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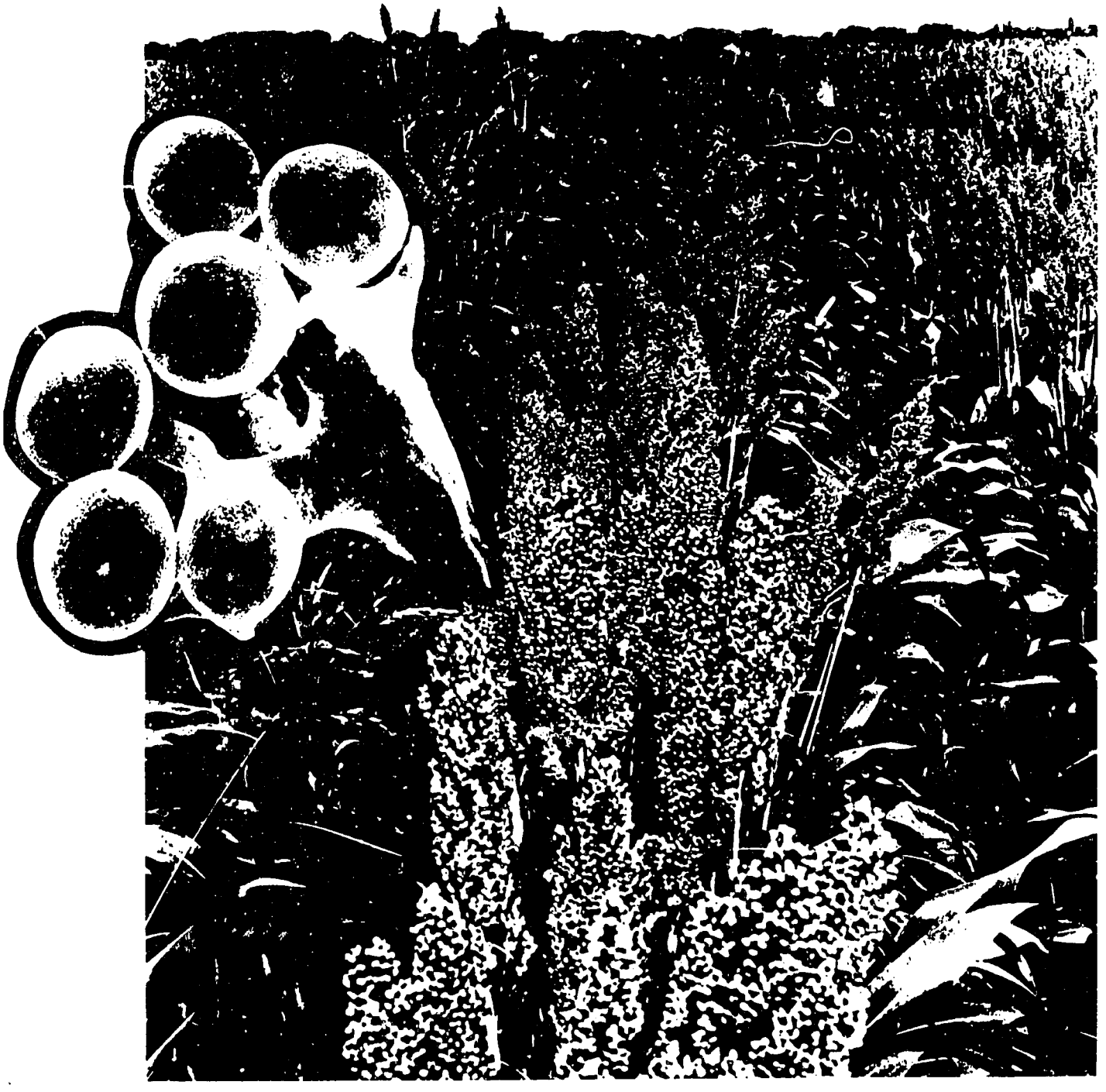
Integrated Control of Sorghum Downy Mildew



