

Table 1. Outline of Presentation

- **A. List of primitive accessions and DN derivatives reported to be resistant to RKN.**
- **B. Shepherd Source of Resistance**
- **C. Relationship among genes for Resistance**
- **D. Infection process for the RKN**
- **E. MIC 3 gene involved in resistance**
- **F. Ubiquitin conjugating enzyme genes**
- **G. Results from Tallassee Nursery**

Table 1. 1979 Jenkins, Parrott, Kappleman, Shepherd

- A DN selection from accession T 78 was released as JPM-781-78-3 and it was released as resistant to RKN.

Table 2. 1979 Kappleman, Jenkins, Parrott

- Identified 8 DN versions of accessions resistant to Fusarium wilt and probably resistant to RKN.
- T- 69, 78, 80, 87,
- T- 88, 113, 116, 495

Table 3. 1979 Jenkins, McCarty, Parrott, Kappleman

- Registered 11 JPM- germplasm lines with Crop Science as resistant to Fusarium Wilt.
- DN lines from T-66, 69, 75, 84, 87, 88
- 100, 495, 113, 158, 195

Table 4. 1983 Shepherd Accession Screening

- Screened 471 accessions in greenhouse
- 18 were resistant. None as good as A634
- T- 19 22 25 26 27 28 29 44 70 75
78 122 176 177 188 247 487 495
- T-78 very high res. Previously reported by
Jenkins et al as resistant.

Table 5. 1988 Shepherd, McCarty, Jenkins, Parrott

- Registered 12 DN lines from accessions Res to RKN.
- M- 27, 28, 75, 78, 19, 22, 25,
- M- 26, 70, 188, 487, 495
- Released as M-accession No. RNR

Table 6. 1998 McCarty, Jenkins, Robinson

- Evaluated 79 DN versions of accessions, 25 resistant to RKN.
- 2, 24, 31, 45, 53, 57, 62, 63, 67, 78, 88, 96, 100, 101, 106, 117, 119, 120, 165, 197, 215, 243, 244, 247, 257
- Reported as T-Accession No. DN

Table 7. 1974 Shepherd

- Breeding Res RKN using wild G. barbadense
- Three lines S 3, S 22, S 28
- None as resistant as wild barbadense.
- Probably polygenic inheritance

Table 8. 1974 Shepherd Transgressive Seg RKN Res.

- Al Smith Crossed Cleviewilt 6-8 with Mexican Wild. Shepherd selected in this cross.
- A 623 came from this cross. More resistant than parents.
- F1 A 623 x Sus Intermediate Res.
- F2 segregated widely.
- Res incom dom Maybe multiple genes

Table 9. 1982 Shepherd Registered 3 germplasm lines

- Auburn 566 in C 201 background
- Auburn 612 in Aub 56 background
- Auburn 634 in Aub 56 background

- Source of RKN Res was Auburn 623
- These are better agronomic types

Table 10. 1989 Shepherd, Parrott, McCarty, Jenkins

- Released 9 RKN Highly Res Lines
- M 240, M 315 in DP 61
- M120 in C 201
- M155, M725 in C 310
- M92, M 249, M 272 in ST 213
- M 331 in Auburn 56

Table 11. 1996. Shepherd, McCarty, Jenkins, Parrott

- Registered with Crop Science the 9 RKN Resistant lines in Table 10. Placed seed in National Seed Storage System

Table 12. 1993. 1995. Mcpherson

Suggested Gene Relationships

- M 315 RNR 1 dominant 1 additive gene
- M 75 RNR 1 dominant 1 additive gene
- M 78 RNR 1 dominant gene
- M 19 RNR 1 additive gene
- M 315 and M 75 have same genes
- M 78 and M 188 different genes
- M 78 x M 8 segregated for the dominant gene
- M 25 and M 487 probably have same gene
- M 19 has the additive gene

1994, 1995. Creech, Jenkins, Tang, Lawrence, McCarty

- Followed development in M 315, M 78, M 8
- J2 penetrate all roots equally
- At 2-6 DAI equal No. J2 in all 3 lines
- At 40 DAI 306, 127, 7 egg mass for M8, M 78, M 315.
- At 40 DAI eggs/em 756, 486, 262 for M8, M 78, M 315.

1994 1995. Jenkins, Creech, Tang, Lawrence, McCarty

- At 6-8 DAI No. nematodes declined in M 315 and declined again at 24 DAI.
- In M 78 no reduction until 24 DAI.
- Original report CW No. declined 6-8 DAI.
- Evidence of 2 major genes in M 315 with recessive gene from CW & Dom from W Mex.
- 6 DAI gall index same all 3 lines.
- Beginning 10 DAI gall index < M 315.
- 40 DAI GI 5.0, 2.5, 1.0
- 40 DAI Gall size 1.6 mm, 1.0 mm, 0.4 mm

1997. Callahan, Creech, Jenkins, Lawrence

- At 6-8 DAI nematode development arrested in M 315 galls.
- 14 kDa polypeptide present in galls of resistant inoculated.
- Novel RKN induced plant gene temporally correlated with resistant response.

2002. Zhang, Callahan, Jenkins, Ma, Karaca, Saha, Creech

- Full length cDNA called MIC 3 identified from roots of M 315 after infection with RKN.
- Encodes for a 15.3 kDa protein with 141 amino acids.
- Belongs to novel, multigene family with up to 6 members.
- Likely involved in resistance

2003. Zhang, Jenkins, Callahan,
Creech, Si, McCarty, Saha, Ma

- Cloned a family of class 1 ubiquitin conjugating enzyme genes.
- GhUBC 1 and 2 in A and D genome respectively.
- 3 additional UBC genes in A & D diploids
- 1 & 2 can complement Yeast UBC 4 & 5 in double mutant of yeast.
- Involved with degradation of short lived proteins.

1988 Cultivars

- Our Exp. Lines eggs ranged 1195 to 3946 eggs.
- Cultivars eggs ranged 24,495 to 163, 942
- La 887 24,425 ST 825 76,358 eggs

1993.Cultivars.

- M 315 2,500 eggs
- Cultivars ranged 111,000 to 242,000 eggs
- LA 887 lowest, Terra C40 highest
- Cultivars don't have all the Resistance genes available.

2000 Cultivars Tallassee, AL

% Wilting

• ST 474	50	AP 7126	42
• SG 747	42	SG 821	30
• DP 655 BR	26	DP 675	19
• NuC 33B	33	PM 1218BR	48
• Rowden	42	M 315	7

2001 Cultivars Tallasse, AL

% Wilting

• FM 966	30	PSC 355	16
• St 4892 BR	33	DP 565	6
• DP 422BR	11	DP 655BR	8
• SG 215BR	11	PM 1199RR	15
• Rowden	78	M 315	13

Our Breeding Lines for RKN RES

3 yr (99, 00, 01) Mean Lint lbs/A

- 993 1013 969 1025 1071
- 941 1063 924 1008 1070
- 1047 1078 944 948 881
- 1007 1006 962 983 828
- 881 933 984 846 872
- 882 881 1043 1040
- ST 474 1008 SG 501 901
- SG 747 977 SG 747 928