Estimating Crop Load in Edible Chestnuts

It is very important for chestnut growers to accurately estimate the crop each year, as this is the start of the process of setting prices. Even though chestnut is a fall crop, market negotiations start as early as August, particularly in years with large crops. To estimate the yield in Michigan, we must consider tree age, type, and weather events when we evaluate how large the yield might be. For example, if there was a frost in the spring or a harsh winter we would expect to see reduced yields. Droughts, excessive rain, pollination weather, and excessive heat may also factor into the yield.

When considering the type of trees, we are primarily delineating based on whether the trees are seedlings or cultivars. Seedling trees are genetic individuals with high levels of variability making the crop load of seedling trees much more difficult to estimate. Conversely, cultivars are genetically identical making their performance more predictable and uniform. That being said, each cultivar is different and requires that we estimate them separately, for example the cultivars Colossal and Labor Day would require separate crop load estimates and then be extrapolated proportionally based on their representation in a given orchard. For those of you with primarily Colossal and a couple other cultivars, the estimation is much simpler and should be more accurate. Experience and speed of crop load estimation improves quickly with practice.

Protocol

To estimate crop load, growers should first estimate the number of nuts per bur and then estimate the number of burs per tree. These estimates should be performed for each cultivar and age group, as applicable.

To estimate the nuts, open 5 burs from 5 trees of each cultivar and age. Be sure to sample from all sides and reachable heights of the tree. Normally, there will be 1 or 2 nuts in a bur, and sometimes 3. Add up the total number of nuts you observed and divide it by the number of burs to estimate the number of nuts per bur. For example, if you looked at 5 burs on 5, 8-year old Colossal trees (25 burs total) and counted 45 nuts then you would divide 45 nuts/25 burs=1.8 nuts/bur on average. Perhaps your 12-year old Colossal trees had more nuts and averaged 1.9 nuts/bur.

To estimate burs, divide the tree into four quadrants (north, south, east and west) to help improve accuracy. Then count the number of burs on the end of each branch within each quadrant on five trees. Again, trees of differing age should be measured separately. The number of burs on 5 trees in each age and cultivar class and divide by 5 to determine the average bur count per tree. For example, if the 5 trees you evaluate contain 112, 126, 108, 100, and 145 burs, then the average burs/tree equals 591 burs/5 trees = 118.2 burs/tree. Consider using a small handheld 'click counter' to assist you.

To extrapolate crop load from the nut and bur estimations use the following formula:

> ***(Nuts per bur X burs per tree X number of trees in class) ÷ nuts per pound* = crop load lbs.***

*To complete this formula, you need to know how many nuts per pound to expect. Generally, Colossal can have about 20-30 nuts per pound, so for our purposes we could average that out to 25 nuts per pound. Nuts per pound is part of the estimation that has the potential to cause errors. If the nuts are smaller (30 nuts per pound) you will have fewer pounds, if larger (18 nuts per pound), you will have more pounds. If trees have been shaded in some areas of the orchard, there will be fewer burs and if you have full sun, you might have more burs in some areas.

So for the examples we have created above, let's do the math:

(1.8 nuts/bur X 118 burs/tree X 50 trees) ÷ 25 nuts/pound = 424.8 pounds of nuts on the 8-year old Colossal trees in this example.

Again, this would have to be repeated for each cultivar and age class and then added together to get the farm total.

To get an accurate estimate on seedlings, you must estimate each tree separately. The pounds from a group of seedling trees may range from 0 to 60 pounds depending on the age, history, and weather.

Timing
The earlier we can make an estimate the better, but it is often difficult to determine how many nuts are actually developing in the bur. In most cases, there will always be 3 nuts, but some only have fibers and some have a small amount of nut kernel or just a gelatinous embryo. The earlier burrs are opened, the harder it is to accurately count the number of nuts in a bur. Growers can practice their estimate in mid-August and then recheck them for accuracy in early-mid September.