



## 1990 Northwest Turfgrass Conference A Success

This year's Northwest Turfgrass Conference and Exhibition in Welches, Oregon, September 17-20, 1990 was rated by the 400 participants as outstanding.

The education program, with over 30 presentations, covered a wide range of turf related topics. Presenters from throughout the nation served to maintain the usual excellent quality of information available at the annual conferences. A proceedings document, including the presentations made at the conference, will be distributed to the conference participants shortly after the first of the year.

The new table-top exhibit, tied in with the conference kick-off reception proved to be an outstanding success. The exhibits were great, the food excellent and plentiful, and the door prizes—provided by the exhibitors—outstanding. The 300 participants had an informative and fun-filled evening.

Over 90 golfers played in the men's and women's tournaments held on the beautiful Rippling River Golf Course. Many thanks to the entire staff for their efforts, without which the tournaments could not have been the success they were.

Those taking first place in each of the four flights of the men's NTA Conference Golf Tournament were as follows:

Flight	Low Gross/Score	Low Net/Score
Championship (0-10 Handicap)	J. Alexander/72	G. Smith/69
Second (11-18 Handicap)	D. Johnson/86	N. Whitworth/74
Third (19-36 Handicap)	J. Bosworth/93	R. Goss/75
Callaway	S. Fraser/96	D. Michels/71

In the ladies 9 hold tournament, Liz Goodling took low gross honors.

Wrapping up the 1990 conference, out-going NTA President William Johnston urged everyone to plan on attending next year's conference, the 45th Northwest Turfgrass Conference & Exhibition scheduled to be held September 16-19, 1991 at The Coeur d'Alene Resort in Coeur d'Alene, Idaho.

## 1990 Northwest Turfgrass Conference Supplier Supporters

The NTA recognizes and appreciates the valuable contribution and outstanding support the turf care industry suppliers continue to demonstrate at each conference and this year was no exception to the rule. With their support in the form of donations for tournament prizes and exhibiting, we are able to put more funds into the NTA Research & Scholarship Fund. Members are urged to remember these suppliers with a big thanks and in a more pragmatic way when the opportunity arises.

Many thanks to the following suppliers who made donations to underwrite the expense of events and who exhibited in the show:

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## NTA Officers and Directors Elected for 1990-91

Mr. William B. Griffith was elected president of the Northwest Turfgrass Association (NTA) during the recently concluded 44th Northwest Turfgrass Conference and Exhibition. Bill is the Golf Course Superintendent at Veterans

*Continued page 2*

## President's Message

The Northwest Turfgrass Association's (NTA) 44th Annual Northwest Turfgrass Conference and Exhibition is now history, and as we've found in the past, Rippling River Resort has proven once again to be a popular facility. I want to thank all of the personnel from the resort who were involved with this year's conference, and while not wanting to leave anyone out, I want to especially express our gratitude to Russ and Trudy Vandehay for the beautiful condition of the golf course and for their attention to the little details that made our conference special.



Bill Griffith

Some of the changes that were made in this year's program seem to have been a real plus. The Monday night welcome reception and exhibition of table top displays was very well attended with most everyone staying for the entire evening. The exhibitors that I talked with were very pleased with the event and indicated there was considerable activity at each of their displays throughout the evening. Another change in this year's conference was the addition of educational sessions on Tuesday and this year's conference was the addition of educational session on Tuesday and Wednesday afternoons. These sessions had much higher attendance than I expected and proved to be time well spent.

I want to express my appreciation to all of the speakers who spent a lot of time preparing for and delivering their talks. These educational sessions are what make our conference such a great educational experience and help to keep us up to date with the many changes that are happening in our industry.

The educational opportunities afforded us by conferences such as the NTA's are critical if we are to be the professional turf managers that today's customer demands—football fields that 15 years ago were expected to survive a season of 7 or 8 games, are now required to have 20-30 games as well as practices; lawn and landscaped areas professionally maintained with the greenest of green lawns and no weeds in sight; and golf course greens with speeds that 15 years ago would have been reserved for national tournaments. I am not saying that this is bad. On the contrary, I think the demands for better quality turf are, for the most part, good for the industry. I'm sure that the turf professional of today doesn't work harder than the turf professional of 15-20 years ago, but there have been tremendous advances in the knowledge that is available to him along with the increased demands by the customer. He has to have more knowledge, and he has to get it more quickly if he is to survive in today's highly competitive turf professional market place.

Another prime example of our need for continuing education is what is happening with pesticide usage, and what the next ten years will bring.

The various golf course superintendent organizations, that are in the same geographic locations as the NTA, are educating hundreds of people each year in pesticide usage, and providing seminars that are specific to the turf professional.

I realize that we can't attend every meeting or educational opportunity that comes along, and that we all have

lives away from our work that demand our time and energy. There is a slogan that the army uses in their promotions—"BE ALL THAT YOU CAN BE." If we're going to be the best turf professionals that we can be, we must schedule the time into our work routine to educate ourselves and keep pace with the changes that are happening around us.

### NTA Officers and Directors (continued)

Memorial Golf Course in Walla Walla, Washington. He served as the association vice president and chairperson of the annual conference program committee this last year.

