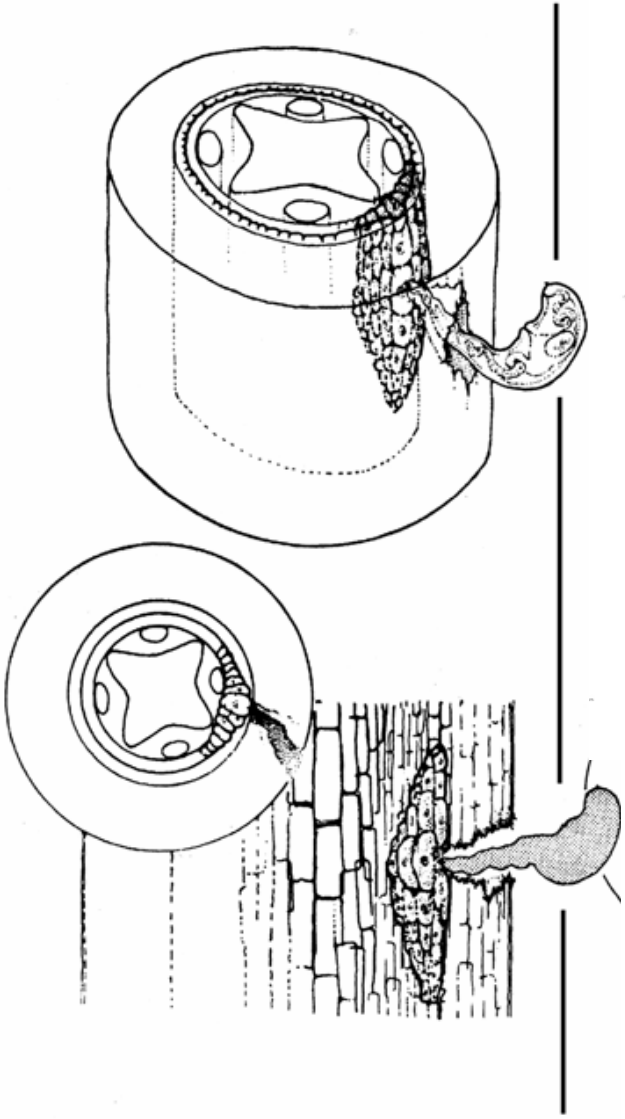
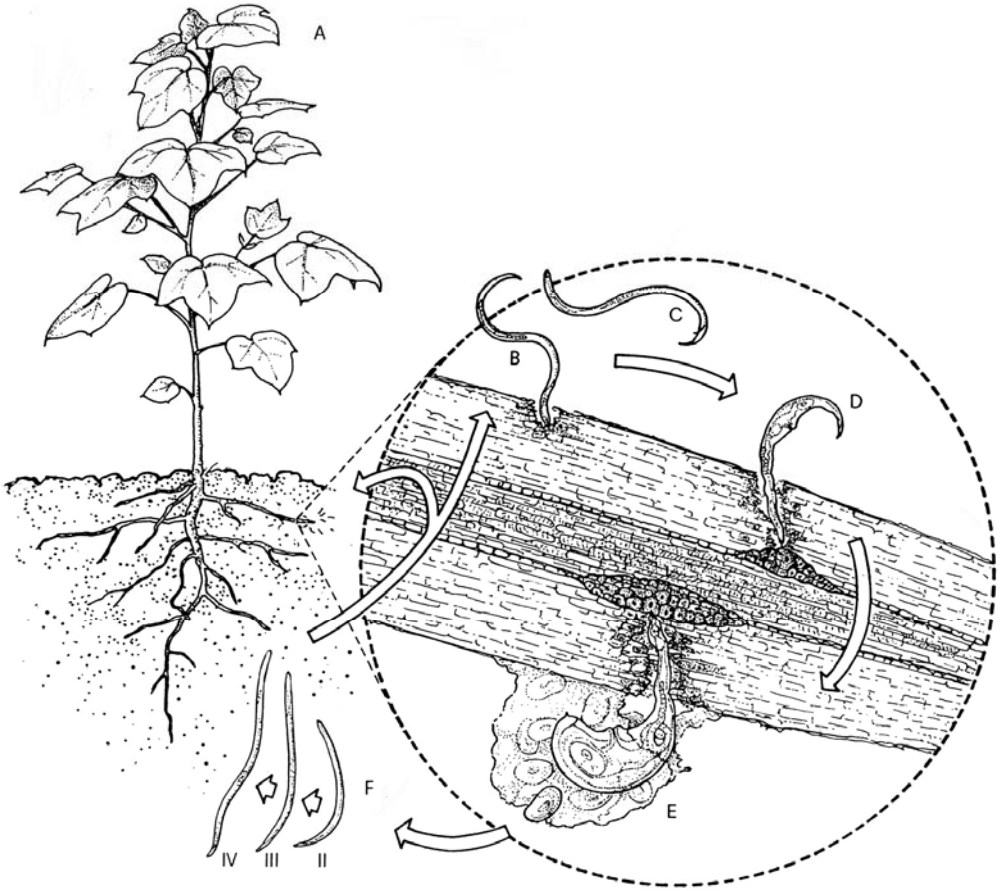
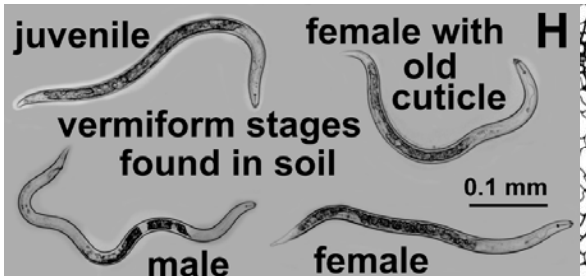
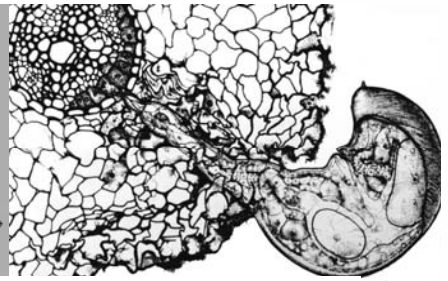
1st slide – Robinson et al.
Cotton Improvement
Friday, 8:45 a.m.
Marriott Grand Ballroom Bissonet

