

Strawberries

Circadian Crop Sciences, LLC

Leave No Pesticide Residues

(Ingredients in our pesticides are EPA Exempt from Residue Tolerance Requirements)



All Phase fungicide & bactericide contains potassium sorbate, one of the World's most trusted food preservatives, with at least **ten distinct modes of action**. We have adapted potassium sorbate to agriculture by combining it with polymers derived from plants. The polymer, Carrageenan, is known to benefit plants, and in All Phase it dries to a clear film infused with potassium sorbate.



In Circadian Sunrise we combine mint oil with raw corn oil to create a broad-spectrum insecticide, miticide, and fungicide with three unique modes of action upon the nervous system of insects and mites, plus it has the smothering action of corn oil. Raw corn oil is rich in antioxidants and the beneficial wax, triacontanol, and this is a horticultural oil you can use immediately before or after a sulfur application.



Long Shadow is 30% cinnamon oil combined with soap from raw corn oil, finely ground coffee, and emulsifiers. Cinnamon oil has at least two unique modes of action upon the nervous system of insects and mites and is strongly corrosive to cell walls and membranes. Antioxidants and triacontanol wax helps plants deal with environmental stresses.

Controlling Strawberry Pests & Diseases

Powdery Mildew All three of our pesticides provide excellent PM control and will even eradicate fresh PM. All Phase combined with a good surfactant had the lowest mean incidence of PM on greenhouse grown strawberries in a field trial conducted by the Cal Poly Strawberry Center in 2021. Circadian Sunrise treated chardonnay grapes had no detectable PM in a 2020 field trial conducted by the Plant Pathology Department at UC Davis. Long Shadow hasn't yet been independently tested on PM, but those familiar with cinnamon oil know it is effective at controlling PM. Use these three products individually or in rotation on a weekly to biweekly basis (depending upon disease pressure) and say goodbye to powdery mildew.

Spider Mites/Broad Mites Circadian Sunrise and Long Shadow are highly effective at killing all types of mites when applied in sufficient volume to ensure thorough spray coverage. You will see results by the time sprays have dried. Try a sample and see for yourself. These products also work well with IPM, as you can introduce beneficial mites after sprays have dried and predatory mites within sachets are protected from sprays.

Mealybugs Long Shadow cuts through the waxes that repel other insecticides and kills mealybugs by the time sprays have dried. Spray with sufficient force to dislodge overlapping mealybug masses and in sufficient volume to ensure uniform spray coverage. For a little more kick, mix Long Shadow with All Phase to incorporate cinnamon oil into the natural polymers. Beneficial insects, such as *Cryptolaemus montrouzieri*, may be introduced after sprays have dried.

Thrips Long Shadow kills the thrips it covers and it's residual can deter feeding. Spray with sufficient volume to ensure uniform coverage. A good wetting agent can help deliver sprays into those tight places where thrips like to hide. Predatory mites within sachets are protected from sprays.

Downy Mildew All Phase sprayed once every 14 days with a wetting agent provided 100% control of downy mildew in hops in a 2021 field trial conducted by Collins Agricultural Consultants.

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Anthracnose All Phase combined with a wetting agent reduced the incidence of almond scab (*Colletotrichum acutatum*) on Monterey Almonds by 39% with three applications spaced three weeks apart in a 2020 field trial conducted by Professor James Adaskaveg of UC Riverside. Long Shadow is likely to provide some measure of control as cinnamon oil was found to completely inhibit spore germination and mycelial growth of *Colletotrichum acutatum* at low concentrations a study published in *Frontiers of Microbiology* in June of 2018. Mint oil, as found in Circadian Sunrise, completely inhibited mycelial growth of several species of *Colletotrichum* in a study published in the *Iranian Journal of Food Science and Technology* in 2019

Botrytis cinerea The active ingredients in our products have all shown efficacy in preventing spore germination and mycelial growth of *Botrytis cinerea* in numerous published studies. Circadian Sunrise decreased bunch rot in Chardonnay grapes by 44% with a single application at bloom, pre-close, and veraison in a 2020 field trial conducted by Dr. Akif Eskalon at UC Davis.

Aphids Several scientific studies have shown mint and cinnamon oils effective in controlling aphids. Combining All Phase with Circadian Sunrise or Long Shadow proved effective in instances where aphids appeared resistant. Sprays of Circadian Sunrise or Long Shadow will not harm parasitoids within aphid mummies.

Other Insects Circadian Sunrise and Long Shadow have shown good efficacy in controlling most insect pests. Best results have been seen by combining Long Shadow (½oz/gal), Circadian Sunrise (1oz/gal) and All Phase (7 grams/gal).

Root Knot Nematodes Several published studies show efficacy of soil drenches of cinnamon oil in controlling root knot nematodes.

Angular Leaf Spot (*Xanthomonas fragariae*) Cinnamon oil as found in Long Shadow was shown to decrease severity of Angular Leaf Spot on tomato plants in a Brazilian study published in 2006, as did menthol as found in the peppermint oil in Circadian Sunrise in a 2019 Iranian study.

Root Diseases Several published studies show efficacy of potassium sorbate in controlling root pathogens, including fusarium, pythium, rhizoctonia, and Verticillium. In a study published in the *Journal of Microbial & Biochemical Technology*, a single foliar application of potassium sorbate to tomato seedlings significantly inhibited the afore mentioned root diseases when evaluated sixty days after inoculation with the pathogens.

Macrophomina The Cal Poly Strawberry Center is trialing foliar applications of All Phase for controlling *Macrophomina*. In vitro efficacy of potassium sorbate was demonstrated in a 2012 study published in the *Journal of Applied Sciences Research*. In that same study, cinnamon oil combined with *Trichoderma harzianum* showed strong efficacy.

All Phase as a Spray Adjuvant Aside from being an excellent broad spectrum fungicide & bactericide, All Phase can improve the efficacy of chemicals it is mixed with by incorporating them into the polymer which also acts as a humectant, reducing leaf drip, so more of what is sprayed stays on the foliage.

Contact us at sales@ccsciences.com for commercial pricing or to request samples