

BETTER LAWN - - HARVESTS

published periodically by the
Better Lawn & Turf Institute

Volume 27, Number 4

991 West Fifth Street
Marysville, Ohio 43040
Phone: (513) 642-1777
January, 1981

INDEX: General Pages 1 - 8

Technical Pages 9 - 19

WITH ALL BEST WISHES FOR THE YEAR AHEAD

This issue of Harvests winds up another calendar year for the Lawn Institute. Our routine is by now familiar to most members, the majority of whom have been Institute participants since 1957. Summary of the year's activities is given, of course, in the "annual meeting issue" at the end of the fiscal year. But the Marysville office staff would like to express its appreciation now to all members, especially to the officers who spend invaluable time with Institute details that are seldom acknowledged. This customary fine support and enthusiasm is much appreciated in Marysville. We pledge to carry on in 1981 the programs that have proven successful. May we wish you the very best for 1981. - Diana Scheiderer, Robert Schery.

AGRONOMY MEETINGS HELD IN DETROIT

The annual meeting of the American Society of Agronomy was held December 1-4 in Detroit, Michigan. As is customary, the American Seed Trade Association hosted a cocktail-supper for Society officers on Monday evening, with Bob Falasca of the Washington office of the Am. Seed Trade Association in attendance and Bill Schapaugh presiding. Dr. Schery attended on behalf of the Institute. Various sections of the Agronomy Society represent the focal point for reported research by technical people at universities and other institutions throughout the country. The meetings were well organized and nicely attended, with an appreciable sprinkling of exhibitors in the tremendous Cobo Hall meeting center.

SPRING PRESS KIT IN PRODUCTION

Plans have been organized, the text completed, for production of the Institute's spring press mailing. This should be ready about the end of January. Arrangements are progressing for utilization of special mailing privileges (as a non-profit corporation), which can result in some savings considering the constantly elevating cost of postage. This will be a full kit, with the usual seventeen pages of text (embracing twenty-three titles), covering letter, back-up reprints, and, as a new attention-getter, four press-ready photographs utilizable for two and three column widths.

JOINT SUPPLEMENT PROGRESSES

Galley proof received from Pflaum Inc., production agent for the joint "Supplement", "Lawns, Gardens and Pools", indicates that this annual spring mailing (jointly sponsored by several associations, and for which the Institute enjoys ASTA backing) is well along in its composition. Unfortunately, several changes and abbreviations

- Continued

JOINT SUPPLEMENT PROGRESSES - Continued

by the copy editor have required that the Institute's contribution be reset to the form sent (in order to convey the intended meaning); each year it seems a struggle to work smoothly with the Pflaum people, who make changes unilaterally without consultation. We anticipate, however, that all will be ready for mailing of the "Supplement" to a large list of publications and house organs by late winter. As of this date we have not been informed exactly which other associations are participating this year, although presumably they will be much the same as in 1980 (American Association of Nurserymen, The Fertilizer Institute, The Lawn Institute, National Swimming Pool Institute, National Bark Producers Association, Spa & Tub Association, International Fence Industry Association, Chain Link Fence Manufacturers Institute). The Institute's contribution embraces twenty-one items, constituting slightly more than one hundred column inches of galley space, with five illustrations submitted (four, at least, to be utilized).

LAWN KEEPING BOOK DISCOUNTED

A limited supply of the Prentice Hall Book, Lawn Keeping, by Dr. Schery, is now available from the Marysville office at considerable discount. These hard-cover books, originally selling for over ten dollars, have been procured in an inventory year-end close-out, and can be offered for \$5.00 each, all mailing and handling expenses included. The book is a comprehensive, popularly-written resume: it discusses modern lawn cultivars and lists VRB selections. If you would like to have one or more copies, or order them sent to others, let us have your instructions in Marysville.

VARIETY REVIEW BOARD ACTIONS

Within recent weeks the Institute's Variety Review Board, under the chairmanship of Dr. Gerald Pepin, has deemed it wise to reverse a preliminary decision made in San Diego concerning listing of Norlea perennial ryegrass among "accepted" cultivars. While there is no question about the usefulness of Norlea in Canada, where its cold-hardiness is well recognized, it has proven difficult to integrate the cultivar into the normal procedures for discussion and listing of perennial ryegrasses. It is not practical to list one ryegrass separately from all of the others in a special category, nor would this be acceptable editorial policy in publications over which the Institute has no control. Norlea is recognized chiefly for its usefulness in Canada; including it with all of the newer cultivars of finer textural quality (which are widely planted in the United States, and significantly for winterseeding in the South) would be misleading. Thus, regretfully, the Board has ruled that Norlea must join other older varieties which have been dropped from the list (e.g. NK-100, Pelo, Game, Compas), to be mentioned where appropriate in the text but not as part of routine listings.

Bob Peterson has also requested that Falcon tall fescue be admitted to the cited cultivar listings, pending final documentation which he is in the process of supplying to the Board through Dr. Pepin. His proposal met enthusiasm among officers and members with whom it was discussed at the Atlantic Seedsmen's/ASTA meetings in Charleston, S. C., October 29-30. Dr. Pepin has indicated that other newly bred tall fescues are likely to receive Board consideration as well in the very near future.

ANNOUNCEMENT IN SEED WORLD

The September issue of Seed World carried announcement of the Lawn Institute's annual meeting, election of new officers and trustees, in the "Association News" section of the magazine. An offer of reprints from staff offices is included.

HORTICULTURE STORY AMPLIFIED

"Spring Lawn Strategy" was the provisional title for a story due to appear in the February issue of Horticulture magazine. In late November editor Cooper asked for an amplification concerning cultivar characterizations, and the particular strengths of Kentucky bluegrass and perennial ryegrass. Two additional pages of text were prepared for the magazine.

STORY SCHEDULED FOR GARDEN

A story is in preparation for the botanically-oriented magazine entitled Garden (cooperatively published by the New York Botanical Garden, the Chicago Horticultural Society, the Indianapolis Museum of Art, the Horticultural Society of New York, The Los Angeles State and County Arboretum, and the Queens Botanical Garden Society). The editor asked for "An article on up-to-date grass species and cultivars - - - ones that do not need to be mowed or watered often, and with only a modest requirements for nutrients and pesticides." That would be a tall order, but the story can explain that many of the objectives are achievable by selecting the proper cultivar, and orienting care to its needs.

STORY FOR AMERICAN LAWN APPLICATOR

At the request of Art Brown, a story was prepared for a future issue of the American Lawn Applicator, entitled "Turfgrass, The Times and Some Trends.". The story emphasizes ongoing research, and how it may interrelate with the lawn service business. It would seem as though knowledge and skills will be increasingly needed for businesses offering reliable, complete service. The story includes as a box ("The Niche of the New Lawn Cultivar") a brief resume of events leading to the new cultivar revolution, followed by Variety Review Board listings.

