AMERICAN LAWN APPLICATOR

September/October 1981
Volume II, No. 5

Herbicide Evaluation Tests by Dr. Hull

...ptoria Blight spread by lawn mower tires

Carl Schwartzkopf
U. S. Golf association
Golf House
Far Hills N. Jersey, 07931

ADDRESS CORRECTION REQUESTED
American Lawn Applicator
31505 Grand River Ave.
Farmington, Michigan 48024 -9990

BULK RATE
U.S. POSTAGE
PAID
ANN ARBOR, MICH.
PERMIT NO. 571

Roundup® makes him a one man army to fight weeds.

One man with Roundup in a backpack sprayer can handle many weed control jobs that once took several people.

General weed control. Edging. Trimming. Small renovation jobs. Roundup® herbicide helps make all of these a one man job.

Sprayed on the foliage of tough, actively growing weeds, Roundup goes right down to the roots, controlling the entire plant. Treated weeds won't grow back. So there is less need for repeat treatments, mowing and hand weeding.

One man can do the work of several, and in less time. This can mean a savings for you in time, labor and maintenance costs.

Reach for Roundup today, and put your own one man army to work.

Nothing works like Roundup.

Monsanto

FOR LITERATURE
CALL TOLL-FREE
1-800-621-5800
In Illinois, 1-800-972-5858.

ALWAYS READ AND FOLLOW THE LABEL FOR ROUNDUP.
Roundup® is a registered trademark of Monsanto Co.
RUP-SP1-114D © Monsanto Co. 1981

Circle No. 1 on Reader Reply Card

 Is published bi-monthly for $10 per year by American Lawn Applicator, 31505 Grand River, Farmington, Michigan 48024, Phone 313-474-4042.

POSTMASTER: Send address changes to American Lawn Applicator, 31505 Grand River, Farmington, MI 48024.

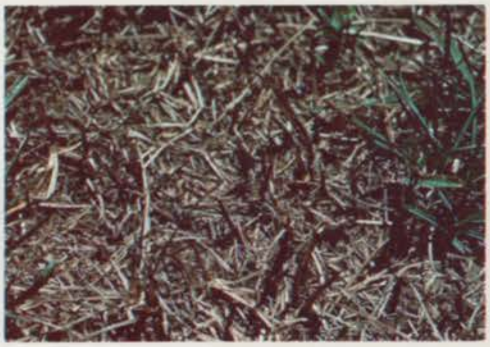
Disease Continues to Plague Lawn Care Companies

by Stephen Brown, Tru Green Corp.; Contributing Editor A.L.A. Magazine

Last year an article entitled "Septoria? Or What?" appeared in the Sept./Oct. issue of **ALA**. The subject of that article was a mysterious disease which was devastating lawns in the northern midwest. The symptoms associated with this disease included "flagged" leaf tips, whitish transverse bands on leaf blades, irregular patches of chlorotic turf, and an almost "crispy" dryness in the affected area. It was pointed out that the disease was not well understood and that a considerable amount of research remained to be done.

Close-up shows transverse band on hybrid bluegrass

Symptoms include flagged leaf tip and chlorosis



Close-up reveals stubble of rotted crowns

Pock-marked appearance of bluegrass turf

The article concluded that, until another outbreak occurred, we really wouldn't know much about this problem.

In July, 1981, that outbreak occurred and a great many home lawns were damaged. As it did in 1980, this year's outbreak came during a period of hot, humid weather when there was little or no rain for three or four weeks.

During the past year three university pathology labs and one independent laboratory have named Rhizoctonia as the primary cause of the damage which has occurred. Recently, however, pathologists have begun to suspect that Nigrospora, a little-known disease of corn and wheat, may be responsible. Until the pathogen can be routinely isolated and the symptoms

General symptoms on bluegrass

Hybrid bluegrass on Michigan sod farm in July

reproduced in the laboratory, we won't know exactly what we are dealing with.

At this point, however, we *do* know quite a bit about how the disease begins, how it is spread, and what chemicals control it. Look for it to start as small, bleached patches that resemble Dollar Spot. These symptoms will appear when daytime temperatures are in the upper 70's and 80's and nighttime temperatures don't drop below 60°F. This disease seems to be very temperature sensitive, and symptoms will disappear rapidly in cool periods. High humidity also apparently plays a role in the development of the disease. Often, outbreaks have occurred during a drought when homeowners are watering their lawns regularly.

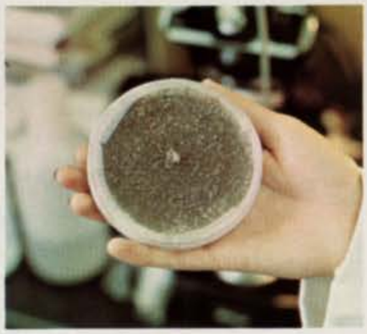
When conditions are optimum, this disease can be rapidly spread by lawn mowers, garden hoses, and by walking over affected areas. Symptoms have been observed to break out along tire tracks and in the shape of footprints within 24 hours after contamination.

This disease can be easily controlled if the proper fungicides are applied *before* the crowns of the grass plants are infected. At the final stage of this disease, sunken areas which contain only the rotted stubble of dead crowns appear. Obviously, at that point, there is no recovery. Research has shown that iprodione, chlorothalonil, and

Symptoms may appear first on an individual piece of sod

Three-year-old bluegrass lawn severely damaged in July, 1981

Disease is easily spread on lawn mower tires



Laboratory isolation from diseased turf shows Nigrospora fungus

Note that disease is rarely found in shaded areas

Drought on lawn in foreground and disease in background

maneb all provide excellent control if applied before the final stage is reached.

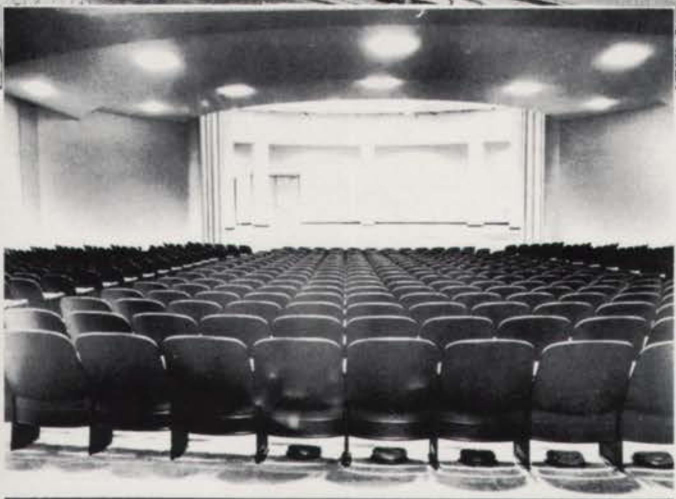
It appears that this disease affects both bluegrass and fine fescue, although the symptoms are somewhat harder to see on fescue. Several of the hybrid bluegrasses seem to be particularly susceptible, as the photos of the sod farms indicate.

At the moment of the most difficult aspect of this situation is having to explain to customers. Without knowing for certain what pathogen is responsible, lawn care professionals have had problems convincing customers that they are dealing with a disease and not chemical burn. Fortunately, Michigan State University has a pathology graduate student working full time on the problem, and she expects that much information will be available in the coming months. Cindy Brown, whose research is being supported by contributions from Michigan lawn care companies, has been working closely with Dr. Joe Vargas since last June. Questions or information concerning this disease should be directed to Ms. Brown, Pesticide Research Center, Michigan State University.

Steven Brown is the Director of Agronomic Programs for the Tru Green Corporation. He holds B.S. and M.S. degrees from Indiana University and Michigan State University. Mr. Brown has been actively involved for the past two years in the identification and control of the disease discussed in the accompanying article. He is also a contributing editor to ALA magazine.

Steven Brown, author

9th annual
GREEN INDUSTRY SEMINAR



The Auditorium is designed to provide close association between stage presentations and audience.

Plan on attending one of the country's most important turfgrass events— the 9th Annual

GREEN INDUSTRY SEMINAR!

This year's Seminar will be held November 4 & 5 at the Community Arts Building, Michigan State Fairgrounds, Detroit, Michigan and will feature many exhibits and lecturers on current turfgrass subjects. Pre-registration is only $9.50 per person, including lunch. Booth space rental (10 x 16) only $95.00. Use form below. November 4th – Turf, November 5th – Ornamentals.

GREEN INDUSTRY SEMINAR
Pre-registration Form

I WANT TO BE A HERO and get ahead of my competition!

Name: ______________________

Address: ______________________

____

☐ Enclosed is a check for $_____ to pre-register ____ persons at $9.50 each per day

☐ Send data on local hotel/motel accommodations

☐ Nov. 4th – Turfgrass ☐ Nov. 5th – Ornamental

Mail to: Phil Goulding, Number 1, Public Works Drive, Pontiac, MI 48054. Registration Deadline October 21, 1981

GREEN INDUSTRY SEMINAR
Booth Space Rental Form

Name: ______________________

Address: ______________________

____

☐ Please reserve booth space (10 x 16) $95

☐ Check enclosed ☐ invoice above address

☐ Send data on local hotel/motel accommodations

Mail to: Phil Goulding, Number 1, Public Works Drive, Pontiac, MI 48054. Registration Deadline October 21, 1981

Long Term Herbicide Use— A Hidden Problem?

by Richard J. Hull, University of Rhode Island

Richard J. Hull is a Professor of Plant and Soil Science at the University of Rhode Island. He received his B.S. and M.S. degrees from the University of Rhode Island in agriculture and agronomy respectively and his PhD. in botany from the University of California at Davis. For five years, Dr. Hull studied the physiology of perennial weeds at Purdue University in Indiana. At Rhode Island, his research has concentrated on the nutrition of turfgrass, woody ornamentals, and tidal salt marsh vegetation.

