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Techniques for
CALLING SAPSUCKERS
and finding their
nesting territories

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Techniques for **CALLING SAPSUCKERS** and finding their nesting territories

ABSTRACT

In 9 years of study in Maine, the author developed a survey method for estimating populations of yellow-bellied sapsuckers (*Sphyrapicus varius varius* L.) and delineating their territories. The birds were attracted for study by tapping hardwood dowels to imitate noises the birds make in drumming and feeding.

THE YELLOW-BELLIED SAPSUCKER (*Sphyrapicus varius varius* L.) nests in many woodlands in the northern United States and Canada, its summer range extending nearly coast to coast (Howell 1952 : 240). Although we have some information about the sapsuckers' feeding habits related to tree sap and bark, we know much less about the benefits they may provide by feeding on insects that harm trees, and we do not fully understand the sapsuckers' place in forest ecology.

To gain that understanding, we first must know how to find sapsuckers easily so they can be studied. Nine years (1964 to 1972) of development, testing, and application of sapsucker calling and surveying techniques have provided efficient methods for finding sapsuckers in their northern nesting territories.

My objective is to describe those techniques and the results of a survey made with them in 1966. Some brief explanations of sapsucker behavior and territorial requirements will assist in understanding how sapsuckers

react to imitations of their drumming and feeding sounds.

In 1964, I began developing sapsucker calling and surveying techniques based upon imitations of their drumming and feeding sounds. In 1966, I tested the techniques in Maine. Although only that study will be described in detail, some applications after 1966 suggest future uses for the techniques, and also help verify the results of the 1966 study. I used the same survey course from 1966 to 1971 for an annual population census; sapsuckers occupied 16 of the same 23 territories every year, 6 territories were occupied 5 years, and 1 territory was occupied 4 years (*unpublished data*).

In 1970, I adapted the techniques for pesticide monitoring near Oxbow (lat. 46° 26' N.), Aroostook County, Maine, where 74 sapsuckers served as indicators of the effects of Accothion on birds during a 210,000-acre spruce budworm spraying project. (The use of trade names does not constitute official endorsement by the U. S. Department of Agri-

culture.) Sapsuckers proved to be an ideal species for monitoring (*Rushmore 1971*). In 1972, I monitored 103 sapsuckers in the same area, when Zectran was used on a 500,000-acre spruce budworm spraying project (*unpublished report*).

The survey techniques were used by another person in 1970 to begin a sapsucker population census in New Brunswick, Canada. And I have taken many photographs of sapsuckers, found by calling, at their nests and feeding trees. This and other work is included in the 1,552 hours that I have spent observing sapsuckers and their behavior within their nesting territories, during the summers of 1964 through 1972; and it supports my confidence in these techniques.

METHODS

Drumming Imitations

Several authors have reported that sapsuckers can be called by imitating their normal drumming. Saunders (1929 : 451) found that sapsuckers drummed in response when he rapped a stick on a tree stump. Bent (1939 : calling three sapsuckers by rapping a fountain pen on a dead tree. Howell (1952 : 246, 267) imitated drumming to attract yellow-bellied sapsuckers of the three western races. Lawrence (1967 : 34) used a small rock or the end of a pencil to imitate drumming. I also briefly outlined my techniques (*Rushmore 1969 : 5 and 1971 : 89*). All of these imitations of the loud, normal drumming are basically similar. None of those reports fully describes a systematic survey technique or imitations of other sounds.

Although a wide variety of objects can be used to imitate the drumming, I used two 1-inch hardwood dowels, one 18 inches long, the other 7 inches. These sizes were convenient to use, they produced a desirable tone, and they induced sapsucker responses at long distances. I put a screw-eye into the end of each stick and fastened them together with a 2-foot length of cord. With the cord looped over my belt, the sticks were ready for use when

needed, but could be dropped quickly when binoculars were used.

To imitate the loud, normal drumming of an adult male sapsucker, I held the larger dowel vertically about 4 inches from the top, between the thumb and one finger, and struck it about 6 inches from its bottom with the small stick, held at one end.

