



# Ramp/Wild Leek Forest Farming 201: February 2022

Eric Burkhart, PhD

Appalachian Botany and Ethnobotany  
Program



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**Email: [epb6@psu.edu](mailto:epb6@psu.edu)**

**Instagram:  
[pa\\_botany\\_and\\_ethnobotany](https://www.instagram.com/pa_botany_and_ethnobotany)**

**Web-site:  
[www.shaverscreek.org/about-us/meet-the-staff/ericburkhart/](http://www.shaverscreek.org/about-us/meet-the-staff/ericburkhart/)**



# Ramp 2021 Webinar Series Part 1



PennState Extension

MENU ▾



ACCOUNT

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HOME / RAMP/WILD LEEK FORAGING AND FOREST FARMING: IDENTIFICATION, USES, AND IMPORTANCE

## Ramp/Wild Leek Foraging and Forest Farming: Identification, Uses, and Importance

Join us to learn more about Ramps/Wild Leeks during this informative event!

#WBN-G-2213 | [BE THE FIRST TO LEAVE A REVIEW](#)



WEBINARS

LANGUAGE:

**English**

LIVE WEBINARS

April 6, 2021 | 7:30pm ET | FREE



**FREE**

# Ramp 2021 Webinar Series Part 2



PennState Extension

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RAMP/WILD LEEK FORAGING AND FOREST FARMING: BIOLOGY, STEWARDSHIP, AND PRACTICES

## Ramp/Wild Leek Foraging and Forest Farming: Biology, Stewardship, and Practices

Join us to learn the latest information and research about Ramps/ Wild Leeks during this informative event!

#WBN-G-2212 | [BE THE FIRST TO LEAVE A REVIEW](#)



WEBINARS

LANGUAGE:

**English**

LIVE WEBINARS

April 20, 2021 | 7:30pm ET | FREE



**FREE**

# Ramp 2021 Webinar Series Part 3



PennState Extension

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HOME / RAMP/WILD LEEK FORAGING AND FOREST FARMING: RAMP CULTURE

## Ramp/Wild Leek Foraging and Forest Farming: Ramp Culture

Learn about Ramp culture through a moderated panel!

#WBN-G-2214 | [BE THE FIRST TO LEAVE A REVIEW](#)



 WEBINARS

LANGUAGE:

**English**

**LIVE WEBINARS**

May 11, 2021 | 7:30pm ET | FREE



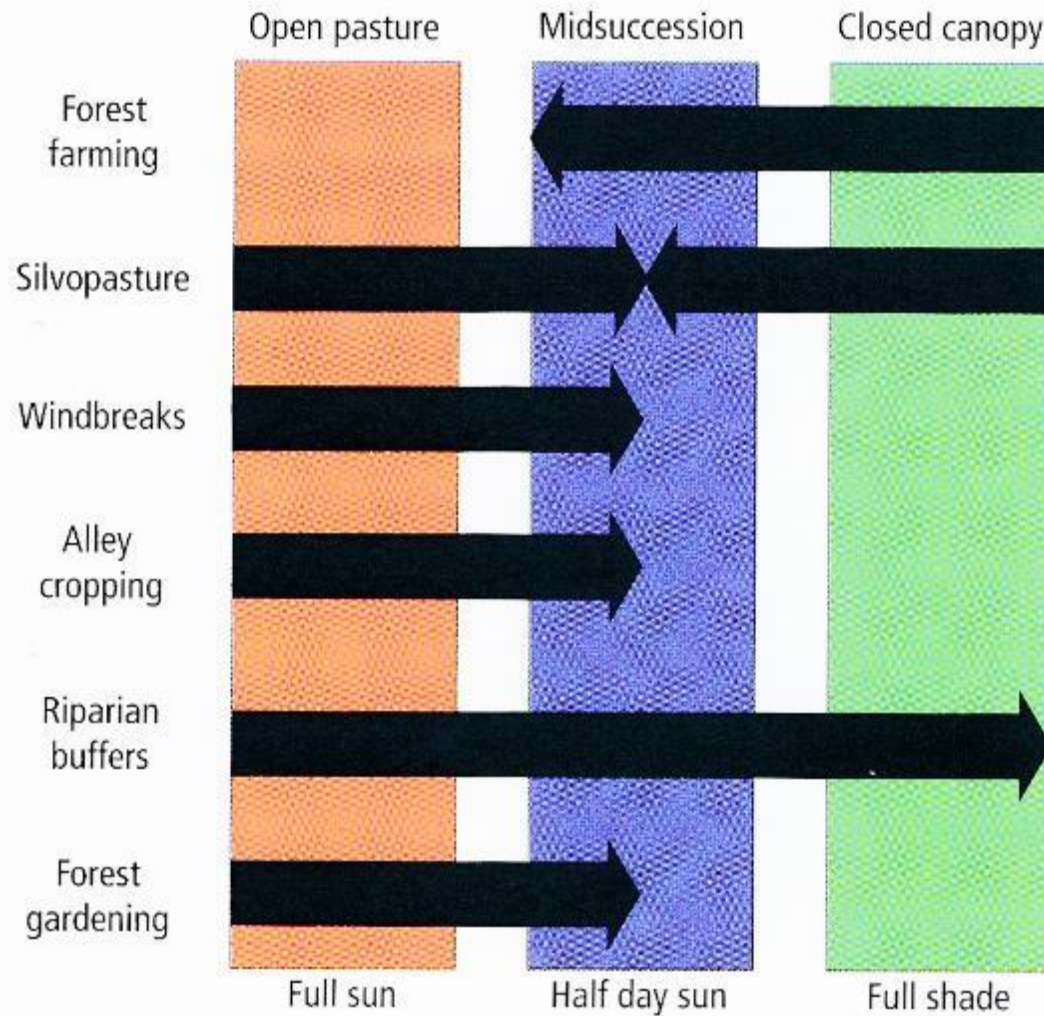
**FREE**

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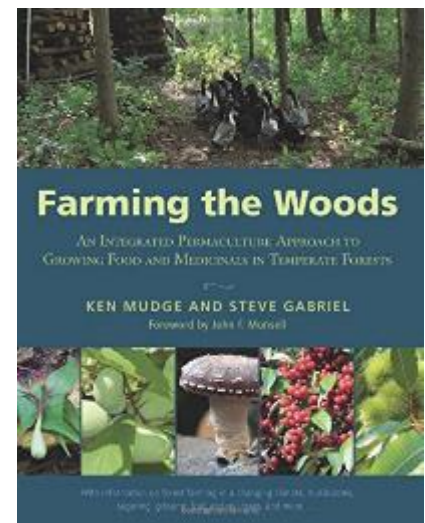
# Forest farming

An agroforestry practice in which specialty crops are **introduced** or **husbanded** in a forest that is managed to provide conducive growing conditions through forest stand improvements.





**Figure 1.8.** Agroforestry practices compared in relationship to stage of ecological succession and light qualities. Arrows indicate the direction in which the systems often head successionaly over time.







**Pnetree**

GARDEN SEEDS ♀ ACCESSORIES

2013 Seed Catalog

## Ramps Bulbs Wild Leeks

NEW!

*Allium tricoccum* One of the earliest woodland plants to poke out after the winter season these fresh greens have a sweet onion flavor and a garlic scent. When growing ramps choose a well-drained site with rich, moist soil high in organic matter and provide adequate moisture throughout all seasons, not just during the early spring growing season. They grow naturally under a deciduous forest canopy. If you do not have a wooded area available to grow the ramps use a shade structure over the planting area to mimic forest canopy conditions.

### RAMP PRICING

10 for \$7.95, 25 for \$16.95



**The low hanging fruit = steward and harvest existing populations**



Wild leek, Ramp  
*Allium tricoccum*

Wild leek, Ramp  
*Allium tricoccum*



# Plant management continuum

**Wild steward**

**Wild simulated**

**Woods cultivated**

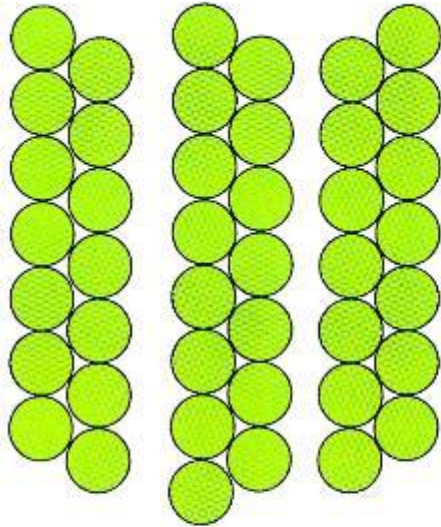
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**Re-seeding**

**Extra seeding**

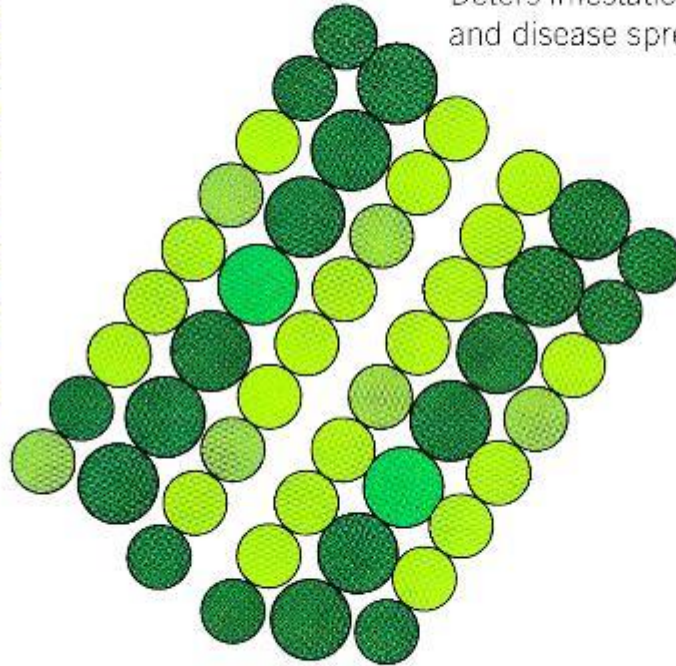
**Cultivation**

## MONOCULTURE



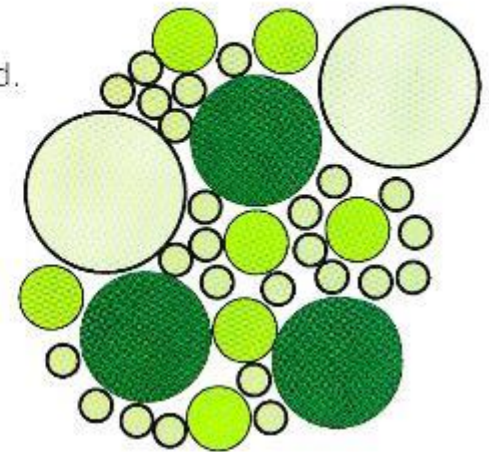
Linear habitat encourages pest infestation and the rapid spread of disease.