TO APPEAR IN FLOWER AND GARDEN

A story tentatively entitled "Lawn Repairs Likely" was prepared for Flower and Garden magazine, for spring usage. The story opens reminding the reader of the difficult conditions prevalent over much of the eastern United States in 1980, that resulted in lawn demise. In some cases drought continued late into autumn, not allowing sufficient season for lawn repair then, and postponing repairs and new plantings until spring. The story summarizes methods of renovation, as well as the traditional means for successfully planting lawn-seed. Newer cultivars are extolled and the Variety Review Board ryegrasses listed for a sidebar. The story winds up recommending proper lawn care through the spring season.

INSTITUTE ANNOUNCEMENT CARRIED

Announcement of Norman Rothwell being elected President of the Institute, listing of other officers and Trustees, too, was carried in the November issue of Nursery Business. The item took most of a column, and sounded like a "who's who" of the lawnseed business.

EDITORS VISIT MARYSVILLE

Dudley Kay, College Division Editor for Prentice Hall, visited the Institute in early December, accompanied by Midwest Representative Mark Vaas. Some discussion was undertaken concerning Lawn Keeping, for which a slow market has resulted in clearance of hard-cover copies before inventory time at the close of the year. A moderate number will be stocked in Marysville, available at appreciable discount over list. Plans were also laid for a new edition of Plants For Man, which deals with useful plants generally rather than turfgrasses in particular.

TURFGRASS SERIES CONTINUES

The October issue of Weeds, Trees and Turf continues the extensive historical examination of the turfgrass industry. This issue concentrates particularly upon equipment and its beginnings. Editor Shank is to be complimented upon assembling so much information from diverse sources, which will become valuable when the various issues are combined in book form at the end of the series.

LAWN CLIPPINGS AND DANDELIONS FOR TOOTH DECAY

The fall issue of Weeds Today mentions that dandelions and grass clippings among other items yield a chemical that deters plaque on teeth. The exact chemical nature is not yet clear, but results with extractions have been encouraging in the laboratory, and promise better control of plaque (which dentist believe to be a major cause of cavities).

THIRD INTERNATIONAL TURFGRASS RESEARCH CONFERENCE REPRINTS

Reprints of the Institute's contribution to the Third International Turfgrass Research Conference held in Munich were finally received in late December and a copy mailed to members. The Proceedings of the Conference appeared earlier in autumn. Dr. Schery's contribution gives an historical account of events leading to the lawngrass cultivar revolution.

INQUIRY OF THE MONTH

Most unusual inquiry of the month is from the Urban and Rural Development Company, Riyadh, Saudi Arabia. The Company is establishing a sod nursery for the Royal Commission for Jubail and Yanbu. The letter, from E. A. Dodson, inquired if Dr. Schery were the same teaching assistant in a class he took in early 1940's at Washington University in St. Louis, - a long memory. Mr. Dodson is apparently a general manager for this Arabian corporation.

"SEAL OF APPROVAL" LOGO BEING REVIEWED

The Executive Committee is currently examining artwork from several sources before considering whether to replace the scroll-design of the Institute's "Seal of Approval" in use for many years with packaged mixtures. In some instances difficulties have arisen in adapting the find lines to newer bags and print-outs, and it may be time for something with a more modern flair, either additional to or in place of the old scroll.

ODDS-AND-ENDS FROM THE AGRONOMY MEETINGS

Presentations given at the National Agronomy Meetings in Detroit in December include a number of items falling in divisions other than those devoted primarily to turfgrass, and their abstracts may be of interest.

Busey, Florida, feels that new technology is needed to reduce cost and energy use of turf maintenance. He provides a check list of causes for loss of energy (due to poorly designed landscapes) that are often overlooked.

Frazier, Naval Air Station, Mississippi, reports on use of Enkamat and Hold-Gro erosion control fabrics for prevention of gully and sheet erosion. Enkamat, a mesh of nylon fibers, is a substitute for concrete flumes in ditches, fairly low in cost, easily installed and esthetically acceptable. Hold-Gro is a weave of polyethylene fiber with strips of paper, which can mulch new seedings, being left in place.

Leikam and Russel, TWA, discuss decreasing the energy requirements for manufacturing fertilizer. They advocate increased efficiency of fertilizer materials including higher nutrient analyses, and discuss a variety of new polyphosphate and other suspensions (some derived from coal) as well as sulphur-coated urea.

Johnston et al, Alabama, find tall fescue clones to differ markedly in ozone tolerance, a characteristic that is highly heritable. Williams et al, Alabama, note considerable response in tall fescue root size and growth relative to genotype, a good omen for deeper-rooting, more drought-resistant, soil-improving cultivars.

Jensen, and Brown, Georgia, found that C₄ (southern) grasses can produce more dry matter more rapidly per unit of nitrogen than C₃ (northern) species. Leopold, Boyce Thompson notes a gradual decline in viability and vigor of seeds (aging) as contrasted to a senescence-type regimen. Included seem to be decline in respiration, increased "leakage" of solutes, and declining of efficiency with several membrane functions. Protein and nucleic acid synthesis also decline.

Power, Nebraska, noted recovery of fertilizer applied to native prairie fourteen years previously. In recent years nitrogen recovery has been as much as twelve percent over non-fertilized prairie. About thirty percent of the fertilizer nitrogen had been tied-up by plant roots, thirty five percent in top growth, and thirty five percent either immobilized in organic matter or lost as a gas.

Akin, TVA, notes that many secondary and trace nutrients are carried unspecified along with primary nutrients, depending upon the manufacturing process in making fertilizer. Merely listing conventional major nutrients is therefore not necessarily indictative of fertilizer influence. Some phosphatic nutrients, for example, carried as much as 2% sulphur and 1.4% iron. Others had appreciable zinc. Akin notes that "fertilizers made today by the pipe-cross reactor process may have sulfur levels as high as 10%", sufficient to provide sulphur response without direct application of sulphur.

Hamdallah and Tucker, Arizona, measured nitrogen losses ranging from 25-50% when applied to several Arizona soils kept saturated for 30 days. They conclude that losses due to denitrification can be of an important magnitude.

RENEWED EMPHASIS ON ZOYSIA FOR MIDDLE LATITUDES

Dr. H. L. Portz, Southern Illinois University, Carbondale, teaming with Dr. Murray of Beltsville and Dr. Yeam (a Korean), reported at length on tests with zoysia seed for the difficult "Transition Zone" seeding of turfs, at the Agronomy Meetings in Detroit.

The researchers have found it advisable to "scarify" the seed, and preferably subject it to the influence of light, in order to achieve high germination levels. For scarification they utilize a 30% potassium hydroxide solution for 25 minutes. The soaked seed is subjected to 36-48 hours of florescent light under warm temperature conditions (86-95 F.). The seed may then be dried, and stored for up to 5 years (at cool temperatures) without reducing viability.

About 2 pounds of seed to the 1,000 sq. ft. is suggested as a normal seeding rate. It is suggested that the seed be soaked again for 24 hours just prior to seeding, mixing it with a fine sand for dry spreading, or applying it as a slurry in a Hydroseeder (including fertilizers and mulch if wanted). A good stand (60% emergence) can be expected in 7-10 days.