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Foreword

The sorghums are among the most important agricultural commodities in Texas. The productivity and health of the sorghum crop affects all agricultural and consumer interests. Researchers from both private and public organizations are currently responding to a threat. Pathotype 3 of sorghum downy mildew has done little actual damage so far. However, it and other pathotypes of downy mildew and other plant diseases have the potential to severly damage sorghum and corn in Texas and the Nation. State agricultural experiment stations such as ours, the U. S. Department of Agriculture, and private seed companies are constantly on the alert for new plant diseases. They maintain diverse germplasm and genetic models as future weapon systems in the battle against plant disease. The more than 30 research and extension centers and stations around Texas are the defense perimeter as are the research and extension facilities of other states, the U. S. Department of Agriculture, and the seed companies.

In the early 1970's southern corn leaf blight struck the nations corn crop. Researchers determined the source of blight resistant corn, the seed industry increased the seed over the winter in the southern hemisphere, and within two seasons the germplasm of the majority of the nation's commercial corn was resistant to southern corn leaf blight. That same team effort stands ready to protect sorghum and other Texas and U.S. crops.

Researchers are working to gain a basic understanding of the new sorghum downy mildew pathogen and the disease it causes, as well as testing and integrating various control concepts. Extension workers, seed, and chemical companies are dveloping systems of applying integrated control and a strategy for informing Texas sorghum producers about alternative control programs. Public forums such as this workshop provide all interested parties with information from which sound and practical recommendations can be developed for downy mildew pathotype 3, or other plant disease threats.

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Outlook and Expectations

J. Artie Browning*

This workshop was triggered by pathotype 3 of the sorghum downy mildew fungus.

Man learns reluctantly, if at all, from history. seemingly it was for this human characteristic, and not because lessons were not there, that many workers seemed surprised by new pathotypes of the sorghum downy (SDM) fungus.

All biological entities are variable and the microorganisms are especially so. Those with a sexual stage and meiosis concomitant with every cycle maximize chances for new gene combinations. An airborne, asexual haploid spore stage maximizes the probability a new variant will be able to express itself and be disseminated widely. An extensively grown field-crop host of the same resistance genotype maximizes the source acreage for genetically homogeneous inoculum and provides an equally large and homogeneous target host population for the airborne inoculum being disseminated.

Other micro-organisms — such as the smut and rust fungi and their extensively grown hosts — with some or all of these characteristics, serve as models of what to expect for fungi such as SDM.

Pathotype 3 indicates that history has repeated itself with SDM, and there is no reason to hope, much less expect, that it will not continue to do so.

There is hope, however, for stabilizing the host-pathogen interaction at a level of low disease incidence. That hope lies in the wise application of contemporary resistance-virulence-epidemiologic theory to the integrated management of the host-pathogen interaction. Workshops and proceedings such as this update all participants and those interested in the problem on rapidly emerging relevant theory and the potential of its application in management to minimize this disease. By managing host plant resistance and cultural practices wisely and backstopping them with prescribed fungicides as needed, I am confident for the future.

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Pathotype 3 of *Peronosclerospora sorghi*

Jeweus Craig*

A third pathotype (race) of *Peronosclerospora sorghi*, the casual gent of sorghum downy mildew, was identified in Texas in 1980. The new pathotype was found in sorghum on a farm near Orange Grove, Texas. Pathotype 3 was identified by its ability to infect certain sorghum lines and hybrids which were resistant to either or both pathotypes 1 and 2.

Pathotype 3 is a serious threat to sorghum production in South Texas because it is pathogenic to the sorghum line Tx430 and its derivatives. Tx430 and related genotypes are widely used as parental lines of sorghum hybrids resistant to downy mildew. As a result, many hybrids now popular with growers are susceptible to the new pathotype. Thirty-eight sorghum hybrids previously considered resistant to downy mildew were tested for reaction to pathotype 3; 36 of these hybrids were susceptible to the new pathotype.

In 1981 and 1982, pathotype 3 was found at new locations on farms near Edna and Ganado. It is probable that outbreaks of sorghum downy mildew caused by pathotype 3 will become widespread in future years. Sorghum hybrids resistant to pathotype 3 should by used where possible to reduce the risk of an epidemic of sorghum downy mildew.

