Reniform Resistance from Texas Day Neutral Lines

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Cultural and Genetic Methods to Manage Reniform Nematode in Cotton

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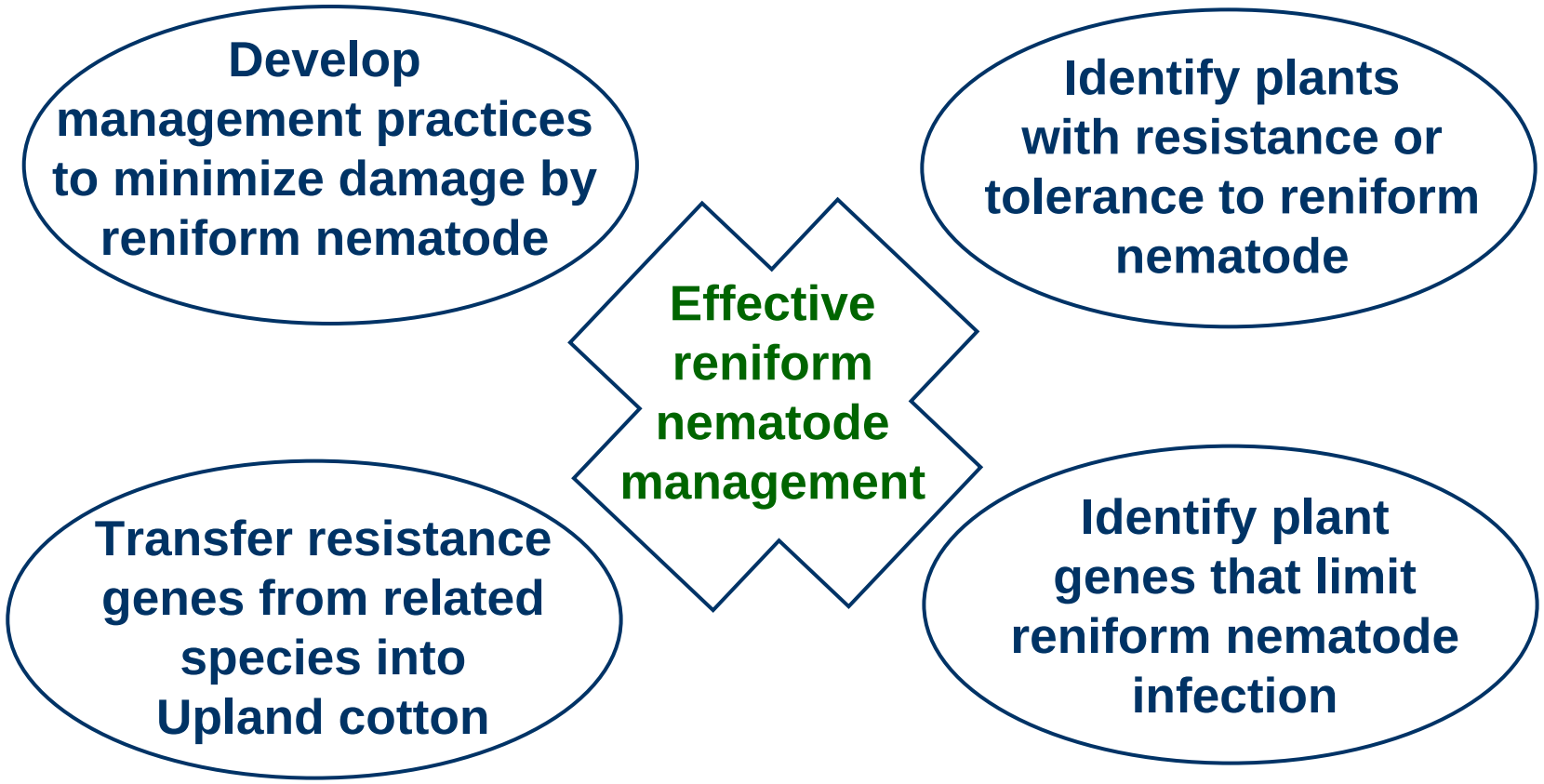
Research Objectives