Seed from Midwest zoysia (a Purdue selection) comes true to type pretty well, but that of most cultivars (Meyer and Emerald) segregates badly and offers little advantage over unselected seed imported from Korea. A fair-sized seed-gathering industry exists in Korea, and formerly a moderate amount of seed was imported into the United States (but in recent years has failed to find a market). Portz indicates that Mangelsdorf Seed, St. Louis, will handle Zoysia japonica seed from Korea on a trial basis this coming year. It is said that 300,000 tons of zoysia seed are hand-harvested each year in Korea, much of it used for roadside and disturbed area plantings.

Test seedings as low as 1/4 pound to the 1,000 sq. ft. gave adequate eventual cover, but heavier rates covered more quickly. Surface seedings, followed by impression with a roller (especially with a Brillion seeder-roller) produced better stands than did drilling the seed. Coverage was much quicker and denser if weeds were controlled. Pre-emergence use of siduron was effective (but other pre-emergence crabgrass preventers cannot be used), as was simazine alone or in combination. 2,4-D-dicamba treatment for broadleaf weeds after the Zoysia was growing was not injurious to the grass.

The authors note the familiar disadvantages of zoysia in more northerly regions, - slow establishment and prolonged winter dormancy, tendency towards thatch accumulation; but they recommended it for areas where other turfgrasses are not well adapted, because of its durability and minimal maintenance. If effective means of seeding, as compared to the usual planting of plugs or sprigs, can be engineered, zoysia seed should find expanding use in the "Transition Zone" from Kansas to the Virginia seaboard.

NEW CULTIVARS WILL BE DISCUSSED

Dr. Daniel, Purdue, has invited Institute Director Schery to discuss "New Cultivars and Turf Care" at the 1981 Midwest Regional Turf Conference. "Publicizing Research" will also be covered. The Conference is March 2-4, at West Lafayette, Indiana.

SYMPOSIUM ON TURFGRASS SEED HELD

On Wednesday, December 3, the Turfgrass Division, and Seed Production and Technology Division, of the Agronomy Society jointly held an invitational symposium on turfgrass seeds, organized by Dr. A. J. Turgeon, Texas A & M, Dallas. Speakers included Howard Kaerwer, Northrup King, a member of the Institute's Variety Review Board; John Long, Scotts; Dave Chilcote, representing Oregon Production; and Bill Meyer of Turf-Seed. Cultivar identification by electrophoresis was discussed by Jim Beard, Texas. Joe Duich, Pennsylvania, was unable to attend, and his scheduled discussion of changing seed laws of the Northeast was fielded by several people from the audience, including Dr. Funk from Rutgers and Dr. Schery from the Lawn Institute.

Review of the seed industry and its responsibilities was thorough-going. It elicited questions and discussion from the audience. As to the booming cultivar business, the necessity for trade-offs (considering costs, need for a sizable market, and impossibility of identifying all strengths and weaknesses in a new selection) was pointed out. Of especial technical interest was Beard's approach of using electrophoresis for ear-marking new cultivars; he feels that such identification will become routine in the future, although at present it requires a great deal of effort, experience and sophisticated laboratory apparatus. He has been quite successful in identifying blind samples of perennial ryegrass seed, including polycrosses such as Manhattan, and notes similarities (groupings) of presumably closely related cultivars on the basis of their electrophoretic banding. Results have not been so precise with bluegrasses as with perennial ryegrasses, and the technique has been tried only rather little with other species.

CHRONICAL GUIDANCE ISSUANCE

The Chronical Guidance Publications, Moravia, N. Y., has just issued its Occupational Brief 451, "Landscapers & Grounds Keepers". The Institute has reviewed materials for the Brief, and is given acknowledgement. A few sample copies are on file at the Marysville office, and up to 45 complimentary copies have been offered to us (additional ones cost 25¢ each, compared to \$1 retail). Contact the Marysville office for a sample copy if you wish one.

Occupational Brief 451 is a six page fold-over, with a November 1980 publication date. It opens with a few historical mentions, then cites the work performed by those interested in the landscape, including lawn service specialists. General working conditions and salary ranges are reviewed. Suggestions are advanced for suitable education and training. It is felt that employment opportunities in the field are excellent, with demand exceeding available talent.

HUNDRED YEARS OLD SEED

1980 was the year for unearthing another jar of the Beal seeds at Michigan State University, buried back in 1879. Through the years several weed species have displayed considerable longevity, - amaranth, ragweed, a cress, plantain, portulaca each 40 years; mustard and polygonum 50 years; evening primrose and dock 80 years; mullein and Malva 100 years; (and some of the seeds are still in the germinator to see if delayed germination may occur). Obviously, familiar weeds, many of which afflict newly planted turf, have considerable longevity in the soil. The results are tabularized in the October Crops and Soils Magazine.

ATLANTIC SEEDSMEN/ASTA MEETINGS

The Atlantic Seedsmen convened their 28th Annual Meeting at Charleston, S. C., October 29-30, and the ASTA Lawn and Turfgrass Division held its autumn program on October 31. Formal programming is secondary to committee activity, where a topic of much concern was the anticipated enactment of a new seed controls by Pennsylvania, which would be reflected throughout the Northeast. The most noticeable departure from past practices would be the naming of perennial crop grasses as "restricted noxious weed seeds" when present in amounts of less than 5% in turfgrasses and their mixtures. Falling into this categorization would be bermudagrass, annual bluegrass, rough bluegrass, bentgrass, meadow fescue, tall fescue, orchardgrass, timothy and velvetgrass. A committee report approved by the Atlantic Seedsmen on October 30 deals with the "Labeling of Lawn and Turfgrass Mixtures", outlining what can be expected as of July 1, 1981 (assuming this section becomes part of the Seed Act or regulations).

Guest speaker for the Atlantic Seedsmen was Dr. John B. Pitner, Director, South Carolina Pee Dee Experiment Station, Florence, S. C. Dr. Pitner spoke about "Lawn and Turf Grasses in the Carolinas", and emphasized winterseeding of golf greens. The Pee Dee Experiment Station is concerned chiefly with the "low country" agriculture of the coastal plain, and is experiencing the nationwide trend of declining farm population and increasing need for urban service. Golf courses throughout the Carolinas are on the tourist route to Florida. Most of those in the low country employ bermudagrass golf greens which are overseeded annually (many of the piedmont and mountain courses, especially in North Carolina, utilize bentgrass which is not overseeded). Dr. Pitner pointed out the intensive overseeding at Myrtle Beach. Clemson recommendations are for 30 pounds of ryegrass per 1,000 sq. ft. when overseeding greens. Pitner estimates that 5 million pounds of seed are sold annually for overseeding, primarily ryegrass, but also considerable fine fescue. The Myrtle Beach area was in the process of winterseeding by late October.

Dr. Robert Miller, ChemLawn Corporation, Ohio, was featured speaker for the ASTA sessions October 31. Dr. Miller emphasized the mutuality of interest between seedsmen and lawn service companies, especially in the field of overseeding. Miller spoke of the progress being made by ChemLawn, which in about a decade has increased its growth more than tenfold, to well over 100 million gross annually. Operations are tailored to the region, and involve chiefly fertilization, herbicidal and insecticidal programs. It has not proven economically worthwhile to provide a seeding service, although the company does have a separate division with a more flexible program that concerns itself with trees, shrubs, and general landscaping. In an arrangement with Seaboard Seed, ChemLawn has offered prescribed lawnseed by UPS as a convenience to the homeowner.