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Sorghum Downy Mildew in Texas, a Brief History

R. A. Frederiksen*

Texas growers first became aware of sorghum downy mildew as an economically important disease in 1967. In that year, 5 years after its discovery in South Texas, hundreds of farmers noted extensive foliar damage and a high frequency of systemically diseased seedlings. Farmers quickly learned that previous cultivation of susceptible broomcorn, sorghum-sudangrass hybrids, and grain sorghums, encouraged a higher incidence of the disease. During the late 1960's and early 1970's, the widely adopted bronze sorghum hybrids became popular throughout the downy mildew area. It was apparent to growers and researchers alike that low levels of systemic downy mildew did not affect yields, as fields with 10-20 percent downy mildew were common and yields reached all time highs. From 1969-1973, these hybrids increased in popularity.

In 1973, however, downy mildew caused devastating effects on yield, with many fields having up to 80 percent infection of downy mildew. That year marked the end of the popularity of the original bronze hybrids and permitted the rapid distribution of downy mildew resistant hybrids. Through 1978, only one race of the pathogen was known, but in 1978, reports of an unusually high incidence of the disease in a downy mildew-resistant commercial hybrid were received. This new variant of *Peronosclerospora sorghi* eventually was designated as pathotype 2. A number of tests indicated that pathotype 2 differed little from pathotype 1 and that most commercially grown hybrids and known sources of resistance were non-affected. However, the ice was broken; *P. sorghi*, like most biological species, is plastic. In 1980, yet another pathotype was described (from Orange Grove, Tx) which can attack most of the popular sources of resistance to downy mildew. Tx430 and TAM428 are two examples of inbreds resistant to pathotypes 1 and 2 but susceptible to pathotype 3. Pathotype 3 of *P. sorghi* was found on the Upper Coast in 1981 and continued to spread in 1982.

This workshop was called to provide a forum to discuss the implications of these new pathotypes and the various control strategies we can integrate to reduce the threat of this or any potential race of *P. sorghi*.

REFERENCE

Frederiksen, R. A. 1980. Sorghum mildew in the United States: overview and outlook. 64:903-908.

**Professor, Department of Plant Sciences, Texas Agricultural Experiment Station, College Station, Tx.*

Sorghum Downy Mildew

F. R. Miller*

Incidence of sorghum downy mildew has been reduced in recent years because of the release and use of improved parental materials. Most important among these has been RTx430 and to a lesser extent, other zerazera germplasm. There have been isolated occurrences of pathotypes which will attack these materials. The long term significance of the currently identified pathotypes is still not understood. Pathologists have, in the laboratory, been able to identify stocks which separate these pathotypes by susceptibility and resistance reactions. Their techniques are new or are still in the developmental stages. Few of our current breeding materials have, therefore, been critically evaluated. It is known that CS3541 and RTx430 separate pathotypes 2 and 3. There are preliminary lists which show a few cultivars that are totally resistant to pathotype 3. This list is by no means complete. Indications are that partial resistance or low levels of resistance also exist.

There is concern because pathotypes of sorghum downy mildew occur. This concern must be tempered, however, with the fact that neither pathotype 2 nor 3 has moved much from its site of origin. This does not mean that any future pathotype will be either more or less mobile. Because the organism involved is sexual in its reproduction, this means that there are many more possible pathotypes, some of which may become important economically.

From a breeding standpoint, more needs to be known about the downy mildew organism, its liklihood for change, the host-pathogen interaction, the nature of resistance, the genetics of resistance, and the biochemical pathways involved with resistance breakdown. This basic research is essential if the existing sources of resistance are to be protected. These resources cannot be wasted on limited or even unknown pathotype recombinations, which the resistant germplasm could help select. It seems premature, on the one hand, to change breeding procedures, germplasm, and strategy without knowing the race of change - occurrence rate of new pathotypes and their virulence. On the other hand, there is the need to stay up with all sources of new disease resistance.