Other officers elected to serve on the board of directors for the year include: Thomas M. Wolff, Golf Course Superintendent at the Sahalee Country Club in Redmond, Washington who will serve as vice president; Bo C. Hepler, Turfgrass Agronomist with Senske Lawn and Tree Care in Yakima, Washington who will serve as treasurer; and, William J. Johnston, Turfgrass Agronomist with WSU in Pullman, Washington who will serve as past president.

Freshman directors on the board include Jon C. Hooper, Grounds Manager at the University of Washington in Seattle, Washington and Larry L. Farwell, Golf Course Superintendent at the Wenatchee Golf and Country Club in Wenatchee, Washington.

Elected to a second three year term was Rebecca R. Michels, President of Messmer's Landscaping Service in Kent, Washington.

Carryover directors for the year include: Patrick Nibler, Vice President for Operations with PROGRASS Landscape Services in Wilsonville, Oregon; Alan L. Nielsen, Golf Course Superintendent of the Royal Oaks Country Club in Vancouver, Washington; and, David P. Jacobsen, President of Farwest Turf & Industrial Equipment in Portland, Oregon.

In addition to the elected, voting members of the board, there are non-voting members Roy L. Goss, Director Emeritus and Blair Patrick, Executive Director.

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## 1991 Annual Membership Dues

The NTA is a non-profit corporation founded in 1948 to help all people interested in turf grass culture. The association membership has grown over the years to over 400 people involved in turf facilities development and maintenance at schools, parks, golf courses, cemeteries, sports fields, commercial sites, and home lawns. In addition, lawns spray services, landscape architects, landscape contractors and designers, and equipment and chemical suppliers all participate as members in the organization. Through its many activities, the NTA has benefitted all of these people by helping them learn more about their profession. Its annual conference and publications program provide timely and pertinent information specifically aimed at turf culture needs in the Pacific Northwest. In recent years, its focus has broadened to include landscape maintenance in addition to turf culture.

The NTA is directed by its membership through a board of directors. Board representation encompasses all fields and geographic areas throughout the Pacific Northwest. Board members are elected at the general membership meeting of the annual conference, and serve three year terms. Active participation by members is encouraged so that the organization will reflect their needs and wants.

The NTA offers an opportunity to participate shoulder to shoulder with other leading turf professionals in the Pacific Northwest. Members get:

1. An opportunity to attend the annual conference to listen to outstanding researchers and practitioners and then discuss their findings face to face.
2. A copy of the annual conference **Proceedings**. This publication typically runs 100 to 150 pages and contains approximately 25 different topics as presented by top researchers throughout the Pacific Northwest and the United States. Many of the talks are practically oriented and provide information to take home and apply.
3. An opportunity to exchange ideas and experiences with other turf colleagues in the Pacific Northwest.
4. A first hand look at new equipment and products as displayed at the conference by suppliers from throughout the region and the United States.
5. A quarterly publication, **Turfgrass Topics**, filled with timely information on turf care and other items of interest in our industry. **Turfgrass Topics** also includes advertising by the supplier with whom you want to do business on a regular basis.
6. An annual **Directory** including a listing of association members along with valuable industry data.
7. A handsome annual **Certificate of Membership**.
8. An active group of elected and appointed colleagues looking out for your interests and those of the industry.
9. An opportunity to support and promote industry-related research.

Annual dues statements for 1991 will be mailed in the next month or so. The dues are as follows; \$75.00 for **Active Members** (any individual, firm, corporation, jurisdiction or institution engaged in the turfgrass industry or in the development or application of turfgrass industry technology); \$15.00 for **Student Members** (any person enrolled in a university, college, community college or vocational school, turfgrass or related industry program of

studies); and, \$25.00 for **Subscriber Members** (any person employed and sponsored by an active member).

There has been confusion on occasion in the past with the fact that the Active Member dues rate (\$75.00) is the same as the annual conference registration rate (\$75.00). Even though the rates are the same, that is the only similarity. They are both independent charges and one \$75.00 payment does **not** cover both items.

## 1991 Northwest Turfgrass Conference and Exhibition Scheduled for Coeur d'Alene

The Board of Directors of the Northwest Turfgrass Association extend a cordial invitation to the members of the association, along with their colleagues, employees, spouses, friends and others interested in the turfgrass industry in the Pacific Northwest to attend and participate in the 1991 **45th NORTHWEST TURFGRASS CONFERENCE AND EXHIBITION** scheduled for September 16-19, 1991 in Coeur d'Alene, Idaho at the Coeur d'Alene Resort conference Center.

Research information, education, equipment displays and demonstrations, the annual turfgrass men's and women's golf tournaments and a turfgrass facilities tour will highlight the Conference and Exhibition. Also on the schedule of events are the annual business meeting of the NTA members; an excellent program for spouses and friends; and a number of social activities designed for everyone.

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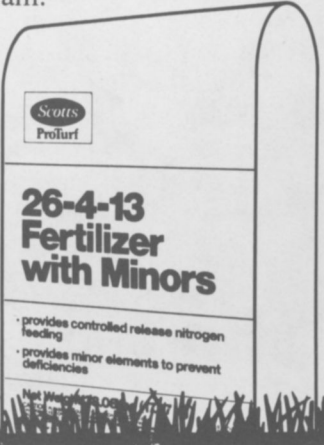
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Coeur d'Alene will host the hundreds of golf course superintendents; parks, cemetery, school and other grounds maintenance personnel; professional consultants; landscape and lawn care personnel; equipment and product suppliers; research and extension staff; and others involved in the turfgrass industry from throughout the Pacific Northwest who will assemble for the outstanding professional development conference.

