2025 Spinach Field Day

February 18, 2025

10:00 a.m. - 1:00 p.m.

Tiro Tres Farms - Crystal City, TX

Coordinated by: Larry Stein, Paige Ritchie and Maribel Alonzo
Texas A&M AgriLife Extension Service
All photos provided by Paige Ritchie, Tiro Tres Farms

Agenda
10:00 a.m. – 1:00 p.m.

Marcel Valdez, MC
Introduction
Texas A&M AgriLife Extension Service - Emeritus

Ed Ritchie
Welcome
President of Wintergarden Spinach Producers Board

Leslie Dominguez
CEUs
Zavala County, CEA Agriculture
Texas A&M AgriLife Extension Service

Vic Alexander
Laws and Regulations
Assistant Regional Director
Texas Department of Agriculture

Julieta Leija
Spinach Smoothie Presentation
Zavala County, BLT
Texas A&M AgriLife Extension Service

Larry Stein
Overview of the Research Trials
Texas A&M AgriLife Extension Service, Uvalde

Mike Phillips
Fungicide Control Trial Stemphylium
Cargile Consulting

Lindsey Du Toit
Stemphylium Screening Trials'
Washington State University

Carlos Avila
SCRI grant
Texas A&M AgriLife Research, Weslaco

Field Tour of Research Plots

Lunch

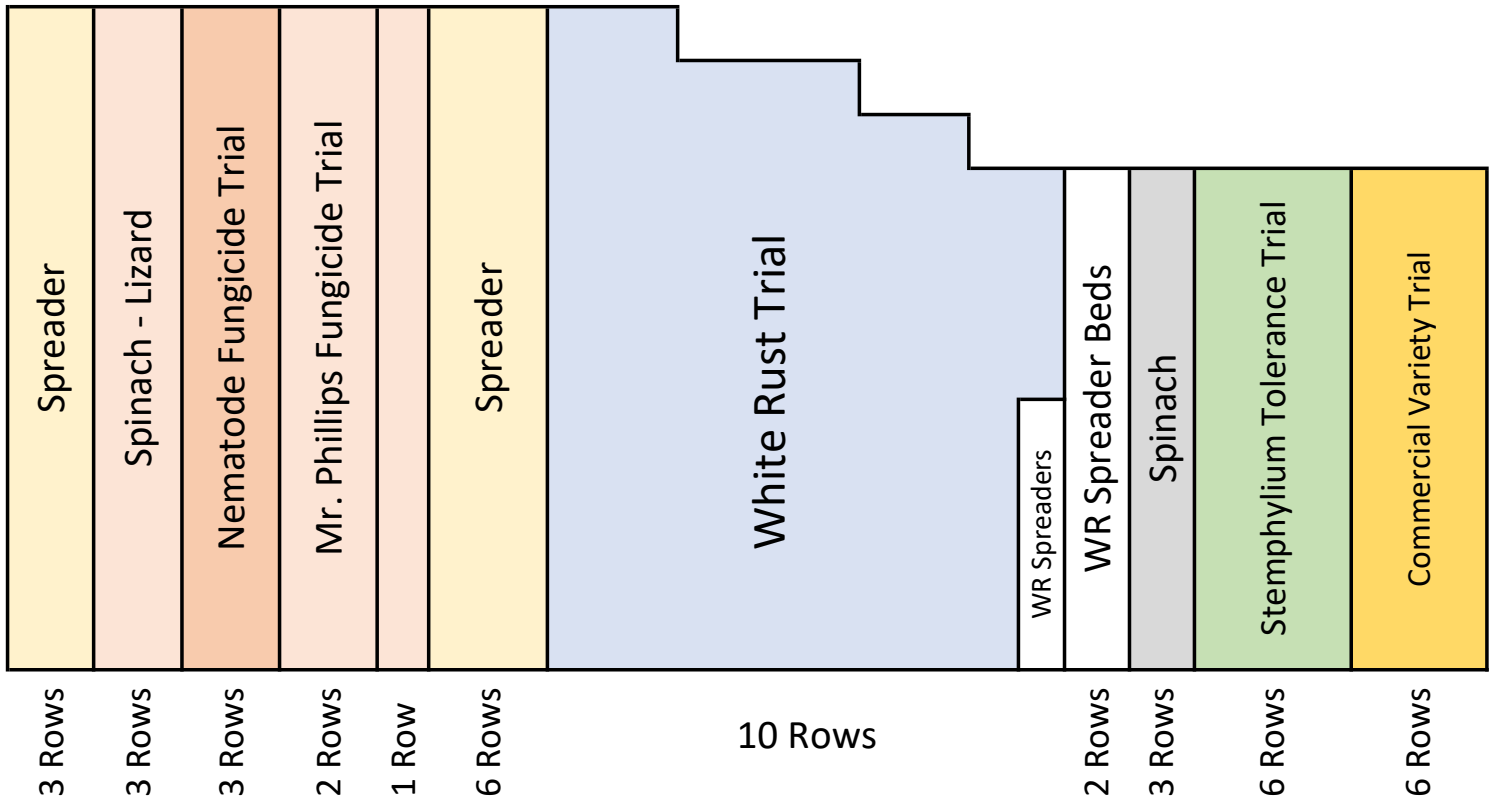
Recognition of Sponsors

Group Photo

Evaluation

You are welcome to stay after 1:00 pm

Research Plot Layout 2024-25



WHITE RUST TRIAL 2024-25

Plant Date: 11/20/2024

Nematode Damage

Dampened Off

Row 1

C11	C12
C9	C10
C7	C8
C5	C6
C3	C4
C1	C2
B75	-
B73	B74
B71	B72
B69	B70
B67	**B68**
B65	B66
B63	B64
B61	B62
B59	B60
B57	B58
B55	B56
B53	B54
B51	B52
B49	B50
B47	B48
B45	B46
B43	B44
B41	**B42**
B39	**B40**
B37	**B38**
B35	**B36**
B33	**B34**
B31	**B32**
B29	**B30**
B27	**B28**
B25	**B26**
B23	**B24**
B21	**B22**
B19	**B20**
B17	**B18**
B15	**B16**
B13	**B14**
B11	**B12**
B9	**B10**
B7	**B8**
B5	**B6**
B3	**B4**
B1	B2
A7	A8
A5	A6
A3	A4
A1	A2

Row 2

C14	**C13**
C16	C15
C18	C17
D2	D1
-	D3
E2	E1
E4	E3
E6	E5
E8	E7
E10	E9
E12	E11
E14	E13
E16	E15
E18	**E17**
E20	**E19**
E22	**E21**
E24	**E23**
E26	**E25**
E28	**E27**
E30	**E29**
E32	**E31**
E34	**E33**
E36	**E35**
E38	**E37**
