

SYSTEM PERFORMANCE MONITORING OVERVIEW

Network Performance

All in-orchard components of the Semios system update to the central hub (gateway) via the wireless network every ten minutes. The gateway then reports to the Semios database via a cellular connection to the Cloud. An analysis is then completed by the Semios database to verify communications with all in-orchard components including:

- Camera traps
- Pheromone dispensers
- Repeaters (wireless network infrastructure)
- Sensors (soil moisture, leaf wetness, weather stations, etc.)

If any components have not updated within the required timeframe, the Network Services Team is notified to conduct a remote communications check. In most instances, they can successfully re-establish communications with the identified unit. If not, the Field Services Team is notified of the GPS location of the device and a field visit is scheduled to quickly repair or restore service.

Camera Traps



The camera traps photograph and update their sticky base contents once a day. The trap catches are reviewed every day by our in-house Entomologists.

If a camera trap has not uploaded its daily photo, the Network Services Team is notified and they attempt to resolve the issue. If they are not able to do so, the Field Services Team is notified of the GPS location of the device and a field visit is scheduled to quickly repair or restore the device.

Each camera trap is regularly monitored and the Field Services Team is dispatched when the liner and lure are scheduled to be replaced.

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Pheromone Dispensers

Pheromone dispenser schedules are frequently updated in accordance with Semios' Variable Rate Mating Disruption method. Schedules are modified in response to factors such as in-canopy degree day calculations, pest development (monitored via trap catches), and other influences that could affect pest behavior.

Dispensers report back to the Semios system the number of times their spray hammer has actuated so that it can be compared to their spray schedule to identify potential issues.

The dispensers do not rely on constant network communications to ensure their daily performance. Because the in-orchard network communications can be interrupted from time to time by a number of factors, Semios pheromone dispensers have an onboard processor that stores their individual dispensing schedule.

This ensures that even if the network communications are temporarily disrupted, the dispensers maintain their prescribed schedule. They are also independently powered by their own battery source.



Pheromone Dispensers Continued...



A study conducted by the Walnut Board of California established that pheromone plumes can carry up to 1800 feet in length by 600-800 feet in width depending on the tree canopy. When you consider that walnut trees tend to grow higher, and with denser canopies, plumes in other tree fruit and nut crops could extend even further.

Semios dispensers are placed to ensure plume overlap. This provides contingency crop coverage should an individual dispenser be temporarily disabled.

While Semios has not experienced any system-wide failure in over five years, periodic pheromone can weight sampling is conducted as an additional quality test.

At this time, we have experienced 99% uptime performance of our dispensers in the field and we continue to develop systems and technologies to further improve monitoring.