Coeur d'Alene, one of the largest meeting facilities of any resort in Idaho, will house the supplier show, a regular high point of the annual conference. Supplier interested in further information about the show should contact the NTA office to be sure they are on the NTA supplier mailing list.

## Adapt Your Management Style to Suit Different Situations

For many years, management style was either autocratic or democratic. Autocrat gave orders and expected obedience; democratic managers gathered opinions and tried to involve employees in every major decision. Today, managers are recognizing different styles of leadership. Here are four:

**Directive:** Like the autocratic style, this technique relies on giving commands and controlling behavior. In the short term, a directive style can help you get things done quickly, and will be effective when you supervise employees with little job experience or knowledge.

**Supportive:** Employees who lack experience or self-confidence will respond better to this style, which emphasizes listening to people, praising performance, and facilitating personal interactions.

**Coaching:** Generally directive, this style allows increasing degrees of support for employees as they become more experienced and confident of their abilities.

**Delegating:** Best when you work with experienced professionals who know what to do without supervision.

Of course, there is no "right" style of management. You must be able to recognize which employees will respond best to each style, and provide the kind of attention and leadership necessary to work effectively with each member of your staff.

*Source: Emergency Librarian*

## Pesticide "Off-Target Drift" Rules Explanation

"Recently, I have become extremely concerned about the apparent confusion and misunderstanding regarding the Department's administration of state and federal pesticide laws and regulations, particularly as it relates to off-target drift," stated Dr. C. Alan Pettibone, Director, Washington State Department of Agriculture, in a letter mailed to Presidents an Executive Directors of Agricultural organizations. He went on to explain the "misperception" being the results of an attempt to respond to a question, in a May 31, 1990 publication of the WSDA's Pesticide Management Division... "What is the WSDA's policy on pesticide drift?"

**Pettibone says he recognizes that the answer "was a broad generalization and oversimplification of an extremely complex regulatory matter."**

He quoted sections of RCW's 15.58.150(2)(c), 17.21.150(4) and WACs 16-228(1), 16-228-185(2) and he commented that these sections of statutory and adminis-

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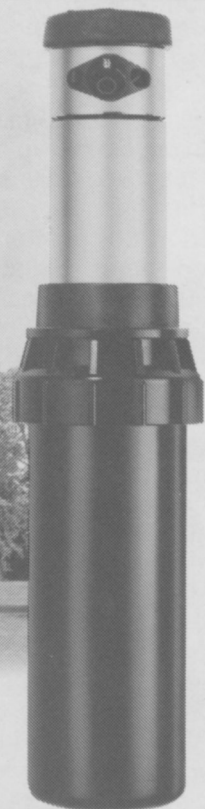
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trative code are not new...the RCW's were enacted in 1971 and 1961 respectively and WAC's were promulgated in their current form in 1976. We agree that they are not new, but they also do not say that drift automatically equals damage. That step was apparently taken as a Department policy decision. Perhaps that is a part of the oversimplification to which Director Pettibone referred.

"These sections are the basis of investigating any complaint of pesticide drift. The evidence collected by WSDA investigators is tested against these laws and rules to determine if a violation has occurred. We question:

- were the label instructions violated,
- was the application faulty, careless or negligent, was there endangerment, and
- did damage or injury occur.

If the answer to one or more of these is yes, a violation has occurred, stated Pettibone. Recommended penalties range from a verbal advisory or warning to license suspension and/or civil penalty of up to \$7,500."

Pettibone continued, "Another misperception which has been tied to the misunderstanding related to pesticide drift violations has to do with recent consideration and/or passage of "right-to-farm" ordinances. **These ordinances reinforce what already exists in the state's nuisance laws.** Though they have portrayed so, these ordinances do not countermand state pesticide law."

"I support these right-to-farm ordinances. They are more important than ever as we see continued urban growth into rural areas. I encourage the agricultural industry to review and, if necessary, strengthen the state's nuisance laws as well as local ordinances to ensure the viability of our industry is not compromised."

"Also, because of the complex nature and the increased concern about pesticide drift, I am acting on the recommendation of the Pesticide Advisory Board and will be appointing a task force in the next few weeks to carefully review the issue and the state's laws and rules to see if any changes or clarifications are needed. The issues involving pesticide drift are not simple. If you have questions about the state's pesticide laws or pesticide drift, please feel free to contact me or members of my staff. I am interested in your concerns and your ideas. I welcome the opportunity to discuss pesticide issues with you or your group."

"We commend Director Pettibone for his support of County "Right to Farm" ordinances and for his frank assessment and explanation of this unfortunate situation regarding pesticide regulations. Farm Bureau is willing to work with Director Pettibone in solving this serious problem.

