

BETTER LAWN - - HARVESTS

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STORY IN COUNTRY GENTLEMAN

The spring issue of Country Gentleman, "The Magazine of Country Living", carried the Institute story entitled by the editors "Greener Grass On Your Side of the Fence". Aside from a few of the familiar reticences on the part of editors to combine words such as bentgrass, the story was attractively laid out with map, charts, cultivar listing and a few weed drawings. The editors allowed the insertion "send a self-addressed envelope to the Lawn Institute - - -" to remain in the text, and should result in some requests for literature.

The story opens with a general review relating less intensive "country" lawns to those that might be more intensively managed in the city. Fertilization, mowing, watering and pests are all briefly considered. Emphasis is on practical applications in an era of increasing stringencies.

WEEDS, TREES AND TURF STORY APPEARS

We were pleased that the story, entitled by the editors "No Frills Future May Require Closer Attention to Turf Selection", appeared in the February issue of Weeds, Trees and Turf Magazine. This provides something of "look ahead" in the face of stringencies that affect us all, but addresses itself particularly to economical means for handling the fine new cultivars that have become commonplace in recent years. The Lawn Institute's Variety Review Board acceptances are described briefly in a boxed insert, that sets the stage for discussion of conventional turf maintenance practices.

"LAWNS ACROSS AMERICA" AVAILABLE TO MEMBERS AT COST

Members may recall having received a copy of the color-cover leaflet, "Lawns Across America", adapted from materials supplied for the "Ground Covers for North America" book issued by the American Association of Nurserymen. The maps and hardiness zones refer to lawns and lawn conditions in all parts of the United States and southern Canada. With paper and printing becoming ever more costly, this fold-over to fit a standard envelope (the equivalent of about a dozen pages in a typical booklet) can prove an economical stuffer or handout in place of small, custom printings. In order to lower unit costs when scheduling a run for one member, we have had an additional quantity printed, and offer these at the same unit price in feasible quantities to others who would like to have some for their own use. Send your requests to the Marysville staff office.

SOON-TO-APPEAR STORY IN SEED WORLD

"New Lawn Cultivars, An Industry Plus", is in the hands of Glenn Wiklund for presentation in the April issue of Seed World. We look forward in seeing this article appear.

ADDITIONAL NEWS SERVICE RELEASES

The Institute has been invited by Copley News Service, San Diego, with national clientele, to contribute lawn stories to an upcoming "Outdoor Living" packet that is sent to newspapers subscribing to the service. The "special sections" editor indicates: "It would be great publicity for the Lawn Institute and there is absolutely no charge". The project was undertaken in late March, for summer appearance.

NEW TURF BOOK BEING PUBLISHED

Drs. Turgeon and Giles, University of Illinois, have a new book in publication, Turfgrass Management, by Reston Publishing Co. (a subsidiary of Prentice-Hall). The Institute has been contacted by Dr. Turgeon during his compilation of this text, and in particular has supplied him some information on bentgrass germination and identification. If a review copy of the book can be procured from the publisher, further information about it will be given in a future Harvests. It should be a carefully-done compendium, profiting from weaknesses noted in the rash of other turfgrass agronomy books published in recent years.

LAWN AND GARDEN BOOKS FURNISHED

Frank Plovick, well-known Men's Garden Clubber from Anderson, Indiana, will utilize for garden classes remaining supplies of Dr. Schery's softcover book, Householders Guide To Outdoor Beauty, copies of which were still in stock in Marysville. A hundred and fifty copies were sent to the Anderson Chamber of Commerce in early January.

Incidentally, Mr. Plovick writes from Bradenton, Florida, "This is also my second winter to seed a winter lawn - - . Tried to locate newer varieties - - such as Manhattan or Pennfine, with no luck. All they stock in this area is annual rye - - -. The annual rye is difficult to mow - - ". What's with the distribution of perennial ryegrasses in the deep South?