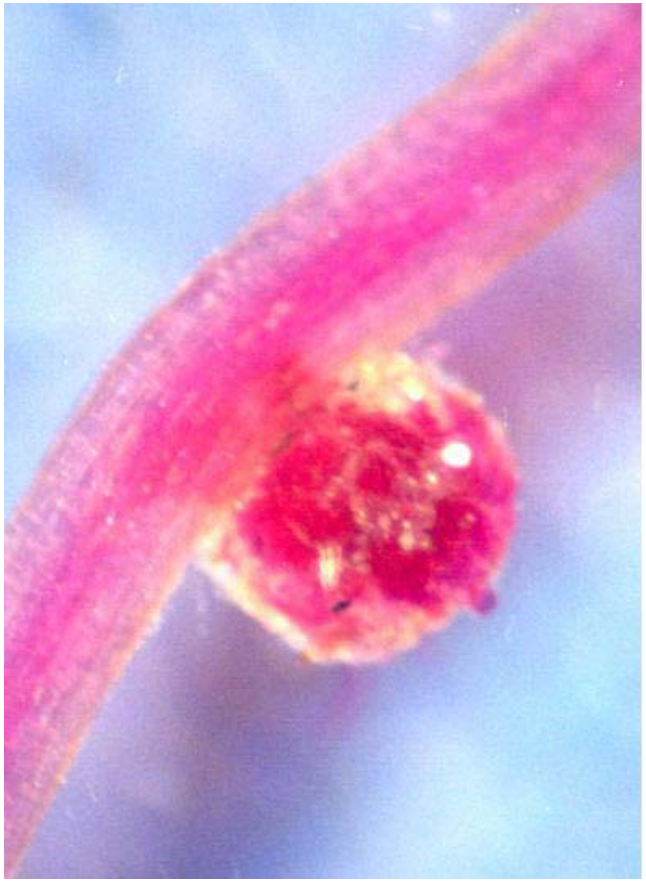
Rotylenchulus reniformis



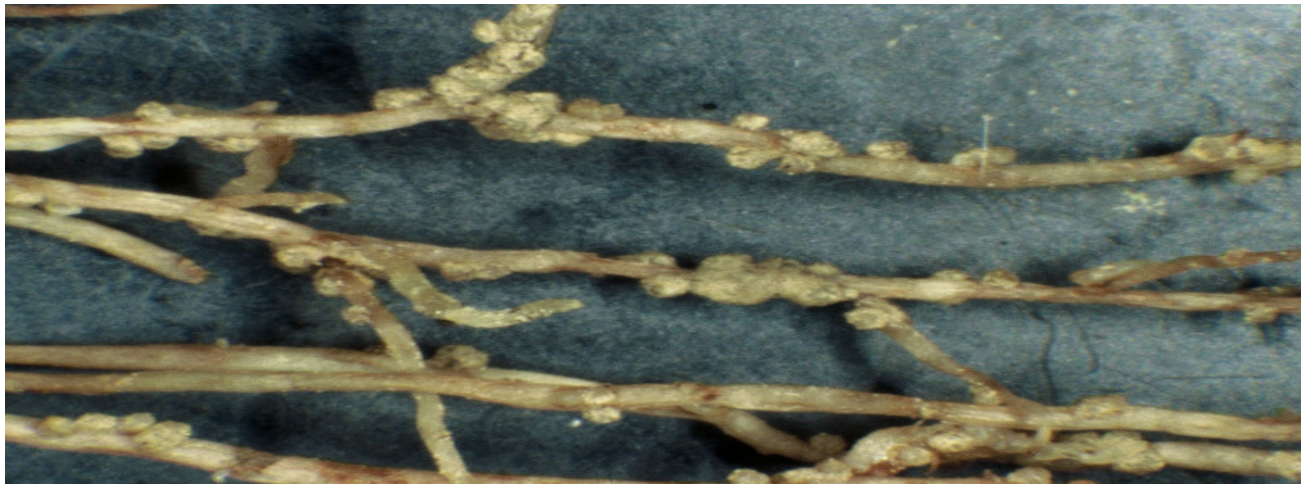


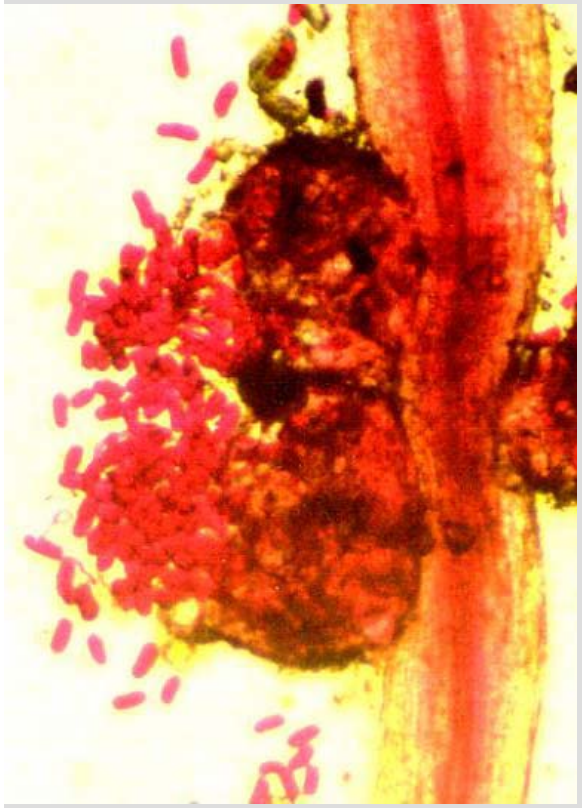




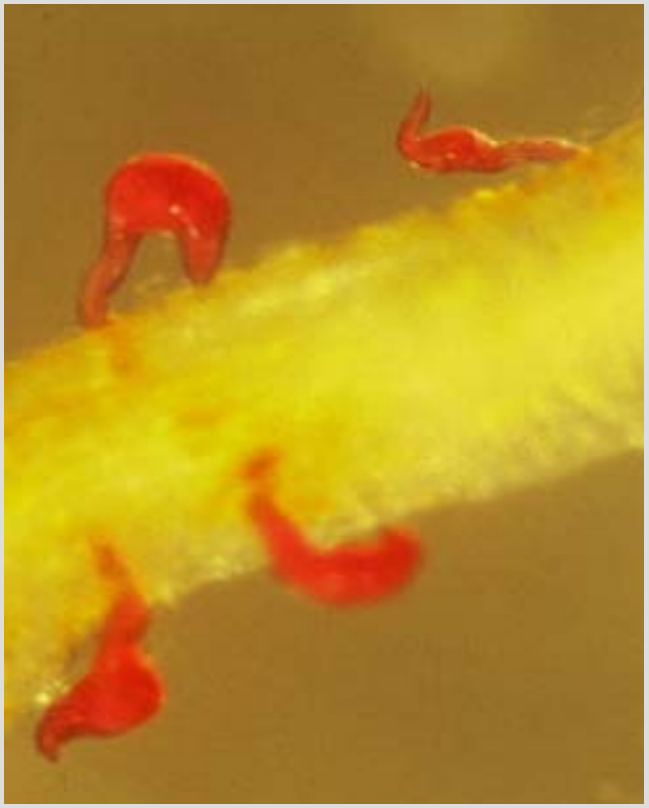


Reniform with sand stuck to egg masses on roots

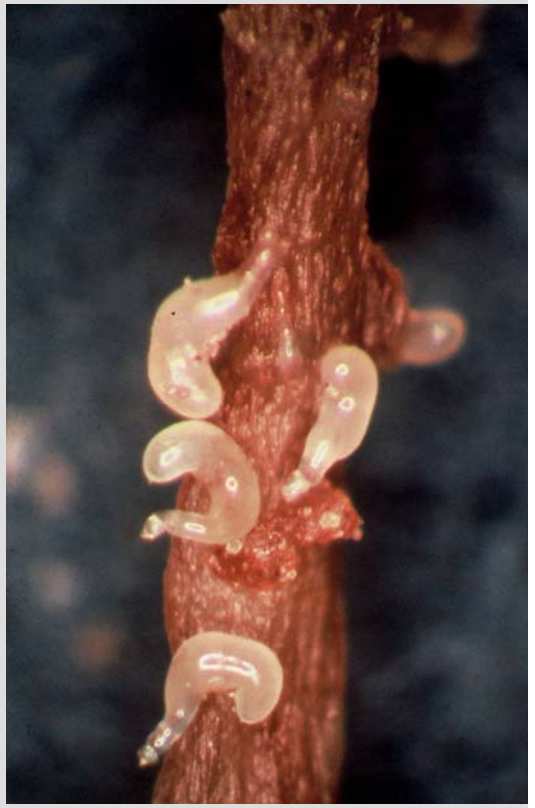




Females with eggs

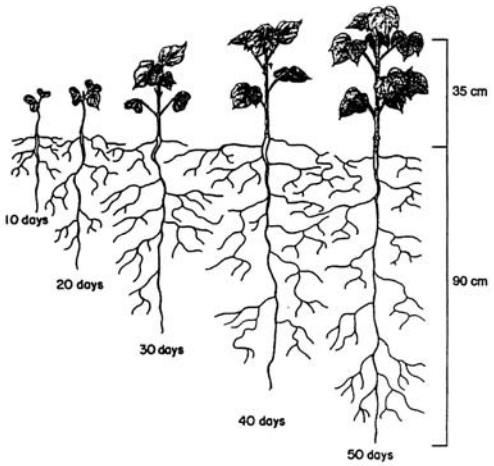


Females with eggs removed



Females removed and laid on top of the root

Reniform nematode



Alabama

