



Identifying the American Chestnut



B3 Summer Science Camp at
Olympic High School 2016

Collecting samples in nature

- How do you identify the specimens you want?
- What part of the specimen is important to later studies?
- How do you preserve the part(s) you care about?

Known differences in the two Chestnut species

- Tress have different mature height and shape
- Density of simple vein hairs on the lower (abaxial) surfaces
 - American Chestnuts are smooth: the abaxial interveinal leaf surface is glabrous
 - Chinese Chestnuts are hairy: the abaxial interveinal leaf surface is pubescent
- Density of simple twig hairs in the leaf midribs and secondary veins
 - The petiole, midrib and secondary vein of the Chinese chestnut sun leaves and twigs are covered in dense simple hairs
 - The hairs are sparse for American Chestnuts.
- Stipule size (little outgrowths on each side of a leaf where it joins the petiole)
 - Chinese: wide at the base (5-10mm), tapers sharply to a point
 - American: narrow at the base (1mm), tapers gradually to a point.
- Stem color
 - Growing Chinese leaves have a green or tan stem.
 - Growing American leaves have a reddish stem

American at Maturity: 75-100 ft high, 15 ft in diameter, single main trunk



Chinese at Maturity: 40-60ft with a 40-50ft crown, multiple main trunks, branches droop.



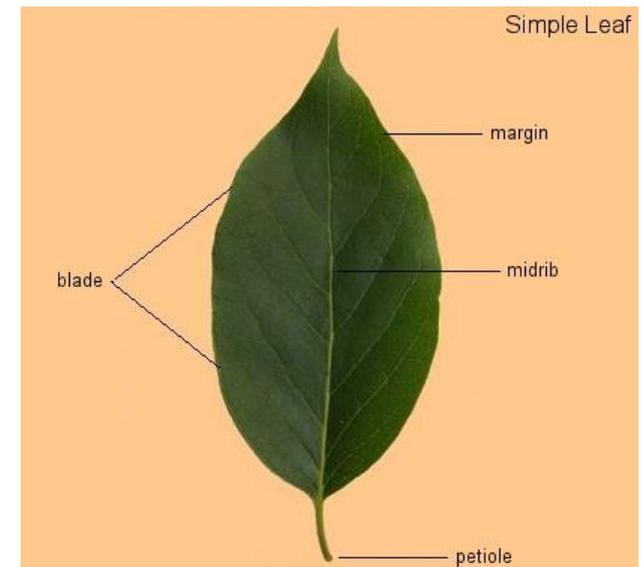
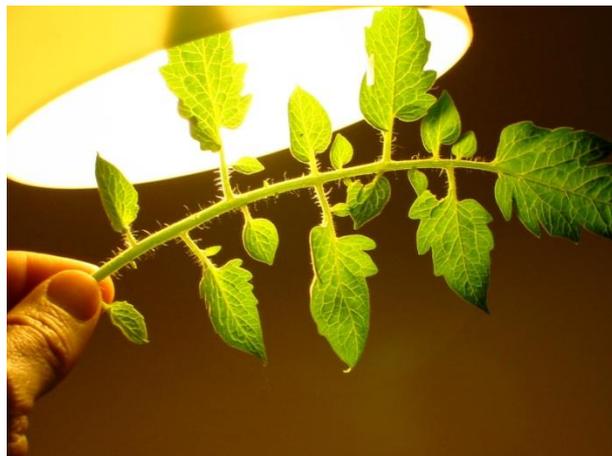
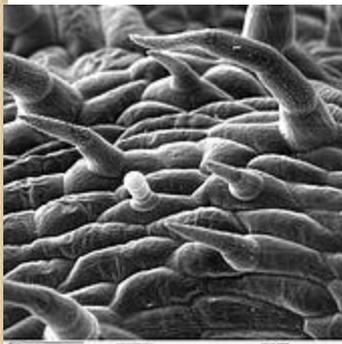


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Leaf anatomy and vocabulary

- The upper surface of a leaf is called **adaxial**
- The lower surface of a leaf is called **abaxial**
- The main part of the leaf is the leaf **blade** or lamina
- The little hairs that you can see are called **trichomes**.



