such as siting new forward or Red Course tees.

The *Green Section Specifications for Green Construction* is in the process of an updating rewrite. The good printer willing, it *should* be available for distribution by June 1, 1988. There are no major changes, because the basic principles of soil physics involved in this construction method do not change. This updating is to tighten some of the specifications on components and procedures and to clarify some ambiguities found in previous editions.

Other Recommended Reading: Four publications from the Council for Agricultural Science and Technology published in 1987.

1. Reprint from January issue Science and Food and Agriculture — How Risky are Pesticides?
2. Comments from CAST — 1987 (1)-May. Health Issues Related to Chemicals in the Environment: A Scientific Perspective.
3. Comments from CAST — 1987 (2)-May. Pesticides, Cancer and the Delaney Clause.
4. Comments from Cast — 1987 (3)-December Perspectives on the Safety of 2,4-D.

These papers were written by eminent scientists in the fields of agriculture, medicine, environmental toxicology and statistics at major universities, industry, the USDA, etc. They deal with the facts of pesticide usage in an objective, scientific and readable manner. It is the kind of information needed when (not if) we are asked about pesticide safety. For more information write CAST, 137 Lynn Avenue, Ames, Iowa 50010-7120. This organization, incidentally, accepts individual members. Their publications are worth the \$25 fee.

I was stunned last summer when a graduate of two *Majors* universities featuring turfgrass science told me he had never seen the classic time-lapse movie *Water Movement In Soils*. It dates from 1959, but the principles of soil physics do not change. There has never been a better illustration of what

happens to water in a layered soil, why rolling helps seed germination, how salts accumulate and which aeration holes work while others do not. It's only a 25 minute movie, so I cannot believe that any straight lecture can be so enlightening. If anyone who was similarly deprived would like to see the new turf-oriented version, give me a call. We can arrange for either a 16 mm movie or a VHS tape.

About this time of the year when everything is just about ready and the turf conference information and conversations are not yet filed, it gets to be Ponder Time. That's when we try to get oriented and just ponder about something that is unlikely to happen, but . . .

All the Joneses are getting bentgrass fairways for a variety of reasons, but basically because good golfers play best from tight fairway lies. (The last U.S. Open played on bluegrass was in 1950 at Cherry Hills in Denver.) We are learning that good bentgrass fairways don't come free for nothing — lightweight mowing, intensive aeration, some vertical mowing, well-balanced irrigation and better than average drainage.

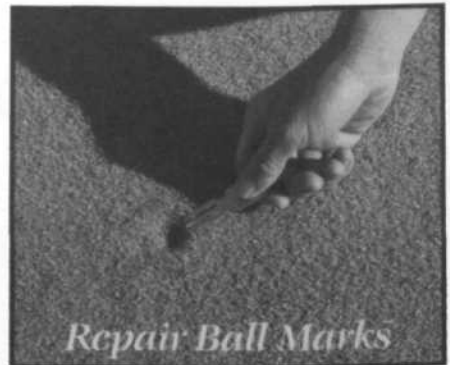
Now that is the ponderable: What kind of playing quality could be developed for the vast horde of nonchampionship-calibre golfers if we voluntarily put that much effort and care into some of those new, high powered Kentucky bluegrass cultivars? One of the greater Chicago area superintendents came close to this on a test fairway last year and produced very good turf. He is nameless because that really wasn't the intent of the test.

But it shore is a ponderable.

JIM LATHAM will be our speaker on September 12 at his son-in-law Bob Belfield's club, Kettle Hills.



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don't forget to follow through.**



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