PROCEEDINGS

of the

12th ANNUAL NORTHWEST TURF CONFERENCE

October 2-3, 1958

STATE COLLEGE OF WASHINGTON PULLMAN, WASHINGTON

WELCOME

Mark Buchanan, Director
Agricultural Experiment Stations
Pullman, Washington

I have just returned from two years in Pakistan. It's good to be back in the United States again. When we first went to some of the countries in Europe and on the trip home we were very much impressed with the nice green grass. In Pakistan, as perhaps you know, everhthing is dirt and dust. There just isn't any grass anywhere. When you play golf there's just sand greens, and you chase your ball down the dusty fairway. I had the pleasure of welcoming some of you several years ago when Mr. Law and Professor Schafer were establishing the first meeting of this sort. As I mentioned at that time there are several things that come from conferences of this sort in addition to regular activities that you carry on during the year. This conference provides an opportunity for you to share in the experiences of others. You know Confucius said that a smart man learns from his experiences, but a smarter man learns from the experiences of others. Following this original meeting twelve years ago your decision was to organize an Association and one of your activities from which we've certainly been interested is to put a little money into the agricultural research program particularly related to problems in which you are interested. We hope this has been a profitable investment for you.

I see from the membership pad given me that you now have a membership of sixty-nine. This must be outdated because there's more than that many people here, so you must have more than 100 per cent attendance.

TABLE OF CONTENTS

PROGRAM

Thursday
October 2, 1958

Morning

Wilson Compton Union Building
Room - Browsing Library

Chairman, Don Hogan, President, Northwest Turf Association and Irrigation Consultant, Seattle, Washington

8:30 - 10:00

Registration

10:00 - 10:00

Welcome - Mark Buchanan, Director, Agricultural Experiment Station, Pullman, Washington

10:10 - 10:50

Turf Research Report - Roy Goss, Junior Agronomist, Puyallup, Wash.

10:50 - 11:30

Wetting Agents and Their Place in Turf Management - Bill Bengeyfield, Western Director, USGA, Forest Grove, California

Afternoon

Chairman, J. K. Patterson, Agronomy Department, WSC, Pullman, Washington

1:15 - 1:45

Annual Business Meeting

1:45 - 2:30

Velvet Grass Control, Panel Discussion, Chairman, Jack King, Golf Course Superintendent, Columbia-Edgewater Golf Club, Portland, Oregon. Turf Research WSC - Roy Goss

2:30 - 3:15

Disease Control on Canadian Turf - N. A. MacLean, University of British Columbia, Cancouver, Canada

3:15 - 3:30

Break

3:30 - 4:00

Canadian Turf Grasses - V. C. Brink, University of British Columbia, Vancouver, Canada

4:00 - 4:30

History and Problems in Canadian Turf - Manny Gueho, Supt. Vancouver Golf Club, 771 Austin Rd. New Westminster B.C.

7:00

Banquet, Horse Sense in the Atomic Age - Elwyn Schwartz, University of Idaho, Moscow, Idaho (Cub Banquet Room)

Friday

October 3, 1958

Morning

Wilson Compton Union Building
Room - Browsing Library

Chairman, A. G. Law, Agronomy Department, WSC, Pullman, Washington

8:30 - 9:15

Panel Discussion, Home Lawns - K. J. Morrison, Extension Agronomist, WSC; Jerry, Munro, Landscape Architect, Bothell, Washington; and Ben Roche, Extension Weed Specialist, WSC.

9:15 - 10:00

Panel Discussion, Cemetery Problems - Paul Brown, Chairman, Evergreen Cemetery, Seattle. Panel members: Charles Wallace, Gordon Bowen, Bryan Brewer, Wm. Elsass, and Lee Fryer

10:00 - 10:15

Break

10:15 - 11:00

Research Report - Charles Gould, Plant Pathologist, WSC, Puyallup, Washington

11:00 - 11:45

Research Report - Herman Austenson (Given by Roy Goss Agronomist WSC, Pullman, Washington and Deran Markarian)

Afternoon

Chairman, Glen Proctor, Superintendent, Rainier Golf & Country Club, Seattle, Washington

1:15 - 2:00

Nitrogen Fertilization - Objectives and Methods - D. W. Kolterman, Product Technologist, DuPont Company, Wilmington, Delaware

2:00 - 2:30

Report on the PNW Bluegrass Selection - J. K. Patterson, Agronomist WSC, Pullman, Washington

2:30 - 3:30

Questions and Answers on Machinery and Equipment (Company Representatives) Chairman, Glen Proctor

Vinson, James C.	Western Golf Course Supply Co.	1006 S.E. Hawthorne Blvd. Portland 14, Ore.
Wade, Rolland	Walla Walla Country Club	Walla Walla, Wash.
Wallace, Charles	Sunset Hills Memorial Park	Box 461 Bellevue, Wash.
Werth, Rudy	Jackson Golf Course	137 - 10th, N. E. Seattle, Wash.
White, Sidney S.	The Dalles Country Club	Route 3 The Dalles, Ore.
Williams, Glen	Veterans Memorial Golf Course	52 Chesopic Street Walla Walla, Wash.
Zook, Sam	Waverly Golf & Country Club	1100 S. E. Waverly Dr. Portland 22, Ore.

Land, Henry W. (Jr.)	Sand Point Country Club	23012 Brier Road Alderwood Manor Seattle, Wash.
Land, Henry	Tacoma Golf & Country Club	9210 Winona Ave. S.W. Tacoma, Wash.
Law, Alvin G.	Department of Agronomy State College of Washington	Pullman, Wash.
Lawton, Geo.	Elks Allenmore Golf Course	Tacoma, Wash.
Leonard, Joe	Hillcrest Country Club	Box 4026 Boise, Idaho
Macan, A. Vernon	Golf Architect	1110 Beach Drive Victoria, B.C.
MacLean, Neil Allen	Division of Plant Sciences University of British Columbia	Vancouver, B.C.
Malcham, Don	H. D. Fowler Co., Inc.	901 Lane Street Seattle 14, Wash.
Markarian, D.	Agronomy Department State College of Washington	Pullman, Wash.
McKenzie, K. W.	Galibrath & Co.	Seattle, Wash.
Mihelich, Joseph P.	Enumclaw Golf Club	Route 3, Box 599 Enumclaw, Wash.
Mitchell, Charles	Clarkston Golf Course	Clarkston, Wash.
Morgan, C. W.	Liberty Lake Colf Course	E. 16207 Spokane, St. Liberty Lake, Wash.
Morrison, Kenneth J.	Extension Service State College of Washington	Pullman, Wash.
Munro, Jerry	Highland Point Gardens	7622 Simmonds Road Bothell, Wash.
Munzenmaier, L. J.	DuPont Company	1720 Webster Palo Alto, Calif.
Olson, Robert	Soil Conservation Service	454 Holland Lib. Pullman, Wash.
Patterson, J. K.	Agronomy Department State College of Washington	Pullman, Wash.
Pennell, James T.	Later Chemicals	Seal Island Vancouver, B.C.

Pottenger, Joe E.	Yakima Country Club	2704 Willow Yakima, Wash.
Proctor, Glen	Rainier Golf & Country Club	2222 S. 111th. Seattle 88, Wash.
Putnam, Ken	Seattle Golf Course	Seattle, Wash.
Reed, Byron E.	E. P. Baltz & Son	9817 East Burnside Portland 16, Ore.
Reger, Austin	Liberty Lake Golf Course	Box 235 Liberty Lake, Wash.
Rive, C. Elliott	Northern Industries, Ltd.	245 North 8 Road Richmond, B.C.
Roche, Ben	Extension Service State College of Washington	Pullman, Wash.
Rogers, Ed H.	Northwest Mowers	20827 - 81st West Edmonds, Wash.
Rowe, Chen	Tacoma Seed Company	805 Pacific Avenue Tacoma, Wash.
Rydrych, Donald J.	Grant Co. Extension	Ephrata, Wash.
Schmidt, Louis J.	Indian Canyon Golf Course	Cov. 6th & 14th Street Spokane 44, Wash.
Schwendiman, John L.	Soil Conservation Service USDA	454 Holland Library Pullman, Wash.
Scott, Lloyd A.	West Seattle Golf Course	13017 - 41st Ave., S. Seattle, Wash.
Scott, Robert	Shaughnessey Heights Golf Club	1400 W. 33 Avenue Vancouver 13, B.C.
Shouse, Robert H.	Esmeralda Golf Course	2604 E. Columbia Spokane 28, Wash.
Spaulding, Jack	Inglewood Golf & Country Club	11301 N.E. 9th Street Kirkland, Wash.
Strahl, W. H.	Bentley Company	1246 So. 130th Seattle 88, Wash.
Tait, R. S.	Rain Bird Sprinkler Mfg. Company	120 - East 25th Street North Vancouver, B.C.
Verling, Francis P.	USBR Bureau of Reclamation	Route 1 Ephrata, Wash.

NORTHWEST TURF ASSOCIATION

BOARD OF DIRECTORS

Milt Bauman	Overlake Golf Course, P. O. Box 97, Medina, Wash.
Paul Brown	Evergreen Cemetery, 111 E. Aurora, Seattle 33, Wash.
John Harrison	Hayden Lake Golf & Country Club, Hayden Lake, Idaho
Dick Haskell	Seattle Park Development 10132 Rainier Avenue, Seattle 88, Wash.
Don Hogan	National Irrigation Consultants 1910 Minor Ave. Seattle 1, Wash.
Henry Land, Sr.	Tacoma Golf & Country Club, 9210 Winona Avenue, S.W., Tacoma, Wash.
Glen Proctor	Rainier Golf & Country Club, 2222 So. 111th., Seattle 88, Wash.
Ken Putnam	Seattle Golf Course, Seattle 77, Wash.
Sam Zook	Waverly Golf & Country Club 1100 S.E. Waverly Drive, Portland, 22, Oreg.