Nuts and Leaves



American leaves have sharp ‘teeth’ (dentata) and are 5-10 inches long. Usually there are 3 - 7 nuts in a bur. The nuts are hairy near the tip. (Top and bottom Left)

Chinese chestnut leaves are 4-8 inches long, oblong with serrated edges. There are 1-3 nuts per bur, they are 1-3 inches across, and smooth. (above, right)

Petiole – where the leaf attaches



American



Chinese



American Chestnut: Twigs and Leaves

- The leaves are smooth and thin
 - There are few hairs on abaxial surface or twig
 - Where the leaf joins the twig is the petiole
 - Petiole is red, twig is reddish brown
 - There is a very sharp angle where the leaf joins the petiole.



Chinese Chestnut Twigs and Leaves

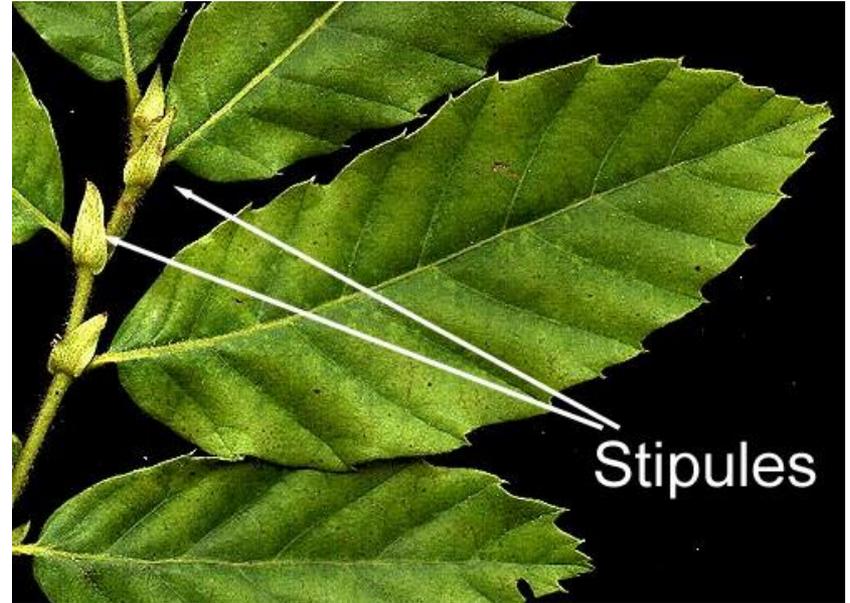
- Chinese: the leaves are thicker, hairy on the lower surface
 - The twigs are brown and have hairs.
 - The base where the leaf meets the petiole is wider.
 - The petiole is green or tan



Stipules



American



Chinese



1. Chinquapin
2. *Castenea mollissima*
3. *Castenea dentata*
4. *Castenea dentata*
5. *Castenea mollissima*
6. Chinquapin

<http://www.accf-online.org/accfcast.html>

Pollination

- Chestnuts are monoecious (mono-ee-shus): both male and female flowers appear at the same time on the same shoots of a tree.
 - Flowers are on the tips (after leaves expand).
- Chestnuts are self sterile – they will not self pollinate. The wind is the major way they are pollinated (not insects).
- Seedlings need 5-7 years before they produce nuts.