Lawn care professionals have come to depend upon pre-emergence herbicides to prevent crabgrass invasion of turf. There are several highly effective herbicides which can be used for this purpose and their most beneficial methods of use have been discussed in earlier **ALA** articles by John Jagschitz (1981) and Peter Dernoeden (1981). Because these materials are used as a preventive measure, they have become part of turf management programs and are often used year after year on the same turf areas. This long term use of a herbicide may weaken the turf or aggravate injury caused by disease or insects. All herbicides alter the physiology and metabolism of plants to which they are applied. These effects of herbicides on turfgrass plants are often of short duration and result in no permanent injury. However, short term herbicide evaluation tests are not designed to identify potential problems which may result from repeated application over several years under a range of environmental stress conditions.

An early indication that repeated herbicide applications could result in turf management problems was reported by Lloyd Callahan at the University of Tennessee (1972). He noted that creeping bentgrass turf became more susceptible to disease infection when it had been treated with preemergent crabgrass herbicides for several seasons. He attributed much of the turf injury to reduced root growth and increased vulnerability to disease and drought. Jagschitz at Rhode Island (1980) noted a reduction in root development of immature Kentucky bluegrass sod which had been treated 15 weeks earlier with bensulide (BETASAN), benefin (BALAN) or DCPA (DACTHAL) at rates recommended for crabgrass control. He concluded that sod could encounter difficulty in establishment when planted in a landscaping operation within a few weeks after treatment with these herbicides.

To gain a better understanding of turfgrass response to repeated herbicide application, a field plot experiment was established on 'Merion' Kentucky bluegrass seeded in 1971. The herbicides were applied at the rates indicated in Table 1 in 1972 and each year thereafter for five years. Siduron (TUPERSAN) was first applied in 1971 during the year of establishment because seedling Kentucky bluegrass plants can tolerate this herbicide. Dicamba (BANVEL) and DSMA (ANSAR DSMA) were included in this study because they are commonly used on an annual basis for postemergence broadleaved weed and crabgrass control respectively. Maleic hydrazide (MH) has received some use on turf as a growth retardant and was included in this study to compare its

"All herbicides alter the physiology and metabolism of plants to which they are applied."

Subscription Form

AMERICAN LAWN APPLICATOR –

devoted exclusively to the lawn applicator

Subscribe now! Don't miss a single issue

Each issue covers the latest in new developments, products and applications in this dynamic industry.

Subscription Form

AMERICAN LAWN APPLICATOR

31505 Grand River Avenue
Farmington, Michigan 48024
(313) 474-4042

EASY AS 1-2-3

1. Fill out card.
2. Write check or money order.
3. Enclose in an envelope.

CHECK YOUR CHOICE:

- ☐ 1 year $10.00
- ☐ 2 years $17.00
- ☐ 3 years $23.00

U.S. Currency

Name

Company

Address

City/State/Zip

CHECK MUST ACCOMPANY ORDER FOR SUBSCRIPTION TO START

Table 1. Application data on herbicides used in the turfgrass tolerance study.

Common name	Trade name	Rate used	Formulation used*	Time of application
		lbs. ai/A		
Siduron	Topersan	12	G	Late May
DCPA	Dacthal	10	G	Late May
Benefin	Balan	2	G	Late May
Bensulide	Betasan	10	G	Late May
DSMA	Ansar DSMA	4	L	Mid-June
Dicamba	Banvel	0.5	L	Mid-June
MH	Slo-Gro	5	L	Mid-June & September

** G = granular L = liquid*

effects with those of the herbicides. Because herbicide action is often influenced by the growth rate of the plants being treated, two fertility levels were included in this study. Turf was maintained at the minimal and the luxury rates of 2.5-1-1 and 10-4-4 lbs. of $N-P_2O-K_2O$ per 1000 sq. ft. per year respectively.

The initial responses of the turf to these chemicals in 1971 and 1972 have been reported by Larry Smith (1973) in his master of science thesis. In this report, I will summarize observations made between 1974 and 1976 after the herbicides had been applied for several years. Turf quality scores recorded during the 1976 growing season provide an overall view of the herbicide influence on turfgrass performance (Table 2). No herbicide caused a decline in the quality of moderately fertilized turf after five consecutive annual applications. Heavily fertilized turf exhibited poor quality following several annual treatments with bensulide. Jagschitz (1980) noted that both benefin and bensulide reduced the rooting of transplanted sod for several weeks after application. However, in this study, benefin caused no loss of quality at either fertility level. This suggests that bensulide inhibition persisted longer in the season or secondary factors were involved in turf injury. Much of the damage reflected in the low quality scores of heavily fertilized bensulide treated turf was caused by the feeding of Japanese beetle grubs. High fertilizer rates reduced root growth and bensulide may have inhibited root growth even further so that grub feeding caused intolerable root loss and turf destruction. This is an example of herbicide injury and excess fertility predisposing the turf to damage by another agent— in this case, an insect.

Of the postemergence materials, only MH caused a notable reduction in turf quality and this occurred only during the spring and early summer period following application. Again the turf receiving the high fertilizer rate showed the most severe and persistent turf injury. Because injury from fall MH applications persisted into the following spring, this material was applied only in early June after the 1972 season. This explains why in 1976 there was no quality decline during the late summer and autumn.

Turf receiving high fertilizer rate showed the most severe and persistent damage

The comparative injury sustained by turf from herbicide application can also be assessed by infrared color photography (Figure 1). This technique for determining stress was first applied to turfgrass research by Prof. Glenn Wood at the University of Vermont (1974). Turfgrass leaves experiencing moisture deficiency or almost any stress condition will reflect less infrared radiation than healthy vigorously growing leaves. Thus, turf appearing deep red on infrared color film is healthy while that appearing light red or pink is under stress or is diseased. Turf appearing green or blue on infrared film is dead or severely injured. Figure 1 is a pair of color photographs taken on July 2, 1975 and shows substantial injury on the high fertility plots in the foreground and virtually no injury on low fertility plots in the background. Much of this

Long Term Herbicide Use

Figure 1: Herbicide treated plots: Normal color left and infrared reflectance right. Front two tiers high fertility, four background tiers low fertility. Herbicides on high fertility plots: Front tier left to right; bensulide, control, DSMA, and benefin, 2nd tier; dicamba, DCPA, MH, and siduron. Photographed July 2, 1975.

early summer damage was the result of an infection of stripe smut which was most damaging to heavily fertilized grass. This disease contributed to the poor quality scores recorded on all high fertility plots during the spring and early summer of 1976 (Table 2). Plots exhibiting the greatest turf damage in early July included those treated with bensulide (lower left), benefin (lower right), and siduron (upper right). Least injured plots included the control (middle lower left) and those treated with DCPA (middle upper left) and MH (middle upper right). MH had been applied only six days before these photographs were made and no injury had as yet appeared. The deep magenta of the heavily fertilized grass in the infrared plate indicated that the surviving grass was healthy. This was confirmed by the good recovery observed on these plots in 1976 (Table 2). The low fertility plots in the four background tiers (Figure 1) showed little variation in either natural color or infrared film. This tended to be the case throughout the experiment. Grass maintained at moderate fertility, showed only transient injury to MH or DSMA and no herbicide aggravated damage by diseases or insects. Because, in low fertility turf, a greater percentage of photosynthetic product translocates to the roots (Hull 1981), the health and growth of roots will be favored and the grass should be better able to withstand environmental and biological stresses.

Turf maintained at moderate fertility showed only transient injury...

Herbicide induced differences in root activity was demonstrated by the distribution of carbon-14 labeled photosynthetic products in heavily fertilized turf exposed to $^{14}CO_2$ as described in an earlier **ALA** article (Hull 1981). The $^{14}CO_2$ was introduced to the turf on July 23, 1974, 53 days after the preemergent crabgrass herbicides had been applied for that year. The amount of carbon-14 present in the roots was determined one and 72 hours after exposing leaves to $^{14}CO_2$ (Table 3). The reduced translocation rate from leaves to roots of benefin and bensulide treated turf was evident one hour after exposure to radiolabeled CO_2. The impeded translocation was much less evident 72 hours after $^{14}CO_2$ exposure when only bensulide treated turf continued to show reduced transport to roots. The benefin inhibition was probably less severe almost 7 weeks after application while benesulide continued to be inhibitory. This is consistent with findings of Jagschitz (1980) who observed that mature sod treated with bensulide showed inhibited rooting after transplanting for a longer time than sod treated with benefin. Siduron and DCPA showed no signs of inhibited root function based on carbon translocation. The control plots suffered weed invasion after the sod was thinned by stripe smut. This weed interaction with the turfgrass plants could have contributed to reduced photosynthate transport to roots in the control plots (Table 3).

What does all this say concerning the advisability of using herbicides on a routine basis for weed prevention? Since crabgrass is so much more difficult to

Table 2. Turfgrass quality scores* of herbicide treated plots during the 1976 season.

Herbicide	Fertilizer rate	Date scored					
		7 June	15 July	4 August	13 September	7 October	11 November
Siduron	low	6.0	6.2	5.8	5.2	5.6	3.5
	high	3.8	5.2	6.5	6.5	6.8	7.5
DCPA	low	6.5	6.4	6.2	5.0	5.4	3.2
	high	4.8	4.8	6.4	6.5	7.5	7.5
Benefin	low	6.8	6.2	6.0	5.2	5.8	4.2
	high	3.8	4.5	5.6	6.0	6.5	7.8
Bensulide	low	6.8	6.6	5.9	5.0	5.4	3.5
	high	1.2	1.8	2.5	2.8	4.6	6.8
DSMA	low	6.8	6.6	6.4	5.5	5.6	3.5
	high	4.0	4.8	7.0	6.8	7.4	7.2
MH	low	4.5	5.4	6.9	5.8	6.1	4.2
	high	2.8	2.0	3.5	4.8	6.2	7.2
Dicamba	low	6.5	6.4	5.9	5.2	5.6	4.2
	high	4.0	5.0	6.2	6.0	7.4	7.8
Control	low	6.0	6.5	6.1	5.0	5.8	3.0
	high	3.5	4.5	6.1	5.5	6.9	7.2

** Turf scores: 9 = excellent turf, 1 = bare soil or dead grass*

*** Fertilizer rates: low = 2.5-1-1 & high = 10-4-4 lbs. N-P_2O_5-K_2O/1000 sq. ft.*

Table 3. ^{14}C-photosynthate recovered in roots of herbicide treated Kentucky bluegrass turf.

