BETTER LAWM--HARVESTS

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- My last copy -

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QUARTERLY RELEASES

During the quarter the following items were prepared, in press, or reprinted for distribution:

Brooklyn Botanic Garden, "Handbook" Club Management

Crops And Soils Flower And Garden Grounds Maintenance

Horticulture Horticulture HortScience News And Views (Am. Hort. Soc.) Weeds, Trees, Turf Men's Garden Club of America "Lawns And Their Tending" "Better Grasses For Fairways, Tees, Greens And Lawns" "Lawn Fertilization" "Starting A New Lawn" "Quality Lawn Seed - Tests And Controls Help You Buy With Confidence" "Crasses Used For Lawns" "Lawn Ecology" Turf Management Handbook Review "Fertilize The Lawn" "Curious About Cultivars" "Lawn Seed Keeps Well"

MRS. SCHEIDERER ASSUMES OFFICE MANAGERSHIP

Mrs. Diana Scheiderer has replaced Mrs. Ebright beginning in September, as typist and staff office manager in Marysville. Mrs. Scheiderer is on duty at the Institute only until 3:00 P.M. because of necessity of assuming responsibility for her young child after that hour. Calls needing immediate attention are best placed before that time.

LAWN ADVISORY APPEARS

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Dr. Schery provided the five-page review of lawns and lawn-making in the newly published <u>Gardening Guide</u>, the latest in the series of horticultural handbooks published by the Brooklyn Botanic Garden ("Plants & Gardens"). The treatment should stand as a frequently consulted reference, and would make a handy general review for non-specific inquiries as a reprint.

The treatment opens discussing grasses in general, and comments, "On the bright side, hordes of new grass varieties (cultivars) have been bred especially for lawn conditions." Seedbed preparation and after-care are then developed. Under

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LAWN ADVISORY APPEnds (continued)

fertilization, the text reads, "The better lawn fertilizers contain some slowly available sources of nitrogen, such as might be derived from Nitroform".

Pest control reviews weed remedies, insecticides (confusing because of restrictions these days), and the difficulty of the homeowner doing much about disease ("Planting with disease-tolerant cultivars would seem the handiest means for disease prevention, applicable where the new lawns are being started or old ones renovated"). Mention is made of the increasing tendency to use professional expertise, especially from lawn-service companies.

Editor McGourty sums it up, "We are pleased to enclose a copy of the new GARDENING GUIDE which contains your article "Lawns And Their Tending". It is one of the finest articles we have seen in some time and we know that it will be a standard reference for readers for years to come".

"MORNING EXCHANGE" PROGRAM

On September 9, Dr. Schery appeared once again for his seasonal appearance on WEWS-TV, Cleveland, the "Morning Exchange" hour. New bluegrasses and perennial ryegrasses provided examples for sowing at this time of year. Following the showing of a few colored slides, telephone inquiries were fielded as customary. Other guests on the program this time provided a "hard act to follow": - six puppy dogs were "interviewed" to open the program. Reprints offered for a stamped envelope mailed to the Institute office included Lawns And Their Tending, Hit Paydirt When Seeding The Lawn, Lawn Ecology.

PRODUCTION OF "SUPPLEMENT" CONFIRMED

Word has been received from Bill Phlaum that "all systems are go" for the cooperative Supplement sponsored by several associations, with which the Institute has participated in recent years. This effort is backed by sharing of the cost by the Lawn and Turfgrass Division of ASTA. Phlaum indicates general satisfaction with the 1976 issue, to several thousand newspapers, trade magazines and other outlets. He notes that a similar gardening release will be offered for 1976 by a competing organization, at several times the cost per participant as with the Supplement for which he has been producer. Costs will be up only slightly this year over last, less than 5%. Production is to begin in early November, for early issuance in 1977.

NEWSWEEK INQUIRIES

Sunde Smith, Newsweek Broadcasting Inc., New York, called the Institute for verification of facts attributed to us in the <u>Christian Science Monitor</u>, and to develop leads on "what's new" for newscast release. Ms. Smith was informed that perhaps the "hottest" development is the release of new turfgrass cultivars, especially useful for their disease tolerance in an era when public reaction by environmentalists has made pesticide use unpopular. Ms. Smith was also informed that gradual development and improvement of products is more in keeping with actuality

NEWSWEEK INQUIRIES (Continued)

than sudden breakthroughs, such as development of gradual-release fertilizers. An important trend of which Ms. Smith was not aware is the rapid expansion of lawn service. We could not help her in deciding what breakthroughs were likely with lawnmowers, referring her instead to the Outdoor Power Equipment Institute. It is nice to be recognized by so influential an organization as Newsweek Broadcasting.

CROPS AND SOILS TO PUBLISH

We have word from <u>Crops and Soils magazine</u> (American Society of Agronomy) that an epitomization of "Lawn Fertilization", in the hands of the American Horticultural Society for an unabridged version, will appear in a forthcoming issue. The story treats with the need for at least moderate fertilization of modern cultivars. Almost all cultivars deteriorated if not fertilized in the test data cited.

FOR GOLF PUBLICATION

A story entitled "Better Grasses For Fairways, Tees, Greens And Lawns" was prepared for <u>Club Management</u> in August, to appear shortly. The story opens, "These are propitious times for improving golf course turf as well as home lawns." It goes on to cite the new cultivars, especially perennial ryegrasses, and has a summarizing boxed insert naming the various Institute acceptances.

WEEDS, TREES, AND TURF STORY DUE SOON

A story provided <u>Weeds</u>, <u>Trees and Turf</u> magazine, entitled "Curious About Cultivars?" is expected shortly. It reviews the creation of modern cultivars, and provides summarizations of the performance of many cultivars (including all the "Institute varieties") as reported in test results regionally throughout the country.