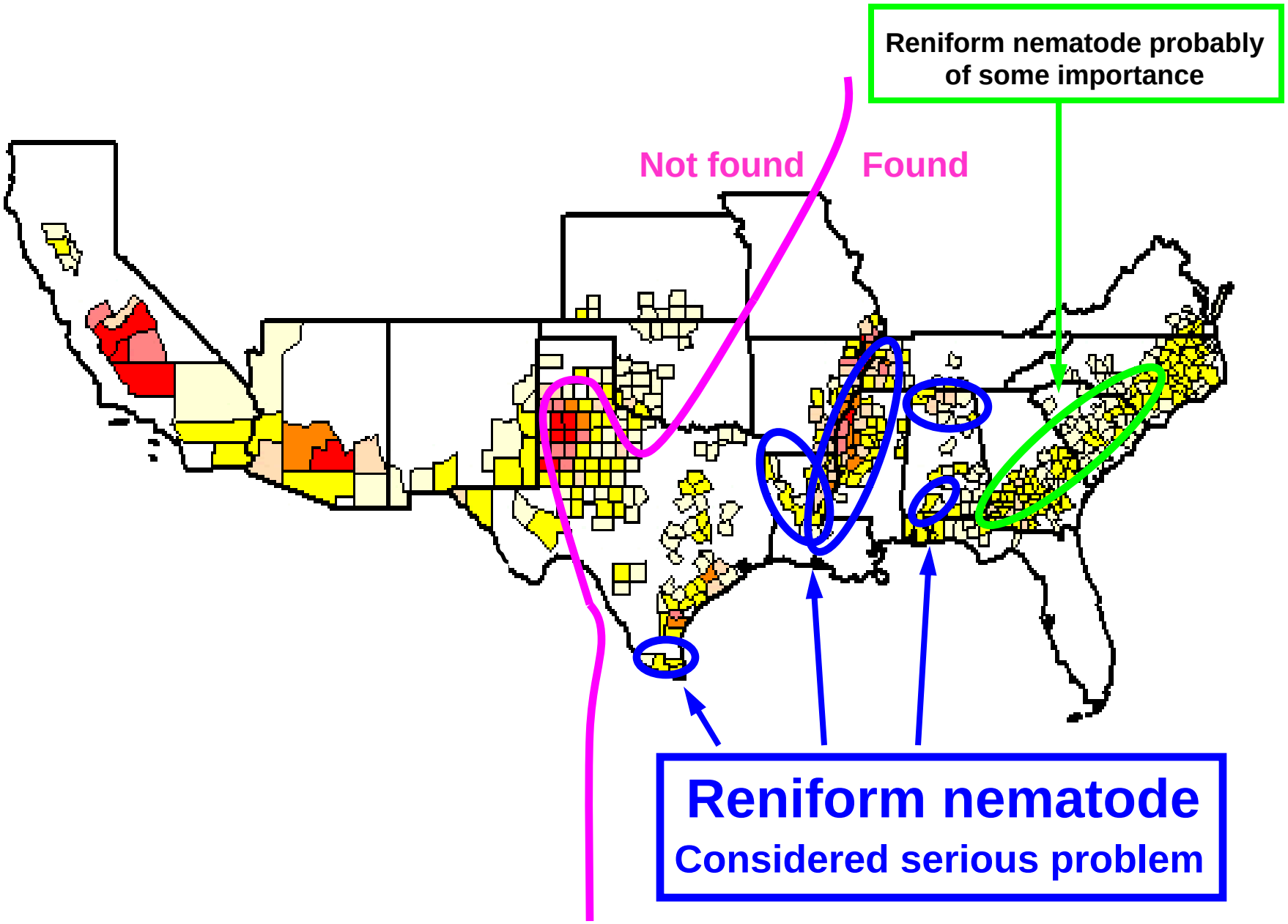
Louisiana

Texas

Fumigation responses

Percentage of area considered infested with *Rotylenchulus reniformis* in each state

Alabama	(12,000 ha)
Georgia	29.6
Louisiana	55.0
Mississippi	32.4
Texas	2.7

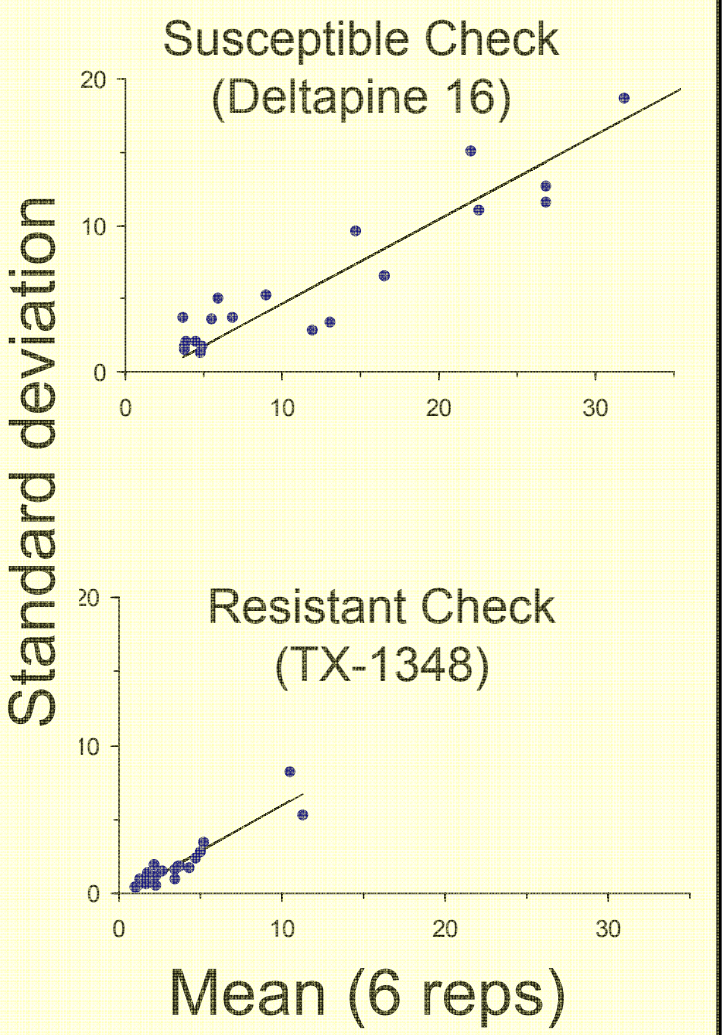

Reniform nematode probably of some importance
Not found
Found
Reniform nematode
Considered serious problem
Cotton Production 2002

Status – Renifom Nematode Resistance in Cotton

