

ACORN STUDY

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Background

Our studies of vertebrates - Northern Saw-whet Owl (Trudy and Drew), Timber Rattlesnake (Ed), and Wood Rat (Ed) - have strongly suggested that the presence of acorns effects both mammal densities and predator densities. The loss of the American Chestnut from our Northeastern forests has left the Oaks and their acorns as a primary source of winter sustenance for our small mammal populations and for all the predators that depend on them.

Goal

This Acorn Study is intended to provide both quantitative and qualitative data to help us understand the significance of acorns in the forest ecology. Our goal is to establish a regional database of yearly acorn production, freely available on line for use by researchers and educators.

Volunteers Needed

We need volunteers to collect data from across the region, using the enclosed protocol. The protocol includes acorn visuals and simple counts of acorns, so students of ecology at all levels can participate. Please read the protocol and then register as a participant.

PROTOCOL: Acorn Study

Materials: measuring tape, 4 meter sticks, container for acorns (bag), tree identification key, data sheet

I. Registration <http://www.battaly.com/acorn/register/>

Generates a registration code, using the following: **SS ZZZZZ PPP XXX**

<i>Code</i>	<i>Meaning</i>	<i>Example: NY10603VAL001</i>
SS	State	NY
ZZZZZ	Zip Code	10603
PPP	Participant or general location	VAL (Valhalla)
XXX	Distinguishing Code, assigned by us	---

The state and zip codes for the study location should be used.

The participant code, **PPP**, should indicate the organization conducting the study at your site. We have used 3 characters since it is more common for anagrams. If the study is conducted by an individual, then the PPP should denote the general geographic area. An individual could also use initials, but we prefer not to change a Site ID if a new person continues the study on the same site.

XXX: These three digits will be assigned by database maintenance to avoid duplicate codes.

II. Study Site

Select a site that will be available for study for at least 5 years. This is important to facilitate comparison of data from year to year. The best time to conduct this study is mid to late October.

A. Site Identification Code

1. **Generate a site ID code**, using the Registration Code above together with the following:

<i>Code</i>	<i>Meaning</i>	<i>Example: NY10603VAL001LAMY14</i>
HH	Habitat Type	LA (Landscaped)
LL	location	MY (my yard)
YY	Start year	13 (2014)

HH is the habitat type. Use one of the following categories:

LA	Landscaped	WS	Woodlot Suburban
WR	Woodlot Rural	FO	Forest

LA - Landscaped applies to all yards, lawns, and landscaped areas. Use WS for woodlots surrounded by a suburban area, and WR for those surrounded by rural land. FO should be used for forested land that is more extensive and provides uninterrupted woodlands.

LL should indicate the location within the study area. For example, if a school has a nearby woodlot and plans to sample 3 sections of oaks within that woodlot, LL might be SO for south, or RR for oaks near Ridge Road, or BF for oaks near the ball field. This is the level for which we would like GPS coordinates, taken from the center of the chosen trees.

YY is the first year that data is submitted for this study site. This will not change from year to year.

3. If possible, **identify the Physiographic Province** for your study site. There are 13 provinces in New York, including the Hudson Highlands, Manhattan Prong, Newark Lowlands, and the Atlantic Coastal Plain in the metropolitan region. There are 4 provinces in New Jersey, including Valley and Ridge, Highlands, Piedmont, and Coastal Plain. This information has the potential of identifying regions of similar acorn production due to geological similarities. (See: http://people.hofstra.edu/j_b_bennington/ny_geology/ for New York and <http://www.state.nj.us/dep/njgs/enviroed/infocirc/provinces.pdf> for New Jersey)

B. Selecting the Trees

1. **Select one or more oak trees** that flower and produce acorns. Red and black oaks mature at 20 to 25 years old, but white oak may take much longer. Therefore, the largest oaks will likely provide the best data.

2. In the first year of the study, take a photograph of the acorns and/or leaves of the tree(s). Send the photo(s) to merlin@pipeline.com along with the site ID code and contact information, using 'acorn study' as the subject.

III. Collect Data

A. Tree Identification

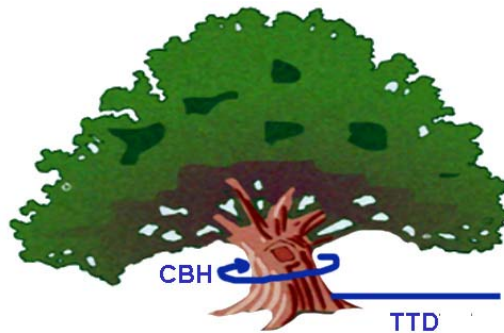
1. **Identify the oak tree group as red or white.** This is **required** for the study and is important for our understanding of the significance of acorns as producers in the ecosystem. White oaks produce an annual crop with complete acorn development in one year. Red oaks have irregular crops with full acorn development in two years. The red oak group has leaves with pointed bristles on the lobes. The white oak group has leaves that are smooth with no bristles. See the identification key.

2. Identify the tree to species. This is not required, but will enable better assessment for conservation efforts. The white oak group includes white oak, swamp white oak, and chestnut oak. Bur oak is uncommon in the northeast, but may occur as an ornamental. The red oak

group includes northern red oak, black oak, pin oak, and scarlet oak. Some other oaks are uncommon, especially along the southern border. Note that oak trees sometimes hybridize making identification to species difficult. See acorn and leaf sheets, and check the web links or resources for more detail.

