

CEDAR WAXWINGS (*BOMBYCILLA CEDRORUM*) FEEDING ON BIRCH SAP AT RED-NAPED SAPSUCKER (*SPHYRAPICUS NUCHALIS*) SAP WELLS

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ABSTRACT—In late June 2020 in western Montana we observed up to 10 Cedar Waxwings (*Bombycilla cedrorum*) feeding on tree sap at Red-naped Sapsucker (*Sphyrapicus nuchalis*) sap wells excavated on 2 limbs of a Water Birch (*Betula occidentalis*). These observations constitute (a) the 1st report of waxwings feeding at sap wells created by sapsuckers of any species; (b) the 1st report of waxwings feeding on tree sap in early summer; and (c) the 1st report of the consumption of birch sap by this waxwing species. The Cedar Waxwings may have sought tree sap because of the limited availability of early-summer sugary fruits at the time of our observations in combination with the presence of new clusters of sap wells created by at least 1 pair of sapsuckers near where the waxwings were beginning to breed. The prevalent sugars in birch sap (glucose, fructose) are also those most efficiently assimilated by Cedar Waxwings and may have contributed in attracting the waxwings to the sapsucker wells.

Key words: *Betula occidentalis*, *Bombycilla cedrorum*, Cedar Waxwing, feeding behavior, Montana, Red-naped Sapsucker, *Sphyrapicus nuchalis*, Water Birch

Fruits form the major part (84%) of the annual diet of the Cedar Waxwing (*Bombycilla cedrorum*) (Tyler 1950; Witmer 1996; Witmer and others 1997), making it one of the most frugivorous bird species in temperate North America. Insects and flowers comprise 12 and 4% of the annual diet, respectively, and are consumed during spring and summer (Witmer 1996). Rarely are Cedar Waxwings reported to feed on tree sap (Witmer and others 1997). The few published cases of this behavior generally mention multiple birds obtaining sap oozing from wounds and broken twigs of maples (*Acer* spp.) in winter and early spring (Beal 1882; Rogers 1907; Leatherman 1992). Bohemian Waxwings (*Bombycilla garrulus*) are also reported to feed on tree sap oozing from wounded birches (*Betula* spp.) and maples during spring (Bent 1950; Witmer 2002), though details remain vague. Cedar Waxwings are not listed among 25 bird species that feed on sap at Yellow-bellied Sapsucker (*Sphyrapicus*

varius) sap trees (Foster and Tate 1966; Walters and others 2002a), nor have they been reported feeding at sap wells of Red-naped Sapsucker (*Sphyrapicus nuchalis*), Red-breasted Sapsucker (*Sphyrapicus ruber*), or Williamson's Sapsucker (*Sphyrapicus thyroides*) (Ehrlich and Daily 1988; Walters and others 2002b; Gyug and others 2020).

On 23 June 2020 at about 10:15 MDT, while conducting a breeding bird inventory on the Weaver Ranch near St. Ignatius, Lake County, Montana, we tracked a male Red-naped Sapsucker to an isolated stand (47.32451°N, 114.12625°W; 861 m elevation) of 2 multi-stemmed Water Birch (*B. occidentalis*) about 20–30 m from the margin of a large stand of Quaking Aspen (*Populus tremuloides*) mixed with more birch (Fig. 1A). Here, we found the sapsucker perched at a series of sap wells on 1 limb adjacent to a 2nd limb with another set of wells (Fig. 1B). The main trunk of the birch containing the sapsucker workings was 20.8 cm DBH, the 2 limbs with the workings split from the main trunk and each other 165 cm above ground and were about 10 cm diameter at the sap wells. Sap wells were present about 200 cm from the main trunk midway up the limbs and were concentrated for about 30 cm along each limb. Each set contained at least 150 sap wells that girdled each limb, with wells more extensive on the upper than lower surfaces. Air temperature at the time was about 23°C. Our observations were made from a distance of about 15–20 m and aided by use of 8× and 10× binoculars.

Shortly after we arrived at the birch, we noticed a Cedar Waxwing feeding on sap at wells on the adjacent limb about 0.7 m away from the sapsucker. When the male sapsucker departed from the tree about 120 s after our arrival, a 2nd waxwing appeared and fed at the sap wells where the sapsucker had been. When the male sapsucker returned to his original location about 60 s later, the waxwings retreated,



FIGURE 1. Red-naped Sapsucker (*Sphyrapicus nuchalis*) sap wells in Water Birch (*Betula occidentalis*) near St. Ignatius, Lake County, Montana. (A) The multi-stemmed birch cluster showing the location of the sap wells (white oval); (B) Close-up showing the 2 sets of sap wells (white arrows) where Cedar Waxwings (*Bombycilla cedrorum*) were observed feeding on tree sap on 23 June 2020. The sapsuckers favored the closer (upper) set of sap wells. The photos were taken on 29 July when most sap wells were dry.

either departing from the birch or moving to different locations within the multi-trunk cluster. This back-and-forth exchange of sapsuckers and waxwings at the sap wells happened about every 30–90 s during our presence for a period of 20 min, and involved up to 10 waxwings and a 2nd (female) Red-naped Sapsucker. The male sapsucker was always the dominant bird when accessing sap wells, and he and the female tended to favor the same set of wells, though never feeding in the birch at the same time. The waxwings fed at both sets of sap wells for 15–45 s at a time, usually 1 bird concurrently at each, and always departed when a sapsucker approached the wells they were at. On 1 occasion we saw a waxwing displace another as it fed on sap at 1 set of wells while a 3rd waxwing ate sap from wells on the 2nd limb. The only other animals we saw attempting to gain access to the sap wells on this date were a female hummingbird and a Mourning Cloak (*Nymphalis antiopa*) butterfly, but neither succeeded while the waxwings and sapsuckers were present, which was almost constantly.

