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## TWO YEAR EVALUATION OF 25 PITAYA VARIETIES IN THE VIRGIN ISLANDS

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**Abstract:** Pitaya or Dragon Fruit, is a cactus, closely related to the Caribbean night blooming cereus, with a large succulent fruit. Twenty-five Pitaya varieties were established in a former grape trellis wire system. Plants were set in a replicated trial at either 2 ft or 4 ft intervals. Pitaya were established and proved able to grow to the top of a six foot trellis wire and flower within a year. Plant growth and flowering were monitored monthly and data recorded. Ripe fruit were harvested and data collected on weight, length, width, fruit flesh color and soluble sugar content. After two years of growth all varieties flowered and set fruit. All flowers were naturally pollinated at night by bats and moths so no hand pollination was required. Six pitaya varieties were selected and recommended based on production, fruit size and sweetness. These varieties are 'Dark Star', 'Makisupa', 'Physical Graffiti', 'Purple Haze', 'Halley's Comet' and 'Delight'. 'Natural Mystic' though productive, is susceptible to scale. Pitaya has potential for production in the Virgin Islands. This research was supported by USDA-Multistate Hatch and USDA-SCBG administered through the Virgin Islands Department of Agriculture.

**Keywords:** Dragon Fruit Production, Trellis, *Hylocereus* spp

### INTRODUCTION

Pitaya is a cactus, closely related to the native night blooming cereus found growing wild on trees, with a large succulent pink, red or yellow fruit. Pitaya varieties are made from three main species *Hylocereus polyrhizus*, *H. undatus*, *H. guatemalensis* and hybrids between species (Crane and Balerdi, 2005). These fast growing cacti are epiphytic or climbing vines with a 3-sided green, fleshy, jointed, many branched stems (Crane and Balerdi, 2009). Each stem segment has 3 flat wavy wings (ribs) with margins and 1-3 small spines or spineless and form aerial roots to adhere or climb. The stem may reach over 20 ft and have a lifespan of 20-30 years (Mizrahi, 1997). The large white flowers are open during the night and pollinated by bats and



moths. Pitaya has characteristics that enhance its prospects as a suitable and viable commercial crop. These features include ease of propagation; low crop maintenance; the short turnaround time between planting and harvesting; and high yield potential, ranging from about 20 to 60 pounds per plant (Gunasena et al., 2006). I first learned of pitaya as a succulent fruit while visiting the Fengshan Tropical Horticulture Experiment Station of the Taiwan Agricultural Research Institute in 2005. Five years later, a source of pitaya varieties was found in Miami, Florida to obtain material for a

U.S. Virgin Islands trial on St Croix (Zimmerman, et al., 2013). A native Pitaya can be found growing wild in the U.S. Virgin Islands especially on Blue Mountain, elevation 350 meters. Though the wild native pitaya has good fruit size, the flavor and soluble sugar content is poor.

## MATERIALS AND METHODS



Twenty-five Pitaya varieties were obtained from Pine Island Nursery in Miami, Florida. Stem cuttings were rooted in 1 gallon pots for two months then established in a former grape wire trellis system. Plants were set in a replicated trial at either 2 ft or 4 ft intervals in a 6 row plot. Drip irrigation, with 2 ft emitters, was used for watering every other week. Fertilization was applied via an injector three times at a rate of 12.5 lbs of soluble 20-20-20 fertilizer during the trial. Iron was applied in the form of FeEDDHA due to

the high pH calcareous soils. Six-foot bamboo sticks were used as support for the pitaya. Plants were tied with tape every month to train them until they reached the top of the trellis. Malathion and Sevin were applied to control ants which were found to feed on the fleshy pitaya stems and fruit. Plants were mistreated when staff cut grass around the base with weed-eater but basal protection was installed to halt further damage to the succulent stem. Side branches were removed to promote one stem to the top of the trellis. Six fruit characteristics were recorded from the mature pitaya: days to maturity, fruit weight, length, width, sugar content and flesh color.



