TECHNICAL NOTES

Plot Delineation with a Pin-and-Chain

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Abstract

The pin-and-chain is currently being used to delineate sampling plot boundaries in Southern forest-range where conventional rigid plots would be impractical. The pin-and-chain method can be used for delineating both circular and rectangular plots.

Vegetation sampling often requires development or modification of existing equipment or methods to delineate plot boundaries. Conventional plot sampling usually uses a rigid frame of the correct size and shape. On southern forest-range a rigid plot frame often presents problems in the dense growth of shrubs and trees. Such dense areas are encountered frequently by the Renewable Resource Evaluation Forest Survey field crews of the Southern Forest Experiment Station. Survey areas often are unmanaged timber stands of pine, mixed pine-hardwood, and mixed hardwoods with dense understories. A rigid frame with an open end is usable; however, when equipment must be hand carried great distances to the sampling area, a rigid frame becomes cumbersome and awkward. The pin-and-chain plot delineation tool has been successfully used in Arizona ponderosa pine forest-range sampling (Pearson and Jameson 1967) and in southwestern Louisiana forest-range surveys (Pearson and Sternitzke 1974). Currently, Forest Survey crews in Tennessee use the pin-and-chain tool for sampling forest lesser vegetation (all vegetation to a 1.5 meter height) and litter depth and composition.

The pin-and-chain method has been found by the survey crews to be an ideal tool for determining understory vegetation plot boundaries on Southern forest-ranges (Fig. 1). It can be used in sampling low herbaceous or woody plant production, utilization, cover, or frequency. The pin-and-chain weighs less than 200 gm and can be carried in a small bag, pocket, or belt loop. Large trees and shrubs are easily included in plots. Often the plot boundary only needs delineation when plants occur near the perimeter (Fig. 2).

Our pin-and-chain for delineating 1-m^2 circular plots was made from 1/4-inch bolts 10 to 15 cm (4 to 6 inches) long and lightweight chain with a 56.5 cm total length. However, a 60 penny nail clamped into the chain near the nail head will also work. Brass link chain is preferred, although other material works as well. Several bolt lengths can be used for markers; a 15-cm bolt for the plot center and a 10-cm for the scribe end work well. The bolt head is removed and the end sharpened; then the chain link ends are tightened between two nuts on the thread end. Chain length can be adjusted slightly by crimping chain links. Cost for materials is about $2.50.

The pin-and-chain is not limited to circular plots. With the use of a stick and measuring tape, two chains can form square or rectangular plots (Fig. 3). Chains are fastened at the center with a stove bolt which becomes the plot center with the chains as plot diagonals. The chains divide the plot into four triangles; the length of the sides and plot area can be calculated. For example, if the cross forms a perfect square, the sides will be 40 cm long and the area will encompass 0.16-m^2; if the length is twice as long as the width, the sides will be 25 and 50 cm and the area will encompass 0.125-m^2. A stick and measuring tape assure correct adjustment of the chains; they also may close in a side while sampling the plot. Therefore,

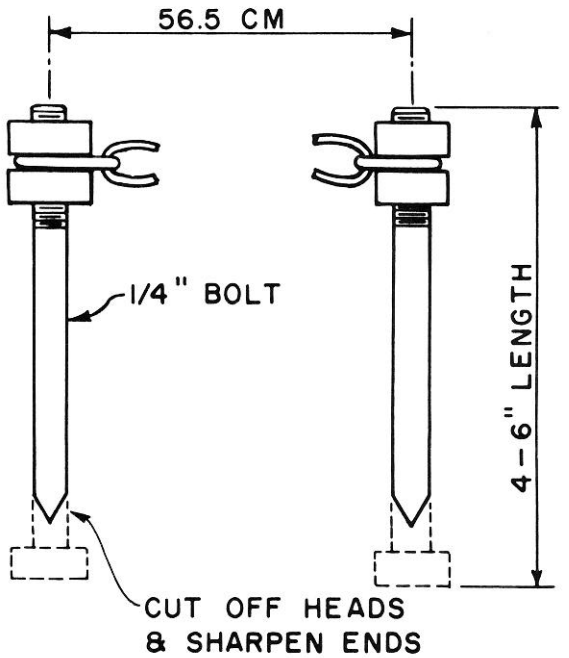

Fig. 1. *Diagram of the pin-and-chain showing modification of bolts.*

Fig. 2. *Pin-and-chain on a typical forest-range plot.*

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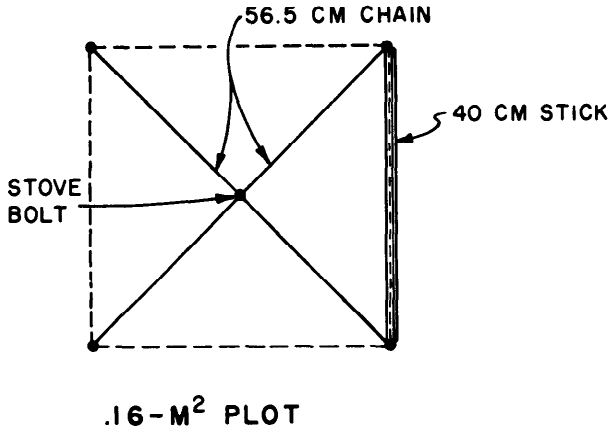

Fig. 3. *Square plot formed using two, 56.5-cm pin-and-chains.*

any size plot, up to the limits of the chain length, can be sampled using two pin-and-chains.

Since both rectangular and circular plots can be easily delineated in dense undergrowth of trees and shrubs, the pin-and-chain "plot frame" is more versatile and is as inexpensive as the circular bandsaw frame which is made from a bandsaw blade and relies on the spring steel material to hold a circular shape (Mitchell and Rodgers 1978). It also is lighter in weight than the collapsible plot (Blair 1963) and wooden adjustable frame (Segura 1969). Both the collapsible plot and wood adjustable frames can be used in heavy shrub vegetation, but one side of these rectangular frames must be opened to fit around shrubs and small trees. Comparisons in Tennessee by Forest Survey range technicians showed the bandsaw frame not suitable on about 40% of the plots because of trees and large shrubs, while the pin-and-chain was useable on all (unpublished data).

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