E40	**E39**
E42	**E41**
E44	**E43**
E46	**E45**
E48	**E47**
E50	**E49**
E52	E51
E54	E53
E56	E55
E58	E57
E60	E59
E62	E61
E64	E63
E66	E65
E68	E67
E70	E69
E72	E71
E74	E73
E76	E75
E78	E77
E80	E79
E82	E81
E84	E83
E86	E85
E88	E87

Row 3

B21	B22
B19	B20
B17	B18
B15	B16
B13	B14
B11	B12
B9	B10
B7	B8
B5	B6
B3	B4
B1	B2
A7	A8
A5	A6
A3	A4
A1	A2
E149	E150
E147	E148
E145	E146
E143	E144
E141	E142
E139	E140
E137	E138
E135	E136
E133	E134
E131	E132
E129	E130
E127	E128
E125	E126
E123	E124
E121	E122
E119	E120
E117	E118
E115	E116
E113	E114
E111	E112
E109	E110
E107	E108
E105	E106
E103	E104
E101	E102
E99	E100
E97	E98
E95	E96
E93	E94
E91	E92
E89	E90

Row 4

B24	**B23**
B26	B25
B28	B27
B30	B29
B32	B31
B34	B33
B36	B35
B38	B37
B40	B39
B42	B41
B44	B43
B46	B45
B48	B47
B50	B49
B52	B51
B54	B53
B56	B55
B58	B57
B60	B59
B62	B61
B64	B63
B66	B65
B68	B67
B70	B69
B72	B71
B74	B73
-	B75
C2	C1
C4	C3
C6	C5
C8	C7
C10	C9
C12	C11
C14	C13
C16	C15
C18	C17
D2	D1
-	D3
E2	E1
E4	E3
E6	E5
E8	E7
E10	E9
E12	E11
E14	E13
E16	E15

Row 5

E107	E108
E105	E106
E103	E104
E101	E102
E99	**E100**
E97	**E98**
E95	**E96**
E93	**E94**
E91	**E92**
E89	**E90**
E87	**E88**
E85	**E86**
E83	**E84**
E81	E82
E79	**E80**
E77	**E78**
E75	**E76**
E73	**E74**
E71	**E72**
E69	**E70**
E67	**E68**
E65	**E66**
E63	**E64**
E61	**E62**
E59	**E60**
E57	**E58**
E55	**E56**
E53	E54
E51	E52
E49	E50
E47	E48
E45	E46
E43	E44
E41	E42
E39	E40
E37	E38
E35	E36
E33	E34
E31	E32
E29	E30
E27	E28
E25	E26
E23	**E24**
E21	E22
E19	E20
E17	E18

Row 6

E110	**E109**
E112	E111
E114	**E113**
E116	**E115**
E118	**E117**
E120	**E119**
E122	**E121**
E124	**E123**
E126	**E125**
E128	**E127**
E130	**E129**
E132	E131
E134	**E133**
E136	**E135**
E138	**E137**
E140	**E139**
E142	**E141**
E144	**E143**
E146	**E145**
E148	**E147**
E150	**E149**
A2	**A1**
A4	**A3**
A6	**A5**
A8	**A7**
B2	**B1**
B4	**B3**
B6	B5
B8	B7
B10	B9
B12	B11
B14	**B13**
B16	**B15**
B18	**B17**
B20	**B19**
B22	**B21**
B24	B23
B26	**B25**
B28	B27
B30	B29
B32	B31
B34	B33
B36	B35
B38	B37
B40	B39
B42	B41

