Black Ash (*Fraxinus nigra* Marsh.): Local Ecological Knowledge of Site Characteristics and Morphology Associated with Basket–Grade Specimens in New England (USA)[1]

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Fraxinus nigra Marsh. is a small, relatively uncommon tree with large social significance. Known as black ash or brown ash, it rarely exceeds 18 meters (60 feet) in height or 30–50 centimeters (12–20 inches) in diameter (Wright and Rauscher 1990). In the U.S. states where the species occurs, its percentage of forest composition ranges from 0.01% in Kentucky to 6.00% in Minnesota, with an average of 1.42% in the region as a whole (Miles 2009). Black ash basketmaking is nonetheless an important element of biocultural diversity in northeastern North America (Benedict and David 2000; Benedict 2001). It is central to the creation story of the Wabanaki peoples of Maine (Maine Indian Basketmakers Alliance 2000) and black ash basketmaking has been an important cultural and economic activity of tribes throughout the region for hundreds of years (Benedict and David 2000). The species also has a history of use in Shaker and other European–derived craft traditions. Today, black ash basketry is a celebrated regional art manifested in both traditional and contemporary forms.

Through an often–backbreaking process, skilled basketmakers render the annual growth rings of black ash into flexible ribbons for weaving. A basket begins when a tree is felled and pounded to separate the rings (Fig. 1). The rings are peeled into strips, which are processed into basket splints through a combination of smoothing, splitting, and shaving. Basketmakers complete these general steps in a variety of ways. Some people pound logs in the woods while others transport logs to their workshops. Logs may be pounded whole or split into smaller lengthwise pieces prior to pounding. Some people pound by hand while others use mechanized equipment created in home workshops specifically for this purpose.

Regardless of method, processing black ash for basketmaking requires large investments of time and energy, creating an imperative for logs to be of the highest possible quality with the maximum amount of useable wood. Estimates of the percentage of black ash trees suitable for basketmaking range from 1% to 20% (Benedict and Frelich 2008; Diamond 2009). Working in Minnesota, Benedict and Frelich (2008) identified trees suitable for basketmaking based on traditional ecological knowledge. Their findings showed basket–grade trees in upland mesic forest and woodland pond sites and negative associations with herbaceous cover in lowland wet forest sites. Like many species, black ash response to ecological conditions may vary throughout its range. We report here on a study that characterizes indigenous and European American basketmakers' knowledge of site and specimen qualities associated with basket–grade black ash in the U.S. New England region.

Methods

We combined ethnographic and ecological field methods to document knowledge used for locating and identifying basket–grade black ash. To do so, we sought out people with extensive personal experience harvesting and working with black ash for basketry. We have termed these people "artisan–gatherers"; practitioners who

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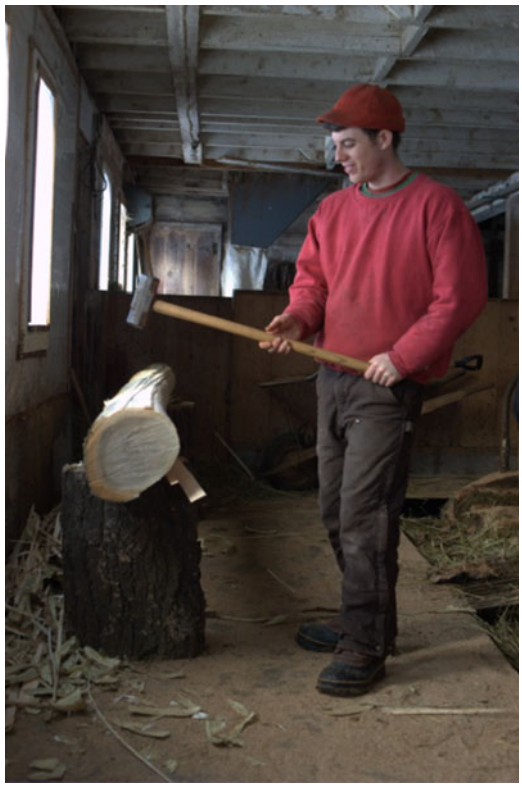

Fig. 1. Pounding black ash logs. Pounding crushes the porous spring growth of *Fraxinus nigra*, allowing the denser summer growth to be peeled off in layers that are further split and shaved to create splints for basket weaving. Photo: Sylvia Ferry Smith.

work with their materials in every stage from the forest to the finished product. The artisan–gatherers we interviewed have been practicing their craft for years to decades and are recognized as expert technicians or innovators within the basketmaking community. They also make some or all of their living from their work, whether through selling finished pieces and kits or teaching courses and workshops.

Information presented here is based on interviews with seven artisan–gatherers conducted during the summer of 2008. Interviewees live in the states of Vermont, Maine, and Massachusetts. Four are men and three are women. Four are European American and three Native American. Semi–structured interviews and field walks were used to gather information about site and specimen conditions associated with basket–grade black ash. Artisan–gatherers were asked about site associations and landscape perceptions on multiple spatial scales: Landscape, feature, and site. Subsequent visits to potential gathering sites without artisan–gatherers were used to test interview–derived information. Quantitative data on vegetation, soils, slope, aspect, wind and sun exposure, and ecological features such as seeps, boulders, and depressions were gathered during site visits and are discussed elsewhere (Diamond 2009).

