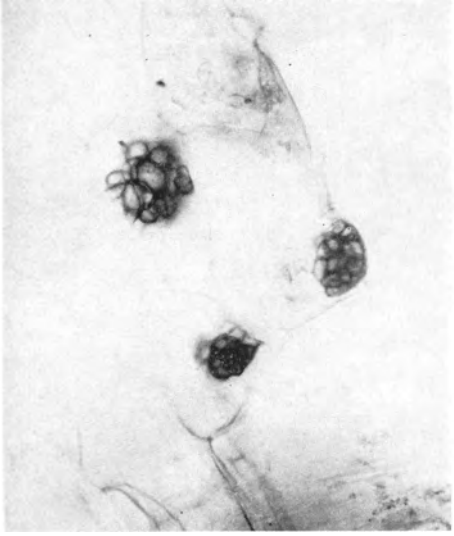

Unusually small microsclerotia of Verticillium formed in laboratory culture within cortical root cells of cotton indicating that infection had occurred.

sible only to identify Verticillium from its characteristic microsclerotia formed in culture within cortical root cells. The microsclerotia provided evidence that infection had occurred prior to culturing of the root (see photo). The results indicate that roots which primarily occupy the surface soil are infected (table 2). When roots were collected, depth measurements were made from the top of the irrigation ridge, and thus the first 8 to 12 inches of soil were actually surface soil.

Data are not quantitative, because no estimation of the amount of rootlet material collected from each depth is given. It is significant that roots occupying the upper 8 to 12 inches of soil, including the irrigation ridge, are readily infected by Verticillium. This zone of soil also contains most of the Verticillium. The deepest infected root was found at about 16 inches.

Attempts were made, using the equipment shown (see photos), to invert the surface foot of soil with soil from below. To help accomplish the inversion, a rye winter cover crop was grown which holds the surface soil together. The effectiveness of the inversion was indicated by the amount of rye showing after invert plowing.

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Heat treatment, and cutting, for INCREASED SWEET SLIP PRODUCTION

N. C. WELCH · T. M. LITTLE

MANY OF THE ROOTS used for sweet potato slip production produce only a few shoots. This is because the end of the root is strongly dominant and can inhibit slip growth. Various chemical and physical methods have been tried to find a practical method to overcome this inhibition. None of the chemicals that showed promise has found extensive commercial use. Sectioning the sweet potatoes by cross-cutting overcomes part of the dominance expressed by the apical end of the root. However, each cut end has a distinct proximal dominance.

Research conducted in eastern states indicates early and more prolific sprouting could be obtained from sweet potato roots if they were held at 85° F at high humidity for 23 days. In some seed lots in California, 10 to 14 days will greatly increase slip production at this temperature and humidity.

When sweet potato roots are held at 109° to 111° F for 26 hours, root nematodes are inactivated and light infections of black rot have been reported to be controlled.

The study reported here was conducted to determine how the combination of the above-mentioned heat treating with cutting would influence slip production.

Test 1964

Velvet sweet potato roots were obtained from Anderson Bros. of Bloomington, San Bernardino County, and stored as field-packed roots in an unheated shed until planting time. In the 1964 experiment, the sweet potato roots were cured at 85° F and 85% humidity before storage. At bedding time, the roots were carefully grouped so that each treatment was applied to the same number and weight. The heat-treated roots were placed in an oven for 26 hours at temperatures between 109° and 111° F.

The cut roots were sliced transversely at the middle. All roots were immersed for 30 seconds in a solution of Semesan Bel (1 lb/8 gallons water), drained of excessive solution, laid in planting beds, and covered with 3 inches of sand. The beds were then sprinkled and covered with plastic. Heat was provided by placing bean straw under the sand before bedding.

Each treatment was repeated six times and contained nine whole roots or 18 sections weighing 3¼ lbs. The statistical

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141

POTATO

Commercial use of heat treatment (foreground), compared with untreated whole roots. Note early and more prolific slip growth.

design was a 6 × 6 Latin square with a 2 × 3 factorial combination of treatments.

The treatments were: (1) whole roots not heated; (2) precut roots unheated (roots cut before heat treatments of other roots were started); (3) postcut roots unheated (roots cut after heat treatments were concluded); (4) whole roots heated; (5) roots cut, then heated; and (6) roots heated, then cut.

There was some rotting in cut treatments that may have reduced the difference between whole and cut roots. The cut roots produced more slips than whole, but that difference fell just below the 5% level (table 1). The heated roots produced more slips than unheated (significant at the 1% level). Roots both cut and heated, produced the highest number of slips. Slips produced from unheated roots were slightly taller and stockier.

Test 1965

This experiment was repeated in 1965 with the cooperation of Tom Archibald of Bloomington. Roots used in this experiment were not cured. Only roots of the same shape, size, and weight were used in this experiment to avoid the large amount of variability in slip production observed in the 1964 experiment between different size and shape of roots. As a result of this selection, very uniform results were obtained.

The treatments responded about the same as in 1964 (table 2). The only notable difference was a greater number of slips from cut roots as compared to whole (significant at the 1% level). There was no rotting of sliced roots in this experiment.

Temperatures of 109° to 111° F for 26 hours on sweet potato roots proved to be safe for increasing slip production and killing nematodes and certain fungi. The effects on slip production of heating and cutting were independent of each other. To obtain the highest number of slips, the roots need to be both cut and heated. Cut roots break down rapidly if not treated immediately after cutting. One experiment was a total loss to soft rot because of a 2-hour delay in treatment.

If lower temperatures (80° F or above) are used for prolonged periods of time the same increase in slips may occur. This heating period may not need to be continuous, because the effects of short heating periods may be cumulative. Roots treated at an average temperature of 110° F have been stored for several weeks before bedding without breakdown.

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Upper left root, heat-treated, as compared with unheated root to right, showing proximal dominance. Lower left cut root, unheated, as compared with heated cut root to right.

TABLE 1. NUMBER OF SWEET POTATO SLIPS PER 1½ SQ FT OF BED SPACE
1964, treatment means

Temperature treatment	Root Treatment				
	Whole	Precut	Postcut	Average	
Unheated	121.0	134.2	138.8	128.0	L.S.D. .01 = 16.49
Heated, 26 hrs, 109–111° F	141.0	150.3	154.5	148.6	
Average	131.0	142.2	141.6		Differences Not Significant

TABLE 2. NUMBER OF SWEET POTATO SLIPS PER 1½ SQ FT OF BED SPACE
1965, treatment means

Temperature treatment	Root Treatment				
	Whole	Precut	Postcut	Average	
Unheated	121.7	142.0	138.2	134.0	L.S.D. .01 = 7.74
Heated, 26 hrs., 109–111° F	153.8	175.3	174.8	168.0	
Average	137.8	158.6	156.5		L.S.D. .01 = 9.47