Row 7

E31	E32
E29	E30
E27	E28
E25	E26
E23	E24
E21	E22
E19	E20
E17	E18
E15	E16
E13	E14
E11	E12
E9	E10
E7	E8
E5	E6
E3	E4
E1	E2
D3	-
D1	D2
C17	C18
C15	C16
C13	C14
C11	C12
C9	C10
C7	C8
C5	C6
C3	C4
C1	C2
B75	-
B73	B74
B71	B72
B69	B70
B67	B68
B65	B66
B63	B64
B61	B62
B59	B60
B57	B58
B55	B56
B53	B54
B51	B52
B49	B50
B47	B48
B45	B46
B43	B44

Row 8

E34	**E33**
E36	E35
E38	E37
E40	E39
E42	E41
E44	E43
E46	E45
E48	E47
E50	E49
E52	E51
E54	E53
E56	E55
E58	E57
E60	E59
E62	E61
E64	E63
E66	E65
E68	E67
E70	E69
E72	E71
E74	E73
E76	E75
E78	E77
E80	E79
E82	E81
E84	E83
E86	E85
E88	E87
E90	E89
E92	E91
E94	E93
E96	E95
E98	E97
E100	E99
E102	E101
E104	E103
E106	E105
E108	E107
E110	E109
E112	E111
E114	E113
E116	E115
E118	E117
E120	E119

Row 9

W53	W54
~~W51~~	W52
W49	W50
W47	W48
W45	W46
W43	W44
W41	W42
W39	W40
W37	W38
W35	W36
W33	W34
W31	W32
W29	W30
W27	W28
W25	W26
W23	W24
W21	W22
W19	W20
W17	W18
W15	W16
W13	W14
W11	W12
W9	W10
W7	W8
W5	W6
W3	W4
W1	W2
E149	E150
E147	E148
E145	E146
E143	E144
E141	E142
E139	E140
E137	E138
E135	E136
E133	E134
E131	E132
E129	E130
E127	E128
E125	E126
E123	E124
E121	E122

Row 10

W56	W55
W58	W57
W60	W59
W62	W61
W64	W63
W66	W65
W68	W67
W70	W69
W72	W71
W74	W73
W76	W75
W78	W77
W80	W79
W82	W81
W84	W83
W86	W85
W88	W87
W90	W89
W92	W91
W94	W93
W96	W95
W98	W97
W100	W99
W102	W101
W104	W103
-	W105

White Rust Trial Bed

Example Diagram

White rust susceptible varieties were chosen as the spreader rows in the bed, which are located on the outside and center of the bed. The spinach cultivars submitted for entry in the trial are located in between the spreaders.

STEMPHYLIUM/COMMERCIAL TRIAL LAYOUT 2024-25

Plant Date: 12/18/2024

Hammerhead	Limestone	Lizard

22	23	24	27	26	25				13	14	15		18	17	16
19	20	21	30	29	28				10	11	12		21	20	19
16	17	18	33	32	31				7	8	9		24	23	22
13	14	15	36	35	34				4	5	6		27	26	25
10	11	12	39	38	37				1	2	3		30	29	28
7	8	9	42	41	40				28	29	30		3	2	1
4	5	6	45	44	43				25	26	27		6	5	4
1	2	3	48	47	46				22	23	24		9	8	7
46	47	48	3	2	1				19	20	21		12	11	10
43	44	45	6	5	4				16	17	18		15	14	13
40	41	42	9	8	7				13	14	15		18	17	16
37	38	39	12	11	10				10	11	12		21	20	19
34	35	36	15	14	13				7	8	9		24	23	22
31	32	33	18	17	16				4	5	6		27	26	25
28	29	30	21	20	19				1	2	3		30	29	28
25	26	27	24	23	22				28	29	30		3	2	1
22	23	24	27	26	25				25	26	27		6	5	4
19	20	21	30	29	28				22	23	24		9	8	7
16	17	18	33	32	31				19	20	21		12	11	10
13	14	15	36	35	34				16	17	18		15	14	13
10	11	12	39	38	37				13	14	15		18	17	16
7	8	9	42	41	40				10	11	12		21	20	19
4	5	6	45	44	43				7	8	9		24	23	22
1	2	3	48	47	46				4	5	6		27	26	25
									1	2	3		30	29	28

Stemphylium
Inoculated 1/14/2025
2/3/2025

Commercial

Stemphylium Leaf Spot Trial

Plant Date: 12/18/2024
Inoculation Dates: 1/14/2025, 2/3/2025
Target Plant Population: 2 million seeds/acre