There is a preliminary indication that resistance to pathotype 3 is conditioned by 3:1, one-gene segragation. The question remains - are researchers dealing with a complex system of resistance to downy mildew which is being eroded in a one-gene pattern from pathotype to pathotype? If this is indeed the case, a very calculated course of action should be taken. That course must include those points made above and also campaigns to educate growers that crop rotation, fungicides, and cultural practices must be used to help conserve the precious sources of disease resistance.

Table 1 lists some breeding materials which were screened by Dr. J. Craig. This list is supplemental to that which gives reactions for materials in the Sorghum Conversion program.

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TABLE 1. PERCENT SYSTEMIC INFECTION FROM CONIDIAL INOCULATION OF DOWNY MILDEW (PATHOTYPE 3), DATA COMPLETED MARCH 3, 1981, FROM TEST BY J. CRAIG ON SORGHUMS FROM F. R. MILLER, COLLEGE STATION.

Inbred Line Designation	Pedigree	Percent Infection	Field Reaction
1. ADN55	(SCO120-6 × RTx7000)-sel	0	Very resistant
2. 76CS478	(RTx414 × SCO108-)-15-1-2-1-1	9	"
3. 377CS2	(BTx406 × SCO170) sel	12	"
4. 77CS3	GPR138 India	16	"
5. B7504	(BTx3197 × SCO170-6)-sel	22	Susceptible
6. SCO326-6		23	"
7. CS3541	India	25	"
8. 76CS388	(RTx2536 × SCO170-6)-14-6-1-1-2	35	"
9. RTx430		36	"
10. B7905	(BTx3197 × SCO170-6)-sel	38	"
11. RTAM428	(BTx406 × SCO110)-sel	39	"
12. 74CS5388	(SCO599-6 × SCO110-9)-24-4-1-3-2-3	44	"
13. 76CS490	(RTx414 × SCO108-)-15-2-3-6-1-R	44	"
14. 77CS256TS	(SCO110 × (RTx414x1490)-1-16-1-3-1	48	"
15. B7904	(BTx3197 × SCO170-6)-sel	58	"

Sources of Resistance to Pathotype 3 of *Peronosclerospora sorghi*

D. T. Rosenow*

A number of converted lines have consistently demonstrated high levels of resistance to downy mildew in field trials. These sorghums were tested in the laboratory using the modified Craig technique, a procedure which permits the evaluation of local lesions following inoculation. This test provides information on reaction to secondary inoculum as well as the incidence of systemic disease. Note that the popular zerazera sorghums, SC108, SC109, SC110, SC170, and SC173, are all highly susceptible to pathotype 3. SC414, SC93, SC708, and SC727 are caudatum sorghums with high levels of resistance to pathotype 3. QL-3 India sel., is also highly resistant. Several other sources of resistance have been found in the durra sorghums. However, they are agronomically inferior to the caudatum types.

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TABLE 1. 1982 DMRCLT & Suppl. (Pathotype 3 inoculation)

SC No.	IS No.	Group	%[1] Sporulation	% SDM
2	—	Dur	16.7	8.8
13	—	Dur Sub	48.4	22.6
21	—	Doc Kaf	0	11.1
23	—	Dur	0	0
37	—	Dur Bic	0	7.7
38	—	Dur	0	0
108	12608C	Zerazera	100.0	82.8
109	12609C	Zerazera	57.1	44.0
110	12610C	Zerazera	100.0	90.3
111	—	Zerazera	100.0	74.3
170-6-17	—	Zerazera der	100.0	73.0
112	12612C	Zerazera	78.6	65.5
120	2816C	Zerazera	37.5	12.1
126	12617C	Dur Sub	10.0	0
127	12618C	Dur Doc	0	5.6
137	—	Dur Doc	0	0
141	—	Dur Doc	0	0
155	—	Sub Dur Doc	0	2.6
158	—	Dur Doc Sub	0	0
414-12	—	Cau Kaf	0	0
166	12657C	Dur Bic	3.1	6.9
167	12658C	Dur Bic	5.4	13.5
170	—	Zerazera	100.0	69.4
173	12664C	Zerazera	100.0	100.0
224	12685C	Doc Leon	4.5	36.4
309	2483C	Doch	10.8	0
325	—	Nigr	0	0
64	2573C	Cau Kaf	100.0	100.0
337	7094C	Cau	100.0	85.1
414	2508C	Cau Kaf	0	2.9
418	1335C	Cau Kaf	0	0
425	3579C	Cau Dur		
493	6418C	Nand	16.2	0
575	—	Cau Dur	0	0
663	—	Caf Rox	97.4	45.9
TX430	—	Zerazera der	100.0	85.1
692	—	Dobbs	89.7	61.5
726	—	Cau	38.9	36.1
748	—	Cau Guin	65.0	25.0
283-14	—	Consp	100.0	100.0
760	—	Cau Kaf	66.7	20.5

