

## Effect of waterlogging on the growth and yield of sweet-potato (*Ipomoea batatas* L.)

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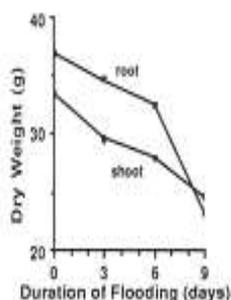
Sweet potato is considered a drought tolerant crop (1). In tropical regions during the rainy season soils may be saturated with water over a period of days. Flooding causes decreases in size and number of tuberous roots but increases fresh weight of the shoots (2). The present study examines the effect of waterlogging at different depths on the growth and yield of 2 cultivars of sweet potato: Jewel and Centennial.

### Methods

Two experiments with cultivars Jewel and Centennial were conducted in a glasshouse. For the first experiment cuttings were planted in plastic pots 20 cm deep and 16 cm diameter containing a loamy soil mixture. At six weeks after planting they were exposed for 7 days to waterlogging by raising the watertable to the soil surface, or 10 cm or 15 cm below. In the control the pots were freely drained. Plants were harvested at 7 and 49 days after beginning the treatment. For the second experiment, plants were exposed to the water table at the soil surface for 0, 3, 6, and 9 days.

### Results and discussion

There were no significant differences between cultivars except at day 49 in both experiments when Centennial was greater than Jewel in shoot DW and leaf area, but Jewel was greater in root DW and length.



**Figure.** Change in root and shoot DW during 9 days with watertable at soil surface. CVV means.

	Watertable 0-7 d	Freely drained	15cm deep	10cm deep	at surface
<u>Sampled at day 7</u>					
Root DW (g)	33.6 <sup>a</sup>	26.7 <sup>ab</sup>	28.0 <sup>ab</sup>	19.0 <sup>b</sup>	
Shoot DW (g)	23.1 <sup>a</sup>	27.3 <sup>b</sup>	28.7 <sup>b</sup>	32.3 <sup>b</sup>	
Total DW (g)	56.7 <sup>a</sup>	54.0 <sup>ab</sup>	56.7 <sup>ab</sup>	51.3 <sup>b</sup>	
<u>Change during recovery while freely drained from 7 to 49 days</u>					
Root DW (g)	59.5 <sup>a</sup>	51.5 <sup>b</sup>	42.5 <sup>c</sup>	14.8 <sup>d</sup>	
Shoot DW (g)	14.3 <sup>a</sup>	7.3 <sup>b</sup>	4.5 <sup>b</sup>	-3.3 <sup>c</sup>	
Leaf Area (cm <sup>2</sup> )	603 <sup>a</sup>	269 <sup>b</sup>	-262 <sup>c</sup>	-348 <sup>d</sup>	
Root Length (cm)	1691 <sup>a</sup>	1505 <sup>b</sup>	1066 <sup>c</sup>	934 <sup>d</sup>	

**Table.** Effect of waterlogging for 7 days on the growth and recovery of sweet potato. CVV means.

Loss of root DW between 6 and 9 days of flooding (Figure) was greater than loss of shoot DW. In the experiment at different water depths (Table) shoot DW of all waterlogged treatments were significantly greater than the freely drained control, however roots had less DW with the water table at the surface than in the control (Table). These data suggest a change in dry matter partitioning between root and shoot during waterlogging. This was not apparent in the other experiment (Figure). The extent of recovery (days 7 to 49) depended on the depth of waterlogging. In some cases leaf area and shoot DW decreased but in all cases root DW and length increased, but by different amounts. Transient waterlogging had a

long term, deleterious effect on sweet potato growth. The first response to waterlogging may be a changed partitioning of dry matter between root and shoot, but later both root and shoot growth declined.

1. Sung, J.M. (1985). J. Agric. Assoc. China, 129: 42-55.

2. Li, L. and Kao, C.H. (1985). J. Agric. Assoc. China, 132: 115-120.