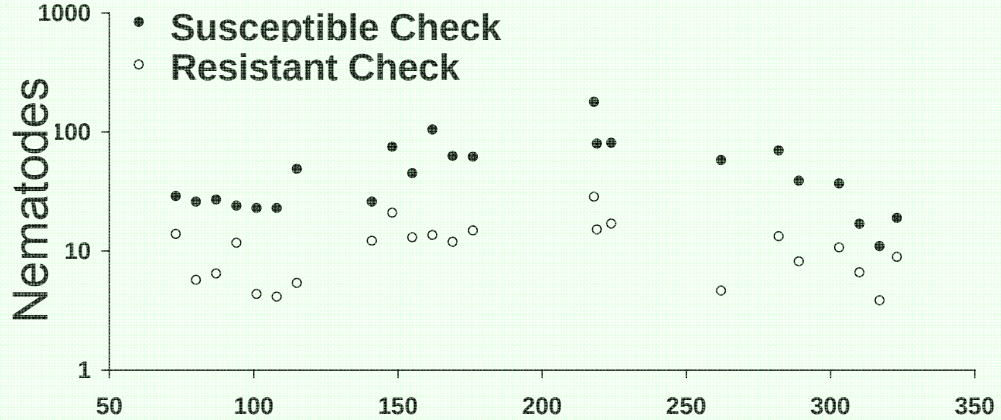
Resistance category		Notes
Susceptible		
	Contemporary cultivars	Probably all
	Obsolete cultivars	Probably all (5)
Tolerant		
	11 breeding lines	(3, 4)
Resistant		
	3 *G. hirsutum* accessions	Disconfirmed (1, 6)
	G. barbadense TX-110, TX-1347, TX-1348	Confirmed (6, 7)
	G. arboreum	Confirmed (1, 2, 5, 6)
	G. herbaceum	Confirmed but weak (1, 6)
	G. anomalum, raimondii, somalense, stocksii, thurberi (1)	
Immune	*G. longicalyx*	(1, 5, 8)

