



Tomato Variety Replicated Trials 2018

Dilip R. Panthee, Ann Piotrowski, Jianbo Zhang, Pragya Adhikari, Navin Shreshtha and Xingyue Gong
Department of Horticultural Science, North Carolina State University
Mountain Horticultural Crops Research and Extension Center, 455 Research Drive, Mills River, NC 28759



Large-fruited tomato replicated trial 2018

- It consists of standard checks (8), promising new hybrids (8), and top hybrids identified from replicated trials from last year (8).
- Main objective of the trial is to identify superior hybrid tomato with respect to yield potential, fruit quality and disease resistance, which were the major criteria for last year’s selection.
- Trial was planted in the first week of June, 2018 and are replicated three times.
- Major emphasis is given to combine late blight and *Tomato mosaic virus* resistance with other diseases.

Plum Tomato Replicated Trial 2018

- It consists of 12 hybrids including Plum Regal as a control, four hybrids were repeated from 2017 trial for their excellent performance, and only seven more new hybrids were included.
- Objective of this trial was to combine the disease resistance and improved fruit quality into the hybrid plum tomato.
- This trial was planted in the first week of June with three replications.
- Details of genotypes in the trial and important gene(s) are given in Table 2.

Table 1: Large fruited tomato replicated trial, 2018.

TRT #	Genotype	Comment	Trait
LR-01	Fletcher	Control	F1, F2, N, S, V
LR-02	Mountain Fresh Plus	Control	F1, F2, N, V
LR-03	Mountain Glory	Control	F1, F2, S, V
LR-04	Mountain Majesty	Control	crimson, F1, F2, S, V
LR-05	Mountain Merit	Control	F1, F2, F3, LB, N, S, V
LR-06	Mountain King	Control	crimson, F1, F2, S, V
LR-07	Mountain Lion	Control	crimson, F1, F2, S, V
LR-08	Red Defender	Control	F1, F2, S, V
LR-09	NC12168	Hybrid	F1, F2, F3, LB, N, S, T, V
LR-10	NC12195	Hybrid	F1, F2, S, T, V
LR-11	NC13092	Hybrid	F1, F2, S, T, V
LR-12	NC13094	Hybrid	F1, F2, S, T, V
LR-13	NC13506	Hybrid	F1, F2, F3, N, S, S, T, V
LR-14	NC14079	Hybrid	crimson, F1, F2, S, T, V
LR-15	NC14132	Hybrid	F1, F2, S, T, V
LR-16	NC15150	Hybrid	F1, F2, LB*, S, T, V
LR-17	NC15152	Hybrid	F1, F2, LB*, S, T, V
LR-18	NC15156	Hybrid	F1, F2, LB*, S, T, V
LR-19	NC15161	Hybrid	F1, F2, Mi, S, T, V
LR-20	NC17174	Hybrid	F1, F2, LB*, S, T, V
LR-21	NC17176	Hybrid	F1, F2, LB*, S, T, V
LR-22	NC17192	Hybrid	F1, F2, LB*, S, T, V
LR-23	NC17201	Hybrid	F1, F2, LB*, S, T, V
LR-24	NC17204	Hybrid	F1, F2, Mi, S, T, V

Note: F1, F2, F3 = Fusarium wilt races 1, 2, and 3; LB = Late blight; LB*= Late blight resistance found with molecular marker analysis and are being verified under field conditions. N = Root knot nematodes; S = Tomato spotted wilt virus (Sw-5 gene); T=Tomato mosaic virus; V = Verticillium wilt race 1.

Table 2: Replicated yield trial of plum tomatoes, 2018.

TRT #	Genotype	Comment	Trait
PR-01	NC11265	Hybrid	crimson gene, F1, F2, LB, V
PR-02	NC11278	Hybrid	crimson gene, F1, F2, LB, V
PR-03	NC13522	Hybrid	crimson gene, F1, F2, LB, T, V
PR-04	NC13540	Hybrid	crimson gene, F1, F2, LB, S, T, V
PR-05	NC16197	Hybrid	F1, F2, LB, S, T, V
PR-06	NC16199	Hybrid	F1, F2, LB, S, V
PR-07	NC16200	Hybrid	F1, F2, LB, S, V
PR-08	NC16201	Hybrid	F1, F2, LB, S, V
PR-09	NC16205	Hybrid	crimson gene, F1, F2, LB, V
PR-10	NC16213	Hybrid	crimson gene, F1, F2, LB, V
PR-11	NC16217	Hybrid	crimson gene, F1, F2, LB, V
PR-12	Plum Regal	Control	crimson gene, F1, F2, LB, S, V

Note: F1, F2, F3 = Fusarium wilt races 1, 2, and 3; LB = Late blight; Pto = Bacteria Speck; S = Tomato spotted wilt virus (Sw-5 gene); T = Tomato mosaic virus; V = Verticillium wilt race 1.