## RESULTS AND DISCUSSION

Few Pitaya varieties flowered and set fruit during the first year but grew vigorously on high pH calcareous soil to reach the six foot top of the trellis. However, the wire of the trellis was found to cut into the fleshy stems. During the first year, fruit were not attacked by birds. However, during the second and third year, birds developed a taste for pitaya fruit and caused damage. Being a cactus, pitaya can survive the extended dry season and still be productive during late spring when rains occur. Most Pitaya flowered and set fruit during the second year from late May through September. After a year and a half of field establishment, 97% of the varieties flowered and set fruit. All flowers were naturally pollinated at night, so no hand pollination was required. Lower fruit set occurred on



varieties that are self-incompatible and require cross-pollination which included ‘Alice’, ‘American Beauty’, ‘Cosmic Charlie’, ‘LA Woman’ and ‘Rixford’ (Table 1). Fruit matured 30 to 52 days after flowering (Table 1). The smallest fruits were on ‘Costa Rica’, ‘Pink’, ‘Voodoo’ and ‘Yellow’. Six varieties were selected to be recommended to local growers based on size, production and color. The six varieties were ‘Dark Star’, ‘Delight’, Halley’s Comet’, ‘Physical Graffiti’ and ‘Purple Haze’ (Table 2). One variety, ‘Natural Mystic’, was found to be most susceptible to stem rot under U.S. Virgin Islands environment.

Table 1. Average Pitaya fruit harvested, days to harvest, length, width and fruit weight over two years. Bold font indicates varieties recommended for growing in the U.S. Virgin Islands.

Variety	Fruits Harvested	Days to Harvest	Length mm	Width mm	Weight g
Alice	7	30	126	61	255
American Beauty	5	35	208	68	115
Bloody Mary	36	32	76	53	177
Cosmic Charlie	5	34	195	65	74
Costa Rica	20	36	70	51	97
<b>Dark Star</b>	<b>41</b>	<b>34</b>	<b>136</b>	<b>68</b>	<b>185</b>
David Bowie	20	34	84	57	237
<b>Delight</b>	<b>32</b>	<b>33</b>	<b>91</b>	<b>67</b>	<b>221</b>
<b>Halley’s Comet</b>	<b>32</b>	<b>34</b>	<b>105</b>	<b>91</b>	<b>217</b>
L A Woman	6	35	90	65	242
Lake Atitlan	29	34	69	59	185
<b>Makisupa</b>	<b>49</b>	<b>34</b>	<b>71</b>	<b>59</b>	<b>181</b>
Natural Mystic	27	34	88	76	318
<b>Physical Graffiti</b>	<b>53</b>	<b>34</b>	<b>80</b>	<b>60</b>	<b>224</b>
Pink	17	34	74	51	102
<b>Purple Haze</b>	<b>38</b>	<b>33</b>	<b>73</b>	<b>69</b>	<b>234</b>
RGHP	8	34	123	55	70
Rixford	9	40	142	66	170
Seoul Kitchen	29	33	62	58	138
Thompson	17	36	89	58	242
Tissue Culture	17	38	73	56	129
UVI	14	34	80	80	224
Voodoo	25	39	70	48	113
Yellow	12	52	70	41	101
Zamorano	24	49	68	54	122

Table 2. Average Pitaya fruit soluble sugar content (% Brix), flesh color and production determined after two years of production.

Variety	Brix %	Flesh Color	Yield lbs
Alice	16	White	3.9
American Beauty	20	pink	1.3
Bloody Mary	15	Red	14.0
Cosmic Charlie	16	Pink	0.8
Costa Rica	16	Red	4.3
<b>Dark Star</b>	<b>18</b>	<b>Pink</b>	<b>16.7</b>
David Bowie	16	White	10.4
<b>Delight</b>	<b>20</b>	<b>White</b>	<b>15.6</b>
<b>Halley's Comet</b>	<b>19</b>	<b>Pink</b>	<b>15.3</b>
LA Woman	17	red	3.2
Lake Atitlan	19	white	11.8
<b>Makisupa</b>	<b>19</b>	<b>Red</b>	<b>19.5</b>
Natural Mystic	16	Pink	18.9
<b>Physical Graffiti</b>	<b>18</b>	<b>Pink</b>	<b>26.2</b>
Pink	18	Pink	3.8
<b>Purple Haze</b>	<b>18</b>	<b>Red</b>	<b>19.6</b>
RGHP	18	Red	1.2
Rixford	19	Purple	3.4
Seoul Kitchen	16	White	8.8
Thompson	17	White	9.1
Tissue Culture	16	Red	4.8
UVI	18	Pink	6.9
Voodoo	19	Red	6.2
Yellow	22	White	2.7
Zamorano	16	Red	6.4

## CONCLUSION

Pitaya is a new tropical fruit for the Virgin Islands which has potential for commercial growers or back yard gardeners. After two years of evaluating 25 varieties, six varieties are recommended based on production, fruit size, color and sweetness. Six varieties selected have fruit color from white, pink to deep red. Self-pollinating varieties are recommended to ensure fruit set. One variety, 'Natural Mystic', was found to be susceptible to a stem rust disease. Pitaya grew well and can tolerate the high pH 8.5 calcareous soils found on the island of St. Croix, USVI.

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