Yield and Quality of Aquaponic Pakchoi

Aquaponics in the Classroom
Windward Community College
10/13/12

Ted Radovich, Archana Pant, Kai Fox, Clyde Tamaru, Leina'ala Bright, Jensen Uyeda, Virginia Daly, C.N. Lee

Initial work at WCC, 2010-11

• Initial work at WCC focused on using local materials to ameliorate nutrient deficiency symptoms.

• Compost extracts added to the water did not work.

• Addition of small amounts of vermicompost (<0.5g) to seedlings prior to transplanting adequately addressed the problem in cinder beds.

•Larger applications of vermicompost (up to 50% by volume in media) were needed in floating raft systems.

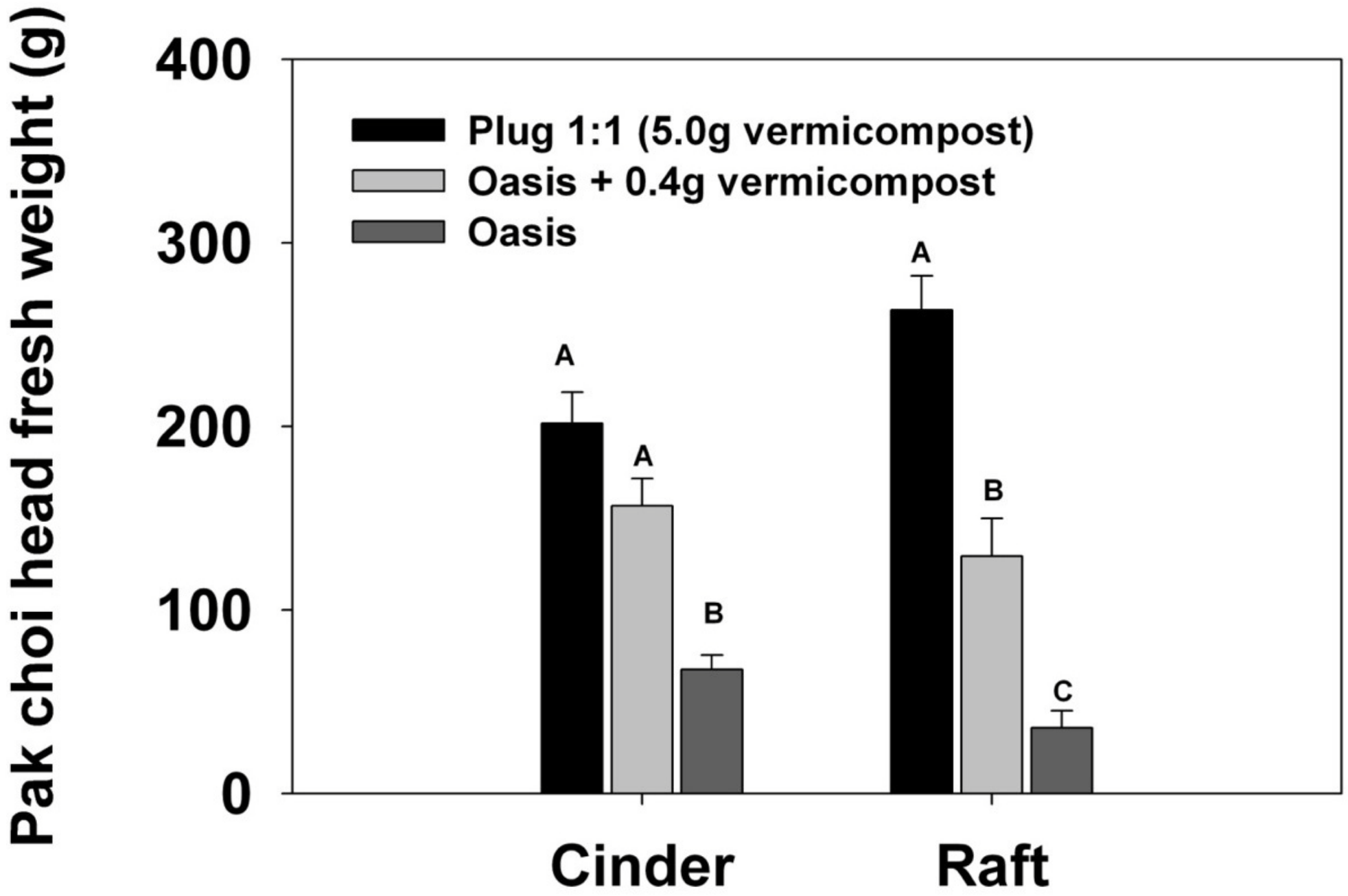
Replacing Oasis with Media

Oasis only

Oasis + Vermi

Vermi + Plug

Impact of seedling media on aquaponic pak choi yield (WCC 2010-11)



Pakchoi variety trials at Waimānalo

•3 week old seedlings of seven Pakchoi varieties were transplanted 7/26/12 at the Waimānalo Research Station.

• 4 reps, 6 plants per rep with 8 inch spacing between and within rows.

• Effluent from 350 fish in a 650 gallon tank was recirculated through 4'x48' beds with black cinder media.

