

Table 16. 2017 Race 4 Fusarium (FOV-4) infested field evaluation of RBTN entries in Tulare country near Tipton, CA¹, conducted by University of California and USDA-ARS (Hutmacher, Ulloa et al). Averages and standard deviations (σ) are shown for disease severity index, root staining, number of mainstem nodes, plant height, plant survival.

Cultivar	Foliar Disease Severity Index ²		Vascular Root Staining ³		Main Stem Nodes		Plant Height		Plant Percent Survival ⁴	
	0-5	σ	0-5	σ	no.	σ	cm	σ	%	σ
LA 1406 3046	0.20	0.20	1.27	0.76	28.6	2.8	15.0	1.2	97.9	0.1
LA 1406 3101	0.53	0.61	1.33	0.31	29.2	1.6	15.9	0.4	93.4	4.6
LA 1406 3038	0.20	0.20	1.13	0.46	25.7	1.5	15.6	0.4	88.9	8.5
LA 1406 3001	0.87	0.81	1.60	1.06	28.5	1.5	15.0	0.5	93.7	5.3
LA 1406 3083	0.07	0.12	1.13	1.01	28.7	0.6	15.6	0.2	90.6	9.9
TAM 13S-03	0.60	0.60	2.07	0.12	25.3	1.2	15.6	1.3	86.1	0.7
TAM WK-11L	0.60	0.60	2.20	0.87	26.1	3.0	15.1	0.6	88.4	2.6
TAM 13Q-51	0.60	0.20	2.07	0.42	24.1	1.5	15.3	0.5	90.5	3.6
Tamcot G-11	0.07	0.12	1.67	0.81	23.9	3.7	14.1	0.8	88.0	3.8
TAM 13Q-18	0.53	0.42	1.67	0.42	27.7	1.7	15.8	0.2	90.5	6.9
PD 201 3016	0.00	0.00	1.40	1.00	28.3	0.8	15.1	1.7	90.4	8.4
PD 07040	0.20	0.20	1.20	1.11	28.7	3.6	14.8	1.0	93.6	1.3
PD 08028	0.40	0.20	2.27	0.70	26.2	0.7	14.7	0.5	86.5	5.5
PD 09084	0.13	0.23	1.80	0.53	25.7	1.5	14.6	0.4	93.5	4.1
PD 09046	0.15	0.30	1.50	0.58	25.7	1.7	15.1	0.8	94.5	5.9
Ark 0921-27 ne	0.47	0.50	1.33	0.64	33.3	1.6	16.1	0.4	95.3	2.3
Ark 0912-18	0.20	0.35	1.07	1.01	27.8	1.8	14.9	1.0	90.4	4.8
Ark 0921-31 ne	0.27	0.31	1.27	1.10	29.5	3.3	14.3	0.6	96.0	2.0
Ark 0911-13	0.27	0.46	1.13	0.90	27.8	1.0	15.7	1.3	92.4	6.5
Ark 0908-60	0.27	0.46	1.53	0.42	27.4	1.6	14.8	0.5	94.6	5.4
NM 16-13P 1088B	0.27	0.31	1.60	1.11	27.9	1.8	14.0	0.6	83.4	0.9
NM 13R1015	0.13	0.23	0.67	0.42	34.0	1.0	15.1	0.3	94.6	6.6
Acala 1517-08	0.00	0.00	0.87	0.42	29.4	2.6	14.2	1.6	93.0	1.0
TAM LBB 130218	0.20	0.20	1.20	0.40	23.9	2.8	14.3	1.5	94.6	5.0
TAM LBB 131001	0.47	0.42	1.40	0.87	28.9	1.6	14.9	0.3	98.3	1.7
AU 90098	1.33	0.70	2.33	0.50	26.7	0.6	14.5	0.6	92.4	1.7
GA 2012141	0.27	0.31	0.93	0.50	28.5	2.6	16.4	1.1	91.4	7.3
GA 2015032	0.00	0.00	0.80	0.35	25.8	1.8	13.9	0.9	83.9	10.2
GA 2015073	0.30	0.42	1.60	0.57	27.7	1.6	15.3	0.4	98.0	2.9
GA 2015090	0.60	0.53	1.40	1.00	28.7	1.2	15.1	0.8	92.9	6.7
DP 393 CK	0.40	0.35	1.47	1.29	26.7	1.7	14.0	1.6	100.0	0.0
DP 493 CK	0.40	0.31	1.47	0.64	28.7	0.5	15.5	0.4	89.7	1.5
FM 958 CK	0.13	0.23	1.20	0.92	24.4	2.2	15.0	0.5	96.8	4.1
UA 222 CK	0.67	0.50	1.40	0.53	24.7	2.1	15.3	0.1	89.1	4.8
Phy 725 RF ⁵	0.47	0.31	1.87	0.12	28.3	4.0	15.9	1.1	88.2	4.7
Phy 764 RF ⁵	0.07	0.12	0.67	0.50	27.7	4.1	14.8	0.5	89.5	4.0
DP-744 ⁶	3.44	0.39	3.71	0.64	6.9	1.7	6.1	2.4	17.6	11.2
DP-340 ⁶	2.76	0.57	2.43	0.51	15.9	3.8	12.3	2.7	57.9	10.4
Phy-802 RF ⁶	0.00	0.00	0.73	0.23	22.9	1.4	13.7	0.8	87.2	1.0
DP-358 RF ⁶	0.00	0.00	0.27	0.23	24.3	0.9	14.2	0.9	97.3	2.5

¹Tulare Country location is a naturally infested field site where presence of race 4 of the Fusarium pathogen has been confirmed in pathology studies. Evaluations were conducted approximately 7 to 9 weeks after emergence (multiple dates in July and August). Destructive measurements were collected from 5 plants within three replications. A moderate development of FOV-4 symptoms was observed in 2017, the second year of evaluations at this test site. Observed symptoms were more severe compared to 2016. All but the most FOV-4 susceptible cultivars (susc. checks) experienced high survival rates (>80%) in 2017. In terms of screening for resistance to FOV-4, our suggestion would be that genotypes with a root stain index <1.0 in 2017 at this test site warrant further evaluation as a potential source of resistance to FOV-4.

²Foliar Disease Severity Index scale: 0 = no symptoms; 1 = epinasty and slight dwarfing; 2 = 1 to 30% of leaves chlorotic; 3 = 31 to 80% of leaves chlorotic and severe stunting; 4 = 81 to 100% of leaves chlorotic; and 5 = plant death.

³Vascular Root Staining Scale: 0 = no vascular root staining evident, 1 = light vascular root staining evident as spotty areas, 2 = more continuous than 1, but light colored staining covering an area between one quarter and one half of the stem cross-section, 3 = moderate brown/black staining evident in a band encircling most of the stem cross section, 4 = brown/black staining evident across most vascular tissue in stem cross section, and 5 = plant severely damaged or plant death with staining evident throughout a cross-section of root tissue (Ulloa et al. 2006, 2009a).

⁴The percentage of plant survival (PS) was calculated by dividing the total number of surviving plants on sample date by the initial plant count after plant establishment, and multiplying by 100.

⁵Check varieties moderately-susceptible to FOV-4

⁶Pima check varieties: DP-744 (highly-susceptible), DP-340 (moderately-susceptible), Phy-802 RF and DP-358 RF (moderate to higher resistance)