## COMPANION PLANTING



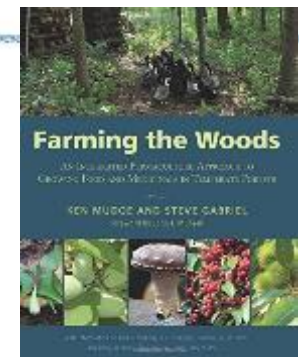
Deters infestation and disease spread.

## POLYCULTURE GUILDS



Diversity disrupts invasive patterns and buffers disturbances to the system. Guilds add pest predators to the crop area.

Progressive diversity benefits the ecology.





▶ West Virginia Ramp Diggers



1h · 📷

Trans planted this patch about 20 years ago.



**2020**

👍❤️😱 149

19 Comments

## Delaware Valley Ramps



Ramps (Wild Leeks) are one of the earliest wild edible plants of Spring. Highly prized by discerning eaters, fine chefs and locavores, Ramps can be used in place of garlic, onions or leeks in almost any recipe.

Favorite recipes include pickled ramps, ramp pesto pasta, ramp vichyssoise and simple grilled ramps.

We manage acres of accessible fields of ramps and harvest, distribute and deliver ramps across the Northeast to wholesalers and fine restaurants.

Ramps are typically available from early April through May. Early in the season we harvest the younger more delicate ramps whose leaves and bulbs can be used in salads. Later in the season we harvest the more mature ramps whose large bulbs and leaves can be used in a variety of recipes.

Ramps are available for sale as available at the market price. To place an order or inquire as to current availability, please use the order form.

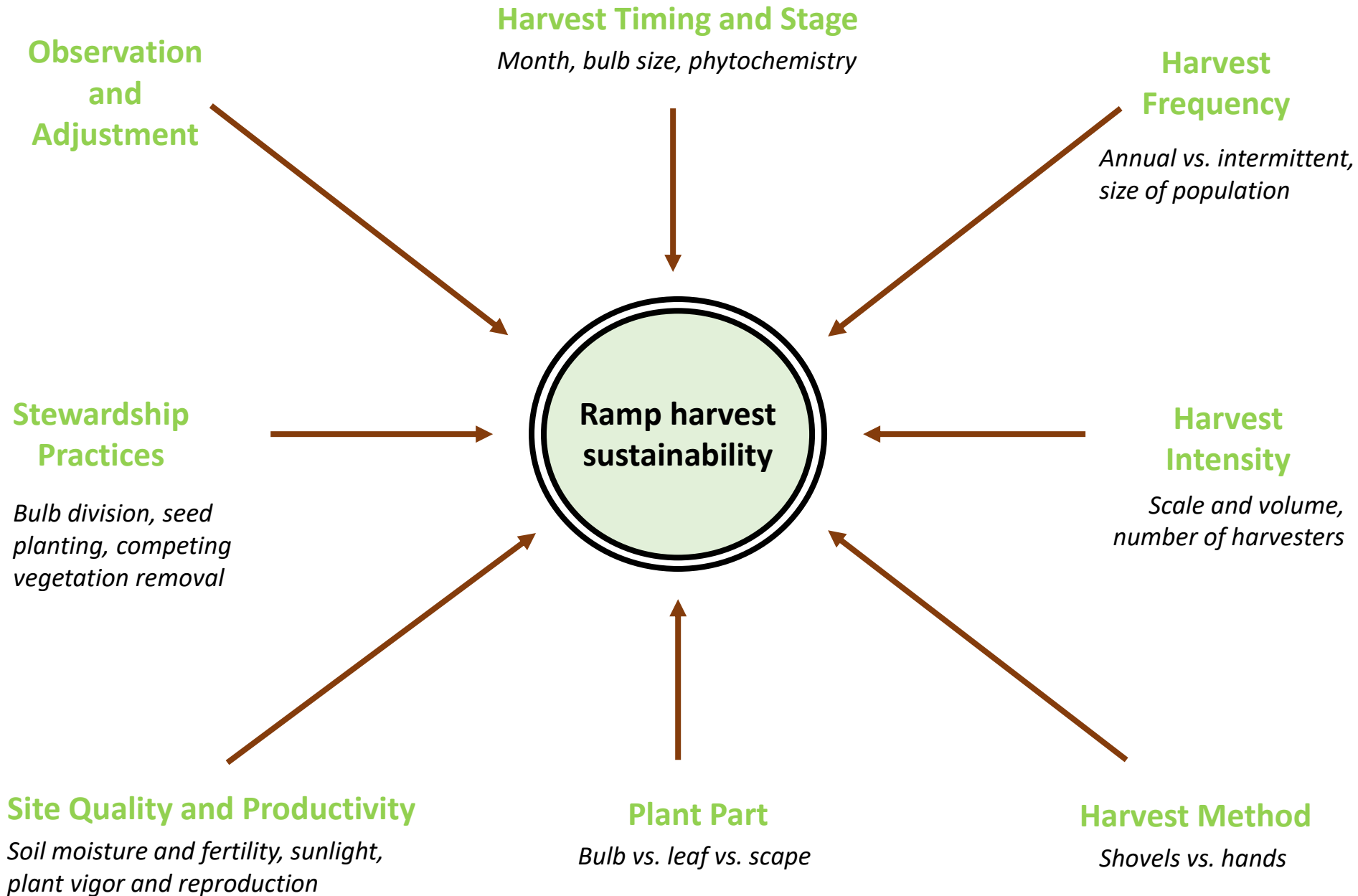
If you have any questions about ramps or desire additional information please feel free to contact us using the contact form or email us directly at: [smsinc@panix.com](mailto:smsinc@panix.com)

Visit the Delaware Valley Ramps Facebook page for additional info, photos and recipes.



“Take care of your ramp  
patch and your ramp patch  
will take care of you”

-Appalachian Proverb



# Ramp stewardship:



**Habitat quality influences everything**



Wild leek, Ramp  
*Allium tricoccum*

A wide-angle photograph of a forest floor. The ground is densely covered with green, leafy plants, identified as wild leek (Allium tricoccum). In the background, numerous tall, slender trees with green foliage stand against a bright sky. The scene is captured from a low angle, looking up at the trees.

Wild leek, Ramp  
*Allium tricoccum*



Wild leek, Ramp  
*Allium tricoccum*

2021

I can't wait until spring time 🌱🌱

And this is a test patch I planted 4 years ago in my yard under my walnut tree, I planted 2 bulbs in each spot.

They are multiplying pretty good I think.

These pictures were of last year. Since then, I've planted over 60 pounds of ramps on my hill. I will share pictures this spring of them.