## OGCSA Chemical Applicators Reference Manual

In answer to many requests, the Oregon Golf Course Superintendents Association has prepared a Chemical Applicators Reference Manual. It is for use in preparing to take the Chemical Applicators Tests conducted by the State Department of Agriculture and as a reference guide for those already licensed. Contents are as follows:

- Prohibited Acts
- Oregon Administrative Rules, Chapter 603, Division 57, Department of Agriculture
- Restricted Chemicals List
- Private Applicator Standards of Compliance

- Chapter 634, 1987 Replacement Part, Pesticide Control
  - Pesticide Certification and Licensing Study Material List
  - Pesticide Certification and Licensing Study Material List, Oregon Department of Agriculture, Plant Division
  - Oregon Department of Agriculture Records Required of Operators
  - Employer/Employee Information Manual, Hazard Communication Rules
  - Applying Chemicals Correctly, OSU Extension Service
  - GCSAA Reference Manual, Pesticide Usage
  - Suggested Chemical application Record Sheets
- COST:** \$40.00, plus shipping and handling  
**COPIES:** Available through OGCSA, 10804 N.W. 11th Ave., Vancouver, WA 98685, (206) 573-6969.

## Endophytes

by Steve Poitras, Seed Research of Oregon, Inc.

Every day we read the reports in the newspaper about the environmental dangers associated with the use of lawn chemicals. Recently the hysteria has reached such a peak that one can hear people seriously pushing for a turf free earth. I don't think these people make the connection between turf and a healthy relaxing environment that is all too needed in this age. It is hard to imagine what it would be like living in a city where there were no lawns, parks or just grassy areas helping to absorb the noise and dirt of the city.

However, one cannot argue against the need for reduced levels of chemicals in our immediate environment. Turfgrass professionals have regarded pesticides as a necessary tool to maintain turf in the condition that the general public has demanded. Luckily for both sides of the controversy there is now a trend toward the development and production of safer turfgrass products. Many turf products are now available that are reducing the risk of environmental contamination. One example is the wide variety of slow release nitrogen fertilizers which improve turf quality while at the same time reduce the potential of nitrate leaching into the groundwater. Another example is the use of biostimulants that when applied to turf stimulate root growth and improve the overall health of a plant enabling the plant to stay at high quality levels at reduced fertility rates.

Plant breeders have traditionally sought to improve the quality of the major turfgrass special. For example, ten years ago Kentucky bluegrass (long regarded as the Cadillac of turfgrasses) had a lot of disease problems and did very poorly in shaded environments. These problems severely limited the areas where Kentucky bluegrass could be used successfully. Since then a vast amount of research has gone into developing improved varieties that are more disease resistant and shade tolerant. There are now varieties, such as Chateau Kentucky bluegrass that perform better in shaded areas than anyone would have ever expected of a Kentucky bluegrass. The improved varieties of creeping bentgrass are another example of a turfgrass becoming more disease resistant and less labor intensive while giving better turf quality than what has been available. With the onset of shrinking maintenance budgets and water supplies as well as increased environmental pressures there has been a push to improve the quality of the low maintenance turfgrass species such as the tall fescues and fine-leaf fescues. Some of these varieties now have high enough quality that they can be used in showcase turf areas and still retain their low maintenance characteristics.

**Endophytes (continued)** All of these improvements have led to a greater adaptation of more desirable species with a decrease in the use of fungicides and pesticides as well as water and other costly inputs.

The Endophyte is one of the latest advances in turfgrass breeding. Endophytes are a type of fungus that have a mutual beneficial relationship with certain species of grass and specific varieties within species. The endophytes get their food and protection by living inside the grass plant, but result in no negative side effects to the plant. As a byproduct these endophytes produce and release certain chemicals into the leaves of the plant. These chemicals make the plants resistant to many turfgrass insect pests. Insects such as billbugs, chinch bugs, armyworms and sod webworms. To date only certain varieties of tall fescue, perennial ryegrass, and fine-leaf fescues contain endophytes.

The endophyte first became known in the late 1800's. However, they became of interest to scientists only when it was discovered that livestock grazing on pasture grasses containing high levels of endophytes had serious health problems compared to livestock feeding on endophyte-free grasses. Their potential importance in turfgrass culture was first reported, in 1982, at a pest control conference in New Zealand.

The main endophytic fungus which confers insect resistance to turfgrasses are from the genera *Acremonium*. There are different species of the endophyte for different grasses. For example, *Acremonium loliae* infect perennial ryegrasses and *Acremonium coenophialum* infect tall fescues. The by-products produced by the endophyte include a wide range of chemicals including various alkaloids. Some of the compounds isolated from turfgrasses containing endophytes are loline, and peramine alkaloids (Siegel et. al. 1984). These chemicals provide a natural insecticide in the plant. For example, a study carried out by Johnson-Cicalese and White (1990) investigated the mortality rate of adult billbugs on endophyte-enhanced and endophyte-free tall fescue. In their studies it was found that the mortality rate of billbugs was 80% on infected tall fescue plants and only 42% on endophyte-free plants. When comparing chinch bug populations on endophytic and endophytic-free fine fescues it was found that varieties high in viable endophyte, SR 3000 hard fescue (97% endophyte infection) and Longfellow Chewings fescue (84% endophyte infection) had only 42.4 and 55.7 chinch bugs respectively per m<sup>2</sup>. Varieties of fine fescue that are low in endophytes, such as Aurora hard fescue and Shadow Chewings fescue, had 185.7 and 132.6 chinch bugs per m<sup>2</sup> respectively (Saha et. al 1987). There are many similar studies dealing with sod webworm, armyworm, Argentine stem weevil, and other turfgrass insects. The majority of these studies confirm beyond a doubt that endophyte-infected turfgrasses are much more than non-endophyte turfgrasses.