Results

Site Characteristics

There was substantial agreement among study participants with regard to site characteristics associated with basket–grade black ash. Physical conditions include, in order of frequency of mention, hydrology, light, and soils. All of the artisan–gatherers described black ash as growing in swamps or forested wetlands, often in association with streams. Five mentioned that it needs "wet feet," but noted that the best trees for basketmaking do not grow in permanent standing water. Rather, these trees occur in seasonally flooded areas or in association with groundwater seeps or springs. As one artisan–gatherer described such sites:

> They're not in standing water but there are spongy areas around, where there are puddles…not flooded in spring but somehow wet.

Trees that grow on hummocks, features that may alleviate the stresses of standing water, are not fast–growing enough for one basketmaker, a preference that contrasts with Benedict's findings in Minnesota (Benedict 2001). Edges also are important features. Three people noted that edges have the light conditions necessary for growth suited to basket making. Two pointed out that a tree growing completely in the open has many branches low on the trunk, creating knots that weaken growth rings. Trees that grow in too shady a site grow so slowly that rings are difficult to separate. Two artisan–gatherers mentioned soil texture. Both associate ash with fine sediments and fine particles that wash down slopes to collect on benches, but one also associates black ash with "gravelly, sandy soil."

Artisan–gatherers also associate basket–grade trees with characteristic vegetation. Black ash can grow with both hardwood and softwood tree species. Hemlock (*Tsuga canadensis* [L.] Carriere) and red maple (*Acer rubrum* L.) were each mentioned as associates by two people, while

sugar maple (*Acer saccharum* Marsh.), balsam fir (*Abies balsamea* [L.] Mill.), beech (*Fagus grandifolia* Ehrh.), birch (*Betula* sp.), pine (*Pinus* sp.), spruce (*Picea* sp.), and Northern white cedar (*Thuja occidentalis* L.) were each mentioned by one person. Herbaceous species noted by artisan–gatherers include false hellebore (*Veratrum viride* Aiton), ferns, and grasses.

Morphology

As noted above, black ash has what we have termed high "specimen specificity," with only a small percentage of trees being suitable for basketmaking. The artisan–gatherers interviewed for this study all stated that the ideal tree is straight, with no curves or sweep in the trunk, and has no knots. Artisan–gatherers also agreed that the ideal tree has straight grain because twisted grain makes peeling growth rings more difficult and increases the likelihood of imperfections. One noted that even in good trees, wood higher in the trunk will be more twisted than that lower down. Four people emphasized that good trees are healthy, with vigorous growth, although three noted that open–grown trees or trees that grow too fast are less desirable. Signs of poor health and, thus, poor quality wood include obvious rot or dead wood, dead branches, trees that are packed too closely together, and trees with exposed roots or broken branches. Other signs of inferior wood, though not necessarily of poor health, include trees with tapering trunks or low branches. Three artisan–gatherers note bark texture as an indicator of wood quality. They avoid trees with deeply fissured bark, which they believe results from slow growth, in favor of trees with smoother, less–fissured bark, which two people described as "flaky" (Fig. 2).

Basketmakers use different size rings for different basket styles. Ash baskets traditionally fall into two general categories: Larger utility baskets such as pack, market, potato, and cheese baskets (Fig. 3), and smaller "fancy" baskets for decorative use or storage of small items. Basketmakers who make both fancy and work baskets select different trees for different kinds of baskets. Five artisans noted that thicker rings are better suited for bigger, heavier utility baskets, while thin rings ("from slow–growing years") are usually more flexible and can be used for smaller, more intricate baskets. A single tree can yield a variety of ring sizes. When harvesting for themselves, artisan–gatherers are assessing a tree's likelihood of having rings that are the appropriate size and quality for their particular uses. Three artisan–gatherers use an increment borer to take tree cores and assess ring size before cutting a tree. The others predict ring size exclusively by looking at site and morphological characteristics.

Some variation in size preference may be due to geographic location and the types of trees that each person is accustomed to finding in his or her area. Desired tree size also seems limited by access

Fig. 2. Variety in bark texture of black ash (*Fraxinus nigra* Marsh) trees. According to many artisan–gatherers, shallow "flaky" furrows and relatively smooth bark, like that shown on the left, indicates fast growth and high–quality basket material. Deep furrows like those on the tree on the right could indicate slow growth or a poor growing site, and wounds or knots indicate physical imperfections in the underlying rings. Photo: Allaire K. Diamond.