OFFICERS

1958	1957-58	1957
Don Hogan	President	Don Hogan
Glen Proctor	Vice-president	Glen Proctor
Henry Land, Sr.	Treasurer	Henry Land, Sr.
J. K. Patterson	Secretary	J. K. Patterson

ATTENDANCE

NORTHWEST TURF ASSOCIATION--1958

Name	Representing	Address
Barr, H. E.	Marine Drive Golf Club	1011 Woodland Drive Vancouver, B. C.
Bauman, Clayton	Glendale Golf & Country Club	13440 Main Street Bellevue, Washington
Bauman, Milt	Overlake Golf & Country Club	235 - 10th Avenue, West Kirkland, Washington
Bengeyfield, Bill	U.S.G.A. Greens Section	P. O. Box 567 Garden Grove, Calif.
Bertramson, Rod	Agronomy Department State College of Washington	Pullman, Washington
Blohm, Charles E.	Western Golf Course Supply Co.	1006 S. E. Hawthorne Blvd. Portland 14, Oregon
Borst, Fred R.	Ed Short Company	234 S. W. 160th Seattle, Washington
Bowen, Gordon S.	Boise City Park Dept.	605 Bannock Street Boise, Idaho
Brewer, Bryan E.	Mountain View Cemetery	P. O. Box 632 Walla Walla, Washington
Buchanan, Mark	Director, Ag. Experiment Stations	Pullman, Washington
Brink, V. C.	University of British Columbia	Vancouver, B. C.
Cochran, Bob	Rain Bird Sprinklers	626 Whitman Walla Walla, Washington
Croft, G.	Vancouver Parks Board	7506 Carnation Street Vancouver 13, B. C.
Elsass, Wm. F.	Boise City Park Dept. (City Cemetery)	2701 Dill Street Boise, Idaho
Erlacher, August F.	Wenatchee Country Club	331 Sunset Wenatchee, Washington
Everhart, Cliff	Manito Golf & Country Club	Box 8025 Manito Station Spokane, Washington
Federspiel, Fred	Oswego Golf & Country Club	16755 S.W. Pacific Hwy. Oswego, Oregon
Filer, Ted H.	Plant Pathology Dept. Washington State College	Pullman, Washington

Fryer, Lee	Pacific-Agro Company	3308 Harbor Ave., S.W. Seattle 6, Wash.
Goddard, Murl	Elks Golf Club	807 North Third Street Yakima, Wash.
Goss, Roy	Western Wash. Experiment Station	Puyallup, Wash.
Gould, C. J.	Western Wash. Experiment Station	Puyallup, Wash.
Gourley, Boyd	Everett Country Club	1809 Columbia Street Pinehurst, Wash.
Gueho, E.M.	Vancouver Country Club	611 Shaw Avenue New Westminster, B.C.
Harrison, George M.	Carsten's Packing Company NuLife Fertilizers P.O. Box 883 Tacoma, Wash.	19445 Normandy Park Dr. Seattle 66, Wash.
Harrison, John	Hayden Lake Golf & Country Club	Hayden Lake, Idaho
Haskell, Dick	Seattle Park Department	10132 Rainier Avenue Seattle 88, Wash.
Hogan, Donald A.	National Irrigation Consultant	1910 Minor Seattle, Wash.
Hoggatt, George W.	Three Lakes Golf Course	1200 Utah Street Wenatchee, Wash.
Hohner, Joe P.	Jefferson Park Golf Course	3960 - 59th S.W. Seattle 16, Wash.
Jackson, Edward T.	H. D. Fowler Co., Inc.	901 Lane Street Seattle, Wash.
Jaslowski, John	Broadmoor Golf Club	2606 - 12th North Renton, Wash.
Knoedler, Heinz	Northern Industries, Ltd.	245 North 8 Road Richmond, B.C.
Kolassa, Don	Washington Turf & Irrigation Co.	1200 Stewart Street Seattle 1, Wash.
Kolterman, D.W.	DuPont Company	Wilmington Del.
Kuhn, Carl H.	H. D. Fowler Co., Inc.	8434 S.E. 37th Street Mercer Island, Wash.

TURF RESEARCH IN PROGRESS AT PULLMAN AND PUYALLUP, WASHINGTON

By Roy Goss
Junior Agronomist

All too often consideration is given to some factors affecting the quality of turf only when severe damage has occurred. However, by looking at a few of these factors, I believe that we can be better prepared to answer the problems of the future.

A preliminary report of this experiment was given last year, and some conclusions can be drawn at this time for the first year's data. To briefly reiterate, the treatments are as follows:

HCHN* - 1" cut + 8 # of N/1000 sq. ft. divided into 4 equal month applications
HCLN - " + 2½#
LCHN - ½" " + 8 #
LCLN - " + 2½#

* High cut high nitrogen.

From Table 1, it can be seen that the high cut and high nitrogen produced the greatest clipping weight with low cut and high nitrogen the next largest in production. From this data, it is obvious that the nitrogen level controls the amount of grass produced, if no other factors are seriously limiting.

In Table 2, however, there is presented a much different picture, and no doubt startling to some people. Root production which has always been a serious problem with close clipped turf is inversely affected by the amount of nitrogen applied. By comparing root yields of HCHN plots and HCLN plots, it was found that the low nitrogen plots produced 16% more roots than the high nitrogen plots. In the same manner, HCLN plots produced 26% more roots than LCHN plots. This is enough evidence to show that both cutting height and nitrogen level influence root production, with nitrogen level playing the most important role.

TABLE 1. Turf Grass Clipping Yield Data for 20 Weeks (In Grams)

Varieties	HCHN	HCLN	LCHN	LCLN	Ave.
Merion	790	453	843	453	635
602	996	645	970	577	797
402	888	534	846	517	696
205	943	574	930	619	767
104	915	548	964	548	744
Park	763	525	726	535	637
Newport	808	552	963	495	705
Cr. Red	827	652	669	513	665
Bent	725	621	700	483	632
Delta	824	669	587	520	650
Total	8479	5773	8159	5260	
Ave.	42.40	28.87	40.80	26.30	

TABLE 2. Yield of Roots and Rhizomes by Treatment and Variety (In Grams)

Variety	HC Roots	HN Rhiz	HC Roots	LN Rhiz	LC Roots	HN Rhiz	LC Roots	LN Rhiz	Ave. Roots	Rhiz
Merion	10.81	4.75	12.02	6.06	8.33	3.20	9.66	5.40	2.55	1.21
602	11.16	6.50	12.23	6.20	8.91	5.70	12.99	6.99	2.83	1.59
402	10.40	6.10	13.70	6.80	8.92	4.10	10.61	6.51	2.73	1.47
205	11.16	5.26	12.92	6.39	7.97	3.97	10.88	6.71	2.68	1.40
104	9.47	4.90	13.53	7.59	12.24	5.16	11.96	5.49	2.95	1.45
Park	9.40	2.63	10.22	3.75	9.73	2.41	8.59	3.34	2.37	.76
Newport	11.69	7.56	11.23	6.86	10.04	3.92	8.16	6.11	2.57	1.53
Cr. Red	9.52	0.00	11.14	0.00	8.27	0.00	11.75	0.00	2.54	0.00
Bent	4.56	.25	5.84	.15	4.77	0.00	5.24	.53	1.28	.05
Delta	7.24	.84	9.55	.39	6.08	2.17	8.92	1.08	1.99	.28
Total	95.41	38.54	112.38	43.95	85.26	30.63	98.76	41.53		
Average	2.39	1.20	2.81	1.37	2.13	0.96	2.47	1.30		

In conclusion, deeper root penetration and larger root masses can be expected with higher cutting and by decreasing the nitrogen level where possible. This could be a contributing factor in maintaining a better and more vigorous stand of bent and Poa annua during the summer months.

Nematode Research

The climatic conditions during the summer of 1958 caused many strange phenomena heretofore not encountered in the Pacific Northwest. As much as 75% of the grass was lost on one putting green at the Broadmoor Golf & Country Club and Seattle Golf and Country Club, both at Seattle. Other greens on both of these courses suffered varying damage. Loss of vigor on some greens at the Rainier Golf & Country Club also occurred, and in all cases living roots were practically nonexistent, except in the upper 1-2 inches of soil.

Since no disease was evident at this time and ample water was being applied, samples were taken and analyzed for nematodes by Dr. Walter Apt, USDA Nematologist at Puyallup. His findings indicated extremely large populations of spiral nematodes, which alone could kill turf grasses by destroying the roots, without any other stresses or injuries.

With this information, replicated experiments were initiated at the Seattle and Rainier Country Clubs. Two materials, emulsifiable Nemagon and VC-13, having nematicidal properties, were applied on these plots. Treatments will continue through next summer (1959) before results will be known.

It should be pointed out at this time that:

(1) Information is not available as to the extent of damage caused by nematodes.

(2) Control measures are not definitely established.

(3) Treatments are not being advised until more data are available.

Wetting Agents

For a long time it has been known that wetting agents will reduce the tension between water and the media to which it is applied. Armed with this knowledge I believe that good use of these materials could be made on turf areas that are hard to wet.

Since roots are not active in dry soil, quite often the grass may be subsisting in the upper 1 or 2 inches of soil, or even less. Many localized dry spots appear even after ample irrigation. These dry areas may be due to thatched, compacted, or heavy soil areas that take water very slowly when they become dry.

In some screening tests at the Western Washington Experiment Station, five different commercially available wetting agents were tried on dry spots on the putting green, and it was found that all produced satisfactory results insofar as allowing the hastening of water penetration. Satisfactory results from the use of organic wetting agents have further been reported from Sandpoint, Rainier, Tacoma, and Manito Country Clubs.

If use of these materials is contemplated, the following points should be observed:

(1) Use organic "nonionic" wetting agents.

(2) Use only where and when necessary

(3) Follow the manufacturers' recommendations carefully.

(1) Pearlwort, Mouse-ear, and Common Chickweed: Neburon still remains the best control for these weeds when used at the rate of 5-6# of 50% material per acre or 15-18# of 18.5% material. 50/50 mixtures of 4#/gal. of acid of 2,4-D and 2,4,5-T with a good wetting agent will give fairly good results when used at the rate of 2 tablespoons per gallon of water--not recommended for putting greens.

(2) Speedwell (Veronica spp.) and White Clover (Trifolium repens) can be killed with the same 50/50 mixture of 2,4-D and 2,4,5-T. A wetting agent or spreader-sticker is a must here. Endothal appears to be very effective against speedwell and white clover at the rate of 1 quart per acre by spraying twice at 2-week intervals.

(3) Crabgrass, a weed that rarely causes serious concern in the Northwest, caused some concern this year. Several outbreaks were reports on the West Coast, and heavy infestations were reported in the Wenatchee and Yakima valleys.