#	Seed Company	Variety	Germ	Seedcnt	Treated	Treatment
1	Rijk Zwaan	Galago (51-378)	90	64,596	NO	
2	Rijk Zwaan	Ovenbird (51-541)		60,366	NO	
3	Check	Viroflay	98	57,417	NO	
4	BASF/Nunhems	Rastaban	90	54,985	NO	
5	Rijk Zwaan	Shearwater (51-539)		52,817	YES	Maxim 480 FS
6	Pop Vriend/KWS	Colusa	94	51,545	NO	
7	Rijk Zwaan	51-SE746		50,204	NO	
8	Pop Vriend/KWS	Limestone (PV 1664)	98	48,774	NO	
9	Rijk Zwaan	51-SL389		48,752	NO	
10	Pop Vriend/KWS	Quartz	92	44,910	NO	
11	Bejo	Pershing	90	44,549	NO	
12	Rijk Zwaan	Boxfish (51-370)	95	44,505	NO	
13	Bejo	Patton	90	44,355	YES	
14	Pop Vriend/KWS	Bornite (PV 1989)	88	44,038	NO	
15	Pop Vriend/KWS	Skarne	99	44,038	NO	
16	Pop Vriend/KWS	Nevada	95	43,615	NO	
17	BASF/Nunhems	Hydrus	95	43,211	NO	
18	Pop Vriend/KWS	KSP0057	93	43,036	NO	
19	Pop Vriend/KWS	PV 1569	96	42,392	NO	
20	Rijk Zwaan	Baboon (51-529)	91	42,352	NO	
21	Rijk Zwaan	Yakalo (51-729)	88	42,316	YES	Thiram 480 DP
22	Rijk Zwaan	Hammerhead	90	42,034	YES	Thiram 480 DP
23	Rijk Zwaan	Tarsier (51-728)	86	36,105	YES	Thiram 480 DP
24	BASF/Nunhems	Nembus	94	35,418	NO	Seed count seems wrong
25	BASF/Nunhems	NUN 07563	99	34,368	NO	
26	BASF/Nunhems	NUN 07568		33,228	NO	
27	Rijk Zwaan	Bonnethead (51-722)	94	32,828	NO	
28	BASF/Nunhems	NUN 07571		31,494	NO	
29	BASF/Nunhems	Toliman	84	31,197	NO	
30	Pop Vriend/KWS	Lignite (PV 1779)	95	30,442	NO	
31	Bejo	Wainwright (3680)	92	29,606	NO	
32	Rijk Zwaan	Diamondback (51-736)	88	29,567	NO	
33	Taylor Farms	4031		29,208	NO	
34	Pinnacle	2051		29,112	NO	
35	Pop Vriend/KWS	PV 2088	88	28,350	NO	
36	Bejo	Marshall	95	28,258	NO	
37	Syngenta	El Majestic	96	27,000	NO	
38	Syngenta	El Bolero	96	26,926	NO	
39	Taylor Farms	4023		25,944	NO	
40	Syngenta	El Kuduro	98	25,697	NO	
41	Pop Vriend/KWS	Flourite (PV 1526)	95	25,627	NO	
42	Pop Vriend/KWS	Obsedian (PV 1980)	92	25,454	NO	
43	BASF/Nunhems	NUN 07553	90	24,992	NO	
44	Check	Mandolin	94	24,732	NO	
45	BASF/Nunhems	Arakis	91	24,663	NO	
46	Bejo	MacArthur	90	23,733	NO	
47	Rijk Zwaan	Gerenuk (51-734)	93	23,260	NO	
48	BASF/Nunhems	NUN 07557	95	20,914	NO	

Commercial Showcase

Plant Date: 12/18/2024

Target Plant Population: 2 million seeds/acre

#	Seed Company	Variety	Germ	Seedcnt	Treated	Treatment
1	Rijk Zwaan	Shearwater (51-539)		52,817	YES	Maxim 480 FS
2	Pop Vriend/KWS	Limestone (PV 1664)	98	48,774	NO	
3	Bejo	Pershing	90	44,549	NO	
4	Bejo	Patton	90	44,355	YES	
5	Pop Vriend/KWS	PV 1569	96	42,392	NO	
6	Rijk Zwaan	Baboon (51-529)	91	42,352	NO	Old Seed - Bad Germ
7	Rijk Zwaan	Hammerhead	90	42,034	YES	Thiram 480 DP
8	Taylor Farms	2523		36,909	YES	
9	BASF/Nunhems	Nembus	90	35,418	NO	
10	Rijk Zwaan	Bonnethead (51-722)	94	32,828	NO	
11	Bejo	Wainwright (3680)	92	29,606	NO	
12	Rijk Zwaan	Diamondback (51-736)	88	29,567	NO	
13	Taylor Farms	4031		29,208	YES	
14	Pinnacle	2051		29,112	NO	
15	Pop Vriend/KWS	PV 2088	88	28,350	NO	
16	Bejo	Marshall	95	28,258	NO	
17	Taylor Farms	4064		27,617	YES	
18	BASF/Nunhems	Crater	95	27,282	NO	
19	Syngenta	El Majestic	96	32,942	NO	
20	Syngenta	El Bolero	96	26,926	NO	
21	Taylor Farms	4023		25,944	YES	
22	Taylor Farms	2318		25,804	YES	
23	Syngenta	El Kuduro	98	25,697	NO	
24	Pop Vriend/KWS	Flourite (PV 1526)	95	25,627	NO	
25	Pop Vriend/KWS	Obsedian (PV 1980)	92	25,454	NO	
26	BASF/Nunhems	NUN 07553	90	24,992	NO	
27	BASF/Nunhems	Seginus	95	24,913	NO	
28	Bejo	MacArthur	90	23,733	NO	
29	Rijk Zwaan	Gerenuk (51-734)	93	23,260	NO	
30	BASF/Nunhems	NUN 07557	95	20,914	NO	

Cargile Consulting

Fluoxapiprolin / Leafy Vegetables, Brassica, Lettuce/ Downy Mildew

Trial ID: FN24USAF5TTST1 TD Number: LOCALCREATED Protocol Edition No.: 1.04
Project ID: MD-NATIONAL 10ACRE
Project Number(s): % % %
Protocol Developer: Godara, Rakesh
License User: Steele, Greg

