

BIBLIOGRAPHY

MALIONES, BRYAN E. APRIL 2013. Performance Evaluation of Seven Chinese Cabbage Varieties Under La Trinidad, Benguet Condition, Benguet State University, La Trinidad, Benguet.

Adviser: Percival B. Alipit, PhD

ABSTRACT

This study was conducted to determine yield performance of Chinese cabbage varieties under La Trinidad, Benguet condition.

Results revealed that Kimchi F₁ significantly formed heads earlier at 69 days from sowing. Percentage of heading and computed marketable yield was significantly higher in CR Alabama at 56.21 t/ha and Kimchi F₁ at 47.36 t/ha. Champion F₁ and Vanguard significantly had wider equatorial and polar diameter of heads while CR Alabama and Kimchi F₁ significantly had the highest number of very compact heads.

Market acceptability was significantly greater in CR Alabama from which the highest return on investment at 95.37% was obtained followed by Kimchi F₁ at 73.46%. Blues F₁, Champion F₁, Vanguard, and Kimchi F₁ had the longest shelf life at 25 days.



RESULTS AND DISCUSSIONS

Days to Heading and Percentage Heading

Among the varieties, Kimchi F₁ significantly had the earliest formed heads at 69 days from sowing while Blues F₁, Green Cool, CR Chesney, Vanguard, CR Alabama, and Champion F₁ headed later at 71 to 78 days (Table 1).

In Table 1, CR Alabama, Kimchi F₁, and CR Chesney significantly had higher percentage of heading ranging from 62.50 to 81.85%.

Table 1. Days of heading and percentage heading

VARIETY	DAYS TO HEADING	PERCENTAGE OF HEADING
Blues F ₁	71.50 ^c	39.84 ^{de}
Green Cool	72.75 ^{bc}	57.81 ^{bcd}
CR Alabama	78.00 ^a	81.85 ^a
CR Chesney	74.00 ^b	62.50 ^{ab}
Champion F ₁	78.00 ^a	45.31 ^{cde}
Vanguard	74.00 ^b	39.94 ^e
Kimchi F ₁	69.00 ^d	67.97 ^{ab}

Within a column means followed with the same letter are not significantly different at 5% by DMRT



Head Size and Average Head Weight

The wider equatorial diameter of heads measured from Champion F₁ and Vanguard while CR Chesney, Blues F₁, and Kimchi F₁ had the lowest equatorial diameters of heads (Table 2).

In terms of polar diameter of heads Champion F₁ and Vanguard had the longest polar diameter compared to the other varieties (Table 2).

Champion F₁ significantly had heavier heads at an average of 1.49 kg (Table 2).

Table 2. Equatorial and polar diameter of heads and average head weight

VARIETY	EQUATORIAL DIAMETER (cm)	POLAR DIAMETER (cm)	AVERAGE WEIGHT OF HEADS (kg)
Blues F ₁	13.25 ^c	21.50 ^c	1.14 ^c
Green Cool	16.00 ^b	22.25 ^c	1.15 ^c
CR Alabama	15.75 ^b	24.25 ^b	1.08 ^c
CR Chesney	13.00 ^c	19.50 ^d	1.14 ^c
Champion F ₁	17.50 ^a	27.00 ^a	1.49 ^a
Vanguard	17.75 ^a	26.50 ^a	1.37 ^b
Kimchi F ₁	14.00 ^c	20.75 ^{cd}	1.09 ^c

Within a column means followed with the same letter are not significantly different at 5% by DMRT



Marketable, Non-Marketable, Total and Computed Marketable Yield

Table 3 shows that CR Alabama, Kimchi F₁, CR Chesney, Champion F₁, and Green Cool significantly had higher marketable yield over Blues F₁ and Vanguard.

Among the varieties evaluated, Vanguard, Champion F₁, and Blues F₁ significantly had the highest non-marketable yield.

Champion F₁ significantly had highest total yield at 35.65 kg per 1x5m plot (Table 3).

All the varieties except Blues F₁ and Vanguard significantly had higher computed marketable yield ranging from 42.45 to 56.21 t/ha (Table 3).