PROCEEDINGS OF THE THIRD INTERNATIONAL TURFGRASS RESEARCH CONFERENCE

Under auspices of the American Society of Agronomy, the Proceedings of the Third International Turfgrass Research Conference was finally published in November. Dr. Schery, for the Institute, was a member of the Editorial Board, chaired by Dr. J. B. Beard. Ninety-one presentations by scientists from twelve countries appear in the Proceedings, all written-up in English. The Conference was held in Munich, Germany, in July of 1977, and was attended by 266 participants from 19 countries. The 530 page book should be available from the American Society of Agronomy, 677 S. Segoe Rd., Madison, Wisconsin 53711.

TURFGRASS INSECTS SYMPOSIUM

The "Symposium on Turfgrass Insects - 1980", organized and sponsored by the ChemLawn Corporation, was held in Columbus, Ohio, October 14, 15. Speakers from various parts of the country are invited, and the afternoon of the second day was devoted to a tour of the ChemLawn's Chemical Research and Development Center at Milford Center, Ohio.

To judge from the presentations, insects are becoming more of a problem in turf, and newer insecticides are not being produced sufficiently to cope with developing insect resistance. The emphasis is increasingly on less pesticide, more integrated pest management (IPM). That more kinds of insects seem to be becoming troublesome may in part be a reflection of the greater scrutiny being given turfgrass these days.

J. A. Reinert, Florida, opened the presentations. He mentioned unsatisfactory chemical control for a number of pests, and development of insect resistance. Specific cases include sod webworm, Crambus, on bluegrass (common types of bluegrass are less damaged than improved varieties), on bentgrass (Seaside was least damaged, Penncross most heavily damaged), differential damage on st. augustine (some genetic lines are resistant, others not), and in bermudagrass (where select lines are more severely attacked; in Hawaii, common and Tifway were least damaged). Mole crickets have been devastating to turf in Florida, "plowing up" the lawn (centipedegrass seemed least damaged among major turf species). Tifway and Tifdwarf bermudagrasses are most damaged by bermudagrass scale; Banks grass mite and Rhodesgrass scale are also new pests. Bermudagrass mite seems host-specific, with Tifgreen and Tifway rather resistant. Some lines of st. augustine may show insect antibiosis as well as tolerance.

R. H. Ratcliffe, Beltsville, discussed susceptibility to hairy chinchbugs, which attack fescues, bluegrass and perennial ryegrass. Score, Pennfine, and Manhattan have proven the most resistant of the perennial ryegrasses, Yorktown, Yorktown II and Caravelle the most susceptible. Banner and Jamestown were the most susceptible of the fine fescues. Adelphi was susceptible among the bluegrasses, but Fylking quite resistant. Differential devastation seems to be due to preference by the chinchbugs, but may also involve some tolerance to damage according to variety. Ratcliffe has not seen any instances of antibiosis, at least to the nymph stage either on bluegrasses or perennial ryegrasses, but a certain amount occurs with fescues. Chinchbugs are especially "fond" of crabgrass and foxtails, which are consumed avidly in preference to most other species.

The bluegrass billbug, Sphenophorus parvulus, a pest in agriculture as well as on lawns, was discussed by Dean Kindler, Nebraska. Kindler lists the species as number one on destructiveness to crops. If you find even one bug per square foot in April enough larvae will be produced to ruin a sod field. A single generation is produced annually, on a 47 to 85 day cycle from egg to adult. The number of larvae peak in late July. Both diazinon and carbaryl are still effective with billbug, and irrigation frequently "drowns" the larvae. Billbug attacks a wide range of grasses, but Kentucky bluegrass is preferred. Park, Ram I (recovered poorly) and common types seem least damaged; Nugget, Sydsport and Baron are most attacked. There is a pretty good correlation between thatch build-up and billbug incidence. Also, low mowing seemed to favor billbug presence.

D. E. Short, Florida, discussed some of the pilot IPM programs on southern turfgrasses. Chinchbug is the most serious pest on st. augustine, which constitutes 60% of the lawns in Florida. Next most troublesome is webworm. The critical threshold for economic importance (in number of insects per square foot) is 25

TURFGRASS INSECTS SYMPOSIUM - Continued

for chinchbug, 12 for sod webworm, and 2-5 for grubs. There are many types of beneficial insects in the lawns, too, which feed on chinchbugs and other pests (earwigs, spiders, big-eye bugs, etc.). The insects can be identified by water flooding (sinking a cylinder and filling with water), by flushing them out with soapy water (one ounce of liquid soap in two gallons of water applied over four square feet of turf), and erecting pitfalls into which predators drop. The series of lawns receiving chemical treatment, compared to those on an IPM program, had a lower peak of chinchbug and mole cricket number. Preventive spraying sometimes reduced the beneficials, although not always. Short feels that over-spraying has been commonplace, but that the number of sprayings per year is being reduced and now averages about three applications. He indicates that fertilization intensifies the pest problem and recommends but a single application per year at a rate of 1-2 pounds of nitrogen (on st. augustine).

J. L. Hellman, Maryland, discussed a system of scouting lawns on a fee basis. 1980 was an extremely dry year, and Japanese beetle grub was the worst pest. J. A. Kamm, Oregon, reviewed pheromone lures to trap insects, perhaps most effectively used for disruption (by luring the males away from the receptive females). J. Fothergill spoke of lawn service operations in Massachusetts, and emphasized the individuality of each situation. He believes that less spraying is probably advisable; for example, when big-eye bugs are noted avoid spraying since they will control the chinchbug better and more persistently than will the spray.

C. R. Harris, Ontario, noted that in Canada about 50% of the insecticides used are for soil pests. Historically the cyclodienes showed such promise that the soil insect problems were presumed finished; but insects developed resistance, and in turn to carbamates, too. He notes that each insecticide behaves differently, persists differently in the soil, and according to the kind of insect, the stage of the insect's life cycle, moisture, temperature, and thatch condition. As a general rule he finds that the greater the solubility of the pesticide the less its activity. H. Tashiro, New York, finds the organophosphates no longer very useful, but without evidence of insect resistance having been built to them. However, in New Jersey, insects acquiring resistance to DDT also showed resistance to chlorpyrifos, an ominous threat. Tashiro's tests show that watering doesn't move an insecticide very deeply into the soil; most influence is quite near the surface. The half-life of most insecticides is only a week or two, and diazinon almost completely disappears within six weeks. Chlorpyrifos is a bit more persistent. Moist soils appreciably reduce the effectiveness of an insecticide compared to dry soil, and a high pH generally causes degradation (diazinon is an exception). No great difference was found comparing granular insecticides to emulsifiable types.