FOR GROUNDS MAINTENANCE MAGAZINE

A story entitled "Quality Lawn Seed: Tests And Controls Help You Buy With Confidence" was prepared on assignment for <u>Grounds Maintenance</u> magazine during this quarter, although its appearance is not scheduled until 1977. The magazine's interest was in having an explanation of lawn seed production, the care that goes into it to assure quality, and the quality-control measures which automatically apply to provide assurances for the purchaser.

MEN'S GARDEN CLUB MAILING MENTIONS INSTITUTE

The "Garden Tips" page included in a national mailing by the Men's Garden Club of America includes excepts from Lawn Institute releases under the title "Lawn Seed Keeps Well". The Institute is named in the text.

HORTSCIENCE BOOK REVIEW

Dr. Schery's book review of the Sprague "Turf Management Handbook" appeared in the August issue of <u>HortScience</u>. Sprague's book may be useful as a reference, conveying the standard information. It is not imaginatively expressed, and lacks discussion of some of the more recent developments in the turfgrass field.

REPRINT PERMISSION REQUESTED

The Maryland Center for Public Broadcasting has requested of the Lawn Institute permission to reprint an older reprint, "What Lawn To Plant Where". Permission was given over the telephone to use any of the Lawn Institute releases, giving credit to the Institute. It was suggested that perhaps a more-to-date summarization could be utilized, since the reprint in question was published in the <u>American</u> Nurserymen a number of years ago and does not reflect modern varieties.

INSTITUTE ANNOUNCEMENT IN SEEDSMEN'S DIGEST

The August issue of <u>Seedsmen's Digest</u> carried an announcement about the Institute's annual meeting in Los Angeles, under the heading "Lawn and Turf Institute elects Doyle Jacklin". A complete listing of officers and trustees, with their affliations, is given.

LAWN CARE "CONSUMER SURVIVAL KIT" REVIEWED

The Center for Public Broadcasting, Owings Mills, Maryland, asked Dr. Schery to review the text of a presentation due for airing on March 6, 1977. On the whole the presentation is useful for publicizing lawns and their care, but does reflect some inexperience with lawns, and may have reflected a little more attention to N.H. Day's viewpoints (Maryland Department of Agriculture) than was necessary, especially with respect to lawn seed labeling (giving emphasis to unnecessary negative "precautions" to be carefully looked for).

Dr. Schery offered numerous suggestions, some to correct technical errors, but mostly to make the presentation more positive (without constant "don't" admonitions, and the impression that having a lawn was "difficult"). Even though the text is intended for March presentation, it emphasizes that autumn is really the only good time to seed (pains were taken to suggest that this be revised). Similarly the admonition to choose fertilizer by the price per pound of the nitrogen was (hopefully) corrected, to reflect values in slow-release and non-burn gualities.

We hope that these changes, and others suggested, will be acted upon to improve the presentation for its spring release. Apparently "Consumer Survival Kits" are offered in a number of subject areas as twenty-six minute TV presentations with visuals and a cast of narrators personifying consumers.

STORY FOR HORTICULTURE

A story tentatively entitled "Grasses Used For Lawns" was completed in September, for probable appearance in the March issue of <u>Horticulture</u>. This describes leading lawngrass species for both North and South, with an addendum listing modern varieties.

IN COUNTRY GENTLEMEN

Word from Paul Trachtman, editor for <u>Horticulture</u> magazine, indicates that "Lawn Ecology", appearing in the August issue of <u>Horticulture</u>, will be reprinted in a spring issue of <u>Country Gentlemen</u>. We are flattered that the story has attracted such attention.

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NEWS AND VIEWS MENTION

Information from the Institute is reported in the September issue of "News And Views", publication of the American Horticulture Society. Title of the item is "Fertilizing the Lawn". Autumn fertilization is recommended, and improved Kentucky bluegrasses (listed by name) are cited as especially rewarding objects of fertilization.

IN CHICAGO TRIBUNE

Art Kozelka, Garden editor for the Chicago Tribune, kindly sent us tear sheets from the Sunday, August 15 issue of the paper. Kozelka concentrated on lawns in this issue, under the title "Greener Grass".

We are pleased that the Lawn Institute was credited and mentioned in the text. An appreciable portion of the first page content was taken from the autumn Press Kit. University of Illinois research was also cited.

INSTITUTE LENDS PHOTOGRAPHIS SUPPORT

A telephone call from Allan Swenson, national columnist, asked the Institute for about twenty "good" pictures to point up lawn making and care in the up-coming Gardener's Almanac (for which Swenson is author), and for use in his nationally syndicated television series. A selection was made from the Institute's photographic library, on the order of those used in Institute publications. Mr. Swenson was asked to emphasize in his treatment the use of quality lawn cultivars and lawn care products. Several reprints were enclosed to exemplify the Institute's outlook.

SCOTTS ENTERTAINS GARDEN WRITERS

Scotts Seed Company provided a very hospitable, well-planned "field day" for garden writers July 28-30, including coverage of expenses while in Columbus-Marysville. While attendance was not large, the thoroughness of arrangements was a credit to the company.

In Marysville activities began with a short briefing, followed by field inspections of fertilizer trials, garden-plant research plants, turfgrass breeding test grounds, etc. A luncheon barbecue allowed many Scott executives to mingle with the group. The afternoon was devoted chiefly to inspection of laboratory, packaging, and communications facilities, with an evening cocktail hour and banquet.

Attendees were well impressed with the extensiveness of the Scott facilities, and the dedication to research and quality that is the foundation for the product line. The event provided an excellent medium for informal mingling with garden writers, a few of whom joined Dr. Schery for a visit to the Institute and its grounds.