PESTICIDE MARKET

The Weed Science Society of America newsletter for January contains a report picked up from the "Pesticide and Toxic Chemical News", indicating that the EPA estimates a 1979 pesticide market at 5.1 billion dollars. Of that the home garden segment was estimated as 12%, or 600 million dollars. Of the total US market (not necessarily homes) herbicides were by far the biggest segment, more than twice as important as insecticides, which in turn were 5 times as large as fungicides (and all other types).

COOL SEASON GRASSES IN PARK MAINTENANCE

Dr. Gerald Pepin, Chairman of the Institute's Variety Review Board, reviewed "Cool Season Turfgrass" in the December issue of Park Maintenance magazine. Jerry gave a concise review of bluegrasses, ryegrasses, bentgrasses, and fescues, mentioning many of the cultivars listed with the Variety Review Board.

AGAINST THE CONVENTIONAL LAWN

Bob Stiffler, Chesapeake Advertising, alerts us to an anticipated appearance of a "natural landscaping" series in Rodale's New Shelter magazine. You will recall Rodale Press as leader of the "organic gardening" school.

We have anticipated this sort of thing, and have attempted to counteract it with such releases as "Lawns, A Concept Proven", and "The Alternative To Lawns", plus items in press kits and newspapers. The Rodale people have been in touch with the Institute by telephone concerning this very subject, but apparently were not deterred by Dr. Schery's negative attitude towards trying to establish "natural" lawns generally around the home.

The flyer outlining plans for the May/June issue, which will feature natural landscaping as the cover story, states that, "Prairies offer a sound alternative to the traditional bluegrass lawn in the West and Midwest." Sources for native grasses and wildflowers will be listed. Another article discusses "Eurasian Meadows", apparently a combination of wild grasses and wildflowers for eastern parts of the country. A third article is to cover living in the woods.

SUNSET MAGAZINE CHECKS IN

Jim McCausland, assistant editor, Sunset Magazine, Seattle, telephoned the Institute in mid-January to discuss a proposed spring lawn advisory, especially emphasizing thatch. McCausland sent a draft of the proposed text to Dr. Schery for criticism, a good many changes being required. McCausland concludes, "Thank you for the time and effort you have taken to help us put together another issue of Sunset."

SOUTHERN LIVING RESPONDS

"After reading your winter, 1980 bulletin, I am very interested in receiving the list of the Lawn Institute's Variety Review Board Cultivars." - Lois B. Trigg, Southern Living Magazine.

CHRONICAL GUIDANCE "OCCUPATIONAL BRIEF" PUBLISHED

We are pleased to have received from Chronical Guidance, Moravia, New York, several sample copies of the newly published "Occupational Brief" 164, Landscape Architecture. Dr. Schery, for the Institute, had reviewed this career guidance text before publication. The Institute is one of five listings printed on the publication. The "Brief" is intended for guidance of prospective students entering the field of landscape design, and sells for \$1.00 each, mainly to high school students. As a reviewer, the Institute is entitled to receive without charge a limited number should need arise.

WORD GETS AROUND

This editorial comment was noted in the November Parks and Sports Grounds (England): " - - there seems to be controversy about artificial surfaces now! At least, in America. Apparently the city of San Francisco has recently ripped out over 130,000 square feet of an artificial surface at Candlestick Park and replaced it with a natural grass playing surface - and at a fraction of the cost."

LAWN ADVISORY FOR LONG ISLAND

Bob O'Knefski, Extension Agent for Nassau County, expressed some doubt about turfgrass fertilizer needs in the February issue of Nassau Living. He pointed out that the most advantageous schedules have not been worked out exactly for varying lawngrass cultivars. After mentioning Merion's reputation as a "heavy feeder", he states "by contrast, one of the newer varieties of bluegrass, Touchdown, looks exceptionally well at our research plots at Cornell when fertilized in the fall with only one pound of nitrogen per 1,000 square feet. We are sure other varieties will do well with less fertilization." As a generalization O'Knefski states, "Poor soils may require higher applications more frequently for best results. For other bluegrass-ryegrass lawns a good schedule would be early fall and late fall fertilization." Energy difficulties are triggering a switch in attitudes; not long ago the extension experts were recommending heavy fertilization schedules, and many still do suggest a pound of nitrogen per 1,000 sq. ft. per month of growing season.