Entry No.	Entry/Trt. Description	Form. Type	AI Conc.	Dose	Dose Unit	Trans. Dose	Trans. Dose Unit	Appl. Code	Amt Product to Measure	Rep 1	2	3	4
1	UNTREATED									101	205	301	402
2	ACTIGARD 50WG	WG	50	26.27	G A/HA	0.75	OZ/A	A	0.2248 g/mx	102	202	302	407
	ORONDIS ULTRA	SC	25.85	163.7	G A/HA	8	OZ/A	B	2.501 mL/mx				
	PRESIDIO	SC	39.67	140.3	G A/HA	4	OZ/A	C	1.25 mL/mx				
	ZAMPRO	SC	47.2	537	G A/HA	14	OZ/A	C	4.376 mL/mx				
	DYNE-AMIC	SL	99	0.1	% V/V	0.1	% V/V	ABC	0.8 mL/mx				
3	ACTIGARD 50WG	WG	50	26.27	G A/HA	0.75	OZ/A	A	0.2248 g/mx	103	201	307	406
	XIVANA PRIME	SC	1.905	17.54	G A/HA	12	OZ/A	B	3.752 mL/mx				
	PREVICUR FLEX	SL	66.24	105.5	G A/HA	2	OZ/A	B	0.6251 mL/mx				
	PRESIDIO	SC	39.67	140.3	G A/HA	4	OZ/A	C	1.25 mL/mx				
	ZAMPRO	SC	47.2	537	G A/HA	14	OZ/A	C	4.376 mL/mx				
	DYNE-AMIC	SL	99	0.1	% V/V	0.1	% V/V	ABC	0.8 mL/mx				
4	XIVANA PRIME	SC	1.905	17.53	G A/HA	12	OZ/A	ABC	3.75 mL/mx	104	207	303	401
	ZAMPRO	SC	47.2	537	G A/HA	14	OZ/A	ABC	4.376 mL/mx				
	DYNE-AMIC	SL	99	0.1	% V/V	0.1	% V/V	ABC	0.8 mL/mx				
5	XIVANA PRIME	SC	1.905	17.53	G A/HA	12	OZ/A	ABC	3.75 mL/mx	105	206	305	404
	REVUS 250 SC	SC	25	146.1	G A/HA	8	OZ/A	ABC	2.5 mL/mx				
	DYNE-AMIC	SL	99	0.1	% V/V	0.1	% V/V	ABC	0.8 mL/mx				
6	ORONDIS ULTRA	SC	25.85	163.7	G A/HA	8	OZ/A	ABC	2.501 mL/mx	106	203	306	405
7	XIVANA PRIME	SC	1.905	17.54	G A/HA	12	OZ/A	ABC	3.752 mL/mx	107	204	304	403
	PREVICUR FLEX	SL	66.24	105.5	G A/HA	2	OZ/A	ABC	0.6251 mL/mx				
	DYNE-AMIC	SL	99	0.1	% V/V	0.1	% V/V	ABC	0.8 mL/mx				
8	REASON	SC	500			7	FL OZ/A	ABC		108	208	308	408
9	ACTIGARD 50WG					0.5	OZ/A	A		109	209	309	409
	ORONDIS ULTRA	SC	25.85	163.7	G A/HA	8	OZ/A	B	2.501 mL/mx				
	INDUCE					0.25	% V/V	B					
	RIDOMIL GOLD COMBI	WG	45	1009	G A/HA	2	LB/A	C	9.592 g/mx				
10	ACTIGARD 50WG					0.5	OZ/A	A		110	210	310	410
	ORONDIS ULTRA	SC	25.85	163.7	G A/HA	8	OZ/A	B	2.501 mL/mx				
	ACTIGARD 50WG					0.33	OZ/A	B					
	INDUCE					0.25	% V/V	B					
	RIDOMIL GOLD COMBI	WG	45	1009	G A/HA	2	LB/A	C	9.592 g/mx				
	ACTIGARD 50WG					0.33	OZ/A	C					

APP DATES

12/17/24	A
12/30/24	B
1/27/25 AND 2/3/25	C

Sort Order: Replicate 1

Product quantities required for listed treatments and applications of trials included in this table:

Amount*	Unit	Entry/Trt. Description	SLS Key	AI Conc.	AI Conc. Unit	Form. Type	Lot Batch Number
0.454	g	ACTIGARD 50WG		50	%AW/W	WG	
15.157	mL	ORONDIS ULTRA		280	GA/L	SC	
2.526	mL	PRESIDIO		480	GA/L	SC	
22.098	mL	ZAMPRO		525	GA/L	SC	
12.120	mL	DYNE-AMIC		99	%AW/W	SL	
37.881	mL	XIVANA PRIME		20	GA/L	SC	
2.525	mL	PREVICUR FLEX		722	GA/L	SL	
7.575	mL	REVUS 250 SC		250	GA/L	SC	
19.377	g	RIDOMIL GOLD COMBI		45	%AW/W	WG	

* 'Per area' calculations based on application amount= 187 L/HA, mix size= 0.8 L (mix size basis).
* Product amount calculations increased 1 % for overage adjustment.
* 'Per volume' calculations use spray volume= 187 L/HA, mix size= 0.8 L.
* Adjusted for multiple applications in treatment list.