# SURVIVAL AND GROWTH OF *Allium tricoccum* AIT. TRANSPLANTS IN DIFFERENT HABITATS

Liette Vasseur\* & Daniel Gagnon

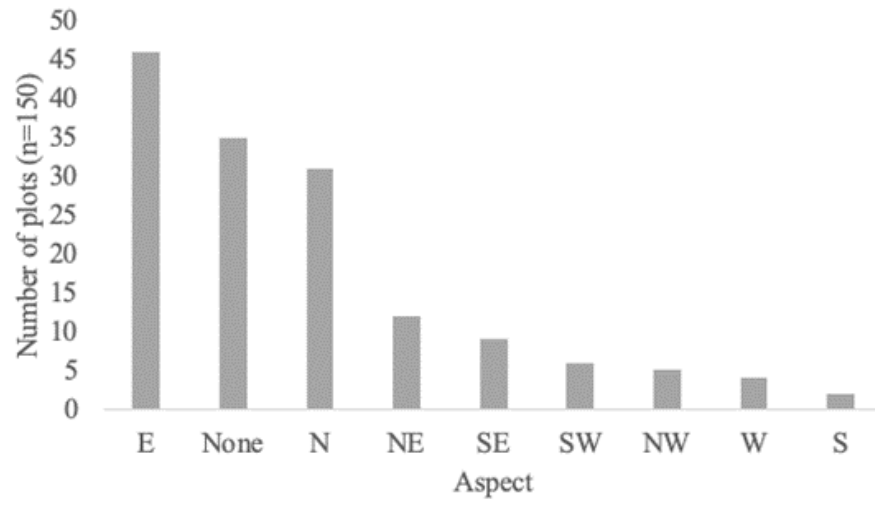
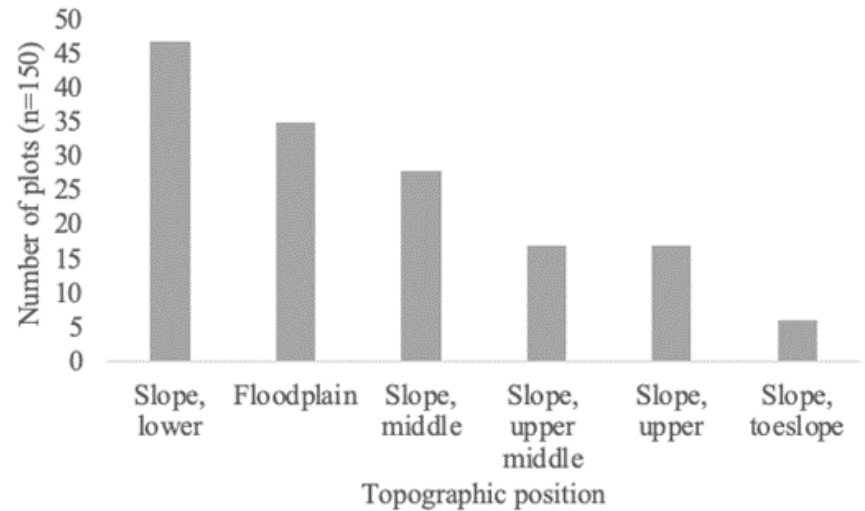
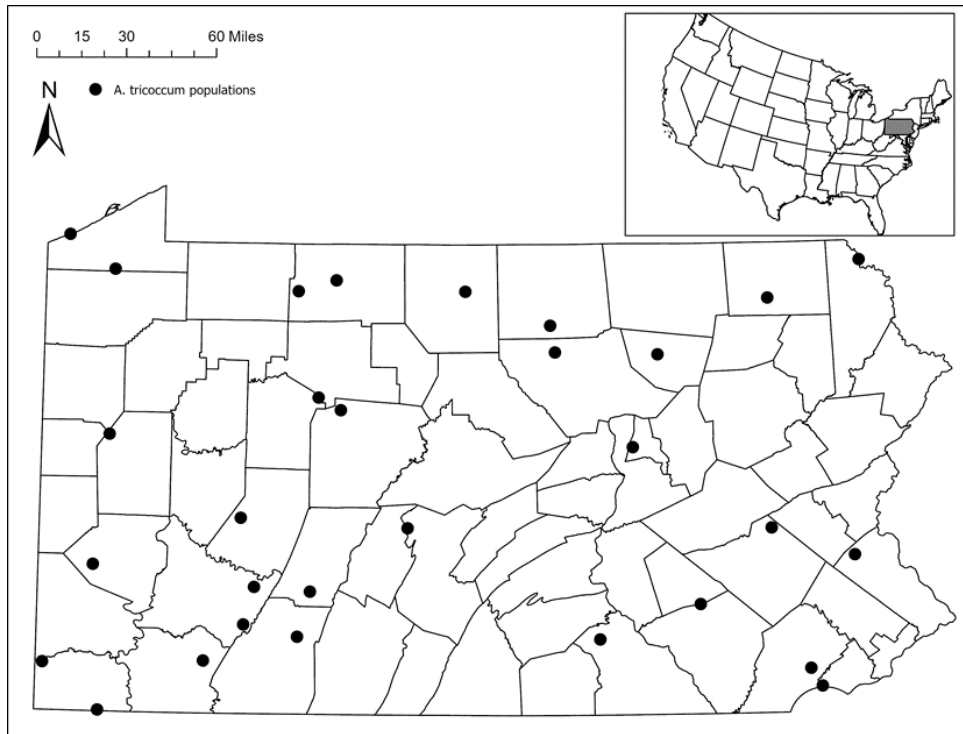
*Groupe de recherche en écologie forestière, Université du Québec à Montréal, CP 8888, Succ. 'A',  
Montréal, Québec, Canada H3C 3P8*

## **Abstract**

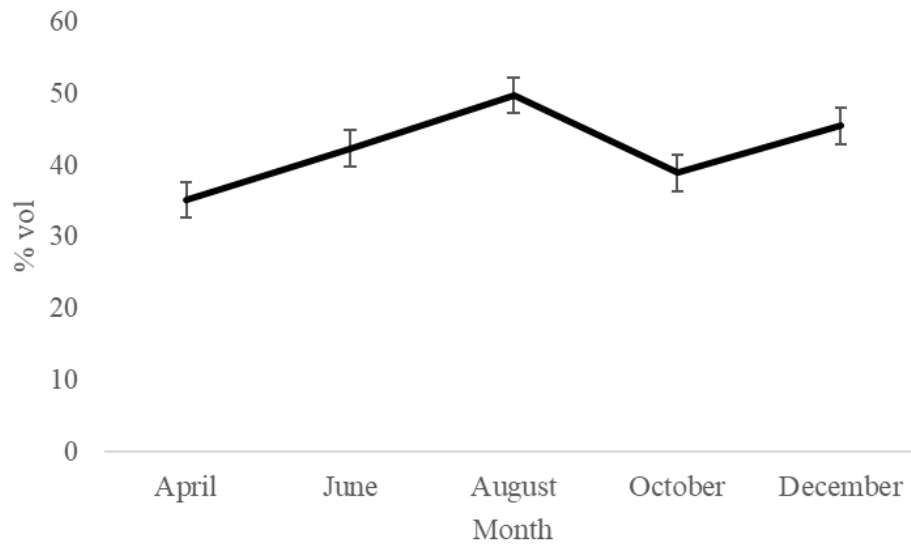
*Southern Quebec (Canada) represents the northern limit of distribution of *Allium tricoccum* Ait., a forest spring ephemeral. In this region, *Allium tricoccum* is considered to be a 'vulnerable' plant because of commercial exploitation of natural populations. In order to gain a better understanding of its ecology, and therefore also its protection, a transplantation experiment in seven natural sites (forest and field) and one in a garden, involving bulbs and seeds, was carried out between 1985 and 1990. The objectives were to determine (1) which environmental factors (light availability, soil moisture and soil nutrient levels) most strongly affect the survival and growth of *A. tricoccum* and (2) which developmental stages are most susceptible to the adverse effects of the environmental factors studied. Separate redundancy analyses were performed on demographic parameters (such as growth and mortality rates) of both juvenile and adult transplants to determine the importance of each environmental factor. Transplants, except for seedlings, showed low initial mortality rates. Transplantation shock appeared to be minimal. Seedling emergence rate was site-specific and was mostly influenced by soil moisture. Summer drought prolonged seed dormancy. Redundancy analyses showed that soil moisture was the most important environmental factor affecting survival and growth of the transplants, whereas light availability did not significantly affect survival and growth. High soil nutrient levels appeared to help maintain growth of both juveniles and adult transplants. These results showed that *A. tricoccum* may be flexible enough to grow under various environmental conditions, not necessarily just under forest canopies. *A. tricoccum* could be grown in open agricultural fields due to its tolerance to full sunlight as long as abundant soil moisture is available.*

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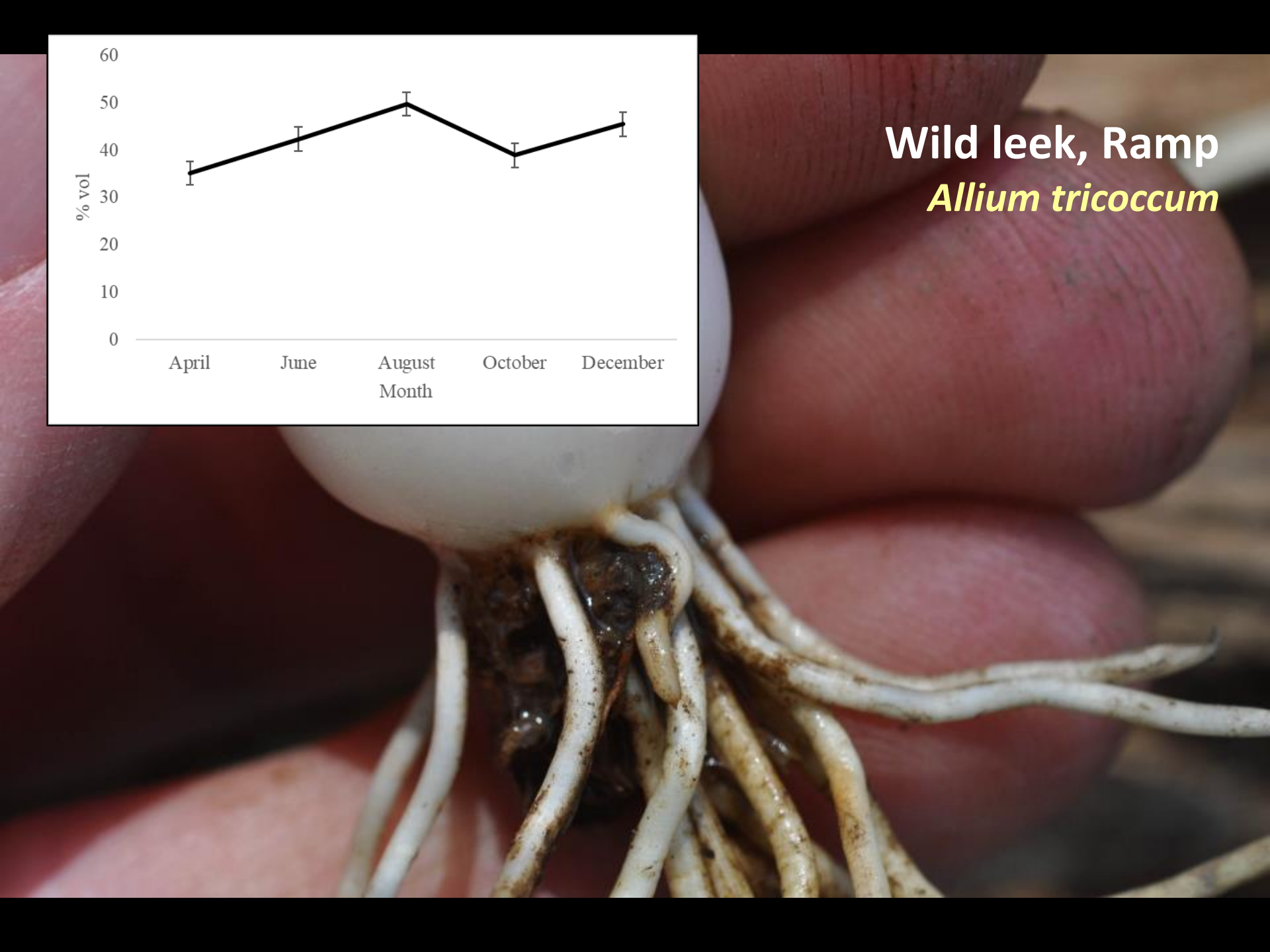




## Habitat research in Pennsylvania



Wild leek, Ramp  
*Allium tricoccum*



# Response of Woodland-planted Ramps to Surface-applied Calcium, Planting Density, and Bulb Preparation

K. Dale Ritchey<sup>1</sup> and Carol M. Schumann

*U.S. Department of Agriculture, Agricultural Research Service, Appalachian Farming Systems Research Center, 1224 Airport Road, Beaver, WV 25813*

*Additional index words.* gypsum, slaked lime, calcium hydroxide, calcium sulfate, land plaster, wild leek, *Allium tricoccum*, acidity, nontimber forest products.