REQUEST FROM JAPAN

Yoshisuke Maki, Chief, Hokkaido National Agricultural Experiment Station, requested in February whatever Institute literature could be sent that might help him with background for his special lecture "Research Activities of Turfgrass Breeding and New Cultivars in European and North American Countries" planned for delivery to the National Research Conference, Japan Turfgrass Research Association, Tokoyo, in April. Dr. Maki writes, "I would like to take this opportunity of expressing my sincere appreciation for your kindness shown to me during the 2nd and 3rd International Turfgrass Research Conferences - - - through your help we, Japanese, learned many things about turfgrass science - - - most of the turfgrass species and varieties used in Japan are improved in your country". Dr. Maki indicates that there is growing recognition of improved cultivars in Japan.

USING GRASS CLIPPINGS

An informative article appeared in the December Seed World on the Warren experience in using grass clippings (from sod operations) to provide livestock feed. The idea was started experimentally in California, and now contemplates dehydration plants in Wisconsin, Ohio, Indiana, New York, and Illinois. In the course of a year clippings from an acre of sod production can run to 4-6 tons, dried and pelleted, worth as much as \$200/ton. If the clippings are collected without touching the ground, rather than being swept, value is increased; special equipment for catching the clippings during the immense mowing operations had to be constructed. Also dehydration should be as quickly as possible, to avoid loss of nutrients and vitamins.

CHICAGO SUN-TIME "ACTION TIMES"

The Institute continues to be recommended by Tom Sheridan, editor of the Sun-Times "Action Times" service, which attempts to answer reader inquiries. He forwards occasional correspondence, and has access to answers (for possible use in his columns) by virtue of a carbon. Most inquiries involve lawn failure for one reason or another, and the answers provide opportunity to recommend improved lawngrass cultivars.

COURTESY FROM HERTZ

Hertz auto rentals offers to the Institute membership 20% rental discounts for cars used either for personal or business purposes. Unfortunately, an agreement sent by Becky O'Sowski was overlooked because of Dr. Schery's absence overseas, and is only now being formally executed. Further information will be provided in a future Harvests.

RECIPROCAL LITERATURE EXCHANGE COMPLETED

In keeping with past custom, the Institute has mailed a set of reprints accumulated since the last mailing to each of seventy-one professionals on the Agronomy Society's "reciprocal literature exchange" list, initiated by Dr. Beard some years ago. Included were the last eight titles (all of which have been distributed to members), extending through "Greener Grass On Your Side of the Fence" from Country Gentleman.

ISSUANCE OF THIRD INTERNATIONAL TURFGRASS PROCEEDINGS NEARS

Final page-proof editing and indexing is under way on the Proceedings of the Third International Turfgrass Conference, held in Munich in July of 1977. Dr. Schery spoke at that conference on "Evolution of Improved Lawngrasses in America: A Review of Major Events Leading to the Kentucky Bluegrass Cultivar Revolution". Behind schedule, it is hoped that this volume will be off the press before the year is out.

RESPONSE TO PLANT VARIETY PROTECTION ACT PROTEST

At the behest of the ASTA, the Institute was on record with representative E. de la Garza, Texas, regarding the Bill HR999 proposing changes in the 1970 Plant Variety Protection Act. The revised act would include carrots, celery, cucumbers, okra, peppers and tomatoes, exempted in the 1970 legislation. There seems no good reason why these crops should not be accorded the same advantages and opportunities as others. Representative de la Garza writes, "This is in further reference to your interest in HR999 - - - I am enclosing a copy of a recent release for your review. - - - If we are going to pass a bill, I am determined that it will be beneficial to all concerned."

TECHNICAL
PROCEEDINGS OF THE 33RD NORTHWEST TURFGRASS CONFERENCE.

A nicely printed, 130 page booklet relating to the 33rd Northwest Turfgrass Conference held at Port Ludlow, Washington, September 25-27, 1979, was received in early January. As has been the case in the past, the Puyallup people do a remarkably fine job in assembling this material well and quickly. Not a whole lot of this particular conference is of direct interest to Institute members, but a few highlights are worth exploring.

