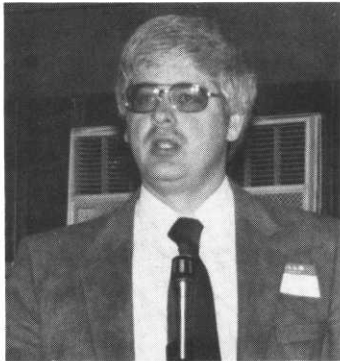


RESEARCH REPORT  
PYTHIUM BLIGHT  
MICROPROCESSOR  
EVALUATION



by DR. WARD C. STIENSTRA  
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The prediction of disease development based upon environmental factors is a reality. Equipment and mathematical models do exist. The beginning of this process was a hydrothermograph instrument used two years at Interlachen Country Club. Today much more "High Tech" equipment is available. The ability to predict accurately the future development of a disease will improve disease management skills and lower costs by reducing or eliminating unneeded chemical applications. The objective of this research is to monitor golf course turf with such equipment and determine if predicted disease outbreaks do occur, or if outbreaks occur when they are not predicted, or if disease is predicted and does not develop and if no disease is predicted does the turf remain free of disease.

A Reuter Stokes units RSS-412 will be placed at one cooperating golf course. The exact location to be determined by myself and the Golf Course Superintendent. The site will be monitored by the superintendent and my staff to determine if Pythium does occur. Suspected diseased tissue will be sampled and examined for oospores typical of Pythium. An area near the monitored site must be left as a check area to determine when and how severe the Pythium attack is. I also suggest that treatments, timing and costs for Pythium control be compared when the

superintendent treats versus the forecaster decision to treat.

Environmental data and disease observation/documentations will be recorded with the cooperating superintendent and my staff. The frequency of chemical treatments - human vs. machine will be compared and evaluated. Success of a preventative program will be compared to a predictive programs.

The Reuter Stokes unit RSS-412 Predictor, shelter, tipping bucket rain gauge, printer and no Pythium chip was received and made operational in June and placed in the field on June 21 at Interlachen Country Club. On July 10, the Pythium Chips were installed and the system was complete and operational. Data in memory was lost July 5 and again on July 16 & 17. This was due to the rain gauge signal being feed in improperly to the computer. The signal line was removed and the remaining systems operated through September 3 when the system was no longer monitored. The Predictor was removed and will be sent to RS for rewiring to prevent rain gauge over ride problems.

Environmental data and disease predictions are presented in table form. The figures reflect the History of Environmental Data (Key 2) usually and on one day the current Environmental Data was used. Data is provided on Anthracnose; Level and Index Score and Pythium; Time Temperature was greater than 70 degrees F, Temperature Maximum-Minimum-Average, Time Leaf Wet and Pythium Score #1 and #2.

The disease predictor was set up on the edge of fairway 14, next to an area known to have Pythium the year before. A large untreated area was set aside for plot work and samples. The evaluation design was to compare the turf quality and disease development or control under three systems of fungicide management. A preventative disease program started when weather conditions were expected to be favorable for disease development, i.e. the Standard Preventive Schedule. The 2nd, a predicted disease development program started when the disease predictor indicated a "high" score for both #1 & #2, i.e. a Predicted Preventative Schedule. The 3rd, a curative application started when the disease is present and observed on the

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plots, i.e. a Recovery Schedule.

In 1985 no disease developed on the plots. The Standard Preventative Schedule treatments began, 7/9 following several days of high 80 degrees and first 90 degree day. Re-treatment occurred in 14 days, however, the average temperature then was seldom over 70 degrees. The Predictive Disease Schedule did not call for any treatments and none were applied. No Recovery Treatments were made on the 3rd schedule. A final turf quality evaluation revealed no difference in plots treated or untreated with regard to Pythium damage. A few plots did have active Dollar Spot but damage was slight.

The R-S Disease Predictor, a unique monitoring system performed very well. The information record was clear and useful. A print out is nice and may not be necessary, however, in todays data oriented society, a permanent record will be wanted by most superintendents. The equipment was easy to set up, directions were clear and understandable. The loss of data, twice will not be a problem as the electronics will be rewired to accommodate the rain guage.

Disease development was not predicted by the RSS-412 in 1985 and no disease was seen. This is a positive for R-S Predictor. Some may say test results were inconclusive but in fact the results are positive. The unit successfully predicted no disease and no disease occurred. That half of the system works and additional field testing is needed to prove the other half of the system. In economic terms negative disease predictions that are correct will result in substantial savings. This is the major economic benefit of a disease predictive system. The benefit of an early disease treatment resulting in no or reduced disease damage will be measured less in economic terms and more in "quality control" and "job security". Although another year of testing is required to complete the evaluation of the Disease Predictive system it may already have shown its greatest economic benefit-prevention of unneeded fungicide applications.