Investigators: 1 Yik and Birchfied; 2 Carter; 3 Jones; 4 Cook et al.; 5 Stewart; 6 Robinson et al.; 7 Starr & Smith; 8 Bell & Robinson

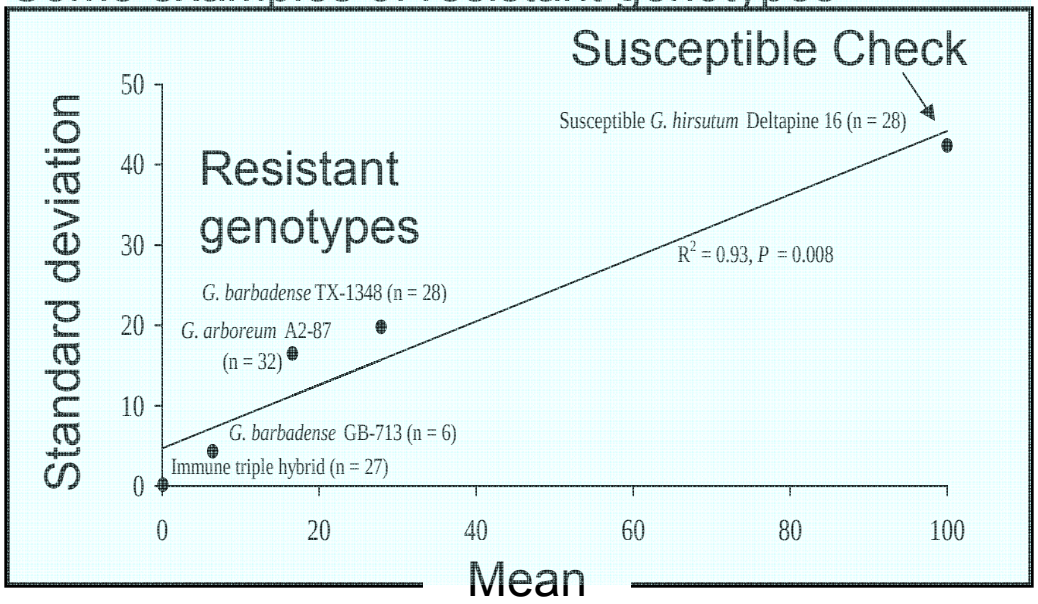
Poisson distribution

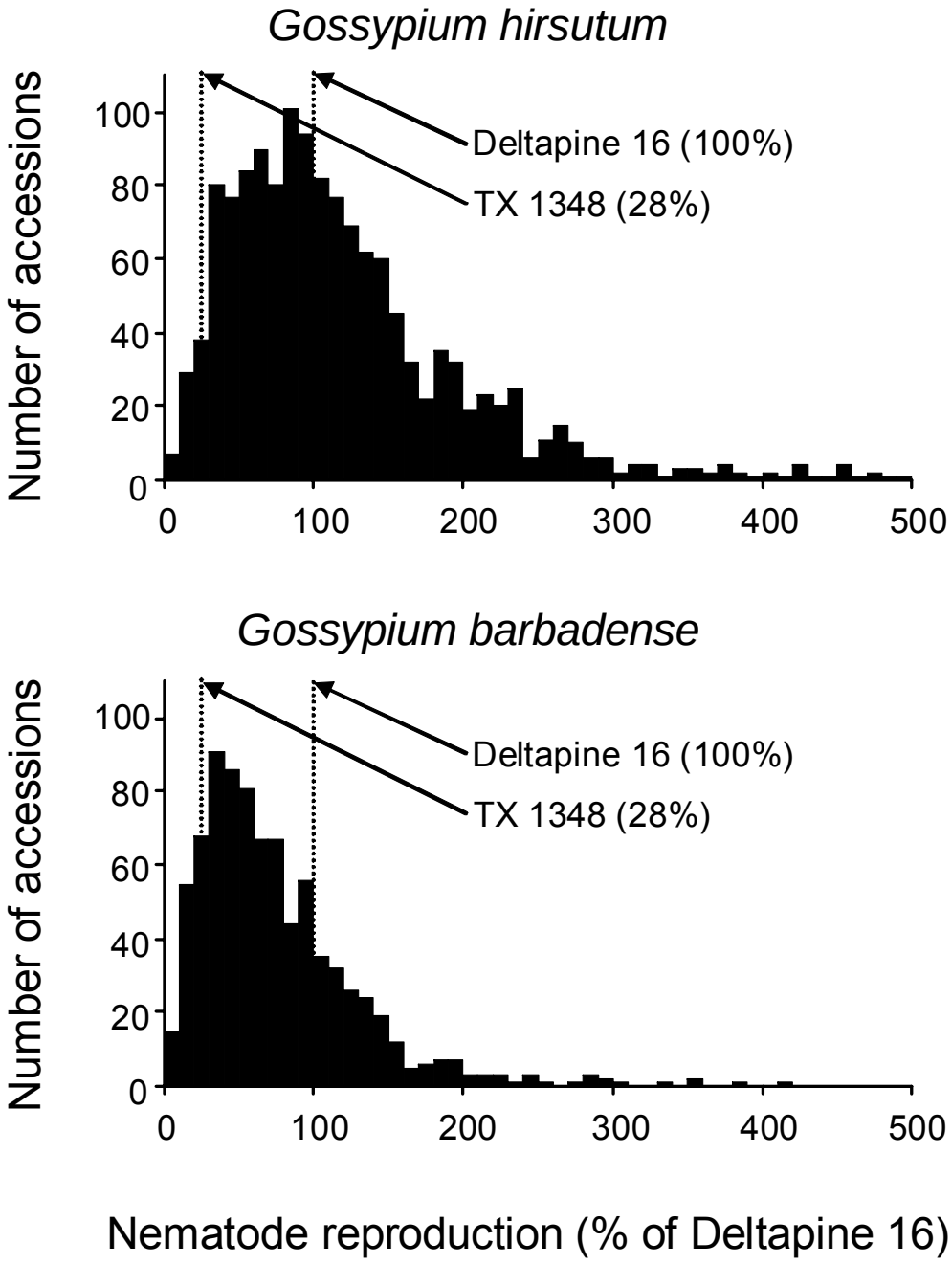


Experimental controls: greenhouse seasonal effects (23 experiments; 3 years)



