

Chromosome 3, 66 cM

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BACKGROUND: : Dr. Y. Ji, University of Florida, indicated that there was an introgression associated with Ty4 gene on chromosome 3 near 76-85 cM. Originally, Ty4 was thought to be on chromosome 6 between 40-80 cM. Our UW-team scanned this region at 5-cM intervals and did not find any evidence for an introgression in Gc171, which gives the SCAR marker for Ty4. With this new information and the information from Dr. Ji, our group starting scanning chr. 3 from 66 - 85 cM to check for an introgression. Begomovirus resistant inbred used was G70, which was a selection from Gc171 by a susceptible hybrid. The susceptible germplasm was HUI-VF (lab code, W168, an inbred from Hebrew University of Jerusalem, F. Vidavski and H. Czosnek) and M82.

Primers

P3-66 F: GCTGAAGTAGTACATATGGAGC

P3-66 R: CATTTCCTGAACTCCCTAGG

Annealing temperature: 53 C.

Partial Sequence of G70 (Resistant Inbred, Ty4 introgression originated with Gc171), p3-66

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1      TGCTGAAGTA GTACATATGG AGCCTGAGAA GGCAGAGTGG TAAGGAGTTG AAACCTTGAAA
61     GTTTTAATTT GCAGTCTTCA ACTGTGCTTT TATAAAAGCT TACTGCTTGT GTAGCTTTTTG
121    TTTAATATGT CCTGAAAGTC AAAATCACTT ACCTTGGTTA ATAAAAAGAG GTCAGAATCA
181    ATTAGATTTT CAAGGTTTAA AAGCTCGTCG GATAATGGGC TTGCCCTCTA TCTTCTTCA
241    CTAAGATAAC AAGCTTCCTT CTCATCAGCT AGTAAAACCA AATTCGTGAC GTGTATTTAT
301    ACATAAACCT CTCTTCTCTC CATTCTTGG GCTTATATGA TTGAACAAAT TTCAAATCAC
361    TAATGAAGAT CAAGCTCTTT CGTTTATTTT TAACCGGATT TTTCATCTTC TGGCATGTGG
421    TTTTCTATCC TCTTCTCTGA ATTGGAATTT TATATTCTT ATTATGTCCC TTATCCAAAA
481    ATTTAAGTTA TAGTGTAAGT TTGTAATGTT AAAATGACGT AAGCCTCTTA TTCAGGTCAC
541    AGCTTTATGC TTTCAACTAA GGAGTTTCTT AAAGCTTTTT AAGAATTTTA GAGCTACAAT
601    TTGCTATTGT GTTGCTTTTA TCAACTATAT CATTATCTCC AGGGGATTTA AAGCTTTAAA
661    GCAAACGTGT AAGCTTTACT ATAACCTAGG GAAGTTC AAG GAAAGGA
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Partial Sequence of M82 (Susceptible), p3-66

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1      TTGCTTAAGT TGTACATATG GAGCCTGAGA AGGCAGAGTG GTAAGGAGTT GAAACTTGAA
61     AGTTTTAATT TGCAGTCTTC AACTGTGCTT TTATAAAAGC TTACTGCTTG TGTAGCTTTT
121    GTTTAATATG TCCTGAAAGT CAAAATCACT TACCTTGGTT AATAAAAAGA GGTCAGAATC
181    AATTAGATTT TCAAGGTTTA AAAGCTCGTC GGATAATGGG CTTGCCCTCT ATCTTCTTCTC
241    ACTAAGATAA CAAGCTTCCT TCTCATCAGC TAGTAAAACC AAATTCGTGA CGTGTATTTA
301    TACATAAACC TCTCTTCTC TCATTTCTTG GGCTTATATG ATTGAACAAA TTTCAAATCA
361    CTAATGAAGA TCAAGCTCTT TCGTTTATTT TTAACCGGAT TTTCATCTT CTGGCATGTG
421    GTTTTCTATC CTCTTCTCTG AATTGGAATT TTATATTCT TATTATGTCC CTTATCCAAA
481    AATTTAAGTT ATAGTGAAG TTTGTTATGT TAAAATGACG TAAGCCTCTT ATTCAGGTCA
541    CAGCTTTATG CTTTCAACTA AGGAGTTTCC TAAAGCTTTT TAAGAATTTT AGAGNTACAA
601    TTGGCTATGG GGTGGCTTTN ATCAACTATA TCATTATCTC CAGGGGATTT AAAGCTTTAA
661    AGGAAACGGT TAAGCTTTAC TATAACCTAG GGAAGTTC AAG GAAAGGA
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Partial Sequence of W168 (HUI-VF, Susceptible), p3-66