Distribution of the endophyte within the plant varies. The highest concentration occurs in the leaf sheath and seed, followed by the stem and crown regions of the plant. The roots have the lowest concentration (Siegel et. al. 1984). This is the reasons that endophyte-enhanced grasses are more resistant to surface feeding insects than to subsurface feeders. There also appears to be seasonal variation of endophyte concentration within the plant. The highest concentration of infection occurs in the leaf tissue during the summer and fall.

Once turfgrass scientists and managers started to key in on the characteristics that were attributed to endophyte-

enhanced grasses other benefits began to become apparent. There is strong evidence that there are beneficial growth characteristics in endophyte-infected plants, particularly in regards to environmental stress tolerances. In a fine-leaf fescue trial (Saha et. al. 1987) there were no significant differences in turf quality when the plots were maintained at high maintenance levels. However, when irrigation and fertility were reduced SR 3000 hard fescue and Longfellow Chewings fescue had significantly better quality than did non-infected varieties. Over time these differences became more apparent. The turfgrasses without the endophyte had poor recovery from drought stress. Field experiments in New Jersey have observed better summer survival, better fall recovery, and reduced weed invasion (Funk et. al. 1985). These results are in part due to a denser more vigorous turf. Experiments on tall fescue, under greenhouse conditions, have indicated that a denser, healthier turf is the result of endophyte enhancement. In this study endophyte-enhanced plants had approximately 12% more tillers and 25% greater root growth than did non-infected plants (Battista et. al. 1990).

It is interesting to note that the percentage of plants containing endophytes increases while the endophyte-free plants die off. After seven years the endophyte level off SR 3000 hard fescue had risen from 94% to 97% while Longfellow Chewings fescue had increased from 48% to 84% (Saha et. al. 1987). This phenomenon ensures that once you plant endophyte-infected turf it will remain infected and the benefits will be long lasting. In essence, there is a very long period of residual activity that is totally natural, safe and comes with a low cost compared to repeated chemical applications.

There is only one way to get the endophyte into your turf, you must start with seed that is already infected. Endophytes can not be "applied" to turf in any way. The only way that endophytes are disseminated is through the seed. It is important to remember than only certain varieties of tall fescue (Titan SR 8200, Chesapeake), perennial ryegrass (SR 4000, SR 4100, SR 4200, Citation II, Dasher II, Commander) and fine-leaf fescues (SR 3000, Longfellow, Reliant) contain high levels of viable endophyte.

What does viable mean? As mentioned earlier, in an established stand the percentage of the endophyte will increase over time. However, the amount of live endophyte in the seed will decline over time. This is especially true if the seed is not stored in cool dry conditions. Your only guarantee that the endophyte in your seed is still viable is to buy fresh seed. Seed that is over two years old will more than likely have experienced a decline in the viability of the endophyte. Unfortunately there is no way to test seeds to determine if the endophyte is still viable. To date the only way to determine the presence of viable endophytes is by a grow-out test, not a very convenient method for the end user. Other tests on seed cannot distinguish between viable and non-viable infection. So it is very important to purchase the freshest seed available.

The endophyte is not the total answer to all the environmental issues that face turfgrass managers today. However, by using endophyte-enhanced turfgrasses it is possible in many instances to significantly reduce the amount of pesticides that are released into the environment and at the same time have a healthier turf of higher quality. This is a step in the right direction that all turfgrass managers can take. It should also be the job of all turf managers to educate the general public about the benefits of turfgrass

and how we, as an industry, are constantly looking for ways to improve the quality of our environment.

(For bibliography references, contact Steve Poitras, Seed Research of Oregon, Inc., (503) 757-2663).

## Pacific Coast Turf and Landscape and Trade Show Scheduled for December 1990

There are now three tracts of educational seminars to choose from for the Pacific Coast Turf and Landscape Conference and Trade Show to be held in Seattle, Washington on December 12-13, 1990 at the Seattle Center. The seminars will give professionals in the greens industry the opportunity to learn the most current and up to date industry techniques and theory on pesticide issues, landscape and turf care, and equipment servicing. The seminars will be valuable to commercial and private landscapers; groundkeepers; golf course superintendents; nursery owners and operators; and turf and lawncare professionals. Washington Pesticide Recertification credits will be available. The trade show, scheduled in conjunction with the conference, will host more than 60 industry suppliers and distributors.

The Turf and Landscape Conference early bird registration fee of \$75 is available until November 14th (after November 14th the fee is \$100). The fee includes entrance to all seminars and exhibit areas, materials and refreshments for both days.

This event is sponsored by the Western Washington Golf Course Superintendents Association, WSU Cooperative Extension and Jones and Associates. To register or for more information contact Jones and Associates at Park Center Bldg., Suite 200, N. 908 Howard Street, Spokane, WA 99201-2261 or 1-800-729-5904.



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## Fall Fertilization

by Richard L. Duple, Extension Turfgrass Specialist  
Texas A & M University

After being covered up with grass clippings all summer, many turfgrass managers are simply too busy to think about fertilizing turf in the fall and, if the truth be known, most are ready for the grass to go dormant. Traditionally, fall application of nitrogen was avoided to induce hardening of the grass and, thereby, increase its cold hardiness. Hardening of the grass was reported to be favored by reduced growth which, in turn, was favored by low nitrogen. But turf research has given us reason to consider late fall fertilization of lawns, golf courses and athletic fields.