Table 3. Marketable, non-marketable, total and computed marketable yield

VARIETY	YIELD (kg/1x5m plot)			
	MARKETABLE	NON-MARKETABLE	TOTAL	COMPUTED YIELD (t/ha)
Blues F ₁	14.58 ^c	11.84 ^{ab}	26.42 ^c	29.17 ^c
Green cool	21.23 ^{abc}	9.55 ^{bc}	30.78 ^b	42.45 ^{abc}
CR Alabama	27.35 ^a	3.75 ^d	31.85 ^b	56.21 ^a
CR Chesney	22.73 ^{ab}	7.50 ^{cd}	30.28 ^b	45.77 ^{ab}
Champion F ₁	21.58 ^{abc}	14.11 ^a	35.65 ^a	43.16 ^{abc}
Vanguard	15.73 ^{bc}	15.63 ^a	31.35 ^b	31.35 ^{bc}
Kimchi F ₁	23.68 ^a	6.50 ^{cd}	30.10 ^b	47.36 ^a

Within a column means followed with the same letter are not significantly different at 5% by DMRT



Number of Heads as to Compactness

Blues F₁, Vanguard and Green Cool significantly had the highest number of no heads formed but it is not significantly different with Champion F₁ and CR Chesney while CR Alabama had the least number of no heads formed (Table 4).

There were no differences among the varieties with regards to compact heads slightly compact and loose heads (Table 4).

In terms of very compact heads, CR Alabama and Kimchi F₁ significantly had the highest number of very compact heads while Blues F₁ and Vanguard had the least number of very compact heads (Table 4).

Table 4. Number of heads according to compactness

VARIETY	NO HEADS FORMED	LOOSE HEADS	SLIGHTLY COMPACT HEADS	COMPACT HEADS	VERY COMPACT HEADS
Blues F ₁	7.50 ^a	3.00 ^a	7.50 ^a	4.50 ^a	10.00 ^c
Green Cool	7.25 ^a	3.25 ^a	3.75 ^a	4.75 ^a	13.00 ^{bc}
CR Alabama	2.25 ^c	0.50 ^a	4.00 ^a	47.75 ^a	20.75 ^a
CR Chesney	4.75 ^{abc}	2.00 ^a	4.50 ^a	3.75 ^a	17.00 ^{ab}
Champion F ₁	6.75 ^{ab}	3.50 ^a	6.00 ^a	3.50 ^a	12.25 ^{bc}
Vanguard	7.25 ^a	4.50 ^a	7.75 ^a	2.50 ^a	10.00 ^c
Kimchi F ₁	3.75 ^{bc}	2.50 ^a	4.00 ^a	4.25 ^a	18.75 ^a

Within a column means followed with the same letter are not significantly different at 5% by DMRT



Boron Deficiency

Among the varieties evaluated CR Alabama was the most resistant to Boron deficiency while Blues F₁, Vanguard, Green Cool, and CR Chesney were susceptible to Boron deficiency associated with browning and cracking of the midribs of the petiole (Table 5).

Table 5. Boron deficiency

VARIETY	MEAN (%)
Blues F ₁	3.75 ^a
Green cool	3.25 ^{abc}
CR Alabama	2.00 ^d
CR Chesney	3.00 ^{bc}
Champion F ₁	3.50 ^{ab}
Vanguard	4.00 ^a
Kimchi F ₁	2.75 ^c

Within a column means followed with the same letter are not significantly different at 5% by DMRT



Market Acceptability

Table shows the quality of heads and the rating by some consumers and traders. It appears that all the cultivars were acceptable in terms of color, (light to dark green). In size, Green Cool, CR Alabama, CR Chesney, and Kimchi F₁ were acceptable. CR Alabama, CR Chesney, and Champion F₁ were acceptable to those who tasted. As to flavor/aroma, CR Alabama, CR Chesney, Champion F₁, and Kimchi F₁ were acceptable (Table 6).

