Figure 1. Broad-winged Hawk nest in a Gypsy Moth defoliated mixed oak-pine stand. The nest is approximately in the center of the photograph.

THE POTENTIAL IMPACT OF GYPSY MOTH DEFOLIATION ON BROAD-WINGED HAWK REPRODUCTIVE SUCCESS

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The Gypsy Moth (*Lymantria dispar*) can defoliate large tracts of forest, thereby dramatically altering the breeding habitat of many species of birds. Some populations of breeding birds have increased or remained unchanged during large-scale insect defoliations (Magee 1971a; Moseley 1971; DeGraaf and Holland 1978). Degraaf (1987) found no significant difference in breeding species richness between foliated and Gypsy Moth defoliated forest stands in central Pennsylvania. Alternatively, entire local avifaunas (DeWire 1972) or particular species may decline (Magee 1971b; DeGraaf and Holland 1978) during these insect outbreaks. The reasons for these declines were not clear, but Palmer (1972) speculated that open-nesting species might suffer decreased nest success due to increased exposure to nest predators and parasites. I report the nest failure of a Broad-winged Hawk (*Buteo platypterus*) in a defoliated portion of the pine barrens of central Long Island, New York.

On 22 June 1981, I observed an active Broad-winged Hawk nest in a mixed oak (*Quercus* sp.)-pine (*Pinus rigida*) forest along a county road near Middle Island, Long Island, New York. All hardwoods in the vicinity had been completely defoliated by Gypsy Moth larvae. The nest, approximately 37 meters from the edge of the road, was in a fairly typical situation for Broad-winged Hawk (Titus and Mosher 1981; Crocoll and Parker 1989). Both the nest and incubating adult were clearly visible from the road as I drove by (Fig. 1).

The nest, visited five times, was 7.8 m up a Northern Red Oak (*Quercus rubra*). When I first climbed to the nest on 29 June, it contained only one nestling. The nestling was judged to be between 13 and 15 days old based on the author's previous experience with aging Broad-winged Hawk nestlings in western New York (Crocoll 1984 and unpubl. data). The nest was next visited on 14 July and the nestling still had a predominantly downy (white) head. On 16 July the nestling was gone. By this time the nest tree had partially refoliated but the nest was still easily observable from any location on the ground. The nestling would have been between 29 and 31 days old on 16 July and could possibly have fledged. For the following reasons, however, the nestling probably died before it could fledge.

In western New York Broad-winged Hawk nestlings took their first flight from the nest at about 31 days of age (Crocoll and Parker 1989). Most of these nestlings were well feathered and, in particular, had mostly feathered heads.

No nestling fledged with a predominantly white downy head. Also, as is common for many raptors (Newton 1979, 1986), newly fledged Broad-winged Hawk were always found on and around the nest several days after fledging. This was not observed at this nest in the defoliated area. Newton (1979) indicated that predation is one of the factors that influences raptors' choice of nest sites. That predation can have considerable impact on breeding success has been observed in several studies (*e.g.*, Parker 1974; Gates and Gysel 1978; Crocoll and Parker 1989). Many open-nesting species rely on the foliage of the forest canopy or shrub layer partially or completely to conceal their nests from predators or parasites. Broad-winged Hawk nests suffer predation from species such as Great Horned Owl (*Bubo virginianus*) (Crocoll and Parker 1989) and probably Raccoon (*Procyon lotor*) (Rosenfield 1984). Great Horned Owl did nest within a 0.25 km of the defoliated nest in 1981 (Crocoll pers. obs.). Thus, reduction or elimination of tree and shrub foliage by Gypsy Moth is likely to have reduced significantly the chance for reproductive success of the particular Broad-winged Hawk nest observed in this study by increasing its visibility to predators.

Removal of foliage would also have exposed the nest to increased weather stress in the event of severe weather conditions. Removal of foliage might also result in a decrease in potential prey (especially open-nesting avian species) over the course of the breeding season. This could lead to starvation of some or all young. The observation of a single nestling at this nest is suggestive of food supply problems (Crocoll and Parker 1989), but a quantitative study of the effect of Gypsy Moth defoliation on food supply should be conducted.

Thus, although a Gypsy Moth infestation may cause an increase in breeding numbers of certain species that use its larvae for food, a more thorough study of the effect of defoliation on breeding success and nestling growth needs to be undertaken to measure the moth's potential negative impact on open-nesting avian species.

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