Sapsucker drumming can be distinguished easily from the drumming of other woodpeckers, because only the sapsucker uses the slower, spaced taps at the end (*Saunders 1929 : 451*). To imitate the male's loud drumming, I made a series of hard, short rapid taps lasting about 1 second, with a few slower, louder, spaced taps at the end, like this:

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The time, length, and number of taps can vary widely and still produce good results. A series of these drummings at one location generally are required to get a response. The sequence that I used was to drum about 5 seconds and pause 10 seconds, then repeat that series 3 more times. If no response was received, I paused 1 minute and then repeated the first sequence. Then paused 2 minutes and — if there had been no response — repeated the first two sequences. These four sequences required about 8 minutes. First responses often occurred during the pauses.

New Imitations

I had planned to use only the imitation of the loud, normal drumming for my study, but I developed three new imitations in April and May 1966 which substantially improved the survey efficiency. These were different from drumming; I was not aware of any earlier use of them. Sapsuckers are highly attracted to imitations of their feeding or drilling on live bark. The bark-feeding taps have a much softer tone than drumming, and they occur in short series of very rapid taps, often around the inside edges of existing sap holes. This tapping may be illustrated as:

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The bark-drilling is louder and slower than the bark feeding, but much softer in tone than drumming. These sounds are easily imitated with the same sticks, but the larger dowel is

held with the full hand to reduce the resonance, and much less force is used than when drumming.

Better response was also obtained from some very reluctant birds by imitating two birds. Since the drumming spots chosen by males and females often vary in resonance, it is easy to imitate two birds by varying the resonance of the imitation. To do this, I first imitated the male's loud drumming as previously described. Then I immediately grasped the stick with the full hand at the same place and produced a softer, shorter drumming of the same pattern. This muted drumming imitated the second bird.

In general, I used the male's loud, normal drumming for the first 4-minute sequence at each station. If more calling was needed, I tried a combination of drumming and the male's muted bark-feeding imitations. When a sapsucker came within 200 feet, but would not approach my loud drumming, the feeding imitation generally brought it to within 50 feet. Then, using the dowels, or softly tapping a pencil or pen on the metal of my binoculars to imitate a feeding or drilling sapsucker, I could generally bring the bird closer and into good position for positive identification — without requiring me to approach the bird and risk frightening it. Some extremely reluctant birds required the reassurance provided by one or two soft, normal drummings mixed with the feeding imitations.

Finding Sapsucker Territories

Finding sapsucker territories is the key to intensive long-term study of these birds on their nesting range. For this study I defined a sapsucker territory as the area one pair of adult birds will occupy, nest in, feed in, and defend for at least one nesting season. The approximate boundaries are established well before the incubation period; and the adult sapsuckers will aggressively defend the territory and its major feeding trees by evicting non-family adult sapsuckers, at least during the period between nest-hole completion and the time migrant sapsuckers begin arriving in the fall.

Although there are some differences, this

definition is essentially in agreement with Lawrence's (1967 : 32) "woodpecker territorial unit." In my study I included as territory that part of the range that contained major feeding trees and was defended against other sapsuckers and my imitations.

On 20 and 21 April 1966, I laid out six survey lines on the Penobscot Experimental Forest (lat. 44° 50' N.), near Bradley, Penobscot County, Maine. The forests in this area generally contain a mixture of conifers and hardwoods, in a wide range of tree sizes and stand densities. The lines varied in length from 2,000 to 6,400 feet and totalled 5 miles; they were on gravel or logging roads, all within woodlands, and were well distributed throughout the 4,000-acre forest.

The area I considered to be covered effectively by the survey was 400 feet each side of the lines. Sixty census stations were located at 400-foot intervals along these lines, and they provided a 12-percent survey of the forest. Each station was visited eight times in 1966, twice during each of four periods: 2 to 18 May (in the pre-nesting period); 3 to 16 June (in the nesting period); 19 July to 2 August (after nesting); and 22 August to 2 September (before migration). Intensive observations also were made within some individual territories on other dates.

