AGROFORESTRY NOTES
AF Note – 47 December 2014

Forest Farming Ramps

Introduction

The spring ephemeral, *Allium tricoccum Ait.* (called ramps in the south and wild leeks in more northern areas), is native to the forests of eastern North America. Ramps can be found growing in patches in rich, moist, deciduous forests in eastern North America. They begin to emerge when the soil temperatures increase after snow melt, which usually occurs in late March and early April, depending on geographic location. Young plants send up smooth, broad leaves that die back as the shrub and tree canopy closes, reducing the amount of sunlight that reaches the ramps. Patches of ramps often can be located by their distinctive odor, the source of which is chemical constituents similar to garlic (Calvey et al. 1997). Before the plants lose their leaves, people flock to the forests to collect this delicious but smelly spring edible. The bulbs taste spicy and have been compared to a cross between scallions and garlic.

Figure 1. Ramps have, on average, two leaves, a petiole that fades from pink to white, and an underground rhizome that serves as a storage organ. All parts of the plant are edible. (Credit: Jim Chamberlain)

Plant Description & Habitat

Allium tricoccum, a member of the onion family is native to temperate hardwood forests from Canada to north Georgia, and west to Missouri (Jones 1979; Nault and Gagnon 1988; Nault and Gagnon 1993). It grows under a variety of deciduous trees, including American beech *(Fagus grandiflora L.)*, yellow birch *(Betula canadensis L.)*, sugar maple *(Acer saccharum L.)*, black cherry *(Prunus serotina L.)*, American basswood *(Tilia glabra Vent.)* and tulip poplar *(Liriodendron tulipifera L.)*. These trees form a dense overstory canopy once their leaves are fully developed. The most favored micro-habitats are north to north-east facing slopes with damp, well drained, organic soils. In its southern range, *A. tricoccum* is found most commonly at elevations between 1070 and 1675 meters above sea level. An early description of the plant's taxonomy (Jones 1979) indicates that bulb diameter ranges from 15-30 mm, leaf length ranges from 15-40 cm, and leaf width ranges from 30-90 mm (Figure 1). Plants have two to three elliptic or oblong-oblanceolate leaves that taper distinctly into a petiole base that emerges from a bulb attached to a rhizome below the forest floor.

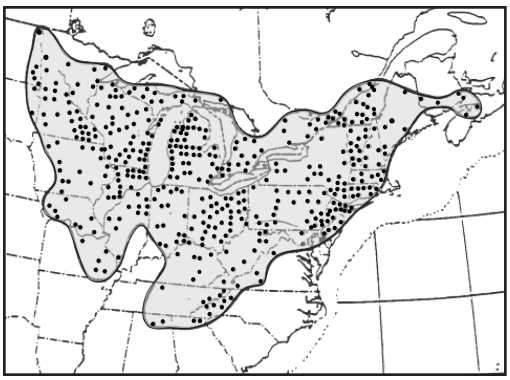
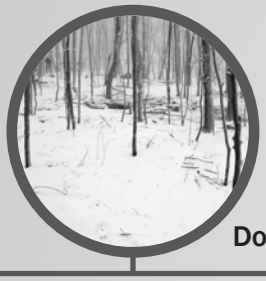


Figure 2. Ramps range from southern Canada to north Georgia and west to Minnesota and Missouri. Dots indicate known ramp locations. (Credit: Almut G. Jones 1979)

By some accounts, there are two varieties of ramps (Jones 1979). According to Jones, *Allium tricoccum*, *variety tricoccum* has larger more oblong leaves with distinct petioles. On the other hand, *Allium tricoccum*, *variety burdickii*, the 'narrowleaf' wild leek, has narrower more linear leaves that are shorter with



Dormant

Full leaf-out

Leaves die back

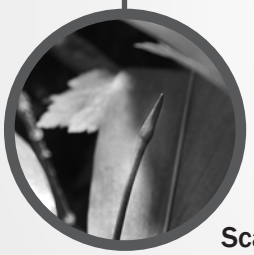
JANUARY • FEBRUARY • MARCH • APRIL • MAY • JUNE

Canopy leaf development

Ramps Timeline

Ramps emerge from the forest floor in early spring and the leaves die back when the overstory trees fully leaf out. Understanding the life-cycle of this spring ephemeral is important when forest farming.