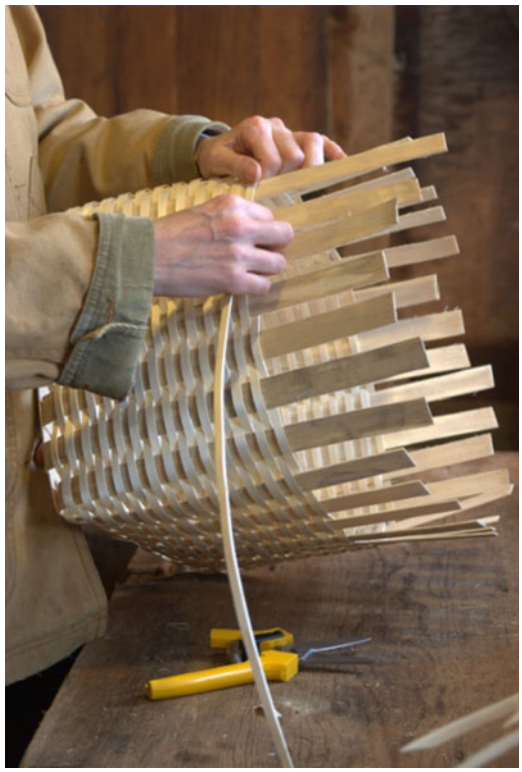

Fig. 3. Black ash basket weaving. Thicker splints are used to weave utility baskets such as that shown here. Smaller "fancy" baskets are woven from thinner, more flexible splints. Photo: Sylvia Ferry Smith.

and ease of getting the log out of the woods. Two gatherers, who have easy access to a highly productive ash swamp in southwestern Massachusetts, prefer the biggest trees they can get. Another gatherer uses a tractor to pull logs out of the woods and also prefers larger trees. In contrast, the three gatherers who pull logs out by hand or with minimal equipment take only smaller trees.

While the bulk of ash is used for basket weavers and uprights, many also use the wood for rims and handles. Wood used for this purpose is split into lengths that are many growth rings in thickness. Three participants in this study use dedicated smaller trees for rims or handles, while a fourth uses logs from higher in the tree for these purposes. Lower quality trees also may be used for handles and rims.

Discussion

Artisan–gatherers' knowledge of black ash, which is derived from and contributes to their artistic practice, encompasses ecologically meaningful information about this tree and the natural communities of which it is a part. In New England, their descriptions place ideal basket trees along wetland–upland transitions characterized by seasonally saturated soils. Though not all participants in this study mentioned seeps or springs, most described conditions consistent with these hydrological features, such as moist toe slopes, which bring groundwater to the surface. Research in Vermont shows strong associations between springs, seeps, and mineral enrichment, particularly calcium (Sorenson et al. 2009). These findings suggest a potential value for future research on the relationship, if any, between basket–grade black ash and calcium levels in soil.

Black ash is a cultural keystone species (Garibaldi and Turner 2004) in northeastern North America. With the species' narrow ecological amplitude, basket–grade black ash trees likely have never been plentiful. Reports from throughout the species' range suggest that it is becoming increasingly difficult to find (Trial and Devine 1994; Ward et al. 2009). The specter of emerald ash borer (EAB, *Agrilus planipennis*) further threatens black ash and the economic and cultural practices that depend on it. Native to China and first identified in North America in 2002, the larvae of this beetle feed on the cambium layer of *Fraxinus* species, disrupting the translocation of water and nutrients in the tree (Poland et al. 2011). As of this writing, some 50 million ash trees have been killed in 14 U.S. states and two Canadian provinces. The first known infestations occurred in Detroit, Michigan. EAB since has been found as far east as northern New York state and western portions of Quebec province. Entomologists, foresters, and organizations representing basketmakers have begun planning response strategies in anticipation of EAB's arrival in New England.

Results from this research demonstrate the potential value of combining artisan–gatherer expertise with the methods and knowledge of western science in the development of such strategies. Research being conducted in Michigan offers a further model of collaboration between scientists and artisan–gatherers for the conservation of black ash and basket making. Entomologists have partnered with master basketmakers in the Match–e–be–nash–she–wish Band (Gun Lake Tribe) of Potawatomi Indians in southern Michigan to test whether infested logs can be submerged to kill EAB

while preserving qualities necessary for basket making. Scientists worked with basketmakers to identify five basket–quality trees infested with EAB. The trees were cut in late April, following which log bolts were submerged in running water. At the conclusion of two months, entomologists confirmed that all EAB larvae and prepupae had been killed while artisan–gatherers determined that most of the wood retained the qualities necessary for basket making. Future research will pinpoint the minimum amount of time necessary to kill EAB and whether this varies seasonally, as well as the effects of prolonged submergence on the quality of wood splints (Poland et al. 2011).

In light of EAB and the increasing scarcity of black ash, we believe *Fraxinus nigra* deserves special consideration in conservation efforts. We also believe that black ash conservation programs will be most successful if they are locally tailored and engage artisan–gatherers as partners (Ticktin and Johns 2002). As the results reported here demonstrate, artisan–gatherers possess important local ecological knowledge about black ash and basket–grade specimens, and are stakeholders in conservation efforts directed at this species.

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