Proposed new criterion for scheduling residential buffer treatments

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Summary

As stated in the California Department of Food and Agriculture (CDFA) "Action Plan for Asian Citrus Psyllid and Huanglongbing (Citrus Greening) in California", if growers are conducting coordinated treatments in 90% of a commercial production area, the CDFA may treat neighboring residential citrus trees ("buffer zones") within 400 m of that area to further suppress the ACP population, provided that there has been an ACP detection within 1 mile of the commercial citrus groves in the last year.

After analyzing participation in the commercial ACP treatments, DATOC proposed a new criterion to determine which residential buffer zones are treated: If 90% of the commercial acreage is treated within the treatment window in 2 out of the last 3 seasons, that area qualifies for the residential treatment. Using data from previous seasons would allow more time for the grower liaisons to calculate participation levels, and for CDFA to plan the buffer treatments. It would also increase application efficacy by better timing it to coincide with commercial treatments. Lastly, it would incentivize consistently high participation in commercial treatments over time.

Background

The 90% participation threshold was originally chosen to motivate grower participation in area-wide treatments and to limit expenditures. However, pesticide use reports (PURs) must be gathered to calculate participation before it can be determined which areas qualify for the residential treatments, public meetings must be scheduled to notify homeowners of treatment, and treatment logistics must be planned. All of these factors create operational difficulties and contribute to a delay between commercial and residential treatments. This led to a request from the Citrus Pest and Disease Prevention Committee to review the criterion to determine which production areas would qualify for residential buffer treatments.

Evidence

Coordinated area-wide treatments are applied into Southern California counties that are generally infested with ACP: Imperial, Riverside, San Bernardino, San Diego, Santa Barbara and Ventura. In those counties, citrus production areas have been organized in Psyllid Management Areas (PMAs) or Pest Control Districts (PCDs). We analyzed participation levels from a total of 93 growing areas in these counties, which have been treating for ACP for the last 7 seasons (Fall 2016, Winter 2016/2017, Fall 2017, Winter 2017/2018, Fall 2018, Winter 2018/2019 and Fall 2019).

The bulk of participation across the 93 areas that have been conducting area-wide coordinated treatments for ACP in Southern California is above 60% (Figure 1), and the mean participation for some treatment windows is close to or above 90%. This suggests that 90% is still an appropriate threshold.

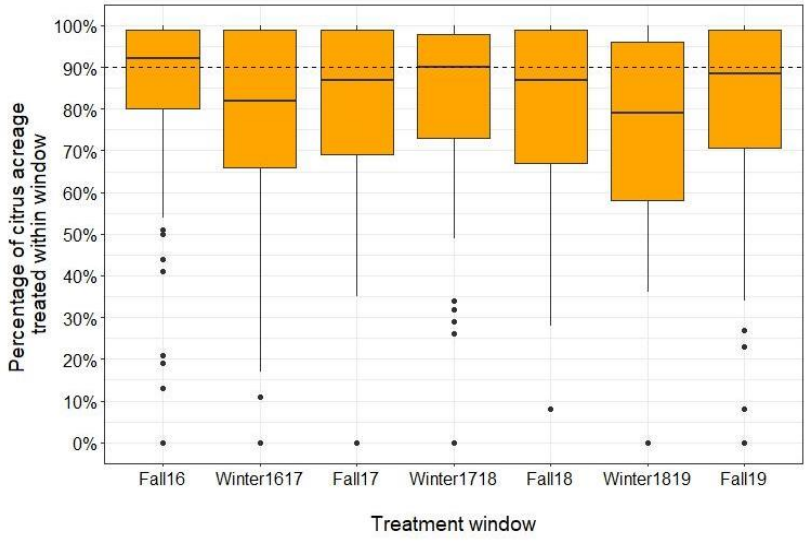

Figure 1: Mean participation per treatment window across the 93 PMAs and PCDs in Southern California. In each box, the low boundary represents the 25% percentile, the middle line represents the mean and the high boundary represents the 75% percentile. The whiskers extend to 1.5 times the interquartile range and the dots represent outliers.

Participation in some counties (Imperial and Riverside) has been consistently high over time. In others (Santa Barbara, Ventura, San Bernardino), it went down for a few treatment windows and then increased in the Fall of 2019. In San Diego, participation has fluctuated; the mean for the county reached 90% in Fall 2019. Overall, participation increased from the Winter 2018/2019 to Fall 2019.

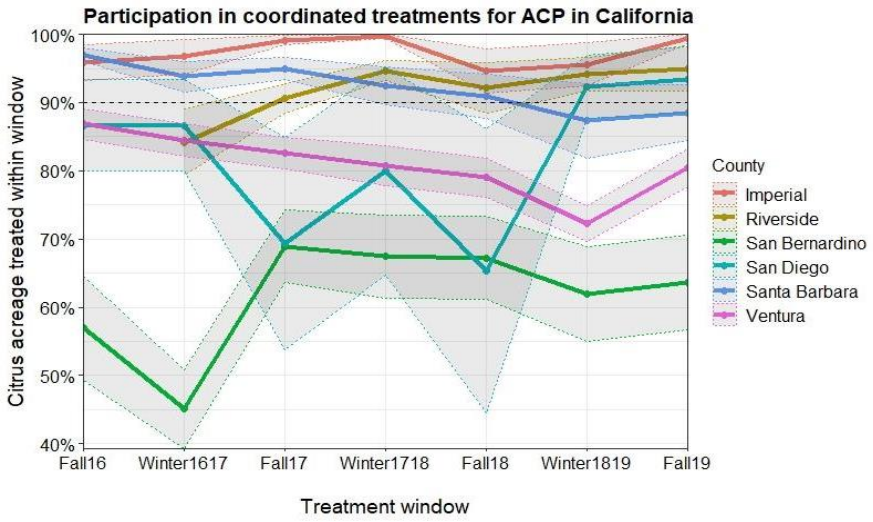

Figure 2: Mean participation per treatment window by county. Lines represent the mean and shaded areas represent the standard error of the mean. Means and standard errors were calculated for 7 PCD growing zones in Imperial, 6 growing zones in Riverside (Coachella and Hemet), 18 zones in San Bernardino, 3 zones in San Diego, 9 zones in Santa Barbara and 50 zones in Ventura.