BOOK PLANNED

Augusta Goldin, Ph. D. from New York, writes about plans for a book to be called Grass: The Everything, Everywhere Plant, due out in March of 1977. Miss Goldin requested materials and photographs, and will credit the Institute on the "acknowledgement page" for any help given.

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FAVORABLE MENTIONS

We're pleased with the review given Lawn Keeping, by E. Dexter Davis, publisher of "Greener Gardening, easier" designed especially for garden centers. Davis comments, "This is a book with 232 pages packed with just about all the things that affect home and public lawns - - - Lawn Keeping provides an outstanding understanding of lawn pride and problems."

Dr. Duich, Professor of Turfgrass Science at the Pennsylvania State University, writes of Lawn Keeping, "Without reservations, I believe you did an outstanding job in approach, organization flow and content. It was encouraging to me to be able to read something for the serious layman on turf with rationale. Congratulations:"

DIRECTOR VISITS LEADING BREEDERS

The first week of October Dr. Schery visited with Dr. Reed Funk at Rutgers University, with Dr. Joseph Duich at Pennsylvania State University, and was guest of Hercules in Wilmington for discussions with Ross Allmon, Institute trustee, Doris Watson and others.



TECHNICAL SECTION

ROADSIDE REPORT

The "Final Report" on roadside erosion control in Oklahoma, for which Wayne Huffine served as Project Director, was received in mid-September. This is a 141 page document giving details on 44 experiments dealing with grasses used for seeding Oklahoma roadsides, their mulching, soil stabilization and other related matters. The grasses found most satisfactory for Oklahoma seldom included the northern lawngrasses of particular interest to members.

Recommended as best adapted, all things considered, for eastern Oklahoma, are: K. R. bluestem and weeping lovegrass on south slopes, weeping lovegrass on north slopes, bermudagrass (for erosion control) on east and west facing slopes, with buffalograss often a second choice. In western Oklahoma switchgrass and sideoats, gramagrass were best for north exposures, weeping lovegrass for southfacing slopes; sideoats gramagrass worked well on both east-and west-facing cuts, with buffalograss and weeping lovegrass also useful. Other covers suggested include various Asiatic bluestem blends, sericea lespedeza, and honeysuckle "tubes".

As has usually been the case, straw or excelsior-mat mulches proved better than most of the spray-on polymers, fiber slurries and elastomers. Results were often confused because of failure due to drought. Growth stimulators offered no advantage in promoting shoot and root development of bermudagrass sprigs. Drilling seed (to a proper depth) seemed definitely advantageous. Weed control with herbicides (mainly propazine) was advantageous for giving seeded grass an advantage (measured as percentage of the cover). Under special circumstances smooth bromegrass, tall fescue, crested wheatgrass, wheat, rye, sudangrass, crested wheatgrass, indiangrass, and several blends were included in the test plantings. Most were very little inhibited by pre-emergence herbicides used at planting.

NITROGEN FIXATION IN GRASSES AFFIRMED

A group of Florida researchers has been successful in inoculating at least two grasses (species of Pennisetum and Panicum) with <u>Spirillum lipoferum</u>, with significant production benefits. Although nitrogen fixation draws upon plant energy, in many instances benefits exceed debits contributing to increased productivity. Nitrogen fixation in "grasses" was first noted in rice (a member of the grass family), and has now been demonstrated in maize, wheat, and several forage grasses. The Florida experiment was apparently not successful with bermudagrass, and so far there has been no demonstration (of which we are aware) of nitrogen fixation in the conventional lawngrass species (although it would be surprising if such is not eventually discovered). The research is reported in the September 10, 1976 issue of Science.

TALL FESCUE GERMINATION

Danielson and Toole, Oregon, report in the May-June <u>Crop Science</u> on investigations concerning tall fescue germination. Higher temperatures impose a block to germination (above about 18° C.), which can partly be reversed by red light irradiances.

PENNFINE SCORES WELL

A group of Pennsylvania and West Virginia researchers reporting in the May-June <u>Crop Science</u> note that Pennfine perennial ryegrass, as a forage, rated highest of any of the 13 grasses compared in non-structural carbohydrate concentration through spring. Non-structural carbohydrate content (TNC) is assuming increased importance as a source of energy, what with grain prices advancing. Neither Pennfine nor Kentucky bluegrass exhibited more than 4% loss of TNC from vegetative to bloom stage. Average TNC concentration was 50% higher in Pennfine ryegrass than in Kenblue Kentucky bluegrass.

WINTER SEEDING STUDY

Dr. Jim Beard passed along a summarization of his winter overseeding research in Texas, along with requests for varieties we might wish to have included in the tests (Institute samples on hand in Marysville were offered, although none represent new and unknown cultivars).

Ratings for the winter seeding studies conducted 1976-76 at Texas A & M University were included. In these comparisons most ryegrass varieties were seeded at 40 lbs/ M fescues at 30 lbs., bluegrass at 12 lbs., and creeping bentgrass at 3 lbs. Thorough attention established the seedings will.

Judged by repression of Poa annua (which was 63% represented where no winterseeding had been practiced), all ryegrasses gave creditable results (mostly in the 7-14% Poa annua range). In order of best performance (the differences are rather negligible) were: Birdie, Manhattan, Game, NK-200 and Lamora. In general the perennial ryegrasses afforded better competition to Poa annua than did the bentgrasses and fescues, although Poa trivialis had good ratings. Polystands were generally not so good as "straight" plantings. Based upon a general visual rating Citation lead, followed closely by Manhattan and Pennfine, with Yorktown, Birdie, Derby and Omega not far behind. Twenty perennial ryegrasses, 11 polystands, and 10 non-ryegrass plantings were entered in the comparisons.