Niemzcyk, Ohio, found chlorpyrifos (Dursban) to be easily bound to soil or thatch. Isofenthos (Amaze) was slightly less so, diazinon still less, fensulfothion (Dasanit) still less, bendiocarb next, and trichlorfon (Proxol) last. R. Chapman, University of Guelph, noted that most insecticides react with water to become less effective. This includes organophosphates carbamates and pyrethroids. The OH ions of alkaline solutions have the same effect as water but an even more intense reaction, so that alkaline conditions make for a shorter solution life with pesticides (conversely the half-life is increased by acidification, with diazinon being an exception). Trichlorfon (Dylox) was effective for only one day at a pH of 8, but lasted nearly a year at a pH of 4.5. Sterile water prolongs

- Continued

TURFGRASS INSECTS SYMPOSIUM - Continued

the solution life over that containing organisms, either aerobic or anaerobic. Microbial degradation in soils is very manifest compared to sterilized soil. Malathion has proven sensitive to alkali.

J. A. Reinert, Florida, summarized the progression of insecticides. He noted that most products have a useful life of from 7 to 20 years (with chinchbug on st. augustine), before resistance develops. In 1954 chlordane was introduced and was quite effective; in 1957 DDT; in 1960 parathion; all now generally fail. In 1976 diazinon and chlorpyrifos were introduced, and already are failing. He feels it is necessary to look to other measures to assist insecticides in controlling insects, - use of pheromones, for example.

ChemLawn Corporation has research centers in Ohio; Atlanta, Ga.; and Boynton Beach, Florida; each concentrating on different types of turfgrasses. In addition to the Milford Center Chemical Research and Development Center, ChemLawn has an equipment research center in Troy, Ohio. A goodly number of PhD's are supported by laboratory and field technicians. A relatively new approach is the ChemScape Division, which attempts to do for landscaping (trees and shrubs) what ChemLawn does for turf (at present it has over 40,000 customers, and gross income exceeds 6 million dollars annually). Effort is being made to develop suitable rates and types of nitrogen fertilization, and to control weeds in ornamental beds. The trucks are equipped with various spray guns, and deep-root injection devices. With turf one of ChemLawn's interests is to analyze the volatilization and leaching of fertilizers, with development of inhibitors to lengthen and intensify the usefulness of fertilizer.

AMERICAN LAWN APPLICATOR REPORTS

The relatively new publication, American Lawn Applicator (Farmington, Mich.), mailed its third issue (September/October). It was mainly concerned with lawn fertilization and lawn diseases. Editor Brown speculated about uncertain cause of dying patches of turf in Michigan and Ohio, which may have been due to Septoria? The symptoms much resemble drought or chemical burn, but seem to respond to fungicidal treatment.

Hull, Rhode Island, reviewed the influence of fertilization on the basis of carbon uptake during photosynthesis. He concludes that nitrogen alone receives too much emphasis, and that balanced fertilization is essential for thriving, disease-tolerant turf. Schmidt, Virginia reaches the same conclusion from field application experiments, in which nitrogen was always more satisfactorily utilized if phosphorus and potassium were adequate. Under Virginia conditions applying two-thirds of nitrogen in autumn rather than summer or spring was beneficial, and, of course, was most productive when supported by P and K.

Editor Brown pulls together some technical data from Michigan State University on the salt index and insolubility of various sources of fertility elements. For example, potassium sulfate has less than half the salt index of potassium chloride, and urea only three-fourth the salt index of ammonium nitrate. Sanders, Pennsylvania, winds up the issue with a discussion of Fusarium blight, about which, she concludes, we understand very little in spite of it having received much attention through the years. Common conceptions about conditions triggering onset of the disease don't hold up under rigorous experimentation.

NEBRASKA IPM PROGRAM

With the aid of federal grants, the University of Nebraska has begun a series of integrated pest management programs relating to home lawns and gardens. The idea is to reduce dependence on a single method of control, especially where pesticides are frowned upon. Specialists at the University indicate that reasonably well maintained turf comprises 113,000 acres in Nebraska, of which home lawns constitute nearly 74,000, golf courses around 19,000, school grounds over 12,000, parks nearly 8,000. The major turfgrass is Kentucky bluegrass, followed by fescues and perennial ryegrass.

A series of NebGuides provide instruction. One might wonder where IPM comes in if the instructions of these guides is taken seriously. For example, fertilization is recommended four times a year, totaling 4 to 5 pounds of nitrogen. Watering is recommended throughout the season, with extensive applications of herbicides, insect controls, fungicides, thatch removal and so on. The disease control guide suggests 3 to 4 fungicidal applications for leafspot through late spring and early summer, 2 to 3 during the summer for fusarium blight and a dozen other application for a half dozen familiar fungi. The same fungicide is not necessarily recommended for each of the diseases.

However disease-tolerant varieties are recommended, particularly for specific diseases such as fusarium. Listed for planting in fusarium problem areas are these bluegrasses: Adelphi, Baron, Bonnieblue, Bristol, Birka, Cheri, Enmundi, Glade, Majestic, Sydsport, Touchdown, Vantage, Victa and Parade. Essentially the same group are listed for resistance to melting out disease.

In a leaflet entitled "How to Establish Bluegrass Blends and Mixtures" (and blends and mixtures are recommended), these bluegrass cultivars are listed as performing well in Nebraska: Adelphi, Baron, Bonnieblue, Cheri, Glade, Majestic, Ram, Sydsport, Victa and Touchdown. Cultivars which are said not to do well in Nebraska include: Kenblue, Merion, Nebraska common, Newport, Park, and South Dakota certified. Best suited fine fescues include: Banner, Biljart, Dawson, Fortress, Highlight, Jamestown, Koket, Pennlawn, Ruby and Scaldis. Recommended perennial ryegrasses include: Citation, Derby, Diplomat, Manhattan, Pennfine, and Yorktown, with "pasture-types to be avoided" including Norlea, Lynn, Game, Lamora, NK-100 and Pelo.

Recommendations for seeding and establishment follow familiar procedures, with an autumn sowing preferable and mulching recommended.

GRASSLAND FERTILIZATION

Woodmansee and Duncan, Colorado, report in the August Ecology on a grassland ecosystem dominated by exotic annuals (perhaps parallel to many lawns). Litter, and various growing parts, were examined over a three year period. Input-usage of nitrogen varied widely, but phosphorus was rather stable, as fertilization theory leads one to believe. Nitrogen uptake was observed to be 119 kg/ha in 1972-73, with only half this amount mineralized (it is believed that appreciable additions came from symbiotic fixation that particular year). In other years mineralization exceeded uptake, resulting in appreciable nitrogen losses. Observation of this natural ecosystem supports the theory for need of nitrogen fertilization at reasonable intervals, although phosphorus once applied seems to be well-recycled.

AGRONOMY PRESENTATIONS RANGE WIDELY

The 72nd annual meeting of the American Society of Agronomy was held in Detroit November 30 - December 5. Especially of interest were presentations to the C-5 division, Turfgrass, most of which are nowadays quite technical and involve special test facilities or apparatus. We have tried to organize the presentations here and into relevant groups, beginning with those of a general turf nature, followed by those having a northern turfgrass slant, then those having a southern orientation. Further information will be provided when the full papers appear in the technical journals in subsequent months and years, and these reviews are but the briefest epitomization.