### Cold Hardiness

Contrary to earlier beliefs, high nitrogen content in the foliage may actually increase the cold hardiness of turfgrasses. Apparently it is not the nitrogen content that affects cold hardiness. Rather, it is the succulent shoot growth produced by early fall fertilization that reduces cold hardiness. Also, the ratio between nitrogen, phosphorus and potassium and low in phosphorus should be used for late fall fertilization of turfgrasses. If soil tests indicate high levels of phosphorus, only nitrogen and potassium need to be applied.

### Enhanced Color and Greater Turf Density

Late fall applications of nitrogen prolong color retention and extend the usefulness of the turf. Throughout the South, where golf courses and athletic fields are used year-round, a green foliage presents a more attractive and resilient surface than a semi-dormant turf. Although turfgrasses (warm season or cool season grasses) may not produce measurable growth during the late fall or early winter, turf density and recuperative capacity are greater where the grass has been fertilized in the late fall. The late fall fertilization enhances wear tolerance. Also, turfgrasses are more competitive with weeds when fertilized in the fall. Even cool season turfgrasses retain color and density throughout the winter in southern latitudes as a result of late fall fertilization.

### Root Growth and Carbohydrate Storage

Environmental conditions in late fall (cool temperatures, short days and high light intensity) favor root growth and carbohydrate accumulation. Fall nitrogen fertilization was not recommended because it was thought to increase growth and deplete the plant's carbohydrate (energy) reserves, thus, increasing the danger of winterkill. Research has shown that due to favorable environmental conditions in the late fall, fertilization actually increases root growth and carbohydrate accumulation. However, excessive nitrogen rates may have the opposite effect.

The importance of iron in late fall should not be overlooked. Foliar applications of iron enhance turf color and increase both root growth and carbohydrate reserves. Where iron deficiencies commonly exist, foliar applications of iron are essential.

### Spring Recovery

Late fall applications of nitrogen increase spring clipping yields and improve turf appearances. Grass fertilized in the late fall also resumes growth earlier in the spring than grass not receiving a late application of fertilizer. In addition, the timing of spring fertilization is not as critical when a late fall application of fertilizer was made.

#### Other Considerations

Nitrogen must be available to the grass in late fall in order to obtain the benefits of fall fertilization. Nitrogen sources that are dependent on microbial activity for nitrogen release are not as effective for fall fertilization as the more soluble sources. Thus, soluble sources such as ammonium sulfate and slow release sources that are not dependent on temperature should be useful for late fall fertilization. Rates of fertilization should not exceed one pound of nitrogen per 1,000 sq. ft. per application for soluble sources and 1.5 pounds for slow release sources. Where the color and density of permanent grasses are maintained throughout the winter, applications of soluble nitrogen at a one-half pound per 1,000 sq. ft. rate should be repeated at monthly intervals.

Grasses are not the only plants that benefit from late fall fertilization. Although trees and shrubs appear dormant, plant roots absorb nutrients very readily in the fall and winter. Also, leaves retain color and remain on the plant longer when late fall applications of fertilizer are made. Spring growth of trees that receive late fall applications of fertilizer is superior to that of plants not fertilized in late fall. Tree height and trunk diameter also respond to fall applications of fertilizer.

Despite appearances to the contrary, there may be some negative effects of late fall fertilization. Some turfgrass diseases are favored by fall nitrogen fertilization. Typhula snow mold, Fusarium and Rhizoctonia brownpatch activities may be increased by early fall applications of nitrogen. However, knowing this, fungicides can be applied to prevent losses of turf. Also, potassium levels may be increased in the plant tissue to help reduce the incidence of diseases.

Excessive rates of nitrogen applied in early or late fall may produce succulent shoot growth and reduce cold hardiness in turfgrasses. Also, high levels of nitrogen and phosphorus in relation to potassium may reduce cold hardiness. But, these problems can be avoided by applying low rates of a fertilizer high in nitrogen and potassium in the late fall.

Sources: Southern Turfgrass, Southern Turfgrass Association,  
Fall 1989.

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## Topping or Proper Pruning?

by Davey Tree and Lawn Care Service

Many people have the misconception that cutting the main branches of a tree back to stubs in an effort to reduce the height is the proper way to prune. In reality, the cutting of a tree back to stubs permanently disfigures and actually weakens a tree.

There are some tree service companies that promote and practice this drastic form of "pruning." Apparently, a short tree is thought to be safer and healthier than a tall tree regardless of how the result is attained. In fact, topping a tree in this manner is one of the worst things man can do to trees says Dr. Roger Funk, Plant Physiologist for The Davey Tree Expert Company of Kent, Ohio.

In addition to the unsightly appearance, topping directly results in several other problems for trees, the most severe being internal decay. When a branch is correctly pruned at its point of attachment to the trunk just outside of the branch collar and the branch bark ridge, internal decay is usually stopped from progressing into the trunk by a barrier inside the collar. Also, a correct cut results in more rapid wound closure by callus tissue so that the bark's continuity is eventually re-established.

Topping was common practice by some tree companies in the early days of tree care and during the 1920s-30s. "Even in the light of modern day, scientific evidence to support proper pruning methods, we are constantly amazed at the amount of topping that we see," Funk stated. "But topping is still done in many areas."