Table 6. Market acceptability

VARIETY	COLOR		SIZE		TASTE		FLAVOR/AROMA	
	A	N.A	A	N.A	A	N.A	A	N.A
Blues F ₁	15	5	6	14	7	13	7	13
Green Cool	18	2	15	5	8	12	8	12
CR Alabama	19	1	18	2	14	6	12	8
CR Chesney	17	3	19	1	12	8	11	9
Champion F ₁	16	4	3	17	17	3	18	2
Vanguard	17	3	4	16	4	16	8	12
Kimchi F ₁	17	3	18	2	3	17	12	8

20= Respondents

A= Acceptable

N. A= Not Acceptable



Other Observation

Varieties Green Cool, CR Chesney, and Vanguard were dark green in colors while Champion F₁, CR Alabama, Kimchi F₁, and Blues F₁ had the greenish color. Moreover, varieties CR Alabama, CR Chesney, Green cool, and Kimchi F₁ had the large size heads. Furthermore, Champion F₁, Blues F₁, and Vanguard had the largest head size.

Shelf-life

Chinese cabbage varieties, Champion F₁, Vanguard, Kimchi F₁, and Blues F₁ significantly had the longest shelf life at 25 days.

Table 7. Shelf-life

VARIETY	MEAN (Days)
Blues F ₁	25.00 ^a
Green cool	17.50 ^b
CR Alabama	15.00 ^c
CR Chesney	13.00 ^c
Champion F ₁	25.00 ^a
Vanguard	25.00 ^a
Kimchi F ₁	25.00 ^a

Within a column means followed with the same letter are not significantly different at 5% by DMRT



Return on Investment

Among the varieties evaluated, CR Alabama had the highest percentage of return on investment at an average of 95.37 (%) followed by Kimchi F₁, CR Chesney, Champion F₁, Green Cool, Vanguard, and Blues F₁, respectively.

Table 8. Cost and return analysis

Particular	Cultivars						
	Blues F ₁	Green Cool	CR Alabama	CR Chesney	Champion F ₁	Vanguard	Kimchi F ₁
Marketable	53.33	84.9	112.16	90.93	86.31	62.9	94.71
A .SALES	874.9	1273.5	1682.4	1363.95	1294.65	943.5	1420.65
B.EXPENCES							
Seed	20	20	20	20	20	20	20
1.Fertilizer							
-Fedmuco	63	63	63	63	63	63	63
-14-14-14	13	13	13	13	13	13	13
-16-0-0	22	22	22	22	22	22	22
2.Insecticide							
-Padan	43	43	43	43	43	43	43
-Super Cartap	43	43	43	43	43	43	43
-Chix	22	22	22	22	22	22	22
3.Fungicide							
-Dethane 45	87	87	87	87	87	87	87
Transportation	29	29	29	29	29	29	29
Labor	250	250	250	250	250	250	250
Middle man	87	128	168	135	129	95	143
Trimmings	59	81	109	88	84	61	92
Total ex:	730	793	861	807	797	740	819
C. Net Profit	144.9	480.5	821.1	556.95	497.65	203.5	601.65
D. ROI(%)	19.85	60.59	95.37	69.01	62.44	27.5	73.46
RANK	7	5	1	3	4	6	2

The selling price during harvest was Php 15 per kilo

Pictorial Presentation





Figure 1. Over view of the test varieties: Blues F₁ (A), Green Cool (B), CR Alabama (C), CR Chesney (D), Champion F₁ (E), Vanguard (F), Kimchi F₁ (G)

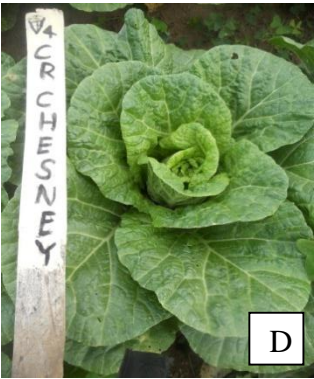
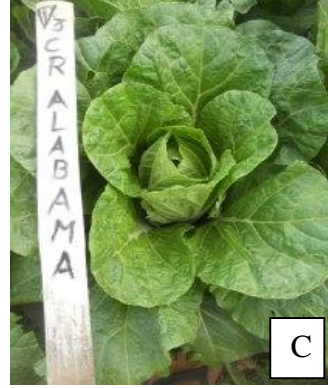


