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Yields of Organically Produced Vegetables in the Cool-Dry and Hot-Wet Season in Tropical Taiwan

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Abstract

Information on potential yields of organic vegetables grown under tropical climatic conditions is important for researchers to evaluate the opportunities and constraints of developing organic vegetable production systems in the tropics. Decision makers in agriculture also benefit from knowing about the conditions under which organic production can be a viable alternative to conventional production systems.

In 2006 and 2007, we conducted variety evaluation experiments to gain preliminary results on yield potential in several economically important vegetable crops under organic farming conditions in tropical Taiwan. In these on-station experiments, we achieved high yields and good quality under organic farming conditions in the open field. Results indicated that marketable yields of cucumber (up to 85.9 t ha-^{1} , 20–25 times hand picked dependent on variety), sweet pepper (up to 45.6 t ha^{-1}), and tomato (up to 57.6 t ha^{-1}) were similar to the marketable yields achieved in previous AVRDC field experiments using conventional farming techniques. However, the yield potential of the vegetables was dependent on variety, transplanting date and growing season. For example, the yields of sweet pepper transplanted in November (cool-dry season) compared to March (hot-wet season) are lower in our field experiments may be due to suboptimal temperatures, which can weaken the plants' growth and natural defense mechanism against pests. In contrast, the total (up to 70.9 %) and marketable (up to 59.9 %) yield of tomato was greatly reduced when transplanted in March (hot-wet season) compared to October (cool-dry season), a phenomenon usually also found in conventional production systems. Tomato entry PT4727 of determinate growth type bred at AVRDC reached also in the hot-wet season an acceptable total (65.3 t ha^{-1}) and marketable (40.8 t ha^{-1}) yield. PT4727 combines both virus resistance and presumably heat tolerance, two important traits necessary for successful tomato production during the hot-wet season.

The relatively high yields achieved on-station with superior varieties under favourable growing conditions in tropical Taiwan may encourage farmers and agricultural stakeholders to consider organic farming approaches as a viable alternative to conventional farming systems, and may prompt more institutionalized research on organic farming in tropical countries.

Keywords: Cucumber, sweet pepper, tomato, transplanting date, variety,

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