The beak tips of the sapsuckers and waxwings were visibly wet, a sign that they were feeding on sap and not small insects that may have been attracted to the sap. We also noted swallowing motions by both species but no movements by either that appeared to be an attempt to catch an insect. Nor is it likely the waxwings were consuming sap only for its water content; water was present in 2 nearby streams. The logical explanation for our observations is that the

waxwings were attracted to the sugars in the tree sap.

We revisited the sapsucker tree for 60 min (09:55–10:55 MDT) on 29 July 2020 (air temperature = 27°C). Most of the sap wells were dry except for a few of the top-most on each limb. In the absence of birds, the wells with sap were visited almost constantly by up to 6 Bald-faced Hornets (*Dolichovespula maculata*) at a time and 2 Mourning Cloak butterflies, with numerous flies, including blow flies (Diptera: Calliphoridae), also feeding on patches in and near the wells where oozing sap had evaporated. There was no bird activity at the wells until 10:35, at which time a male Downy Woodpecker (*Picoides pubescens*) landed on 1 limb at the base of the set of sap wells visited by the hornets and was almost immediately displaced by a juvenile Red-naped Sapsucker, who then proceeded to feed for the next 20 min on sap (as evidenced by the wet tip of its beak) at the top-most wells where the hornets had fed, in bouts lasting up to 45 s. Cedar Waxwings did not visit the birch during the time we were present, nor did we detect them nearby, but our observations of the juvenile sapsucker and insect activity at the wells demonstrated that tree sap was still accessible to the waxwings, albeit in reduced amounts.

Three aspects of our observations are worth comment. First, our report is the 1st for waxwings of any species feeding on tree sap at wells created by sapsuckers (Foster and Tate 1966; Ehrlich and Daily 1988; Witmer and others 1997; Witmer 2002), and adds to the list of

species whose consumption of tree sap is facilitated through the actions of these woodpeckers. The suggestion that sapsuckers function as keystone species by creating access to food and nest sites to the benefit of other animal species (Ehrlich and Daily 1988; Daily and others 1993) is supported by our observations, but Cedar Waxwings as a species may be opportunistic in their exploitation of sapsucker sap wells rather than being especially reliant upon them, because many waxwings nest successfully in locations where sapsuckers are not present (P. Hendricks, pers. obs.).

Second, previous published observations of waxwings feeding on tree sap were made in winter and early spring (Beal 1882; Rogers 1907; Bent 1950; Leatherman 1992). Our observations are unusual in that they were made early in the nesting season (late June), which in Montana extends from late May through late August (Marks and others 2016). We often saw Cedar Waxwings on the ranch traveling in pairs throughout June, signaling that breeding was about to begin or already underway. The waxwings may have been attracted to sap at the sapsucker wells because of a relative lack of ripe early-summer fruits, which form a significant portion of their summer diet (Thompson and Wilson 1979; Witmer 1996).

Third, all previous reports of Cedar Waxwings feeding on tree sap pertain to maples (Beal 1882; Rogers 1907; Leatherman 1992). In the case we report here, the waxwings fed on the sap of Water Birch, probably for the sugars contained in the sap. We assume sugar composition and concentration in Water Birch sap is representative for other birch species, but published data for Water Birch are lacking. Maple sap and birch sap are essentially dilute sugar solutions, about 2.0–4.1% concentration in maples and about half that concentration in birches, or 0.3–2.6% (Tate 1973; Kallio and Ahtonen 1987; Ball 2007; Łukasz and others 2014); both maple sap and birch sap are used to create syrups for human consumption (Ball 2007). However, maples and birches differ in the sugars that predominate in their sap, with maple sap mostly sucrose, and birch sap mostly glucose and fructose. Cedar Waxwings are much better at absorbing the sugars found in birch sap, with assimilation efficiencies of 92 and 88% for glucose and fructose, respectively, whereas assimilation efficiency is 61% for sucrose (Martínez del Rio and

others 1989; Lotz and Schondube 2006). Sugary fruits are relatively scarce for waxwings in late spring (Witmer 1996) when sapsuckers are making and feeding at new sap wells in birches, tree species often used for this purpose across the range of sapsuckers (Kilham 1964; Foster and Tate 1966; Tate 1973; Eberhardt 2000; Walters and others 2002a, 2002b). Birch sap, when accessible, could fill an important gap in the diet of adult Cedar Waxwings at the commencement of nesting, and its availability, at least locally, is facilitated through the activities of sapsuckers.

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