

Effectiveness of Drone Spraying to Control Bagworm Outbreak

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*Outbreaks of the bagworm *Metisa plana* often occur in Malaysian oil palm plantations. Given the complexities of the *M. plana* lifecycle, the high cost of lower-toxicity chemical pesticides, and the labour shortage, the application of unmanned aerial vehicles (UAVs), also known as drones, was used, as it is more practical at a commercial scale. In July 2022, FGVPM Besout 6 and Besout 7, with a total planting area of 2 110.20 and 2 737.30 ha, respectively, experienced massive *M. plana* infestations with a total outbreak area of 622.50 ha (29.50%) and 650.00 ha (23.75%), respectively. Within five days, drones equipped with fan nozzles for spraying flubendiamide insecticide at a rate of 36 L per hectare were able to combat the infestation. Water-sensitive paper was set up to ensure the droplet distribution met the standard operating procedure requirement. ImageJ analysis confirmed the sprayed coverage area was excellent, especially on the upper frond. At 30 days after spraying (DAS), the number of live *M. plana* individuals per frond dropped to zero compared to the non-treated area, which counted 82.50 *M. plana*. The effectiveness of spraying is supported by its high productivity as compared to the conventional approach of trunk injection. The results demonstrated that with the right dosage of pesticides, drone spraying with proper specification is more feasible, affordable, saves time, and has been proven to be efficient for *M. plana* treatment on a commercial scale.*

*Keywords: Unmanned aerial vehicle, drone, oil palm, precision agriculture, bagworm *Metisa plana*.*