Some examples of resistant genotypes




Gossypium hirsutum
Number of accessions
100
80
60
40
20
0
0
100
200
300
400
500
Deltapine 16 (100%)
TX 1348 (28%)
Gossypium barbadense
Number of accessions
100
80
60
40
20
0
0
100
200
300
400
500
Deltapine 16 (100%)
TX 1348 (28%)
Nematode reproduction (% of Deltapine 16)

Classification of accessions in greenhouse

Reniform nematode reproduction

0 < TX-1348 < Deltapine 16 < ∞ OR

Species	Possibly resistant	Probably susceptible	Susceptible	Not classified
Gossypium hirsutum	66 (47 retested)	650	703	447
Gossypium barbadense	105 (31 retested)	544	201	57

Accessions retested in replicated growth chamber experiments

Resistant accessions in growth chamber experiments

Experiment 1			Experiment 2			Experiment 3			Experiment 4			
Accession	*Rr*[wx] density GH|GC (% of DP-16)	*Mi*[xy] gall rating (0-5)	Accession	*Rr*[wx] density GH|GC (% of DP-16)	*Mi*[xy] gall rating (0-5)	Accession	*Rr*[wx] density GH|GC (% of DP-16)	*Mi*[xy] gall rating (0-5)	Accession	*Rr*[wx] density GH|GC (% of DP-16)	Accession	*Rr*[wx] density GH|GC (% of DP-16)
Gossypium hirsutum												
TX-71	13|85	2.0	TX-1167	16|137	1.5	TX-25	10|30 **	0.2 **	TX-8	30|83	TX-1849	27|57
TX-79	16|39	3.7	TX-1403	1|93	3.4	TX-1414	8|48 **	2.1	TX-9	25|75	TX-1854	22|78
TX-112	8|88	2.8				TX-1828	10|28 **	0.8 **	TX-11	28|146	TX-1856	27|88
TX-390	16|175	3.1				TX-1860	10|26 **	0.5 **	TX-244	31|125	TX-1857	19|111
TX-408	23|138	3.0				TX-1960	15|63 **	3.8	TX-289	23|112	TX-1861	32|63
TX-459	11|90	1.6 *							TX-464	18|82	TX-1864	19|78
									TX-720	7|117	TX-1866	31|83
									TX-748	29|32 **	TX-1868	15|88
Gossypium barbadense									TX-768	33|143	TX-1873	19|49
GB-13	15|9 **	2.8	GB-459	6|56	1.9	GB-126	10|24 **	2.9	TX-1421	12|48	TX-1884	32|80
GB-49	12|10 **	3.3	GB-485	12|19 **	2.8	GB-127	17|30 **	4.4	TX-1536	17|57	TX-2051	32|70
GB-207	34|27 *	2.3	GB-536	8|17 **	3.3	GB-171	14|8 **	2.2	TX-1585	19|103	TX-2086	22|80
GB-208	9|37	3.3	GB-581	10|24 **	2.5	GB-212	14|26 **	2.9	TX-1586	13|33 **	TX-2161	12|117
GB-210	18|26 *	3.8	GB-681	0|65	3.4	GB-833	4|27 **	2.7	TX-1666	20|76	TX-2408	17|107
GB-211	12|41	4.1	GB-706	1|60	2.8	GB-1045	14|35 **	2.2	TX-1736	26|58	TX-2459	18|68
GB-214	9|39	2.6	GB-713	3|3 **	3.2	GB-1081	4|23 **	4.1	TX-1787	25|40 *	TX-2468	17|53
GB-262	6|13 **	3.1	TX-110[z]	6|29 *	2.8	GB-1083	14|30 **	2.8	TX-1810	32|108	TX-2469	2|34 **
GB-264	6|9 **	3.3				GB-1113	10|24 **	3.9				
TX-502[z]	12|22 *	2.5				GB-1141	7|30 **	2.5				
						GB-1143	10|30 **	3.7				
						GB-1145	14|34 **	3.4				
						GB-1147	17|28 **	3.3				
Susceptible control												
DP-16	100	3.2	DP-16	100	3.0	DP-16	100	2.8			DP-16	100
***Mi*-resistant control**												
Aub-623	—	1.1 **	Aub-623	98	0.0 **	Aub-623	—	0.7 **			None	—
***Rr*-resistant controls**												
TX-1348	13 **	—	TX-1348	20 **	3.5	TX-1348	13 **	—			TX-1348	27 **
											GB-713	3 **