SPINACH NEMATODE TRIAL

1	UNTREATED							
2	NEMACLEAN 2 POUNDS PER ACRE Japplied as a soil spray at planting, then irrigated.							
3	MOVENTO AT 5 FL. OZ/A APPLIED FOLIAR TWICE							
4	VELUM AT 6.5 FL. OZ/A APPLIED IN FURROW							
5	VICTRATO SEED TREATMENT RATE A							
6	VICTRATO SEED TREATMENT RATE B							
						northwest end		
			yellow	L	3	2	1	20 FEET
			red	K	6	6	6	20 FEET
			yellow	J	1	2	3	20 FEET
			yellow	I	3	1	2	20 FEET
			white	H	5	5	5	20 FEET
			yellow	G	3	2	1	20 FEET
			pink	F	4	4	4	20 FEET
			yellow	E	2	1	3	20 FEET
			red	D	6	6	6	20 FEET
			white	C	5	5	5	20 FEET
			pink	B	4	4	4	20 FEET
			yellow	A	1	2	3	20 FEET
					ONE BED	ONE BED	ONE BED	
						south end		

	PLANTING DATE 11/20/2024. 1000-1030. DEPTH 0.2 INCHES							
	cv. LIZARD. SEEDING RATE 1 MILLION SEEDS PER ACRE							
	AIR TEMPERATURE 64F; SOIL TEMPERATURE 60F; RELATIVE HUMIDITY 46%							
	WIND NORTH 4 TO 8 MPH							
	TREATMENTS 2 AND 4 APPLIED 11/20/2024 1400-1500							
	AIR TEMPERATURE 71F; HUMIDITY 21%, WIND NORTH 3 TO 6 MPH; SOIL TEMP 68F							
	TREATMENT 2 APPLIED AS A FOLIAR SOIL SPRAY WITH 2 8002 NOZZLES							
	AT 30 PSI AT 2 FT/SEC DELIVERING 30 GALLONS PER ACRE							
	TREATMENT 4 APPLIED AS A PINSTREAM IN 40 GALLONS PER ACRE OVER THE FURROW							
	WITH 1 SINGLE TX5 NOZZLE AT 18 PSI 6 FEET PER SECOND.							
	DUAL 8 FL. OZ/A APPLIED 11/20/2024. IRRIGATION IMMEDIATELY 0.35 INCHES,							
	IRRIGATION 24 HOURS AFTERWARD 0.7 INCHES,							
	APPLICATION 1 APPLIED TO TREATMENT 3 12/17/2024 1515TO1530							
	APPLIED AS WAS APPLICATION OF TREATMENT 2 AT PLANT.							
	AIR TEMP AND SOIL TEMP 82F; HUMIDITY 50%; WIND SSE 4 TO 8.							
	APPLICATION 2 TO TREATMENT 3 12/30/2024 1454-1504							
	AIR TEMPERATURE 90F; SOIL 86F; HUMID 10; WIND W5; 0 CLOUD							
	SPINACH 7 LEAF 4 INCH ROSETTE; SOIL SLIGHTLY WET IN SPOTS.							
	SAMPLED 01/18/2025BY TAKING 3 GARDEN TROWELS 2 INCHES DEEP PER PLOT							
	ALSO SAMPLED 1/20/2025 2 SAMPLES 801 AND 806 FROM SPINACH AT CARNES FARM							
	SHIPPED 1/20/2025 FEDEX GROUND.							
	DATA RECEIVED 02/17/2025							

	DATA SUMMARY							
	1/18/2025	1/18/2025	1/18/2025	1/18/2025	1/18/2025	1/18/2025	1/18/2025	
	#PLANTS	shootwt	rootwt	#eggs/	vermiform	freeliving	shoot wt	
	NUMBER	grams	grams	gram root	100ccsoil	100ccsoil	g/plant	
TRT								
1	7.17	25.5 b	3.67	53.78	3.15	42.57	3.65 b	
2	7	27.87 ab	4.9	50.92	7.88	44.15	4.03 b	
3	6.33	24.62 b	3.4	118.31	4.73	42.57	4.12 b	
4	7.17	31.05 ab	2.68	14.68	6.31	55.18	4.45 b	
5	6.67	34.47 ab	3.58	86.48	7.88	28.38	5.27 b	
6	5.67	39.08 a	3.72	91.06	3.15	26.8	7.17 a	
	DISCUSSION							

Dr. Marina Rondon, nematologist at Texas Agri-Life Center in Lubbock, identified the nematode infesting this trial as the false root-knot nematode, Naccobus abberans. She performed the counts and data shown above. The investigator calculated the final column, grams per shoot. It is his belief that the efficacy of these nematicides is best measured by the fresh shoot weight of the plants in the treatment, since this is the result for which we are striving (plant protection).

Theee data suggest that NEMACLEAN and MOVENTO, while more effective than untreated plots, and labeled, were less effective than the currently labeled standard, VELUM at 6.5 ounces/a. Of great interest, however, was the performance of VICTRATO seed treatment, which gave the greatest increase in shoot weight. The seed treatments also gave the greatest reduction in the free living parameter.