At each visit to a station, drumming and feeding sounds were imitated as previously described. Sapsucker responses were recorded on a new field-data map for each station; maps made earlier were not reviewed in the field. Preprinted maps permitted fast recording. The station was in the center of four circles spaced 100 feet apart; a line through the center represented the road and served to orient the map. A line was drawn from my position to each new estimated position of a responding bird. The estimated distance and direction, the time, the manner of response (drum, call, or silent approach), and age and sex of the bird, if determined, were all recorded for birds either heard or observed. About 3½ hours were needed for one round trip over each mile of survey line.

Survey work generally was done between 0830 and 1600 hours, Eastern Daylight Saving Time. Binoculars used were 8.5 x 44. While

at the stations I used no concealment or special clothing. I stood at the road edge, and in shade if it was available.

RESULTS AND DISCUSSION

Sapsucker Response to Imitations

I estimated the population of sapsuckers in the survey strips to be 138 birds: 2 adults and an estimated 4 juveniles in each of 23 territories. These birds responded to imitations of drumming and feeding sounds 341 times — counting a bird only once each trip. Adults responded 237 times and juveniles 104. Adults included 77 males, 50 females, and 110 whose sex was unidentified. Juveniles included 26 males, 59 females, and 19 whose sex was unidentified. Some juveniles that I recorded as females might have been males without red on their throats, but all juveniles recorded as males had red on their throats, as commonly occurs even on some nestlings in this region.

Sapsucker response to imitations varied with the seasons. Within the 23 best territories, on all 8 trips over the survey lines, I obtained responses from adult or young sapsuckers during 61 percent of the visits. The percentages of responses obtained during the four seasons were: pre-nesting 87, nesting 61, post-nesting 54, and pre-migration 41.

Response of both males and females was good from the time the birds arrived in the spring until actual nesting began, then responses steadily decreased. During incubation of the eggs, neither the male nor female was available for response while in the nest. The bird outside frequently was busy obtaining food before its next turn in the nest and generally required more coaxing before it would respond to imitations.

In known territories where I had not obtained a response on a particular day, it was easy to enter the territories later and find the birds by using the imitations, or by going to the nest or a feeding tree that I had found earlier. This verified that they had been present but refused to respond.

This apparent lack of concern did not extend to the actual encroachment of strange

sapsuckers. I saw many aggressive territorial defenses during all seasons, and strong defense continued until migrant sapsuckers began arriving in the fall. Only then were strange adult sapsuckers tolerated within the territory, and only on the sap trees not being used by family members. Occasionally, before migration, juvenile sapsuckers that had strayed from an adjacent territory within several weeks after fledging were tolerated within a territory, but they were driven from sap trees being used by family members. Even the local juveniles participated in this defense. This is best observed when the local juveniles are color-banded (*Rushmore 1971*).

The increasing independence of juvenile sapsuckers sharply increased their response to imitations by late July. (Earlier, adults commonly drove their juveniles away from my imitations, often with vigorous attacks.) When I was within a territory, there generally was at least one juvenile that quickly left the sap-tree area and came to my imitations. That response was very helpful during my 1970 and 1972 pesticide monitoring, when I wished to verify the survival of color-banded juveniles (*Rushmore 1971*: 98).

The weather also seemed to have some influence on responses. Fewer responses were obtained when strong winds whipped tree branches together and made excessive noise. Then I could not hear birds unless they were close. Heavy rain and snow seemed to reduce responses on 9 May when some sapsuckers took shelter in old sapsucker nests. Warm, gentle rain and calm wind did not seem to deter responses. At temperatures well above 80°F, birds seemed to be less active; otherwise, temperature and cloud cover seemed to have little effect on the responses I observed.

Supplemental observations suggested that best response after midsummer may be obtained from about 0600 to 1000 hours EDT. Early spring drumming and calling among sapsuckers, unprovoked by imitations, appeared to occur at peak intensities on calm, sunny days, and those were optimum for surveys. Some birds may have been missed on surveys made during strong wind and rain, and these generally required another trip over a line.