**Abstract.** Concern about over-harvesting wild populations of ramps (*Allium tricoccum* Ait.) has led to interest in planting ramps as an under-story agroforestry crop. To see if ramps would respond to Ca amendments in an acidic site, we planted three types of ramps bulbs and broadcast slaked lime (3316 kg·ha<sup>-1</sup>) or gypsum (7704 kg·ha<sup>-1</sup>) on a Rayne silt loam (fine-loamy, mixed, mesic Typic Hapludults). After 3 years, surface-applied slaked lime raised Ca levels as deep as the 22.5 to 30 cm layer, which showed an increase of 0.34 cmol<sub>c</sub>·kg<sup>-1</sup>, and increased pH in the 2.5 to 5.0 cm layer from 3.96 to 4.67. Gypsum application raised Ca concentration in the 22.5 to 30 cm layer from 0.2 in the control to 0.7 cmol<sub>c</sub>·kg<sup>-1</sup>, but had little effect on pH anywhere in the profile. In plots harvested after 2 years, both amendments increased plant survival and per-plant weight, compared to controls. In plots harvested after 3 years, ramps grown in the slaked lime treatment were heavier than in the gypsum treatment indicating that slaked lime, which raised pH as well as supplied Ca, was probably the better amendment. Single or joined bulbs survived better than bulbs obtained by breaking joined bulbs in two. While more research is needed to overcome limitations to commercial planting of ramps in acidic sites, our data show that Ca application is beneficial to growth and survival of ramps.



**Top understory indicator:**  
**Blue cohosh (*Caulophyllum thalictroides*)**



**Top overstory indicator:**  
**Sugar maple (*Acer saccharum*)**

# Ramp stewardship:



**Does it matter when I harvest?**



West Virginia



Ramp Diggers

18m · 📷

Digging ramps in 4 inches hard packed snow on the mountain makes you appreciate them a lot more



👍 Like

💬 Comment

👍 6



Can I send ya my address for 5 lbs 😊😊

13m Like Reply



West Virginia Ramp Diggers



Group post by I

11h · 📷

Did I hear someone say they needed ramps? I have a few bundles cleaned and ready to go. 3 bucks a bundle of 20 or 2 for 5. I'm in Hurricane.



👍 24

10 Comments



East End Food Co-op

4 hrs · Instagram · 🌐



We've got beautiful, fresh locally foraged Ramps!  
\$19.99/lb while supplies last! #foraged #ramps  
#springhassprung #pennsylvania #local #foraging  
#delicious #fresh #shoplocal #shopsmall #coop  
#pittsburgh



▶ PA-Morel



Mushroom Hunting



Yesterday at 4:31 PM · 📷

Leaves are starting to yellow out but the bulbs are nice and fat right now. Does anyone know if there is a male and female variation, some of the red stalks have a nice "stigma". I love this allium to death.