Visible symptoms of plant damage did not manifest themselves throughout the trial, suggesting that the trial location slightly missed the heaviest infestation of pests. However, even the moderate numbers shown above resulted in damage as the data suggest.

Additional concurrent data show this nematode is an increasingly serious problem throughout this production area. Ongoing work includes other non-replicated trials in the area which will be sampled and analyzed to give spinach growers their best tools to combat this problem.

I express many thanks to Ed and Paige Ritchie, Larry Stein, Brad Crawford, and Leslie Dominguez without whose assistance this trial could not have been planted and performed. I am also indebted to Dr. Marina Rondon, who provided the data. As always, I am very grateful to the Texas Wintergarden Spinach Producers Board, who funded this work and provided the location for this study.

Screening Spinach Cultivars for Resistance to Stemphylium Leaf Spot caused by *Stemphylium vesicarium*

Lindsey du Toit (Washington State University) and Larry Stein (Texas A&M AgriLife)
Funded by a Texas Department of Agriculture Specialty Crop Block Grant

Objective:

Identify spinach cultivars with excellent resistance to Stemphylium leaf spot caused by *Stemphylium vesicarium* to reduce: 1) the need for fungicide applications to manage this disease, and 2) losses to this disease in spinach production in the Wintergarden region of Texas.

Materials and Methods:

To help growers identify spinach cultivars with high levels of resistance to *S. vesicarium*, a baby leaf spinach cultivar trial was planted on 18 December 2024 in a field of Tiro Tres Farms by Dr. Larry Stein, Ed Ritchie, Paige Ritchie, Jimmy Crawford, Mike Phillips, and others. This was a repeat of field trials completed in 2020-2021, 2021-2022, 2022-23, and 2023-24 near Crystal City in the Wintergarden region of Texas. In fall 2024, Lindsey du Toit at WSU worked with Paige Ritchie, Ed Ritchie, and Larry Stein in Texas to invite submission of seed of spinach cultivars to evaluate in the 2024-25 TX Spinach Stemphylium Leaf Spot Field Trial. An email invitation was sent to seed companies in Sep. 2024. Seed samples for 48 spinach cultivars were submitted by seven national and international seed companies to Paige Ritchie. The trial was planted at a baby-leaf seeding rate of ~3 million seed/acre.

At WSU, production of inoculum of three Texas isolates of *Stemphylium vesicarium* was completed using the same protocol as the previous Stemphylium leaf spot trials. Approximately 1,800 petri plates of inoculum were produced on clarified V8 agar medium and shipped to Larry Stein's office in Uvalde in Jan. 2025. Inoculum was applied to the plots on 14 January and 3 February 2025. For each inoculation, the colonized agar medium of ~500 plates was blended in water and applied in a band down the center of each plot using a backpack sprayer

Severity of Stemphylium leaf spot was rated in each plot on 17 Feb. 2024 by Lindsey du Toit, Larry Stein, and Leslie Dominguez using a scale of 1 (no symptoms) to 10 (90 to 100% of the foliage symptomatic). White rust (*Albugo occidentalis*) and/or downy mildew (*Peronospora effusa*) were observed in some plots but did not interfere in the ability to rate severity of Stemphylium leaf spot. The mean and standard deviation of the severity of symptoms for the three replicate plots of each cultivar are shown in **Fig. 1**.

Results:

Severity of Stemphylium leaf spot for the 48 cultivars averaged 2.5 and ranged from 1.0 to 9.0 for individual plots (**Fig. 1**), and from 1.0 to 8.7 for the cultivar means, with significant differences among cultivars. Plots planted with seed of the cv. Baboon had very poor

emergence so that cultivar was not rated. Of the remaining 47 cultivars, 18 (38%) had no symptoms (mean rating of 1.0), 20 (41.7%) were partially resistant (mean severity of 1.1 to 3.0), 1 was moderately susceptible (mean severity of 3.1 to 5.0), and 8 (16.7%) were highly susceptible (mean severity >5.0). The cultivars Galago (51-378), Viroflay, Limestone (PV 1664), 51-SL389, KSP0057, Tarsier (51-728), NUN 07563, Bonnethead (51-722), Lignite (PV 1779), Diamondback (51-736), PV 2088, El Majestic, Flourite (PV 1526), Obsedian (PV 1980), Arakis, Gerenuk (51-734), and NUN 07557 did not develop Stemphylium leaf spot in any of the replicate plots. An additional 8 cultivars had a few leaf spots in only one of the replicate plots (mean rating of 1.3): Rastaban, Shearwater (51-539), Skarne, Hydrus, PV 1569, Nembus, Marshall, and El Bolero.

Discussion:

Results of the 2024-25 spinach trial in Texas illustrate the range in susceptibility of commercial spinach cultivars to Stemphylium leaf spot caused by *S. vesicarium*, and the ability to select cultivars highly resistant to this disease that negate the need to apply fungicides to control this pathogen. This is particularly valuable for growers given that *S. vesicarium* is the predominant *Stemphylium* species causing Stemphylium leaf spot in southern states of the USA, and all isolates of this species tested to date have proven to be resistant to fungicides in FRAC group 11 that previously were effective for controlling Stemphylium leaf spot of spinach (e.g., Quadris or Amistar with the active ingredient azoxystrobin, and Cabrio with the active ingredient pyraclostrobin).