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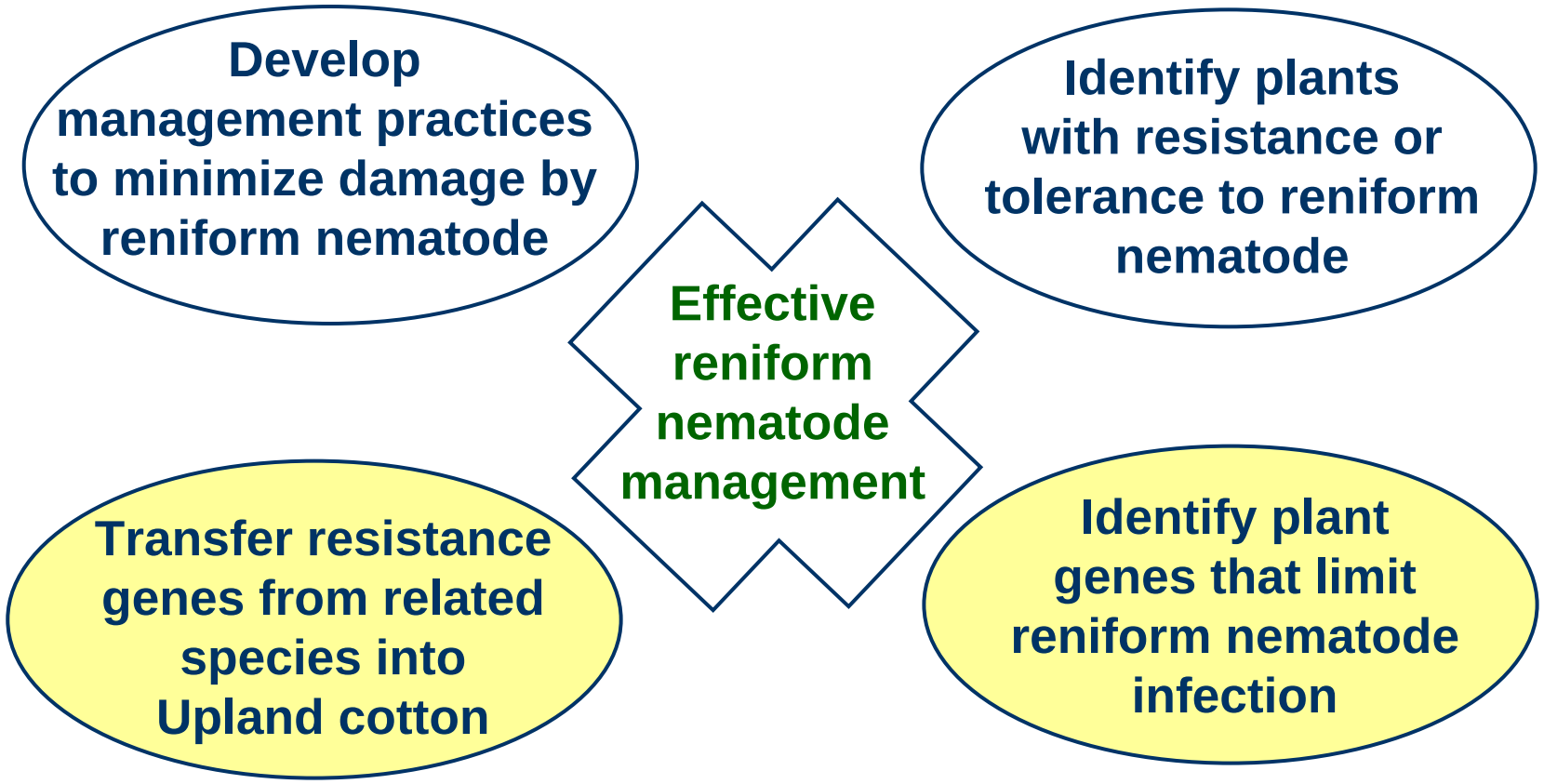
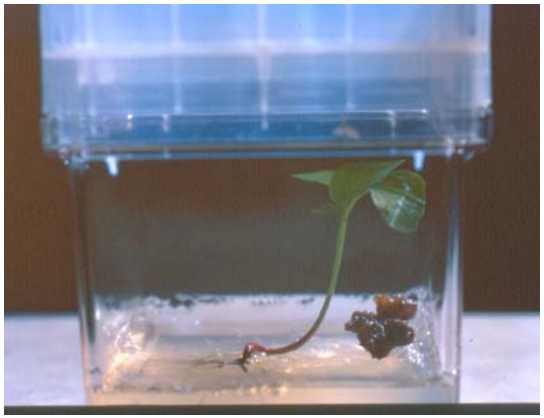