Herbicide	^{14}C recovered in roots		% recovered ^{14}C in roots	
	1 hr.	72 hrs.	1 hr.	72 hrs.
	- - - - - cts./min.- - - -		- - - - - - - - - %- - - - -	
Siduron	1256*	8860	0.282	1.21
DCPA	2330	6635	0.317	1.00
Benefin	767	7635	0.091	1.08
Bensulide	577	5412	0.077	0.81
Control	978	4836	0.138	0.73

** All values are the average of 4 determinations.*

control once it has germinated and is evident in the lawn, the preventive preemergent materials will continue to be the principle tools for suppressing this weed. Because not all of the available herbicides have the same inhibiting effect on heavily fertilized turf, siduron and DCPA caused little if any quality loss or impaired root activity, there would be an advantage in rotating herbicides so that the detrimental effects of one material do not become compounded over several years. This option is especially attractive on bluegrass lawns where there is the greatest number of herbicides which can be safely used (Dernoeden 1981). In shaded areas, where the fescues are likely to be a more significant turf component, crabgrass will probably be no problem and herbicides need not be used. The repeated use of postemergent herbicides appears to have few persistent adverse effects on turf quality. However, even here rotating materials and tailoring the herbicide treatment to the specific weeds present is advisable. In the final analysis, the concluding comments made by Jagschitz in his earlier **ALA** paper (1981) should serve as a guide. If turf is properly managed and

Long Term Herbicide Use

a dense vigorously growing stand of grass is maintained, weeds should be no serious problem and herbicide usage can be reduced. This should be the goal of the lawn care professional.

BIBLIOGRAPHY

1. Callahan, L.M. 1972. The real culprit behind turf diseases. *Golf Course Superintendent* 40(4):13-16.
2. Dernoeden, P.H. 1981. Crabgrass control with preemergent herbicides. *Am. Lawn Applicator* 2(2):16-19.
3. Hull, R.J. 1981. Bluegrass energy distribution: Part 2. *Am. Lawn Applicator* 2(3):6-8.
4. Jagschitz, J.A. 1980. Development and rooting of Kentucky bluegrass sod as affected by herbicides. p. 227-235. In J.B. Beard (ed.). Proc. Int. Turfgrass Research Conf., Munich, West Germany, July 1977. Am. Soc. Agron., Madison, WI.
5. Jagschitz, J.A. 1981. Weed control in cool season turfgrass. *Am. Lawn Applicator* 2(2):10-14.
6. Smith, L.M. 1973. The interaction of herbicides with fertility on bluegrass turf. M.S. Thesis, Univ. of Rhode Island. 59 pages.
7. Wood, G.M. 1974. Applications of color infrared photography to turfgrass science. p. 246-255. In E.C. Roberts (ed.) Proc. 2nd Int. Turfgrass Research Conf., Blacksburg, VA, June 1973. Am. Soc. Agron., Madison, WI.

xxx

It's Even Better . . . The Second Time Around!

Professional Lawn Care Association of America
2nd Annual Convention and Trade Show

November 18-20, 1981
Commonwealth Convention Center
Louisville, Kentucky

The Industry's first major event of the season!

The 1981 event promises to be even bigger than last year's successful convention!

> "This convention was the best I've ever been to. The people who came wanted to learn and exchange ideas."

> "The program was excellent. It was right on track. Many of these topics could be repeated and never lose their appeal."

Managing Your Resources . . . Money, People, Products and Time . . .

A forward-looking program designed for your individual needs and interests, bringing these essentials to you.

"Energy - Yesterday, Today, And Tomorrow"

Ralph L. Lewis, Jr.
Vice President / Corporate Communications Coordinator
Gulf Oil Corporation

Our Keynote Address looks at a wide range of social, economic and political activities surrounding the worldwide search, development and use of energy resources.

- **Workshop topics on issues that vitally affect our business . . .**
  - Office Management
  - Personnel Management
  - Management Stress
  - P & L Analysis
  - Accounting
  - Advertising
  - Operating Lawn Care Equipment for Maximum Efficiency
  - The 2, 4-D Situation
  - Handling and Disposal of Pesticides
  - Turfgrass Herbicide Update
  - Toxic Waste
  - Turfgrass Pathology Update
  - Insects and Insecticide Update
  - Employee Health Programs
  - Ornamental Programs in the Lawn Care Industry
- **Hands-on display of products from leading industry suppliers.**
- **Over 120 booths reserved . . . nearly 100% increase from last year.**
- **Ideas exchanged with over 1,000 of your fellow lawn care professionals from all over the country.**

Plan now to attend. It's to your advantage to be in Louisville at the 2nd Annual Convention and Trade Show of the Professional Lawn Care Association of America . . . See you in Bluegrass Country!

To: **Professional Lawn Care Association of America**
435 N. Michigan Avenue
Suite 1717
Chicago, IL 60611
312/644-0828

Symbol of Good Practice
PLCAA
PROFESSIONAL LAWN CARE ASSOCIATION OF AMERICA

I want to attend this important conference. Please send me information on:

_______ Registration

_______ Exhibiting

_______ Membership

Name ______________________ Company ______________________

Address ______________________ City, State, Zip ______________________ Phone # ______________

Part 2
Southern Chinch Bug in Louisiana

by A. D. Oliver and K. N. Komblas, Louisiana State University Entomology Department

NYMPHAL PERIOD

Upon leaving the egg the young nymphs began to search for food. Nymphs which hatched in the leaf sheaths of St. Augustine grass remained there and started feeding by forcing their beaks into the plant tissue. Other nymphs which hatched on other plant parts wandered about for several hours until each found the desired area between the leaf sheath and the stem of the grass sprig.

Lawn observations indicated that the nymphal population, especially that of the very young, decreased when heavy rains removed them from the leaf sheath where they were feeding, and where wet weather prevailed for several days.

Nymphs seem to feed gregariously. In one leaf sheath as many as 8 nymphs were observed. They remained in the same position until the leaf had turned yellow and dried. Two nymphs were observed to remain in the leaf sheath until they reached the third and fourth instar.

DURATION OF DEVELOPMENTAL PERIOD OF EACH NYMPHAL INSTAR

The duration of development of each nymphal instar was studied only in the case of the third generation. The nymphs of each egg batch were studied collectively during their development. Observations were made only twice a week in order to minimize disturbance. The length of time from hatching to the end of each instar was estimated by these observations.

A considerable variation was observed in the duration of the developmental period in the various nymphal instars. Nymphs of different instars were observed in all batches of eggs which hatched on the same day. The population of a batch might consist of nymphs in the first to third, second to fourth, or third to fifth instars.

Data on the stadium length from hatching to the end of each instar are presented in Table II.

Batches of eggs coming from short- and long-winged females were studied separately with respect to the developmental period. Nymphs from eggs hatched late during the third generation were also studied separately to ascertain the influence of low temperature upon development during late fall. No differences in the period of development of different instars was found between nymphs coming from short- and long-winged females.

The first instar developmental period varied from 5 to 20 days, the average being 11.74 to 13.28 days. The second instar nymphs took from 9 to 29 days to finish their development from hatching, the average being 18.19 to 19.05 days. The period of development from hatching to the end of third instar

Table 2. Duration in days from hatching to the end of the development of each instar of southern chinch bug. Baton Rouge, Louisiana.

	Eggs Laid by Short-Winged Females				Eggs Laid by Long-Winged Females	
	8/12 - 8/23		8/29 - 9/13		8/24 - 9/8	
Insect Stage	Number	Average	Number	Average	Number	Average
First Instar	69	11.74	109	13.28	39	12.00
Second Instar	85	19.05	70	18.30	48	18.19
Third Instar	80	27.62	46	27.72	40	27.85
Fourth Instar	56	33.66	31	35.09	35	34.91
Fifth Instar	56	43.05	25	48.76	19	46.84
Short-Winged	46	42.91	23	49.35	16	47.81
Long-Winged	10	43.70	2	42.00	3	41.67

varied from 14 to 42 days, the average being 27.62 to 27.85 days.

Slight differences were found in the developmental period of the fourth nymphal instar between the nymphs of early and late broods. The early broods ranged in development from 26 to 45 days, the average being 33.66 days. The late broods ranged in development from 20 to 46 and 22 to 51 days, the average being 35.09 and 34.91 days for the short- and long-winged forms, respectively.

Nymphal populations decrease with heavy rains

Greater differences were observed in the total average developmental period between the early and late broods. The early broods of nymphs developed to adults in an average of 43.05 days. The late broods developed to adults in an average of 48.76 and 46.84 for the short- and long-winged forms, respectively.

The differences between the average developmental period observed in fourth and fifth nymphal instars of early and late broods might be interpreted as an effect of the differences in average temperature in September and October when they developed. The average temperature in September was 76.9°F and in October, 66.9°F. The early broods of nymphs of short-winged females developed to short-winged adults in an average of 42.91 days and to long-winged adults in 43.70 days, respectively. The late broods of short-winged females developed to short-winged adults in an average of 49.35 days and to long-winged adults in 42.00 days, respectively.

No period of quiescence was observed when nymphs transformed from one instar to another or to adults. Figure 1 shows the 5 nymphal instars and long- and short-winged forms of the adults.

Very little work has been reported on the exact duration in developmental periods of the different instars. Shelford (1932), working with the chinch bug, found that the length of several stages at 90% relative humidity and 73.4°F mean temperature to be: first instar, 6 days; second, 5.9 days, third, 5.7; fourth, 6.1; fifth, 11.2; total developmental period of nymphs, 34.9 days. James (1935), working with the chinch bug, found the length of the life cycle to range from 45 to 119 days for females and 54 to 138 days for males at 76°F.

ADULT PERIOD

Immediately after transformation, the southern chinch bug is soft, and its color varies from white to pale yellow with reddish appendages. Later, the red color predominated, and after 12 or more hours, depending on the season, the adult body hardened and became black.