Table (Cont.)

SC No.	IS No.	Group	%[1] Sporulation	% SDM
763	—	Cau Kaf	91.3	84.2
780	—	Cau Kaf	85.7	73.0
810	—	Cau Dur	64.9	48.6
964	—	Dobbs	96.4	78.9
972	—	Zerazera (Mn960)	50.0	16.7
984	—	Zerazera	61.3	25.0
655	—	Caf Bpr	97.4	65.8
963	—	Cau	96.4	65.0
3541	—	Zerazera der	93.7	65.6
574	—	Cau Nig	94.8	67.5
693	—	Dobbs	91.9	27.8
324-12	—	Nigr	100.0	73.0
237	3071C	Dobbs	53.7	35.9
33	—	Durra	2.9	0
QL3 India	—		0	0
559	—	Nigr	97.1	80.6
804	—	Cau Nig	90.0	15.4
805	—	Zerazera	100.0	73.5
TAM 428	—	Dur	100.0	65.7
865	—	Dur	100.0	72.5
131	12622C	Dur Doc	51.3	10.8
124	12615C	Dur Doc	0	2.5
130	—	Dur	0	14.0
596	—	Sub	0	2.6
806	—	Cau Dur	0	0
680	—	Dobbs	69.0	64.3
970	—	Cau Nig	100.0	48.8
1015	—	Dur Doc	0	0
ATx399 x Tx430	—		90.0	42.5
1017	—	Sub Dur Doc	0	0
Tx430	—	Zerazera der	100.0	59.4
494-14E	—	Doc-Amb-Sub	48.7	11.9
982-14E	—	Zerazera	100.0	53.6
1009-14E	—	Sub	18.7	12.0
1033-14E	—	Sub-Dur-Doc	90.5	9.0
DMRCLT Supplement				
6	12526C	Sub	100.0	8.3
7	—	Dur Doc	100.0	47.5
16	—	Doc Amb	97.4	35.1
36	12556C	Dur	7.1	0

Table (Cont.)

SC No.	IS No.	Group	%[1] Sporulation	% SDM
43	—	Sub Dur	90.0	16.7
44	12563C	Doc Amb	82.3	54.5
67	—	Nig Guin	100.0	32.5
93	2266C	Cau	0	2.6
103	2403C	Cau	100.0	35.3
114	2662C	Cau Nig	61.5	30.8
TX 7078			100.0	
906	—	Dur	2.5	
239	3574C	Zerazera	100.0	
330	—	Nig Fet	92.3	
701	—	Cau	100.0	
709	—	Cau	63.9	
728	—	Cau	100.0	
566	7254C	Cau Guin	93.5	
414-12	—		0	
145	—	Doch	82.9	
683	—	Nig Fet	94.9	
659	—	Caf-Rox	87.2	
1039	—	Dur Doc	51.9	
566	7254C	Cau Guin	67.6	
Tx430			87.1	
CL243 (Acme Broomcorn)			76.3	
TX 2519			100.0	
Tx430			100.0	
Tx7078			100.0	
QL 3			3.6	
SC 170-6-17			78.6	
SC 425			0	

Table (Cont.)