Many of the early presentations deal with educational and employment opportunities in the turfgrass field, with speakers from Universities in both Washington and Idaho. A proprietor of a contract lawn firm emphasizes how difficult it is to obtain training for personnel in his business.

Outside specialists include Vargas of Michigan State, and Watson of Toro. Vargas assumes his typical unorthodox stance in wondering why the same amount of effort is not extended for maintaining *Poa annua* on golf fairways as for getting rid of it; he seems to be an advocate of persistent pesticide applications. Watson undertakes his usual business-like approach to practical matters, including conservation of energy through intelligent selection of mowing equipment and practices.

Vargas lists these bluegrass as resistant to the major diseases (*Helminthosporium*, *Fusarium*, and stripe smut): Cheri, Adelphi, Majestic, Touchdown, Enmundi, Parade, Baron, A-20. He indicates that there is no chance for a disease-free turf, "when you use the disease-susceptible cultivars like Merion, Fylking, Pennstar, Nugget and Windsor".

University of Idaho researchers report upon turfgrass performance, particularly at Moscow. Much of their rating involves "best" color, which varies according to season. They feel that a 2 inch mowing height is best for bluegrass, 3 inches for perennial ryegrass. However, snowmold was a bit more severe on the taller mowed ryegrass. Nine cultivars were singled out as being resistant to snowmold, including Norlea ryegrass, Fortress, Wintergreen and Koket fescues. Little disease was noted on the Kentucky bluegrasses. Other research at Moscow showed regular fertilizer to have some advantage over slow-release types, and they suggested at least a combination of rapid-release nitrogen along with slow-release.

Some special insect pests of western Washington are reviewed, their life cycles indicated. Fertilizer specialists at Puyallup note that ammonium sulfate provides longer lasting nitrogen (ammonium) for turf because it is strongly acidifying, Nitrification (growth of nitrifying bacteria) is prevented, which is less true with near-neutral urea. Also, the strongly acidic soil condition induced by ammonium sulfate seems to discourage annual bluegrass and several diseases. The fundamental causes are still being explored.

Roberts and Goss, have noted that red thread disease becomes much more severe where growth retardants are used. Showing best resistance to red thread were these cultivars: Pennfine, Citation, Acclaim, Yorktown II, and Loretta. Servo was most consistently afflicted. Winter fungicide tests on bentgrass have continued, as have expanded studies on nematodes. An alternative to DCPA sprays was investigated in western Washington, for controlling *Veronica filiformis*. Dikegulac is promising and quite effective, but under certain conditions discolors the turfgrass.

- Continued

PROCEEDINGS OF THE 33RD NORTHWEST TURFGRASS CONFERENCE - Continued

Goss et al, continue their investigations of the influence of nitrogen on bentgrass grown on a synthesized medium (that included sawdust). The benefits from sulphur or from sulphur-containing fertilizers continues to be outstanding, particularly with respect to color, Poa annua control and resistance to Fusarium. Milorganite continues to be "difficult", with a high incidence of Poa annua where used. New regional variety evaluations have been planted and are being observed, but are not far enough along for any ratings at the time of this conference. The new perennial ryegrasses are especially being emphasized.

NEW ENGLAND TURFGRASS RESEARCH

The Turf Bulletin of the Massachusetts Turf and Lawngrass Council, Winter, 1979, carried an "update" of research undertaken at the University of Massachusetts. During last winter A-34 and many of the "common" type Kentucky bluegrasses suffered injury from ice, but most improved cultivars showed no damage. Among Institute cultivars, two performing well at low mowing height were Fylking and Touchdown. Most others responded well at a medium mowing height (1 1/2 inches). As is typical of fine fescues, summer performance (with heat and soil moisture) was not so good as cool weather performance; DSMA for crabgrass control also severely injured the fescues in summer. However fine fescues have done well under low maintenance. Extensive tables of both Kentucky bluegrasses and fine fescues are given, for performance at low and medium mowing heights. Suffering most from Helminthosporium leaf spot were Vantage, Troy, Rugby, S-21, Plush, Kenblue, A-34 and Scenic; several, including Nugget and Touchdown, had no Helminthosporium infection.

