9.19 Using Novel Photonic Fence Technology to Protect Foundation Block and Nursery Stock from Asian Citrus Psyllid

Johanson, E.¹, Patt, J.², Mullen, E.¹, Rutschman, P.¹, Pegram, N.¹

¹Intellectual Ventures Lab, Bellevue, WA, USA
²USDA-ARS, Weslaco, TX, USA

Photonic Fence Technology (PFT) uses a combination of real-time image processing, optics, and lasers to detect, identify, track, and kill specified insects that enter the detection area. Originally developed to combat malaria, the system has been tested on Asian citrus psyllids (ACP). PFT identifies the genus and gender of an insect based on the target’s wingbeat frequency and is able to identify and kill insects at a range exceeding 30 m by applying a brief but lethal burst of photonic energy via a directed focused laser beam. The entire system can be built from relatively inexpensive components common in consumer electronics, including safeguards to disarm the system if a human enters the detection area. Recent testing shows that PFT also has the capability to detect, identify, and kill Asian citrus psyllids (ACP). Specifically, photonic exposure testing shows that ACP can be identified and eliminated at a distance of 7 m using a 15 millisecond dose of 10 mJ of photonic energy. Next steps include optimizing this technology specifically to protect foundation block and nursery stock from ACP. As PFT can be adapted to perform non-lethal analysis of insect flight movements, future work will include research on the system’s capabilities in monitoring ACP presence in trucks, shipping containers, and outdoor citrus plantings. Initial test results indicate that PFT could become a cost-effective ACP management and research tool.

References