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A Sweetpotato Variety Trial on Hawai'i: Preliminary Results

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Sweetpotato (*Ipomoea batatas*) is an important minor crop in Hawai'i, occupying about 350–400 acres annually during 2004–2007 (Hawai'i Department of Agriculture 2008). Statewide annual yields have been around 5–6 million pounds. Although much of this crop is exported, Hawai'i farmers typically have provided three-fourths or more of the state's market supply. More than 90 percent of production is on the island of Hawai'i along the Hāmākua Coast, and the principal variety that is grown for export is Okinawan purple.

A nutritious food

An average sweetpotato serving of 3½ ounces (100 grams) contains 140 calories (Bisone and Maretzki 1982). A portion this size supplies 7 percent of your daily carbohydrate requirement ("good carbs") and 13 percent of your daily fiber needs. Orange-fleshed varieties are rich in beta-carotene, and purple-fleshed varieties are rich in anthocyanins, both of which are popular dietary antioxidants (Teow et al. 2007). Antioxidants are thought to reduce the harmful effects of oxidative stress, and to prevent development of chronic diseases (such as heart disease, or cancer).

In addition, all sweetpotatoes have a low glycemic index, meaning that they are broken down slowly into sugars in the body (NCSU 2007). Foods with a high glycemic index, such as Irish potato, or baked goods containing large amounts of refined sugar, cause blood sugar levels to spike upward, followed by an equally rapid decrease—a sugar "high" followed by a sugar "low." Foods with a low glycemic index release sugar into the blood more slowly and are recommended for people with diabetes.

Crop management

Two good overviews of this crop are available (Nelson and Elevitch 2010, Valenzuela et al. 1994). The major insect pest of sweetpotatoes in Hawai'i and around the world is the sweetpotato weevil (*Cylas formicarius*; Sherman and Tamashiro 1954). The immature insect feeds on roots, making the tubers ugly in appearance and inedible due to the bitter flavor and rotten smell that develops. To manage the weevil, it is important to rotate sweetpotato plantings with other crops and to remove old vines and culled roots. Such crop rotation and field sanitation practices deny the weevils a place to multiply and infest the next sweetpotato crop. Also, a commercial pheromone is available (Great Lakes IPM, AGS-SPW, http://greatlakesipm.com/ipmlures.html) to attract adult

Sweetpotato is grown from cuttings approximately 12 inches long. Be careful to select planting material that is free of pests and diseases. You can grow your own cuttings by letting tubers produce shoots.

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Table 1. Winter planting yields of seven sweetpotato varieties grown in Pepe'ekeo on Hawai'i.

	Commercial yield		Damage (% of commercial yield)	
Variety	(pounds/acre)	(% of total)	Weevil	Nematode
Agena	12,680	65	43	2
Kona B	13,560	63	34	20
Mokuau	13,760	56	**14**	4
Okinawan	15,260	77	35	2
Simon	**22,760**	**79**	21	35
Uyentan 1	2636	17	62	**0**
78-4-28	4390	24	61	**0**

males, which disrupts their mating and allows monitoring of the pest population.

Another common pest of sweetpotato in Hawai'i is the reniform nematode (*Rotylenchulus reniformis*), which can cause root-tubers to be severely cracked and distorted (Clark and Moyer 1988).

The most important disease of sweetpotato in Hawai'i is black rot, caused by a fungus (*Ceratocystis fimbriata*) that can result in complete loss of the crop after harvesting. (A presentation by CTAHR's Scot Nelson on this disease can be downloaded from www.plant-doctor.net). The fungus has a fairly wide host range and can persist in the soil for several years in roots remaining in the field after harvest. As with the sweetpotato weevil, the best control method is to rotate sweetpotato plantings, allowing 3–4 years between crops, and to practice good postharvest sanitation in the field and in the washing/packing areas.

Other significant postharvest diseases of sweetpotato in Hawai'i are Java black rot (*Diplodia gossypina*; Nelson 2008) and rhizopus soft rot (*Rhizopus* sp.; Nelson 2009). Scurf is another fungal disease (caused by *Monilochaetes infuscans*) found on sweetpotatoes in Hawai'i (Clark and Moyer 1988).

Cultivars and winter yields

We planted seven sweetpotato cultivars (see photos) in late September 2009 and harvested 7 months later. All root-tubers were harvested and graded according to the State of Hawai'i standards for Hawai'i-grown sweetpotatoes. We calculated the percentage of commercial yield (grades AA, A, or B) relative to total yields (commercial grades plus off-grades). Then, we evaluated commercial-grade root-tubers for damage due to sweetpotato weevils or reniform nematodes, and calculated the percentage of economic losses due to these two pests (Table 1). Simon had the highest commercial yield, with Okinawan purple second. Mokuau had the lowest percent damage due to sweetpotato weevil. Uyentan I and 78-4-28 had the lowest percent damage due to reniform nematodes.

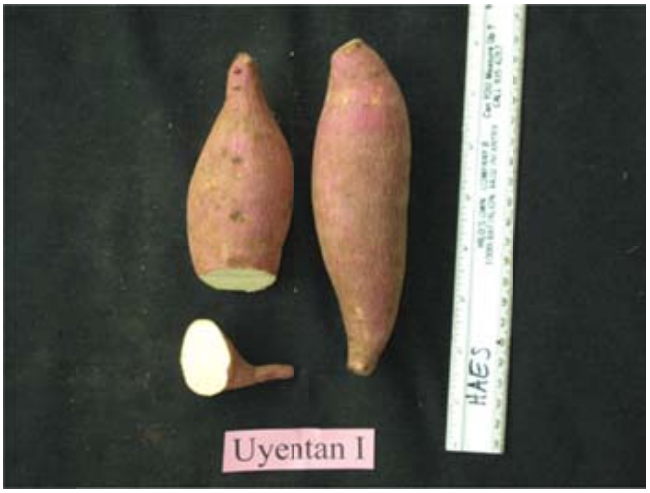
These results indicate that increases in commercial yields could be achieved through better crop management and/or breeding for improved pest resistance. This field trial is being repeated during the summer months, and results will be reported later.

Agena: white skin, purple flesh

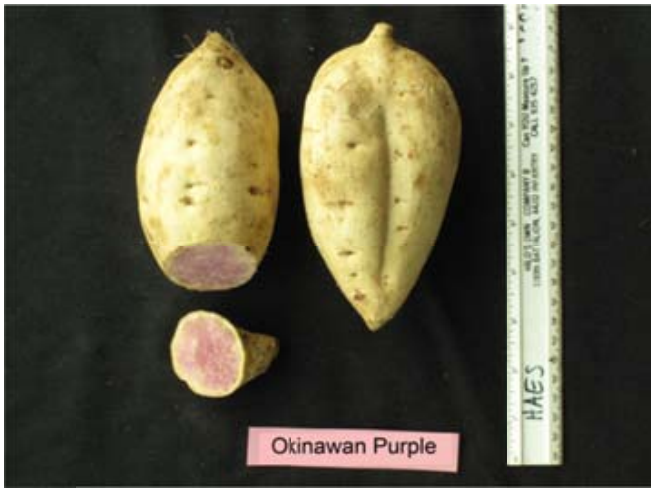
Kona B: orange skin, orange flesh

Simon: white skin, white flesh

Mokuau RxP: red skin, purple flesh



Uyentan 1: red skin, white flesh



Okinawan purple: white skin, purple flesh

78-4-28: red skin, white flesh

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*When available, citations are hyperlinked to online files in the pdf version of this publication, available at www.ctahr.hawaii.edu/oc/freepubs/pdf/RC-1.pdf.

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