In plots trials this summer, DSMA (Disodium Methyl Arsonate) and Neburon were applied, with the DSMA giving a good kill. DSMA was applied at the rate of 1#/3000 sq. ft. of 2 tablespoons in 3 gallons of water. Apply enough to wet the foliage by using a good spreader-sticker material. Favorable reports of a material called PAX have been reported, but it has not been tried. More crabgrass work will be planned next year.

Planned Experiments

Experiments for elimination of Poa annua

Since Poa annua acts as a winter annual here, that is, one that becomes established in the fall and winter months, sets seed from early spring until summer, and then dies during times of stress (from heat, diseases, insects, etc.), the obvious time to control the weed is during its period of establishment.

An experiment will be initiated this fall on the experiment station putting green for controlling Poa Annua by the use of arsenates, Endothal, Neburon, and Simazine. The existing populations of Poa and Bent will be measured, then totaled during the winter and early spring and remeasured next year. This experiment will be continued for an indefinite period of time.

Wetting agents

The possibility for using wetting agents, especially nonionic forms, for promoting better drainage of soils appears good at this time. In western Washington, winter play is the rule rather than the exception and hence results in many problems of compaction and trampling of the grass due to overwetness of the soil.

An experiment is being planned whereby various rates and frequencies of application of wetting agents will be used in an attempt to create better drainage where greens will be played all winter long.

Cooperative experiments

Experiments are being planned in cooperation with Dr. C. J. Gould to determine the possible interactions between some management practices, especially fertilizers, and the occurrence of diseases.

Nematode investigations will continue in cooperation with Dr. Walter Apt, USDA Nematologist. These investigations will also be made in conjunction with agronomic and pathologic experiments to determine possible complex interactions.

Turf insect research is being planned with Dr. A. J. Howitt, Station Entomologist, to provide better controls for some of the common injurious insects.

Turf fertility experiments for both putting green and lawn and playfield types will be initiated in 1959 as more turf is established at the experiment station. These experiments will include rates, sources of nutrients, and time of application.

Question and answer period

Ques: Do you analyze the soils where namatodes were discovered?

Ans.: We had chemical analyses run on all of these soils and in all cases they were high in all nutrients. We always take the clippings off rather than waste them. So the only limiting factor in this case we

assumed here was nitrogen, and with an application of nitrogen we got direct response.

Ques: (Paul Brown) Did you run across any sand fleas this summer?

Ans.: No, I didn't and I'm not in that particular line of work, so can't report much on that problem.

WETTING AGENTS AND THEIR PLACE IN TURF MANAGEMENT

W. H. Bengeyfield
USGA Western Office

What are they?

Simply stated, wetting agents will make water wetter. A good wetting agent will have the ability to reduce surface forces, such as surface tension and interface tension.

What is surface tension?

Surface tension might be illustrated by sprinkling a few drops of water on wax paper. Note how the water "balls up." This is an example of the attraction of water molecules for each other. The tighter the ball, the tighter the tension. An actual pressure develops within the water droplet.

There are many waxy-like substances in soils. Certain soil bacteria have a waxy coating as well as organic matter.

What is interface tension?

To illustrate this, consider a thin glass tube with water in it. Note that the water rises around the edges of the tube. A rounded surface (concave) is produced. An actual pressure is developed within the water column.

A smaller tube will have a greater curve surface (concave) than a large tube. A greater pull is therefore developed in the smaller tube.

In the soil, these curved surfaces may face in any direction, and the movement of water due to tensions may be in any direction. Did you ever think of why water moves up a wick or into a flower pot when watered from below? This is nothing more than capillary adjustment upward. Capillary adjustment will also work downward or sidewards. In the downward movement, gravity helps but as the surface of a soil is watered, the water will move downward due to capillary adjustment as well as gravity. When the watering stops, an equilibrium is gradually reached and the downward movement stops. This is brought about by equal pressures at the bottom of the water column as well as at the top of the column. This is all brought about by actual pressures within the water.

How are plants supplied with water?

There are two methods whereby plants obtain moisture. One is by the capillary adjustment method just described. The plant rootlets absorb water in the soil, capillary fronts are thinned and curvatures increased. This increased curvature increases the pressure within the water system, and it is "pulled" toward the root zone.

The second method whereby plants obtain water is by an extension of the plant root system. The classic example is a rye plant that, in one season, will develop a total root length of approximately 380 miles carrying 6,600 miles of root hairs. This is a tremendous root system and greatly helps in obtaining sufficient quantities of water for the plant.

So - What are wetting agents?

Wetting agents are materials that have the ability to make water wetter. They reduce surface tension and interface tension.

Wetting agents are divided into three chemical classes, based on the electrical charge of the chemical. These three classes are: Anionic, carrying a negative charge; cationic, carrying a positive charge; and nonionic, carrying no charge on the particle. Most soaps and detergents fall into the first two categories.

The ionic materials form charged particles in solution and are generally more chemically active. For example, when table salt is placed in solution it will break into sodium ions (cations) and chloride ions (anions). The nonionic materials do not form charged particles in solution and are therefore less chemically active. An example of this type of solution is one in which sugar has been placed. The sugar does not break into an ionic solution.

Research shows that the ionic wetting agents are erratic in soil applications. Being more chemically active, they seem to combine with certain soil matter, and the result is that they no longer act as wetting agents. The nonionic's, being inert to soil matter, do not loose their identity in soils as wetting materials.

The entire purpose or reason for using wetting agents can be boiled down to one vital point: They make water more effective.

Do they work? Let's keep socre

A. Dr. O. R. Lunt of UCLA worked with the anionic and cationic wetting agents in 1952. He reported the results as being largely negative, i.e., no benefit or increased water absorption of any great significance. One wote "no."

B. O. R. Lunt and V. Youngner of UCLA worked briefly but inconclusively with a nonionic wetting agent in 1957. Pipes of 4-inch diameter were driven into heavy U-3 bermudagrass turf to a depth of 2 inches. A solution containing nonionic wetting agent material was poured in one pipe and plain water in another. They noted no marked increase in water movement in the treated water. A "no" vote.

C. Work at North Carolina State showed that "the rate of flow through soils of a treated solution is not significantly greater than that of plain water. However, once the wetting agent had been applied, the rate of flow of plain water was appreciably higher on the treated areas as compared to untreated areas." A "yes" vote.

D. Mr. Warren E. Lafkin of the Golf and Lawn Supply Corporation, White Plains, New York, had a heavily thatched lawn area with localized dry spots developing during hot, dry summer weather. He cultivated (aerified) this area, but this operation did not prevent the further development of browned areas. He then treated one half of the area with a nonionic wetting agent and left the other half untreated. After a period of identical watering, soil cores were removed from both areas. In the treated zone, moisture depth was found to be between 6 and 8 inches. In the untreated zone, water depth was less than 2 inches. Mr. Lafkin would vote "yes."

E. Dr. Marvin H. Ferguson of the USGA Green Section did some preliminary work with nonionic wetting agents on bermuda turf and bare soil in 1957. The bare soil areas were extremely difficult to "rewet" during the summer. However, after treatment, these areas began to take water much better, and run off was reduced. The turfed area also appeared to have better penetration. A qualified "yes" vote.

F. Mr. George Rasmussen, Superintendent of the Contra Costa Country Club, applied a nonionic wetting agent to his Colonial bent greens in the early summer of this year. Turf problems began to show up approximately 4 to 6 days following the application of the wetting agent. Those greens thate were not treated did not have this trouble. Considerable thinning and some actual turf loss was reported. This would be a "no" vote.

G. The Pasadena Municipal Golf Courses also tried a nonionic wetting agent this early summer. This was on Poa annua and Seaside bent greens. About 7 days after the application, the Poa annua started to go out with considerable bare areas resulting. Difficultities have been traced to the a application of the wetting agent. Another "no" vote.

In reference to the last two cases, the manufacturer reports that, under certain weather and soil conditions, a nonionic wetting agent seems to induce a nitrogen release within the soil if any "stored fertilizers" are present. This rapid nitrogen release burns the grass roots, and subsequent turf damage is observed. The above two cases did appear to be similar to a nitrogen burn.

H. Elmer Borden, Superintendent of the Olympic Country Club, Jim Haines, Superintendent of the Denver Country Club, and Cliff Everhart, Superintendent of the Manito Country Club, have all used the nonionic wetting agents in 1957 or 1958. They all report good results with better water effectiveness. Three "yes" votes.

I. An interesting report from Joe Flynn of the Metropolis Country Club in White Plains, New York, appeared recently in the Golf Course Reporter. Joe Flynn had a "wash-out" problem on a trap next to his Number 4 Green. Heavy rains always caused a wash-out of this trap, and the crew had to shovel back the sand. Actually the crew members got in the habit, and after a heavy rain they automatically went out to shovel the sand back into the trap.

Early this year, Joe Flynn and his assistant applied a nonionic wetting agent to the collars and banks of Number 4 Green. They did not tell the maintenance crew of this undertaking. Within a week, a heavy downpour of 1/2 inches resulted in the late afternoon. Experience told the men that this was enough rain to cause a serious wash-out of the trap. Next morning, the crew went out to shovel back the sand as usual. However, when they got there they found that "there was something funny going on as there was no washing in the traps of Number 4 green." Joe Flynn still did not tell the crew of his treatment of the collars and aprons of Number 4. In two weeks another heavy rain fell, and the results were the same, no wash-out. He has concluded that the results show a greater water effectiveness from the application of the nonionic wetting agent. A "yes" vote.

Add up the score, and this will give you a pretty fair idea of the results obtained to date from wetting agent applications.

What are wetting agents not?

It does seem that wetting agents of the nonionic form will make water more effective. However, they should not be considered as soil conditioners; they are not a substitute for good drainage and they do not correct a compaction problem. Wetting agents may help to move water through compacted soils, but they do not seem to be a substitute for any of our accepted turf maintenance practices.

The vote above seems to favor wetting agents. They are not miracle liquids that are going to change our way of life. They are, however, another tool in our bag of tricks and seem to be worthy of investigation on your course. When you wish greater water effectiveness because of a thatch problem or "hard to wet" soils, they are worth a try.

They must be applied properly in order to have a fair chance to work. Follow directions carefully in making their application. It seems that even the greatest critics of wetting agents will concede that they may have a helpful place in areas with heavy thatch.