Resistance from Related Species and Gene Identification

- Transfer resistance from *Gossypium herbaceum* and *G. arboreum* into *G. hirsutum*
- Identify polymorphisms between *G. hirsutum* and diploid species
- Determine inheritance of resistance
- Identify plant genes that have altered regulation in resistant genotypes



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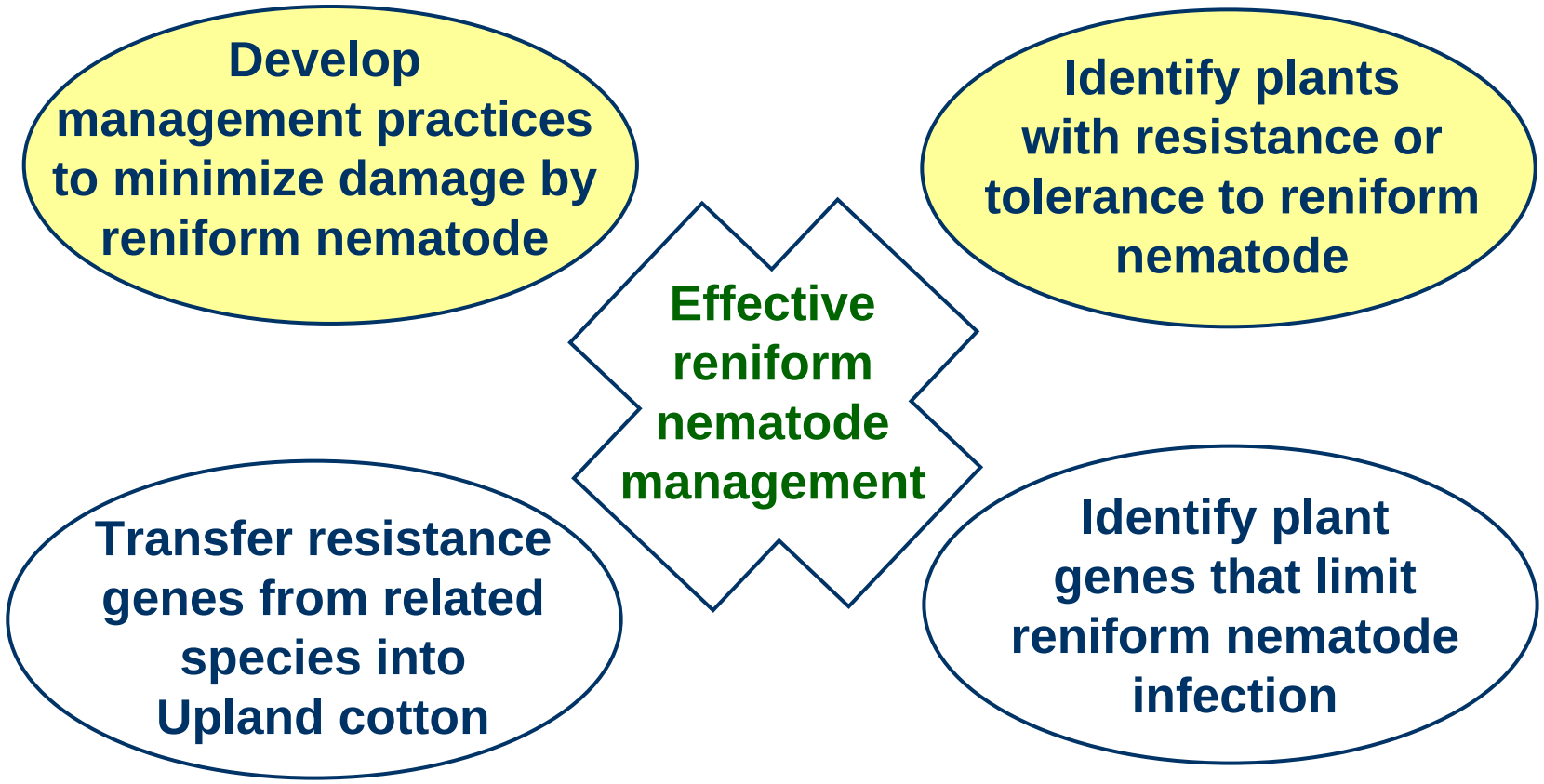