The National Arborists Association considers "topping back to stubs" an unacceptable arboricultural practice and

advises against it. The NAA has developed pruning standards which define the type and degree of recommended pruning and this does not include topping in this manner.

Branch stubs produced by topping harbor decay fungi which eventually break down the barrier in the collar and then proceed into the trunk. Whenever a cut is made in the main leader by topping, there is nothing to prevent decay from developing in the trunk. The trunk may be structurally weakened and its useful lifespan reduced. Other adverse effects of topping are:

- Topping removes a major portion of a tree's leaves which are necessary for the production of carbohydrates.
- Once-shaded bark in the canopy becomes scalded by exposure to direct sunlight.
- Stubs are likely to attract woodboring insects.
- Stubbing stimulates the development of watersprouts just below the cut. These shoots grow rapidly, causing a topped tree to grow back to its original height faster and denser than a properly pruned tree. The watersprouts are also weakly attached and area easily broken off in storms.
- Topping permanently disfigures a tree.

Davey Tree, with headquarters in Kent, Ohio, has been a leader in the horticultural industry since 1909 and today provides tree and lawn care services in 40 states and Canada. Davey Tree is a partner in the American Forestry Association's Global ReLeaf Program whose message is consistent with Davey's long-term concern for trees and the environment.



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## Calibrating Spreaders

by Parry Klussen, Editor, Farm Chemicals

Spinner spreaders too often are taken for granted by those of us who look for new innovations and fancy gadgets to write about in agricultural magazines. The basic design of pull-type spinner spreaders in particular hasn't changed for probably 20 years.

Yet these are the workhorses, the unheralded business-getters for many a dealer around the country. When farmers want to apply their own fertilizer – and many still do – you can either send them down the street or provide them the means to do the job themselves. The equipment may have added overhead and in some states cost you extra liability insurance, but it is your fertilizer they apply through that spreader.

For all the income these spreaders generate for a dealer applicator, you'd expect them to be treated like the money machines they are. From what I heard while doing research, that is not always the case. One manufacturer told of his personal campaign to get dealers and their farmer customers to calibrate their spreaders more frequently. Too often, he said the response was "They're good enough..."

If that doesn't elicit a cringe from you, it certainly should. No survey I could find tells the percentage of U.S. fertilizer that is applied with pull-type spinner spreaders. My guess would be close to half the total, maybe more. If 20% of those machines are overapplying fertilizer or have uneven spread patterns, that is an awful lot of incorrectly applied product.

The result? Streaky fields (picture farmers glaring at you), reduced yields (repeat previous visual), or worse yet, overapplication of nutrients that will end up where they don't belong (picture more bad newspaper headlines).

Dealers today can't afford to be just "good enough." Your bank account can't afford it, the environment won't take it, and the entire industry certainly doesn't need it. And for what? A simple calibration kit that will tell you if your fleet of work horses needs new shoes.

## Pesticide Recordkeeping Form Revised

The Washington State Department of Agriculture has adopted a fifth version of the Daily Pesticide Application Record form for use by the pest control operators.

Through public hearings and consultation with users earlier this year, the department worked to develop pesticide recordkeeping versions which could be used by all sectors of the industry. After giving applicators a chance to use the new recordkeeping forms, the department has found that the four existing versions do not adequately consider the record keeping needs of pest control operators. Providing this recordkeeping form version specific to the needs of pest control operators will allow for better compliance and more accurate records of pesticide usage.

As revised in 1989, Washington state pesticide law requires all certified applicators and all persons applying pesticides to more than one acre of agricultural land to keep records on a form prescribed by the Department of Agriculture. Four versions of the recordkeeping form were adopted in May. Three versions are for recording various types of agricultural applications and the fourth is for

commercial residential ornamental and lawn applications only. This new version is for use only by individuals licensed as pest control operators.

For further information and/or copies of the "Daily Pesticide Application Record (version 5)", contact: Cliff Weed, Pesticide Compliance Manager, (206) 753-5063.

## Pesticide Storage

**Below are guidelines for pesticide storage:**

- Keep all pesticides out of the reach of children, pets, livestock, and irresponsible people. Store pesticides in a locked, secure place such as a separate building or storage room. Consider fencing around and in the storage building to provide protection from theft and increase safety.

- Consider soil and land surface characteristics when constructing a storage facility to prevent contamination of surface or groundwater by drainage, runoff, or leaching. Locate your storage area where water damage (flooding) is unlikely to occur. Keep it down-wind and downhill from sensitive areas such as houses, play areas, gardens and ponds. Locate the facility a safe distance away from wells.

- It is preferable to have a separate building for pesticide storage. If it is necessary for the pesticide storage to be a part of a building used for other purposes, the storage area should be on the ground floor. Offices should not be located in the building or area.

- Within the storage area, separate pesticides by group (herbicides, insecticides, etc.) to prevent accidental misuse or contamination. Store pesticides away from food, feed, potable water supplies, veterinary supplies, seeds and protective equipment. This prevents contamination from fumes, dust or spills.

- Ventilate the storage area and keep it relative free from temperature extremes. Very high or low temperatures can cause pesticide deterioration. Generally, pesticides should be stored at temperatures above 40 degrees F and below 90 degrees F. Never place pesticide containers in front of windows. Humidity should be kept low to prevent lumping or degradation of powder formulations and to reduce corrosion of metal containers.