VELVET GRASS CONTROL

Panel Discussion
Chairman - Jack King

King: It's embarrassing not to have the other fellows here who have done a lot of work on velvet grass control. Dr. Harold Schudel of Oregon State and Homer Gray, Superintendent of the Corvallis Country Club, couldn't make it this year. We've treated four fairways down in our area, half of them one year and half of them the next with very good results, but it's a dangerous material to use and I would hate to recommend it. Maybe Mr. Goss can give you some technical evaluation of it.

Goss: We did look at his fairways down there last fall, and they were free of velvet grass. He has an excellent velvet grass kill on them as Jack says. Sam Zook will go along with that; at the time we were there no velvet grass was to be seen. Karmex DW (Diuron) is very dangerous to use unless you know exactly what you want done and know how to use it. It is a soil sterilant, and most sterilants will act as herbicides used at the proper rate. But this is heavier than the proper herbicide rate. We have just a little bit of work going on it. We applied Karmex DW and some simozine material, which is a soil sterilant, at the Rainier Country Club in the rough. We went out to the rough to apply these as Glen said if it killed there he could talk his way out of that, but if it was a strip of fairway it would be more difficult. We got a terrific kill on velvet grass, bentgrass, poa, and everything else. We cleaned the plots--that's what it amounted to. The important thing, however, is the time of application. I'll go back to Jack now and he can tell you when he applied and how.

King: At the country club rates from 1/2 lb. of Karmex DW up to 10 lbs. were tried. With the 2-lb. rate we got approximately a 50 per cent kill. At the 6-lb. everything is killed. The 4-lb. rate seems to be the best. In one area the soil was dry and the soil was sterilized and nothing came on it. On the other test plot where the soil and moisture was right, there was 100 per cent kill.

We put it on with a spray rig at the rate of 4 lbs. per acre. Some strips of grass didn't come back until late the next year. A couple of places were burned where a heavier rate was applied, as we went slower up the hills. It took a year to get grass back on these burned places.

In the two years since that one half of the fairways were done, I haven't found any velvet grass in them yet. We have better fairways there than any other part of the course.

Goss: Velvet grass isn't found too much in eastern Washington, but on the coast it is increasing all the time. The putting greens are becoming badly invested with it over there. It is showing up as it bleaches out and doesn't have the desired green color of other grasses and also it is very coarse. It's a pest on agricultural land all over now. Jack, did you use any wetting agent?

King: Yes, I used sticker and spreader. We were lucky and didn't have any velvet grass on our greens, only on our fairways. The weather plays an important part in the time to spray. You should spray when you think you will have a rain in about 24 hours. Last time I sprayed I cut it

down to 3 1/2 lbs. an acre. From October until the middle of May we just had a burnt patch out in the middle of the fairways. We did get some chickweed and crabgrass in some of the places that were sterilized.

Goss: How soon do you think you can apply this before a rain?

King: Well you have to have your soil and moisture up fairly high. You need a fairly heavy rainfall following treatment for it to work properly.

Goss: The only approach to putting greens and closer turf would be to remove a patch and get rid of the velvet grass that way, because anything that would kill velvet grass in the putting green would practically remove bentgrass cut at 3/17'' or 1/4''. I don't know of any more material like it that is out and before using it, it would require a lot of investigating. You don't know of any other material, do you Jack?

King: Karmex D and Karmex W were at one time used separately. I hesitate to recommend it except on a trail basis, but sometimes it will get 100 per cent kill.

Goss: There are many other things you've possibly heard that are good for killing quackgrasses, etc. Amino triazole was used at Rainier, but we didn't have good results. It did bleach it out quite a bit but didn't kill it.

Bengeyfield: One of the golf course superintendents tried some of this at Tucson at the Tucson Country Club. He was after crabgrass and he was applying it at the rate of 3 lbs. per acre and it was doing a good job with the crab, but he didn't follow with fertilizer the next year he had just as much crabgrass again. Karmex DW has a very strong residual effect in the soil as it doesn't move downward very fast.

Ques.: Would you advise watering it in if you didn't expect a rain within 24 hours?

King: Yes, I would suggest that you water fairly heavily to get a steady penetration for at least a month's time afterwards. We usually don't have to worry about lack of water, but last year we did.

Ques.: Does nutrition or pH have any effect on the reoccurrence of velvet grass once you get rid of it?

Goss: As far as I can see it possibly would have because anything that causes loss of turf could be an avenue of re-entry for velvet grass.

King: Where we did this we had a pH range of from 6.5 to 6.8. If Karmex DW is applied to flagstone walks and you get it in the fixed properly, you're all right, but if you get a washing rain on top of it, look out for your lawn. If Karmex DW is used around trees, it has affixed itself and will be there forever and eventually kill the tree.

Ques.: If the ground is dry to start with, would it be well to water the soil first?

King: In my experiment and on test plots I've seen, you have to have adequate moisture to start with. In other words you have to water first.

DISEASE CONTROL ON CANADIAN TURF

N. A. MacLean
University of British Columbia

I've spent many long years at this institution, and it's a pleasure to come back and renew acquaintances. Many of the faculty are still here, and some of the other friends I knew that lived in Pullman. When I found out my topic was Disease Control on Canadian Turf, I felt much like the young surgeon did when he was talking to one of his Russian colleagues at a conference held in Montreal recently. They were talking about operations and the difficulty of these operations. What, he asked the Russian, was the most difficult operation in Russia. The Russian replied the tonsillectomy was the most difficult operation. The Canadian looked quite surprised as that was a simple operation in this country and asked why? Well, the Russian said, in the Soviet everybody is so scared to open their mouth that we have to approach that problem from the other end.

As you realize Canada is a large country. We have problems comparable in eastern Canada to what you have in the eastern U.S.--areas of New York, New Jersey, and the New England states. Our problems in British Columbia compare to those in Washington and Oregon to some degree. B.C. is a peculiar province in its geographical distribution. It is probably the most mountainous area in the world for its square mileage. Most of the agriculture and the people are located in the southern part of the province.

The diseases in the eastern part of Canada are much the same as in the eastern part of the United States. In British Columbia we had our first Sports Turf Conference last year, and as a result of that, we decided that one phase of turf work that should be followed in British Columbia is disease control. Very little work had been done, and very little work is still being done. We decided perhaps a survey might be in order so we could determine what diseases were present in our area. We had a dry summer, and water restrictions were put on. Through the observation of our superintendents they noticed that there was one species of grass that was dying out--Poa annua. The grass is coming back fairly well now, and most of the spots have been filled in. If we don't get a sudden cold spell we shall get through the winter in fine shape, and next year we will have some fine turfs.

We have much the same disease problems as Washington; fusarium patch and fairy ring for the most part, are due to soil conditions. Then we have a number of leaf spots, and red thread is getting more pronounced in some of our fairways.

Two weeks ago I was out to an experimental farm which is about 100 miles north of Vancouver and was introduced to a disease on Merion bluegrass. It looked to me like a smut disease. But I found out from Dr. George Fischer here at WSC that it was definitely a serious smut disease on this Merion bluegrass.

We're primarily interested in root rots and soil microbiology. We have been using various fumigants, fungicides, and soil drenches. We do not believe, however, that fungicides and soil drenches are very practical especially with fairy ring.

We have had some good experiences with Vapan and also some bad experiences. One of our new courses was treated last year with Vapan, and it came out with not too many weeds and it looked very good. Some other people have used Vapan and have had nothing but hard luck with it, and it doesn't have much effect on quackgrass. When it is put on properly, however, I think it will do a good job. We will be conducting more tests this following year.

We are interested in what we call soil ammendments. In order that a disease can take place, three things must be present. You feel you can't rid the ground entirely or inoculate with fumigants or fungicides. We have to think of environment as an over-all picture, and it's more or less what we call microenvironment. It might only be a small portion of a green. We are thinking of soil temperatures, soil moisture, soil reaction as the pH of the soil and soil nutrient level, compaction, places where you have heavy traffic, and anything that is disturbing the plant in its normal growth. Besides pathogenic organisms in the soil, of course, there are billions of other organisms present.

One way, of course, of establishing organisms that are favorable to the plants is to add them to the soil, and one way is to add them to the organic matter. We hope that these certain ammendments in the soil will provide a growth of organisms that will be antagonistic in some way to the parasites that are already in the soil. The practice is not new, it goes back very far in history, but we feel particularly in those areas where you use nothing but inorganic fertilizer year after year, there is very little opportunity for any other organisms to develop in the soil. And we think by the addition of this organic matter to the greens we will eliminate these growths entirely.

Some of the work done in Germany a few years ago suggested that just the use of grass clippings added to the soil reduced the population of the fungus. It wasn't total control, but it certainly helped. Probably all of you have heard of the disease known as potato scab. It was found in England a few years ago, that grass clippings applied could reduce this disease from about 100 per cent to almost zero. We have used alfalfa clippings on another disease of potatoes in the B.C. area and have reduced our troubles with it from 50 to 100 per cent in some cases.

For root rot in our strawberries we have used sawdust and a green manure combination. We're working in the greenhouse with them now and are finding that organisms are growing on these various amendments. When we find the ones that can compete satisfactorily with the pathogens, we'll use those amendments. Eventually we will have to use a soil fungicide and keep adding amendments.

Last year looking through our greens, the areas we referred to as poor were the spots where disease started and moved into the greens, so we think management has a lot to do with it to keep these organisms from moving in.

Bark products have also been used as a top dressing. This is applied on the top of the ground and slowly moves down to the roots. Fertilizer is also used with it.

I think in B.C. we will go ahead with some of our soil amendment programs, and I think probably it will be a matter of fumigation and amendments to begin with. We are trying also to learn how to use fish extracts and chicken feathers.

HISTORY AND PROBLEMS IN CANADIAN TURF

E. M. Gueho
Gulf Course Supt.,
Vancouver, B.C.

This article deals with past and present problems in greens management. As the past is not too important, I will deal primarily with our present day problems.

Owing to the heavy play on most golf courses our foremost problem today is compaction, then of course with compaction comes Poa annua. I'll offer a few suggests that may help it until such time a chemical is found to kill Poa annua.