INSECT GRAZERS STIMULATE GRASS

A study by Dyer and Bokhari, Colorado, reported in the Summer 1976 issue of Ecology, indicates that grasshoppers feeding on blue gramagrass stimulated regrowth processes materially more than did mere clipping. Other studies have indicated that substances in cattle saliva cause similar response in grass, and it is speculated that a train of event results from grasshopper grazing that triggers a number of below-ground responses in the grass root ecosystem. Sixty five-eighty live percent of the energy fixed by photosynthesis is ultimately used to drive below ground processes.

DISTINGUISHING PERENNIAL RYEGRASS CULTIVARS

Research by Nittler and Kenny, New York, reported in the July-August Agronomy Journal, utilizes tiller height, color, and percentage of coloration to distinguish cultivars of perennial ryegrass grown on a series of carefully controlled growth media.

RUTGERS 1976 TURFGRASS PROCEEDINGS

Received from Rutgers University in this quarter was the extensive (115 pages) compendium that included guest presentations as well as lecture papers from the 1975 New Jersey Turfgrass Expo.

Dr. Duell covered minimum mowing. He mentions that Adelphi and Bonnieblue bluegrasses, as contrasted to common types, remain fairly low and dense. Under chemical control he reviews timeliness of fertilization as well as use of growth retardants. Mowing provides physical control, but Duell feels that allowing grass to develop through seed production jeopardizes the stand if it is suddenly mowed back in droughty summer weather. In short many interrelating factors govern minimum growth.

Cinque reviewed nematode damage on Long Island, noted chiefly during stress (summer chlorosis). Troll reviewed nematodes more generally; in greenhouse tests little linkage between infection and turfgrass damage could be found. In the field nematocides reduced the number of parasitic nematodes, but response of the turf may have been more due to soil fertility interactions than due to nematode control. Rutgers researchers also reported no particular correlation with nematocide use and improvement in the condition of the turf. The usefulness of nematocides for northern turf seems to be complex and still equivocal.

Mruk reviewed maintenance of athletic fields. Halisky outlined and classified fungicides. Waddington reviewed at length what is meant by "sand", particularly as it relates to golf green construction. A number of papers dealt with golf course maintenance, and seasonal problems. Engel reviewed years of experience in bluegrass fertilization at Rutgers. He concludes that 1-3 pounds N/M annually should satisfy most lawns; he prefers September-October as the best season for fertilization. Fertilization did seem to increase the annual bluegrass population in Kentucky bluegrass, but the type of nitrogen was not influential. In general, heavier fertilization encouraged Fusarium roseum disease.

Ledeboer discussed grasses for athletic fields, and felt that tall fescue, although a tough grass, was not often let mature enough before being subjected to wear. He would prefer, in most cases, the new perennial ryegrasses (80% of a mixture) blended with bluegrasses (20% of the mixture). Other papers gave an extension agents views on lawn care, use of pre-emergence chemicals for curbing Poa annua, and the cost of golf course maintenance.

Rutgers researchers reported upon new crabgrass control chemicals, of which butralin and oxadiazon join proven products (but were no better than the better existing ones, as bensulide). Other research indicated that potassium had little or no influence on the summer durability of creeping bentgrass, and that nitrogen fertilization increased the chance the damage (but also hurried recovery). There was a slight advantage from late April fertilization in restricting Poa annua seedhead abundance, but the source of nitrogen makes little difference.

Ratings of Kentucky bluegrasses were made by Dickson and Funk, on turf rather generously fertilized but only modestly managed otherwise. In spite of suffering a fairly high percentage of Fusarium damage in 1975, Brunswick alone and in combination rated most highly, followed by P-59, Enmundi, Adelphi plus Glade,



RUTGERS 1976 TURFGLASS FROCLEDINGS (continued)

Windsor, Parade, Touchdown and Adelphi for the "top nine". Rating quite poorly were Park and other common types, as well as some of the other generally highrating selections (Pennstar, Fylking, Nugget) now suffering rather badly from Fusarium. It was noted that a number of bluegrass varieties suffered appreciable damage from arsenate treatments. Funk and Dickson also reported upon perennial ryegrass comparisons, of which Lofts syn. D-1 had distinctly the highest average score, followed by Diplomat, Omega, Citation and Yorktown before an appreciable drop to the second five. It was noted that no single variety is top-rating in all characteristics, and that in no two years is the same cultivar apt to be in top position.

Funk discussed backcross breeding techniques, and with other authors the possible use of perennial ryegrasses for food (cereal) seed. Funk and Duell reviewed a method for hastening development of polycross cultivars, while O'Knefsky and Engel reviewed rather thoroughly the advantages and disadvantages (and means for establishment or riddance) of zoysia in New Jersey. The authors mention that simazine is the most effective weed control for encouraging rapid establishment of zoysia, but should not be used by the non-professional; rather siduron, benefin, or DCPA might be used, combined with necessary broadleaf or post-emergence (DSMA) controls. To eliminate unwanted zoysiagrass the authors suggest dalapon or amino triazole. One gains the impression that the authors are lukewarm about recommending zoysia for New Jersey conditions.

In a separate reprint Funk and his associates discuss hybrids between Kentucky bluegrass and Canada bluegrass, and find that certain fertile hybrids exhibit possibilities for making attractive turf. Seed of this cross obtained from Funk some years ago and planted on the Institute grounds has never showed to much advantage, however, and under Institute conditions has not been the equal of Kentucky bluegrass.

FUSARIUM BLIGHT OVERVIEW

Fusarium blight is rapidly becoming one of the worst afflictions of lawngrass, particularly Kentucky bluegrass. Several experts who participated in a symposium on the subject at the Illinois Turfgrass Conference, give their views in the July issue of <u>Weeds Trees and Turf</u>. This provides an excellent summarization on Fusarium, concerning which a good bit of confusion and uncertainty still exist.