Perennial ryegrass and tall fescue have not survived winters well in New England, and are generally not recommended. Diseases continue to be a problem during humid periods. Glyphosate has given good systemic weed control of perennial grasses, although there seems to be some revival from extended, lateral stems. A balanced regime of potassium has helped with low temperature survival of perennial grasses, (an N:K ratio of 2 to 1 or 3 to 1). The need for some quick-release nitrogen along with slow-release applications is mentioned.

Seed containing bentgrass as "crop" is decried; only a few seeds of bent are enough to create quite unpleasant consequences. Mulching mowers are good in theory, but were noted to give clumps of macerated clippings during active growth periods of the grass.

Traditional crabgrass preventers continue to prove effective, although results with oxadiazon and alachlor were not satisfactory in the tests. Prosulfalin controlled crabgrass well, but injured the permanent turf. Bensulide and DCPA proved 99 to 100% effective, with siduron and benefin not far behind. On the basis of these tests, these would be the herbicides recommended.

PLANT RESISTANCE TO HERBICIDE BUILD UP

The January Weed Science Society of America newsletter notes that although in 25 years there has not been build-up of weed resistance to the 2,4-D chemicals, resistance is fast developing now with respect to the triazines. This would not seem surprising, considering how frequently insects and even fungi acquire resistance to pesticides.

TEXAS REPORT FOR 1979

PR-3667-3678, February 1980, was received in March from Dr. Beard and the Texas A & M University system. It is a well-structured report on Turfgrass research undertaken in Texas. Incidentally, the report estimates over 3 million acres of kept turf in Texas, the maintenance for which is estimated to require \$620 million annually.

Research during the year reflects an unusually severe winter after a very mild and rainy November (a good test for winter hardiness, since the extremes occurred with little chance for hardening off). This was especially critical with winter seeding with perennial ryegrasses, which suffered great competition from bermudagrass that failed to go dormant "on schedule", yet were unable to germinate and prosper well later because of the cold weather in December.

Of course, most of the research deals with warm-season grasses, principally st. augustine and bermudagrass. Findings, however, apparently parallel results with Kentucky bluegrass in the North. St. augustinegrass was found to suffer considerable stolon rot, presumably due to Pythium, intensified by excessive rainfall and excessive vegetational cover. Attempts to wipe out bermudagrass completely, prior to renovating or reestablishing a new cultivar, showed glyphosate to perform best (but not perfectly), with dalapon also good (better short term than long, however).

Beard and Almodares investigated minimum temperature requirements for seed germination. Base temperature at which appreciable germination could be noticed within two weeks begins around 43° F., and is most apparent with some of the conventional cereal grains. Among turfgrasses, perennial ryegrass was quickest, all cultivars much alike, with Jamestown Chewings fescue about as evident; rough bluegrass, creeping bentgrass and tall fescue followed, the tall fescue requiring an appreciably higher minimum temperature.

White grubs were the most serious insect pest. Only diazinon was very effective in their control, and even then timing was very important (a December treatment was ineffective; September treatments were effective).

Further research continues to support spring die-back of roots, which begins shortly after shoots start new growth; browning and loss continues for a number of days, after which new roots develop. This is true with both bermudagrass and st. augustinegrass, and is probably true of northern grasses as well. Appreciating this natural cycle, one can be guided in timing maintenance practices. Anything forcing shoot growth at die-back time (thus restricting resources available for new rooting) is best avoided. Obviously, at root loss time, rooting strength of sod suffers. Vertical mowing should precede root die-back. The date of root die-back in Texas is generally early to mid-March, at which time the turf may be more susceptible than usual to low temperature, drying, traffic, and pests (there may be some unexpected phytotoxicity from pesticides at this time, too). Of course vegetative propagation is less effective then than in later spring when new root growth peaks.