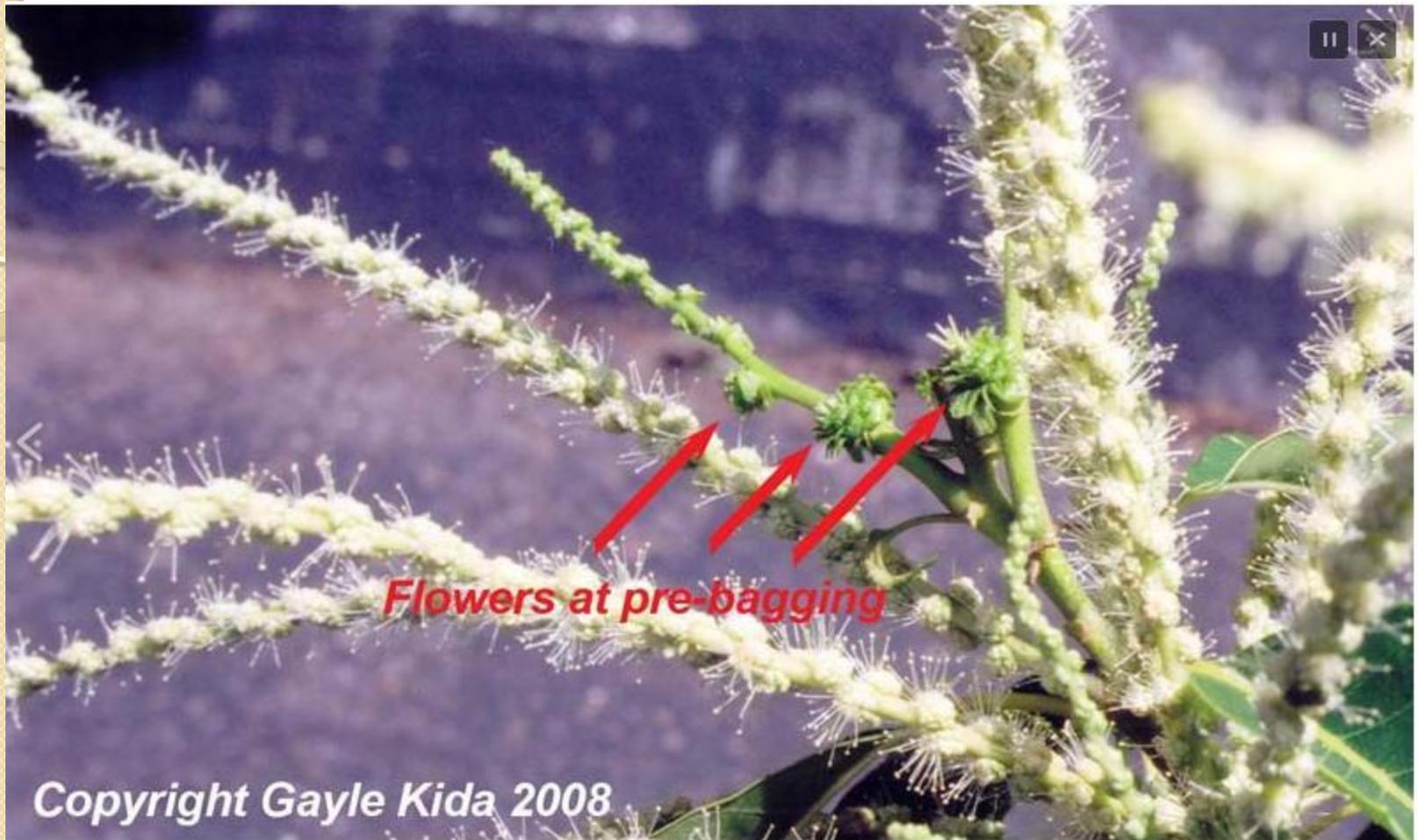
These are called catkins – the female flowers are at the base and the male flowers extend along the length.

Controlling pollination

- While we are up at Pryor Farm you may be asked to help with
 - Bagging flowers to control pollination
 - The next few slides show the process – Dr. Sisco will explain it again.



<http://ctacf.org/2009/01/16/capturing-connecticuts-american-chestnut-genes/>



Find a flower that has styles you can see. Use scissors to trim away all of the tip's male catkins and the male part of the bisexual catkins are trimmed off, also removing or trimming back leaves that would take up room in the bag or get in the way of securing it. A finished pollination bag is fastened with a twist tie in the next photo.



This is what it should look like when you are done trimming





Females 10-14 days after pre-bagging are usually ready for pollination. The styles, structures connecting the receptive stigmas to ovules, have turned very pale yellow. The tree's remaining male catkins are bushy. Bisexual catkins are still in bud but ready to open.



Bark /Blight (Cryphonectria parasitica)



Root blight - Phytophthora