GENERAL

Of especial interest to seedsmen would have been Duich's (Penn State) presentation on Turfgrass Seed Quality, not for information new to seedsmen, but because it acquaints research people with changing seed control requirements for the Northeast. In his abstract he commended changes that "close a major legal loophole" by requiring seed formerly considered as "crop", in the genera Cynodon, Poa, Agrostis, Festuca, Dactylis, Phleum and Holcus, to be listed as "restricted noxious weeds" when in amounts of less than 5% by weight, with their presence listed.

Chilcote, Oregon, reviewed modern seed production in the Pacific Northwest (with the explosion of new cultivars he sees greater need for roguing "off-types", and improving certification handling). Yet the outcome should be better seed and better turf. Seed treatments are still being investigated: Peacock et al, Florida, noted very little benefits from treating Fylking bluegrass, annual ryegrass, or tall fescue seed, with either water or gibberellic acid before sowing. Murray et al, Beltsville, did find advantage from what was termed "scarification" by a potassium-hydroxide solution; germination of old and poor-sprouting cultivars of bluegrass was greatly enhanced. This treatment was also quite effective with zoysia seed from Korea, and might prove a boon to zoysia sowings in the transition zone.

From a fundamental standpoint an investigation by Wood et al, Nebraska, was of special interest. Park Kentucky bluegrass was inoculated with a nitrogen-fixing organism (Klebsiella), with positive influences that were root-associated. Taylor and Blake, Minnesota, reported upon a perennial "problem" of water insoak through thatch, and concluded that wet thatch offered little barrier to water penetration (nor did growing grass, compared to bare soil).

Emerson and Koerwer, Union Carbide, reported on company efforts to find a substitute for silvex in broadleaf weed control in case its banning becomes permanent. A combination of dichlorprop butoxyethyl ester and 2,4-D butoxyethyl ester makes a pretty fair substitute for former phenoxy combinations containing silvex. Turfgrasses show satisfactory tolerance with the exception of st. augustinegrass. Rather good control was obtained of problems weeds including oxalis and ground ivy.

Christians et al, Iowa, noted from what part of the soil column phosphorus is absorbed, utilizing radioactive isotopes. As much nutrient was picked up from the thatch zone as from the soil, but thatch is ignored and discarded in soil tests! Considerable physiological work is being undertaken at Texas A & M. DiPaola and Beard checked fatty acids in turfgrass crowns subjected to cold hardiness testing. The mitochondrial component contained significantly lower linolenic and saturated-to-unsaturated ratios for warm season grasses as compared to Kentucky bluegrass and perennial ryegrass. During cold hardening

AGRONOMY PRESENTATIONS RANGE WIDELY - Continued

linolenic acid increased in cool-season grasses, but not in warm season ones. In another study Beard found disc gel electrophoresis effective for cultivar identification (on the basis of extracted proteins). He claims success with both southern and northern grasses, and even with seeds of some species. Johns et al found that rate of water use can be accurately estimated by recording the cooling of an abruptly shaded canopy, and utilizing this to calculate a "heat transfer number".

In Florida Green et al were able to make broad separations utilizing isoenzyme systems for electrophoretic identification of st. augustine clones. Daniel et al, Purdue, reported on computer storage of data concerning turf-grasses. Johnson and Goss, Washington, discussed the difficulties resulting from ash fall (Mt. St. Helens). Long, Scotts, defines the role of the turf-grass breeder in maintaining varietal integrity.

NORTHERN GRASSES

Kentucky bluegrass is one of the most investigated species for northern turfs. Augustin and Karnok, Ohio, examined Glade and Merion cultivars under reduced light levels; Glade had higher apparent photosynthetic rates than did Merion. Dark respiration of the cultivars declined under reduced light, which the authors suggest may partly explain "why Kentucky bluegrasses do not perform as well as other cool season grasses under shaded conditions". The measurements seem to signify that Glade's better adaptation to shade may be more physiological than due to resistance to mildew. Also reported from in Ohio by Darrah et al, ChemLawn Corp., is research showing little difference in effects comparing dry with liquid fertilizer applications.

Brede and Duich, Pennsylvania, offered a leaf area index for measuring sheath and blade area. Bruneau et al, Nebraska, screened 38 bluegrass cultivars for resistance to billbug; Fylking was rather severely injured from low billbug density, while Touchdown showed low injury even from high billbug density. Thatch did not seem to be a factor in billbug infestation. Carrow, Kansas, investigated the effects of soil compaction on bluegrass growth. Under heavier compaction quality decreased, but root growth actually increased. Riordan et al, found that "mass production" methods of hybridizing bluegrass (as by shaking plants over others, as contrasted to the tedious bagging, emasculation etc.) worked reasonably well; only about half as many hybrids resulted, but the greater productivity for time spent more than compensated for this.

In Michigan, Kaufmann and Kahanak subjected Merion bluegrass to a series of unusually high temperatures, and noted characteristic stomatal behavior, increase in photosynthesis, and reduced photorespiration. Of overall interest is that the photosynthetic apparatus of Kentucky bluegrass seems capable of acclimating (after a period), becoming adapted to 10° F. or so increase in temperature while still maintaining optimal physiological performance. Williamson and Kaufmann evaluated systemic fungicides on Adelphi Kentucky bluegrass. In most cases transpiration and assimilation were somewhat reduced, with effects (from most to least) in this order: Chipco 26019, Ciba Giegi 64251, Benomyl, Bayleton. Yahure and Kaufmann report that with Merion bluegrass total shoot growth was not significantly lower at high temperature than at optimum temperature, but that high crown temperature significantly reduced leaf extension rate and high root temperature reduced tillering regardless of crown temperature.

AGRONOMY PRESENTATIONS RANGE WIDELY - Continued

Ratcliffe and Murray, Beltsville, screened numerous Kentucky bluegrasses for resistance to greenbug; plants selected from three cultivars have shown moderate to high resistance, and the authors conclude that antibiosis and/or nonpreference exist. Ruser and White, Minnesota found that sod heating is primarily due to the clippings and culms, not the rhizome mat. Brooks et al, Massachusetts, examined nitrogen-potassium ratios with respect to cold-hardiness of Manhattan perennial ryegrass. Surprisingly, greater kill of tillers occurred at higher potassium levels, but kill was reduced as soluble carbohydrate content increased (which correlated with potassium tissue levels). A two parts nitrogen to one part potassium ratio provided maximum tiller survival. In El Paso, Griggs and Horst checked out mowing practices with tall fescue. Returning the clippings, especially when a mulch-mower was used, improved turf quality and recycled nutrients.