SC No.	IS No.	Group	%[1] Sporulation	% SDM
136	—	Dur Doc	13.3	11.1
175	12666C	Zerazera	84.2	50.0
181	—	Dur Sub	0	0
465	—	Dur Rox	16.3	4.9
502	—	Dur Nig	0	0
641	—	Caf-Darso	51.3	4.9
681	—	Zerazera	87.8	4.8
686	—	Dobbs	62.2	8.1
283-14	—		100.0	74.3
689	—	Nig Fet	2.5	7.5
691	—	Nig Fet	0	0
708	—	Cau	0	2.5
715	—	Cau	82.9	45.0
724	—	Cau	87.1	38.8
727	—	Cau	0	0
732	—	Cau	47.5	24.3
733	—	Cau	54.5	17.4
737	—	Cau	7.9	0
170-6-17	—		41.9	12.5
798	—	Zerazera	94.4	62.2
803	—	Zerazera	56.4	12.8
Tx430	—		98.1	57.1

[1] Lab inoculation with Pathotype 3 (Orange Grove isolate) of *P. sorghi*. Percentages are qualitative and based on sporulation from local lesions on inoculated plants. May, 1982.

Cultural and Chemical Control

G. N. Odvody*

The primary means for control of sorghum downy mildew (SDM) caused by *Peronosclerospora sorghi* on sorghum is through host plant resistance. However, the existence of pathotypes of *P. sorghi* which overcome the popular sources of resistance (1) demonstrates the need for alternative SDM-controls.

Alternative SDM-controls could either function as the primary control when host resistance is lacking or complement incomplete host resistance, but through a reduction in the selection pressure for new pathotypes of the pathogen. This approach would give a new stability to our control of SDM.

The general types of alternative controls that demonstrate promise for SDM are in the three broad groups of cultural, chemical, and biological controls.

Cultural controls like deep plowing to 12 inches (30 cm) and crop rotation are already a normal component of tillage systems in many areas of South Texas. Deep plowing (2,4) reduced SDM-incidence by up to 75 percent the following growing season when compared to normal tillage to 6 inches (15 cm). However, the energy and time investment of deep plowing and occasional soil moisture problems make this method an unattractive one to many growers. Simulated crop rotation over a three-year period demonstrated a continued decrease in both SDM-incidence and, compared to the sorghum monoculture areas after three years, the crop rotation area had an 85 percent reduction in SDM-incidence and a 73 percent reduction in oospore populations.

Biological controls for SDM are not yet developed, but organisms are being sought which have activity either in reducing oospore survival or in protecting the host plant from infection. Known mycoparasites of oospores may be potential control agents for SDM.

TABLE 1. SORGHUM EXPERIMENT I. EFFECT OF METALAXYL SEED TREATMENT ON STAND ESTABLISHMENT, SDM-INCIDENCE, AND GRAIN YIELD OF AND SDM-SUSCEPTIBLE SORGHUM HYBRID PLANTED AT TWO SOUTH TEXAS LOCATIONS IN 1979[a]

Metalaxyl seed treatment (g ai/kg)[b]	Stand establishment[b] (5-6 wk)		Percent SDM (5-6 wk)		Grain yield (kg/8.1 × 10^{-4} ha)[d]	
	Beeville	Robstown	Beeville	Robstown	Beeville	Robstown
Nontreated	91a	131a	28 b	28 b	2.96a	2.90a
0.1	167 cd	208 c	3a	1a	3.61 bc	3.69 c
0.2	188 d	233 c	1a	<1a	3.61 bc	3.79 c
0.3	165 cd	219 c	1a	<1a	3.51 b	3.44 b
0.4	213 e	277 d	<1a	0a	3.84 de	3.67 c
0.5	154 c	217 c	<1a	0a	3.68 bcd	3.68 c
1.0	125 b	166 b	0a	0a	3.79 cde	3.44 b
1.5	110ab	145ab	0a	0a	3.71 bcde	3.30 b
2.0	103ab	130a	0a	0a	3.86 de	3.30 b
2.5	112ab	156ab	0a	0a	3.92 e	3.30 b
3.0	114ab	158ab	0a	0a	3.84 de	3.33 b

[a] Values followed by the same letter are not significantly different according to Duncan's multiple range test, P = 0.05. Data from each site were analyzed separately.