The adults also were usually found feeding between the leaf sheath and stem of St. Augustine grass. It is supposed that this feeding behavior was due to their negative phototropism.

No extensive flight was observed but in a few instances when disturbed, long-winged forms might fly one or two feet.

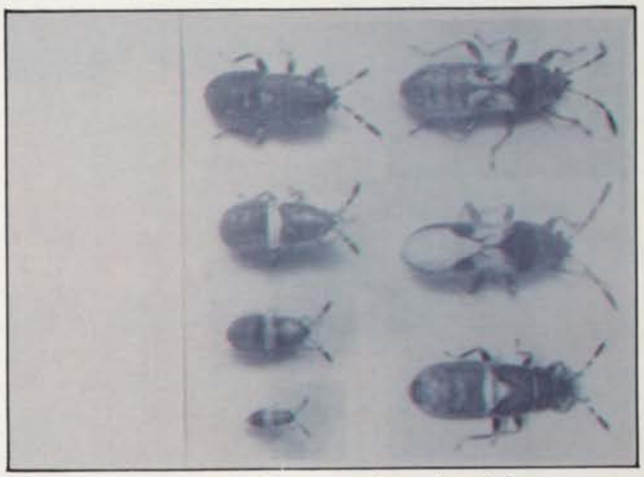


Figure 1: Life stages of the southern chinch bug, Blissus insularis Barber. Left— bottom to top: first, second, third and fourth instar nymphs. Right— bottom to top: short- and long winged adults and fifth instar nymphs.

Southern Chinch Bug

Males and females mated several times. Copulation lasted for hours, and the sexes were not easily separated even if disturbed. Adults were found mating up to the middle of November. Males and females of the short-winged form mated with males and females of the long-winged form. Both sexes of a long-winged form collected from corn mated with both sexes collected from St. Augustine grass.

The longevity of males averaged about 8 days; females averaged about 10 days. Some of both sexes lived for 48 days.

NATURAL CONTROL

Beyer (1924) pointed out that warm and fairly dry weather during spring and fall favored hatching of chinch bug eggs. A series of drenching rains or a prolonged rainy, wet season during the hatching period might prevent outbreaks. Such conditions favored the development of parasitic fungus in eggs. He also found some predators such as lady beetles, trash bugs, lace winged fly larvae and ants feeding on the chinch bug. Several predators of southern chinch bug in Louisiana include the big-eyed bug, rove beetles, earwigs and the red imported fire ant.

Wilson (1929) felt that in areas where St. Augustine grass was grown the natural enemies of lawn chinch bugs had little effect in controlling outbreaks probably because of its repugnant odor. He emphasized that in St. Augustine lawns there was an absence of diseases which controlled chinch bugs. Wilson also believed that adult bugs were little affected by water even when submerged for several hours of days. He accepted the fact that nymphs were readily killed by rain.

TURF CULTURAL METHODS AS AIDS IN CONTROL

Watson (1925) suggested that infested lawns should not be mowed closely and should be kept in a thrifty condition by irrigation and fertilization. The resulting lawn would be less susceptible to lawn chinch bug injury.

These practices definitely help in sustaining healthy turf and in reducing injury from the chinch bug in Louisiana. The age of a lawn, mowing and thatch accumulation or removal effect severity of injury. Where clippings are left in the turf, they gradually accumulate to a point where an almost complete layer rests on the soil surface. In such cases, the grass roots become established in the layer of decaying thatch and finally separated from the soil. As a result, the grass responds poorly to fertilization and soil moisture. This condition also serves to protect insects from control measures and is subject to severe injury even with moderate infestations, especially during extended dry periods of weather.

Dry weather during spring and fall favors hatching

When practical, thatch should be removed after mowing to prevent this, otherwise, ultimate condition. In cases where such conditions prevail, re-establishment of the turf is often necessary because of turf loss to insects, winter kill and drought. However, most lawns in this area are mowed without regard to thatch removal.

CHEMICAL CONTROL

Chemical control has been necessary for two decades in order to maintain healthy St. Augustine turf in Louisiana. Wilson (1929) suggested that chemical application should start when the first injury was noted and that a strip from 3 to 5 feet wide about the edge of an infested spot should be treated. He believed that one thorough treatment would control an outbreak on any particular patch of ground and that another application might be necessary two weeks later if a large number of eggs hatched.

Kuitert and Nutter (1952) suggested that the entire lawn should be treated and that a pretreatment soaking permitted better penetration of the grass mat by the insecticide. They observed that if the eggs were not affected, a second and perhaps a third application might be necessary.

Kerr (1956) pointed out the difference in toxicity of insecticides to the chinch bug in the Midwest and B. insularis in Florida. This was not surprising since specialists in Hemiptera reported that two species of insects were involved. He also found that two treatments were necessary at 7 to 10 day intervals and that the first application showed just a significant reduction. Kelsheimer and Kerr (1957) recommended a barrier against re-invasion into treated areas by the chinch bugs from surrounding areas. They suggested applying insecticides on a three-foot wide strip around the edge of the premises.

Where feasible, broad-coast application has been most satisfactory in Louisiana. Formulation of chemical available is a factor to consider in relation to size of area to be treated. Granular formulations are easily applied and evenly distributed with various models of seeders and spreaders. Granules sift downward into dry turf and therefore avoid some exposure to various animals. Post-application of water to the turf aids in activating the granules and is recommended unless it rains within 48 hours after application.

With liquid spray applications pre-watering is recommended

With liquid spray applications, thorough pre-watering of the turf is recommended so that the insecticide will be more effectively carried downward into the turf. When dry conditions prevail, pre-watering is most necessary to get effective kill of the insects which stay on or near soil surface and underneath debris most of the time. Southern chinch bugs were found to exit upward during the middle of the day, apparently for aeration. During this time, the movement in the turf exposes the bugs to chemicals if an application has been made. An excellent time to make surveys is from 10: AM to about 2: PM on clear, sunny days.

TIMING OF APPLICATION

The problem of timing of insecticide applications has not been completely solved for controlling the southern chinch bug. Most chemical control applications have been made after injury was obvious in the lawn, as indicated by dead turf. In order to improve control it was believed necessary to find a vulnerable period during the insect's development and before serious injury occurred. All stages of development were found to be present in the lawn throughout the year, except the egg and first stage nymph which was found to be absent during late winter and early spring. This point was thought to be deserving of further study since it is well known that the egg of many insects is more resistant than any other stage to insecticides. No work has been done on the effect of insecticides on the lawn chinch bug egg but since the incubation period of the eggs was found to be at least 15 days, at least 2 applications of most currently used insecticides would be necessary for effective control.

A study was undertaken to determine if more effective timing would minimize the number of applications required to give seasonal control. Two treatments, one timed with the beginning and the second during the middle of oviposition early in the spring proved to be very effective. Under the conditions of this experiment the lawn was protected with both treatments from lawn chinch bug infestation throughout the season. The number of bugs found in the check plots increased constantly and injury to the lawn was obvious during the summer. Examinations of the check plots revealed a large number of adult bugs which did not move into the treated plots until the grass had been completely destroyed. In these cases, the bugs were found entering along the borders of the treated plots.

The reduction in populations ranged from 96.6 to 99.2 per cent for the application made on March 13. Reductions from treatments made April 8 ranged from 89.4 to 98.1 per cent.

No significant differences were found between the two dates of insecticide application although the percentage reduction of population was always higher in the plots treated on March 13. The St. Augustine grass appeared to be healthy in both treatments during the subsequent 7 months of observation.

However, the notably long period of protection from a single application of insecticide occurred during an unusually wet summer when drought stress was not a factor.

When to apply chemical control measures must be determined by use of careful surveys and examinations of the turf. Two facts are obvious: 1. insects not present in the turf will not be controlled; 2. control should be initiated before serious injury occurs. Timely post-applications examinations should be made to ascertain that control efforts were effective and to determine if and when a repeat application is necessary.

It has been necessary to make two and often three applications annually in Louisiana to maintain satisfactory control of chinch bugs in St. Augustine grass. The number of applications necessary is influenced to considerable extent by the surrounding. Neighbors who do nothing to control their insect infestations afford a source for re-infestations of treated areas. Southern chinch bugs float on water and have often been observed on floating debris moved by heavy rain from infested turf. Lateral movement from heavily infested yards also results in formerly treated turf becoming reinfested. Therefore, a single application, except under unusual conditions, is not a panacea for complete season long control of southern chinch bugs.

Southern Chinch Bug

LITERATURE CITED

Barber, H.G. 1918. A new species of Leptoglossus: A new Blissus and varieties. Brooklyn Ent. Soc. Bull. 13(1): 35-39.

Beyer, A.H. 1924. Chinch bug control on St. Augustine grass. Fla. State Hort. Soc. Proc. 37: 216-219

Beyer, A.H. 1924. Controlling chinch bug with calcium cyanide. Fla. Agric. Exp. Sta., Press Bull. 362.

Brogdon, J.E. and S.H. Kerr. 1958. Lawn pest control guide. Fla. Agric. Ext. Serv. Circ. 181.

Decker, G.C., and F. Andre. 1937. Winter mortality of chinch bug in Iowa. Jour. Econ. Ent. 30(6): 927-34.

Eden, W.G. and R.L. Self. 1960. Controlling chinch bug on St. Augustine grass lawns. Auburn Univ. Agric. Exp. Sta. Prog. Rpt. No. 79.

Felt, E.P. 1933. Chinch bug (Blissus leucopterus (Say). Journ. Econ. Ent. 26(5): 994.

Hamilton, C.C. 1935. The control of insect pests of lawn and golf courses. N.J. Agric. Exp. Sta. Circ. 347.

James, M.J. 1935. Oviposition studies on the chinch bug, Blissus leucopterus (Say). Ann. Ent. Soc. Amer. 28(1): 109-120.

James, M.J. and A. Hager. 1936. Studies on the incubation of the chinch bug egg. Iowa St. Coll. Jour. Sci. 10(4): 325-402.