First Responses

Sapsuckers make two distinct calls. Most frequently heard was a call that to me resembled *CREE*; it was usually repeated several times. It often was used by unsuspecting birds to answer my drumming. Birds using it generally responded further. The other call resembled a drawn-out *CAY*, given when they were alarmed. Birds voicing it sometimes would not respond further to imitations of any kind; but if they did, the drilling and feeding imitations worked best.

Throughout the survey the most frequent first response among 237 birds was calling: 49 percent responded by calling, 28 percent by drumming, and 23 percent by coming without either calling or drumming. Most of the drumming response occurred in the pre-nesting season, when it exceeded calling. Later, calling exceeded drumming. Most of the silent approaches occurred during the pre-migration season.

Among 192 adults that made their first response by drumming were 56 males, 18 females, and 118 whose sex I could not determine. I saw only four juveniles drum in response to my imitations; their responses occurred 29 July and later; one of these juveniles was female and one male; I could not determine the sex of the other two. Birds responded more by calling. Drumming often required a flight to a known drumming place.

Calling Birds Nearer

Among 257 sapsuckers that responded, I called 70 to within 100 feet, and many of them came much nearer — often to within 20 feet or less. Of the 189 adults, 120 came; of the 68 juveniles, 60 came within 100 feet. Birds that responded repeatedly but would not leave their territory and come to the stations could easily have been approached.

Adults were first seen at distances averaging about 180 feet and were called to within distances averaging 40 feet. For juveniles these distances were about 120 and 35 feet. Many of the adults in the 23 territories soon were called to within 100 feet. The first trip in early May brought in 43 percent of the females and 56 percent of the males. After the second trip in May, 74 percent of the females and 91 percent of the males had come within 100 feet.

My imitations of feeding and drilling sounds were more effective for bringing sapsuckers close to me than was the imitation of their loud normal drumming. Among 162 sapsuckers that I called to within 100 feet, 82 percent came to the feeding-drilling imitations, 16 percent came to the loud drumming, and 2 percent came to the muted drumming.

The feeding and drilling imitations seemed to convince sapsuckers that another sapsucker was nearby. They often came within 30 feet and searched the lower trunks of 10 or more trees in a circle around me, and they would return repeatedly if the feeding imitations were used as they started to leave. It was not unusual for a bird to fly directly toward me and then zoom off when about 5 feet away; I assumed they believed another sapsucker was at my location, even when I was not near a tree. My lack of concealment did not seem to deter them — until after they had searched the trees — provided I did not move except to make the imitations when the birds did not see my movements. Imitations of bark feeding were especially useful for bringing reluctant birds close, to induce responses late in summer, and to coax birds into position for easy observation and identification.

Territories Found

Sapsucker responses revealed feeding, nesting, and defense locations within their territories, but allowed only approximate estimates of territorial boundaries. That estimate was made later by making a composite map from the information on the eight maps for each station; the number of response locations averaged 27 per territory and varied from 13 to 52. Enclosing these locations with a line gave a rough estimate of the territory boundaries.

These survey techniques do not enable an observer to remain at stations and precisely identify all territorial boundaries. But after a territory has been found, it can be entered for more intensive studies, and I later verified the boundaries of several territories that way. Often the conflicts between sapsuckers from two different territories indicated boundaries that later proved to be very stable — even for several years. My imitations frequently

seemed to perpetuate those conflicts, especially in early spring before the birds had settled their boundary disputes.

Sapsucker territories occupied about 47 percent of the survey strips. An unoccupied buffer zone occurred between each of 21 territories and the adjacent one, and the buffer generally was at least as large as a territory. The other two territories were separated only by a road, which served as a boundary for the same male (banded) for at least three years; adverse habitat surrounding these territories apparently forced this crowding.

The 23 territories were at least partly within the survey strips. Nineteen of the 23 final territories were found on 20 and 21 April 1966, by using a 4-minute drumming sequence at each station during survey line establishment. However, I withheld final judgment of the approximate territory location until after all eight trips over the survey lines had been completed on 2 September 1966. Four more territories, well beyond the 800-foot strips, were occupied, but I discarded them when reliable responses were no longer obtained in late summer; that is typical of distant birds.

