

Appendix G

Integrated Pest Management Techniques for Gypsy Moth and Southern Pine Beetle

A brief summary of gypsy moth and southern pine beetle Integrated Pest Management (IPM) programs is presented in Appendix G.

Gypsy Moth

Prevention

(Some techniques listed under Silviculture could be classified as prevention.)

Activity:

Risk rating.

Application: Gypsy moth susceptibility (probability of defoliation if gypsy moths were present) can be predicted from the relative amount of trees that is preferred food of the gypsy moth. Vulnerability (probability of mortality after defoliation occurs) is a function of the crown condition of preferred host trees. Maps depicting relative susceptibility have been generated for the Southern Appalachian Assessment (SAA). Sufficient data for vulnerability projection are available for national forests and have been created for that ownership class.

Activity:

Training and technical assistance provided to land managers by forest pest specialists with state forestry agencies, USDA Forest Service, and Animal and Plant Health Inspection Service (APHIS).

Application: Training and technical assistance is available to land managers in all settings for evaluating gypsy moth susceptibility, vulnerability, hazard, and risk and for outlining management options.

Activity:

Quarantine (domestic and international)

Application: Quarantine reduces the probability of new introductions of the gypsy moth from areas where it does not yet exist. The domestic quarantine serves to slow the spread of gypsy moth to the south and west of the generally infested area in the eastern United States. The international quarantine prevents new introductions of the European gypsy moth into presently uninfested areas and the initial introduction and establishment of Asian gypsy moth.

Detection

Activity:

Male moth pheromone trapping.

Application: Male moth trapping with sex pheromone bait is used to delineate the boundaries of isolated infestations to guide eradication efforts, track the spread of gypsy moth, and evaluate the success of eradication efforts.

Activity:

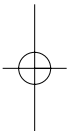
Aerial survey.

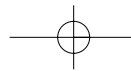
Application: Gypsy moth outbreaks are detected through aerial survey (still photography, videography, and sketch mapping) followed by ground validation.

Activity:

Egg mass survey.

Application: The density of egg masses is an indication of the defoliation potential of the gypsy moth population in the following growing season. When used in combination with action thresholds for various social values (e.g., prevention of nuisance, noticeable defoliation, or tree mortality), egg mass surveys help to set treatment priorities. Egg





mass surveys also can be used to evaluate effectiveness of treatment.

Silvicultural

Activity:

Reduction of stand susceptibility (by altering species composition, i.e. reducing species preferred by gypsy moth) and vulnerability (by removing trees that are high risk for mortality after defoliation) by thinning, harvesting, shelterwood, or changing species featured in management.

Application: Silvicultural methods are used to minimize the adverse effects of defoliation, such as mortality and aesthetic deterioration. They are most effective when applied well in advance of infestations but can be used to accomplish some objectives when defoliation is imminent or has already occurred.

Biological

Activity:

Mass trapping of male moths.

Application: Mass trapping of male moths using the sex pheromone is used on isolated populations outside the quarantine zone.

Activity:

Mating disruption with mass pheromone releases.

Application: Mating disruption with mass pheromone release to inhibit mating is used on low-level populations outside the quarantine zone.

Activity:

Sterile insect release.

Application: Release of large numbers of sterile moths to inhibit mating is used on small, isolated populations outside the quarantine zone.

Activity:

Gypchek, nucleopolyhedrosis virus (NPV).

Application: Gypchek is used for suppression and eradication of gypsy moth outbreaks where gypsy moth-specific

Activity:

Bacillus thuringensis v. kurstaki (B.t.k.).

Application: *B.t.k.* is widely used for suppression and eradication of gypsy moth outbreaks. It can produce effects on non-target moths and butterflies, but does not harm aquatic invertebrates.

Chemical

Activity:

Diflubenzuron (Dimilin; insect growth regulator).

Application: This compound is used for suppression and eradication of gypsy moth outbreaks. It can produce non-target effects on terrestrial and aquatic invertebrates.

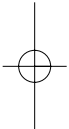
Activity:

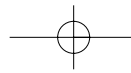
Acephate (Orthene) and carbaryl (Sevin).

Application: These compounds have a registration for gypsy moth control but are not included in the EIS.