Shade studies continue to show Texas common st. augustinegrass to be hardier in shade than Floratam. Tall fescue has worked out well in shade most of the time, but can suffer in summer if not irrigated. Mixtures of tall fescue and st. augustine may or may not persist in balance; spring overseedings of tall

TEXAS REPORT FOR 1979 - Continued

fescue seem to lose out to summer competition from the st. augustinegrass, but might survive better with autumn seeding (at which season the st. augustine is beginning to turn dormant).

Low mowing, and reduced fertility, increased dollarspot on Tifgreen bermudagrass. In transplanting bermudagrass in spring, timing was important. Much stronger rooting was obtained following the period of early March root die-back. Sod well fertilized on the surface received a higher quality rating than that having the same amount of fertilizer mixed into the soilbed. Whether the soilbed was wet or dry made little difference to transplanted sod, so long as the sod was properly cared for after relocation.

Cold simulation chambers are being developed to screen for winter hardiness, an important consideration with texas turfgrasses. A number of st. augustine selections have been screened for SAD and chinchbug resistance, and are now ready for screening for turfgrass quality. Garrett has proved very good, except that it seems to lack winter hardiness. Hardiness is apparently greatly influenced by the hardening-off "experience". Good drainage, high mowing (for an insulating blanket), moderate nitrogen fertilization, adequate potassium etc. are recommended to encourage survival. To judge by recent winters, Texas is experiencing a cycle of colder winter weather following decades of "normal" temperatures. Of the bermudagrass cultivars, Midway and Midiron (from northerly regions) have proven by far the most cold-tolerant. Tiffine was not far behind, but did not exhibit quite such good color retention as the other two.

The winter overseeding studies are of interest to northern seedsmen. As has been noted, perennial ryegrass this year left something to be desired after several years of great success. This year mixtures, and especially mixtures containing *Poa trivialis* (or *Poa trivialis* alone), outshone most single cultivars. Rating highest for winter performance among the perennial ryegrasses were Barry, Hunter and Loretta, followed by Yorktown, Yorktown II, Citation and others. Most of the VRB acceptances fell around the middle of the list, - better than Game and pasture types, but not so good as those named. Among the rough bluegrasses Sabre led the list, with Kimona the leading Kentucky bluegrass, Banner the leading fine fescue (although none of the fine fescues did very well because of the wet winter). The failure of the northern species to fill in quickly in the cold of December, after enduring heavy competition from the bermudagrass during the warm weather in November, left thin stands that were heavily invaded by *Poa annua*. It stood out especially with dark green cultivars such as Citation and Caravelle. As is usual, bentgrasses were late starters and therefore not very satisfactory.

GLYPHOSATE ABSORPTION BY BERMUDAGRASS

Glyphosate (Round-up) is often used to eliminate perennial grasses prior to reseeding or renovation of turf. A study by Whitwell et al, Oklahoma, reported in the January Weed Science provides some hints as to when Glyphosate treatment is most effective. Radiographing was used to determine absorption and dispersion of the glyphosate. Foliar applications provided ready downward translocation and large accumulations in new roots and growing stolons. A low relative humidity decreased such translocation as compared to a high relative humidity. Absorption into severed shoots was greater in the light than in the dark. Greater accumulation occurred in actively growing than in mature stolons.

IN PRAISE OF MIXTURES

Wolfe and Barrett, Cambridge, England, report some interesting observations on barley that may well apply to grasses in general. They have shown, statistically, that a mixture of cultivars, even though some are susceptible to the diseases being studied, outyielded the components accrued separately. The population dynamics are involved, but field studies showed (in the case of mildew being studied) incidence reduced to half or less what was to be expected. The authors state, "Overall, the average mixture yield was 106.5 percent that of the - - - components grown alone: - - -". Maybe we have some statistics here suggesting that blends of lawngrass cultivars are less likely to suffer the degree of disease that might occur with the same cultivars grown separately? The authors conclude, "Perhaps we have gone too far along the road to crop uniformity - - -. A more biologically sound approach may be to produce heterogeneous crops that are better able to exploit the range and counter the limitations of the environment, at lower costs." The research was reported in the February 1980 Plant Disease (International Journal of Applied Plant Pathology).