[b] metalaxyl = Apron 35 SD

[c] Average plant number/replication

[d] Grain yield was determined at crop maturity from an 8.4 m length of row/replication (8.1 × 10^{-4} ha)

Chemical control represents one of the best, potential, alternative SDM-controls available for immediate use, especially as new systemic fungicides are being developed with unique activities against the Peronosporales which includes *P. sorghi* (3).

One of the most effective systemic fungicides of this type is metalaxyl (Ridomil, Apron) produced by the CIBA-Geigy Corporation. Consistent, near-100 percent control of SDM in South Texas was achieved when utilizing metalaxyl seed treatment at rates of 0.1-3.0 gram of active ingredient per kilogram (g ai/kg) on corn and sorghum (Table 1). Reduced stand establishment of corn and sorghum occurred at metalaxyl seed treatment rates above 1.0 g ai/kg regardless of formulation used (Apron SD, Ridomil 2E). Metalaxyl was effective as a curative of SDM in systemically infected plants, but this is not economically feasible nor desirable use of the fungicide, since it could enhance the selection of metalaxyl-tolerant strains of *P. sorghi*.

As the selection of tolerant strains is also a possibility with metalaxyl-treated seed, a rate should be used which is sufficiently high to consistently give control as near 100 percent as possible without posing phytotoxicity problems. Although the metalaxyl seed treatment rate of 0.5 g ai/kg generally provides this type of control, there was sufficient, sporadic disease incidence to justify a rate of 1.0 g ai/kg. To further minimize development of metalaxyl-tolerant strains of *p. sorghi*, it is suggested that metalaxyl be predominantly used on SDM-resistant hybrids at seed treatment rates of 1.0 g ai/kg.

Another systemic fungicide, fosetyl-Al (Aliette, Rhone-Poulenc Chemical Co.) has also demonstrated ability to control SDM when utilized as a seed treatment, but high rates (5.0-10.0 g ai/kg) appear necessary for control. If fosetyl-Al remains consistent in its performance, it could represent another valuable alternative control to be deployed with metalaxyl, host plant resistance, and cultural controls.

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Chemical Control — A Reality In 1983?

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The title of this presentation could just as adeptly been called "Chemical Control with APRON+ Seed Treatment Fungicide - A Reality In 1983?", the reason being that based on currently available chemistry, APRON is the only chemical that could be labeled in time to use in 1983.

At present, and E.P.A. approved federal label that will allow the use of APRON as a seed treatment on sorghum is expected to be issued by December of 1982. This label will have a high rate of 0.5 ounce active ingredient per hundred weight of seed, which is below the rate that Dr. Odvody has found to be optimum for control of downy mildew. In order to reduce the chance for escapes, a higher rate will be recommended — the logic being that fewer escapes will reduce the chance of a resistant pathotype evolving. Fortunately, residue tests are underway to support registration at the higher label rate. Although this information will not be available soon enough to support the initial federal label, with efficacy and residue data and a tolerance for sorghum, we are optimistic that a special local need (SLN) label for the State of Texas can be issued in late 1982 or early 1983. The initial federal label expected to be issued in December of 1982 will subsequently be amended to include the higher rates for downy mildew control, however, this label may not clear until mid to late 1983.

These predictions are based on currently available information and, of course, could change. However, expectations, based on the E.P.A.'s experience with APRON seed treatment registration on cotton and soybeans, the label for sorghum will proceed smoothly without any major complications.

Fortunately the handling procedures for APRON will not differ significantly from that of the presently used common fungicides. Seed treating equipment that is currently being used to apply captan will also be suitable for APRON. The only qualifications are that the treater be capable of providing proper coverage and that there be a premix tank with adequate agitation to keep the slurry in suspension.