Leaves begin to emerge



Scape emerges

indistinct petioles. *A. tricoccum var. tricoccum* is reported to have a red pigmented stem; *A. tricoccum var. burdickii* does not. *A. tricoccum var. tricoccum* is reported to flower earlier and has more flowers per umbel. Vegetative reproduction is the more common mode of population growth in *A. tricoccum var. tricoccum* compared to *A. tricoccum var. burdickii*. The range of *A. tricoccum var. tricoccum* (Figure 2) suggests that it is more dominant in the southern Appalachian region, while *A. tricoccum var. burdickii* is more common in the north.

Site Selection

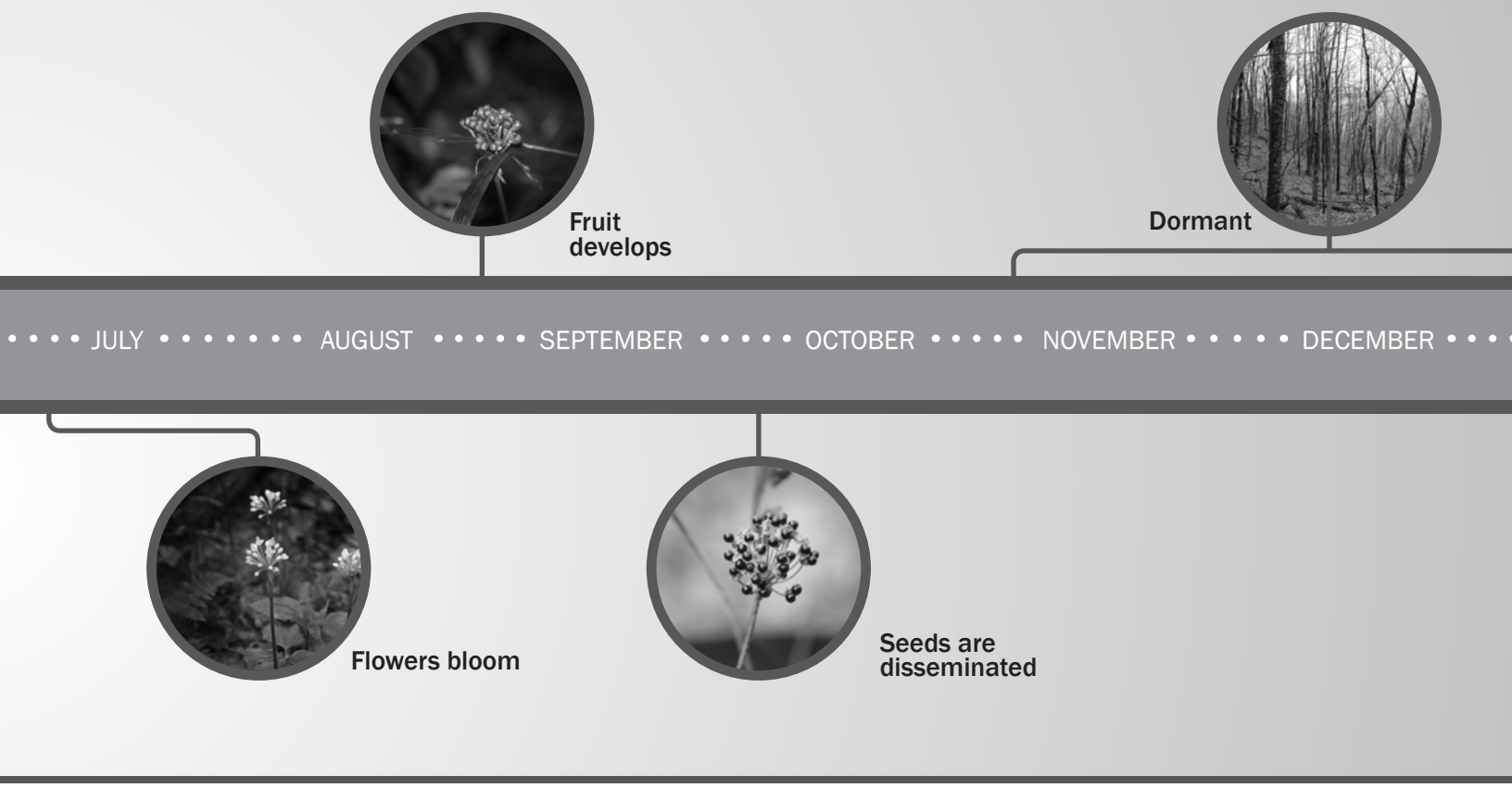
Selecting the right site to grow ramps is of utmost importance. Key considerations include slope aspect, tree cover, soil qualities, and understory vegetation.