I will point out that most of our greens are built with soil that is too good, the proportion of silt and clay is far too great. We are often told that this can be changed by continuous forking and top dressing with sandier material. This will help, of course, but a proper job would be to take up the turf and recondition the whole surface down to a depth of at least 12 inches so as to give the water an even flow until it is well past the depth of the root system. Of course this is a long-range programe. Peat moss or any material that is inclined to hold water should not be used; instead use a material that is decaying, such as rice hulls. I used this material 25 years ago in rebuilding one of my greens, and it is one of my best greens today. This, of course, is by no means conclusive. My whole idea behind this material or such materials is to have something to create a permanent cushion in the turf root system. In the outer edges of our greens where the traffic is less, the bent grass is able to build its own cushion and crowd out most of the Poa annua.

We may also be able to cut Poa down by a careful rotation of watering. Our dry June on the coast this past summer and the fact that many of our greens had some fade out--something I had never experienced here before--leads me to believe that after 6 or 8 months from germination this grass becomes very weak and shallow rooted. Therefore, I will say that if a green could be well watered for 2 days in succession and then left without water for as long as possible, say 4 days, the first 3 days from start of watering would germinate any seed that may be on the green and by the end of the fourth day without water the surface of the green should be dry enough to kill those same plants and also dry enough to kill some of the older mother plants. Again this is not conclusive, but I believe it is something we could experiment on.

We are also experimenting with too many varieties of grasses in the coast area. There are some fine patches of dark green Colonial Bent varieties on old greens around Vancouver, Seattle, and Tacoma; seemingly in recent years the original Colonial Bent has lost its identity.

I am going to contradict myself here, but the point I wish to make is this: if we have a patch of grass on our greens with a good colour, that stands up well under heavy play, and has been standing up on those greens for 35 to 40 years under our coastal weather then this is the grass we should work on.

PANEL - HOME LAWNS

K. J. Morrison, Extension Agronomist
Jerry Munro, Landscape Architect
Ben Roche, Extension Weed Specialist

Morrison: The average homeowner generally has about four or five thousand square feet of lawn. He would like to have a grass that he can fertilize the first warm day of spring, that will stay nice and green all summer, stay down until he is ready to mow it, one that will crowd out the weeds, that doesn't need very much water, will take wear from kids, dogs, and the mailman, and will not creep into the flowerbeds or the borders. About the only thing that would fulfill these requirements, as you gentlemen will probably agree, is concrete painted green.

The homeowner makes a mistake when he purchases his seed. You can buy seed in the supermarket, hardware store, and the drug store. I don't object to anyone selling seed, but I do object to the type of seed he sells. The reason seed sells is that it is cheap. Some of it is unadapted for home lawn use, and there may be 10 per cent weed seed or inert-content. The price will range anywhere from 75¢ to 1.25 per pound. Bentgrass or creeping red fescue is best for west of the Cascades. Rust is a definite problem on Merion bluegrass in western Washington, but is showing up good in plots at experiment stations in western Washington. This is the first year that rust has been a major problem here. Pennlawn makes a nice lawn, but seed is somewhat limited as yet. In eastern Washington bentgrass is not as good as creeping red fescue or the bluegrasses. Merion is one of the best grasses for eastern Washington even though it does get rust and fairy ring.

The second mistake that homeowners make is their fertilizer program. They don't realize that a grass has to have food the same as their dog, cat, or any other plant. The homeowner again is prone to buy a lawn analysis fertilizer because it is readily available in most stores and the better fertilizers aren't. The homeowner should put on a minimum of 2 lbs. of available nitrogen per 1000 square feet. It is better to put it on in three applications. In western Washington 50-100 lbs. of available limestone to the 1000 sq. feet is recommended. In eastern Washington, however, as a general rule we don't recommend limestone. We recommend the homeowner have his soil tested before using potash and phosphorus.

The third mistake homeowners make is their watering program. "Too little too often" describes the situation. It's hard on the grass and increases the disease problems. It was especially noticeable this year with all of the problems. The most often asked question this year was "Why do I have brown spots in my lawn?" Ninety per cent of it was probably due to improper watering.

Another problem with the homeowners is the proper mowing height. Many of our eastern Washington lawns are mowed too short, and the western Washington lawns are the opposite. In western Washington with the bentgrasses high clippings cause thatching. In eastern Washington we recommend about an inch and one-half clipping height for creeping red fescue and the bluegrasses except Merion. Merion should be clipped about 3/4 inches high. In western Washington we recommend about half an inch on bentgrass and an inch and one-half maximum on bluegrass and creeping red fescue. Merion should be clipped lower.

Another problem with the homeowner is removing the clippings. With a bentgrass or Merion bluegrass lawn, the clippings should be removed. Other grasses do not need clippings removed if they are mowed often.

Ben Roche: If you'll bear with me I'll make a statement that you may think is repetitious but which really isn't: "the most effective method of controlling weeds is by proper management." We know from working with weeds that they are basically opportunists. A weed, with some exceptions, is more apt to make a vigorous growth where there is no vigorous growth of the desired specimen. Consequently, if weed-control programs in lawns are to be successful, they must either be combined with or preferably proceeded by a proper lawn management program. I would like to list briefly the five points that must be remembered in a lawn management program:

1. Adequate fertilization.

2. The planting of the type grasses that are adapted to the area to which they are being planted.

3. In the handling of those grasses after they have been planted, so far as clipping or mowing is concerned, always consider the most successful height that has been established for the particular species.

4. The use of proper watering practices.

5. The controlling of insects and diseases.

I don't think we can spend too much time on watering practices when we discuss lawn management or weed control. Some of our lawn weeds, particularly the chickweeds, either the mouse-ear or the annual chickweed, are prone to thrive on excessive, shallow irrigations. If the backfill is not satisfactory and you don't have a reservoir there for water for maintaining a healthy root system, then it becomes necessary to water in such a manner as to be ideally suited for weeds of the chickweed type. A moist area, frequent irrigation, high humidity--these are ideal conditions for chickweed. Other weeds fall into that same category, so again I say watering is most important.

I would like to make the point that a vigorous lawn, a healthy lawn, must be the basis for a successful weed-control program in any lawn turf.

A couple or three points I would like to make would be as follows: Nothing is as important in weed control as the time of application of the treatment. It's desirable from the standpoint of the homeowner, the greens superintendent, or whoever may be involved to go out when they get spring fever and do their fertilizing, spraying, etc. But actually that isn't the time to do the best weed work. Your weed work on turf should be managed in such a way as to fit into your management program, after you get the effects of your watering and fertilizing, come in and put on your chemical and get the maximum results therefrom. Figure your timing, then. If it is at all possible, you should consider the temperature of the day (which should be at least 50°). If it is higher it's better for most materials.

I think I should mention the method of application as applied principally to home lawns. Of the many methods I have seen used on home lawns, I think by far the best and simplest is the simple sprinkler can. The sprinkler can

is readily adapted to any sized area. The homeowner can practice with the sprinkler can until he knows how much he needs to cover a given area. Once he has made this determination with plain water, he can begin putting his chemical into plain water, and he's apt to get a fairly uniform coverage. In addition to a more uniform coverage he's not using any pressure. Other methods have proved unsatisfactory, and if people would get away from these marketed (plastic shakers, pull behinds, etc.) gimmicks which preceded the hulahoop, we wouldn't have near the problem of neighborhood damage we now encounter.

Another member on this panel spoke of the type seed we can buy and of the undesirability of some seed. I think that our chemical setup is in as bad a shape, if not worse, than our seed supply. If you will look on many of the store shelves you will find materials that are supposed to kill weeds. If you read the label on the container you will find the contents are not basically 2,4-D but are more similar to the 2,4-D - 2,4,5-T combination that is sold commercially as a brush killer. Why they mix that particular preparation for lawn use, I don't know, but when the two are mixed it turns out to be a brush killer instead of a weddicide that you would normally recommend for lawns. The cost of these small containers of weed killers is of such a nature that if a person were desirous of using the best recommended material, the smart thing to do is, if it is possible to get containers smaller than a gallon, to get a gallon of the proper formulation. Enough will be left to do a good job the second time, and if any is left it can be given to the neighbors. Weed control by your neighbor is weed-seed prevention by you.

Question: Will 2,4-D kill Japanese clover or should combination of 2,4-D - 2,4,5-T be used?

Roche: Actually the two best materials I have seen used on it are: (1) Silvex and (2) probably better than that is the material that is called Endothal which is very poisonous and is having a hard time getting on the market.

Question: Is it a good idea to change cutting heights during the same season or should you maintain one height throughout the year?

Morrison: I think it is a good idea to change cutting heights. You can mow closer during the early spring months, and later on a little higher cutting would be better. Don't make a height change all at once or you'll have a very unsightly lawn.

Jerry Munro: Working on home lawns cost-wise, we run into a wide range of situations.

Quality of lawn desired, the area to be planted, and condition of the property influence the price of the lawn and the materials and labor put into the lawn. We have considerable competition in putting in lawns in the Seattle area. If the cost is much over 10 cents per square foot, people object and will try to put in their own lawns.

Our average price for a lawn is about 10 cents a square foot. We differ from golf courses, cemeteries, and parks in putting in lawns in that we must realize a profit from the job. Figuring on the basis of 10 cents per square foot, the following is average for our lawn installation per 1000 square feet:

Peat soil, 6 cubic yards averages $18.00, 30# fertilizer, $3.00, 5# grass seed, $7.50, peat, bale, about $3.70. Use of tractor, rototillers, and equipment is about $9.00 per 1000 square feet. Labor allowance is 16 man-hours per 1000 square feet. Labor allowance includes all preparation, planting, hauling equipment away, and cleaning up.

One change we have seriously considered in our lawn planting has been the use of premixed soils. The samples shown are the grade of peat soil we use, which is of very high quality, and also a prepared soil mix. Our cost for materials is increased using the mix, but the saving in labor and preparation is more. Where the areas to be planted are high in weed content, the soil mixes are a distinct advantage. One objection we have to the use of soil mixes is the tendency to cause layering of soils. Soil layering can be reduced by tilling in peat soils, then using the prepared soil on top. It is necessary to charge more for the lawn when this is done.