Acknowledgements:

The trial was a collaboration of Lindsey du Toit (Washington State University), Larry Stein (Texas A&M AgriLife), Ed and Paige Ritchie (Tiro Tres Farms), Jimmy Crawford (Crawford Farms), Mike Phillips, and the Texas Wintergarden Spinach Producers' Board. The project was funded by a Texas Department of Agriculture Specialty Crop Block Grant. We thank Leslie Dominguez for assistance with rating the trial.

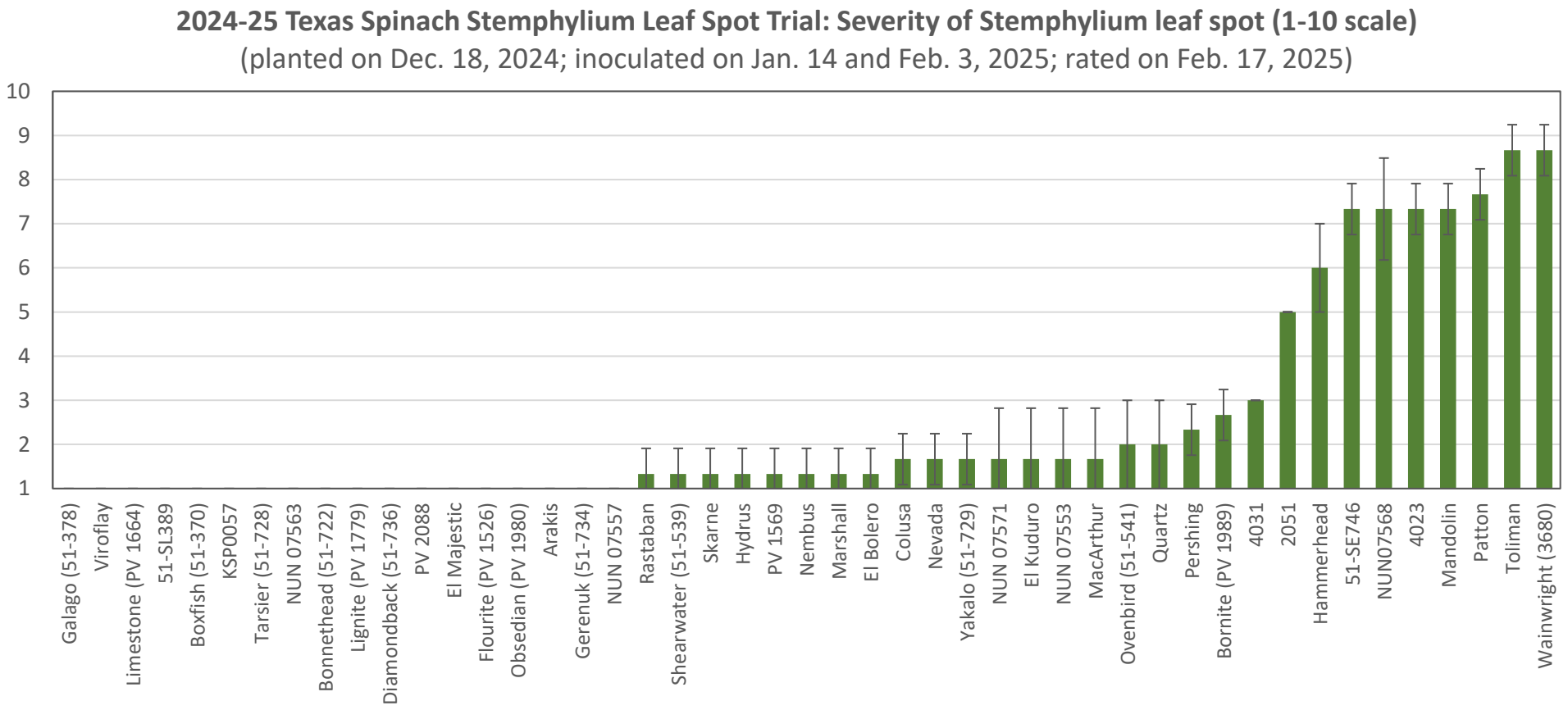


Fig. 1. Mean severity of Stemphylium leaf spot on spinach cultivars evaluated in a baby leaf field trial in Crystal City, TX in 2024-25. Three replicate plots of each cultivar were inoculated with a spore suspension of three Texas isolates of *Stemphylium vesicarium*. The trial was a collaboration of Lindsey du Toit (Washington State University), Larry Stein (Texas A&M AgriLife), Ed and Paige Ritchie (Tiro Tres Farms), Jimmy Crawford (Crawford Farms), Mike Phillips, and the Texas Wintergarden Spinach Producers' Board. The project was funded by a Texas Department of Agriculture Specialty Crop Block Grant. The severity rating for plots ranged from 1 (no symptoms) to 10 (most severe Stemphylium leaf spot).

Lindsey du Toit, Washington State University, February 2025 (dutoit@wsu.edu, 360-391-2407)

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A tremendous <u>THANK YOU</u> to all who contributed to the preparation of this field day, from the sponsors listed in this program, to the farm laborers and the cooks. No doubt, without their help this event would not be possible.

Spinach Field Day
February 20, 2024
Tiro Tres Farms
Crystal City, TX