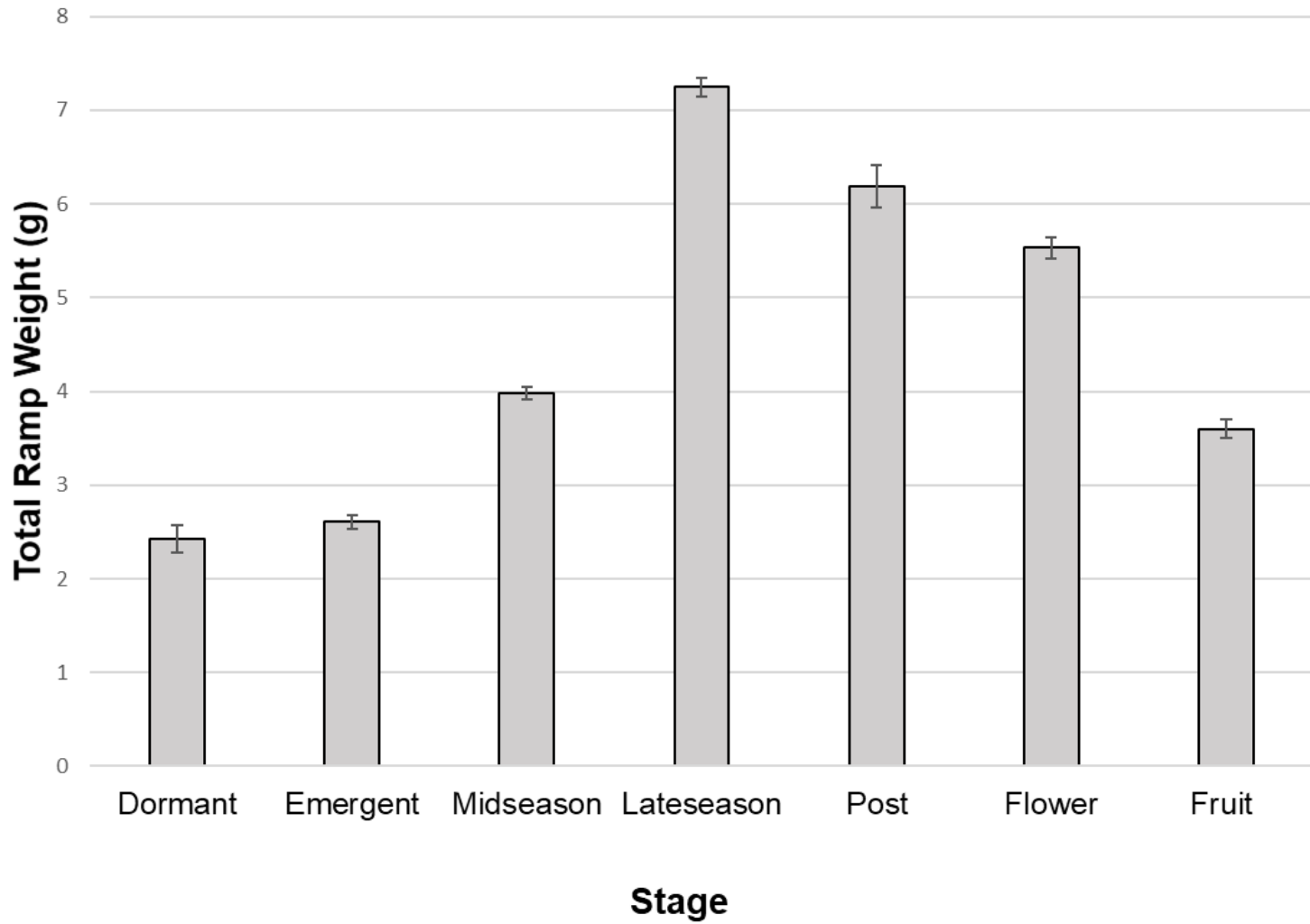


April 12

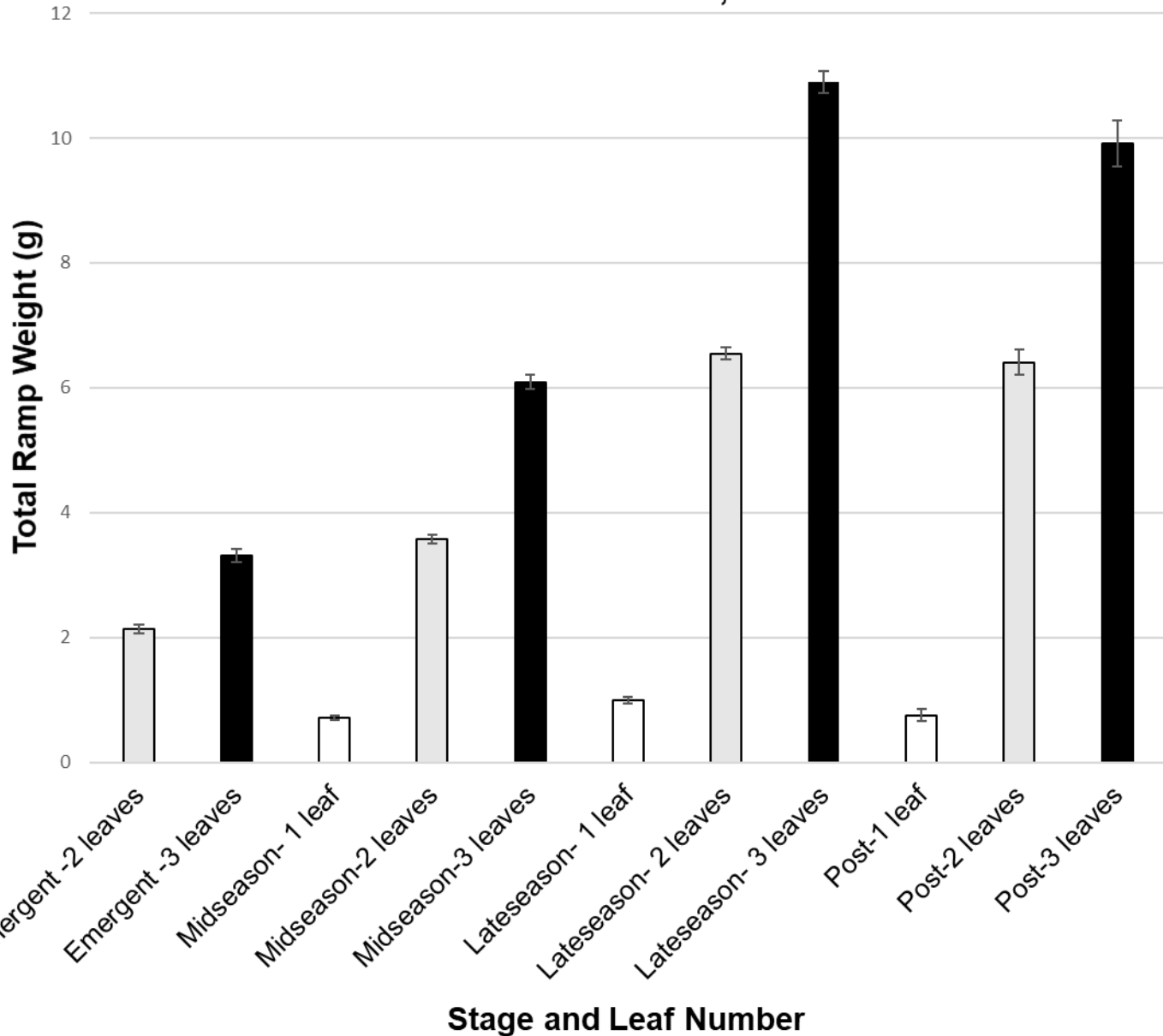


May 12

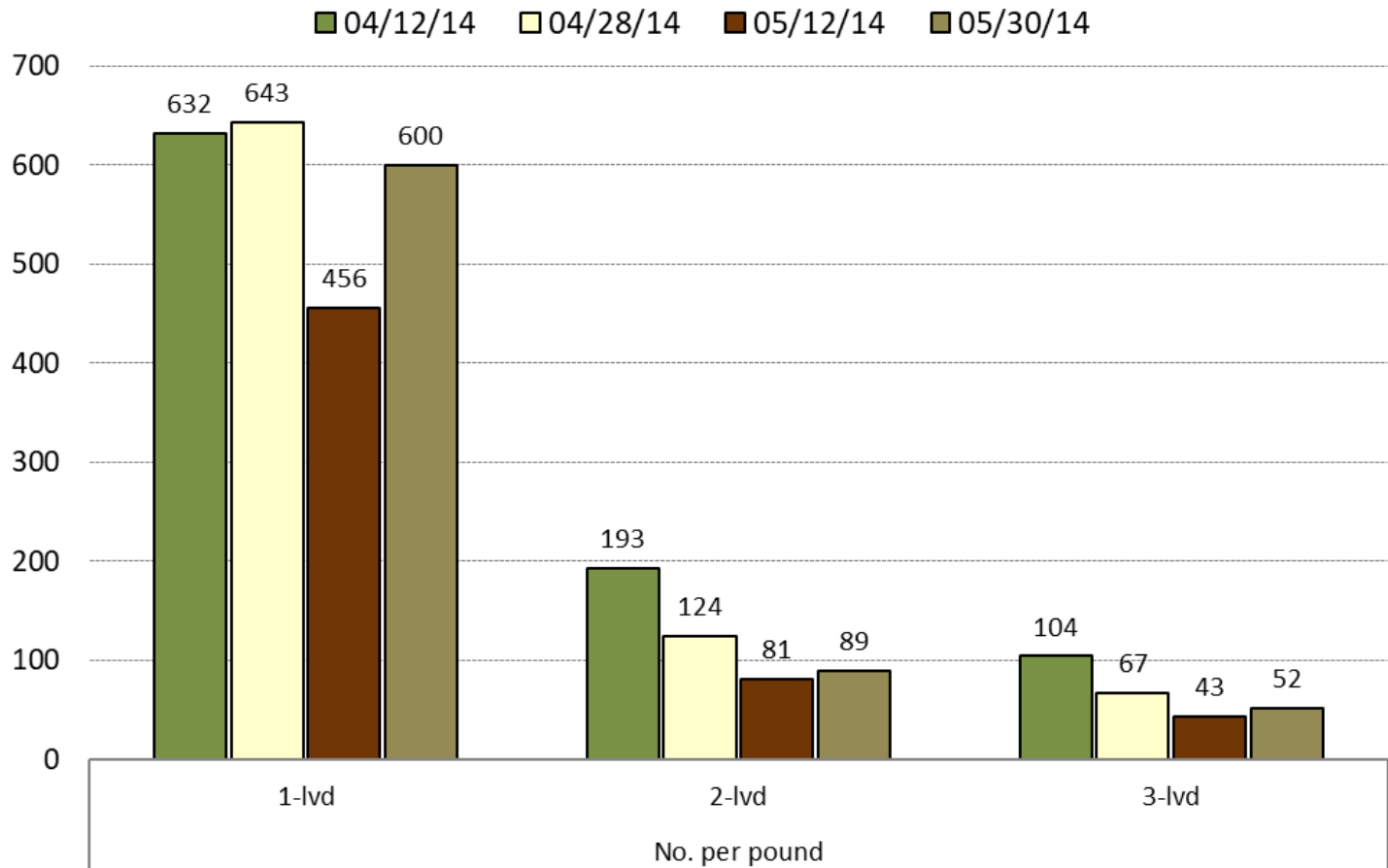
**Total Weight by Stage Across all Sites and Years. Error bars=  
SE of mean n= 94-1439**



**Total Weight by Stage and Leaf Number Across all Sites and Years. Error bars= SE of mean, n= 57-633**



## Ramps per pound (grams/fresh) according to stage and harvest date



Wild leek, Ramp  
*Allium tricoccum*



## Researchers to study ramps' market, flavor profile, vulnerability to pest

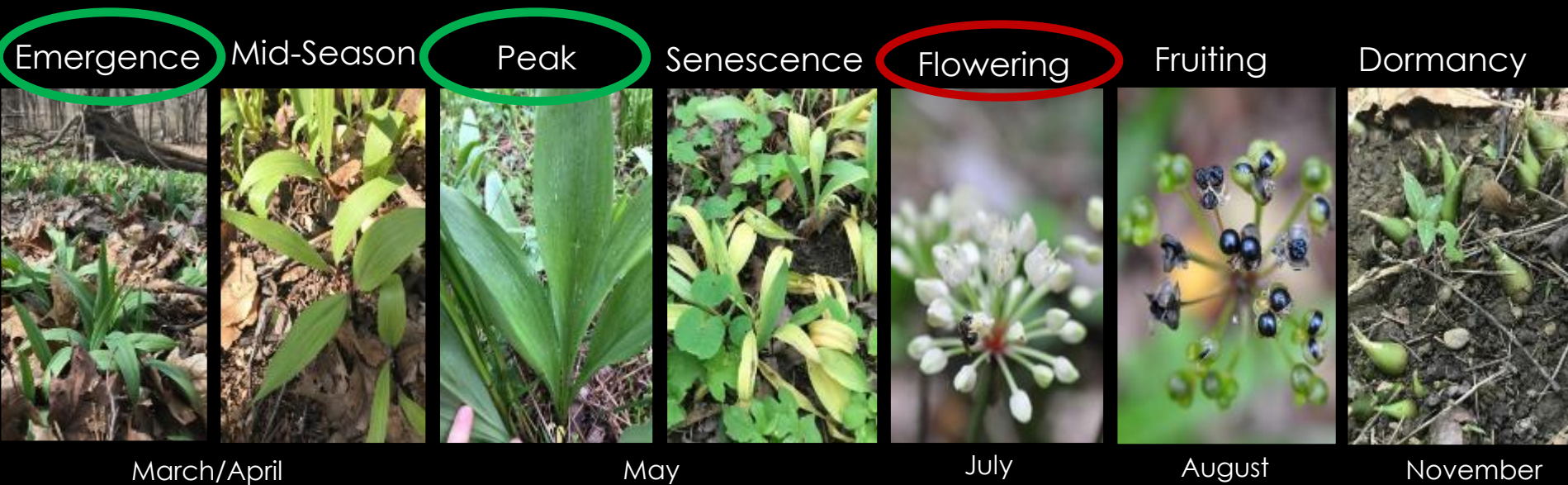


A rising number of producers wish to manage ramps as an agroforestry crop, and this research will provide the Pennsylvania Department of Agriculture with information on the trade of ramps at farmers markets, grocery stores and restaurants to better understand market opportunities, concerns and constraints for guiding forest farmers. **IMAGE: ERIC BURHART / PENN STATE**

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Jeff Mulhollem  
March 07, 2018

# Timing harvests to maximize health promoting compounds



Harvesting bulbs at the flowering stage offers the highest levels of allicin **and** Total Phenolic Compounds (TPC).

Harvesting leaves at the peak stage offers the highest allicin.

Harvesting leaves at the emergence stage offers the highest TPC.

# Ramp stewardship:



**How much or frequently can I harvest from the same area?**



**It depends!**



**What is the size of your ramp patch?**



Wild leek, Ramp

*Allium tricoccum*

A wide-angle photograph of a forest floor densely populated with wild leeks (ramps). The plants have broad, vibrant green leaves and are growing in a thick carpet across the ground. In the background, numerous tall, slender trees with dark trunks and light green foliage rise vertically, creating a sense of depth and enclosure. The lighting is soft and diffused, typical of an overcast day in a wooded area.