Strategies are used in different combinations within a given area. The transition zone is where the greatest variety of strategies is employed in a pilot program called Slow the Spread (STS). This area lies between the generally infested area to the north and east, and the uninfested area. The full range of detection activities described above is used in addition to mass trapping, mating disruption, sterile insect release, *B.t.k.*, diflubenzuron, and Gypchek. Silvicultural methods are available, but not included in cost-sharing programs. No data are available concerning the area treated with silvicultural methods specifically for gypsy moth, which is a tiny fraction of the available host type.

Social values play an enormous role in the priorities used for treatment decisions, as most areas receive no treatment at all. Between 1986 and 1994, the cumulative total acres defoliated by gypsy moth in Virginia statewide exceeded 3 million acres while cooperative suppression projects were conducted on less than 1 million acres. The vast majority of this treated area was in forested residential or high-use recreation sites. General forest areas defoliated by gypsy moth are rarely treated.





Southern Pine Beetle

Prevention

(Some techniques listed under *Silviculture* could be classified as prevention.)

Activity:

Training and technical assistance provided to land managers by forest pest specialists with state forestry agencies and the USDA Forest Service.

Application: Training and technical assistance is available to land managers in all settings for evaluating southern pine beetle susceptibility, vulnerability, hazard, and risk and for outlining management options.

Activity:

Risk rating.

Application: Southern pine beetle occurrence is a function of host type (yellow pine) abundance, density, and recent radial growth. While radial growth data are not readily available on a site specific basis, an indication of relative risk can be gained by the other two factors.

Detection

Activity:

Southern pine beetle trapping.

Application: Southern pine beetles and associated insects are trapped using terpene baits. The abundance and relative frequency of southern pine beetles and clerid beetle predators indicate the intensity of outbreak and the likely course over the next growing season (increasing, stable, or decreasing).

Activity:

Aerial detection with ground truthing.

Application: Aerial detection is used when outbreaks are indicated by trapping results, ground surveillance, or local conditions. Ground truthing is used to confirm southern pine beetle activity, the actual size of the infestation, and resources threatened.

Silvicultural

Activity:

Stand susceptibility can be reduced by maintaining tree vigor with thinning and increasing diversity in structure and composition (i.e. multi-storied, multi-species stands).

Application: Reducing susceptibility is best used before outbreaks occur and throughout stand life.

Activity:

Stop existing infestations and prevent proliferation with cut-and-leave, cut-and-remove, or pile-and-burn.

Application: Cut-and-leave is used in late spring and summer to disrupt spot growth where spots are small, inaccessible, or with value too low to support removal. Emerging beetles disperse into the surrounding forest. Cut-and-remove is used year-round on spots where access and value of the attacked trees permit utilization. Beetles are removed from the site in the timber. Pile-and-burn is used in settings similar to cut-and-leave, but where destruction of beetles is desired. This method is not often used due to increased wildfire risk and high cost.

Biological

Activity:

Parasite and predator activity.

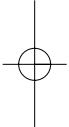
Application: Cutting methods acknowledge the importance of predators and parasites in regulating southern pine beetle populations. Dead trees without foliage support these agents after southern pine beetles have emerged. Such trees are retained where cutting methods are used to control spots so that they have an opportunity to complete their life cycle and remain available for regulating southern pine beetle populations.

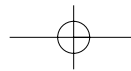
Chemical

Activity:

Dursban (chlorpyrifos) and lindane.

Application: These compounds are used in cut-and-spray. Infested trees are felled, cut into lengths that can be handled and the



*appendix G*

entire bark surface of the bole sprayed with one of these chemicals registered for this purpose. Cut-and-spray is used in the same settings as pile-and-burn (i.e. where southern pine beetle brood must be destroyed).

Like gypsy moth outbreaks, not all southern pine beetle spots receive treatment. Detection efforts must identify at least one multiple tree spot per 1,000 acres of host type before suppression efforts can receive federal cost sharing. Even when this threshold is reached or exceeded, spots are treated only when justified economically or by other overriding social values (e.g. threatened or endangered species).

Post-treatment evaluations are not a routine part of IPM for southern pine beetle. However, national forests in the SAA area (and everywhere in the Southern Region) maintain the Southern Pine Beetle Information System (SPBIS). SPBIS is a continuous tracking system of spots from the first detection, through monitoring, ground checking, and salvage. Some estimate of treatment efficacy is gained by evaluating the spots that do not become active again after suppression.