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1      TGCTGAAGTA GTACATATGG AGCCTGAGAA GGCAGAGTGG TAAGGAGTTG AAACCTTGAAA
61     GTTTTAATTT GCAGTCTTCA ACTGTGCTTT TATAAAAGCT TACTGCTTGT GTAGCTTTTG
121    TTTAATATGT CCTGAAAGTC AAAATCACTT ACCTTGGTTA ATAAAAAGAG GTCAGAATCA
181    ATTAGATTTT CAAGGTTTAA AAGCTCGTCG GATAATGGGC TTGCCCTCTA TCTTCTTCA
241    CTAAGATAAC AAGCTTCTT CTCATCAGCT AGTAAAACCA AATTCGTGAC GTGTATTTAT
301    ACATAAACCT CTCTTCTCT CATTTCTTGG GCTTATATGA TTGAACAAAT TTCAAATCAC
361    TAATGAAGAT CAAGCTCTTT CGTTTATTTT TAACCGGATT TTTCATCTTC TGGCATGTGG
421    TTTTCTATCC TCTTCTCTGA ATTGGAATTT TATATTTCTT ATTATGTCCC TTATCCAAAA
481    ATTTAAGTTA TAGTGTAAGT TTGTAATGTT AAAATGACGT AAGCCTCTTA TTCAGGTCAC
541    AGCTTTATGC TTTCAACTAA GGAGTTTCTT AAAGCTTTTT AAGAATTTTA GAGCTACAAT
601    TTGCTATTGT GTGTCTTTTA TCAACTATAT CATTATCTCC AGGGGATTAA AAGCTTTAAA
661    GCAAACCTTT AAGCTTTACT ATAACCTAGG GAAGTTCAAG GAAAGGA

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Comparison of M82 (S, upper line) with G70 (R, lower line)

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1      TGCTGAAGTAGTACATATGGAGCCTGAGAAGGCAGAGTGGTAAGGAGTTGAAAACCTTGAA
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1      TGCTGAAGTAGTACATATGGAGCCTGAGAAGGCAGAGTGGTAAGGAGTTGAAAACCTTGAA

61     AGTTTTAATTTGCAGTCTTCAACTGTGCTTTTATAAAAGCTTACTGCTTGTGTAGCTTTT
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60     AGTTTTAATTTGCAGTCTTCAACTGTGCTTTTATAAAAGCTTACTGCTTGTGTAGCTTTT

121    GTTTAATATGTCCTGAAAGTCAAAATCACTTACCTTGGTTAATAAAAAGAGGTCAGAATC
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120    GTTTAATATGTCCTGAAAGTCAAAATCACTTACCTTGGTTAATAAAAAGAGGTCAGAATC

181    AATTAGATTTTCAAGGTTTAAAAGCTCGTCGGATAATGGGCTTGCCCTCTATCTTCTTC
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180    AATTAGATTTTCAAGGTTTAAAAGCTCGTCGGATAATGGGCTTGCCCTCTATCTTCTTC

241    ACTAAGATAACAAGCTTCTTCTCATCAGCTAGTAAAACCAAATTCGTGACGTGTATTTA
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240    ACTAAGATAACAAGCTTCTTCTCATCAGCTAGTAAAACCAAATTCGTGACGTGTATTTA

301    TACATAAACCTCTCTTTCTCTCATTTCTTGGGCTTATATGATTGAACAAATTTCAAATCA
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|
300    TACATAAACCTCTCTTTCTCTCATTTCTTGGGCTTATATGATTGAACAAATTTCAAATCA

361    CTAATGAAGATCAAGCTCTTTCGTTTATTTTAAACCGGATTTTTCATCTTCTGGCATGTG
|
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|
360    CTAATGAAGATCAAGCTCTTTCGTTTATTTTAAACCGGATTTTTCATCTTCTGGCATGTG

421    GTTTTCTATCCTCTTCTCTGAATTGGAATTTTATATTTCTTATTATGTCCCTTATCCAAA
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420    GTTTTCTATCCTCTTCTCTGAATTGGAATTTTATATTTCTTATTATGTCCCTTATCCAAA

481    AATTTAAGTTATAGTGTAAGTTTGTATGTTAAAATGACGTAAGCCTCTTATTCAGGTCA
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|
480    AATTTAAGTTATAGTGTAAGTTTGTATGTTAAAATGACGTAAGCCTCTTATTCAGGTCA

541    CAGCTTTATGCTTTCAACTAAGGAGTTTCTAAAGCTTTTAAAGAATTTTAGAGCTACAA
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|
540    CAGCTTTATGCTTTCAACTAAGGAGTTTCTAAAGCTTTTAAAGAATTTTAGAGCTACAA

601    TTTGCTATTGTGTTGCTTTTATCAACTATATCATTATCTCCAGGGGATTTAAAGCTTTAA
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600    TTTGCTATTGTGTTGCTTTTATCAACTATATCATTATCTCCAGGGGATTTAAAGCTTTAA

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661 AGCAAACGTTAAGCTTTACTATAACCTAGGGAAGTTCAAGGAAAGGA
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660 AGCAAACGTTAAGCTTTACTATAACCTAGGGAAGTTCAAGGAAAGGA

Comparison of G70 (R, upper line) with W168 (HUI-VF, S, lower line)

TGCTGAAGTAGTACATATGGAGCCTGAGAAGGCAGAGTGGTAAGGAGTTGAAACTTGAAA
|||||
1 TGCTGAAGTAGTACATATGGAGCCTGAGAAGGCAGAGTGGTAAGGAGTTGAAACTTGAAA