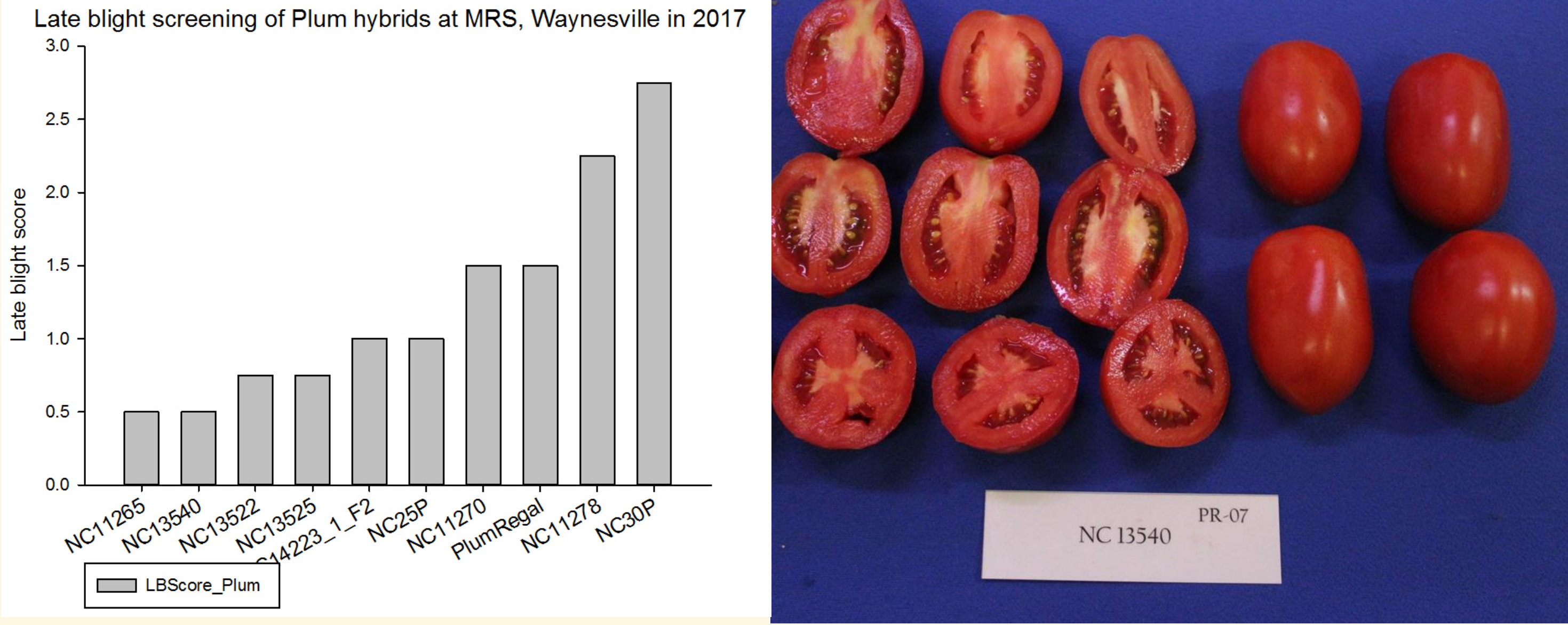


Table: Overall performance of Plum hybrid NC13540, using NC 30P x NC 1Plum as parents in replicated trials at Mountain Horticultural Crops Research and Extension Center at Mills River, NC from 2016 to 2017.			
Geno	Total yield (ton/ha)		Average
	2016	2017	
NC13540	79.2	124.1	40.7
Plum Regal	91.5	116.4	41.6
LSD(0.05)	8.6	ns	ns
Geno	Marketable yield (ton/ha)		Average
	2016	2017	
NC11265	47.7	86.6	26.9
NC11278	45.9	86.5	26.5
NC13540	45.2	100.2	29.1
Plum Regal	56.4	85.0	28.3
LSD(0.05)	6.9	12.0	ns
Geno	Fruit wt (g/fruit)		Average
	2016	2017	
NC11265	134.0	132.9	53.4
NC11278	109.2	106.3	43.1
NC13540	110.9	120.8	46.3
Plum Regal	126.8	117.7	48.9
LSD(0.05)	11.7	10.2	4.4

Grape tomato replicated trial 2018

- It includes 13 genotypes consisting of experimental hybrid (4), and control (1).
- Smarty is the control in this study, which is regarded as the industry standard for fruit quality.
- Objective of this trial was to combine the disease resistance and the fruit quality into the hybrid grape tomato.
- This trial was planted in the first week of June with three replications.
- Details of genotypes in the trial and important gene(s) are given in Table 3.

NC13506: A New Potential ToMV Resistant Hybrid

1. Better in yield potential
2. Excellent fruit quality
3. Early maturity
4. Excellent plant vigor

- There was not a significant difference between Mountain Majesty and other ToMV hybrids for Marketable yield and fruit weight.
- New hybrids mature earlier than Mountain Majesty.
- They combine *Tm2* and *Sw5* genes conferring resistance to Tomato mosaic virus and Tomato spotted wilt virus resistance, respectively.