Wild leek, Ramp  
*Allium tricoccum*

# Population recovery following differential harvesting of *Allium tricoccum* Ait. in the southern Appalachians

Janet H. Rock<sup>a,\*</sup>, Brian Beckage<sup>b</sup>, Louis J. Gross<sup>b</sup>

<sup>a</sup>Great Smoky Mountains National Park, 107 Park Headquarters Road, Gatlinburg, TN 37738, USA

<sup>b</sup>University of Tennessee, Department of Ecology and Evolutionary Biology, 596 Dabney Hall, Knoxville, TN 37996-1610, USA

Received 2 April 2002; received in revised form 1 April 2003; accepted 1 May 2003

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## Abstract

Over 100 native herbaceous forest perennials are harvested in the United States. Management of these populations for continued survival requires information on the long-term effects of varied harvesting levels on populations of forest perennials. *Allium tricoccum* Ait. is a species that is harvested throughout its range for its edible bulb. We examined the recovery of *A. tricoccum* populations over a 5-year period following experimental harvests of different intensity to predict the number of years required to return to pre-harvest levels and to establish guidelines for sustainable harvesting. Our harvest treatments included removal of 0, 25, 50, 75, and 100% of plants within experimental plots. Treatments were repeated at three sites. Population recovery was monitored for 4 years at two sites and 7 years at one site. We found a relationship between the level of harvest and the negative impacts on populations of *A. tricoccum*, with limited population recovery in the 4 years following harvesting. We projected recovery times as a function of harvest level using a population projection model. Deterministic projections of recovery time ranged from 148 years for a 95% harvest to 2.5 years for a 5% harvest. Incorporating stochasticity into our projections increased the uncertainty in our estimates of recovery time. For example the recovery time from a 5% harvest ranged from 1 to 89 years (95% confidence limit). Based on our results, a 10% harvest once every 10 years would, on average, be a sustainable level of harvest for *A. tricoccum* in southern Appalachian forests.

Published by Elsevier Ltd.


*Keywords:* Over-harvest; Ramps; *Allium tricoccum*; Sustainable harvest; Forest perennial; Population recovery; Modeling

Wild leek, Ramp  
*Allium tricoccum*

10%?



# Sustainable leaf harvesting and effects of plant density on wild leek cultivation plots and natural stands in Southern Quebec, Canada

Pierre-Paul Dion  · Julie Bussi eres ·  
Line Lapointe

**Abstract** Overharvesting reduces the populations of wild leek in deciduous temperate forests of North America. Forest farming relying on planted bulbs that are fertilized and selectively harvested could enhance and sustain wild leek production. Density reduction following bulb harvest could improve yield in natural wild leek stands that reach growth-limiting densities. Limiting the harvest to leaves may also provide an alternative form of exploitation, but could slow growth by reducing both carbon and nutrient reserves depending on the timing and intensity of such harvest. Our objectives were to assess the effects of (1) planting density and post-harvest density reduction, and (2) the timing and intensity of leaf harvest on subsequent

growth and reproduction of wild leek. Three experiments were established. Bulbs were planted at densities from 44 to 356 bulbs  $m^{-2}$ , covering the range surveyed in natural populations. Plots in dense populations were subjected to up to 40 % bulb harvest. In cultivated plots, either half or all the leaves on each plant were harvested, from 15 to 25 days after unfolding. Plants growing in higher density plots exhibited slower growth and reproduction rates, but greater productivity per cultivated area. A similar effect, albeit marginal, was obtained following bulb harvests in natural populations. Harvesting leaves did not affect survival, but delaying the harvest and harvesting only half of the leaves favored subsequent plant growth. We recommend harvesting down to a fixed bulb density rather than harvesting a percentage of bulbs, and harvesting leaves only as ways to ensure sustainable exploitation of leeks.

A man wearing a maroon long-sleeved shirt, blue jeans, and a grey cap is kneeling in a forest, working with a tool to thin a dense patch of green wild leeks. The forest floor is covered with these plants, and the background shows a stand of tall, thin trees with bare branches under a clear blue sky.

**A**  
**Strawberry**  
**Patch**  
**Approach to**  
**Thinning**

Wild leek, Ramp  
*Allium tricoccum*



Wild leek, Ramp  
*Allium tricoccum*



A close-up photograph of the root system of a Wild leek (Allium tricoccum). The image shows several bulbous, light-colored roots emerging from the soil. The stems are reddish-brown and have a fibrous, papery sheath at the base. The surrounding soil is dark and moist, with some dried leaves and twigs visible. The lighting is bright, highlighting the textures of the plant parts.

**Wild leek, Ramp**  
*Allium tricoccum*



Wild leek, Ramp  
*Allium tricoccum*

# Ramp stewardship:



Should I only harvest leaves?



Andy Levick ► PA-Morel Mushroom Hunting

Yesterday at 7:55 PM · 🌐

Part of my ramp bounty. One patch had nice big ones. The rest need time to grow. Morels just around the corner.



## Ramps Action Alert: The Sustainable Stand

4/4/2011 5:09:43 PM

By Lawrence Davis-Hollander

Tags: [ramps](#), [wild leeks](#), [foraging](#), [wild food](#), , [Lawrence Davis-Hollander](#)

### Action Alert

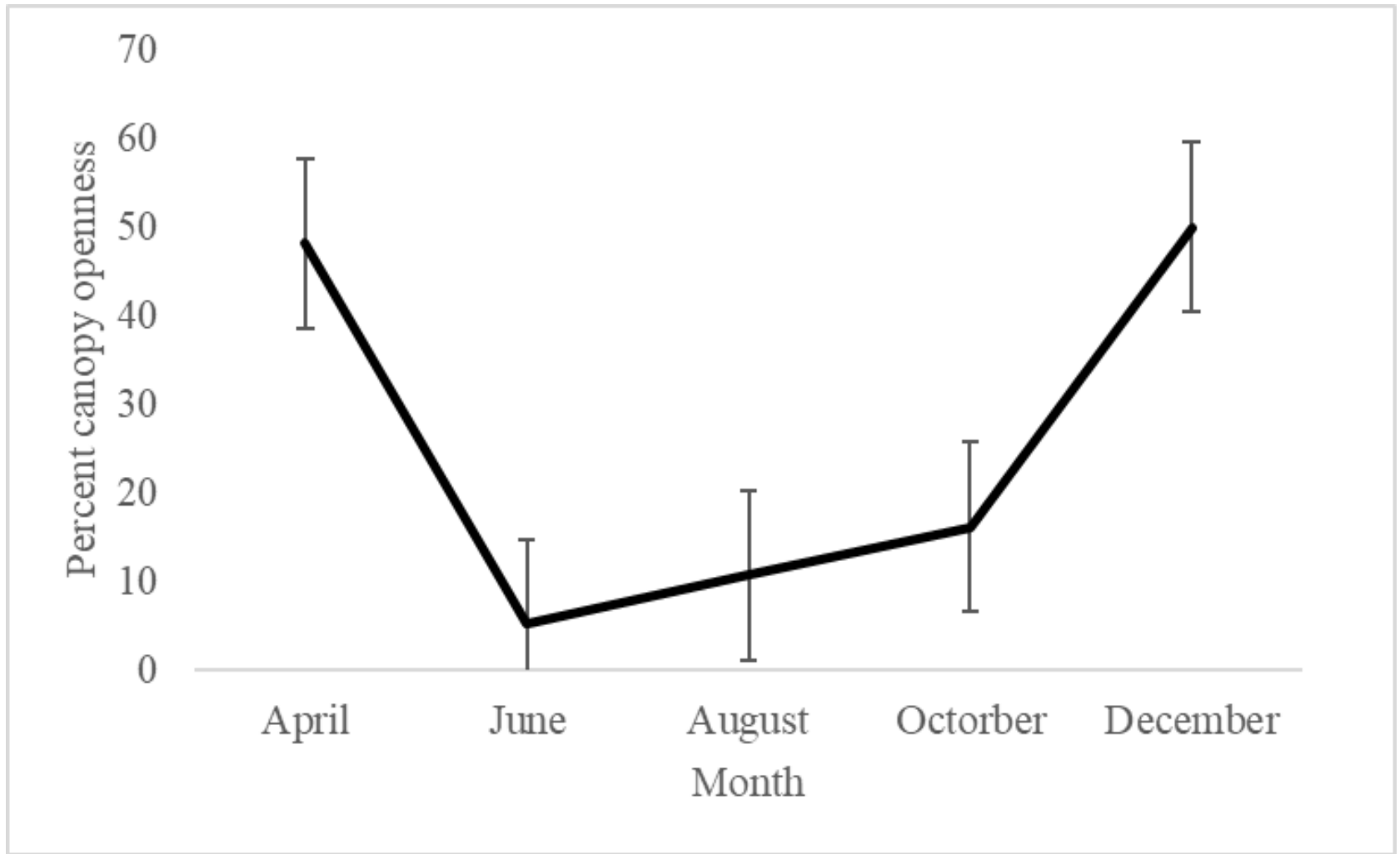
**Ramps or wild leeks, native of rich woodlands in the eastern US are becoming vulnerable to over harvesting, especially due to increased demand by the culinary trade. In 2011 it is estimated at least 2 million plants will be harvested.**

You may see them offered for sale in specialty food stores, health food stores, farm stores, farmer's markets, on the internet and on restaurant menus. Recommendations are not to purchase whole plants and bulbs.

<http://www.grit.com/food/ramps-action-alert-the-sustainable-stand.aspx>




Wild leek, Ramp  
*Allium tricoccum*



Forest canopy

# Sustainable leaf harvesting and effects of plant density on wild leek cultivation plots and natural stands in Southern Quebec, Canada