CORNELL RATINGS

The January issue of Lawn Care Industry reprinted an article from the New York State Turfgrass Association Bulletin of 1978, in which Smiley and Pidduck, Cornell, rated various cultivars on the basis of their color during summer drought at Ithaca. Among the Kentucky bluegrasses, Nugget rated first by a considerable margin, followed by Majestic, Ram I, Bonnieblue, Sydsport, Adelphi, Touchdown and a number of others considerably lower on the scale. Poorest in color were the common types. Among fine fescues Centurion and Scaldis rated at the top, with the majority of familiar names quite low (indicating less satisfactory performance by fescues in summer than by bluegrass). Among the perennial ryegrasses there was considerable spread with Yorktown leading, followed by Loretta, Player, Lamora and Norlea, and with such recognized cultivars as Citation and Pennfine at the bottom of the listing. However, the text notes that some ryegrasses would have rated better had it not been that they were planted to a "bad" soil area.

BLUEGRASS CULTIVAR RESPONSE

Turgeon and Street, formerly of Illinois, report in the December issue of HortScience on investigations involving plugs of bluegrass cultivars treated with oxadiazon, and response to differential mowing heights and fertilization rates. Utilizing A-20 as the test cultivar, in general rate of coverage increased with mowing height and with moderate fertilization (heavy fertilization gave as rapid coverage, but reduced sod strength). Many cultivars were little or not at all bothered by the oxadiazon, including Glade and Brunswick. On the other hand some coded cultivars were completely killed by the same treatment, which also was quite "rough" on Merion, Parade, and Park bluegrasses. Most of the Institute's Variety Review Board bluegrasses suffered moderate injury, 4-5 on a scale of 1-9, with respect to oxadiazon phytotoxicity.

ALLELOPATHY IN CANADA THISTLE

Studies in Colorado, reported in the January Weed Science, indicate a significant degree of chemical repression of competing vegetation (allelopathy) by Canada thistle. Canada thistle residues inhibited annual plants, although some perennial grasses were not affected. Foxtail and amaranth were two types quite repressed.

END-OF-YEAR "RASEN"

The German publication "Turf" was received in late January. The Journal is the nearest thing to an international turfgrass publication. As we have reported in the past, all articles carry English, French and German summaries.

In this issue, Hemmersbach, of Bonn, concludes that it is quite possible to identify differing cultivars of turfgrasses accurately (his data was chiefly with perennial ryegrasses and fine fescues). We don't pretend to understand all the details explained in German, but it appears as though traditional morphological characteristics are utilized (as opposed to electrophoresis or chromatography).

Other papers deal with soil conditions peculiar to southern Germany, with turf displayed at the Federal Horticultural show (as might be expected, perennial ryegrasses, fine fescues and bluegrasses performed best), and the impressions of a German turfgrass specialist visiting California. A few short reports are given of seminars held in Germany (these without benefit of English summaries).

ANNUAL BLUEGRASS CONTROL IN OVERSEEDED BERMUDAGRASS

Dickens, Alabama, in the Nov. 1979 Weed Science tells of results utilizing ethofumesate as a selective control for Poa annua, when applied with ryegrass at the time of overseeding dormant bermudagrass golf greens. The Tifdwarf permanent grass was not injured, but its revival in spring could be delayed from late (February) applications. In most cases 95% of the Poa annua was controlled with a single application most years, but multiple applications were needed at rates lighter than 2.2 kg/ha.

"SMOG" INJURY TO TURFGRASS

Youngner and Nudge, California, report in the Jan./Feb. Agronomy Journal on air pollution effects of turfgrass. Grass samples grown in filtered air were subjected to both ozone and peroxyacetyl nitrate (PAN) fumigation, ratings then taken. All perennial ryegrasses suffered considerably from ozone, but there is variation among cultivars of most other species; southern grasses suffered little from either contaminant, although Tifgreen was more sensitive than Santa Ana and common bermudagrasses, Emerald zoysia more sensitive than Meyer zoysia and st. augustinegrass.

