CHARACTERISTICS OF STANDS SUSCEPTIBLE AND RESISTANT TO GYPSY MOTH DEFOLIATION

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Site conditions strongly influence where gypsy moth defoliation will occur. In New England, where gypsy moths and forests have interacted for over a century, some forests have had a history of repeated defoliation while others have been defoliated only rarely. The often defoliated or susceptible forests characteristically grow on dry sites such as rocky ridges or deep sands. In many cases, they have been disturbed--sometimes frequently--by fire, wind, snow, or ice storms. The trees in these forests, mainly dry-site oaks, often are highly favored as food by gypsy moths, are slow growing, small, and scrubby, and have abundant structural features such as bark flaps, deep bark fissures, and holes or wounds that are used as resting sites by gypsy moths.

The open nature of susceptible forests encourages the growth of plants such as blueberry, huckleberry, bracken, sweetfern, grasses, and sedges. Leaf litter usually is shallow or lacking; on ridge stands, surface rocks or exposed ledges are common.

Resistant forests where defoliation is rare characteristically grow on relatively undisturbed sites with well-drained, deep loam soils where moisture is not limiting. They usually are well stocked and contain mixtures of species, including some that are highly preferred. Trees on these sites have good growth rates and relatively few structural features used by gypsy moths.

Understory plants in New England's resistant forests include such species as wild sarsaparilla, maple-leafed viburnum, and woodland ferns. Resistant stands have deep litter layers that are favorable habitat for many predators of gypsy moth.

It is not axiomatic that trees growing on susceptible sites are more apt to succumb to a given defoliation regimen than trees on resistant sites. Studies suggest that trees on adverse sites may be no more--indeed, may even be less vulnerable--than trees on good sites. Perhaps this reflects, at least in part, the fact that trees on poor sites represent the survivors of an exceptionally intense and continual selection process. Other relationships that are probably involved include the relative energy demands of small, slow-growing trees compared to large fast-growing ones; the amounts and conditions of substrates that support fungi and insects that attack and kill defoliation-stressed trees.

These descriptions of susceptible and resistant stands in the Northeast represent the extremes of a range of susceptibilities. It is likely that stands will be susceptible if they are on adverse sites and contain high proportions of preferred tree species with abundant refuges. It is also likely that well-stocked, mixed, fast-growing stands free of recent disturbance will be resistant, and will suffer damaging defoliation only upon disturbance or upon invasion by a large number of larvae from adjacent areas.

But stands at opposite ends of the susceptibility spectrum are not always, indeed not usually, encountered. In New England, many intermediate stands on mesic sites are changing from susceptible to resistant as their natural development is accompanied by decreases of highly preferred species and by proportionate increases of less preferred species. Intermediate stands that contain sizable proportions of highly preferred food species can be rendered more susceptible by disturbances that "open them up" and favor once again the more light-demanding food species that are preferred by the gypsy moth. Such disturbance also can reduce the impact of ground-inhabiting gypsy moth predators by removing or drying out the litter and soil habitat so important to these animals' survival and by creating above-ground protective refuges for the insect on the trees.

We often refer to susceptible stands, particularly those on ridges, as focal sites, and research and observations have indicated that gypsy moths do spread from such stands to surrounding more resistant forests. Probably susceptible stands should also be considered as focal areas for the processes that contribute to release of gypsy moth populations. Conceptually, susceptible stands that are under more or less continuous moisture stress and disturbance support the systems for population release that are expressed in more "buffered" resistant forests following periods of water shortage or disturbance.

Literature Cited

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