Table: Overall performance of large-fruited hybrids in replicated trials at Mountain Horticultural Crops Research and Extension Center at Mills River, NC from 2013 to 2017.						
Geno	Total yield (ton/ha)					Average
	2013	2014	2015	2016	2017	
Mountain Fresh Plus	57.1	64.0	85.4	82.3	115.4	80.8
Mountain Majesty	41.8	40.3	85.2	91.1	106.2	72.9
NC13506		63.8	87.0	63.4	128.4	85.6
LSD(0.05)	ns	23.0	7.8	11.0	9.4	16.0
Geno	Marketable yield (ton/ha)					Average
	2013	2014	2015	2016	2017	
Mountain Fresh Plus	35.3	47.9	53.7	38.7	66.1	48.3
Mountain Majesty	25.0	26.9	43.5	43.6	70.5	41.9
NC13506		51.3	48.5	26.3	62.1	47.1
LSD(0.05)	ns	ns	5.8	10.0	5.2	13.3
Geno	Fruit wt (g/fruit)					Average
	2013	2014	2015	2016	2017	
Mountain Fresh Plus	264.6	308.9	279.5	229.8	256.7	267.9
Mountain Majesty	327.5	317.9	317.9	245.9	288.5	299.5
NC13506		320.6	281.9	234.8	309.0	286.6
LSD(0.05)	ns	ns	11.8	13.8	21.1	37.5

Table 3: Replicated yield trial of grape tomatoes, 2018.

TRT #	Genotype	Comment	Trait
GR-01	NC 10259	Hybrid	F1, F2, F3, LB, S, V
GR-02	NC15352	Hybrid	F1, F2, F3, LB, S, T, V
GR-03	NC15358	Hybrid	F1, F2, F3, LB, S, T, V
GR-04	NC15417	Hybrid	F1, F2, F3, LB, S, T, V
GR-05	Smarty	Control	
GR-06	Mountain Vineyard	Control	
GR-07	Mountain Honey	Control	
GR-08	NC16250	Hybrid	F1, F2, F3, Mi, S, T, V
GR-09	NC16259	Hybrid	F1, F2, F3, Mi, S, T, V
GR-10	NC16234	Hybrid	F1, F2, F3, Mi, S, T, V
GR-11	NC15401	Hybrid	F1, F2, F3, Mi, S, T, V
GR-12	NC16252	Hybrid	F1, F2, F3, Mi, S, T, V
GR-13	NC 13148(X)-1-	Breeding line	F1, F2, LB, Mi, S, T, V

Late blight screening of grape hybrids at MRS, Waynesville in 2017

The figure consists of two parts. On the left is a bar chart titled 'Late blight screening of grape hybrids at MRS, Waynesville in 2017'. The y-axis is 'Late blight score' ranging from 0 to 4. The x-axis lists genotypes: NC10259, Smarty, NC15352, NC15358, NC15388, NC15394, NC15417, NC15376, and NC15401. The bars show scores of approximately 0.5, 2.0, 2.4, 2.4, 2.4, 3.5, 3.5, 3.8, and 3.8 respectively. A legend indicates 'LBScore_Grape'. On the right is a photograph of grape tomatoes. A label 'GR 01' is placed above a cluster of tomatoes, and a label 'NC 10259' is placed below a cluster of tomatoes.

Table: Overall performance of grape hybrid NC10259, using NC 7Grape x NC 8Grape as parents in replicated trials at Mountain Horticultural Crops Research and Extension Center at Mills River, NC from 2012 to 2017.									
Geno	Total yield (ton/ha)						Average		
	2012	2013	2014	2015	2016	2017			
NC 10235	54.8	77.3	42.9	38.6	50.8				
NC 10242	58.6	79.9	50.4	40.0	49.7				
NC 10259	62.0	96.7	44.7	48.4	48.1	73.9			
Smarty	78.7	77.9	38.5	30.8	52.3	71.1			
LSD(0.05)	4.9	20.0	5.7	10.0	ns	ns			
Geno	Marketable yield (ton/ha)						Average		
	2012	2013	2014	2015	2016	2017			
NC 10235	45.3	64.2	41.7	32.1	49.8				
NC 10242	85.1	89.9	96.2	89.9	95.4				
NC 10259	84.4	90.6	96.4	90.6	96.3	97.1			
Smarty	86.1	91.0	94.9	92.1	97.0	97.4			
LSD(0.05)	8.4	11.0	7.2	11.0	3.1	ns			
Geno	Fruit wt (g/fruit)						Average		
	2012	2013	2014	2015	2016	2017			
NC 10235	12.5	10.5	12.9	11.0	9.4				
NC 10242	13.1	12.0	13.6	7.2	8.4				
NC 10259	12.7	13.4	13.5	10.7	10.0	9.3			
Smarty	10.7	14.0	13.6	10.5	8.4	8.5			
LSD(0.05)	0.9	1.8	ns	1.8	ns	ns			
Geno	TSS (%)						Average		
	2012	2013	2014	2015	2016	2017			
NC 10235		6.9	6.5	7.5	6.2				
NC 10242		7.0	6.0	7.6	6.5				
NC 10259		7.3	6.0	7.2	6.0	6.4			
Smarty			6.4	7.5	6.4	6.9			
LSD(0.05)		ns	ns	ns	ns	ns			