Identify Resistance or Tolerance

- Improve or develop screening techniques (greenhouse, lab, field)
- Evaluate commercial cultivars for tolerance to reniform nematode
- Assess ability of nematode populations to overcome resistance
- Resistance from day-neutral Texas race stocks

Resistance from Texas Day Neutral Lines

PARENT GENOTYPES

PRIMITIVE MATERIALS

Gossypium hirsutum

T19
T19-12
T19-13
T19-27
T19-30
T1348-27
T1348-30

T1347-2
T1347-31

ADAPTED MATERIALS

Gossypium hirsutum

DES119H
DES119B
55-3

Resistance from Texas Day Neutral Lines

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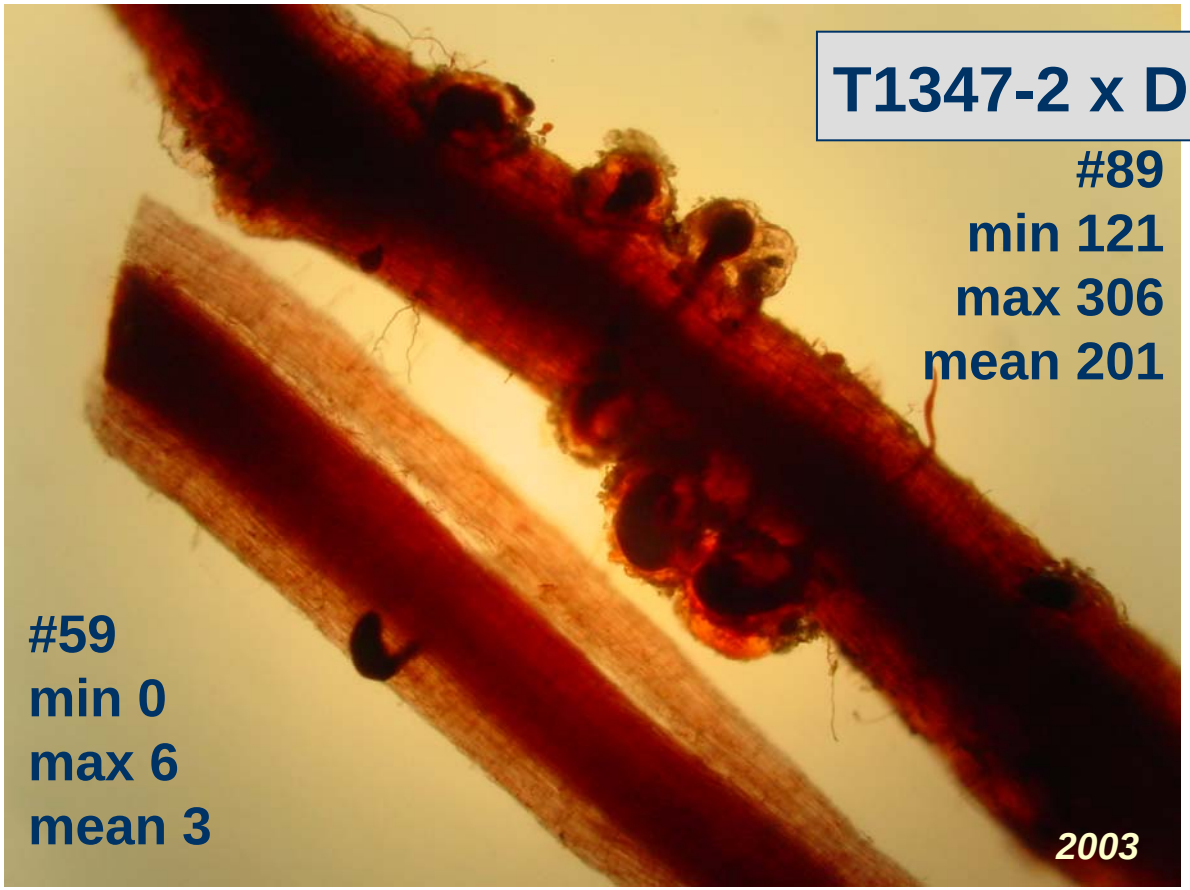