About 5 years ago, we were using conventional packaged lawn seed mixes of bluegrass, chewing fescue, red creeping fescue, and bents. As we varied the mixes, we found we were more satisfied when bluegrasses were left out of the seed mixes. The lawn textures were finer and stood up well. With lawns of bents and fescues, we found in many areas that bents were taking over many lawns and crowding out the fescues. The bent lawns are not suitable for homeowners. There is too much specialized maintenance. I hesitate to use a Verticut. I have seen what it has done on other home lawns, and the results have been undesirable. Using an Aeriofier has been considered to reduce puffiness. We handraked thatch out of one area and hauled away wheelbarrow loads, but the lawn has been slow to respond.

Capitan has been used on lawns to keep down the incidence of rust.

Question: Was Capitan successful?

Munro: One owner of a lawn feels that is was. He was also spray-fertilizing that lawn once a month with urea.

Question: How old was the lawn?

Munro: It was the second year for the lawn.

Here's one other thing about the lawn--the owner waters it once a week. Fescue and bent lawns in the same area had to be watered almost continuously. He now has a pretty good soil, but it took a lot of labor to get all the rocks out of the way.

On a lawn of fescue different fertilizers werefused each summer to determine results of different types. This fescue is very uniform and as of yet we have very little thatch. It was kept heavily watered. We have found invasion of some white powdery material on some of the foliage. On this lawn and almost all other lawns we have examined, we have found the invasion of fairy ring. To prevent this, for 2 years we tried using nothing but straight chemical fertilizers on certain lawns, but these lawns are just as badly infested as the lawns where we used organic fertilizers. We now feel that organic fertilizers hold lawn color a little better for the homeowner and seem to last over a longer period of time than more soluble chemical fertilizers.

The homeowner, himself, is not in a position to use your PMAS and other similar commercial fungicides, I would like to have PMAS tried out to see if we can diminish fairy ring. I know we can't kill fairy ring, but can we reduce the germination of new spores?

In our work, we do some sprinkler installation, and we are seriously interested in getting a sprinkler that would use a metered fertilizer applicator right through the sprinklers. We have been using it with nursery stock, and I think it has potential use for use on lawns in the near future.

PANEL DISCUSSION

Cemetery Problems

Paul Brown, Chairman, Panel members--Charles Wallace, Gordon Bowen, Bryan Brewer, Wm. Elsass, and Lee Fryer.

Question: What is the common practice now, Al, on this side of the mountains pertaining to clover?

Answer: (Law) It depends on who is seeding the lawns. Lots of lawns go in in eastern Washington with clover in the mix with bluegrasses and fescues primarily. The only objection I have to clover is that it stains my clothes and the kids, and it makes my wife very angry.

Now going from grass mixtures the most important thing is watering. In watering the lawns the method of applying water is important. What method are you using on yours, Chuck?

Answer: (Charles Wallace) I have an automatic sprinkler system. We just do what the Fowler Company tells us. It's set up for about 1 or 1 1/2 hours every 3 days. We just turn the switch, and, of course, it goes through the watering cycle.

Question: I wonder if you could keep it from burning up with that amount of water this summer?

Answer: (Charles Wallace) Yes, it held the water in the soil pretty much all summer, and the grass remained green.

Question: How is it down at Boise?

Answer: (Gordon Bowen) I came here mostly to listen, and regarding our cemetery management a little background might be in order. This started out as an old country cemetery many years ago. The first burials were made there about 1880, and for many years it was a mile or two out of town. Within the last few years, however, the city has grown up around it, and it's long been handled almost like a country farm. Very little attention was paid before to the matters of drainage, and consequently there are high and low spots. The roads were built so that they were above the level of the surrounding lawns.

I think that clover helps a little in maintaining the structure in the upper layer of the soil, and also in our area, particularly if you have to start a lawn in the summer time, clover helps to reduce the amount of watering.

Mr. Brewer could you tell us something about your methods of watering?

Answer: (Bryan Brewer) Yes, we use Rainbird sprinklers. We're handicapped by low water pressure due to the water mains being installed in about 1885.

Question: Could you tell us the proper pressure on a Rainbird to make it function right?

Answer: (Brewer) There are so many pressure differences for every kind of sprinkler, that you can't say any particular pressure, but most of them run about 30.

Paul Brown: The next important thing in a good turf for cemetaries, and I've always said that turf is the show window for a cemetery, is proper mowing. Golf course men, park men, and school men should have the proper equipment to keep these lawns looking trim and neat. I would like to learn from these men the type of mowing equipment, etc. they found were best for their conditions. Chuck, what are you using over there?

Answer: (Charles Wallace) We're using a toro mower. It's not necessarily what we found best, it's what we got.

Question: What about Walla Walla, what type do you use?

Answer: (Bryan Brewer) We use the 21-inch rotary type. The way the lots are laid out if you use a 72-inch mower, you can't maneuver as well.

Question: How about Boise, Mr. Elsass?

Answer: (Wm. Elsass) Well, we're using toro now, and if you get the right fellow to operate it, it works quite well. We've got areas that they will just barely go through, and quite a few of them we have to double back on.

Paul Brown: Mowing is very important in our cemeteries and is just as important as any other professional turf. Having it look presentable at all times at a proper height at all times is a real problem. In the cemeteries we have another problem aside from mowing, and that is trimming. Trimming must be done around markers and monuments, along curbs, drives, and walks, and on stretches we can't get with a mower. If we would allow the grass to grow up tall around the headstones it would become unsightly. This has to be trimmed just about as often as the grass itself. There are many types of trimmers, but the best that I have found is the Jacobson 10-inch. With one guide wheel in front and two in the rear, it does a good job. I would like to ask these gentlemen too what methods they are using for trimming.

Answer: We frame our markers in 4-inch cement so that we can put our Jacobson between the grass and the cement. That speeds up the time spent on the markers.

Brown: How about Walla Walla, Mr. Brewer?

Answer: (Mr. Bryan Brewer) We use a 10-inch Goodall rotary. It has been very dependable and does a beautiful job of trimming.

Question: What do you use down in Boise, Mr. Elsass?

Answer: (Mr. Elsass) I use an 18-inch reel-type to cut around the stones, and then the Stanley trimmer to trim.

Brown: I would like to say a little about fertilizer as it is also important, and we're learning more about it all the time. I was for a long time recommending an organic base. This year I used an all-chemical fertilizer. I'm going to ask Lee Fryer to enlighten us on this because he has been instrumental in mixing for us a fertilizer with weed killer in it.

Lee Fryer: It is always a problem to get a fertilizer that will give a green color and sustain it for a certain amount of time for the least amount of money. We found that the applications of fertilizers containing 50 per cent organic and 5 per cent available nitrogen best accomplished this purpose. We used the amine form of 2,4-D which is a rather rare one. One of the advantages of this is that the dust of 2,4-D will remain on the leaves of the weeds longer and you get a kill on some of the weeds that are harder to handle. As you know we have supported the idea of organic bases in fertilizers for many years, and we still for many reasons in many situations do that. We're trying to develop fertilizers that give us color, and give a sustained action, and have a higher nitrogen content. We've been working on this for 3 or 4 years. It's dangerous unless you use the urea-formaldehyde form of nitrogen because grass can be burned very easily. There was a lady who went to a psychiatrist and said she had six children and her husband didn't love her. He said, "Well lady, see what trouble you would be in if your husband did love you!" I'd like to rather introduce this situation. If you fellows pay $200 a ton for a fertilizer that you can apply and get on 3 or 4 lbs. of nitrogen per 1000 sq. ft. per application, your cost for that per 1000 sq. ft. will not run over 75% of the cost if you are still using the old 5% organic formulations.

TURF DISEASE RESEARCH AT THE WESTERN WASHINGTON EXPERIMENT STATION

Charles J. Gould[1]

The disease picture in 1958

The unusually mild winter and hot dry summer resulted in an abnormal turf condition in 1958 in western Washington. Although most of this trouble was apparently physiological (dryness, dying of Poa annua, etc.), the unusual weather did have an effect on the disease complex. Thus, following a week of hot days and warm nights, Brown Patch (Rhizoctonia solani) was found on a golf course near Tacoma--the first appearance of this disease in recent years. The outbreak was minor and lasted only a short time--thanks to fungicidal treatments by the superintendent and/or a change in weather.

Less trouble than usual was encountered with red thread and fairy ring during the summer months, but both diseases became increasingly pronounced after a period of rainy weather in early September. These two continue to be the main disease problems on high-cut turf (lawns, etc.).

Brief outbreaks of fusarium patch occurred on most golf courses in the spring of 1958. The fungus then became dormant during the summer, but began developing again in September with the onset of moist weather.

In addition to the fungi mentioned above, many others have been isolated from diseased turf by the writer and by his associate, Dr. Maksis Eglitis. These include various types of fusarium, helminthosporium, and other fungi. Tests are under way to determine their pathogenicity.

Control of fairy ring

The use of methyl bromide for control of this common disease was reported at the 1957 Turf Conference. Detailed directions for this treatment and for certain other treatments were published in April by the Washington Agricultural Experiment Stations as Station Circular 330. The fairy ring research has been carried on in cooperation with V. L. Miller and H. M. Austenson, both of the Western Washington Experiment Station.

Since field experiments with fungicides for control of this disease have been very time-consuming and often fruitless, efforts will be made this winter to develop a method by which most of the noneffective fungicides can be eliminated in the laboratory. This will permit a more rapid and effective method of testing new materials.

Control of red thread

This disease, which causes a widespread scorching of high-cut turf in western Washington, has responded better to fertilization with nitrogen than to fungicidal control in tests on lawns and on a fairway at the Rainier Golf and Country Club in cooperation with Glen Proctor, Superintendent.

---

[1]Plant Pathologist, State College of Washington, Western Washington Experiment Station, Puyallup, Washington

Control of fusarium patch

Cultural. Perhaps half of the battle against this disease is cultural. This includes: (1) keeping the greens as dry as practicable by trimming or eliminating surrounding trees and hedges, sweeping (if not mowed) in the early morning, etc.; (2) maintaining good soil drainage; (3) avoiding overfertilization with nitrogen; (4) selection of resistant varieties; and; (5) such other good management practices as prevention of thatch, aerifying, etc.