Pierre-Paul Dion  · Julie Bussi eres ·  
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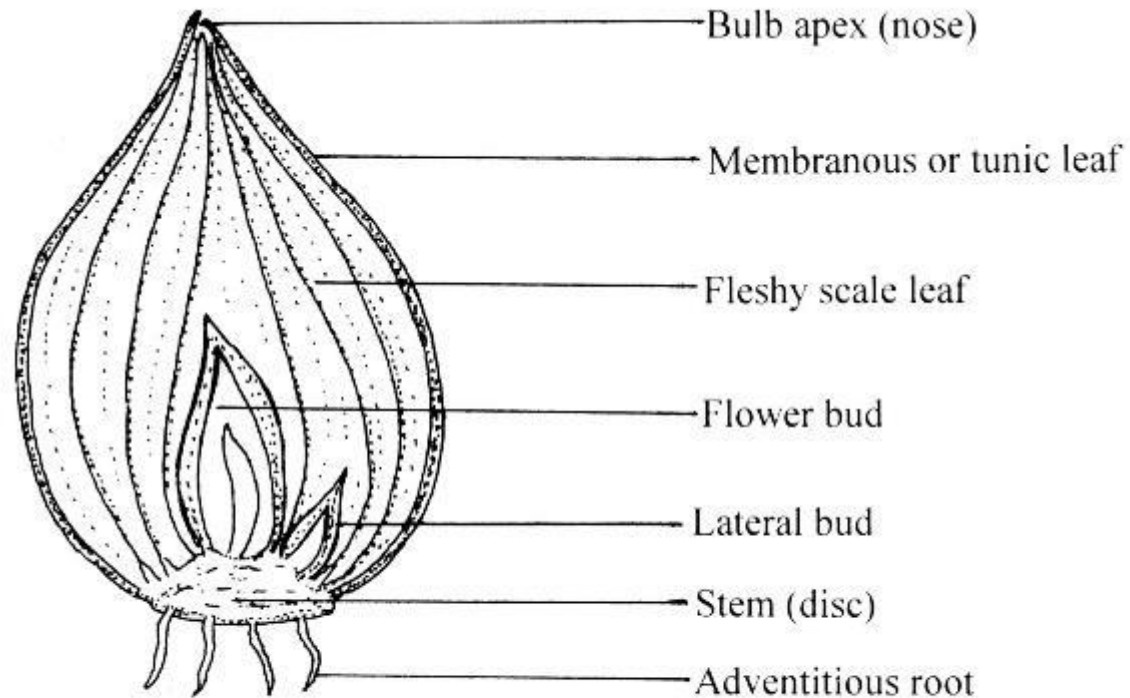
# Ramp stewardship:



**Can I divide the bulb or replant the base?**



**Bulb:** an underground bud with thickened fleshy scales



L.S. of Onion, *Allium cepa*



### West Virginia Ramp Diggers

Group post by Steffi Hone · 17h · 📷



The elusive 4-leaf (and before any bad comments, I don't dig - I cut and leave 2" of bulb and roots intact)



👍 53

9 Comments



### Pennsylvania Morels and Mushroom Hunting

Group post by James Saner · 2d · 📷



Anyone want to start a ramp patch. I have little over a LB of starter roots make offer. Fresh from Friday.





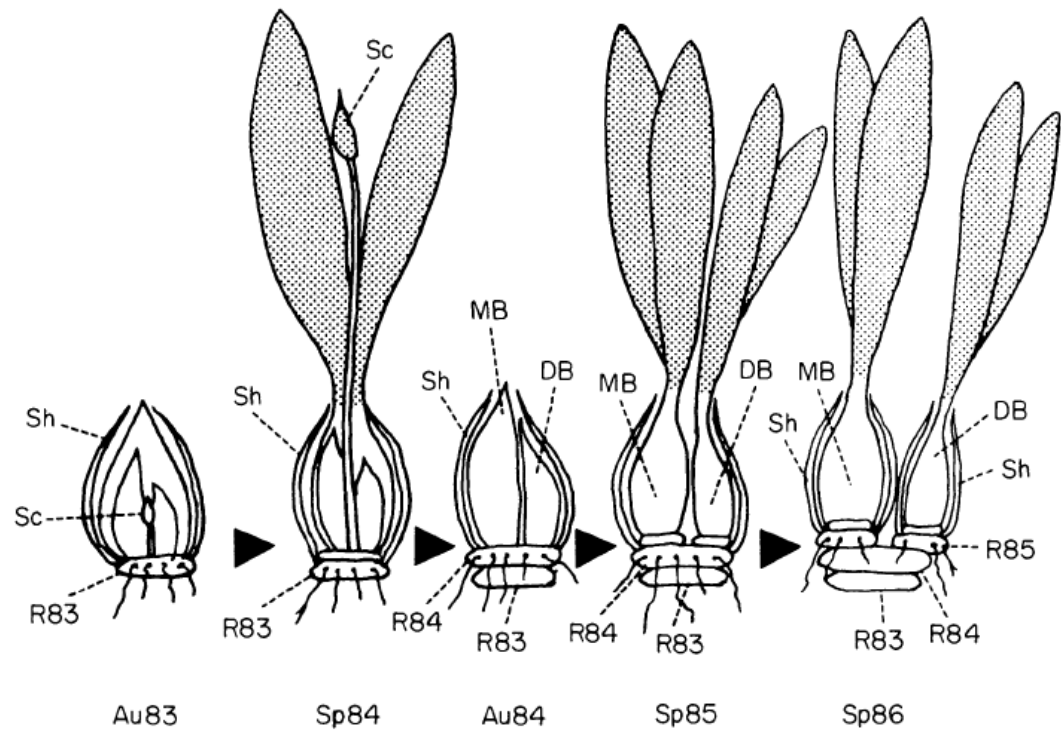
**Does anyone have experience with this propagation method?  
Please share in the Q and A.**

## Ramet demography of *Allium tricoccum*, a spring ephemeral, perennial forest herb

ANDRÉE NAULT\* and DANIEL GAGNON

Groupe de recherche en écologie forestière, Département des Sciences biologiques, Université du Québec à Montréal, CP 8888, Succ. 'A', Montréal, Québec, Canada H3C 3P8

**Fig. 1.** Diagram of bulb division and sequential development of daughter ramets in *Allium tricoccum*. The inflorescence initiated in autumn is terminal, and sympodial growth takes place through lateral bud development. Emerging from the same sheath in spring, the daughter ramets are unequal in size due to apical dominance. They are referred to as mother bulb (i.e. the larger; MB) and daughter bulb (i.e. the smaller; DB). Autumn and spring are indicated in the diagram by Au and Sp along with the year. Sc: scape; Sh: bulb sheath; R&n: rhizome first appearing during indicated year.





Wild leek, Ramp  
*Allium tricoccum*

A photograph showing several wild leek (ramp) plants growing in a forest. The plants have thick, white, bulbous bases and long, green, blade-like leaves. They are surrounded by a dense layer of brown, fallen leaves and twigs on the forest floor. The lighting is natural, highlighting the texture of the leaves and the ground.

Wild leek, Ramp  
*Allium tricoccum*

Wild leek, Ramp  
*Allium tricoccum*





Wild leek, Ramp  
*Allium tricoccum*





**Wild leek, Ramp**  
*Allium tricoccum*



Wild leek, Ramp  
*Allium tricoccum*

# Ramp stewardship:



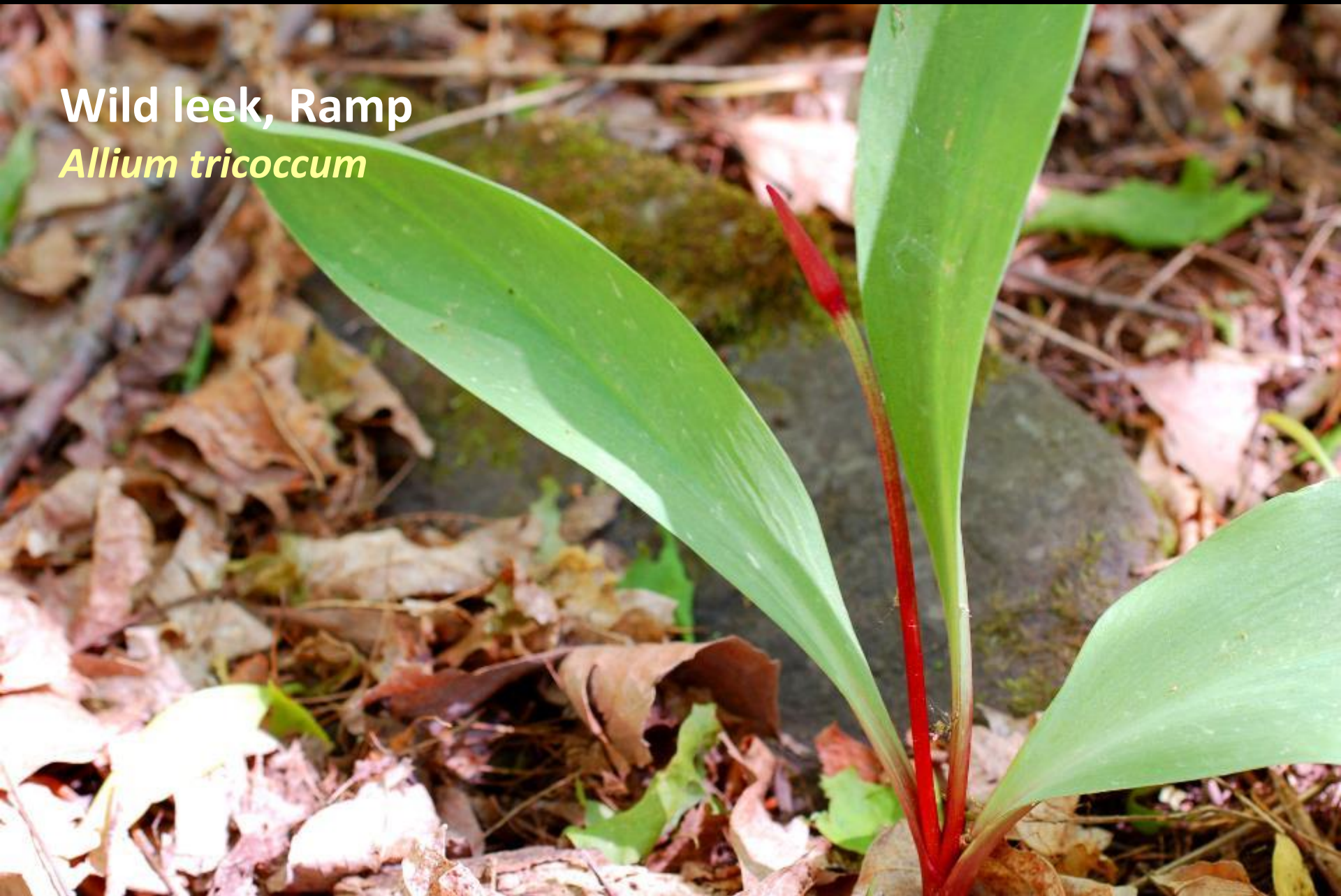
What about the seeds?

A photograph of a forest stream with wild leek plants growing on the banks. The stream is in the lower left, and the banks are covered in dense green vegetation. The background is a dense forest of tall trees with green leaves.