Figure 2. Heading stage: Blues F₁ (A), Green Cool (B), CR Alabama (C), CR Chesney (D), Champion F₁ (E), Vanguard (F), Kimchi F₁ (G)

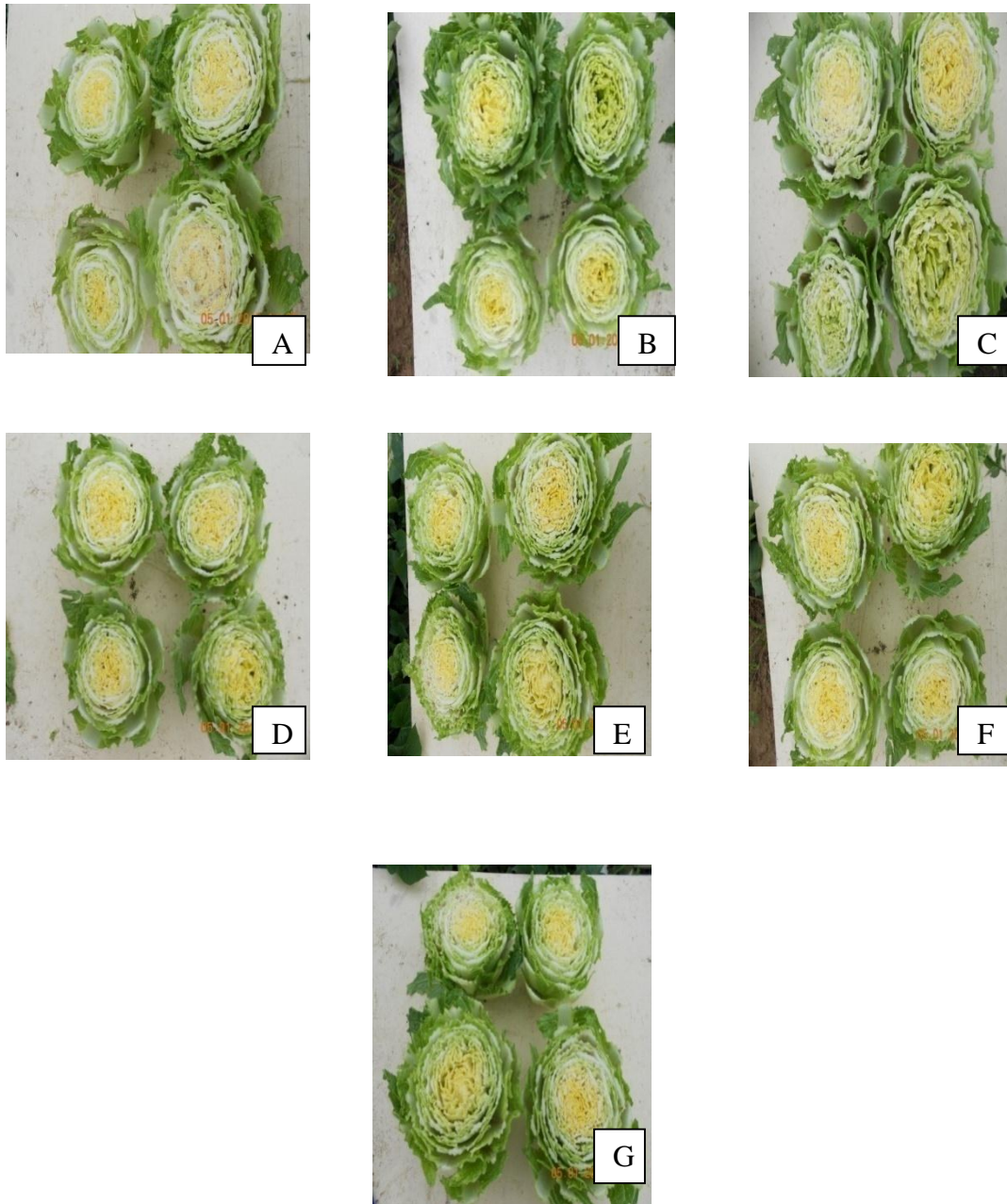


Figure 3. Cross cut section of heads: Blues F₁ (A), Green Cool (B), CR Alabama (C), CR Chesney (D), Champion F₁ (E), Vanguard (F), Kimchi F₁ (G)