Kucharski and Karnok, Ohio, found difference in rooting response between Poa annua and Pennncross bentgrass. At peak Pennncross roots showed almost double the rate of growth Poa annua did, but Poa annua initiated growth as soon as soil temperatures reached 45° F. for three days. When Poa annua formed seed-heads rootgrowth ceased. Bentgrass exceeded Poa growth threefold throughout the growing season. Westhafer et al, Rhode Island, found that Poa annua suffered appreciably under low sulphur conditions, but recovered quickly when a sulphur regime was reinstated. Meyer and Turgeon discussed the need to characterize bluegrass cultivars according to a level of care they would receive. For low maintenance the cultivars should have good resistance to dollarspot, red thread and rust. Hard fescues (F. longifolia) are recommended over F. rubra. Aquilla, Kenblue and Vantage are suggested for low levels of care; Adelphi, Baron, Columbia and Majestic for intermediate; A-34, Brunswick and Touchdown for high levels.

Danneberger and Vargas, Michigan, found even light rates of iprodione to be effective in controlling leafspot (Drechslera) on Poa annua. Duff, Rhode Island, showed that grass residues (even old root systems) strongly inhibited new seedlings among perennial ryegrass, Kentucky bluegrass, fescue, crabgrass and goosegrass. The effect was definitely allelopathic, not nutritional. All grasses seemed to repress other grasses, with the exception of goosegrass not bothering red fescue. Duff comments that these observations may help explain poor results in overseeding into an existing sod, or into a seedbed where a portion of old grass plants remain.

Hummel and Waddington, Pennsylvania, continue observations on slow-release fertilizers. Ureaform and organics generally produced poor quality turf unless supplemented with soluble nitrogen. Sulphur-coated urea provided best results. In Arkansas fertilization programs were investigated on perennial ryegrass, Kentucky bluegrass and tall fescue. There ammonium nitrate yielded better quality than did IBDU; timing was not greatly important, especially with tall fescue. Heavier rates applied during September-October-November-March-April-May resulted in the highest turf score. Tall mowing was advantageous. Despite irrigation, turf became dormant during the unusually hot summer of 1980. In Kansas, Sills and Carrow found slight variations in response to differing types of fertilization on perennial ryegrass and tall fescue, on compacted vs. uncompacted soils. Sheffer and Dunn, Missouri, concluded that greater root depth is a major reason why tall fescue stays green despite drought compared to ryegrass or bluegrass.

- Continued

AGRONOMY PRESENTATIONS RANGE WIDELY - Continued

SOUTHERN GRASSES

Busey, Florida, investigated bermudagrasses for low maintenance, and concludes that the species is amenable to selection for low maintenance environments. Almodares et al, Texas, found bermudagrass not to do very well on soil media made with pine bark, but did well where sewerage sludge was utilized. Henry and Schmidt, Virginia, found that medium rates of nitrogen significantly increased post-dormancy bermudagrass growth over higher and lower rates. Horst and Baltensperger related regrowth of bermudagrass in the dark to previous fertility regimens. White and Dickens, Alabama, found parasitic nematode populations not to be affected by the bermudagrass cultivar or its management.

Batten et al, Texas, checked optimal temperatures for overseeding with Loretta perennial ryegrass. Warm temperatures were most favorable for seedling vigor and percent-of-cover. Dudeck et al, Florida, investigated overseeding bahiagrass with mixtures of legumes and ryegrass or tall fescue. The nitrogen-fixation from the legume was beneficial, and carried over into the following summer regrowth of bahia. Portz et al, Illinois, advocated "chemical scarification" of Korean zoysiagrass seed for hydroseeding, and if possible pre-emergence treatment with siduron. Stolons established more rapidly than did plugs if adequate weed control was provided. Hydroseeding zoysia seed to roadside cuts would seem a possibility in southern Illinois and other transition areas.

YELLOW-TUFT DISEASE CONFIRMED

Jackson and Dernoeden, Rhode Island, report in the October Plant Disease that they have confirmed Sclerophthora macrospora, a downy mildew, to be the incitant of yellow-tuft disease on turfgrasses. Zoospores derived from a given turfgrass species are effective in inoculating other species, so that yellow-tuft is not host-specific.

FERTILIZATION AND SOD TENSILE STRENGTHS

November Crops and Soils reports that Mitchell and Dickens, Alabama find that fertilization with one pound of nitrogen is equal to or superior to higher feeding rates measured for tensile strength in bermudagrass. Also, with 'Eifway' and 'Tifgreen' cultivars frequent fertilization (as opposed to monthly) resulted in decreased tensile strength. Mowing height made little difference.

SOUTHERN GRASS ROOT GROWTH DEPRESSION BY HERBICIDES

Johnson, Georgia, reports in the September Weed Science on tests with several cultivars of zoysia and bermudagrass receiving various herbicide treatments. Napropamide reduced root growth of all cultivars, prosulfalin likewise for Tifgreen and Tifdwarf bermudagrasses (and others when high rates were used). Zoysia was not affected by pre-emergence herbicides such as oxidiazon, bensulide or benefin, nor did DCPA and oxidiazon reduce root growth of bermudagrasses (except Tifgreen at high rates).

PYTHIUM AND OVERSEEDING

Freeman, Florida, discusses the tribulations from Pythium blight on overseeding southern turfs with northern grasses. The problem arises under warm, humid conditions, but sometimes overseeding cannot be delayed until cool weather arrives (which if cold enough would inhibit germination). None of the perennial ryegrasses, fine fescues, or *Poa trivialis* recommended for overseeding have proved resistant to *Pythium aphanidermatum*. Thus to protect the investment in increasingly high cost labor and seed, chemical and well as cultural controls have been practiced. Chloroneb, ethazol and fenaminosulf have all proven effective in controlling Pythium when applied as a drench. Of these ethazol has also been highly effective when used as a seed treatment. The discussion appears in the October issue of Golf Course Management.

SPRING DEADSPOT OF BERMUDAGRASS

The September issue of Plant Disease reviewed spring deadspot of bermudagrass and its control, by Lucas, North Carolina State. The causal organism for SDS has not been clearly identified yet, and in the United States it may be different from what has been identified in Australia. A general control of the disease has always been difficult. Symptoms are intensified by high nitrogen fertilization, especially in autumn. A number of fungicides have been tried for control of SDS, some occasionally reported successful, but most having little or no effect. In this research fairly strong applications of benomyl in October and November, or multiple applications of PCNB, gave fairly successful control.

IRRIGATION STUDY REPORTED

The September/October issue of Landscape and Turf carried a report by five southern California researchers on irrigating turf in their area. The authors feel that using automatic tensiometer controls provides efficient means for watering turf at all seasons. The studies indicate that cool-season grasses use somewhat more water than do warm-season ones, probably because of a shallower root system creating more surface demand. It was shown that bermudagrass and st. augustine survive on about 27" and 25" of water respectively, compared to 42" for tall fescue and 39" for bluegrass. The test results differ, however, with report from a commercial manager, who utilized about 52" for warm season grasses compared to about 41" for cool season grasses. Only in mid-summer did water usage by any species reach or exceed two-tenths inch daily, with bermudagrass and st. augustine only slightly exceeding fifteen one-hundredths of an inch.

