

THE FEEDING PATTERN OF SAPSUCKERS ON PONDEROSA PINE IN NORTHEASTERN CALIFORNIA

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The Red-breasted Sapsucker (*Sphyrapicus varius daggetti*) and the Williamson Sapsucker (*S. thyroideus*) occasionally drill holes in ponderosa pine (*Pinus ponderosa*) trees in northeastern California. Their feeding has been so sporadic that the reason why the birds will attack some trees but ignore others is somewhat obscure.

On the Blacks Mountain Experimental Forest in Lassen County is a 22-acre stand of young ponderosa pines where feeding has been particularly active. The feeding pattern there was studied in 1952, 1964, and 1966. The amount of sapsucker feeding was determined by counting the number of horizontal or vertical lines of drill holes. The age of the drill holes was estimated to the nearest year for holes 3 years old or less. Age of older holes was not estimated. The stem diameter at 1.4 m above ground, relative crown dominance, relative vigor, and stem injury from other causes were noted for each damaged tree.

OBSERVATIONS AT BLACKS MOUNTAIN

According to some observers, breeding sapsuckers maintain a "sap orchard" by regularly tapping certain favorite trees near their nest to keep the sap flowing throughout summer and fall (W. C. Ziller and D. Stirling. *Forestry Chronicle* 37(4):331, 1961). At the same time, they ignore other trees except for an occasional "test hole." At Blacks Mountain there does not seem to be such a pattern of feeding. The proportion of trees tapped both recently and in the past was small. Of 2713 trees examined, only 53 trees in 1952 and 78 in 1964 and 1966 were tapped. These attacked trees were widely scattered throughout the stand.

The dispersed pattern of attack may have been the result of feeding by non-breeding birds. Ohman and Kessler (Lake States Forest Exp. Sta., U.S. Forest Serv. Res. Paper LS-14, 1964) found a similar pattern in a sugar maple (*Acer saccharum*) stand in northern Michigan. They attributed the pattern to males who often precede females to breeding areas. At Blacks Mountain, breeding birds are probably not common, although both Williamson and Red-breasted Sapsuckers have been seen there during the breeding season. Red-breasted Sapsuckers have also been found nesting in ponderosa pine trees near Eagle Lake, 23 mi. SE of Blacks Mountain (Grinnell, J., J. Dixon and J. M. Linsdale. *Univ. California Publ. Zool.* 35, 1930), but neither species prefers this habitat.

TABLE 1. Number of trees suffering past and recent sapsucker attacks in Blacks Mountain Experimental Forest, Lassen County, California.

| Year | Both past and recent attacks | New attacks only | Old attacks only | Total attacked |
|------|------------------------------|------------------|------------------|----------------|
| 1952 | 1 | 0 | 52 | 53 |
| 1964 | 31 | 7 | 40 | 78 |
| 1966 | 11 | 0 | 67 | 78 |

TABLE 2. Amount of sapsucker damage to trees with and without bole wounds in Blacks Mountain Experimental Forest, Lassen County, California.

| Year | Drill hole lines when tree had: | | Difference |
|------|---------------------------------|----------------|------------|
| | Bole wounds | No bole wounds | |
| 1952 | 24 | 8 | 16* |
| 1964 | 38 | 10 | 28** |
| 1966 | 36 | 12 | 24** |

* Significant at 5 percent level as determined by "t" test.

** Significant at 1 percent level as determined by "t" test.

I found that recent sapsucker activity tended to be concentrated on trees previously attacked (table 1). In 1952 the one recently attacked tree had been attacked before. I noted a heavy increase in feeding activity in 1964, but only 7 of the 38 freshly drilled trees were tapped for the first time. Activity slowed down in 1966, with no recent attacks found on previously unattacked trees.

In 1964 and 1966 I observed that the more heavily drilled trees suffered most from re-injury. In 1964, recently-attacked trees averaged 17 more old drill-hole lines than trees without fresh attacks (28 vs. 11, $P < 0.01$ by t test). In 1966, they averaged 48 more old drill-hole lines (61 vs. 13, $P < 0.01$). The data also suggest that when feeding pressure is high the birds often attack trees less favored in the past, and sometimes seek entirely new trees. When feeding pressure is low, however, the birds usually confine their attacks to favorite trees.

ATTRACTION OF TREES

What first attracts sapsuckers so that they return repeatedly to the same trees? Perhaps it is thin bark, which would enable the bird to reach the cambium more easily. To check this possibility, I measured the bark on the 78 sapsucker-drilled trees and on an equal number of undrilled trees in 1964, but detected no difference in bark thickness. Nor were stem diameter, relative vigor, or dominance of the trees related to the feeding pattern.

Bole wounds did seem to attract sapsuckers, however. The trees within the study area had many such wounds resulting from removal of the mature pine overstory 16 years earlier, and a few wounds from light porcupine feeding over the years. The areas surrounding these bole wounds usually were peppered with drill holes. And on the sides of the wounds were vertical rows of holes instead of the usual horizontal rings, as if the birds were trying to make maximum use of the area. Wounded trees had three times as many lines of holes as unwounded trees (table 2). In studying Yellow-bellied Sapsuckers in New Hampshire, Kilham (*Auk* 81:520, 1964) found a similar feeding pattern; i.e., the birds singled out wounded birch from among unwounded trees.

Probably the one feature of wounds that attracts sapsuckers is exuding pitch. Yet an actual wound need not be present to draw the birds. I observed a Red-breasted Sapsucker at work near McCloud, California. The bird drilled an unwounded, open-grown ponderosa pine that had exuded groups of pitch droplets below the axils of many large branches. The sapsucker then diligently followed each crescent of droplets by drilling a small crescent of holes.

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