Integrated Pest Management (IPM) Program

Program Office
1680 Madison Ave.
138 Selby Hall
Wooster, OH 44691
P 330-263-3846
F 330-263-3841
http://ipm.osu.edu

Modular Ecological Design (2008)

An Intensive Fruit and Vegetable Polyculture System

Joe Kovach, J. Mendez, D. Murray, B. Beery, I. Williams, K. Hange

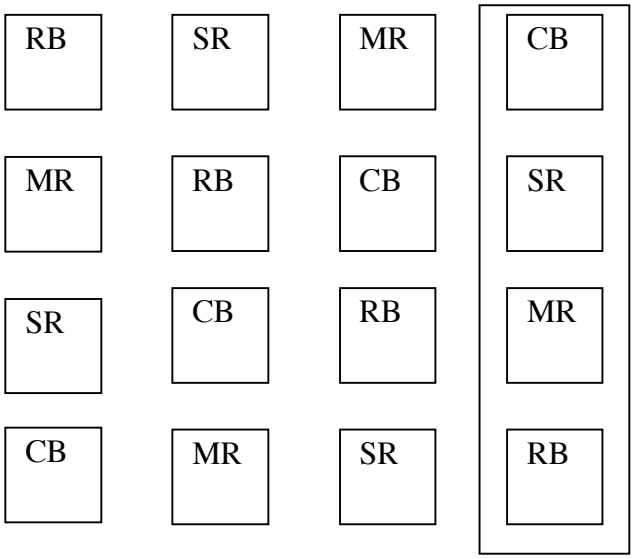
Goal: To determine the optimal layout (in terms of economics, pest density, efficiency) of an intensive fruit and vegetable polyculture system that can be used by the small urban farmer.

- Design a food production system that:
  - Simulates natural systems (genetic, temporal and spatial diversity)
  - Use ecological principles (minimize disruptions, prevention, biocontrol, compost)
  - Economically viable ($10/ft of row ≈ $90K/A)

Methods Each modular unit or plot (about 44' x 60') consists of 4 tree/shrub fruit crops (apples, blueberries, peaches, raspberries) and 4 herbaceous commodities. In 2008 annual, perennial day neutral strawberries, cucurbits (pumpkin, cantaloupe, cucumber) were planted. No tomatoes were planted this year. Edamame soybeans and green beans were planted July 30 to replace old perennial and annual strawberries

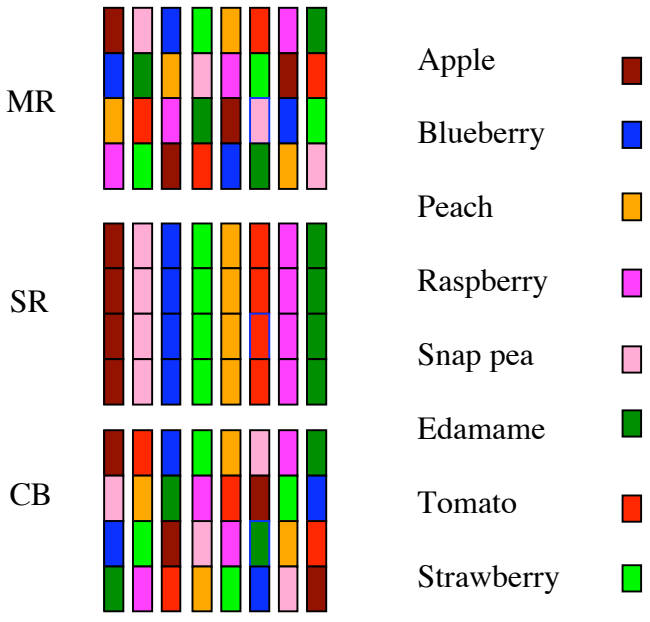
- Each perennial commodity includes three cultivars (early, mid and late). Cultivars were usually selected for their pest resistance and cold hardiness (peaches).
- There are 4 treatments, replicated 4 times: 1) Solid rows (SR), 2) Woody fruit commodities and herbaceous commodities mixed within a row (MR), 3) Woody fruit and herbaceous commodities mixed in a checkerboard arrangement (CB) and 4) the mixed row configuration on raised beds (2 landscape timbers).
- Approximately 1.4 acres. High tunnels were covered on April 14.

Treatments: Mix Row (MR), Solid Row (SR), Checkerboard (CB), Raised Beds Mixed Rows (RB)



Plot Layout

High Tunnels



Treatment

Costs

2005-2006 - Establishment cost – $24,477 ($3.20/ft of row)
2007 – Dear/racoon/fox fencing - $730 ($0.75/ft)
Haygrove high tunnels - $18,306 for 0.25 A ($9.50/ft – only HT plots)
Labor - $1.00/ft for $8/hr for 6 months.

Growth

2006-07 - RB treatment ($1.35/ft) had the most yield/growth (14-81% inc.) for most crops.

Difference in High Tunnel Growth (cm) (applied 1 May 2007)

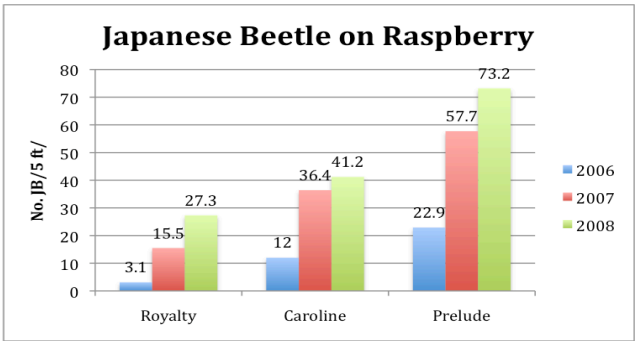
Treatment	All	Apple	Blue	Rasp	Peach	Soy	Straw	%Trees w/ aphid/mites
No High Tunnel	172 a	232 a	118 a	142 a	271 a	74 a	41 a	19 a
High Tunnel	**196 b**	243 a	123 a	**185 b**	**333 b**	**86 b**	**44 b**	**38 b**
% increase	14%			30%	23%	16%	7%	

Pest Problems

Japanese Beetles

2005 = 15K beetles, primarily on soybeans
2006 = 60K, most on raspberry and peaches
2007 = 280K, soybean and raspberry (HT = 4%, No HT = 96%)
2008 – 441K, raspberry, peach, apple (HT=3%, No HT = 97%)

	JB/5ft/date	
Treatment	2007	2008
RB	**17.3 a**	22.1 ab
MR	14.9 b	24.2 b
SR	14.7 b	26.1 b
CB	13.6 b	**18.6 a**



Economics - Best plots, local supermarket price

Crop	Gross $/ft
Green Beans '05	1.99
Sw. Corn '05	2.25
Edamame '05	3.35
Tomato '05	11.83
Strawberry '06	9.21
Summer Raspberry '06	8.80
Fall Raspberry '06	7.46
Tomato '06 (cupid)	26.67
Strawberry '07	13.48
Peaches '06, '07	0.00
Apple '06, '07	0.00

Total Harvest Times - 2005
(green beans, tomato, soybeans, sw. corn)

Treatment	Hours/Meter/Person
SR	5.8
RB	6.8
MR	6.4
CB	7.3

2006

2007