Refining fungicide timing: Residual effects on stigma receptivity and pollen viability

N M. Williams & K. L. Ward, University of California, Davis;
Department of Entomology and Nematology

Background

Fungicide application is an integral part of best orchard management. Our objectives are to help optimize spray timing during bloom to minimize potential negative impacts on post-pollination stages of fertilization. Specifically we test how coarse differences in the timing of spray (open versus in-bud) affect pollen viability, stigma receptivity and pollen tube growth in almond. Previous testing of fungicide impacts have been lab based. We proposed to test flowers exposed in the field to gain a more accurate reflection of real field-based exposure level.

Specific Goals

1. Quantify differences in pollen germination and fertilization of flowers exposed to multiple fungicide classes in bud and post dehiscence of anthers.
2. Isolate impacts through different pathways of exposure - Pollen versus stigma / style pathway

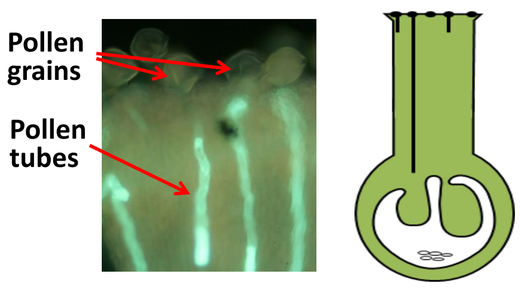
Approach

Planned treatments:	**No Fungicide variety A pollen**	**Fungicide exposed variety A pollen**
Exposure as open flower		
No Fungicide stigma	control	pollen route
Fungicide exposed stigma	stigma route	pollen –stigma combined route
Exposure in bud		
No Fungicide stigma	control	pollen route
Fungicide exposed stigma	stigma route	pollen –stigma combined route

Apply fungicide treatments to flowers in orchards

Hand pollinate among treatments

Score
- pollen germination
- pollen tube growth
- seed set



Previous results

Tests run on
- FRAC 3 - demethylation inhibitor
- FRAC 7 - succinate dehydrogenase inhibitor

- No effect of treatment on pollen tube development or the number of pollen tubes reaching the base of the style in either variety when exposed as buds or flowers (Fig. 2).
- Drake stigmas exposed to the FRAC 7 as buds showed significantly reduced pollen germination compared to the flowers whose stigmas sprayed with control or exposed pollen (Fig. 1a). Drake pollen exposed to FRAC 3 as buds had lower pollen germination on Nonpareil stigmas than the other three treatments (Fig. 1b).
- 574 flowers hand pollinated in the laboratory and successfully stained for pollen tube growth; 292 Drake stigmas and 282 Nonpareil stigmas.

Planned for 2016
- FRAC 9 - methionine biosynthesis
- FRAC 11 - quinone outside inhibitor

Fig. 1 Fungicide exposure pre-pollination

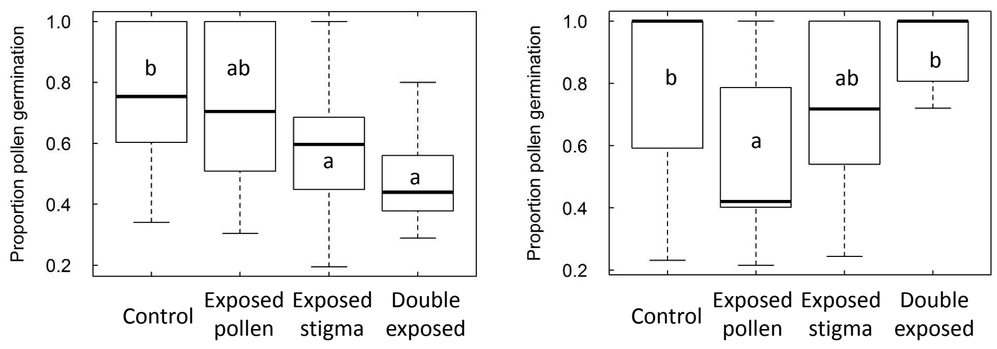
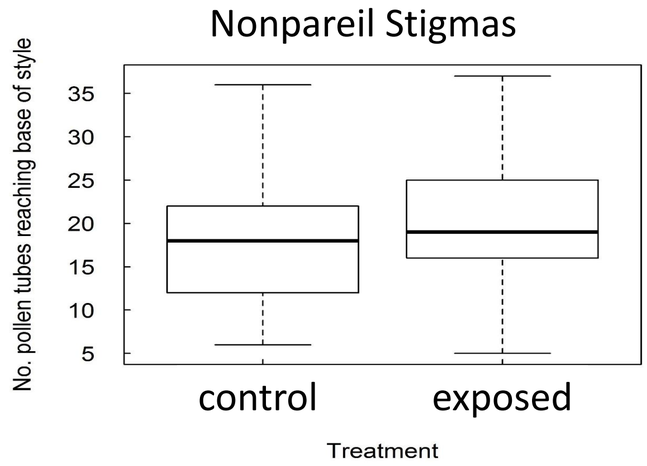


Fig. 2 Fungicide exposure after pollination



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