PREEMERGENCE WEED CONTROL IN BERMUDAGRASS

Fermanian et al, Oklahoma, report on trials with pre-emergence herbicides for seeded bermudagrass in the September-October 1980 Agronomy Journal. Oxadiazon and siduron proved lethal to bermudagrass, but metribuzin and terbutryn gave fair to good weed control with only acceptable damage to the seeded bermuda. Terbutryn was more toxic to the bermuda than metribuzin, but slightly more effective in controlling weeds.

DISTINGUISHING FESCUE CULTIVARS

Nittler and Kenny, Cornell, report in September-October Agronomy Journal on a technique for better distinguishing seedlings of fine fescue. By subjecting seedlings in a sand nutrient culture to aluminum sulfate solutions, differing appearances showed up on purpling and necrosis of leaf blades. Differences were not 100% clear cut, but varied between 61% red leaf blade for Banner to only 16% for Ensylva. Ruby, Ensylva and Fortress cultivars had upwards of 40% necrosis, while Banner, Highlight and several others showed almost none.

TURFGRASSES IN SHADE

Karnok, Ohio, discusses "Shade Tolerance" in Golf Course Management, Jan./Feb. 1981 issue. He notes differential quality of the light beneath a tree canopy, much of the blue spectrum being absorbed by tree foliage (thus lessening its dwarfing effect on the grass below, which responds to the attenuating red spectrum that penetrates a bit better). Grass cultivars respond differently depending upon the balance between photosynthesis and dark respiration. Utilizing Merion bluegrass as a standard, Pennlawn fescue has about the same photosynthetic capability but reduced dark respiration, for a greater energy spread, so survives a bit better in the shade. On the other hand Glade bluegrass has about the same dark respiration as Merion, but is more efficient photosynthetically at reduced light.

Karnok mentions the physical factors that can affect shade tolerance, - things like restriction of air movement, more dew, tree root competition and so on. He recommends only moderate fertilization, to avoid excessive shoot growth (at expense of roots) that would come with heavy fertilization. Watering should be thorough but infrequent (adequate for the soil, but not encouraging disease-fostering surface moisture). He notes the suitability of fine fescues for cool-dry shade, but not for hot or moist shade. Among bluegrasses, Bristol, Birka, Glade and Nugget have shown good shade tolerance, as, of course has Sabre rough bluegrass for moist shade. Autumn planted perennial ryegrass is recommended, but Karnok thinks that generally it should be treated as an annual. Sometimes fungicides may be needed.

Karnok regards st. augustine as the most shade-tolerant of the southern grasses, although the Floratam cultivar is not too good. St. augustine and zoysia (Emerald especially) will generally provide an acceptable turf in up to 70% shade. Centipedegrass is reasonably shade-tolerant, too, but bermudagrasses are severely thinned when shade much exceeds 50%. Tall fescue has worked well in the South, but must be irrigated.

AMMONIA BALANCES

Lemon and Van Houtte, Cornell, report upon ammonia exchange under normal vegetational conditions, in the Nov./Dec. Agronomy Journal. Under typical testing in a growth chamber, vegetation serves as a continuing sink for ammonia. The authors find that with normally growing plants on land surface, however, a balance is struck between ammonia absorption and emission from vegetation. It is concluded that plants keep atmospheric ammonia in check, at low concentrations, and that winds move it from areas richer in nitrogen to ecosystems poorer in nitrogen. Overall, ammonia is probably being increasingly dispersed from crop lands, causing net global biospheric uptake of both nitrogen and carbon. So we seem to be "fertilizing" our lawns whether or not fertilizer is applied!

NEWLY PLANTED BERMUDAGRASS AND HERBICIDES

Johnson, Georgia reports in the November Weed Science, on tests involving new plantings of bermudagrass into areas treated with herbicides, primarily for the control of goosegrass. Neither methazole nor metribuzin, especially in combination with MSMA, caused trouble at moderate rates. In some cases sprigs or seed could be planted the same day as herbicide treatment, but stolons were a bit more sensitive and a week interval before planting is suggested. MSMA plus metribuzin was a bit more toxic to new bermudagrass seedlings than MSMA plus methazole, and to ensure minimum injury a two-week interval between treatment with the former and planting is advocated by Johnson.

BLUEGRASS LEAF AREA

Eggers, Guelph, Ontario, notes in the Nov./Dec. Agronomy Journal that the area of the third youngest leaf of a Kentucky bluegrass plant correlates highly with total vegetation, and can be used as a simple (but accurate) indicator of total area in comparisons. Correlations were made on Birka, Nugget, Sydsport and Touchdown bluegrasses, grown in competition with A-34.

RYEGRASS REVIEWED

A presentation by Hall, Virginia, to the Ohio Turfgrass Conference in December, was reviewed at length in the December Lawn Care Industry. One of the points, seldom stressed, is that new perennial ryegrasses seem well adapted to very close mowing; they have thrived for 18 months in Virginia under bentgrass-height clipping. Hall also suggests that the new ryegrasses develop a stronger rooting bond with the soil than other turfgrasses, such that clods of turf are not kicked up so easily. But he still does not feel that ryegrasses are as effective over-all as is Kentucky bluegrass, and characterizes their mowing quality as poor (something with which one might disagree for the more modern cultivars). He also notes their aggressiveness in seeding mixtures, with only small proportions of ryegrass tending to dominate large proportions of Kentucky bluegrass. On the Institute grounds we have not noticed great susceptibility to summer diseases, for which Hall criticizes the perennial ryegrasses.

NITROGEN FIXATION AIDS GRASSES

In the resume of research reported at the Agronomy Meetings it was noted that inoculation of Park bluegrass with a microorganism (Klebsiella) resulted in some nitrogen fixation. A report by Weaver et al, Texas, in the Nov./Dec. Agronomy Journal, documents significant rhizosphere fixation of nitrogen with bermudagrass and other pasture grasses, without any special inoculation. Nitrogen fixation attaining as much as 33 kg/ha/100 days was noted.

SOIL COMPACTION AFFECTS TURFGRASSES

A study by Carrow, Kansas, involves the influence of soil compaction on Baron Kentucky bluegrass, Pennfine perennial ryegrass, and Kentucky 31 tall fescue. The results are reported in the Nov./Dec. Agronomy Journal. Carrow concludes that ryegrass and bluegrass are somewhat more tolerant of compaction than is tall fescue. The test soil was mechanically impacted, with marked results on the test grasses. Eight months after compaction tall fescue and bluegrass still exhibited reduced quality. Except for some diminution of root length, ryegrass was little affected by medium levels of compaction.

WINTER SURVIVAL OF BERMUDAGRASS

Schmidt, Virginia, discusses the title subject in the October Golf Course Management magazine. Research in Virginia indicates that not only the degree of cold, but the length of the cold period, has an influence on bermudagrass survival. Generous nitrogen can make the bermuda more susceptible, unless accompanied by adequate potassium. Pre-emergence chemicals have an influence, especially upon the rooting of reviving bermudagrass in spring; in one instance rooting was reduced 84%. Schmidt feels that multiple factors interrelate during winter dormancy of bermudagrass, and that winter loss is not due solely to cold weather (or such winter diseases as spring deadspot).