Resistance. A test of the resistance of several grasses was started in 1957 in cooperation with Dr. H. M. Austenson and Henry Land, Sr., Superintendent at the Tacoma Golf and Country Club. The plots have been cut at greens height but have not been played on. The most resistant grasses to date have been Penncross and a strain of Seaside. The most susceptible were Colonial and Highland. Intermediate types were Poa annua, Congressional, Cohansey, Rhode Island Colonia #5, and Pennlu. The Pennlu and Cohansey have shown a marked ability to reinvade killed areas. Penncross developed an off-color in large spots during the late winter months. Because of the very unusual weather during the past 10 months, even preliminary recommendations must be postponed. Meanwhile, two additional experimental plots have been established--another at the Tacoma Golf and Country Club and the other at the Seattle Golf and Country Club in cooperation with Ken Putnam, Superintendent.

Fungicides. Fungicidal tests have been made in cooperation with V. L. Miller, H. M. Austenson, and Roy Goss of the Western Washington Experiment Station. The first series of tests were carried on at the Overlake Golf and Country Club in cooperation with Milt Baumann, Superintendent, and later at the Broadmoor Golf and Country Club with the cooperation of Superintendent John Jaslowski. Results to date have shown that mercury fungicides apparently give the best control of fusarium patch and that certain types of mercuries are more effective than other types. In general, a formulation of phenyl mercuric acetate (PMAS) has given the best results in recent tests followed by mixtures of mercurous and mercuric chloride (as Calocure and Caloclor). Excellent control has been obtained with PMAS applied every 2 weeks at 3/4 oz. in 10 gallons of water per 1000 square feet. Some superintendents, however, are reluctant to use this type of material because it has noticeable burned the turf at times. Therefore, we began a series of experiments in the spring of 1958 to find a means of overcoming the injury. The preliminary results on the Western Washington Experiment Station green indicated that the addition of nitrogen and perhaps of iron compounds to the fungicidal solution might help in reducing grass injury. A large-scale test was then started at Broadmoor to confirm the preliminary results as well as to determine whether the fungicidal effectiveness of the PMAS was affected. This experiment is still under way. Results to date indicate that an effective and safe combination may be possible by using certain nitrogenous materials. The type of nitrogen used appears to be quite important, since the disease was increased with one type and not with another. However, certain areas of the green responded differently to the combination treatments. The cause of this variation is unknown. These developments pose new problems for investigation.

Some of these new problems will be studied this winter in the new plastic house recently constructed and equipped at the Western Washington Experiment Station with grant funds from the Northwest Turf Association and the Northwest Golf Course Superintendents' Association. Our appreciation goes to Don Hogan, Henry Land, Jr., Glen Proctor, and all others who have made this possible. The research will also be aided by a recent grant from the Greens Section of the United States Golf Association.

These grants and other assistance will directly aid the development of better control measures. They will also facilitate the study of such fundamental facts about turf diseases as the effect of temperature, moisture, pH, nutrition, etc. Through such study more effective control of the diseases and reduction in cost of treatments should result.

TESTING AND SELECTING FOR BETTER TURF GRASSES

Roy Goss and Herman Austenson

Re-selecting and testing Colonial bentgrass

For some time it has been known that most of our older turf grasses have become mixed or contaminated due to careless production and handling methods. Colonial bent, having been one of the better adapted varieties in the Northwest, has developed considerable variation as to growth habit (upright or creeping), leaf blade length and width, color, and seed productivity.

In this program three apparently desirable types were selected from about 30 different types, all from Colonial. These three types were planted in rows and allowed to freely cross. Seed was taken from the best of these three types and isolated in individual plant rows.

In September of this year 30 plants were selected from this plot of 200 individuals. These plants will be grouped according to similar characteristics. Wide variations in plant type have been found.

Seed from these 30 individuals will be tested for germination and placed in plant bands in the greenhouse this winter and planted in isolation next spring.

In this manner, it can be determined if seed from selected individuals will produce true to type plants. Selection is planned on this basis for as many generations as is necessary to secure uniform plants with as many desirable characteristics as possible.

Testing introduced turf grasses

ZOYSIA: (Matrella, Japonica, etc.)

Because of a very mild winter in 1957-58 these grasses are still living, but show a very low vigor. At this time this grass cannot compete in this climate with native weeds and grasses.

DICHONDRA:

This plant is doing a good job this year for making a ground cover, even in the absence of sprinkling and fertilizer in test plots at the Western Washington Experiment Station. The height attained this year was 2-3 inches. Winterhardiness is still a questionable factor, since it hasn't had a severe winter test yet.

If recommended at all, it should only be considred for ledges, steeper banks, and rockery.

BERMUDA GRASS:

Small test rows of T-35A, Uganda, Everglade No. 3, Common, and U-3 lived through last winter and were in good condition this year. Common appears more like a weed in addition to its other undesirable characteristics.

These Bermudas, of course, have the same undesirable characteristics here as in the better-adapted areas in respect to early dormancy and late spring recovery.

In conclusion, it might be said that the bents, fescues, and bluegrasses are the best adapted species of the Northwest, and selections and breeding along this line are much more apt to bear fruit than some of the exotics discussed above.

TURF GRASS BREEDING

D. Markarian

The breeding of turf grasses includes genetic phenomena common to all the cross-pollinated grasses. The status of turf grass breeding today might be approached by considering three of these genetic phenomena.

A. Genetic recombination.
B. Hybrid vigor.
C. Apomixis.

Genetic recombination: Refers to the ability of the parent plants to exhibit in their progenies the many possible combinations of their heritable traits. Two categories of plants may be considered here.

1. Self-compatible plants: there are probably no turf grasses in this category. Self-compatible plants are those which can produce good seed by utilizing their own pollen. Examples of this type of plant are wheat and barley. Self-pollination results in uniform varieties.

2. Self-incompatible plants: In contrast to the above, these plants degenerate rapidly in agronomic merit when selfed and, in many cases, turf grasses are completely self-sterile. This means that at least two plants from different seeds must be present in order to produce fertile seed. Also in contrast to the self-compatible plants mentioned above, the turf grasses are highly variable from plant to plant. This variation permits the breeder to select superior individuals and propagate them in clones. Improvement can also be made in seed stocks by testing superior clones in isolated blocks for what is technically called general combining ability, which refers to an individual plant's ability to cross with other plants and produce a superior progeny.

   The primary difficulty the self-incompatible type of plant presents to the breeder is that pure lines cannot be isolated -- only limited portions of the total genetic variation can be isolated without danger of agronomic degradation. Where the use of the grass is a highly specialized one, such as a greens turf, the problem is circumvented by clonal propagation.

Hybrid vigor: Hybrid vigor refers to progenies from matings where the qualities concerned surpass the average of the parents. Hybrid corn and the mule are examples of this phenomenon, and, although not so graphically demonstrated in turf grasses, there is no question that hybrid vigor is involved in specially produced seed such as Penn Cross Creeping Bent. A characteristic of hybrid vigor is that successive seed generations from the hybrid exhibit less and less vigor; in fact, the vigor if often loss in the second generation. Thus varieties dependent on this phenomenon for their performance must be carefully propagated according to the breeder's recommendations.

Apomixis: This genetic phenomenon provides a means whereby individual plant types are identically reproduced through seed, even though considerable genetic variation is present. Obviously the normal process of the pollen and egg uniting is disrupted and, fortunately for the turf grower, provides an easy means of clonal propagation.

The bluegrasses are the most familiar types exhibiting Apomixis, and Merion is a product of this process. When there is need for introducing variation into an apomictic variety some difficulty is encountered, although most apomictic varieties exhibit a small percentage of sexual recombination. At WSC one of our studies with bluegrass involves the use of x-rays to induce variation into Merion bluegrass.

NITROGEN FERTILIZATION--OBJECTIVES AND METHODS

(Condensation)
D. W. Kolterman--E. I. du Pont de Nemours & Co., Inc. Wilmington, Delaware

1. Nitrogen nutrition is one of the most important phases of turf grass management. Nitrogen means growth; nitrogen means color.

2. Source of nitrogen--Native soil fertility or soluble, natural organic, or synthetic organic fertilizers--is immaterial to grass plant as long as it gets the right time and in available form.

3. Special-purpose grasses are somewhat unique in the plant world in that vigorous and attractive vegetative growth is demanded of them not only year after year but also for the maximum period of time each year.

4. To fulfill this rigid requirement, grasses on even originally fertile soils must be given adequate nitrogen through fertilization.

5. To much available nitrogen can be as disastrous as too little.

6. Nitrogen feeding can be accomplished with any of the three classes of nitrogen fertilizers--soluble, natural organic, or synthetic organic--provided each is employed in accordance with its availability characteristics.

7. Soluble nitrogen--Amonium, nitrate, urea, etc. These are quickly available--require frequent light applications--low material cost, but high in labor cost, easily misused, require strictest use management.

8. Natural organics--Sewage sludges, vegetable proteins, tankages, etc. These have considerable advantages over solubles. More slowly available and require less frequent applications and are safer--require less use management. However, they have low nitrogen content and are high in cost.

9. Synthetic organics--Ureaform fertilizers have most ideal release characteristics and high nitrogen content. Require fewest number of applications, provide available nitrogen most nearly in accordance with growth conditions and grass needs, require least management effort. High in material but lowest in labor costs.

10. Use of any nitrogen fertilizer must meet a single need--adequate but not excessive available nitrogen in the root zone throughout the growing season. This may require a widely varying soluble or natural organic feeding program as dictated by climate and environmental conditions. It may mean supplementing a urea-form feeding program, particularly if feeding level has been incorrectly judged, with light applications of soluble nitrogen.

11. The DuPont Company supplies two of the three classes of nitrogen fertilizers to the professional turf grower. Soluble urea nitrogen--as "NuGreen" fertilizer compound. Synthetic organic ureaform--as "Uramite" fertilizer compound.

12. Urea--relatively long-lasting soluble nitrogen source, ideal for solution or solid fertilizers, leach resistant, noncorrosive, compatible with pesticide Sprays. Used widely to color up turf with light spray applications.

13. Ureaform--Methylene urea products formulated to release a gradual supply of nitrogen in the soil. Ureaform manufacture requires extremely precise control since a slight deviation may result in severely lowered fertilizer quality. Buttons and telephone receivers, worthless as fertilizers even though finely ground, are made from the same ingredients as ureaform. The fertilizer value of ureaforms is determined solely by two factors--amount and quality of the insoluble methylene urea nitrogen. Fortunately chemical methods exist (and have been adopted by State Fertilizer Control Chemists) for determining ureaform quality before sale and application. DuPont's "Uramite" fertilizer compound is consistently manufactured and sold at a quality level well above the minimum required by law.