Figure 4. Longitudinal cut section of heads: Blues F₁ (A), Green Cool (B), CR Alabama (C), CR Chesney (D), Champion F₁ (E), Vanguard (F), Kimchi F₁ (G)

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

The study was conducted to evaluate the yield performance of seven (7) Chinese cabbage varieties under La Trinidad, Benguet condition from October 2012 to January 2013.

Among the varieties, Kimchi F₁ was significantly the earliest to form heads at 69 days. In terms of percentage of heading, CR Alabama significantly had the highest.

Vanguard and Champion F₁ significantly had the widest equatorial and polar head diameter. Champion F₁ significantly had heavier head weight at 1.49 kg.

CR Alabama and Kimchi F₁ significantly had highest marketable yield and computed marketable yield at 56.21 t/ha and 47.36 t/ha, respectively. Vanguard and Champion F₁ significantly had the highest non-marketable yield while total yield was significantly higher in Champion F₁.

Varieties CR Alabama and Kimchi F₁ significantly had the highest number of very compact heads.

Among the varieties evaluated, CR Alabama was the most resistant to boron deficiency. Market acceptability was significantly greater in CR Alabama from which the highest return on investment at 95.37% was obtained followed by Kimchi F₁ at 73.46%. Blues F₁, Champion F₁, Vanguard, and Kimchi F₁ had the longest shelf life at 25 days.



Conclusion

Based on the result of the study, CR Alabama and Kimchi F₁ performed best having higher percentage of heading, marketable yield with very compact heads and higher return on investment obtained.

Recommendations

Chinese cabbage CR Alabama and Kimchi F₁ could be best grown under La Trinidad, Benguet condition.



LITIRATURE CITED

- ANONYMOUS. 1981. Chinese cabbage. Proceedings of the first International Symposium Asia Vegetable Research and Development Center, Shanhua Tainan, Taiwan. P. 18.
- ANONYMOUS. 2005. Cabbage Production in Saskatchewan, Canada. Retrieved August 2007 From www.Agr.govsca. P. 113.
- BORJA, F.S. and DAR. 1985. Varietal Performance of Chinese Cabbage using AVRDC and Local Highland Cultural Practices. MS thesis, Mountain State Agricultural College La Trinidad, Benguet. P. 65
- CHILDERS, F., H. F. WRITERS, P. S. ROBLES, and H. PLANK. 1950. Vegetable Gardening in Federal Experiment in Puerto Rico of the United States. Department of Agriculture Mayaguez, Puerto Rico. P. 89.
- DIMSEY, R. and N. BARTON. 1997. Growing Chinese cabbage. Retrieved August 2007 from Dp.vcgov.au. Pp. 156-265-270.
- GURUNG, C. R. 1991. Growth and Yield Performance of Chinese Cabbage (*Brassica pekinensis Rupr.*) As Affected By Hydrosorb and Irrigation. MS Thesis, Benguet State University, La Trinidad, Benguet. P. 36.
- LARKCOM, J. 2004. Creative Vegetable Gardening. New Edition. Octopus publishing group Limited 2-1 Heron Quays, London [144jp].
- PHILIPPS, R. and M. RIX. 1993. Vegetable. Over 650 vegetables in superb colour. The Pan Garden Plant Series. P. 186.
- SHATTUCK, V. and B. SHELP. 1986. Chinese cabbage Production in Southern Ontario.
- WARE, G. and J.P. MC COLLUM. 1980. Producing vegetable Crops. Third Edition. Interstate printers and publishers, Inc. P. 386.
- WARE, G. W. and J.P. MC COLLUM. 1980. Producing Vegetable Crops. Third edition. Interstate Printers and publishers, inc. P. 244.