- Exhaust fans directed to the outside reduce the temperature and dust or fume concentrations. Fans should provide three to six air changes per hour. Large storage areas, when occupied, may require up to 20 air exchanges per hour.

- Use fire-resistant building materials. A sealed-cement floor is the best. Seal the walls and floor with a substance such as epoxy paint to prevent absorption of spilled pesticides.

- Explosion-proof electrical wiring, switches and outlets may be required depending on the size, location, materials stored, and the type of facility.

- Sink or showers are needed for cleanup. Drains that may contain pesticide solutions from clean-up, mixing or maintenance operations must not connect to sewer systems or be openly discharged. Water that contains pesticide solution should be stored temporarily in holding tanks until it can be used as a dilutant for the next spray of similar materials or disposed of properly.

- Post highly-visible weather-proof warning signs on walls, door or windows to indicate to anyone entering the facility that pesticides are stored there. "No Smoking" signs should be posted.

- Store liquid formulations and small containers of dry

formulations on metal shelving because it does not absorb spilled pesticides and is easier to clean than other surfaces.

- Store glass containers under cool conditions on lower shelves. Too much heat can break the container or cause it to explode.

- Containers should not extend beyond shelving where they could be bumped or knocked off. Place larger metal drums and non-metallic containers on pallets.

- Store pesticides only in their original labeled containers to minimize the potential for accidents. Pesticide containers should be marked with the date of purchase to ensure that the oldest container is used up first. This practice will help ensure that pesticides are used within their shelf life.

- Consult pesticide labels for special storage instructions.

- Have clean-up materials and equipment (kitty litter, sawdust or other absorbent material, plastic-lined containers, small shovel, broom, dustpan, etc.) readily available. A fire extinguisher approved for chemical fires, first aid equipment, and emergency telephone numbers should all be easily accessible. Install smoke detectors, alarms or sprinklers as needed.

The following information should be kept at the storage area and your home (for use after hours):

1) A list of emergency phone numbers:

- police
- fire
- poison control center
- Oregon Emergency Response System  
1-800-452-3100 in Oregon,  
1-503-378-4124 outside Oregon
- Oregon Department of Environmental Quality  
(503) 298-6534
- Washington Department of Emergency Management, Statewide 24 Hour Spill Number (800) 262-5990
- Washington Department of Ecology Regional Offices:

Northwest Region (206) 867-7000

Southwest Region (206) 753-2353

Central Region (509) 575-2490

Eastern Region (509) 456-2926

- 2) an inventory of pesticides
- 3) Material Safety Data Sheets (MSDS) for each pesticide on site
- 4) a map of the building floor plan showing the location of pesticides
- 5) a site plan indicating building sewers, wells, direction of runoff and other environmental hazards.

For more information on Oregon requirements write to or call:

Richard Cavaletto,  
Ag. Engineering Dept.,  
Gilmore Hall, Room 100,  
Oregon State University  
Corvallis, OR 97331  
(503) 737-4021

For information on Washington field posting and pesticide storage:

Field Posting and Pesticide Storage Hotline—  
(800) 423-7223.  
Dan Locke

Industrial Hygienist  
Dept. of L & I (WA)  
805 Plum Street SE  
Olympia, WA 98504  
(206) 586-8029

For information on Washington waste management:

David Rountry  
Pesticide Waste Specialist  
Dept. of Ecology (WA)  
Mail Stop (MS) PV-11  
Olympia, WA 98504-8711  
(206) 459-6283

## Hazard Communication Help Available

As the Occupational Safety and Health Administration steps up enforcement of the Hazard Communication Standard, golf course superintendents should become better educated on HazCom requirements.

Because the federal government mandates that employers, including golf courses, maintain a written hazard communication program and conduct training for their employees, help is available from OSHA. There is an on-site safety and health program available in each state for employers who need help meeting HazCom requirements.

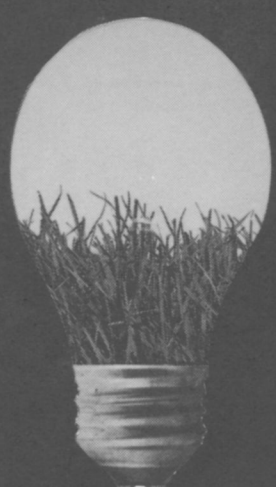
The programs are funded by OSHA but are completely separate from the inspection effort; OSHA says the administration will not cite violations turned up in the training process.

For information about contacting your regional OSHA office, call the GCSAA at 800-472-7878.

Source: GCSAA Briefing

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# Calendar of Events

November 19

NTA Board of Directors Meeting  
Contact: NTA Office (206) 754-0825

December 11-12

OGCSA Pesticide Applications Seminar  
Contact: OGCSA Office (206) 573-6969

December 12-13

Pacific Coast Turf and Landscape  
Conference and Trade Show  
Contact Jones and Associates  
1-800-729-5904

January 22-23 (91)

Fifth Annual Inland Northwest  
Turf and Landscape Conference  
and Trade Show  
Contact: Jones and Associates  
1-800-729-5904

February 18 (91)

NTA Board of Directors Meeting  
Contact: NTA Office (206) 754-0825

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