

# How to Measure a Champion Tree

## CIRCUMFERENCE:

The circumference of a tree is measured in inches at 4.5' (breast height, or BH) above the center of the base of the tree [Figure 1].



Figure 1 *Chamaecyparis lawsoniana*, Buncombe County

However, if irregularities occur that cause this measurement to be under- or overestimated, circumference should be measured as outlined in Avery and Burkhart's Forest Measurements (1994). For example, if a tree forks immediately above BH causing significant swell just below the fork, circumference is measured at the narrowest portion of the stem below the swell [Figure 2]. If a tree forks below BH, the larger stem is measured at BH [Figure 3].

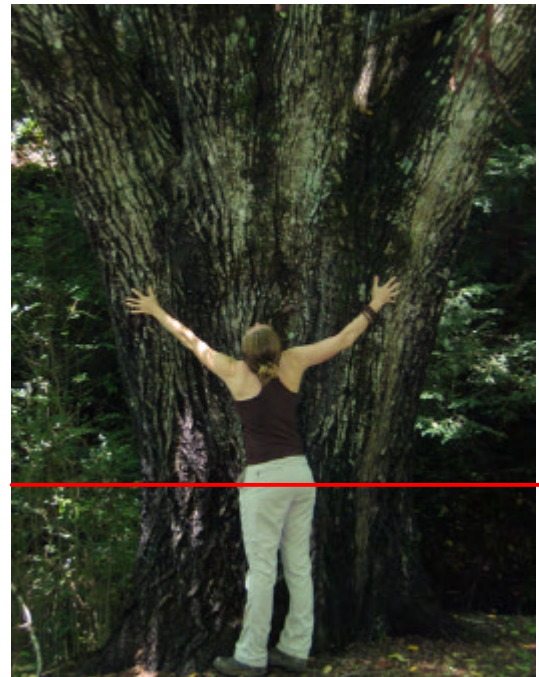


Figure 2 *Juglans cinerea*, Cherokee County

LEGEND:  
— Point of Measurement



**Figure 3** *Cladrastis kentukea*, Graham County



**Figure 4** *Taxodium ascendens*, Hyde County

For buttressed trees such as cypress or tupelo where swell may extend for several feet off the ground, circumference is measured at 1.5 feet above the pronounced swell [Figure 4].



**Figure 5** *Betula alleghaniensis*, Graham County

If a tree occurs on sloping ground, circumference is measured at BH from the uphill side of the tree [Figure 5]. If a tree has appreciable lean, circumference is measured not at 4.5 feet above the ground, but 4.5 feet along the stem [Figure 6].



**Figure 6** *Osmanthus americanus*, Wilson County

## HEIGHT:



**Figure 7** Measuring height

Total height to the nearest foot is measured with a clinometer [Figure 7].

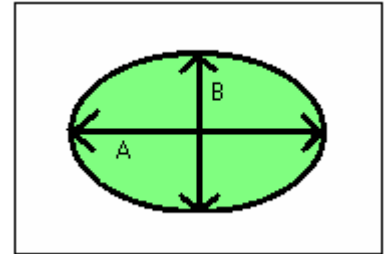
For leaning or crooked trees, height measurements are taken at right angles to the direction of lean [Figure 8]. Furthermore, one end of the measuring tape (used to measure the distance for the clinometer reading) is held directly under the tallest point of the tree.



**Figure 8** *Prunus munsonniana*, Buncombe County

## AVERAGE CROWN SPREAD:

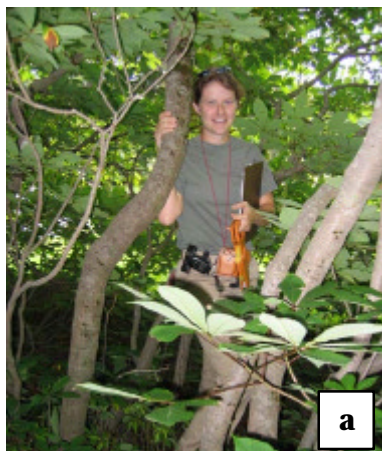
Average crown spread is measured to the nearest foot with a tape measure. Two measurements are taken in perpendicular directions (accounting for the widest and narrowest diameter of the crown) and averaged [Figure 9]. A clinometer with a degree scale can be used in order to ensure measurements are taken directly under the outer perimeter of the crown.



**Figure 9** View from Above  
Average Crown Spread =  $(A + B) / 2$

## OTHER CONSIDERATIONS:

For deliquescent (multi-stemmed) specimens such as *Cercis canadensis*, *Styrax grandifolius*, and *Lagerstroemia indica*, circumference is measured on the largest stem at BH. Height is measured on the tallest stem, and average crown spread is determined for the entire specimen. However for root sprouts, only the largest sprout is measured for circumference, height, and average crown spread. Bottlebrush buckeye [*Aesculus parviflora*, Figure 8 a. and b.] is the most representative example for the latter case.



**Figure 8 a** *Aesculus parviflora* Champion Sprout; **b** Vegetative clump of *Aesculus parviflora*

## REFERENCES

Avery, T. E.; Burkhart, H.E. 1994. Forest Measurements 4<sup>th</sup> Ed. McGraw-Hill, Inc, New York, NY. 408 p.

DENR (Department of Environment and Natural Resources). 1999. 1999 Register of Big Trees. North Carolina Champion Big Tree Program. Raleigh.