In each county, areas that reach 90% tend to be consistent over time, even though some treatment windows are occasionally missed due to unfavorable weather or unexpected events. Areas with poor participation (<50%) also tend to be consistent over time, and the rest usually improve. Therefore, looking at

past participation levels might be an option to determine which areas qualify for residential buffer treatments. To avoid penalizing areas that might have missed 1 treatment window because of unexpected events, we decided to look at participation in the last 3 seasons: if participation was ≥90% in 2 out of 3, that area would qualify for the residential buffer treatment. To make a decision about a Winter residential treatment, this would involve looking at the Fall from the previous year, and Winter and Fall from the current year; to make a decision about a residential Fall treatment, participation from Winter-Fall-Winter would be considered.

In order to evaluate possible effects of the proposed new criterion, we calculated the number of areas that would have qualified for a buffer treatment based on the original criterion and the new criterion (Figure 3).

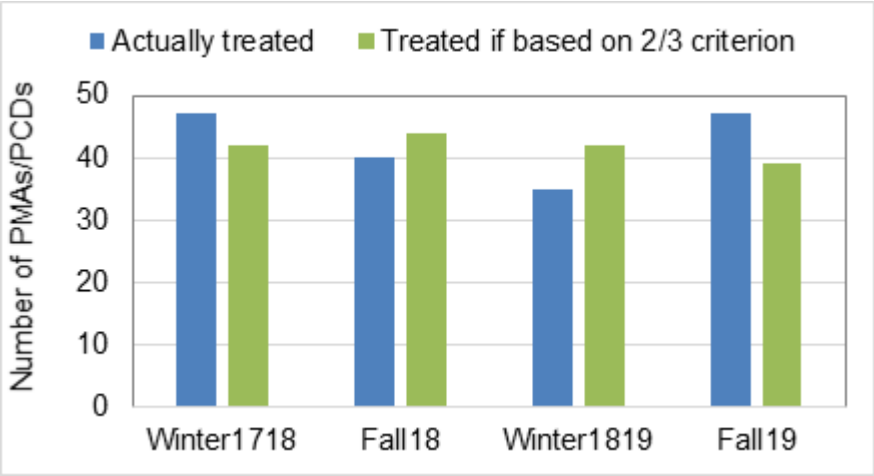

Figure 3: Comparison between the original and the new criterion for residential buffer treatments. The bars represent the number of PMAs or PCD areas that qualified for the residential buffer treatments based on the original criterion of ≥90% participation in the current treatment window ("actually treated", green); and the number of areas that would have qualified based on the new criterion of 90% participation in 2 out of 3 of the previous treatment windows ("treated if based on 2/3 criterion", blue).

If the proposed criterion had been used for the residential treatments in the Fall of 2018 and the following Winter, more areas would have qualified for treatment than were actually treated. Moreover, 80% of the buffer treatments could have been planned a full year in advance, due to consistently high participation. In the Fall of 2019, fewer areas would have qualified for treatment than were actually treated; 47 areas had participation ≥90% for that season only, but only 39 reached 90% in 2 of the last 3 treatments (blue). Two additional areas would have qualified because participation was >90% in 2 out of 3 previous seasons, even though they were <90% in the Fall of 2019. However, 10 areas would not have qualified because they reached 90% for the first time in the Fall of 2019.

Alternative Criterion

Treatments for the majority of the residential buffer zones could be planned a full year in advance using the proposed criterion, because they reach the 2/3 threshold without needing to include the most recent season's participation. However, because about 20% of production areas, on average, would require the most recent treatment *before* meeting the threshold, the proposed criterion would not completely eliminate the logistical difficulties it set out to resolve. An alternative criterion would be to utilize the 2/3 threshold but

exclude the most recent treatment from consideration. For example, a treatment in Winter 2018/2019 would consider treatments applied in Winter 2016/2017, Fall 2017, and Winter 2017/2019, but not the most recent treatment in Fall 2018. This would ensure that all areas could be planned a year in advance. Based on historic participation, it could also result in a slightly more consistent number of buffer treatments applied during each treatment window (Table 1)

Table 1. The number of PMAs that would be treated during each treatment season, using either the Proposed Criterion (≥90% participation in 2 out of the last 3 treatment cycles) or an Alternative Criterion (≥90% participation in 2 out of 3 treatment cycles, excluding the most recent treatment).

	Number of PMA's treated	
Treatment Season	**Proposed Criterion**	**Alternative Criterion**
Fall '18	40	41
Winter '18/'19	42	41
Fall '19	39	42
Winter '19/'20	42	39

Conclusions and Considerations

The proposed criterion was presented to the Operations Subcommittee meeting on January 8th, 2020, and to the full CPDPC on January 15th, 2020. The recommendation was accepted, with added flexibility to allow areas that meet the 90% threshold for the first time to be included in the buffer treatments, to avoid penalizing areas that reach the threshold for the first time. The Alternative Criterion could replace that recommendation with no anticipated drawbacks.

More detailed information about how and where CDFA makes residential buffer treatments can be found in the Action Plan.