•Head weights were recorded on 3 plants from each rep 28 days after transplanting. The 4th leaf from the center was collect for mineral and phytonutrients analyses.

Yield

•Yield was greatest in the white stem varieties.

• However there is a strong market for the green stem varieties.

•Yield was not significantly different between varieties <u>within</u> the different types.

•Head sizes of both type were comparable to store bought samples purchased on day of harvest.

•The novelty varieties 'Shiro' and 'Red Choi' are perhaps best suited for the baby greens market.

Average weight (lbs) of pak choi heads harvested 8/22/12, 28 days after transplanting at the Waimanalo aquaponics facility . Each value is a mean of 3 subsamples from 4 replications (N=12). Values with same letter are not significantly different from each other.

Variety	Mean (lbs)	Stdev
Winwin	0.55a	0.06
Joichoi	0.49ab	0.11
Meiqing	0.34b	0.09
Blacksummer	0.26bc	0.08
Shiro	0.23bc	0.04
Bonsai	0.23bc	0.03
Redchoi	0.16c	0.06

Phytonutrient quality

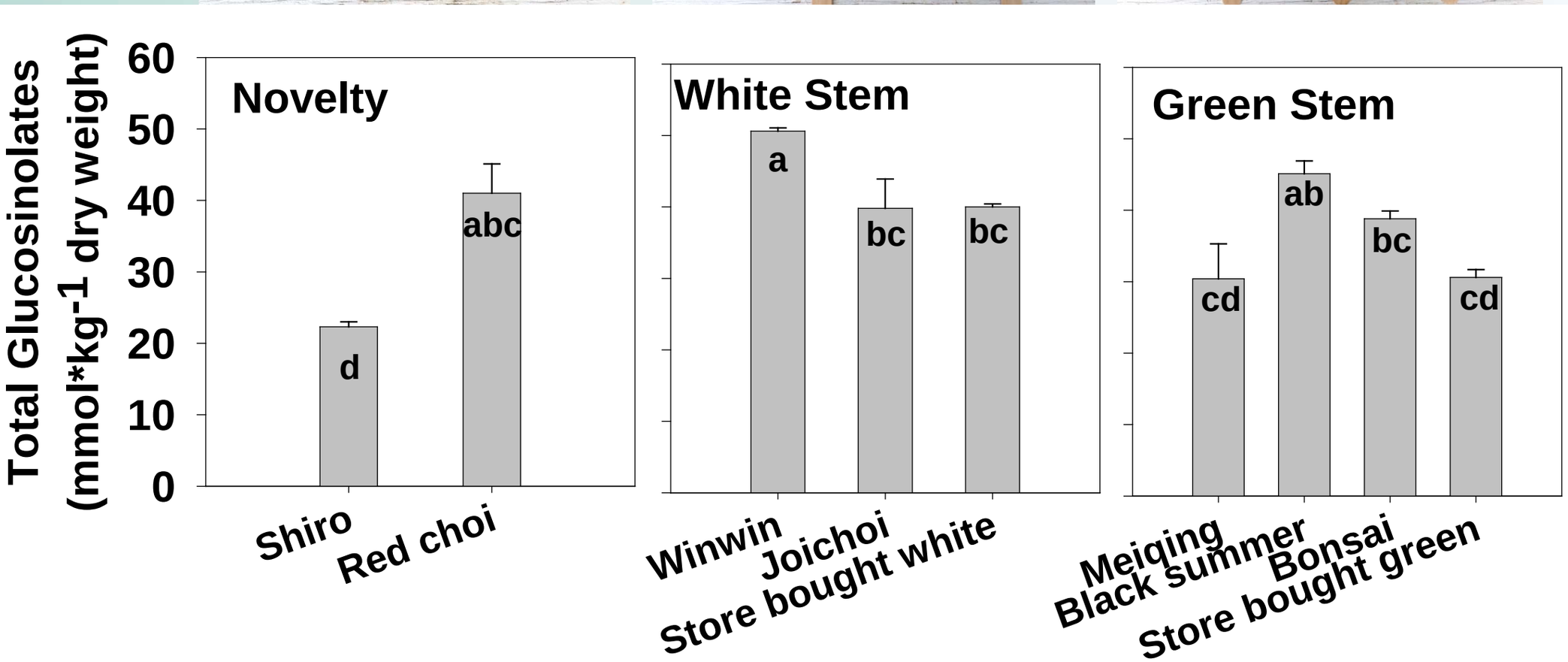
•There were significant differences in total glocosinolate and phenolic compounds among the varieties.

•These pytonutrients are important antioxidant, anti-carcinogenic and flavor compounds.

• In this trial, ‘WinWin’ and ‘Black Summer’ were the most phytonutrient dense of the white- and green-stem varieties respectively.

•There were no significant difference among the varieties in total carotenoids.

Glucosinolate content



Total Phenolic content

Preliminary conclusions

•Aquaponic pakchoi yield and phytonutrient content are acceptable for commercial production.

•Variety selection is an important, underutilized tool to maximize quality and yield in aquaponic vegetable production.

•Yield and quality should be evaluated throughout the year, because of the influence air temperature and other factors have on quality.

•Aquaponics is an effective tool for STEM skill development.

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