Couch, Virginia reviews the fundamentals, particularly from the laboratory testing viewpoint. He recommends benomyl and cultural controls (moderate fertilization, watering, taller mowing, - anything to reduce stress). Cole, Pennsylvania, emphasizes field observations, which don't always coincide with those from the laboratory. He analyses some of the stresses that may intensify the disease, but admits to considerable uncertainty about the affliction and how to control it. He feels we do not yet have scund understanding of the disease in the field.

Turgeon discusses the influence of cultural practices, and provides several tables indicating seriousness of Fusarium disease on particular varieties. Heavier fertilization increases the disease on the more susceptible varieties (Merion,

FUSARIUM BLIGHT OVERVIEW (Continued)

Fylking, Pennstar, Kenblue), and to some extent on intermediate varieties (Nugget), but seems not to bother Windsor and A-20. Other varieties showing strong resistance to the disease include Adelphi, Enmundi, Glade, Majestic, Monopoly, Sodco, Touchdown, and Victa, along with several coded selections. Baron, Bonnieblue, Galaxy, Parade, Plush, Ram I, Sydsport and Vantage show only mild susceptibility. The disease is said to be associated. with thatch build+up, but the correlation was not clear in the Illinois tests. Turgeon lists Brunswick, Glade, Nugget, Ram I and Touchdown as varieties that thatch readily; Baron, Fylking, Majestic, Plush, Sodco and Victa as having a slightly less tendency to thatch; Adelphi, Bonnieblue, Enmundi, Galaxy, Merion, Monopoly, Parade, Pennstar, Sydsport, Vantage, and Windsor with still less tendency; Kenblue and Park with least tendency of all. In general there was more Fusarium blight where the clippings were returned to the turf than where removed, at least under heavier fertilization (not true under light fertilization).

Vargas, Michigan discusses the possible relationship between Fusarium and nematode attack, an observation not generally supported by the other experts. Funk, Rutgers, discussed breeding of resistant cultivars (for all qualities, not only Fusarium resistance), and advocated general resistance not specifically related to a race of disease for perennial plants such as turfgrasses (usually a multi-gene matter, rather than the single-gene immunity often characteristic of annuals). He feels that there are genetic possibilities for tolerating Fusarium, and discusses at length the need for bluegrass cultivars for the transition zone (where the summers are long and hot). Several phenotypically distinctive lines have been identified. Among present varieties cited by Funk as being unusually resistant to Fusarium are (in order) Enmundi, Windsor, Adelphi, P-59 and Parade, all essentially undiseased; close behind are Sydsport, Bonnieblue, Adelphi combinations, Glade-Nugget, Vantage, Adelphi-Fylking, Touchdown, and Majestic, all less than 10% diseased. Merion and Baron are intermediate; Nugget, Fylking, Pennstar and others above 25% diseased. Funk goes on to discuss fine fescues, tall fescue and perennial ryegrass in a general way.

Meyer and Berns review greenhouse testing, in which cultivars were specifically inoculated with Fusarium (with cultured fungus, introduced into a small wound). Some strains of disease were more virulent than others, and some grass cultivars did not show as high a percentage of "takes" from the disease as did others. On the whole, however, the all-or-nothing approach from wound inoculation does not reveal a great deal about natural resistance under field conditions. Perhaps more practical was the introduction of varieties in 18-inch strips into a fairway rather heavily diseased; in the second year Fylking and Baron were severely damaged, but a number of coded selections remained relatively unaffected. First year grass remains relatively undamaged by any disease.

TEXAS TURFGRASS RESEARCH

We were pleased to receive in late July, through the good offices of Dr. Duble, Texas Agricultural Extension Service, several reports and a summary of research undertaken in Texas. Dr. Duble has authored a leaflet entitled "Lawn Care" suited for homeowner instruction in the maintenance of a St. Augustine lawn. He



TEXAS TURFGRASS RESEARCH (Continued)

suggests mowing at least two inches tall, means for irrigation, spring and autumn fertilization, chinchbug and grub control, and probably brownpatch disease control. Tables are provided for chemical choices for control of insects, diseases and weeds.

Another leaflet combines the research reported by Shearman and Beard that originally appeared in three articles in the <u>Agronomy Journal</u>. Results have been mentioned in Harvests previously. In brief, species such as perennial ryegrass, tall fescue and bluegraps wore better than did fine fescues, annual ryegrass of <u>Poa trivialis</u>. In general abundant cell wall content, and a high percentage of lignin, were associated with good wearing qualities. These conditions gradually increase from early spring through summer, then "fade" a bit as new growth begins in autumn. The research was conducted while Beard was still at Michigan.

Perhaps of most interest was consolidated PR-3364-3376, "Turfgrass Research", of March, 1976, which provides abbreviated reviews of more lengthy reports available from the experiment station. In the foreword some statistics on the cost of turf (especially golfcourses) in Texas are given. The construction of a golf green is then discussed, and it was shown that organic content in the surface soil had little influence on rapidity of bermudagrass establishment from sprigs. The alternative of using northern bentgrasses (a superior putting surface) was discussed, although the authors have some misgivings about maintaining bentgrass this far south.

Investigations are underway on the cause and effect of thatch in bermudagrass turf. Heavy fertilization is perhaps of first importance, but also slow-down of decay due to use of fungicides or other environmental modifications plays a role. Leaf clippings have little influence, and the cellulose portion of roots, stems and sheaths decays rather quickly, the lignin less rapidly. Certain species and varieties have higher lignin ratios, especially <u>Cynodon</u> <u>transvaalensis</u> (one of the parents of the Tifton series), perhaps explaining in part why these well-known cultivars tend to produce more thatch than common bermudagrass. Aerification and vertical mowing were influential in reducing thatch, and just as effective monthly as when practiced more frequently.