Wild leek, Ramp  
*Allium tricoccum*

Wild leek, Ramp

*Allium tricoccum*



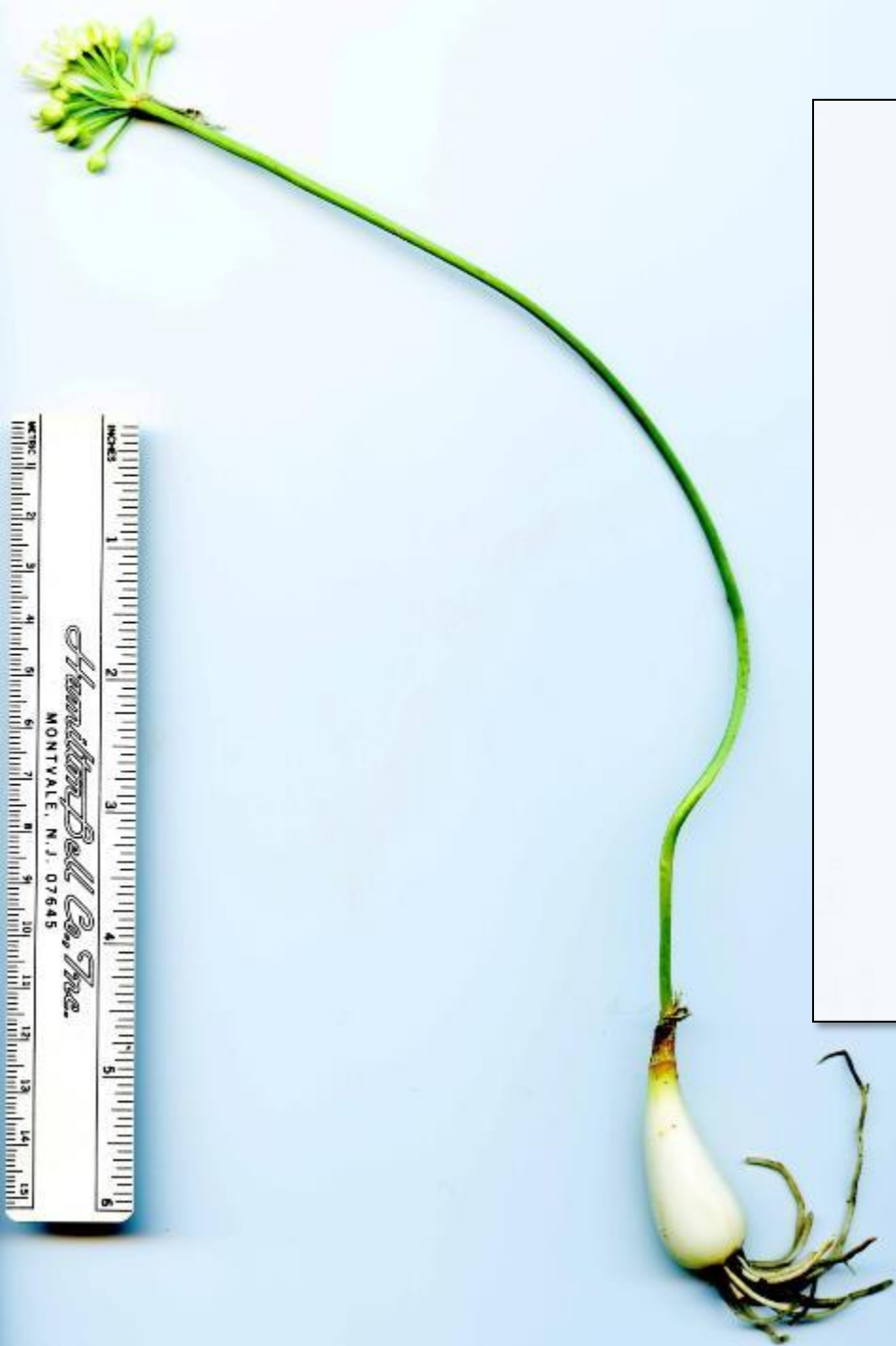
Wild leek, Ramp

*Allium tricoccum*





Wild leek, Ramp  
*Allium tricoccum*



**Wild leek, Ramp**  
*Allium tricoccum*





**Wild leek, Ramp**  
*Allium tricoccum*



**Wild leek, Ramp**  
*Allium tricoccum*

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# Some Aspects of the Pollination Ecology of Wild Leek, *Allium tricoccum* Ait.

ANDRÉE NAULT<sup>1)</sup> and DANIEL GAGNON<sup>2)</sup>

<sup>1)</sup> *Department of Botany, Faculty of Science, Kyoto University, Kyoto 606, Japan.*

<sup>2)</sup> *Département des Sciences biologiques, Université du Québec à Montréal,  
C.P. 8888, Succ. "A", Montréal, P.Q., Canada, H3C 3P8.*

**Abstract** Some aspects of the pollination ecology of a wild leek (*Allium tricoccum* Ait.) population were studied in Gatineau Park, Southern Québec, Canada. Self-compatibility was determined by a pollinator exclusion experiment. Pollinator limitation of seed production was tested by comparing naturally pollinated plants with hand cross-pollinated plants. The insects observed on the umbels were collected for identification. Wild leek was found to be self-compatible. Seed production does not seem to be limited by pollinator activity. An important year to year variability of pollinator activity was observed according to the flowering intensity within the population.



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A close-up photograph of the seed heads of a Wild leek (Allium tricoccum). The image shows several dried, brownish seed heads on thin stems, with a few dark, round seeds visible. The background is a soft-focus green, likely from the plant's leaves.

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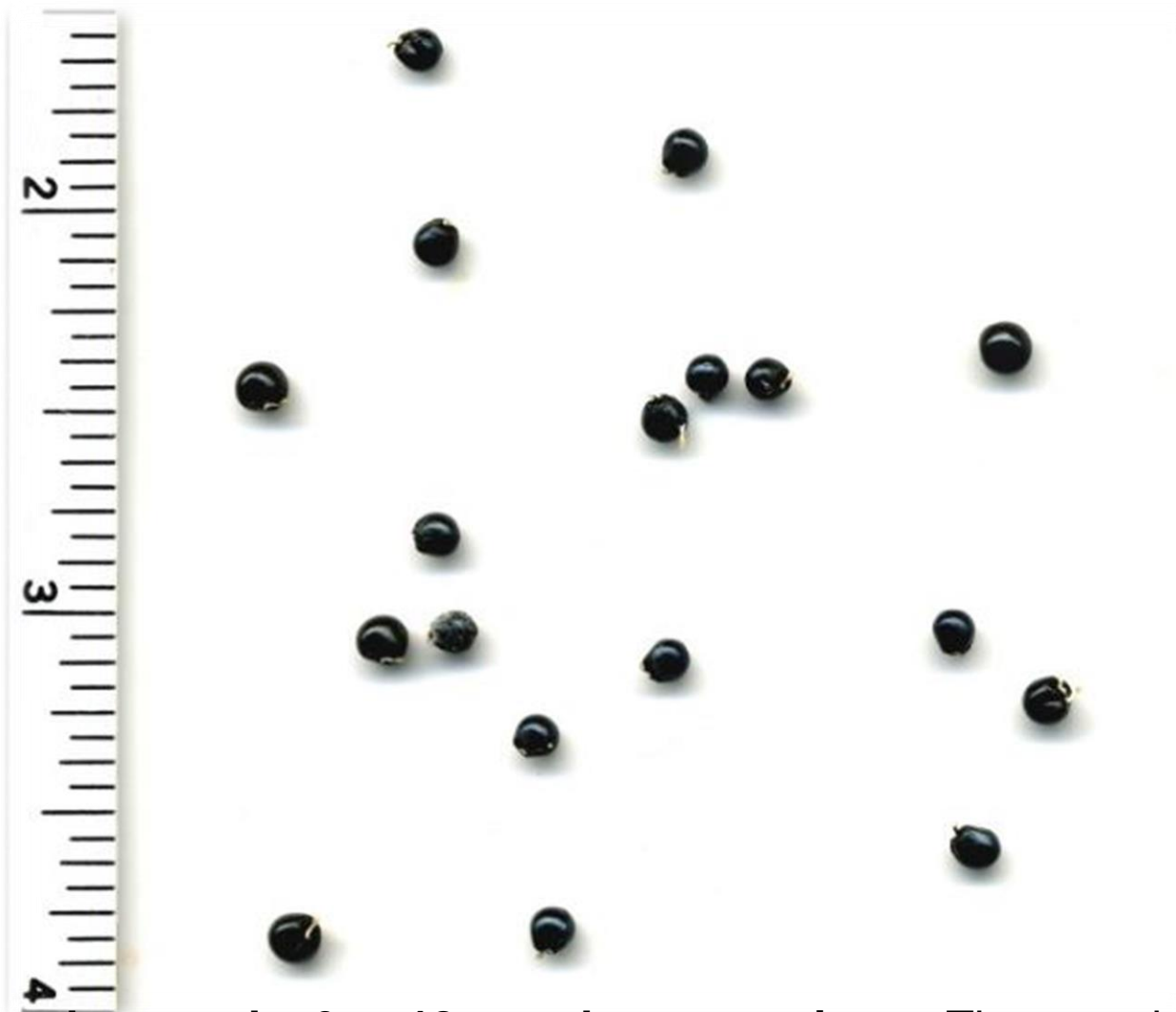
METRIC 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

INCHES 1 2 3 4 5 6

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**Ramp seeds can take 6 to 18 months to germinate.** They require a warm, moist period to break root dormancy and then a cold period to break shoot dormancy. If there is warm weather after sowing in late summer or fall then the winter can break shoot dormancy and the plants will emerge in spring. **If there is not an adequate warm period after sowing, the seed will not germinate until the second spring.**





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**Email: [epb6@psu.edu](mailto:epb6@psu.edu)**

**Instagram:  
[pa\\_botany\\_and\\_ethnobotany](https://www.instagram.com/pa_botany_and_ethnobotany)**

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