14. DuPont also supplies these two types of nitrogen to the fertilizer industry for manufacture of complete mixtures. Same high-quality standards maintained for both.

15. "Uramite" fertilizer compound has gained widespread acceptance in the United States and Canada since its introduction to the trade in 1955. Results on turf grasses, flowers, and woody ornamentals have been excellent. A large number of golf courses have already standardized on "Uramite" for their basic nitrogen supply on greens and tees. Use is expanding at an ever-increasing rate today.

16. The above has dealt with nitrogen only in turf grass management. No intent to discount the importance of other phases--other nutrients, watering, mowing, disease control, etc.--is implied. No nitrogen fertilizer or application technique can give desirable turf alone. A complete management program--from budget to play--will always be necessary.

Question: How many pounds of nitrogen per thousand do you recommend per year?

Answer: It varies with area. Most people have found that between 7 and 9 pounds is the best level.

Question: What is the effect of temperature on breakdown?

Answer: The effect of temperature is the same on uramite as it is on bacteria. Bacteria operates fastest at roughly 87°F., and the release rate is at its maximum at that particular soil temperature.

Question: At what lower temperature is the nitrogen available?

Answer: It depends on the conversion of active bacteria. As long as there's water and material, it's going to dissolve. It's the dissolving rate that is important, not the microbial rate.

Question: Do you notice the ability of uramite to change the texture of the grass?

Answer: Yes, we've noticed that in all types of plants you get a different type of grow with slow additions of nitrogen than with fast.

COMPARATIVE PERFORMANCE OF THE P.N.W. BLUEGRASS SELECTIONS

J. K. Patterson
Washington State College
Agronomy Department

Tests starting in 1955 here and reports of performance from other areas concerning a potential bluegrass variety for turf is summarized in this report.

Agronomic Characteristics
Bluegrasses

		Leaf Width mm.
P.N.W. Selections	105	5.85
	205	6.05
	402	6.01
	602	6.21
Average		6.03
Merion		5.18
Common		4.19

Agronomic Characteristics
Bluegrasses

		% Plants That Mildewed 1955
P.N.W. Selections	105	2.3
	205	7.1
	402	4.7
	602	4.7
Average		4.7
Merion		100.0
Common		83.3

Rate of Emergence
50 seeds after 1 week, 1957

	0 trt.	Gibberellic Treated
402	30	37
602	28	37
205	34	36
Merion	11	19

Disease Resistance, August 19, 1958

	Rust Index
Merion	7.2
402	3.8
205	3.8
602	2.8
Delta	1.8
Newport	1.0

1 Rust free
10 Heaviest infection

Turf Performance, 1957

	Clipping yield gms/plot	Roots	Rhizomes
402	696	2.73	1.47
602	797	2.83	1.59
205	767	2.68	1.40
Average	753	2.75	1.49
Merion	635	2.55	1.21
Newport	705	2.57	1.53
Delta	650	1.99	.28

Germination of New Seed
(1958 Harvest) Aug.-Sept. 1958

	% Germination after 4 weeks
Newport	0
Merion	3
Delta	23
PNW 602	72
PNW 402	72
PNW 205	72

Turf Quality	PNW	Merion	Newport	Delta
Color	Exc.	Exc.	Good	Good
Cover (density)	Exc.	Exc.	Good	Fair
Rhizome production	Exc.	Good	Exc.	Poor
Germination				
Immediately after harvest	Exc.	Poor	Poor	Med.
Rate of emergence	Exc.	Poor	Poor	Exc.
Seedling vigor	Exc.	Poor	Poor	Exc.

Disease Resistance

Leaf rust	Med.	Poor	Med.	Med.
Stem rust	Med.	Poor	Exc.	Med.
Helminthosporum	Med.	Poor	?	?
Seed production	?	Poor	?	Exc.

Summary

The P.N.W. bluegrass selection is about one-sixth wider leaved than Merion and about one-third wider than common bluegrass. Well-fertilized clipped turf of this grass has the same type of dark green color for which Merion is famed. Its growth habit (low spreading) makes it excellent as a turf grass since it provides thorough ground cover. It produces slightly more growth than Merion and is somewhat more vigorous in root and rhizome development.

It is susceptible to some of the common diseases such as mildew, leaf, and stem rust but less so than Marion. Tests in other areas have shown it to be quite resistent to helminthosporium, a disease quite widespread in the bluegrass-growing area and one that attacks common and especially Newport bluegrass severely.

In contrast to Merion and Newport, the P.N.W. selection has excellent seedling vigor and does not appear to have the dormancy following harvest that is so prevalent in the Merion and Newport varieties. This dormancy has often become a problem in the orderly marketing of seed (especially certified) of Merion.

PANEL DISCUSSION--MACHINERY

Chairman - Glen Proctor
Ed Rodgers, Northwest Mowers
Chalres Blohm, Western Golf Supply
W. Strahl, Bentley and Co.

Question: What's new for 1959?

Answer: (Ed Rodgers) We have the Worthington gang mower and the Jacobson greens mower, and the Devere Rotary Line. As far as we're concerned we haven't been exposed to any new models for '59, but improvements are being made on the old lines.

Chuck Blohm: I represent Toro, and we are coming out with a revolutionary new greens mower this year. It's totally different than any greens mower that's been developed, and the new professional is coming with power steering which is going to make it easy to handle in tight quarters. Then there's the new 32-inch whirlwind which has a turn radius of 14 inches, and it is ideally suited for cemeteries.

Bill Strahl: I represent the Westpoint products people in the Roseland mowers, and up to the time I left the company on this trip we had no word of any new changes for '59 at all. There will be, I'm sure, but at the time I cannot say just what they will be.

Question: In the case of a home lawn owner who is just going to run his own mower at home, what's the best way to find out what cutting height you have on your adjustment?

Strahl: I would suggest that a person buy a home lawn mower and go to a reputable firm to get it. There it will be adjusted, and you will be given all possible help. You can also use a piece of plywood marked off at certain measurements and put the mower on a flat surface and raise or lower the blade to the height you want it.

Question: Do you need a torque wrench to adjust the bed bar bolts on your fairway units?

Blohm: The way it is done at the shop is with a air gun, and the bolts are tightened with a punch. Of course, if you didn't have an air hammer, a punch would be the best method of doing this.

Question: Why don't companies standardize their equipment so you can go to the hardward store and get some of the simple parts to fit these mowers?

Answer: It cuts down on the revenue! Seriously, one reason they don't standardize parts is they want you to repair something the way the factory wants you to do it, and they're afraid you might put something in there that doesn't fit and will foul up your machine.

Fertilizer Panel

Larry Munzenmaier, DuPont Co.
Jim McKenzie, Galbraith & Co.
George Harrison, NuLife Fertilizer
Lee Fryer, Pacific-Agro Co.

Question: How long should a plug last in a Jacobson mower without fouling up, and how much oil should you use?

Answer: One quart of oil should be used to about 5 gallons of gas.

Jack King: I use white gas and outboard motor oil and have very little trouble with plugs getting fouled up.

Everhart: Standard Oil has a new 2-cycle oil which has done very well.

Putnam: We use a teaspoon of Zemoute to a tank of gas, and we eliminated a good deal of our troubles.

Question: What kind of oil does the manufacturer recommend?

Answer: There is a Jacobson oil, but we have been selling other types of oil for the Jacobson mowers and have had good luck with all of them.

Irrigation panel

Don Kolass, Wash. Turf & Irrigation
Carl Kuhn, H. D. Fowler & Co.
Bob Cochran, Rain Bird Sprinkler Co.
Don Hogan, National Irrigation Consultants

Question: (Putnam) Don Hogan, is a system down the center as practical as a triangular system?

Answer: I think a system down the middle is not necessarily as efficient as what is classed as a multirow system. The more sprinklers you can get into a given area the more positive the control is going to be.

Question: Are home systems put in with plastic pipe sucessfully or is the old steel pipe still the best?

Answer: I would say this last season 100% of the residential and commercials have been put in with plastic systems. One reason is the economics of it. Also there's not as much chance of corrosion, and it is easier to assemble.

Question: How about freezing?

Answer: In some areas, for instance this one, you might have the problem of freezing. Drains are put on there to drain out the systems when winter approaches.

Question: How do the moles and gophers work on these?

Answer: Well, just like the manufacturer of several pipe companies have said, if we can find any proof where they have bothered the pipe, they will give you $1000 for their research department. So if you find any we will be glad to hear of it.

Question: (Henry Land, Jr.) Has the large popup system proven practical in golf course irrigation?

Answer: In the Northwest I know of no courses that have watered by rotary popup except for around a few greens and tees. We have used them on large turf areas--football fields, parks, etc.--very satisfactorily, but the cost is more, and the system isn't as practical.

Question: Would it be economical to be able to cut out each sprinkler individually?

Answer: No, it wouldn't as it would cause double piping.

Question: I would like to hear something about the new Buckner sprinkler.

Answer: Well, Buckner this year came out with a new gear-driven rotary popup, and it can be adjusted to any portion of a circle in the field.

Kolass: This sprinkler is our 880 special, and Buckner has come out with a new attachment for it called the SR attachment. The attachment will speed the sprinkler up and slow it down so that the rate of precipitation will more or less be uniform in the whole circle. This attachment can be put on any 880 sprinkler.

Question: Why isn't a wrench made so that you can take your valves out without digging a big hole?

Answer: Wrenches are available for all Buckner sprinklers.

Question: Is using urea form fertilizer, if you wanted to add other fertilizers to complete the mix, would you mix them or put them on separately?

Answer: You can mix it. The reason we haven't mixed it is that you may not need the potash or the phosphorus. You can add them separately, and the results will be much the same.

Question: What time of the year would be the best time to apply urea-type fertilizer?

Answer: The fall is the best time to apply it. One reason is because in the spring it may be too wet and the nitrogen fertilizer is there, and also you give the grass a head start on the weeds.

Question: Does the rainfall rate make any difference in the way you apply it?

Answer: Yes, I would say it makes some difference. The fertilizer has to be dissolved in the soil water of course.

Question: (Henry Land, Jr.) Can the concentrated nitrogen be put into liquid solutions without hurting grass?

Answer: You can always use 20 lbs. of urea in 100 gallons of water, and and anything around that rate is adequate.