G. hirsutum ***G. barbadense*** **Controls**

Reniform nematode resistant

Root-knot nematode resistant

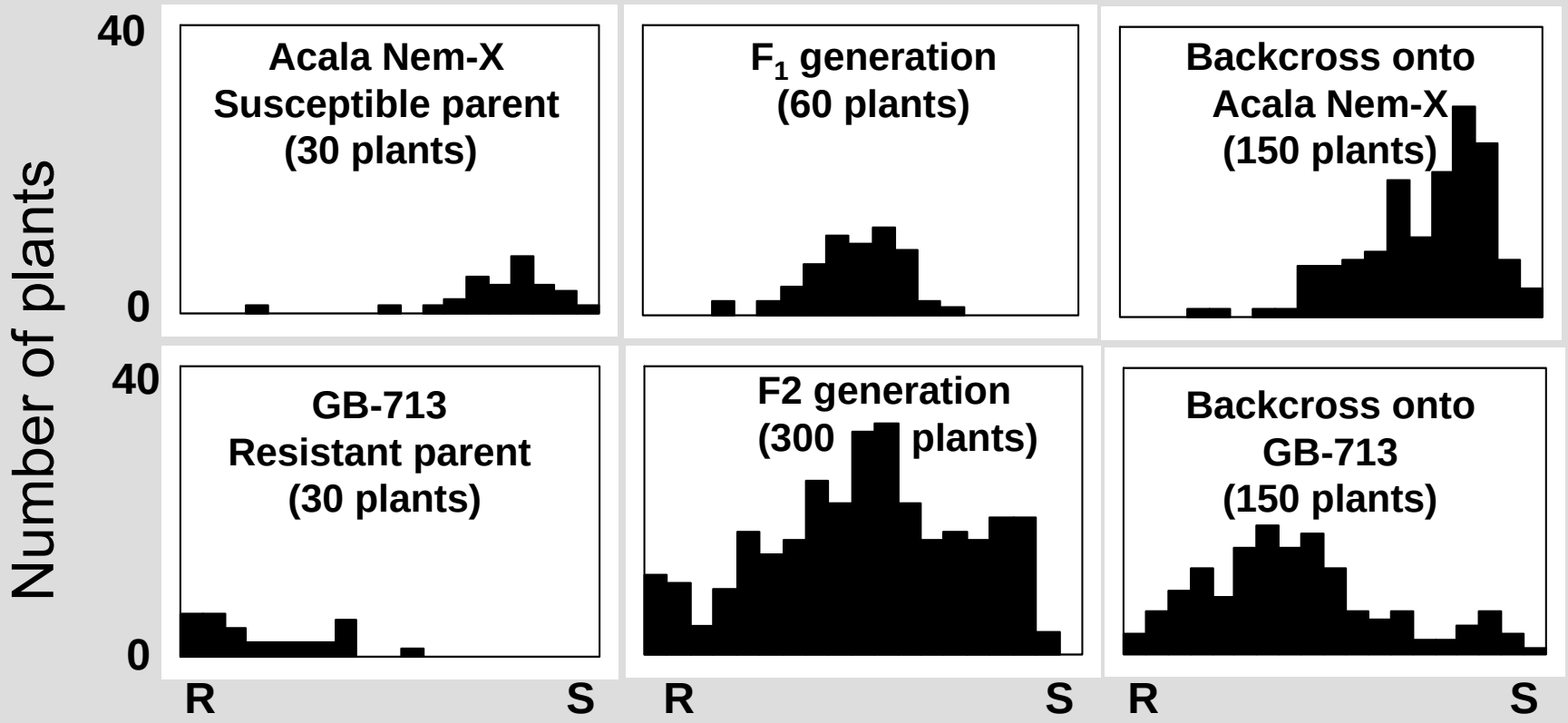
Reniform nematode-resistant accessions

(Accessions listed in increasing order of resistance)

	G. hirsutum	*G. barbadense*
Moderately resistant **(< 34% Deltapine 16)**	**TX-2469** **TX-1586** **TX-748** **TX-25** (+root-knot) **TX-1828** (+root-knot) **TX-1860** (+root-knot)	**GB-127 GB-1083 GB-1141** **GB-1143 TX-110 GB-1147** **GB-207 GB-833 GB-210** **GB-212 GB-126 GB-581** **GB-1113 GB-1081 TX-502** **GB-485 GB-536 GB-262** **(TX-1348 confirmed)**
Resistant **(<10% Deltapine 16)**	**None**	**GB-49 GB-13** **GB-274 GB-171** **GB-713 (3%)**

Crosses made with or among red accessions.

Inheritance of Reniform Nematode Resistance from GB-713 (720 plants in study)



