

BEAVER LABOR SERVES UP SPRING SWEETS FOR BUTTERFLIES

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Examples of a single animal species facilitating foraging opportunities for another species are many. Buzzards taking advantage of lion kills and eagles feeding on the leftovers of bear-ravished salmon are familiar examples. Invertebrates, such as crabs feeding on the remains of a shark meal or flies feeding on a wolf-killed moose, are also well known consumers of leftovers.

Many insects are attracted to fermenting or sweet exudates, as anyone that has battled a hornet or yellowjacket wasp over a slice of watermelon can attest to. Tree sap may be high in sugar, hence injuries to trees may present opportunities for such sap exudate feeders. For example, Yamazaki (2007) observed three ant species (Hymenoptera: Formicidae) two wasp species (Hymenoptera: Vespidae and Sphecidae, respectively), and two beetles (Coleoptera: Scarabaeidae) feeding on sap exuding from injuries caused by cicada (Homoptera: Cicadidae) feeding activities. Thus, it should not be surprising to find insects attracted to injuries on trees caused by vertebrates, although reports of such incidences have been rarely recorded.

Characteristic of American Beaver (*Castor canadensis*) is the ability to cut down various tree and shrub species of all sizes for food, lodging and dam building activities (Belovsky 1984). Although cutting takes place throughout the year, cutting in late winter and early spring affects the trees they cut in a unique way (Scheffer 1952, Kindschy 1989). Trees cut at this time of the year tend to “sap out” as a result of mobilizing large quantities of sap that is moved from below-ground storage structures to the tree crown in the preparation for leaf flush and spring growth (LaRochelle et al. 1998).

In this note we describe an inconspicuous, and to our knowledge previously unreported, example of

several insects benefiting from the foraging activities of beaver in early spring near the city of Prince George, BC. Foraging by insects on six stumps of beaver-cut aspen (*Populus tremuloides*) and willow (*Salix* sp.) were observed on 18 April 2009 over a 3-hour period in the mid-afternoon between 1400 and 1700 h (Figure 1). Exactly when the stumps had been cut by the beavers was not apparent, but it appeared to have had occurred sometime in the weeks prior to observing the phenomenon. Insect types observed feeding on the stumps were mourning cloak butterflies, *Nymphalis antiopa* L. (Lepidoptera: Nymphalidae) along with flies of the family Calliphoridae and others in the suborder Brachycera as well as solitary bees in the family Andrenidae.

That insects such as butterflies feed on sugar- and amino acid-rich sap from broadleaved trees such as oak that are mechanically damaged (*i.e.*, broken branches and cracked tree trunks) is well documented (Ômura et al. 2000, Ômura and Honda 2003). This appears to be an important food source for insects such as the mourning cloak, which overwinters in adult form and emerges in early spring when more typical and preferred food such as nectar and rotting fruits are scarce (Midolo 2009).

All insects that we observed on stumps appeared to be feasting exclusively on the sap exuding from the cut surface of the stump. Although boring carpenterworms are known to stimulate an exudation of oak tree sap to attract sap-eating insects for prey (Yoshimoto et al. 2005, Yoshimoto and Nashida 2007), beavers were obviously not cutting trees to stimulate sap production and attract insect prey. We also did not observe any other interspecific predatory behaviors at beaver-cut stumps. Rather, all insects appeared to be benefitting from free access to sap



Figure 1. Here a mourning cloak butterfly and other insects (above and on the top of the stump) are seen foraging on the sap produced and exuded from the beaver-cut surface of an aspen tree. (Prince George, BC April 18, 2009).

exudate resulting from previous beaver cutting (Figure 2) and as such appeared to be part of a form of symbiotic commensalism between a vertebrate and invertebrate sap-feeding herbivore which to our knowledge has only previously been reported for insects frequenting sap wells drilled by woodpeckers such as the Yellow-Bellied Sapsucker (*Sphyrapicus varius*; Alsop 2001).

Beavers are known to enhance leaf beetle foraging through changes to cottonwood leaf chemistry that occurs in response to beaver cutting (Martinsen et al. 1998). However, this appears to be the first report of beavers inadvertently, but more directly, providing this energy-rich food source for butterflies and other insects that would otherwise have no access to the exudates of these aspen and willow trees. In fact, in the absence of sap from these trees it is curious to

consider exactly what food sources, if any, would be available to insects at the time of year we observed this phenomenon. In this instance, sap feeding insects enjoy the spoils of a labor they themselves could never perform, that of beavers shearing off a tree at its very trunk so that vascular elements involved in the transport of waters, sugar and minerals throughout the tree are exposed and available to exploit.



Figure 2. A mourning cloak feeds directly from the vasculature of an aspen exposed by late winter beaver cutting and from which sap is flowing (Prince George, BC April 18, 2009).

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