SAP FEEDING ON BIRCH TREES BY AMERICAN THREE-TOED WOODPECKERS

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The American Three-toed Woodpecker (*Picoides dorsalis*) is a beetle specialist that feeds primarily on phloem-boring insects that occur only in the inner bark and cambium of attacked trees; apparently it seldom feeds on sap from trees (Murphy and Lehnhausen 1998, Leonard 2001). In Quebec, Imbeau and Desrochers (2002) observed it to spend only 0.6–1.4% of its time feeding on sap from Black Spruce (*Picea mariana*) trees, and in northern Manitoba Villard (1994) found only one individual feeding on sap. Short (1974, 1982) reported that *P. dorsalis* presumably does not drill its own holes for sap but occasionally takes it from wells drilled by sapsuckers (*Sphyrapicus* spp.). Villard (1994) speculated that sap feeding is less well developed in the American Three-toed than it is in the European Three-toed Woodpecker (*P. tridactylus*) because the sap-feeding niche in North America is already taken by sapsuckers, a conclusion questioned by Imbeau and Desrochers (2002). I found no definitive published reports of *P. dorsalis* drilling and feeding from sap wells in birch trees (*Betula* spp.).

However, on 26 August 2007 on the Kenai Peninsula, Alaska, near the town of Soldotna (60° 29′ N, 151° 03′ W), I watched a male American Three-toed Woodpecker drum four times on a dead aspen (*Populus tremuloides*), then fly down and land <50 m away on a birch tree (*Betula kenaica*; diameter at breast height [dbh] 22.1 cm) riddled with numerous old (gray) and fewer recently drilled (brown) sap wells, where it began to seek out and presumably feed at the recently drilled sap wells. Within a minute two others of the same species, an apparent adult female and an immature, joined it. All three investigated recently drilled sap wells in the first tree and later in two adjacent birch trees (18.1 cm and 34.7 cm dbh). Most old and recently drilled wells were oriented in horizontal rows 11–13 cm long with each well approximately 10 mm long, 6 mm high, and spaced 11 mm apart (Figure 1). Several nearby accessible and recently drilled wells were 6 mm deep (Figure 2). The first birch tree contained an estimated 120–130 rows of wells, all on the west-facing side of the tree. The three woodpeckers sought out, carefully inspected, and pecked into the recently drilled wells in the three birch trunks for about five minutes before departing closely together.

Previously, on 1 and 2 September 2005, I had observed hundreds of yellowjackets (*Vespula* sp.) and several butterflies (*Nymphis antiopa*) feeding on sap emanating from numerous recently drilled sap wells in three birch trees about 100 m from the 26 August 2007 observation (Figure 3). Over the past 30 years I also periodically observed numerous birch trees with similar horizontal rows of sap wells in mixed boreal forests throughout the northwestern lowlands of the Kenai Peninsula but was uncertain of their origin. I did not observe similar drilled sap wells in numerous Black Spruce, White Spruce (*P. glauca*), aspen, or cottonwood (*P. balsamifera*) trees. The sap of Paper Birch (*Betula papyrifera*) apparently has a relatively high sugar concentration (16%) compared to other species of trees (Southwick and Southwick 1980).

Although the Black-backed Three-toed (*Picoides arcticus*), Hairy (*P. villosus*), and Downy (*P. pubescens*) woodpeckers also inhabit the Kenai Peninsula, they apparently do not drill sap wells in birch trees, although the Hairy and Downy may occasionally take sap from wells drilled by sapsuckers (Dixon and Saab 2000, Jackson and Ouellet 2002, Jackson et al. 2002). The Red-naped Sapsucker (*Sphyrapicus nuchalis*) is not found in Alaska, and the Red-breasted (*S. ruber*) breeds primarily in coastal forest in the southeastern part of the state (Kessel and Gibson 1978, Armstrong 1995, Walters et al. 2002b). On the Kenai Peninsula, the Red-breasted is accidental in the fall and rare in the winter, only on the southern coast of the peninsula (West 1994).

Figure 1. Older sap wells in birch tree used by American Three-toed Woodpeckers, 27 August 2007.

Photo by Theodore N. Bailey

Figure 2. Recently drilled sap wells in nearby birch tree, 23 September 2007.

Photo by Theodore N. Bailey

Figure 3. Numerous recently drilled sap wells in a birch tree that attracted hundreds of yellowjackets (*Vespula* spp.) and several butterflies (*Nymphis antiopa*), 2 September 2005.

Photo by Theodore N. Bailey

Yellow-bellied Sapsuckers (*S. varius*) often drill holes for sap in birch trees (Kilham 1964, Eberhardt 2000), but in Alaska they are of casual occurrence only (Checklist of Alaska birds, www.uaf.edu/museum/collections/bird/projects/checklist.pdf). Almost all sightings of Yellow-bellied Sapsuckers in Alaska are from the eastern interior part of the state (Gibson and Kessel 1992); that species is not known on the Kenai Peninsula (see West 1994).

Interestingly, Walters et al. (2002a) cited a personal communication by B. Scher that holes drilled in birch trees in interior Alaska presumably by Yellow-bellied Sapsuckers, and reported by Kessel (1986), might have been made by American Three-toed Woodpeckers. The sap wells I observed appear identical to the spacing and horizontal rows of sap wells shown in Figure 2 of Kessel (1986), wells she believed were "primary sap bands" (from Tate 1973) and attributed to the Yellow-bellied Sapsucker. The sap wells I observed on the northwestern Kenai Peninsula were always in horizontal rows, not in vertical chains as often reported for those made by Yellow-bellied Sapsuckers (Kilham 1964, Eberhardt 2000).

My observations, the apparent physical differences between the sap wells of Yellow-bellied Sapsuckers and those of American Three-toed Woodpeckers, the absence of Yellow-bellied Sapsuckers on the Kenai Peninsula, and the numerous old sap wells in birch trees drilled by perhaps many generations of American Three-toed Woodpeckers on the Kenai Peninsula (and perhaps elsewhere in Alaska) suggest that sap feeding on birch trees by American Three-toed Woodpeckers may be more common and widespread than previously realized or may vary in frequency across the species' range.

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