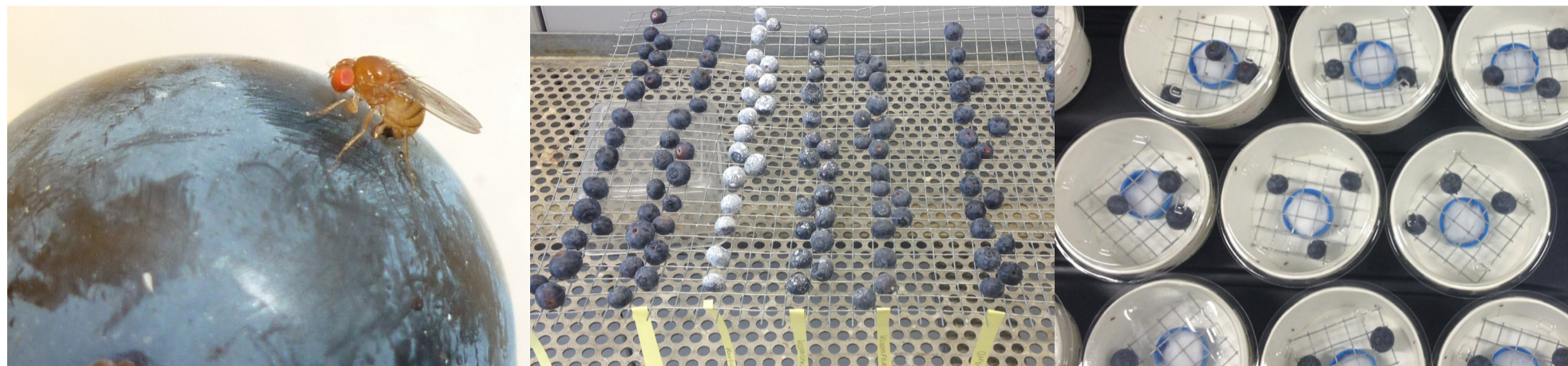


Kaolin, lime and rock dusts to control *Drosophila suzukii*

The spotted wing drosophila, *Drosophila suzukii*, is infesting various soft-skinned fruits. Because *D. suzukii* attacks ripening fruits shortly before harvest, alternatives to insecticides with short pre-harvest intervals are needed. Therefore, the oviposition deterrence and insecticidal effects of kaolin, lime and rock dusts were tested under laboratory conditions.



Oviposition of *D. suzukii*

Different treatments after application before exposure

Exposure of three treated berries to six females for 24 hours

Materials & Methods

Blueberries were treated to run-off in a spinning table spray booth with the following substances dissolved in deionized water: **Spinosad** (0.025% Audienz, Omya AG), **kaolin** (2% Surround, Stähler Suisse SA), **clinoptilolite** (2% Klinospray, Unipoint AG), **clinoptilolite** (2%) + 0.5% **Heliosol** (Omya), **calcium carbonate** (1.7 g/l, 95% pure), **calcium hydroxide** (1.7g/l Nekapur, Kalkfabrik Netstal AG) and **diatomaceous earth** (0.34g/l Pflanzen-Aktivator P2032, AMU-Systeme). Deionized water was applied to the control berries. Three berries were provided in cardboard cups to six *D. suzukii* females for oviposition. After 24 hours, mortality of adult flies was assessed and the number of eggs was counted under a binocular.

Results

Kaolin, clinoptilolite, clinoptilolite + Heliosol and calcium carbonate significantly reduced oviposition, whereas **diatomaceous earth** had no significant effect (Fig. 1). **Calcium hydroxide** had a marginal effect on oviposition ($P = 0.07$). In contrast to **Spinosad**, where almost all flies already died after 12 hours, the tested substances showed no insecticidal effects on adult flies. **Kaolin** reduced oviposition as effectively as **Spinosad** without killing the flies. The efficacy of mineral products might be based on different modes of action: (1) an oviposition deterrence due to the whitish coating, or (2) an oviposition disturbance due to small particles, or (3) in case of lime products due to an altered pH level and an altered microorganism flora.