Among the ryegrass cultivars NK-200, and to a lesser extent Manhattan, seemed a little less sensitive than other cultivars to ozone; Pennfine seemed least sensitive to PAN, with NK-200 and Lamora also somewhat more tolerant than common types. Annual ryegrass was equally as sensitive as perennial.

Among the Kentucky bluegrass cultivars, Nugget, several common types, and Fylking were least sensitive to ozone. A-34& Campus were most sensitive, followed by Prato, Merion, Adelphi, Windsor, Baron and Glade. Nugget, several common types and Fylking were least sensitive to PAN; Baron, Glade, Primo and Adelphi were among the more sensitive (but not so sensitive as to ozone).

Fine fescues were on the whole similar, moderately sensitive to both contaminants. So was Emerald creeping bentgrass (the only creeping cultivar in the comparisons). Among colonial bentgrasses Highland was least sensitive, compared to fairly sensitive Drylands and Astoria.

MORE ABOUT TURFGRASS SENSITIVITY TO AIR CONTAMINATION

Richards et al, Maryland, reporting in the Jan.-Mar. issue of the Journal of Environmental Quality, review research done on damage to various turfgrasses by pollution from various concentrations of atmospheric ozone. As has been reported by Youngner and others, northern grasses are much more susceptible than southern ones (for practical purposes neither Meyer zoysia or Tufcote bermudagrass suffered damage at any reasonable level of ozone). However, tall fescue, perennial ryegrass, bentgrass, fine fescue, Kentucky bluegrass and annual bluegrass all suffered appreciably, the extent varying with the cultivar. Merion bluegrass, for example, was highly tolerant, while annual bluegrass was quite susceptible. In some instances susceptibility varied with the age: young Fylking bluegrass was quite resistant, but became more susceptible as it aged. Increasing the hours of exposure (rather than raising the concentration) also doubled the damage.

In general Kentucky bluegrasses were more tolerant than tall fescue, tall fescue more tolerant than perennial ryegrass, perennial ryegrass more tolerant than bentgrass, bentgrass more tolerant than fine fescue, and fine fescue more tolerant than annual bluegrass. Among seven Kentucky bluegrass cultivars Newport and Sydsport suffered less damage than Merion, Fylking and Windsor, which suffered less than South Dakota and Kenblue common types. Ratings varied somewhat depending upon the concentration of ozone employed. At lower concentrations (up to 0.3 ppm.) NK-100 perennial ryegrass, Penncross bentgrass, and Pennlawn fine fescue all appeared highly susceptible to oxidant injury. In contrast to Fylking, Merion bluegrass gained tolerance with aging; Kentucky-31 tall fescue, Penncross bentgrass, and Pennlawn red fescue showed little change during aging.

INFLUENCE OF CARBON DIOXIDE ENRICHMENT

A study by Patterson and Flint, reported in the January Weed Science, has implications for the long-range future of vegetation. They found that enrichment of the atmosphere with carbon dioxide favored C_3 (generally "cool-season") plants more than C_4 (generally "warm-season" species), giving the C_3 ones a competitive advantage. In effect, were the atmosphere to become enriched with CO_2 , bluegrass should prosper at the expense of crabgrass! Because of forest felling and fossil fuel consumption, carbon dioxide content of the atmosphere is increasing measurably, even to the extent that some fear a warming trend ("greenhouse effect") with melting of the ice sheets and raising of sea level. Of course this is long into the future, if the theory is correct; but, if so, it might be accompanied by crops using the C_3 pathway, becoming more competitive against many of the warm weather weeds. The implications are most interesting.

THATCH AS A GROWING MEDIUM

Hurto et al, Illinois, discuss in the Jan.-Feb. Agronomy Journal, the rooting of lawns in the thatch layer. This is commonplace with bluegrass turf on the heavier soils of the midwest. Most of the root system is within the thatch, and therefore management should consider thatch rather than soil in care undertaken. Thatch has a significantly lower density than soil, greater porosity, and reduced moisture retention during dry periods. The pore system is analogous to macropore size in soils.