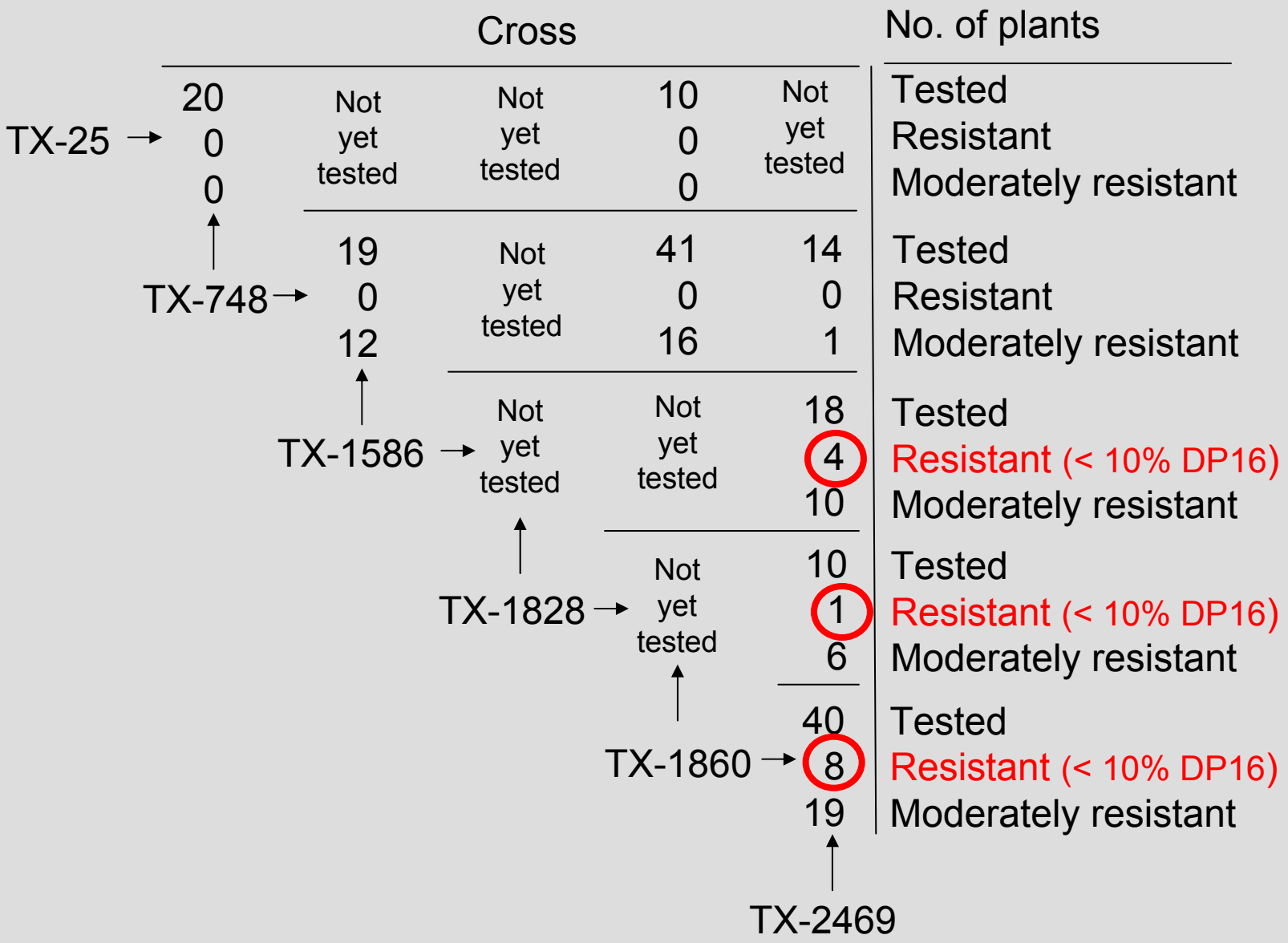
Logarithm of nematodes per gram of soil

(**R** = resistant; **S** = susceptible; scales identical)

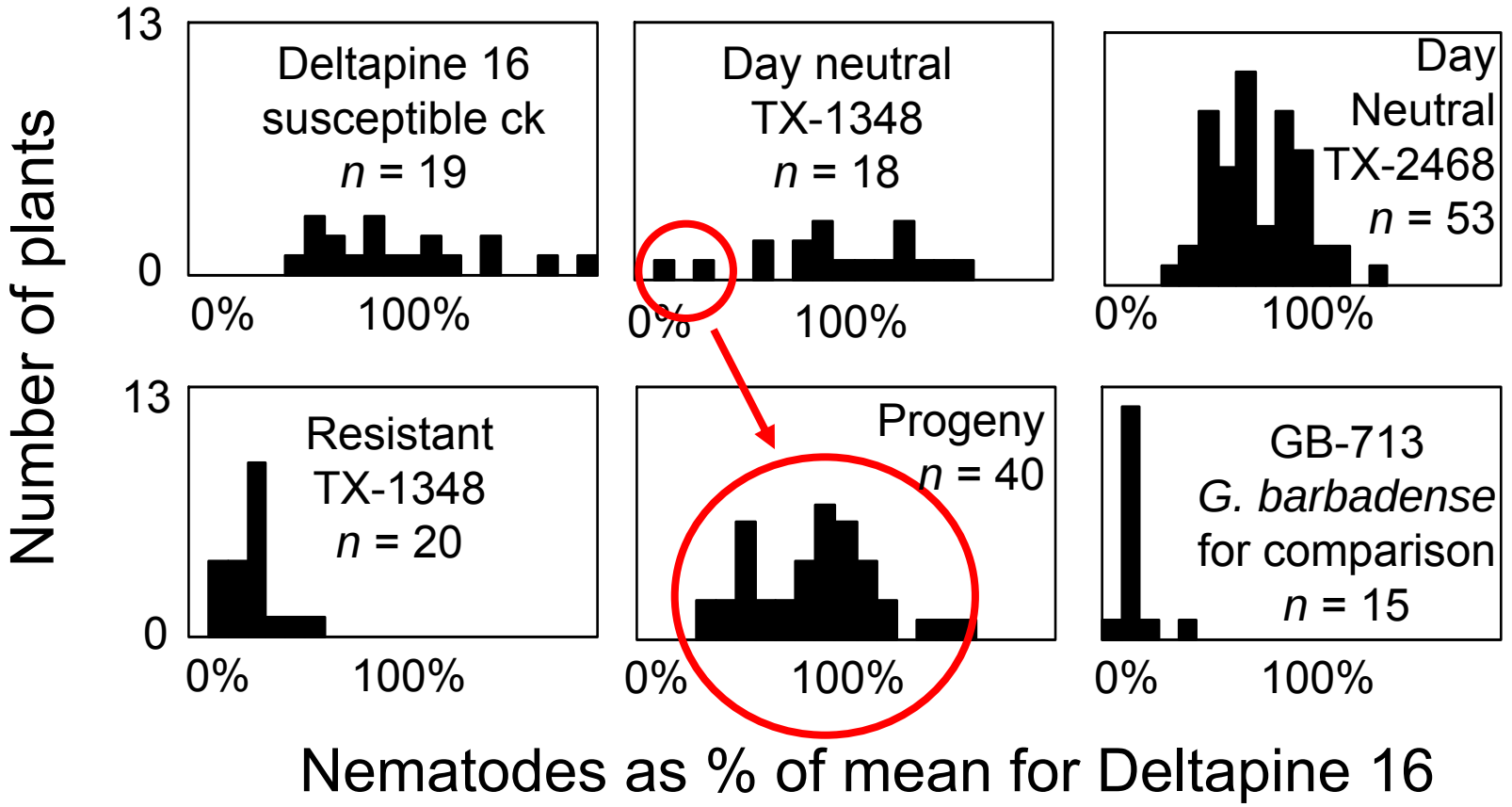
F2 progeny from crosses between resistant accessions of *G. hirsutum*

Susceptible control

F_2 generation from half diallel among moderately resistant *G. hirsutum*



Evaluations of day neutral converted lines of reniform nematode resistant accessions



Alan Bridges
Ed Percival
Osman Gutierrez
Johnie Jenkins
Jack McCarty
Macon LaFoe
Clarence Watson
Forest Robinson