

MOSQUITO ABATEMENT

ST. TAMMANY PARISH

The ideal statewide resistance surveillance program incorporates mosquito sourcing, rearing, and resistance testing. These processes can be challenging for small or understaffed programs, yet are relatively routine for a trained and equipped centralized entity.

Mosquito sourcing

The first hurdle many districts encounter when performing any mosquito evaluation is collection of mosquitoes. Will a small control entity that doesn't perform surveillance know where to collect or trap? Are they able to collect sufficient eggs, larvae, or pupae from one site? Do mosquitoes from various sites need to be pooled in order to have sufficient numbers?

A statewide program alleviates the need for local knowledge of site selection or trapping. Collections/trapping will be performed at a variety of sites provide redundancy should few mosquitoes be sourced, and to allow for multiple populations to be compared from a range of habitats.

Multiple trips to disparate parts of the state may be required if ovitrapping, but even a single slice-in-time resistance trial is beneficial, should time only allow for one visit in the season. Ideally, multiple visits would be made to the same sites throughout the year to provide for surveillance of resistance over time. However, depending upon the scale of the statewide program (ie funding for personnel to visit multiple parishes simultaneously) the number of parishes visited, or the number of replicates within that parish, are likely to be the first place where logistics compromises may be made.

Mosquito rearing

Will the lack of a dedicated insectary at smaller entities stunt or stagger the development time of collected mosquitoes? Are entities with insectaries able to follow a protocol without deviation to produce comparable mosquitoes for testing state-wide? Will adult mosquito age be accurately recorded and transmitted to the testing agency?

A statewide program will provide an insectary with known capacity and capabilities, and is the most capable at standardizing a rearing procedure for all mosquitoes, rather than leaving it up to individual entities. The scale of mosquito rearing needed is largely dependent upon the test being performed. As a baseline, approximately 200 mosquitoes are required per active ingredient per bottle bioassay/topical.

Resistance testing

The bottle bioassay was developed with low-budget and minimal-training in mind, but is still a major hurdle for districts that treat for mosquitoes without surveillance programs. Resistance tests with better sensitivity or specificity than the bottle bioassay, including topical trials, larvicide resistance testing, and enzyme analysis, are unlikely to be widely adopted across a state unless provided by a centralized program. This both supplements mosquito control entities who may do basic resistance testing, and provides the opportunity for untrained or under-staffed programs.

The ideal statewide resistance program would incorporate topical trials for adulticides, concentration response trials for larvicides, and enzymatic analyses for populations with detected resistance. Considering these are all timely procedures, a more economical program might incorporate bottle bioassays for adulticides and diagnostic (LC₉₉) larvicide resistance trials.