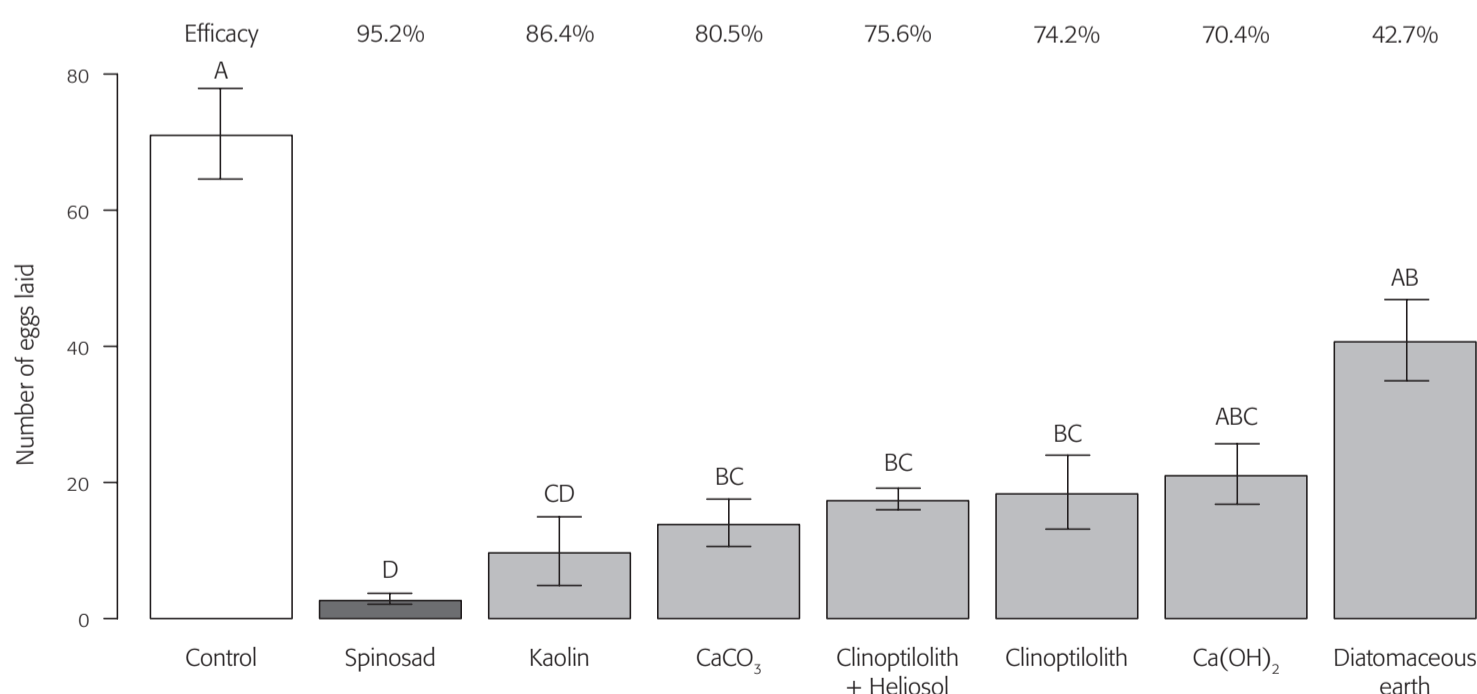


Figure 1: Number of eggs laid on blueberries treated with different dust products 24 hours after exposition. (Mean values \pm standard errors, 6 replicates per treatment, $P < 0.05$, generalized linear model with Poisson errors, Tukey post-hoc test. Different letters indicate significant differences between treatments. Efficacy: Abbott's formula).

Conclusion

Kaolin, lime and rock dusts offer an interesting opportunity to reduce fruit damage by *D. suzukii*. However, visible residues make the use of kaolin unsuitable in table fruits. Calcium products caused less visible residues, but could affect processing of harvested fruit due to an altered pH level. In accordance to the

crop and its processing (table fruits or vinification), kaolin seems to be an interesting opportunity to control *D. suzukii* in vineyards: Field experiments show promising results. Calcium hydroxide is more suitable for berry or cherry production: Field experiments show good results in raspberry production.