Green Ash Seeds

Dave Leatherman

It's a "samara." That is, a "dry, indehiscent winged fruit." So it says in the key to the Oleaceae (a.k.a. "the olive family") in the wonderful new botany book, *Flora of Colorado* (Ackerfield 2015). But what does it all mean? "Dry" is understandable enough. "Indehiscent" describes a ripened ovary with enclosed seeds that does not open when mature. "Winged" means the seed or kernel is attached to a blade that aids in its dispersal, if and when it falls from the branch tip where it developed (Figs. 1 and 2).

Samaras are the norm in many of our familiar deciduous trees, including maples and elms. Those maple "helicopter seeds" are samaras. The particular samara featured here is that of green ash (*Fraxinus pennsylvanica*), a nonnative tree in Colorado that is widely planted and also has naturalized in several riparian corridors. This tree's seeds are eaten by many bird species and could be called favorites, indeed staples, of a few in winter. Green ash is quite prominent in most Colorado low-elevation urban landscapes but would appear to have a rocky future in light of the emerald ash borer's recent arrival and inevitable spread. For these reasons it seems worthy of discussion.

In the woody world of trees, sexual segregation is rare. The standard arrangement is for female flowers and male flowers to coexist on the same plant, often mere centimeters apart. Apparently enough male pollen from trees of the same kind next door or even quite a distance away finds the female flowers that the inbreeding which occurs due to brother–sister shenanigans is not a serious issue. This condition of an organism harboring both sexes of reproductive parts is termed "monoecious" ("one house"). Organisms with only one type of sex organ are "dioecious." Girls over here. Boys over there. Humans are dioecious and so are members of the ash tree genus *Fraxinus*. Other well-known dioecious tree types are poplars including aspen, maple, honeylocust, and many others. Nursery offerings of dioecious species described as "seedless," "cottonless," or "podless" are just another way of saying they are male plants.

So, not all ash trees are super attractive to birds. Unless male trees are stressed and have issues with or harbor insects like oystershell scale, leafcurl aphids, lace bugs, plant bugs, ash bark beetle, borers, certain caterpillars, and a few others, they can be rather birdless. An exception to this would be as a nesting site for robins and goldfinches.

Female trees with seeds are another story. A samara-laden ash can be alive with birds September through April. Most birds I have seen

eating them are finches and woodpeckers. The dehiscent quality of ash fruits means active extraction of the seed or kernel is required. Because the oarlike seeds hang in clusters from old flower stalks at the ends of very small–diameter branches, getting the seed out is not something easily accomplished on the fly. The seed usually has to be detached, braced somehow, and drilled. I have seen bracing accomplished in a couple of ways. Either the individual samara is pulled from the tree and wedged into bark or something else where pecking and picking is possible, or it is pulled and stood upon.

On 1 November 2016 at Grandview Cemetery in Fort Collins, I watched a Black-capped Chickadee making a meal out of ash seeds in skillful, methodical fashion. It landed near the seeds, flitted over, plucked one with its beak, laid it on a twig under its lower belly, placed one foot at each end of the oar, and then wailed at the seed end (Figs. 3 and 4). By chipping open a slit atop the seed (which occupies roughly one-third of the samara's length) it was removed in about 5 seconds. Repeat, repeat, repeat, until full, the attention span is reached, an accipiter is sensed 500 yards distant, a buddy chickadee describes a better adventure, who knows? Chickadees

Fig. 1. Female green ash showing heavy seed crop. 28 September 2010, Grandview Cemetery, Fort Collins (Larimer County), CO. Photo by David Leatherman

Fig. 2. Dry samara as they appear October through spring (top) and seed (bottom) as it would appear after extraction from the left end of the samara. Photo by David Leatherman

seem the epitome of rabbit trailing, but I am probably selling short their hyper mastery of the myriad options.

Other birds exploiting ash seeds during the cool months of autumn, winter, and early spring are predictable, seed-loving types like House Finch, American Goldfinch, Pine Siskin, and Dark-eyed Junco (Figs. 5 and 6). Many other granivores must share this habit. What have you seen? It is hard to imagine what House Finches would do without the availability of green ash seeds.

Downy Woodpeckers occasionally eat ash seeds but more often than not are in ash to exploit bark beetles and scale insects inhabiting the same branches hanging with seeds. Indeed, stress in plants often triggers heavy seed production coincident with predisposition to insect attack.

During the winter of 1984–1985 several Pine Grosbeaks took the altitudinal elevator down several floors from Cameron Pass and other high sites to Fort Collins. While in town they mostly utilized juniper berries, crabapples varieties with small fruits, and, yes, female green ash trees loaded with seeds.

As is the case with honeylocust seed weevils in honeylocust beans (see "The Hungry Bird" in the Winter 2016 issue, Vol.50(1), of *Colorado Birds*), it is possible a small part of the attraction birds have for ash seeds is their being fortified with weevils. Three members of the genus *Lygnyodes* feed on ash seeds, with *L. helvolus* occurring in Colorado. However the life cycle of this weevil is such that late spring thru late summer is the only period when larvae occur within the seeds. This does not match when most bird feeding on ash seeds is observed in my experience (Cranshaw 2014).

