MONITORING COMPONENTS OF GYPSES

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ABSTRACT

The manager needs tools for assistance in planning and interpreting monitoring systems. We are building a system that designs sampling programs by interpreting data about Gypsy Moth, stand condition and management objectives. The system prioritizes areas within the management unit within budgetary constraints and defines the areas to be monitored. The system proposes monitoring procedures to guarantee an effective monitoring program. These tasks are accomplished by the following modules in the GypsES system: The Egg Mass Sampling Designer (EMSD), the Pheromone Trapping System Designer (PTSD), and the Defoliation Projector (DP).

The EMSD delineates the sampling area and proposes an adequate sampling plan. Currently, the area with pheromone trap densities above the sampling threshold are recommended to be sampled for egg masses. As in the Appalachian IPM project last year, the sequential sampling plan developed by Shelby Fleischer is proposed. The EMSD presents this underlying information, provides maps of the areas to be sampled and sampling plans.

We envision improving the design of egg mass sampling by incorporating more information. This can be the moth trend between last year and this year or the egg mass density of last year. Resident calls, observations of nearby infestations, and burlap bands are valuable indications that should be incorporated. Our system keeps track of these indications and will integrate them with more quantitative estimates of gypsy moth pressure. The threshold that defines what areas need egg mass sampling should be more comprehensive by making it dependent on the risk of the sampling unit. Egg mass sampling costs should be incorporated as well. With an estimate of the influence of the sampling plan, the size of the sampling area and the accessibility of the area on the sampling costs, the EMSD will support the manager in planning egg mass sampling under the constrained budget.

The PTSD delineates the sampling area where traps should be posted and proposes the pheromone trap distribution and pheromone trap type. With similar logic as in the EMSD only areas above a certain risk deserve greater monitoring efforts. Pheromone Trapping currently is mainly used in and before leading edge situations as an early warning system. Observations of lasts years pheromone traps and if available this years egg mass density are used to estimate GM pressure. With the PTSD the manager again has the opportunity to estimate the monitoring costs and compare them to his budget constraints.

The DP produces maps of the estimated level of defoliation. The hazard component of GypsES needs defoliation projections to estimate hazard ratings. Currently we intend to incorporate the algorithms developed by Gansner, Campbell and Montgomery into the DP. We anticipate more alternatives as we search through the available information and more researchers are focussing on this central problem in Gypsy Moth management. The uncertainty involved in the projection of the defoliation has to be considered in decisions based on defoliation projections.

With the components EMSD, PTSD, and DP of the GypsES system we want to build a system that can satisfy various needs of the forest manager: a guide for less trained personnel in planning monitoring systems and flexible compilation and display of data for the expert. It is a perfect vehicle to test new research results in field situations. Implementing scientific knowledge into forest management will no doubt improve understanding and generate new research questions.