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.


- 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>
<thead>
<tr>
<th>Table 8. 1974 Shepherd Transgressive Seg RKN Res.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Al Smith Crossed Clewewilt 6-8 with Mexican Wild. Shepherd selected in this cross.</td>
</tr>
<tr>
<td>• A 623 came from this cross. More resistant than parents.</td>
</tr>
<tr>
<td>• F1 A 623 x Sus Intermediate Res.</td>
</tr>
<tr>
<td>• F2 segregated widely.</td>
</tr>
<tr>
<td>• Res incom dom Maybe multiple genes</td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>Line Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Released 9 RKN Highly Res Lines</td>
<td></td>
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<tr>
<td>M 240, M 315</td>
<td>in DP 61</td>
</tr>
<tr>
<td>M120</td>
<td>in C 201</td>
</tr>
<tr>
<td>M155, M725</td>
<td>in C 310</td>
</tr>
<tr>
<td>M92, M 249, M 272</td>
<td>in ST 213</td>
</tr>
<tr>
<td>M 331</td>
<td>in Auburn 56</td>
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</table>
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

- 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

- 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.

- 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 degredation 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

- 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

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>%</th>
<th>Cultivar</th>
<th>%</th>
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<tbody>
<tr>
<td>ST 474</td>
<td>50</td>
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<td>42</td>
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<tr>
<td>SG 747</td>
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<td>SG 821</td>
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<tr>
<td>DP 655 BR</td>
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<tr>
<td>NuC 33B</td>
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<td>PM 1218BR</td>
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<tr>
<td>Rowden</td>
<td>42</td>
<td>M 315</td>
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### 2001 Cultivars Tallassee, AL

**% Wilting**

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<td>St 4892 BR</td>
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<tr>
<td>Rowden</td>
<td>78</td>
<td>M 315</td>
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Our Breeding Lines for RKN RES 3 yr (99, 00, 01)  Mean Lint lbs/A

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<thead>
<tr>
<th>Line</th>
<th>Lint 1</th>
<th>Lint 2</th>
<th>Lint 3</th>
<th>Lint 4</th>
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<tr>
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<td>1007</td>
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<td>ST 474</td>
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<td>SG 747</td>
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