Fertilization of st. augustinegrass is being investigated, with phospherus shown to be important for rapid establishment, nitrogen for good color (although a general recommendation of one pound N/M monthly was "not all that better" than lightly fertilized turf). There was no significant difference in depth of rooting with different fertilization treatments, and it was noted that st. augustine is a rather shallowly-rooted grass (consequently with poor tolerance of drought).

Overseeding bermudagrass golf greens was discussed at some length, using as much as twenty pounds of bluegrass or fifty pounds of perennial ryegrass/M. As is well recognized, bluegrasses and fine feacues are a bit too slow to establish, perennial ryegrasses being much faster. A combination of <u>Poa</u> <u>trivialsis</u>-fine feacue-bent provided the best putting surface (except for color). Perennial ryegrass was superior to annual ryegrass, especially at lower mowing heights.

TEXAS TURFGRASS RESEARCH (Continued)

Ferrous ammonium sulfate, an older fertilizer ingredient now being revived, proved highly satisfactory for st. augustinegrass (it provides iron, nitrogen, and sulphur, all highly desirable on alkaline western soils tending to produce chlorotic growth). Aspon was very effective in controlling chinchbugs, even at "light" (3.7 pounds active ingredient per acre) rates.

St. augustine is touchy about the usual northern herbicides, but tolerated many combinations of 2,4-D-MCPP-dicamba which were quite effective in controlling a number of broadleaf weeds. There was some indication that physiological disturbance occurred resulting in late increased susceptibility to brownpatch (and some stunting). In general atrazine provided good control of most weeds with the least discoloration to st. augustine.

Pre-emergence herbicides were evaluated on st. augustine, and on Tifgreen and Tifway bermudagrasses. Only bensulide seemed to damage the bermudagrasses, but st. augustine was rather "touchy" with most herbicides. Kerb provided excellent control of <u>Poa annua</u>, and Ronstar at higher rates was very good without inhibiting the st. augustine a great deal. In general, where there was effective weed control spread of st. augustine was retarded. In another study several growth regulators repressed seedhead formation or clippings production in both st. augustine and bermudagrass, but st. augustine reacted differently than did the bermudagrasses tested. One gathers that the authors were not too enthusiastic about growth regulation because of danger of discoloration to the turfgrass in exchange for rather limited growth suppression.

Two cultivars of st. augustinegrass (Scotts SAV-5 and Floratam) seem to have excellent resistance to chinchbug attack, out of twenty-three "improved" selections screened for this characteristic. Turf diseases prominent in Texas are described individually, but without recommendation for control. Insecticide residues in the soil, compared to that picked up from fatty tissues of grubs, are cited; tremendous "biological magnification" occurs (up to three hundred fold in some grubs).

MICHIGAN STATE UNIVERSITY RESEARCH

Dr. Schery visited Michigan State University July 16, reviewing research there with Drs. Payne, Rieke, Vargas and Kaufmann. The elaborate field and greenhouse plantings characteristic of the excensive research done at Michigan State University were inspected.

Individual cultivars were beginning to show differences, due primarily to Pythium or Fusarium attack (dollar spot was not much in evidence). In general appearance Nugget was outstanding (but is said to suffer some dollarspot attack later), while cultivars such as Adelphi, Baron, Glade and others not yet commercially important were better than average. Very few cultivars were at all good in the shade plantings, Nugget being something of an exception.

Dr. Payne's breeding work continues, with emphasis on the fescues. After several years of inbreeding in isolation, pure lines seem to be emerging and the ground-work set for directed crossing. Dr. Payne has hopes for a now well-tested meadow fescue that seems to have long life and hardiness in Michigan; it would be suited for low-maintenance (perhaps unfertilized) turf where coarseness can be tolerated (e.g. roadside, cemeteries, etc.).

MICHIGAN STATE UNIVERSITY RESEARCH (Continued)

Dr. Vargas' work deals with disease analysis, and is primarily conducted in greenhouse testing. He is concerned about the incidence of Helminthosporium on fine fescues, apparently the chief cause for their debilitation going into summer at Lansing. In other cases it appears that insects (e.g. <u>Ataenius</u>, billbug, etc.) are the cause of turf demise in summer rather than "disease" as is often diagnosed (he is unable to isolate disease organisms from the dead and dying turf).

Dr. Rieke has elaborated upon some of the old plots established by Dr. Tyson. on which some plantings are many years old. Of interest at this time is a same definite response to potassium, something much theorized but seldom seen. Where potassium additions have been made the turf is considerably greener, denser, and more responsive. Calcium, too, has elicited response, in overcoming herbicide setback and encouraging growth (including weeds, such as <u>Poa</u> <u>annua</u>, which then need extra control).

All in all the turfgrass research, and an extensive teaching program, seem ongoing at Michigan State University little diminished by Dr. Beard's departure. This augurs well for the education of advanced-degree turfgrass specialists for which the demand nationally continues.

SCOTT RESEARCH

Some of the highlights of Scott's research, as shown to garden writer visitors, were as follows. Screening of crabgrass preventers continues, with bensulide used as the standard for comparison. Emphasis is being given annual flowers, for which, nationally, not much precise information has ever been developed; herbicide and fertilizer combinations are much in mind.

With new lawns, emphasis is on a starter fertilizer rich in phosphorus. After the first few weeks, it is felt that success depends upon phosphorus (prior to that there are some reserves from the seed), and since the young roots are near the surface there is no particular need to have the phosphorus mixed into the soilbed. It is felt that established turf can survive and be revived with later fertilization, but that there will be no stand at all if young turf does not receive an appropriate starter fertilization.