SLOPE AND ASPECT: Common advice on where to find or grow ramps is a north facing slope, which is typically cooler and moister. But north slopes are not necessary if there is sufficient soil moisture retention throughout the year. Ramps will grow on south or west facing slopes as long as they get enough moisture. Soil moisture is key to a healthy stand of ramps.

Figure 3. A typical site for growing or finding ramps is north-facing with hardwood trees and well drained, moist soils. (Credit: Jim Chamberlain)

TREE COVER: The overstory tree cover is equally important in selecting places to grow ramps. Ramps need lots of sun early in the growing season, and they like shade when the growing season is over to conserve soil moisture and temperature (Figure 3). Ramps grow best under hardwood trees such as beech, birch, maple, tulip poplar, buckeye (*Aesculus sp.*), basswood, hickory (*Carya sp.*), and oak (*Quercus sp.*). They do not grow well under conifers.

SOIL QUALITIES: Deep organic matter with a pH range of 4.7 to 6.7 is recommended for ramp production (Bernatchez et al. 2004). This pH range



is consistent with natural populations of ramps in western North Carolina. There is conflicting information about calcium; some research has demonstrated that an application of calcium is beneficial to ramp production (Ritchey and Schumann 2005). Other research found better growth rates at sites with lower calcium availability (Bernatchez et al. 2004).

UNDERSTORY VEGETATION: Certain understory plants are important indicators of sites preferred by ramps. An herb layer that includes blue cohosh *(Caulophyllum thalictroides L.)*, trout lilly *(Erythronium americanum Ker Gawl)*, trillium *(Trillium sp.)*, violet *(Viola sp.)*, stinging nettle *(Urtica dioica L.)*, black cohosh *(Actaea racemosa L.)*, false Solomon's seal *(Smilacina racemosa L.)*, Solomon's seal *(Polygonatum biflorum Ell.)*, as well as squirrel corn (*Dicentra canadensis L.*), hepatica (*Hepatica sp.*), anemone (*Anemone sp.*), spring beauty *(Claytonia virginica L.)*, and foamflower *(Tiarella cordifolia L.)* are indicators of ideal habitat.

If a woodlot does not have the associated trees or understory herbs described above, a landowner can still cultivate ramps. The key to growing ramps under trees is to have well drained, high organic matter soil that remains damp year round.

Site Preparation & Planting

Preparation of the site for planting depends on how intensely the landowner wants to farm. The simplest method is to plant directly into the soil. The more intensive approach is to build raised beds filled soil similar to sites where wild ramps are found. The decision of which method to use depends on how much time and money the landowner wants to invest and the existing condition of the site, as well as their aesthetic preferences for their landscape.

DIRECT PLANTING: Given a site that has good soil, shade, and moisture, ramp bulbs or seeds can be planted directly into the ground. The first step is to scrape away the leaf layer to expose the top soil. Raking the soil a bit to loosen the top layer can also help. Plant the seeds about ⅛ to ¼ of an inch below the surface . The bulbs should be planted two inches deep and four to six inches apart. Make sure all roots are buried with tip of the bulb just below the surface. The newly planted bulbs or seeds should be mulched to retain soil moisture. Mulching can simply involve covering the seeds or bulbs with the leaves that were scraped away from the site.

RAISED BEDS: Planting ramps in raised beds provides several advantages, but it also costs more. Raised beds are advantageous when the soil lacks organic matter, is stony, excessively dry, or there are lots of weeds (Figure 4). Raised beds are easy to plant as the soils are loose and friable. They can be constructed from a variety of materials including lumber, landscape ties, or logs. Once the beds are constructed, they are lined with weed cloth. The space is then filled with good quality planting soil. Raised beds do not need to be very deep; one tier of landscape ties (about four inches) is usually sufficient. Once the beds are constructed, the landowner can plant seeds or bulbs directly into the new soil.