Komblas, K.N. 1962. Biology and control of the lawn chinch bug, Blissus leucopterus insularis Barber. M.S. Thesis. Entomology Dept. LSU.

Kelsheimer, E.G. and S.H. Kerr. 1957. Insects and other pests of lawns and turf. Fla. Agric. Exp. Sta. Circ. S-96.

Kerr, S.H. 1956. Chinch bug control on lawns in Florida. Jour. Econ. Ent. 49(1): 83-85.

Maxwell, K.E. and G.F. MacLeod. 1936. Experimental studies of the hairy chinch bug. Jour. Econ. Ent. 29(2): 399-343.

Newell, W. and E.W. Berger. 1922. Insects injurious to the principal crops of the South. Fla. Sta. Plant Board Q. Bull. 6(4): 100-101.

Pickles, A. 1940. Measures for the control of chinch bug infesting lawns in Trinidad. Trop. Agric. 17(12): 236-237.

Schwarz, E.A. 1888. On the insects found on Uniola paniculata in Southeastern Florida. Ent. Soc. Wash. Proc. 1(1): 105.

Shelford, V.E. 1932. An experimental and observational study of the chinch bug in relation to climate and weather. Illinois Nat. Hist. Survey Bull. 19(6): 488-547.

Stringfellow, T. and J.S. Roussel. 1960. Chinch bug control in St. Augustine lawns. Louisiana Agric. 3(3): 3 and 16.

Van Duzee, E.P. 1886. Occurrence of the chinch bug (Blissus leucopterus (Say) at Buffalo, N.Y. Can. Ent. 18: 209-210.

Walden, B.H. 1936. Notes on the hairy chinch bug, a pest of lawns. Conn. Agric. Exp. Sta. Bull. 383, pp. 328-329.

Webster, F.M. 1907. The chinch bug. U.S. Dept. of Agric. Bull. 69.

Wilson, R.N. 1929. The chinch bug in relation to St. Augustine grass. U.S. Dept. of Agric. Circ. 51.

Professional Lawn Care Association of America

ConventionNEWS

Symbol of Good Practice
PLCAA
PROFESSIONAL LAWN CARE ASSOCIATION OF AMERICA

November 18-20, 1981

Louisville, KY

The On Target Advertising Medium!!

PLCAA exhibitors and lawn care product manufacturers and suppliers, are you looking for a rifle shot advertising approach to the marketplace at a time when readers are in a buying frame of mind?

If so, your ad belongs in *PLCAA ConventionNEWS*.

Virtually 100 percent readership is guaranteed. *PLCAA Convention-NEWS* is the official convention newspaper of the Professional Lawn Care Association of America. It will be made available at registration to *all* delegates at the November 18-20, 1981 meeting of PLCAA in Louisville, Ky.

Your ad can take a variety of forms: Product announcements, welcome to delegates, return coupon, announcements regarding your exhibit, invitations to hospitality functions, etc.

As a further service, space permitting, advertiser's press releases or articles regarding new services, products, personnel, etc. will be given priority consideration.

For rate information, deadlines, etc., call C. Rodgers Kines, Advertising Director, at (301) 252-3967 or return the enclosed coupon to *ConventionNEWS*.

YES! I want to be in PLCAA's *ConventionNEWS*. Rush me advertising information.

Name: ____________________

Address: ____________________

____

Area Code/Telephone: ____________________

Return to:
C. Rodgers Kines, Advertising Director
PLCAA *ConventionNEWS*
P.O. Box 4007
Chevy Chase, MD 20815

The Dawn of the Second Decade
for the
NEW JERSEY TURFGRASS ASSOCIATION

EXPO '81

DECEMBER 7-10, 1981
CHERRY HILL HYATT HOUSE
Route 70, Cherry Hill, New Jersey

The Annual Turfgrass Educational Conference and Trade Show sponsored by Cook College - Rutgers University and the New Jersey Turfgrass Association. Sessions will include establishing and maintaining turf for golf courses, athletic fields, lawns of various types and use of sod. Trade show will feature the latest in turfgrass equipment and products. Reserve the date, plan to attend and participate in this exciting annual Turfgrass Conference. Complete program details and registration forms available October 1, 1981. For information before that time contact: Dr. Henry Indyk, General Chairman, Soils & Crops Department, Cook College - Rutgers University, P.O. Box 231 New Brunswick, New Jersey 08903 — (201) 932-9453.

Calibration

Dollars in Your Pocket/ Tips to Save

by Dave Bowser, Water Supplies Inc.

Sprayer calibration has recently become more important than in the past, due to some very important influences. Public scrutiny, EPA, OSHA, more complex formulation of chemicals, and higher chemical cost per/ lb., or gal. result in higher cost of applications per/1000 square feet.

The following short articles will be devoted to tips to help you become more efficient in your spray program. We will deal with your equipment only. References to chemicals will be avoided with the recommendation that you contact your chemical distributor for specific questions.

There are 6 Parts to follow covering the following facts about Calibration.

1. Definition of terms used.
2. Types of nozzles available.
3. Effects of ground speed.
4. Effects of PSI.
5. Effects of maintenance.
6. General trouble shooting problems.

1. DEFINITION OF TERMS

A. Ground Speed-ABR G.S. The rate that you travel on green or fairway in feet/per min. (F.P.M.) or miles per hour. (M.P.H.)

1 MPH = 88 ft./min.
2 MPH = 176 ft./min.
3 MPH = 264 ft./min.
4 MPH = 352 ft./min.

B. Pounds per Square Inch - ABR P.S.I. Pounds of pressure delivered by the pump that appears on gauge. The gauge is usually on the pump. Sometimes it is on the boom to compensate for friction loss due to hose and piping.

C. Gallons per Acre - ABR G.P.A. Gallons of water applied through your boom with various size tips. G.P.A. is dependent on P.S.I., G.S. and the size tips in your boom and spacing of tips in relation to height boom is carried.

D. Gallons per 1000 sq. ft. - Gallons of water applied per/1000 sq. ft. of area. This can be converted to G.P.A. for easy reference to nozzle charts.

1 Gal. per/1000 sq. ft. = 43.6 G.P.A.
2 Gal. per/1000 sq. ft. = 87.2 G.P.A.
3 Gal. per/1000 sq. ft. = 130.8 G.P.A.
4 Gal. per/1000 sq. ft. = 174.4 G.P.A.
5 Gal. per/1000 sq. ft. = 218.0 G.P.A.

2. TYPES OF NOZZLES AVAILABLE

There seems to be a great deal of confusion and controversy regarding the type of nozzle one should use on various types of spraying equipment. Most sprayer manufacturers design into service the type of nozzle that is best suited to their equipment. They base their selection on boom spacing and height the boom is carried as well as the size and type of pumping system on the equipment and the job the sprayer is designed to do. Confusion usually occurs when the owner adapts the equipment to another job. For instance a greens sprayer to a fairway sprayer or vice versa.

The following is a short description of nozzles and their general use. These are not hard and fast rules for use but only guide lines for general application.

PATTERN:
Boom Type Nozzles
Cone-Pattern depends on whirl plate and size orifice and PSI.
Fan-Pattern depends on degree of nozzle and size orifice and PSI.
GENERAL USE
Cone—Usually for high PSI, fog type spray. These nozzles come in many sizes and combinations of whirl plates for desired gal. application per acre and are mostly used for vegetable crops, tomato, potato, cabbage, and sometimes turf. Also this nozzle is generally used with a gun.

Equipment readapted to a new job causes confusion in calibration

Fan Type— Comes in various angle or degree of spray. Most common use, pre-emergence spray, herbicide lawn work, defined areas. Degree selection is based upon nozzle space and height boom is carried from ground. Most fan type nozzles are designed to have an overlapping pattern. Three types are available that apply an even pattern and no overlap. The fan type is most common in brass and designed for low PSI-O-60# . As PSI is increased there is an increase in degree of application plus increase in gal. discharge rate, plus excess wear. Hardened stainless steel, as well as, tungsten carbide are available for higher PSI operations.

Flood Jet— Wide space on boom usually 40 in. This nozzle gives more of a broadcast spray pattern. Also more susceptible to drift than regular fan.
Boom Jet— Cluster of nozzles combining O.C. (off center) nozzles and fan type. Small cluster of nozzles to cover wide area 30-40 feet, generally high gallonage rate.

Cone nozzles are generally marked by a number which represents size by drill size or .032 of an inch.

Fan nozzles are generally marked by degree of angle of spray and by hole size. Such as 8003 would be 80° angle No. 3 orifice, 7303 would be 73° with 3 orifice.

Nozzle manufacturers have extensive general publications as well as very technical bulletins covering effect of nozzles in relation to ground speed, PSI, boom height, nozzle spacing and number of nozzles. Most sprayer manufacturers supply their own bulletin about the nozzle on their boom or a copy of the nozzles manufacturers bulletin.

3. EFFECTS OF GROUND SPEED

Ground Speed can be one of your useful tools if properly used. If it is not considered with significant respect, it will become one of your most costly enemies.

To demonstrate the effect of Ground Speed on Calibration, let's examine the following example of a Boom Sprayer and compare it to Chart A.

EXAMPLE:
Boom Type
Sprayer with: 21' Boom
13 Fan Type Nozzles
20" Spacing
20" From Ground
Coverage Desired: 39 G.P.A.
Ground Speed: 4 M.P.H.
P.S.I. 30 lb.
Nozzle Required: 8006

With all conditions remaining unchanged except G.S., let's examine Chart A and see what happens with an increase or a decrease of G.S.

It would become obvious that G.S. has a dramatic effect on application rate. If you travel too slow with respect to your recommended G.S. you will over apply chemical. This will create 2 possible problems:

1. Wasted Dollars for unnecessary chemical
2. Physical Damage
   A. Means more work for repair
   B. More Dollars spent unnecessarily

If you travel too fast with respect to your recommended G.S. you will under apply chemical causing:

1. Poor results— thus possible re-application
2. Possible spread of fungus or insect problem to areas more difficult to control.

Ground speed can be a useful tool or a costly enemy

You should check the accuracy of your speedometer/tachometer with a watch. If you have equipment without a speedometer or tachometer— then you are guessing.