Attention is being given proportionment in blends and mixtures, for compatibility and competitiveness, as well as durability under certain conditions (as in shade). Bristol plots looked very good in shade, but Nugget was suffering rather badly from dollarspot on July 29.

Investigations continue, not only on grass, but all biological systems, particularly as regards fertilization. It is felt that much fertilizer nutrient is wasted, applied when not needed (as phosphorus and potassium). This is probably more the case with florists crops and foliage plants than with grasses. Investigations are underway leading towards products for nurserymen and other growers.

NUTRITIONAL STUDIES

Roy Goss and his colleagues at Puyallup, Washington, reported on turfgrass nutritional studies in <u>The Journal of the Sports Turf Research Institute</u> (England). The studies indicate appreciable influence of, and interaction between, major and secondary nutrients so far as presence of <u>Poa annua</u> is concerned, and color or disease of bentgrass turf. The research was undertaken in Washington.

In the <u>Poa</u> <u>annua</u> studies mild additions of sulphur increased incidence of <u>Poa</u> <u>annua</u>, while heavy rates reduced it. Phosphorus increased <u>Poa</u> <u>annua</u>, especially at intermediate nitrogen levels. In the absence of sulphur, nitrogen increased populations of <u>Poa</u> <u>annua</u>. <u>Poa</u> <u>annua</u> is more prolific at higher pH than lower. In summary, presence of phosphorus, increased pH, and intermediate levels of nitrogen favored <u>Poa</u> <u>annua</u> over Astoria bentgrass, but addition of high rates of sulphur reduced Poa annua very significantly.

The influence of these nutrients was also investigated on color and disease of Astoria bentgrass managed as a putting green. Color was improved by increasing rates of sulphur so long as nitrogen was adequate. Fusarium disease was inhibited by high levels of sulphur (nitrogen tends to increase disease at low levels but decreased it somewhat at high levels). Phosphorus and potassium helps suppress disease slightly, while algae, earthworms, and ophiobolus patch disease were eliminated by abundant sulphur. In summary, sulphur was especially influential in improving bentgrass color (unless nitrogen was absent); it seems as though nitrogen and sulphur are partners for improving color. Occasionally phosphorus additions resulted in poorer color. Sulphur had a profound influence on discouraging Fusarium, while other nutrients in balance and other combinations had somewhat lesser influence.

RECEIVED FROM RHODE ISLAND

The Rhode Island experiment station kindly sent a reprint of a report that appeared in the Jan.-Feb. Agronomy Journal, authored by Dr. Richard J. Hall. In this he reported upon techniques for measuring Merion bluegrass assimilation by means of "tagged" carbon dioxide. Within fifteen minutes between 19% and 69% of the introduced carbon could be accounted for in the turf, the velocity being more rapid in September, slower (but of greater volume) in December. Heavily fertilized grass absorbed more carbon dioxide than did low fertility grass, but in summer it moved more rapidly and deeply into the root system under low fertility.

FRESH IDEAS ON PEST CONTROL

A presentation by Atsatt and O'Dowd, California, ("Plant Defense Guilds") appeared in the July 2 issue of <u>Science</u>. The authors explore several premises that go against the conventional wisdom. They suggest, for example, that weeds (not necessarily in the crop, but nearby) are advantageous, in fostering predators which keep herbivorous pests under control. They also feel that diversity "confuses" pests (repelling, masking, attracting, decoying) so that their inroads are reduced and their genotype not so strongly affected by selective pressures that eventually yield physiologically resistant pests. In short they view the whole plant community as important in maintaining balance, and for avoiding the evolution of specialized herbivores.

FRESH IDEAS ON PEST CONTROL (Continued)

Thus some plants, although quite susceptible to pests, may escape simply because they grow in an environment where other options for the pests occur. The authors postulate that there is advantage to having susceptible plants available in order to avoid build-up of especially virulent pest populations. They cite the case of wheat rust overcoming bred-in resistance to this disease under monoculture, but not when alternated with non-resistant varieties (one might presume the same for lawngrass?). The pests do not buildup the necessary virulence when not pressured constantly for this adaptation. Thus, resistance to a pest is meaningful only in the context of the total environment. No lawngrass, for example, would be expected to remain perpetually free from a particular disease unless the selective pressure for this disease was reduced (as by diverse plantings).

So, here's another argument for heterogeneity (blends, mixtures, even separated plantings of different varieties). Older, susceptible varieties should endure well when the pests are provided options. It's an argument, too, for mixed, less-neat gardening! Diversity spawns stability. The conclusions bring into question the ecological theory of "competitive exclusion", whereby two very similar varieties theoretically will not persist indefinitely in balance. In this sense it is "good news" for blends and mixtures. It is as though one lulls or appeases the pests (whereby they do not become so "pestiferous"), rather than declaring all-out war against them (making them counter-attack with vigor).

NEW HERBICIDES TRIED FOR TURF

Johnson, Georgia, reporting in the September, <u>Weed Science</u> finds methazole and metribuzin of some use for crabgrass and goosegrass control in certain southern species. By and large treatments did not permanently injure bermudagrass or centipedegrass, but st. augustine grass was severely injured (as was Kentucky bluegrass by methazole at any rate tried). While rates are critical, these findings are encouraging to those wanting to establish centipedegrass, for which control of annual grasses has been difficult without injury to the centipede.

IDENTIFICATION OF BLUEGRASS CULTIVARS

Wehner, Duich and Watschke, Pennsylvania, report on research for identifying bluegrass cultivars by biochemical means in the July-August <u>Crop Science</u>. Using peroxidase isoenzyme, the researchers find generally consistent banding reliability achieved by eletrophoresis, distinctive for most individual cultivars. Of 15 cultivars tested, 11 could be separated individually, and the remaining 4 could be paired. The methodology is tedious (seed is especially grown for 3 weeks, then subjected to a highly technical extraction), but might serve as a means for identification under critical circumstances.