The APRON label will carry an appropriate "Precautionary Statement". This portion of the label gives precautionary procedures that should be observed when handling the formulated product, such as: first aid procedures, environmental hazards, and the physical and chemical hazards. While this is important and should be heeded, it does not differ significantly from other commonly used fungicides.

Regarding the type of formulation that will be available: a flowable, an emulsifiable concentrate, and a wettable powder have been evaluated. Most of the work to date has been with the emulsifiable concentrate, but due to deleterious effects this formulation has had on plastic parts which are found in various pumps, strong consideration is being given to a flowable formulation. A wettable powder is also an option, but because of the inconvenience associated with the use of wettable powders, a flowable formulation is preferred. Fortunately, at the rates required to control downy mildew, none of these formulations has adversely affected germination.

There are benefits associated with APRON other than downy mildew control. APRON is a highly effective control for early seaseon *Pythium* that often reduced seedling emergence, especially under cool, wet conditions. The systemic activity of APRON provides much better control than is available with contact fungicides, such as captan or thiram. The addition of APRON to the standard treatment increased the emergence by more than 50 percent compared to the standard treatment alone.

Of course, another major consideration concerning new products is cost. Although accurate information on pricing is not available, the expected cost of treated seed with APRON will be significantly higher than captan, but the cost per acre will be very reasonable, especially in lieu of the potential return per acre. Cost per acre is expected to be less than most farmers are currently paying to treat their wheat with commonly used planter box seed treatments. Those farmers with the potential for downy mildew will be able to justify the added expense easily.

+APRON is a trademark of CIBA-Geigy Corporation

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Evaluation of Commercial Hybrids

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For several years workers in the Texas Agricultural Extension Service have collaborated with colleagues in the Texas Agricultural Experiment Station in the evaluation of commercial hybrids for disease reaction. Many positive things have come from this effort, and the grain sorghum industry has profited by it. It has served as a common reference source that can be used by producers, seed companies and others in the agribusinesss chain.

With this information available growers are more prone to use disease resistance as one factor in the hybrid selection process. It broadens their options as they deal with company representatives who help them select the best hybrid for their area. While companies know and have known the disease reactions of their hybrids all along, they can look at the comparative listings of their hybrid reactions and those of other companies. This information may also have a stimulating effect on companies to develop more disease resistant hybrids.

The following paragraph is printed in extension publications and clearly expresses how and where resistant variety information should be used.

> Disease resistance is only one of the many characteristics to consider in selecting a grain sorghum hybrid. Yield potential in the local area is the first and most important consideration. County Extension agent demonstrations are a good source of information on yield performance of adapted hybrids. Seed companies also have yield information on hybrids in a given area. Give strong consideration to disease ratings when one of these diseases represents a limited production factor.

The general pattern of activity is to evaluate corn and sorghum hybrids on alternate years. This year forage sorghums were chosen instead of corn. Eighty-two commercial forage sorghums were evaluated at six locations, and each is replicated three times. Information is now available on downy mildew symptom expression (both systemic and leaf) and on maize dwarf mosaic (motteling and red leaf).

Before long pre-publication information will be sent to each company that has entries. Each company should examine these data and their interpretations for inconsistencies, which occasionally occur. Usually data can be re-examined and inconsistencies reconciled.

Almost all seed companies cooperate fully in this activity. This is appreciated both by the Experiment Station, the Extension Service and by producers who use the information. There has been a slight tendency for some companies to submit only disease resistant varieties, but this is not without value. It keeps tests from getting too big, and growers are exposed to only those hybrids when using the information. This increases their chances of selecting a disease resistant hybrid.

Seed companies are making great strides in developing and making available disease resistant varieties. They are to be congratulated individually and collectively for the great service that they perform for Texas agriculture.

Grain producers deserve a major amount of credit also for completing the miracle of production that is such a great asset for this country. They constantly become more aware of the possible as they work with their county Extension agents, seed companies, and farm media, in examining result demonstrations and other educational programs. Texas Agricultural Extension Service workers consider it a privilege to work with seed companies, producers, and all of those who join in the effort to overcome adversities to abundent crop production.

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