ONION (*Allium cepa* 'Vaquero')
Center rot; *Pantoea agglomerans*
Sour skin; *Burkholderia cepacia.*

J. Sidhu, J. Dubose, J. Fernberg, University of California Agriculture and Natural Resources, Bakersfield, CA 93307.
B. J. Aegerter, University of California Agriculture and Natural Resources, Stockton, CA 95206.

Evaluation of variety susceptibility to bacterial foliar disease and bacterial bulb rot in onions, 2022.

A field trial was conducted at the Kern County Extension Research Station in Shafter, CA to evaluate ten onion cultivars belonging to two types/groups, for relative susceptibility to bacterial diseases caused by *Pantoea agglomerans* and *Burkholderia cepacia*. The trial was direct-seeded on 15 Feb 22 using a Jang JP1 seeder. The trial was a split-split plot, randomized complete block design with four replications of a nested treatment. The two onion types (intermediate and long days) were the main plots, the five varieties nested within each type were planted as split plots and the inoculation treatment (inoculated and non-inoculated) was applied as a split-split plot to the varieties. Each split plot was one 30-in. wide bed (with 2 rows of onion) x 20 ft long, with a 5 ft buffer between adjacent plots. Maturity dates for varieties in the intermediate and long-day onions ranged from 107-115, and 100-135 days respectively. Inoculum consisting of an equal ratio of the two pathogens was applied to relevant plots on 1 Jul (intermediate type), 20 Jul (intermediate and long-day type), and on 27 Jul (long-day type), at about 10% and 50-60% tops down in each type. Inoculum was applied in the evening at 10^8 CFU/ml with a battery-operated backpack sprayer at 40 gpa and 25 psi using a flat fan JSF11002 nozzle following brief irrigation to favor bacterial infection. The trial was irrigated using overhead sprinklers throughout the season and irrigated every other day in the afternoon with 0.25 in. of water from mid-Jun until five days after the final inoculation to favor disease development. The plots in each onion type were rated on 9 Aug for disease incidence (percentage of plants with foliar bacterial disease symptoms). The trial was harvested manually on 16 and 22 Aug for intermediate and long-day types respectively, and bulbs from 5-ft sections of each inoculated and non-inoculated plot were weighed for marketable yield. On 17-24 Aug, fifty bulbs from each sub plot were cut open to determine the incidence of internal bacterial bulb rot. Data were subjected to analysis of variance (ANOVA) using PROC MIX and means comparisons were performed using Fisher's protected least significant difference (LSD). The project was funded by Specialty Crops Research Initiative Award 2019-51181-30013 of the USDA National Institute of Food and Agriculture.

Foliar symptoms of bacterial disease were first observed on 15 Jul, two weeks after the first inoculation in intermediate types, and then progressed over time in both types. On Aug 9 the percent incidence of plants with foliar symptoms averaged 30% in intermediate types compared to 19 % in long days. The number of plants with foliar symptoms was also significantly higher, 36% in inoculated plots compared to 12.9% in non-inoculated plots. The incidence of bacterial foliar symptoms varied significantly among varieties within each type of onions. Varieties Granero, Campero, and Vaquero had higher leaf blight incidence compared to the varieties Minister, Tannat, and Marenge.

At harvest, the percentage of bacterial bulb rot was greater (31.5%) in intermediate types than in the long-day type (24.7%). The incidence of internal bulb rot in inoculated and non-inoculated plots was 35.2% to 20.9% respectively. Derby F1 in intermediate type and Joaquin in long day type had the numerically lowest percentage of rot in harvested bulbs while Tannat and Minister in intermediate types had the highest percentage of bacterial bulb rot at harvest.

Marketable bulb yields did not differ significantly between the two types. Marketable yields differed among cultivars within each type. Derby F1, an intermediate type had the numerically highest yield followed by Red Angel and Minister while Marenge, a long-day type had the lowest yield. There were no differences in marketable yield between inoculated and non-inoculated plots. In summary, the long-day types performed slightly better than the intermediate types and some varieties in each type such as Derby F1 and Joaquin were impacted lesser than the other varieties. Keeping the intermediate types in the field for a longer duration and high heat stress may have also impacted the performance of these varieties.

Main plot, split plot, and split-split plot treatments	Foliar disease incidence (%) 08/09	Bulb rot incidence (%)	Marketable yield ton/ac
Main plot treatments			
Intermediate type	30	31.5 a	26.9
Long-day type	19	24.7 b	20.5
P value	0.09	0.04	0.07
Split plot treatments			
Intermediate type			
Red Angel 110 days	29.4 abcd	25.9 cde	28.5 ab
Minister 107 days	13.8 e	38.1 ab	27.3 abc
Derby F1	18.8 cde	16.6 ef	34.3 a
Caliber 122 days	20.6 bcde	28.5 bcd	22.3 bcd
Tannat 115 days	12.5 e	48.4 a	19.6 bcd
Long-day types			
Marenge 115 days	16.2 de	34.7 bc	15.5 d
Granero 115-18 days	38.8 a	24.4 cde	22.3 bcd
Campero 100 days	35.0 abc	21.9 def	17.8 cd
Joaquin 135 days	24.4 bcde	12.1 f	24.4 abcd
Vaquero 118-120 days	35.6 ab	30.2 bcd	22.3 bcd
P value (α=0.05)	0.01	<0.0001	0.043
Split-split plot			
Inoculated	36.1 a	35.3 a	21.6
Uninoculated	12.9 b	20.9 b	25.2
P value (α=0.05)	<0.0001	<0.0001	0.08

*Numbers in a column followed by the same letter are not significantly different, Fisher's Protected Least Significant Difference Test ($p > 0.05$).