Chart A

MPH	2	2.5	3	3.5	4	4.5	5	6	7.5
GPA	80	64	52	45	39	35	31	26	21
% Change	105%	64%	33%	15%	0%	11%	25%	50%	85%

Calibration

4. EFFECTS OF P.S.I.

A very important factor in accurate spray programs is P.S.I. Two major reasons for this are as follows:

1. P.S.I. as it is increased or decreased will change the flow rate through a given size disc or fan type nozzle tip. It will also change the degree of angle pattern for a fan jet nozzle. Higher PSI ranges also create an environment for excessive wear unless the proper hardened tips are used.
2. P.S.I. as indicated on your gauge will also alert you to problems you might have in the equipment such as:
   Nozzle wear
   Plug Suction
   Malfunction in Regulator
   Pump Wear

% of Change	P.S.I.	G.P.M. Each Nozzle	Total GPM 13' Nozzles	G.P.A. at 4 M.P.H.
21%	20 PSI	.42 GPM	5.46 GPM	31GPA
11%	25 PSI	.47 GPM	6.11 GPM	35 GPA
CHECK	30 PSI	.52 GPM	6.76 GPM	39 GPA
15%	40 PSI	.60 GPM	7.80 GPM	45 GPA
28%	50 PSI	.67 GPM	8.71 GPM	50 GPA
41%	60 PSI	.73 GPM	9.49 GPM	55 GPA
90%	100 PSI	.95 GPM	12.35 GPM	74 GPA
179%	200 PSI	1.34 GPM	17.42 GPM	109 GPA

5. EFFECTS OF MAINTENANCE

The importance of proper maintenance on equipment is often underrated. Many people do not recognize the correlation between a properly maintained unit and its efficient operation. The following list of check points refer to general maintenance of many types of equipment including sprayers.

Basic Rules in Care & Maintenance

1. Grease and oil procedures followed per equipment service manual.
2. Nozzles cleaned and checked for wear.
3. Screens cleaned and checked for wear.
4. Lines cleared, suction and discharge.
5. Pressure gauge checked for proper operation.
6. Pressure regulator checked for proper operation.
7. Belts checked for wear and/or slipping.
8. Hose checked for wear and/or leakage.
9. Agitator packing checked for leakage.
10. Engine checked for performance.
11. PTO shaft checked for wear (universals).
12. Pump checked for valve and cup wear or seal wear.
13. Tires checked for breaks or checks.
14. Tank, cleaned and serviced.
15. Guns cleaned and checked.
16. Valves checked for leakage.
17. Bearings checked for noise and proper packing.
18. Engine RPM should be checked on sprayer.
19. PTO RPM should be checked on tractor.
20. On air sprayers outlet should be clean for efficient operation.

Calibration

6. GENERAL TROUBLE SHOOTING PROBLEMS

If these rules are followed as a matter of routine, much of your down time will be elimated due to breakdown, or misapplication of chemical.

When trouble occurs in the field, one or more of the preceding rules have been neglected.

The following will give you some examples:

Fluctuation in PSI Gauge Reading
1. Plugged Suction
2. Bad Regulator
3. Belt Slippage
4. Bad Cups and/or Valve Springs in Pump
5. Bad P.S.I. Gauge

Low Reading on P.S.I. Gauge when Spraying
1. Nozzle Wear past capacity of Pump
2. Low R.P.M. on Pump

Too Much G.P.A. Application
1. Too Slow G.S.
2. Nozzle Wear Excessive
3. Wrong Nozzles

Too Little G.P.A. Application
1. Plugged Nozzles
2. Too Fast G.S.
3. Cup Wear
4. Low R.P.M. on Pump

In summary, I would like to point out that these rules are not 100% complete. I am sure your experience, as mine, has found many exceptions as well as additions to the preceding article.

As I mentioned in the article there are rafts of technical material available from Chemical Companies, Manufacturers, and Research People. Don't be afraid to rely on what is available to you.

x x x

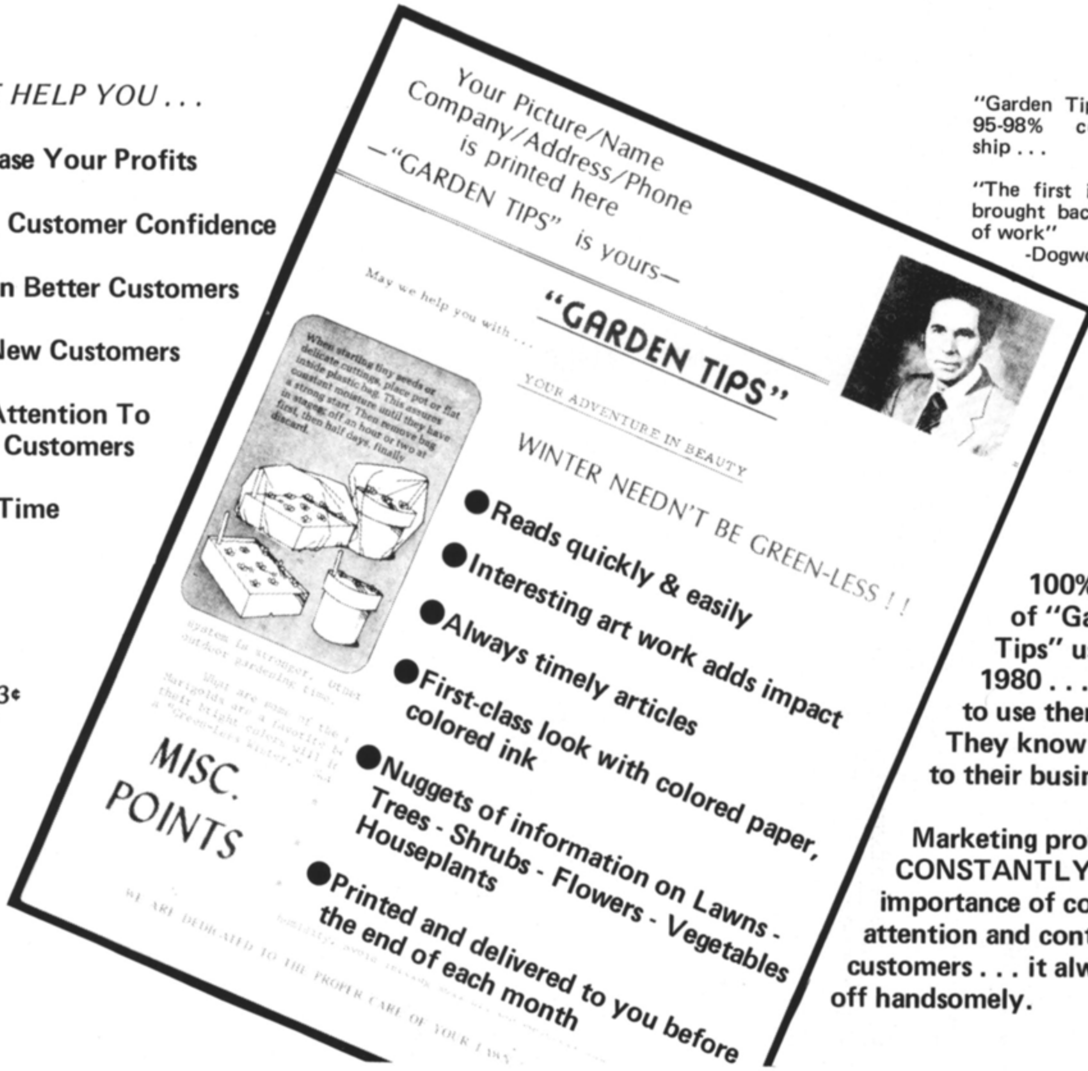
NOW IS THE TIME FOR

"GARDEN TIPS"

MAY WE HELP YOU . . .

- ✓ **Increase Your Profits**
- ✓ **Build Customer Confidence**
- ✓ **Retain Better Customers**
- ✓ **Get New Customers**
- ✓ **Pay Attention To Your Customers**
- **Save Time**

Cost about 13¢ per customer



"Garden Tips" users report 95-98% customer readership . . .

"The first issue I sent out brought back $8,000 worth of work"
-Dogwood Landscaping

100% of "Garden Tips" users in 1980 . . . continue to use them in 1981. They know its value to their businesses.

Marketing professionals CONSTANTLY STRESS the importance of continuous attention and contact with customers . . . it always pays off handsomely.

MISC. POINTS

- * Protected Areas for Usage
- * Monthly Promotional Hints and Copy
- * Composing, Art Work, Folding
- * Handling, Packing, Shipping

ALL INCLUDED IN YOUR LOW, LOW PRICE!

or CALL (516) **483-0100** for quick service and information

IMMEDIATELY

Send me complete information about "GARDEN TIPS"

NAME ____________________

COMPANY ____________________

ADDRESS ____________________

____

PHONE ____________________

SEND TO: "Garden Tips," P.O. Box 117, Garden City, New York 11530

Circle No. 18 on Reader Reply Card

NEW LAWN INSTITUTE OFFICERS, BOARD ELECTED

Norman Rothwell, N.M. Rothwell Seeds, Lindsay, Ontario, Canada, was re-elected incoming President of the Lawn Institute at its annual meeting, held in Atlanta in conjunction with the American Seed Trade Association National Convention. Mr. Rothwell was the first Canadian to hold the President's office, and his administration has been so well thought of that he was asked to serve a second term.

Assisting Mr. Rothwell will be Robert Peterson, E.F. Burlingham & Sons, Forest Grove, Oregon, serving as Vice President; and Robert Russell, J. & L. Adikes, Inc. Jamaica, N.Y., Secretary-Treasurer. Mr. Russell is also serving as President of the American Seed Trade Association, nationally.