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## RESEARCH COMMITTEE SPRING UPDATE

by DOUG MAHAL

Research Committee Co-Chairman

The MGCSA Research Program has taken a strong and positive direction in the past two years. The current projects we are funding illustrate that direction. It is only through the donations of our associate member companies and the golf and country clubs that this progressive direction can be maintained. Our program has become a model for golf turf research among superintendent associations in the country. Through your continued support, MGCSA research will continue its trend toward focused technical answers to Minnesota's technical turf research questions. A written request for funds applicable to research will be forthcoming very soon. Thank you all in advance for your monetary support of our program.

The following is a list of pre-committed research funding for 1986:

- \*Summer Patch Study (Dr. J. Vargas)  
2nd year of 3-year program
- \*Poa annua - Bentgrass Competition Study  
(Dr. A. Douglas Brede)  
2nd year of 3-year project
- \*Pythium Blight Microprocessor Evaluation  
(Dr. W. C. Stienstra)  
2nd year of 3-year project
- \*Biological Snow Mold Control Study  
(Dr. W. C. Stienstra)  
2nd year of 3-year project
- \*GCSAA Research Program  
(Tissue Culture Work)
- \*USGA Research Program  
(Tolerance Breeding Studies)  
(Establishment of Turfgrass  
Information Center)

The MGCSA Research Committee has also recently contacted 29 noted turf researchers in an effort to obtain research project proposals which we may be further interested in funding for 1986.

As further funding decisions are made or other pertinent research information becomes available, additional updates will be published.