Resistance from Texas Day Neutral Lines

	CROSSES	PARENT LINES
2003: (field)	889 progeny rows ($F_{2:3}$ populations) screened	150 rows screened
	↓	↓
	117 *selections* advanced	53 *selections* advanced
	↓	↓
2004: (field)	76 selections advanced	31 selections advanced
		↓
2005: (greenhouse)		31 selections advanced

Resistance from Texas Day Neutral Lines

SELECTION CRITERIA

2003:	**30 or fewer females/root**
(field)	**on each of 5 roots**
2004:	**30 or fewer females/root**
(field)	**on at least 4 of 5 roots**
	and 100 or fewer females on all roots
	AND
	151 (6E) or 179 (6W) females/g root
	on at least 4 of 5 roots examined
2005:	**mean females/g root is 33% or less**
(greenhouse)	**of susceptible control on 4 roots**

Resistance from Texas Day Neutral Lines

	CROSSES	PARENT LINES
2003: (field)	889 progeny rows ($F_{2:3}$ populations) screened	150 rows screened
	↓	↓
	117 selections advanced	53 selections advanced
	↓	↓
2004: (field)	76 selections advanced	31 selections advanced
		↓
2005: (greenhouse)		31 selections advanced

Resistance from Texas Day Neutral Lines

2003

Pedigree	females/root* min	max	mean	number of populations evaluated	selected
119H	0	438	56	-	-
55-3	1	290	79	-	-
T19-12	0	265	29	19	8
T1347-2	0	165	28	20	8
T19-12/DES119H	0	425	58	79	9
T1347-2/DES119H	0	356	55	80	12
T19-12/55-3	0	430	67	71	9
T1347-2/55-3	0	635	66	76	8
T19-12/T1347-2	0	429	63	80	6

•Statistics for all lines tested within each population
The range for all entries evaluated was 0 to 950 females/root.

Resistance from Texas Day Neutral Lines

2004

Pedigree	females/root* min	max	mean	number of populations evaluated	selected
119H	0	174	34	-	-
55-3	0	312	46	-	-
T19-12	0	450	87	8	2
T1347-2	0	500	64	8	5
T19-12/DES119H	0	520	71	9	6
T1347-2/DES119H	0	250	35	12	8
T19-12/55-3	0	1,000	68	9	6
T1347-2/55-3	0	300	27	8	8
T19-12/T1347-2	0	500	86	6	2

•Statistics for all lines tested within each population
The range for all entries evaluated was 0 to 1,000 females/root.

Resistance from Texas Day Neutral Lines

What's next?

- Stabilize resistant phenotype
- Additional crosses
- Durability of resistance