Elected to the Board of Trustees for the 1981-82 fiscal year, in addition to the officers, were: Gil Barber, Southern States; Robert Buker, F.F.R.; James Carnes, International Seeds, Inc.; Gabe Eros, OSECO Inc.; Jay Glatt, Turf Seeds, Inc.; William Hill, George W. Hill Co.; Doyle Jacklin, Jacklin Seed Division, Vaughan-Jacklin Corp.; Drew Kinder, Whitney-Dickinson Seed Co.; Ben Klugman, Twin City Seed Co.; Peter Loft, Loft's Pedigreed Seed Co.; Edward Mangelsdorf, Mangelsdorf Seed Co.; Clifford Mattila, Merion Bluegrass Association; Scott Patterson, Peterson Seed Co.; Howard Schuler, Northrup-King & Co.; John Southerland, Stanford Seed Co.; Douglas Fisher, Highland Bentgrass Commission; Robert Wetzel, Wetzel Seed Co.; Kent Wiley, Pickseed West, Inc.; John Zajac, Garfield-Williamson.

The Lawn Institute is a nationally recognized fount of information about lawngrasses and their care. Dr. Robert W. Schery serves as Director, from staff offices in Marysville, Ohio. Dr. Gerald Pepin, International Seeds, Inc., Halsey, Oregon, is chairman of the Institute's Variety Review Board, which considers new cultivars nominated for acceptance by the Institute.

The Institute is sponsored chiefly by lawnseed breeders and growers, but includes allied interests such as lawn fertilizers, pesticides and equipment. Activities and current research are reported back to the membership in a quarterly newsletter, "Harvests". Reprints about lawns and lawngrass cultivars are available from the Lawn Institute, 991 West Fifth St., Marysville, Ohio 43040.

Fall Weed Control

by Willis West, PBI/Gordon Corporation

Willis West is a Lawn Care Specialist for PBI/Gordon Corporation. He holds a B.S. degree from Pittsburg (Kansas) State College, and has spent the past ten years marketing turf products throughout the United States.

As the day grows shorter and leaves begin to drop, certain autumn weeds pose a control problem in turf. With lower temperatures, slower growing weeds are difficult to control. To compound the problem, these weeds will be the first eyesore, in an otherwise immaculate turf, when the snow melts and spring arrives.

A few of the more common weeds infesting turf during the fall season are dandelions, plantains, veronica and henbit. Dandelions and plantains germinate in the fall and are the first weeds to annoy the home owner in the spring. Faced with weed infested fall turf and a prospective new crop of weeds for the early spring season, the lawn care operator should spend his time killing weeds during autumn slack time rather than the busy spring rush.

Fall weed control is important to prevent the early spring flush of new weeds

PBI/Gordon reports repeated success over the years with the use of TRIMEC Broadleaf Turf Herbicide. The TRIMEC Herbicides are unique in that they are a single formulation of reacted acids including an acetic, a propionic, and a benzoic herbicide. It is these precisely reacted acids which produce a synergism that is able to kill the fall weeds. TRIMEC possesses the herbicidal properties unique to TRIMEC itself. For example, 2,4-D alone will not kill self-heal during late autumn but TRIMEC possesses both 2,4-D characteristics and synergistic herbicide activity that can and does kill self-heal during the fall season.

There are several advantages to fall weed clean-up. To illustrate this, your first application in the spring (fertilizer and pre-emergence crabgrass control) is made before fall germinating broadleaf weeds break dormacy and resume growth. A herbicide application at this time is ineffective and by the time you return for the second application, the broadleaf weeds are growing and several service calls have to be made. A fall application of broadleaf herbicide will control these weeds and thereby eliminate their presence in the spring. Consider the economy of time using a fall-applied herbicide in combination with the final fertilizer application. Furthermore, autumn is an especially beautiful season more likely to draw attention to the outdoors and is certainly no time for unsightly weeds.

If the professional turf applicator does decide to use TRIMEC in a fall program, there are several considerations. Due to the cool season, slow growth of weeds, herbicide uptake and translocation will be correspondingly slow. This characteristic is not negative, it simply insures the operator that translocation is indeed occurring and that the resulting weed kill will be complete.

Fall weed control is important not only for clean, weed free autumn turf, but also to prevent the early spring flush of new weeds. Time, effort and money can be saved by making a simple herbicide treatment with the fall's fertilizer application. The key to successful fall weed control lies in utilizing a broad-spectrum herbicide such as TRIMEC for this important application.

xxx

The Cash Flow Crisis

by Walter D. Wasilewski, Management Consultant

Walter D. Wasilewski, President and Senior Consultant with C.O.L.A. Management Consultants, Inc., 53637 Wolf Dr., Utica, MI 48087, (818) 781-3290. Background includes 25 years of experience in administrative and personnel management.

We have had the "hot sixties", the "shortage seventies", and now the "cash flow crisis eighties". Periods of economic crisis affect small business the hardest. Banks are now offering loans to small businesses when available at up to 25 per cent interest without even blinking an eye. The bank then wants everything but the cemetery lots as collateral.

When working capital becomes inadequate, many small owners tend to look to outside financing for relief. These business people often overlook, or pass too quickly by, all of the number of possibilities that exist within their own operations for sources of additional cash.

In response to the cash flow squeeze, many good managers look hard at their overheads and how they run their firms and then eliminate expenses which they deem not absolutely necessary. They create ways to stretch each dollar and thus improve performance of each operation. As a management consultant, I feel almost any company can make it during a rising economy, which is often referred to as the fat, dumb, and happy days. Everyone is buying everything and at any price. But only the smart business owners can make it during hard times. They use good management methods that can be adapted for use by any company. The smart owners have gotten tough with the times. They start by picking up all that buried cash that was just laying around just begging to be used up. They beat the cash flow crisis, and because they can do well in these times, just imagine what happens when the good times start again.

Smart owners know that good management can always be improved by maximizing cash flow, trimming overhead cost, and looking for costly trouble areas. If they are so close to the forest that they cannot see the trees or if the job becomes too difficult to accomplish alone, then they obtain outside assistance.

There are many areas that should be checked, but for starters try these:

1. Are you making a profit on each customer that you service?
2. Do you really need all the employees that you presently have?
3. Do you have the right people for the job?
4. Are your sales people understating the size of lawns to earn additional commission or just to look good?
5. Are your employees in the right classification for workman's compensation insurance fees?
6. Is your inventory bigger than it should be?
7. Do you consider leasing expensive equipment versus buying based on cost comparisions?
8. Are you paying for unnecessary overtime?

The possibilities of pinpointing areas that should be checked are endless. Do you know a better way to spend some time? The business owner must have objective information to fully consider each area. Good records must be kept. Some basic records should be accurate financial statements. Operating and financial ratios should be constantly monitored.

In each company, varying sets of measurements are of some specific importance in any system of monitoring. For example, the salient facts for a lawn spray company differ from those of a lawn maintenance firm. However, similar areas of weakness can happen in all types of businesses. These weaknesses surface in many ways— sending up the red flags. If these red flags are being monitored, the problem can be resolved unless the owner is so busy being busy that he does not see them. Then he is at the bank seeking additional cash. But what happens when the banker sees these red flags? The banker either refuses the loan or offers same at four or five points over the prime rate.

Take a good look around. Do you see your cash crisis being solved? Many business owners find that they can improve their profit picture many times over.

xxx

OHIO TURFGRASS CONFERENCE & TRADE SHOW

December 2, 3 & 4

The **1981 Ohio Turfgrass Conference and Show** will be held at the Ohio Center, 400 North High Street, Columbus, Ohio. Approximately 200 booth spaces have been reserved for the 1981 Tradeshow.

The educational sessions this year will include separate sessions for:

LAWN CARE
GOLF COURSE
GROUNDS MAINTENANCE

The separate sessions on **"grounds maintenance"** are a new addition to the Ohio Conference Program. These sessions will include topics on grass selection, prairie grasses, total vegetation control, ornamental weed control, and sports field maintenance.

Two workshops will kick off the opening of the Conference and Show on Wednesday morning. An **insect workshop** will be conducted by Dr. Harry Niemczyk (OARDC) and a **turfgrass fertilizers workshop** will be conducted by Dr. Roger Funk (Davey Tree Expert Co).

Speakers who have already accepted invitations to the conference include:

Dr. Jim Beard, Texas A & M University
Dr. Richard Smiley, Cornell University
Mr. John Davidson, Dow Chemical Co.
Dr. Bobby Joyner, ChemLawn Corp.
Dr. Reed Funk, Rutgers University
Dr. Charles Darrah, ChemLawn Corp.
Dr. Wayne Bingham, Virginia Polytechnical Institute and State University

AND MANY OTHERS

The Ohio Department of Agriculture will credit specific subjects on the educational program for pesticide licensing.

COST: Members– $20.00
Nonmembers– $30.00
Price includes educational sessions, trade show and a copy of the Turfgrass Conference Proceedings.

FOR MORE INFORMATION CONTACT: Dr. John R. Street, Depatrment of Agronomy, Ohio State University, 1827 Neil Avenue, Columbus, Ohio 43210; or call (614) 422-2591.

Banol Turf Fungicide To Combat Pythium Blight on Turf

Banol Turf Fungicide, which showed highly effective Pythium blight control when tested on turfgrass, is now available for professional use on lawns as the result of an EPA approved Experimental Use Permit (EUP). Marketed by TUCO Agricultural Chemicals, Division of The Upjohn Company, Banol turf fungicide is a water soluble liquid concentrate with Propamocarb hydrochloride as its active ingredient.

Approved label use includes application of 1.3 to 4 oz. of Banol in 2-5 gal. of water per 1,000 sq. ft. as a preventive treatment when weather conditions favor development of Pythium blight. A repeat application may be made in 7-21 days if weather conditions remain favorable for disease development. According to researchers, disease development appears most favorable when the maximum daily temperature is 86° F. or higher followed by 15 or more consecutive hours with relative humidity at 90 percent and above while temperature remains 68° F. or warmer. Laboratory and field research indicate that Banol provides long residual protection against this turfgrass disease, which can damage turfgrass within 24 hours with these environmental conditions.