# TURF PYTHIUM DATA

## PYTHIUM BLIGHT DAILY DATA

Date - 1985	Temperature			Inch Rain	Humidity			Anthracnose		Severe	Temp. Time 70°	Temperature			Time Wet Leaf	#1	#2
	Max.	Min.	Ave.		Max.	Min.	Ave.	Level	Index			Max.	Min.	Ave.			
June 21	81.5	57.3	73.0	0.27	100	66	89										
June 22	80.5	55.0	65.5	0.21	92	48	67	None	1.65	Low	8:55			2:29			
June 23	74.5	53.5	63.0	0.0	98	49	75	Low	2.77	Low	5:30			8:41			
June 24	80.5	48.0	65.0	0.0	100	48	70	None	1.04	Low	13:14			0:0			
June 25	91.0	66.5	78.5	0.0	89	67	80	Mod	3.47	Low	17:25			0:0			
June 26	77.0	73.0	74.0	0.0	93	83	89	Low	2.44	Low	9:17			0:0			
June 27	67.5	55.0	63.0	0.14	100	69	87	Mod	3.64	Low	0			12:46			
June 28	69.5	51.5	60	0.0	100	62	81	None	.61	Low	0			0			
June 29	76.0	52.0	64.0	0	100	57	80	None	.87	Low	8:25			0			
June 30	84.5	54.5	69.0	.06	97	67	80	Low	2.36	Low	12:05			2:54			
July 1	76.0	59.0	63.5	.08	100	70	88	Low	2.79	Low	1:42			8:46			
July 2	82.0	59	70.5	.13	92	59	74	High	4.27	Low	13:31			8:59			
July 3	86.0	56.5	72.0	.17	98	63	80	High	5.21	Low	14:44			10:26			
July 4	78.0	61.0	69.5	.21	95	54	76	High	4.38	Low	12:06			10:19			
July 5	70.0	60.0	62	.01	95	79	91	Low	2.57	Low	0:11			8:26			
July 5	83.5	58	71	0	98	64	78	None	1.87	Low	13:49			0			
July 6	88	71	78	.04	77	59	67	Mod	3.99	High	24:00			1:25			
July 7	91.5	70.0	79	.06	90	65	81	High	4.3	High	24:00			1:30			
July 8	87.5	65.5	74.0	.15	98	64	84	High	5.32	Low	15:40			8:55			
July 9	90.0	78	82.5	0	81	68	71	High	4.01	Low	2:46			0			
July 10	84	65.5	78	0	83	49	59	High	4.47		2:49			0			
July 11	82	56.5	69	.12	94	48	69	High	4.74		11:30	82	56.5	61	11:35	Low	Low
July 12	77.5	57.5	63.0	.05	86	62	74	Low	2.39		2:08	77.5	61.0	76.5	6:56	Low	--
July 13	84	64.5	74	.08	96	77	86	High	4.29		15:35	84	63.5	63.5	5:41	Low	Low
July 14	83	62.5	71.5	.10	98	59	80	Mod	3.8		12:55	83	55	55	6:25	Low	Low
July 15	75	54.5	63	0	97	50	78	None	.79		8	83	55	55	0	Low	Low
July 16																	
July 17																	
July 18	85.5	67	75	.55	93	69	82	High	6.02		18:25	85.5	65.5	66	9:55	High	Low
July 19	71	65.5	70.5					Mod	3.55		0:02	71.0	65.5	70.5	4:50	Low	--
July 20	85.5	54	70.5		100	57	75	Mod	3.64		13:00	85.5	54	59.0	6:44	Low	Low
July 21	81.0	58.5	69.5		95	51	70	Low	3.03		11:55	81	47.5	48	5:16	Low	Low
July 22	81	47.5	64.5		97	44	68	None	2.24		4:46	78	47.5	78	5:44	Low	--
July 23	76	53.5	59		91	54	79	None	1.57		10:25	81	47.5	53.5	5:01	Low	Low
July 24	80.5	64.0	70		100	65	84	High	4.25		10:30	80.5	57	57	8:50	Low	Low
July 25	79.5	57	68		98	57	77	None	1.96		10:55	79.5	54.5	54.5	2:00	Low	Low
July 26	83.0	54	69		100	59	79	Low	2.99		12:30	83	54	63	5:05	Low	Low
July 27	85	63	72		98	68	82	High	4.27		15:00	85	63	67.5	7:15	Low	Low
July 28	81	63.5	71.5		91	62	80	None	2.25		10:20	81	53	53	1:15	Low	Low
July 29	65.5	52.5	57		100	80	89	None	1.85		0	66.5	52.5	66	1:55	Low	Low
July 30	74	58	64		95	60	79	None	2.04		5:35	74	57	57	4:54	Low	Low
July 31	76	57	66		98	53	76	Mod	3.25		10:05	76	54	54	8:16	Low	Low
August 1	82	54	67.5		100	44	73	Low	2.82		11:20	82	54	55	5:50	Low	Low
August 2	66.5	55	58		97	71	86	None	1.26		0	66.5	55	66	3:45	Low	--
August 3	82.5	60.5	71		92	55	73	Mod	3.65		12:45	82.5	60.5	62.5	5:56	Low	Low
August 4	72.0	62	67		98	71	84	Low	2.36		6:55	72	62	65.5	4:09	Low	Low
August 5	80.5	65	69.5		100	70	88	Mod	3.85		3:50	80.5	65	80.5	8:16	Low	--
August 6	84	63	72		98	60	82	High	--		12:15	84	59	59.5	--	Low	Low
August 7	86.5	57	72.5		91	50	69	Low	2.85		18:30	86.5	57	66.5	2:35	High	Low
August 8	84	65.5	72.5		95	54	73	High	4.51		19:15	84	65.5	71.5	8:00	High	High
August 9	85	57.5	70.5		95	62	79	High	4.02		9:35	85	53.5	53.5	8:04	Low	Low
August 10	74	48	62.5		100	55	75	Low	2.63		9:35	76	48	61	8:41	Low	Low
August 12	71.5	60	65.5		100	76	92	High	4.44		3:10	71.5	56	56	14:15	Low	Low
August 13	75	55	65		98	53	76	None	2.05		8:55	75	54	54.5	4:00	Low	Low
August 14	74	53	63		97	50	74	None	1.01		0:57	71.5	53	71	0:55	Low	Low
August 15	78.5	52.5	64.5		97	50	75	None	.87		9:20	78.5	52.5	61	0	Low	Low
August 16	76	61	67		90	72	81	None	1.42		7:10	76	61	64	0:35	Low	Low
August 17	73.5	59	67		98	60	80	Low	3.09		7:15	73.5	53	53.5	6:55	Low	Low
August 18	68	51	59		91	53	72	None	.57		0	68	49	49	0:0	Low	Low
August 19	60	48	52.5		97	73	85	None	0		0	68	49	49	0	Low	Low
August 20	71	45	58.0		100	52	77	None	1.64		1:50	71	45	55.5	5:45	Low	Low
August 21	71	54.5	60.5		89	64	78	None	1.11		2:20	71	55.5	60.5	2:25	Low	Low
August 22	67.5	59	63		98	80	88	None	1.79		0	67.5	60	63	4:15	Low	Low
August 23	74	61.5	66		100	66	85	Low	2.86		6:10	74	52.5	53	6:40	Low	Low
August 24	62	52.5	58		100	79	89	Low	2.68		0	62	53	56	11:45	Low	Low
August 25	77.5	54.5	64.5		97	57	77	None	.87		8:45	77.5	50	50	0	Low	Low
August 26	77	49.5	63		100	58	80	None	2.26		9:20	77	49.5	58	6:20	Low	Low
August 27	72	57	64		98	73	90	High	4.35		5:20	72	57	64.5	15:19	Low	Low
August 28	69	62	65		100	91	95	High	6.47		0	69	62	63.5	24:00	Low	Low
August 29	66.5	58	63.5		100	87	96	High	4.49		0	66.5	55	55	17:01	Low	Low
August 30	69	54	59		98	68	87	None	.57		0	69	54	54.5	0	Low	Low
August 31	71	54	63		100	81	94	Mod	3.52		6:20	71	54.5	63.5	12:10	Low	Low
September 1	76.5	55	66.5		100	62	86	Low	3.12		6:50	76.5	55	57.5	7:49	Low	Low
September 2	78	55	63		100	86	94	High	5.29		10:45	78	58	70.5	21:10	Low	Low
September 3																	

- 1) Data Loss, 7/5, 7/16, 7/17
- 2) Pythium Chips Installed 7/10
- 3) Rain Bucket Removed 7/19
- 4) Anthracnose Index: None - 0.0 - 2.35, Low - 2.36 - 3.15, Mod. - 3.16 - 4.00, High - 4.01 - 10.00

Anthracnose Index, Pythium Severity, #1 & 2, -- = No Data.