B. Tree Measurements

1. Measure the circumference at breast height (CBH) of the tree trunk in centimeters.



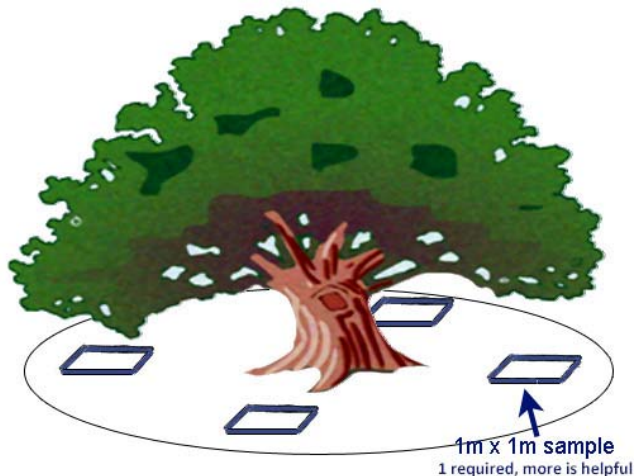
2. Measure the distance from the trunk of the tree to the drip line at the outer edge of the branches in meters. The trunk to drip (TTD) measure provides a gross measurement of the crown of the tree.

C. Sample Space

1. Each square meter sample site should be positioned inside the outer edge of the drip line. **One sampling site for each tree is required.** Select one to four sample sites for each tree. Samples should be completed on the same day. To avoid bias in sampling, and improve repeatability in site location from year to year, select the sites in this order:

Guidelines for Location of Sample Site

one sample (required)	south
two samples	south and north
three samples	south, north, and west
four samples	south, north, west, and east



These positions for the sample site are presented as a guideline for an unbiased selection. If they result in a site for which year to year repeatability might be compromised, adjust the location to one which you believe would be repeatable. Examples of situations that might fall into this category include a steep slope where acorns are washed into or out of the area, dense vegetation that make counting difficult, or a roadway where the acorns might be crushed or dispersed.

2. Mark the point along the TTD line that is 1 meter from the drip line. Using this mark as the center of a sample site, place 4 meter sticks around the mark forming a square. The sample square will be 1/2 meter from the drip line. This defines the one square meter to be sampled.

D. Count Acorns: mid to late October in the Northeast

1. If the oak tree is the only oak in the study area, or if all oaks in the area are the same species, proceed to step 2. If the study area contains trees from both the white oak and red oak groups, examine the acorns and select only those from the study tree. With a little practice you will be able to identify the oak species by the size and shape of both the acorn and cup. See the identification key (http://www.battaly.com/acorn/ID_acorns_leaves.pdf).

2. Count the acorns inside each square meter sample site. Remove the acorns from the sample square as they are counted, placing them into a container (or bag) until the count is satisfactorily complete. Alternatively, you can remove all acorns to a container and count them afterward.

Notes

- A rake can be used to collect acorns. If the meter sticks move while raking the acorns, try raking the acorns on the outside away, leaving behind only those to be counted. Then the meter sticks can be removed before counting.
- Gloves might be advisable - if handling acorns from a fertilized lawn, for example.

3. If acorns have matured, the nut portions may be separated from cups. If this is the case for your acorns, count the nuts and cups independently and use the higher count. (Animals may have taken or eaten the nuts and left cups behind.) If you also have whole acorns (cup and acorn together), be sure to add those. Do not count any acorns or cups that are dried up and obviously from a different year.

4. Record the count(s) on the datasheet.

5. Return the acorns to a nearby area for wildlife benefit, but do not return them to any sample square meter site. This avoids double counting if you chose to sample again before the end of the acorn drop season.

E. Multiple Sampling

While not required, we encourage participants to repeat the acorn sampling multiple times during the same season, beginning in early October or as soon as acorns begin to drop. This would enable assessment of when the peak acorn drop occurs in your area. Also, more acorns would be counted before eaten by animals.

Possible sampling periods include:

1. Two samples: second and last week of October
2. Four samples: weekly during October

F. Qualitative Estimate of Acorn Production

Provide a qualitative estimate of the acorn production in comparison to other years. This is not required for the study, but may prove to be very useful. If you have some experience with acorn observations in other years, use the following to determine a score.

Score	Description
0	failure (none)
1	poor (some)
2	fair (noticeable numbers)
3	good (under foot)

G. Alternative Methods

We encourage participants to try other means of acorn collection. For example, containers that are both weather-proof and animal-proof could be designed, positioned, and left on site for the whole acorn drop season. This would enable comprehensive data collection with minimal field time. Containers could be designed with materials on hand, or with such materials as hardware cloth, inverted squirrel guards, and barrels. The dimensions could vary, but the horizontal surface area would need to be accurately computed and the acorn count converted to count per square meter. Also, a description of the method should be submitted by email, along with the site ID code and contact information, to merlin@pipeline.com with the subject 'acorn trap description.' Conversions from other square units to square meters can be done on the Internet at: <http://www.onlineconversion.com/area.htm>

IV. Record Data on Datasheet

1. Use a separate data sheet for each day of collection. Use a separate sheet for each tree sampled.
2. Be sure to enter the date and site ID code on each sheet.

3. If more than one square meter site was sampled per tree, be sure to enter counts for each sample on the same datasheet.

V. Submit Data

1. Using the datasheet, enter all the data into the database at:
<http://www.battaly.com/acorns/data>

2. The minimum information to be entered:

Date

Site ID code

Name of organization

Name of contact

Nearest town or intersection

GPS coordinates of site

Tree Identification

Tree Measures: CBH, TTD

Acorns Counts

Collection Method: meter sticks or trap