Figure 4. Ramps can be grown in raised beds under a tree canopy, as long as there is enough soil moisture. (Credit: John Hayworth)

Regardless of whether ramps are established in raised beds or planted directly in the forest floor, it is important to understand how the plant grows throughout the seasons (See Ramps Timeline pgs. 2-3). Ramp seeds develop and mature on the plant by October when temperatures range from 52 to 72 degrees F. They then fall to the ground and are covered by leaves. The radicle, which forms the roots, emerges from seeds during the fall and winter. In the spring, the cotyledon, which forms the leaves, emerges when the temperatures are high enough for leaf growth (Baskin and Baskin 2001). Root emergence in *Allium tricoccum* occurs in the fall of the second year after sowing. Ramp seeds require a warm plus cold stratification to break dormancy. If there is not an adequate warm period after sowing, the seed will not germinate until the second spring. Thus, ramp seeds can take 6 to 18 months to germinate. From sowing to harvest can take five to seven years. During this time, the bulb of the plant increases in size and the plant matures.

The best time to purchase ramp bulbs for planting is in February and March. If you cannot plant the bulbs immediately upon receiving them, place them into a soil mixture (potting soil or organic rich top soil) so that they will stay fresh, or put them into a refrigerator where they will stay fresh for a couple of weeks.

Maintenance & Care

Maintaining and caring for ramps in a forest farming setting is simple. Because they are edible and will be consumed, it is best to refrain from putting chemicals into the soils or on the plants. If the soils appear to be too dry, it may be wise to provide some irrigation. Removing weeds and other undesirable plants that compete for resources is easily done by hand. At the beginning of the growing season, weeds can be extracted from the ramp beds. To help reduce weeds, and to ensure retention of soil moisture, mulch with hardwood leaves in the fall. This is probably only necessary if the stand of trees under which the ramps are growing does not produce enough leaf litter.

Harvesting & Processing

Harvesting methods differ between ramps grown in forest farmed beds and those grown in natural settings. When harvesting ramps from natural populations one must think about the potential ecological impacts, taking care to mitigate any negative effects such as harvesting a whole clump as opposed to a portion. This is less of a concern when harvesting forest farmed ramps as the plants may be replaced after harvest like other vegetable crops. For maximum edible biomass (bulbs and leaves), harvesting is best done right before the leaves start turning yellow. Typically, this occurs when the tree canopy is fully developed. The timing of harvest may differ geographically. For example, in southern Appalachia the optimal time to harvest is usually about the third week in April, whereas in cooler northern climates harvesting may be best a bit later. The timing of harvest is important for yield and quality. Harvesting too early in the season will result in much less edible material. Harvest too late and the quality of the leaves will have declined.

Avoid harvesting plants that have a flower scape (stalk) as they are producing seed to ensure the population will grow. In natural populations, it is best to harvest from clumps and then return a portion. A general rule of thumb is to return two-thirds of the clump to the soil to replant. Rock et al. (2004) recommends harvesting no more than 10% of a patch and harvesting from the same patch only once every 10 years. In this way, natural populations have a chance to recuperate. Make sure to keep the rhizome attached to the bulbs that are returned to the patch. Without the rhizome, the plants cannot survive.

Try to minimize disturbance of the soil when digging ramps. A garden fork works well to loosen the dirt around the plants. As the soil becomes loose, grab the leaves and gently, but firmly, wiggle the plants until the come up.

After digging, wash the ramps thoroughly, taking care to keep the leaves dry. Leaves that are left wet may start to wilt later in the season. The papery sheath that protects that bulb will need to be removed prior to cooking.

Uses

Ramps were traditionally consumed as the season's first "greens." After a long winter without fresh vegetables, Native Americans would collect ramps and enjoy eating the tops as well as the bulbs. The Cherokee considered ramps a medicinal tonic that would rejuvenate and cleanse the body. Today, ramps are still viewed as a coming of spring, and people flock to the forests to "dig a mess of ramps."