A university test showed that Banol, when applied to turfgrass 14 days prior to inoculation with Pythium aphanidermatum, provided better than 95 percent control when applied at 2 oz. of active ingredient per 1,000 sq. ft. and provided complete control when applied at 4 oz. of active ingredient per 1,000 sq. ft. In another university test, turfgrass was inoculated with Pythium 21 days after treatment with Banol at 1.875 and 3.75 oz. of active ingredients per 1,000 sq. ft. Plots rated seven days later were found to be relatively free of Pythium blight when compared to control plots and those treated with another Pythium fungicide. Both studies involved treatment under artificially high temperature and humidity conditions which favor fungi growth.

Laboratory tests at two universities also confirmed that rainfall immediately after treatment had little or no effect on Banol's efficacy. In addition, tests indicate that when applied at proper rates, Banol has no phytotoxicity on most turfgrass varieties. The approved EUP allows use of Banol in Alabama, Arizona, Arkansas, Connecticut, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia and Wisconsin.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

First Class **Permit No. 806** **Farmington, Mi.**

Postage Will Be Paid By Addressee

AMERICAN LAWN APPLICATOR
31505 Grand River
Farmington, Michigan 48024-9990

AMERICAN LAWN APPLICATOR

SEPT./OCT. 1981 ISSUE

1	6	11	16	21	26
2	7	12	17	22	27
3	8	13	18	23	28
4	9	14	19	24	29
5	10	15	20	25	30

READER REPLY CARD

The above numbers correspond to advertisements appearing in this issue. Circle appropriate number and mail card if you wish additional information on any product.

(PLEASE PRINT)

NAME ______________________ TITLE ______________

COMPANY ______________________________________

ADDRESS ______________________________________

CITY ______________ STATE ____________ ZIP ________

HAHN SPREADER

A new precision oscillating-action Spreader unit which mounts directly to the frame of the Hahn Spray-Pro and is powered by its engine. Adjustable 12 to 45 ft. swath and micrometer-type settings provide a uniform, measurable rate of flow, making this Spreader a year 'round use vehicle. A sand spreader for the light top dressing of golf greens at a 12 to 20 ft. swath or ice control of paved areas at a rate of 3000 sq. ft. in 2 minutes– spreads seed, lime, fertilizer to 45 ft. Four wheel stability with flotation tires for half the compaction of utility trucks. For further information contact Doris Lindse, Hahn, Inc.,1625 N. Garvin, Evansville, IN 47711, or use reply card.

PLCAA PREPARES FOR 2ND ANNUAL CONVENTION AND TRADE SHOW

The Professional Lawn Care Association of America's 2nd Annual Convention and Trade Show will be held at the Commonwealth Convention Center, Louisville, Kentucky, November 18-20, 1981. This year's convention theme: "Managing Your Resources . . . Money, People, Products and Time". Keynoting this year's convention is Ralph L. Lewis, Jr., Vice President/Corporation Communications Department, Gulf Oil Corporation. His address, "Energy—Yesterday, Today and Tomorrow", will cover a wide range of social, economic and political activities surrounding the worldwide search, development and use of energy sources. Workshop sessions will feature such vital topics as "Accounting", "Personnel Management", "P and L Analysis", "Office Management", "The 2,4-D Situation", "Handling and Disposal of Pesticides", "Management Stress", "Toxic Waste", and "Advertising". Updates on weeds, diseases and insects will also be featured.

The professionalism of the attendee and the content of programs is recognized, also, by suppliers in the industry. At this time space reservations have nearly doubled compared with last year and a sell-out of space is expected. In order to maximize exhibitors' results all sessions will be scheduled to allow ample time to view exhibits and will be conducted in adjoining meeting rooms to provide for easy access.

For further information on the 1981 PLCAA Convention and Trade Show, contact Jane Stecker, Professional Lawn Care Association of America, 435 North Michigan Avenue, Suite 1717, Chicago, Illinois 60611 (312/644-0828).

Slide Sets Available

A set of 66 slides of diseases on cool-season turfgrasses , prepared by Professor Richard W. Smiley, Cornell University, is offered by the New York State Turfgrass Association for $30 ($25 for NYSTA members). NYSTA has also worked with New York's entomologist, Dr. Haruo Tashiro, and weed specialists, Dr. Art Bing and Mr. Bob O'Knefski, to develop parallel series of insect and weed slide sets. The sets are available from NYSTA, 210 Cartwright Blvd., Massapequa Park, NY 11762.

Symposium on Turfgrass Weeds- 1981

The symposium will occur on October 14-15, 1981 at the Sheraton-Columbus Hotel in Columbus, Ohio. Major topics include Alternatives to Phenoxy Herbicides; Preemergence Herbicides; Special Weed Problems—Grasses; and Special Weed Problems—Broadleaf. Pre-registration is encouraged with the fee being $35.00. A registration form and further details can be obtained from Dr. B.G. Joyner, Plant Diagnostic Labs, ChemLawn Corporation, 6969 Worthington-Galena Rd., Suite L, Worthington, Ohio 43085. Phone: (614) 885-9588.

On Lawn Diseases

(the theory of the "little buggers")

FROM THE EDITOR:

For fourteen years turf pathologists have been peeking into microscopes and scratching their heads over what is variously described as Fusarium Blight, Fusarium Roseum, Brown Patch, Rhizoctonia, etc., all sobriquets for bluegrass diseases. As the lawn applicators outnumber the turf pathologists by about 1,000 to 1, and since it would be difficult to magnify the present confusion, I think we should come to their aid with our own suggestions. Therefore, this short article is an appeal to anyone who knows or purports to know anything about subject diseases to submit it in writing and **ALA** will publish it no matter how cockamamie others might consider it to be.

Illustrative of the above, and to encourage some one-upmanship on the part of others (who will no doubt submit some bell ringer ideas) the following is submitted.

First let us rename all those malevolent and suspicious entities such as pathogens, fungi, hyphae, nigrospora and mycelium as those "little buggers". Now you can see from the start that this will be inspirational it its pure approach to understandable reclassification. Having settled upon more proper nomenclature let us move from the specific to the general.

Environmentalists tell us that adaptation takes millions, even zillions of years. It is a matter of survival of the fittest. They tell us that in order for a specie to survive, immunity must be built up. Bluegrass is not native to the United States. We latch onto various species, call it Kentucky bluegrass and proceed to hybridize it, clone it, breed it in all manner of ways and since this has been going on we have over a hundred different kinds of pooped out grass. Amphromophically speaking, bringing "foreign" plants to this country may be as unsuccessful as if the American Indian had been transported to Europe, for you see most of the indians were killed by chicken pox, measles, scarlet fever, and a host of diseases caused by other "little buggers" from which they had not built up any immunity.

Grass does have an immune system. Students of senescense will tell you that present studies of the DNA suggest that as things age immunity breaks down. (In turfgrass we see that most disease problems begin to occur when the turf plant is in its third year.) Another theory is that ultra violet light is culpable in speeding up the aging process. Therefore, and in conclusion, (these cockamamie theories should be short—sort of a hit and run technique before anyone starts to do any heavy thinking) the "little bugger" theory says that breeding may be all right for the text book, but those grasses will need about 6,000 years of adaptation in a new environment before they will be a success. We have too many "little buggers" in this country that are unlike other "little buggers" elsewhere.

continued on page 36

Classified Ads

EQUIPMENT

1979 Howard Turf Blazer, 23 H.P. engine, new; 72" deck, never used. $6,200. Contact Thom Nelson, Beecher, IL 60401

Mist Blower L-80 Hardie $700. Soil Shredder 18 H.P.– THD engine on wheels, $1,200. Contact Dennis Anderson, P.O. Box 702, Barrington, IL 60010, (312) 438-4770.

TRUCKS

2 - 1961 Dodge 1 ton flatbed trucks– low milage, $1,500 each. Contact Dennis Anderson, P.O. Box 702, Barrington, IL 60010. (312) 438-4770.

List of Advertisers

ON LAWN DISEASES

(continued from page 34)

This is the specific sequence of events in a home lawn:

1. A number of cloudy and wet days when there is very little sunlight, allowing all the "little buggers" to multiply and gang up on the poorly adapted turf plant.
2. A number of hot days with excess ultra violet exposure which knocks off the weakened plant.

This theory can readily be checked out by putting some greenhouse glass over diseased areas. Incidentally, these diseases have never been replicated in greenhouses. This is because greenhouse glass is made to filter out ultra violet rays as such are not always good for plants. Too much ultra violet causes plants to discolor, usually to reddish brown or pink colors. These diseases in question, coincidentally, are usually identified by pinkish color, or sometimes brown bands, in early stages.

Now that's my theory— summed up— an inability to adapt.

Cap'n Mike
Windjammer 'Barefoot' Cruises
P.O. Box 120, Dept. 2185, Miami Beach FL 33139

Might take your dare.
Send my free full color 'Great Adventure' Booklet on the 6 and 14 day cruises to the Caribbean and West Indies.

Name ____________________ Address ____________________

City/State/Zip ____________________

LESCOSAN* CAN–

– CONTROL CRABGRASS MORE EFFECTIVELY

than any other pre-emergence herbicide.

– CONTROL CRABGRASS LONGER

than any other pre-emergence herbicide.

– BE APPLIED WITH CONFIDENCE.

Lescosan is labeled for bents. Lescosan does not damage grass roots or thin turf.

– BE PURCHASED NOW IN CONVENIENT FORMS.

Lescosan 4E is competitively priced, an emulsifiable concentrate, not a wettable powder, for ease in mixing and application. In addition to Lescosan 7G and 12.5G, Lescosan 3.6G + Fertilizer is available in a formulation to provide cleaner, greener turf with one application.

LESCOSAN CAN DO ALL THIS.
CAN YOU AFFORD TO BUY ANYTHING ELSE?

Lescosan* (Betasan-registered trademark of Stauffer Chemical Co.)

CALL BARB. SHE'LL TAKE YOUR ORDER.

The patented ChemLawn Gun. The best gun in the business

(800) 321-5325—Nationwide
(800) 362-7413—In Ohio

LESCO PRODUCTS

Division of Lakeshore Equipment & Supply Co.
300 South Abbe Road, Elyria, Ohio 44035
(216) 323-7544

Circle No. 2 on Reader Reply Card