Vine Production from Tuber Pieces of Various Sizes and Sections of Yam (Dioscorea alata L.)

J. E. Quamina, B. R. Phills, and W. A. Hill
Department of Agricultural Sciences, Tuskegee Institute, AL 36088

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Abstract. Vine production from proximal and middle tuber sections of yam (Dioscorea alata L.), subdivided into whole, half and quarter pieces increased with tuber size. Vines produced from proximal, middle and distal tuber sections decreased significantly with distance from the proximal end. Smaller pieces collectively resulted in greater total vine length.

The white yam, also known as greater, water, winged or Asiatic yam, is grown as a source of carbohydrates in much of the tropical world (2). Commercial yam growers in South America and many other parts of the tropics use either whole or part of the proximal section of the tuber as planting material (2, 3). Tuber cost is high and at least 20% of the crop is retained as propagation material for future crops (1, 4). Vine cuttings have been examined as an alternative source of planting material but tuber yield have been too low for commercial production (4). Rooted tuber sprouts have also been suggested for propagation material (5).

Objectives of this experiment were to determine how large a piece and which part of a tuber would produce the most vine.

Yam tubers of uniform size and shape and free from visible signs of disease were divided into proximal, middle and distal sections in August 1979 (Fig. 1A). These sections were subdivided into whole, half, and quarter pieces about 400, 200, and 100 g, respectively (Fig. 1B). A single piece constituted a treatment, the experiment consisting of 3 sizes and 3 sections with 3 replications in a completely randomized design. A 1 sand:1 sphagnum peatmoss mixture by volume was sterilized and spread evenly to a depth of 23 cm in a wooden propagation greenhouse bench. Yam pieces were dipped in Rootone-F [N-naphthalenecacimide-0.067%, 2-methyl-1-naphthaleneacetic acid-0.33%, 2-methyl-1-naphthaleneacetic acid-0.013%, indolebutyric acid-0.057% and thiram fungicide (tetra-methylthiramid-sulfide)-4%], shaken to remove excessive powder, set 13 cm deep and watered as needed. Vines were cut about 1.3 cm above the node closest to the surface of the soil and length measured 2 weeks after planting and at weekly intervals thereafter. Cumulative vine growth was determined after the 9th week following planting.

There was a pronounced interaction in vine growth between sizes and sections of tuber pieces (Fig. 2A). Growth on a per piece basis increased with tuber size and from the distal to the proximal end; whereas total vine growth was inversely related to individual piece size (Fig. 2B). Pieces at all 3 sizes taken from the distal section clearly produced less total vine growth than from either the middle or proximal ones. Cumulative vine length of quarter size (100 g) pieces of the latter 2 sections did not differ significantly, but those from the proximal section had a total length about 13% greater than the distal section. Half-size pieces from proximal sections produced more vine length than quarter size, but the latter would afford more total growth and twice as many plants as could be obtained from half sections and 4 times the number as from whole sections.

In general, plants from quarter size pieces were 1 to 2 weeks slower in growth rate than either half or whole size pieces and they tended to be weaker or spindly in growth habit. While this fact would undoubtedly affect overall production of tubers, the increased number of plants per tuber piece would offset any yield reduction. The extent of yield reduction, if any, needs to be investigated further.

References