The existence of all 23 territories became apparent during the first two trips over the survey lines in May. No new territories were found after that, and I believe these were the only territories that occupied part of the 800-foot survey strips. As noted earlier, 16 of these same territories were occupied every summer during the 6-year population census that followed this study.

The 23 territories averaged about 7.6 acres in size, and their approximate dimensions were 720 by 460 feet. That acreage agrees reasonably well with Lawrence's (1967 : 31) "territorial ranges" of 5.1 and 5.4 acres. My territories generally were smaller when the habitat or adjacent sapsuckers compelled crowding of adults, and territories normally were larger when there was less competition. Similar situations occurred in Aroostook County, Maine, in 1970 and 1972 (*Rushmore 1971; unpublished report 1972*).

There was a common reaction to my imitations that helped identify a territory boundary. Before nesting, some sapsuckers would leave their territories, come part of the dis-

tance toward me, and challenge my drumming. Then they normally would retreat as I came closer and drummed, and they would stay and defend only within their territories.

These defenses were aggressive and included close approaches to my imitations. My drumming frequently went unchallenged when 800 or more feet from known territories, then would be challenged promptly at about 400 feet. The same birds occasionally would come to several stations within their territory, their approach being traced by frequent responses recorded on maps.

Unmated birds, and mated birds in territories with unsettled boundaries, often came farther than did well-established or paired adults. For example, an apparently unmated male followed my drummings for 1,200 feet on 28 April 1966. On 7 May 1968, an apparently unmated female, with all the adult markings, except that she had no red on her head, followed my drummings for 1,600 feet, the longest distance I have recorded. These are exceptionally long distances, but similar actions occur with enough frequency so that an observer should be aware of them. These actions are easily identified when they occur, because the birds drum or call frequently and reveal their routes from one station to another.

Response of Other Woodpeckers

Other species of woodpeckers occasionally responded to my imitations of sapsucker drumming. Their responses included drumming and gradual approach. I have seen and heard the normal drumming of our five other common woodpeckers, and these differed from the drumming of the yellow-bellied sapsucker in speed, loudness, or drumming-place selection; and they did not include the sapsuckers' spaced taps at the end.

Occasionally, I saw and heard sapsuckers omit those spaced taps, but normal drumming soon was resumed. I have never seen another woodpecker use the spaced taps as an ending, and that is a key element of this survey technique. When the taps occurred, I was confident that it was a sapsucker—no matter how far away it was, nor whether I saw the bird.

Sapsuckers were the most abundant woodpeckers I observed on the study area, accounting for 82 percent of the 348 woodpecker observations. Among the other woodpeckers were 9 percent flickers (*Colaptes auratus*), 6 percent hairy woodpeckers (*Dendrocopus villosus*), 1.5 percent downy woodpeckers (*Dendrocopus pubescens*), and 1.5 percent pileated woodpeckers (*Hylatomus pileatus*). The few arctic three-toed woodpeckers (*Picoides arcticus*) were observed when sapsuckers were not present; these were not included in this summary.

Drumming Versus Birding

Although I did not originally plan to compare the drumming technique with other techniques, I did record sapsuckers observed while making my silent return trips along each of the survey lines. This provided a basis for only a rough comparison of the drumming and birding techniques, because I walked faster than normal during birding, and I spent more time on the survey. However, my silent return trips never located as many sapsuckers as the imitations had. Birds seldom came close enough or stayed long enough to be fully identified. My imitations located 2½ to 9 times more adult sapsuckers.

Even during the spring drumming season it is common for sapsuckers to do no voluntary drumming for periods of several hours. Therefore, an advantage of these techniques is that

they permit observation of sapsuckers at the time an observer wants them. Many more sapsuckers can be located in a short time than would be possible by depending on the birds' unprovoked sounds or actions.

The calling and surveying techniques should prove useful in sapsucker studies of many types. They should be especially helpful in activities such as pesticide monitoring, population census, banding, photography, birding, and national programs such as the Breeding Bird Census and North American Nest Record Card Program.

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