WANT TO RECOMMEND GRASS FOR SOIL-IMPROVEMENT?

Research reported by White et al, South Dakota, in the July-August Agronomy Journal, compared various factors in cultivated ground with the same factors eight years after planting to several kinds of pasture. Organic content and nitrogen increased a little each year, but phosphorus did not. These tame pastures gradually improved the soil the same as would natural prairie.

GLYPHOSATE WORKS

Research of Moshier, Turgeon and Penner, Michigan and Illinois, dealing with the use of glyphosate and siduron on turfgrass establishment, is recorded in the September Weed Science. While there may be some suppression under laboratory conditions, there was no disadvantage to the use of these helpful chemicals under field conditions; none of the glyphosate treatments reduced turfgrass germination or growth. Several varieties of bluegrass, bentgrass, and fine fescue were tested.

INCREASE IN PESTS WITH 2,4-D

An article in the July 16 <u>Science</u>, by Oka and Pimentel ("Herbicide 2,4-D Increases Insect and Pathogen Pests on Corn"), notes that leaf aphids, corn borers, and southern leaf blight were more abundant on corn which had been exposed to 2,4-D than on unexposed corn. Higher protein levels triggered in the corn exposed to 2,4-D may account for the favored growth of pests. The study is illustrative of the fact that a pesticide can weaken resistance of a treated plant to other types of infestation.

REPELLENT REPORTED EFFECTIVE

A review by Stone, London, in the May-June issue of <u>World Crops</u>, noted that SAAS (synergised aluminum ammonium sulphate) has been cleared in the United Kingdom for repelling birds and rodents. It is reported highly effective with bagged seed for example, and in no way harmful to the crop (some carry-over is even reported in the seed which protects it from rodents and birds at planting). In one test in France it was highly effective in protecting fruit on trees, superior to spreading a net. The compound repelled birds from the airport runways in Israel, and there is promise of usefulness for forestry seedings.

RENOVATION OF SOUTHERN LAWNS

Johnson, Georgia, reporting in the September issue of <u>Weed Science</u>, finds that glyphosate followed by broadleaf weed control is effective in renovating mixed turfs (principally common bermudagrass) to improved varieties of bermudagrass, and often other turf species. Dalapon is also effective in controlling bermudagrass, but paraquat and cacodylic acid were ineffective. If any appreciable residual bermudagrass remains, it severely contests slow-growing species such as zoysia and centipede. Johnson concludes that glyphosate (or dalapon) helps change a common bermudagrass lawn successfully to improved varieties of bermudagrass, but that even with good weed control zoysia or centipede may falter.

MORE ON TURFGRASS WEAR

Harvests has summarized studies on turfgrass wear, principally those by Anda and Beard, undertaken in Michigan. Beard reports further in the July issue of the U.S.G.A. Green Section Record.

MORE ON TURFGRASS WEAR (Continued)

Beard states that maintenance is highly important, but that individual cultivars display considerable wear difference, too. He notes that a taller-mowed, moderately fertilized turf, with a reasonable thatch, may wear ten or fifteen times as well as a short-mowed, highly forced turf with no thatch.

In a table noting verdure remaining after considerable wear by a wear machine, of eighteen Kentucky bluegrass cultivars the ranking was as follows (from most to least verdure): A-34, Merion, Baron, Nugget, A-20, Georgetown, Primo, Fylking, Adelphi, Newport, Sodco, Galaxy, Bonnieblue, Belturf, Campus, Sydsport, Kenblue and Park. Among commercially available bentgrasses the ranking was: two Michigan coded selections, Penncross, Pennpar, Cohansey, Seaside, Toronto, Emerald, Astoria.

BREEDING SUPERIOR LAWNGRASSES

Phillip Busey reviews in the May-June issue of <u>World Crops</u>, "Genetics and Weed Problems". He cites instances of strains of crop plants resistant to herbicides, for example, that could be rather easily bred into the crop for easier maintenance. Read "Lawngrass" for "Crop"! Likewise allelopathy could be increased in a lawngrass selection, and of course such characteristics as toxicity or unpalatability to insects. Busey theorizes that we should keep weed companion races of various plants in our stockpile of breeding resources, in addition to a multitude of cultivated varieties (and wild relatives), as sources for useful genes that could be bred into the crop.

ANNUAL GRASS CONTROL IN SOUTH

Johnson, Georgia, reports in the July <u>Weed Science</u>, on experiments for controlling crabgrass and goosegrass with pre-emergence herbicides. Timing of application was important. Herbicides applied in May generally failed to stop crabgrass, as did some applied too early (February). Oxadiazon and butralin controlled goosegrass for the full season when applied in March or April, and generally oxadiazon was successful in May as well. Effectiveness of the crabgrass controls varied with location as well as with timing. This inconsistency makes it difficult to rate any pre-emergence herbicide as invariably superior, now one, now another providing better performance depending upon conditions.

BLUEGRASS WEAR RATINGS

Quoting Dr. Beard, from comments made at a panel discussion during the 1976 Turf and Landscape Institute in California, California Turfgrass Culture (Spring 1976) these comparative ratings for eighteen bluegrass cultivars were made for ability to resist wear:

Excellent -	A-34
Good -	Baron, Merion, Nugget, A-20, Georgetown
Medium -	Adelphi, Fylking, Newport, Primo
Fair -	Belturf, Bonnieblue, Galaxy, Sodco
Poor -	Campus, Kenblue, Park, Sydsport