61 GTTTTAATTGTCAGTCTTCAACTGTGCTTTTATAAAAAGCTTACTGCTTGTGTAGCTTTTG
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61 GTTTTAATTGTCAGTCTTCAACTGTGCTTTTATAAAAAGCTTACTGCTTGTGTAGCTTTTG

121 TTTAATATGTCCTGAAAGTCAAATCACTTACCTTGGTTAATAAAAAGAGGTGAGAATCA
|||||
121 TTTAATATGTCCTGAAAGTCAAATCACTTACCTTGGTTAATAAAAAGAGGTGAGAATCA

181 ATTAGATTTTCAAGGTTTAAAAGCTCGTCGGATAATGGGCTTGCCCTCTATCTTTCTTCA
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181 ATTAGATTTTCAAGGTTTAAAAGCTCGTCGGATAATGGGCTTGCCCTCTATCTTTCTTCA

241 CTAAGATAACAAGCTTCCTTCTCATCAGCTAGTAAAACCAAATTCGTGACGTGTATTTAT
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241 CTAAGATAACAAGCTTCCTTCTCATCAGCTAGTAAAACCAAATTCGTGACGTGTATTTAT

301 ACATAAACCTCTCTTTCTCTCATTTCTTGGGCTTATATGATTGAACAAATTTCAAATCAC
|||||
301 ACATAAACCTCTCTTTCTCTCATTTCTTGGGCTTATATGATTGAACAAATTTCAAATCAC

361 TAATGAAGATCAAGCTCTTTCGTTTATTTTAAACCGGATTTTTCATCTTCTGGCATGTGG
|||||
361 TAATGAAGATCAAGCTCTTTCGTTTATTTTAAACCGGATTTTTCATCTTCTGGCATGTGG

421 TTTTCTATCCTCTTCTCTGAATTGGAATTTTATATTTCTTATTATGTCCCTTATCCAAAA
|||||
421 TTTTCTATCCTCTTCTCTGAATTGGAATTTTATATTTCTTATTATGTCCCTTATCCAAAA

481 ATTTAAGTTATAGTGTAAGTTTGTAAATGTTAAAATGACGTAAGCCTCTTATTAGGTCAC
|||||
481 ATTTAAGTTATAGTGTAAGTTTGTAAATGTTAAAATGACGTAAGCCTCTTATTAGGTCAC

541 AGCTTTATGCTTTCAACTAAGGAGTTTCTAAAGCTTTTTAAGAATTTTAGAGCTACAAT
|||||
541 AGCTTTATGCTTTCAACTAAGGAGTTTCTAAAGCTTTTTAAGAATTTTAGAGCTACAAT

601 TTGCTATTGTGTTGCTTTTATCAACTATATCATTATCTCCAGGGGATTTAAAGCTTTAAA
|||||
601 TTGCTATTGTGTTGCTTTTATCAACTATATCATTATCTCCAGGGGATTTAAAGCTTTAAA

661 GCAAACGTTAAGCTTTACTATAACCTAGGGAAGTTCAAGGAAAGGA
|||||
661 GCAAACGTTAAGCTTTACTATAACCTAGGGAAGTTCAAGGAAAGGA

Blast Search

Matched with 92% to [gb|AC212430.2](#) Solanum lycopersicum chromosome 11 clone C11HBa0029C01, complete sequence Length=121824.

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Query 641      AGGGGATTAAAGCTTTAAAGCAAAGCTGTTAAGCTTTACTATAACCTAGGGAAGTTCAG 700
          |||
Sbjct 105785   AGGGGATTAAAGCCTTAAAGCAAAGCTGTTAAGCTTTACTATAAGCTAGGGAAGTACAAG 105726

Query 701      GAAAGGA 707
          |||
Sbjct 105725   GGAATGA 105719

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Also matched on SOL website:

>[SGN-M1714](#) T1029 [cos_markers]

Length = 474

Score = 123 bits (55), Expect = 5e-29
Identities = 58/59 (98%), Frame = +1 / +1

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Query: 35  ggggatttaaagccttaaagcaaactgttaagctttactataagctaggggaagtacaag 93
          |||
Sbjct: 253 ggggatttaaagcctgaaagcaaactgttaagctttactataagctaggggaagtacaag 311

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>[SGN-M3861](#) cTOF-10-H7 [est_clones]
Length = 717

Score = 114 bits (51), Expect = 2e-26
Identities = 57/59 (96%), Frame = +1 / +1

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Query: 35  ggggatttaaagccttaaagcaaactgttaagctttactataagctaggggaagtacaag 93
          |||
Sbjct: 174 ggggatttaaagccttaaagcaaactgttaagctttactataagctaggggaagttcaag 232

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Summary

The sequence data for p3-66 was very good for G70 and HUI-FV. Sequence for M82 (susceptible) was marginal. When a comparison was done between G70 (resistant inbred) and either susceptible plant (M82 or W168), the results showed little (one SNP) to no differences. Therefore, it is concluded that there is no introgression in G70 at 66 cM.