

# Effect of several home-garden fertilizer sources on the yield of Chinese Cabbage

## Preliminary Results for Experiment 1

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**Objectives:** An experiment was established to evaluate the effect of several home-garden fertilizer sources on the growth and yield of two Chinese Cabbage varieties at the UHM Poamoho Experiment Station. Fertilizer application rates will be used following the product label recommendations. The control treatment will be using standard fertilizer application rates used by commercial growers to grow Chinese Cabbage. Data to be collected will include plant height during the growth of the crop, and individual head weights at harvest.

**Treatments** include 3 different home-garden products, Maui Liquid Compost plus urea, and Control (urea alone). Each treatment consists of a single row, 20 ft long, with 4 replications per treatment.



## Materials and Methods

The treatments included Miracle Grow (MG), Miracle Grow New Formula (MG+), Plant Power 2003 (PP), Maui Liquid Compost (LC), and Control (chk). The control consisted of standard urea N fertilizer applications at a rate of about 150 lbs N per acre. We followed product label recommendations in terms of how much to apply and how frequently. The Miracle Grow formulations were applied every two weeks. The Plant Power and LC formulations were applied every 3 weeks. Thus instead of applying the same amount of Nitrogen (in lbs/Acre) to all plots, we simply followed the manufacturer recommendations to evaluate which product resulted in the greatest yields. The experimental hypothesis was that all treatments would result in yields similar to those of the control. The first experiment was planted on March 11, 2003 and harvested on May 14. Plant height was measured twice during the growth of the plants, by measuring the individual height of 10 plants per plot (for a total of 30-40 per treatment). At harvest time 6 heads were individually weighed per plot and total and marketable (wrapper and diseased leaves removed) weight was recorded.

Table 1. Yields (average weight per head) for Cvr. China Express Experiment #1

Treatment	Tot wt (kg)	Mkt. Wt (kg)	Height (cm)	Coeff. Var. Total Wt	Coeff. Var. Mkt. Wt.
MG+	1.91 A	1.09 A	39.1 B	19.4	20.2
Chk	1.88 A	1.05 A	40.8 AB	31.9	41.2
LC	1.80 AB	1.02 A	41.3 A	35	39.5
MG	1.64 AB	0.94 AB	39.5 AB	39.7	52
PP	1.52 B	0.75 B	38.9 B	38.3	50.9

Note: Coefficient of variation is an index of uniformity, lower values are better

Note: Numbers followed by the same letter within each column are considered to be statistically equivalent according to Duncan's new multiple range test. Cells highlighted with pink are considered to show the best results relative to the other treatments.

Table 2. Yields (average weight per head) for Cvr. Pagoda ( only 3 good reps), 1st. Experiment

Treatment	Tot wt (kg)	Mkt. Wt (kg)	Height (cm)	Coeff. Var. Total Wt	Coeff. Var. Mkt. Wt.
MG	2.4 A	1.6 A	56.5 A	22.7	24.2
PP	1.9 B	1.2 B	51.2 B	36	42.6
LC	1.7 BC	1.0 BC	48.9 BC	36.1	34.1
Chk	1.5 C	0.9 C	49.5 BC	28.8	30.1
MG+	1.4 C	0.8 C	47.2 C	39.5	42.9

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Table 3. Average plant height of Cvr. China Express collected twice before harvest, Experiment 1

Treatment	Height (cm) 4/10/03	Coeff. Var. 4/10/03	Height (cm) 5/1/03	Coeff. Var. 5/1/03
MG+	15.7A	17.9	43.8 A	7.1
PP	11.9B	21.8	36.3 C	10.2
LC	11.7B	22.5	37.8 BC	14.9
MG	11.6B	26.3	38.0 A	17.2
Chk	11.6B	21.1	41.7 A	17.6

Note: Coefficient of variation is an index of uniformity, lower values are better Note: Numbers followed by the same letter within each column are considered to be statistically equivalent according to Duncan's new multiple range test. Cells highlighted with pink are considered to show the best results relative to the other treatments.

Table 4. Average plant height (cm) of Cvr. Pagoda collected twice before harvest, Experiment 1

Treatment	Height (cm) 4/10/03	Coeff. Var. 4/10/03	Height (cm) 5/1/03	Coeff. Var. 5/1/03
MG	16.6 A	18.6	47.7 A	29.2
PP	15.2 B	35.0	49.0 A	28.9
MG+	14.4 B	18.3	43.5 A	22.3
LC	14.2 B	29.8	47.7 A	10.4
Chk	12.8 C	35.2	44.5 A	8.0

Note: Coefficient of variation is an index of uniformity, lower values are better

Note: Numbers followed by the same letter within each column are considered to be statistically equivalent according to Duncan's new multiple range test. Cells highlighted with pink are considered to show the best results relative to the other treatments.

Table 5. Tip burn index on cvr China Express collected at harvest

Trt	Index-transform	Index untransformed
MG+	1.74 A	2.70
PP	1.60 AB	2.33
LC	1.50 AB	2.00
MG	1.35 B	1.70
Chk	1.20 B	1.33

Note: An index from 0-5 (ranging from healthy white centers to dark/rotten black centers) was used to determine the extent of 'black heart' on 3 heads per plot. 0= white centers, no evidence of black heart or tipburn incidence; 1= light brown tissues in center of the head; 5= black and/or rotten centers, darkest color. Lower values are better. Only the cultivar China Express showed tip burn symptoms.

Note: Numbers followed by the same letter within each column are considered to be statistically equivalent according to Duncan's new multiple range test. Cells highlighted with pink are considered to show the best results relative to the other treatments.

Table 6. Nutrient tissue analysis of most recently matured leaf, collected on May 2, 2003 at the initial heading stage.

Trt/Cvr	% N	% P	% K	% Ca	% Mg	% Na	ug/g Fe	ug/g Mn	ug/g Zn	ug/g Cu	ug/g B
<b>China Express</b>											
CHK	5.66	0.42	5.35	2.43	0.57	0.28	118	238	91	28	19
MG	4.74	0.51	4.84	2.62	0.58	0.37	99	94	61	19	16
MG+	4.85	0.44	5.27	2.68	0.62	0.39	108	131	87	25	16
LC	4.87	0.41	4.69	2.42	0.52	0.37	107	79	66	16	16
PP	5.36	0.41	5.59	2.19	0.56	0.30	102	323	113	23	18
<b>Pagoda</b>											
CHK	5.43	0.34	6.03	1.97	0.42	0.29	118	184	78	25	26
MG	5.59	0.50	5.24	2.24	0.51	0.29	121	114	82	26	22
MG+	5.15	0.44	5.06	2.20	0.51	0.28	109	155	93	24	24
LC	4.86	0.49	4.97	2.73	0.57	0.31	111	97	73	25	21
PP	5.59	0.56	4.75	2.64	0.51	0.28	110	166	105	39	24





Figure 3. Overview of cultivar China Express treated with Miracle Grow Plus (left), and with Plant Power (right), which represent the best and lowest yielding treatments, respectively (see Table 1).



Figure 4. Overview of cultivar Pagoda treated with Miracle Grow normal formulation (left), and Miracle Grow Plus new formulation (right), which represent the best and lowest yielding treatments, respectively (See Table 2).