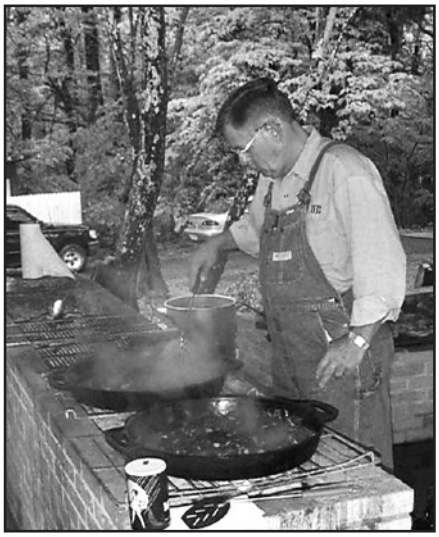


Figure 5. Ramps became popular as a wild-food used in local spring festivals. They can be prepared anyway that onions are used. (Credit: Jim Chamberlain)

Traditions have evolved around the annual gathering and preparation of this pungent, edible forest product. Local residents, while fishing for trout, will dig a bunch of ramps and cook them along with freshly caught fish. Volunteer fire departments, rescue squads, and other civic groups hold ramp festivals to generate funds to support community activities (Figure 5). Local restaurants, as well as roadside vegetable markets, sell ramps to residents and tourists. In recent years, the interest in these spring delicacies has increased to the point that high-end restaurants in cities across the nation are now offering ramps on their menus. All of these activities have increased concern for the sustainability of these forest plants due to the potential for over-harvesting.

The entire ramp plant is edible and can be prepared any way that onions and garlic are used. The leaves are great in salads or prepared as cooked greens. Traditional ramp festivals prepare the wild onions with fried potatoes, meat loaf, and in cornbread. A favorite recipe is a variation on Vichyssoise, a ramp potato soup that can be served hot or cold.

Much of the demand for ramps is being met through wild harvesting. The increasing popularity of this woodland vegetable, however, has created opportunities for landowners to "farm" ramps in their own woodlots. Forest farming ramps not only gives landowners another non-timber forest product (NTFP) from which to choose, but may also help to alleviate pressure on wild populations. Successful woodland production of ramps requires a thorough understanding of the plant's life cycle, proper site preparation and planting, adequate maintenance and care, and a thorough understanding of harvesting and processing.

Markets & Economics

There is potential to make a profit cultivating ramps under a forest canopy, but understanding the markets is critical. Ramps have been increasing in popularity over the last two decades. In the past, ramps could only be found at annual festivals or local road side stands. That started to change in the

early 1990s when food enthusiasts began promoting these tasty spring onions. Today, customers can buy ramps at fancy up-scale restaurants, as well as over the internet. That means producers can sell them at many different venues as well.

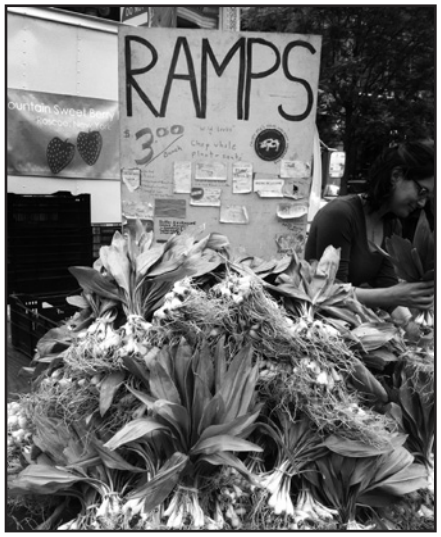


Figure 6. Ramps can be sold in farmers' markets, directly to consumers. (Credit: Jim Chamberlain)

Different markets may require different quantities of ramps. Grocery stores and other large buyers expect large quantities with consistent deliveries. Small, roadside stands and farmers markets can accept smaller amounts. Restaurants will need consistent quantities, but perhaps not as much as big grocery stores. Producers need to be familiar with the needs of their target market to ensure that they can harvest enough product.

The price for ramps varies with the market, as well. Small roadside stands and local markets will typically pay less than high-end restaurants or stores. The physical locations of the markets also affect prices. In 2002, ramps sold in roadside stands in western North Carolina for $2 per pound. In 2011, ramps were selling at the "green market" in Manhattan for $3 per bunch which was about ¼ pound (Figure 7). A local grocery store, adjacent to the "green market" was selling ramps, that same year, for $15 per pound.

Conclusions

Forest farming ramps and managing ramp populations can generate income for landowners with small woodlots. These spring onions have grown in popularity over the last two decades. Farming of ramps under the shade of hardwood trees by landowners can contribute to conservation of natural populations. Getting started is easily accomplished with seeds or bulb transplants. Generating income requires patience. The plants grow slowly and may not be harvestable for five to seven years. Once they start to reproduce, ramps can sustain themselves, as long as landowners do not harvest too much.

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First Edition 2014