

Spider mites are a real threat to orchards, vineyards and many other crop fields. An integrated approach to managing mite populations is crucial, and proper dust control is a critical component. However, conventional dust control products, such as those used on industrial sites, are not conducive to plant health. Lignosulfonate, a byproduct of wood-pulp processing, is a popular choice for agricultural dust control, but has limitations, not the least of which are product consistency and erratic availability. EnviroTech Services, Inc. manufactures a dust control product that provides superior, consistent and enduring dust control without exposing fields to the undesirable components of conventional dust control products.

Introduction

Yellowing and bronzing of leaves and defoliation of crop plants are all too familiar to horticulturalists and agriculturalists. Coupled that with fine webbing on the underside of leaves and plant stems and the problem becomes evident: a spider mite infestation is at hand. Threatening populations of mites occur as the result of several factors, thus an integrated mite management program is fundamental to the health of crop plants. When an infestation occurs, it can often be seen to spread from the roadside vines and trees inward, illustrating the correlation between road dust and mite population.



Photo: Spider Mite Infestation in Vineyard (Skinkis, 2016)

Debate arises in academia and beyond over the exact conditions created by dust on crop plants that encourages spider mite population growth: does the dust inhibit the mites' natural predators or does it render foliage more suitable for mite consumption? Regardless of the exact method, in agriculture the relevant fact is dust and spider mite population upsurges coincide.

The need to control road dust is shared across many industries, but the need to do so without threatening the industry's yield is singular to agriculture. The least expensive dust control solutions, magnesium or calcium chloride treatments, are undesirable in agriculture and other alternative dust control products can poison the living soil necessary for healthy plant life. When evaluating the best options, the field of available products narrows rapidly.

Lignosulfonate gained popularity in agricultural dust control by avoiding the major constraints identified thus far and by promotion that it is environmentally-friendly. While it is a plant based and biologically friendly solution for controlling dust and therefore mite population, lignosulfonate is of inconsistent quality and availability. Lignosulfonate also leaches out of roadways with minimal water or weather



events. One application of lignosulfonate could easily leach out of a treated road with one moderate weather event.

EnviroTech Services, Inc. (EnviroTech) manufactures a product that shows great promise as a safe and effective dust control solution in agricultural settings. BaseBind[®] is an extremely low-chloride (<3% chloride) polymer-based product that stabilizes the fine particles of road surface material. Additionally, BaseBind[®]'s eventual and extremely slow degradation can function as a soil amendment.

Product Demonstrations with Collaborating Partners

With these qualities of BaseBind[®] in mind, EnviroTech demonstrated the product on two separate California vineyard roads. BaseBind[®] was applied in June and July, respectively. The first application was a segment of road on a vast Sonoma Valley vineyard while the remaining vineyard road was treated with lignosulfonate. This provided a concurrent comparison of BaseBind[®] to the industry standard. The second demonstration treated all road surfaces at Sunbreak Vineyard in Napa Valley.

Demonstration Application One

The first demonstration took place in early June of 2015 at a Sonoma Valley vineyard. A non-native road base was professionally prepared and graded, creating an unpaved road of very high quality with excellent shape and compaction. BaseBind[®] was applied over 0.51 miles of 18 to 20 foot-wide road at an application rate of 0.4 gallons per square yard. The application, as with all initial EnviroTech applications, was overseen by an EnviroTech field scientist. According to preparatory research conducted in our lab, the field scientist determined that the road base was capable of absorbing BaseBind[®] with or without pre-wetting; therefore the vineyard elected not to pre-wet the road.



Photo: Application of BaseBind®

The field scientist was satisfied that the road was sufficiently "wet" following application and moments after observed the product "frothing", indicating that voids below the surface were being occupied with product, a key aspect to product performance.





Photo: Road immediately following Application of BaseBind®

The field scientist returned to the application site after 24 hours to observe the treated road. The product was absorbed sufficiently by the road base resulting in a damp appearance with no evidence of standing product. BaseBind[®] was well incorporated, the surface was homogenous and all observations indicated that dust would be well controlled through stabilization of the fine particles.



Photo: 24 hours after Application of BaseBind®

EnviroTech revisited the vineyard approximately six weeks later. BaseBind[®] continued to perform during the interval between application and follow-up, while on the sections of road treated with lignosulfonate the product had completely degraded. Some dust was generated by driving the BaseBind[®] stretch of road, but at 15-20 miles per hour the dust did not rise higher than approximately 30 inches. By comparison, dust from the road treated with lignosulfonate plumed above six feet.





Photo: Vineyard Road Six Weeks Post-Application

Demonstration Application Two

The second demonstration occurred in mid-July of 2015 at Sunbreak Vineyard in Napa Valley. The road base was native soil, and preparatory research indicated that pre-wetting was preferable. The road base was treated with 0.40 gallons per square yard of water. No further preparation was conducted. The vineyard had used lignosulfonate in the past, and while the entirety of the vineyards roadways were treated with BaseBind[®] at this application, the collaborating partner was confident a comparison of the two products could be made based on previous experience. Again, 0.40 gallons per square yard of product were applied over a total of 0.81 miles of vineyard road, both around and through the vineyard. The road width was approximately 12 feet.



Photo: Dust from Traffic prior to Application

An EnviroTech field scientist was again on-site during the application. The field scientist was satisfied with the application, noting that approximately 75% of the product was absorbed by the road after 30 minutes, and after 3 hours the product was completely incorporated in the road.





Photo: Three hours following Application

Conclusions from Demonstration Applications One and Two

According to follow-up conversations with both collaborating partners, BaseBind[®] controlled dust throughout the summer. In addition to outperforming lignosulfonate with regards to effectiveness and longevity, BaseBind[®] is preferable to lignosulfonate due to the consistency and availability of the product. Both vineyards' experience with lignosulfonate is that the product does not have the longevity to last a complete season, and in both demonstrations BaseBind[®] did. Finally, both vineyards were completely satisfied with BaseBind[®] as a dust control product, so much so that they each intend to use it on their entire respective expanses of road in the summer of 2016.

Discussion

BaseBind[®] is excellently suited to provide adequate dust control in vineyards and orchards, as well as other crop fields, particularly in the agricultural regions of California.

In mild mid-latitude climates, such as the Mediterranean or California's agricultural regions, BaseBind® stays hydrated on a road surface and acts as a binder for fine particles without becoming brittle. Moderate summer temperatures that consistently approach the dew point moisturize the product daily without saturating it to the point of wash-out. Summer seasons with consistently light rainfall further facilitate the longevity of BaseBind® in such climates.



Chart: July 2015 Temperature and Dew Point for Sonoma County

As BaseBind[®] is a manufactured, specification controlled product its high quality is reliable, consistent and available according to demand. This is not the case with lignosulfonate, where availability is limited and independent of the needs of multiple industries. Further, because it is a manufactured material, product formulations can be customized to a specific climate and/or soil type. Such customizations are determined through laboratory evaluation of the soil, climate considerations and user goals.



Conclusion

BaseBind® is a safe and effective dust control product when used in the correct environments and conditions. Additional demonstrations in new settings, such as orchards, vegetable farms or nut tree groves, would be beneficial to establish the breadth of BaseBind®'s functionality. It has thus far been found to be a superior dust control product in wine vineyards of California.

For more information, please visit www.EnviroTechServices.com

References

Skinkis, P. (2016, January 28). Pacific Northwest Insect Management Handbook. Retrieved from 1) Photo Courtesy of Patty Skinkis, via http://insect.pnwhandbooks.org/small-fruit/grape/grape-spidermite