The Issue of Emerald Ash Borer

Arborists and players of the stock market have long known, or at least should know, there is risk in putting too much investment in any one commodity. "Diversity" is an overused but nevertheless beautiful word, especially when it pertains to things like people, portfolios, and biodiversity, including our collections of ornamental trees. It could be argued in the case of green ash that many cities and towns overdid it. Just like many cities in the East and Midwest did with monocultured neighborhoods of American elm, we have set ourselves up for epidemic ash losses. With elms, the grim reaper was an exotic fungus and its exotic bark beetle vector leading to massive mortality from Dutch elm disease. Inventories of trees on the computers of Colorado's modern urban foresters often show percentages of ash in the 10–20% range. For a municipality boasting tens of thousands of trees, such proportions compute to a lot of ash trees. Boulder,

where the dreaded emerald ash borer (*Agrilus fumipennis*) first showed up in Colorado in 2013, is estimated to have 98,000 ash trees. The Denver Metro area has an estimated 1.45 *million* ash.

Emerald ash borer (EAB) was first detected on United States soil in Detroit, Michigan, in 1990. It probably actually got there via wooden dunnage used in ships to stabilize loads up to ten years earlier. But difficulties in its detection allowed its escape from the U.S. Department of Agriculture's radar. In an oft-repeated scenario with introduced organisms, in the absence of evolved checks and balances from where native (in this case, Asia), it has marched steadily across our country and now has been found in 27 states and 2 Canadian provinces. In the process it has killed untold millions of planted and forest ash trees. In the way of hope, progress has been made in preventive and curative treatments over the last 26 years but it still remains a serious threat to our ash resource.

This member of the flatheaded wood borer family Buprestidae is a narrow, green beetle about 1.5 centimeters long that develops under the bark in the cambium/phloem region and in the outer layers of xylem wood, thus girdling and often killing the host tree. After emergence as an adult, it feeds for a time on tender shoots and leaves. It spreads somewhat by flying, but its long-distance travel is mostly attributable to the ill-advised actions of humans moving infested firewood, nursery stock, and other wood products from one location to another.

Colorado has access to the best information available and readers are directed to the Colorado Department of Agriculture website (http//www.colorado.gov/pacific/agplants/emerald-ash-borer). It contains excellent information on recognition of EAB, management options, a guide to recommended trees to replace ash lost to EAB, and much more. On this website, the "Front Range Tree Recommendation List" lists 100s of tree varieties according to one of four categories: generally recommended, conditionally recommended, potential/unproven, and not recommended. These categories were constructed by local experts primarily in regard to replacing casualties to EAB, but the list has great general utility for anyone wondering, "What's a good tree to plant around here?"

Spraying strategies designed to prevent and suppress EAB are (Herms 2014):

- soil applied systemics
- trunk-injected systemics
- noninvasive systemic basal trunk sprays
- protective cover sprays

Fig. 3. Black-capped Chickadee immediately after pulling individual samara from a cluster. Grandview Cemetery, Fort Collins, 1 November 2016. Photo by David Leatherman

Fig. 4. Black-capped Chickadee extracting seed from green ash samara by standing on it and chipping slit over the seed. Grandview Cemetery, Fort Collins. 1 November 2016. Photo by David Leatherman

Fig. 5. Female House Finch eating green ash seed. Extraction of the seed is usually executed by deft manipulation of the samara while in the bill. Grandview Cemetery, Fort Collins, 3 November 2016. Photo by David Leatherman

Fig. 6. Several ash samaras found under a tree in which House Finches fed, showing slits cut during removal of seeds. Grandview Cemetery, Fort Collins, 25 September 2010. Photo by David Leatherman

Of interest to birders, most of these techniques and the materials currently registered for use have been evaluated as being of zero to low risk to water quality, nontarget organisms (including woodpeckers that might prey on larvae within infested trees), and unexpected consequences to the trees themselves (Hahn 2011). To my knowledge, there has not been a study that looks at these treatments and their potential impact on pesticide levels in seeds. My guess would be this also would be negligible. Of course, any application of pesticides should be done with extreme care, particularly near bodies of water.

For the sake of birds that utilize ash as one of their favorite eating places, it behooves all owners of ash trees to get up to speed on emerald ash borer.

LITERATURE CITED

Ackerfield, J. 2015. Flora of Colorado. Botanical Miscellany No.41, BRIT Press, Ft. Worth, TX.

Cranshaw, W. 2014. Insects and diseases of woody plants in Colorado. Colorado State University Cooperative Extension Bulletin 506A. Ft. Collins, CO.

Hahn, J., D. A. Herms, and D. G. McCullough. 2011. Frequently asked questions regarding potential side effects of systemic insecticides used to control emerald ash borer. USDA Forest Service and Michigan State University. http://www.emeraldashborer.info

Herms, D. A., D. G. McCullough, D. R. Smitley, C. S. Clifford, and W. Cranshaw. 2014. Insecticide Options for Protecting Ash Trees from Emerald Ash Borer, 2nd Ed. North Central IPM Center Bulletin, University of Illinois, Urbana-Champaign.

Dave Leatherman, daleatherman@msn.com