

BIBLIOGRAPHY

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ABSTRACT

This study was conducted at Lac-lac, San Roque, San Manuel, Pangasinan from October 2012 to January 2013 to evaluate the growth and yield performance of six different varieties of garden pea and to identify the variety that is most suited at San Manuel, Pangasinan.

Results revealed that although vegetative growth and yield of the six garden pea evaluated were not significant, data reflected that garden pea pods harvested from Betag variety had the heaviest total yield per plot and computed yield per hectare with a mean of 1.25 kg and 1.95 t/ha followed by pods obtained from Chinese garden pea (white) and CGP-11 and CPG-13 varieties having the same means of 1.24 kg/plot and 1.92 t/ha. Plants grown from CGP-110 produced pods having the lowest total yield with a mean of 1.13 kg/plot and 1.85 t/ha among the varieties evaluated.

Results also revealed that Betag variety obtained the highest return of investment of 260.53% followed by the varieties Chinese Garden Pea (White), CGP-11, and CGP-13 with an ROI of 253.17%. The CGP-110 variety produced the lowest return of investment of 242.14%.



RESULTS AND DISCUSSION

Days to Seedling Emergence

The results presented in Table 1 shows that there were no significant statistical differences observed with regards to the number of days from sowing to seedling emergence of the six varieties of garden pea. However, numerical figures reveals that the earliest to emerged were the varieties CGP-11, Betag, CGP-13, and CGP-110 with a comparable means of 5 days while to Chinese garden pea (white) and Lapad varieties having comparable means of 7 days took longer days to emerged.

Number of Days to Flowering

The number of days from sowing to flowering of the six different garden pea varieties did not differ significantly as shown in Table 2. However, numerically, varieties that flowered earlier were CGP-11, Betag, CGP-13, and CGP-110 with comparable means of 39 days as compared to Chinese garden pea (white) and Lapad varieties having a comparable means of 37 days. Since Chinese varieties are considered to have a maturity period of 90-100 days (BSU Techno Guide for Garden Pea, 1982). Thus, peas grown in an area having higher temperature would produce flower earlier than those grown in an area having relatively lower temperature. This also collaborates with the findings of Dayag (1980) that climatic requirements of garden pea production starts from October and extends to January.



Table 1. Days to seedling emergence

VARIETY	MEAN (Days)
Chinese garden pea (White)	7 ^a
CGP-11	5 ^a
Betag	5 ^a
CGP-13	5 ^a
CGP-110	5 ^a
Lapad	7 ^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT

Table 2. Number of days to flowering

VARIETY	MEAN (Days)
Chinese garden pea (White)	37 ^a
CGP-11	37 ^a
Betag	39 ^a
CGP-13	37 ^a
CGP-110	37 ^a
Lapad	39 ^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT

Days to First Harvesting

As presented in Table 3, there were no significant differences observed on the numbers of days to first harvesting of garden pea pods. However, pods that were harvested earlier were from the varieties Chinese garden pea (white), CGP-11, CGP-13, and CGP-110 having comparable means of 57 days. It was followed by the pods produced from Betag varieties with a mean of 58 days while the pods obtained from Lapad variety with a mean of 59 days attained the first harvesting stage after one day.



Number of Pods Per Cluster

The number of pods per cluster is presented in Table 4. Result shows that all the different garden pea varieties evaluated used did not differ significantly. But numerical data shows that the most number of pods was noted on Betag variety with a mean of 8.45 followed by pods from Chinese garden pea (white) variety with mean of 8.15. The least number of pods per cluster were obtained from the variety CGP-110 with a mean of 7.75.

Table 3. Days to first harvesting

VARIETY	MEAN (Days)
Chinese garden pea (White)	57 ^a
CGP-11	57 ^a
Betag	58 ^a
CGP-13	57 ^a
CGP-110	57 ^a
Lapad	59 ^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT

Table 4. Number of pods per cluster

VARIETY	MEAN
Chinese garden pea (White)	8.15 ^a
CGP-11	8.05 ^a
Betag	8.45 ^a
CGP-13	7.95 ^a
CGP-110	7.75 ^a
Lapad	7.85 ^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT



Days to Maturity of Pods

Table 5 shows that there were no significant statistical differences on the number of days to maturity of pods of the six garden pea varieties. Numerically, pods observed from Chinese garden pea (white) and Betag variety were the last to reach maturity stage with a mean of 78 days. Pods from the varieties CGP-11, CGP-13, CGP-110, and Lapad were earlier to reach maturity stage with 74 days.

Length of Pods (cm)

Table 6 shows that there were highly significant differences observed with regards to the pod length of six the varieties of garden pea. Betag variety produced the longest pods with a mean of 7.17cm followed by CGP-13 with a mean of 6.81 cm. It was followed further by Lapad variety but statistically comparable to CPG 11 variety with a mean of 6.45 and 6.47cm. The CGP-110 variety registered the shortest pod length with a mean of 5.99. The results maybe due to the general observation that Betag variety produced long and large pods.

Table 5. Days to maturity of pods

VARIETY	MEAN
Chinese garden pea (White)	78 ^a
CGP-11	74 ^a
Betag	78 ^a
CGP-13	74 ^a
CGP-110	74 ^a
Lapad	74 ^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT



Weight of Marketable Pods (kg)

Table 7 shows that the weight of marketable pods among the garden pea varieties evaluated were not statistically significant. However, numerical results indicated that pods from Betag variety had the heaviest marketable weight having a mean of 0.98 kg. It was followed by the pods grown from Chinese garden pea (white), CGP-11, and CGP-13 having the same means of 0.96 kg. Pods obtained from the variety CGP-110 had the lowest marketable yield of 0.93 kg. These differences in the weight of marketable pods maybe directly related to the quality of seeds sown.

Table 6. Length of pods (cm)

VARIETY	MEAN (cm)
Chinese garden pea (White)	6.21 ^{cd}
CGP-11	6.47 ^{bc}
Betag	7.17 ^a
CGP-13	6.81 ^b
CGP-110	5.99 ^d
Lapad	6.45 ^{bc}

Means with a common letter/s are not significantly different at 0.05% level of DMRT

Table 7. Weight of marketable pods (kg)

VARIETY	MEAN (kg)
Chinese garden pea (White)	0.96 ^a
CGP-11	0.96 ^a
Betag	0.98 ^a
CGP-13	0.96 ^a
CGP-110	0.93 ^a



Lapad

0.95^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT

Weight of Non-Marketable Pods (kg)

Likewise, results show that there were no significant differences obtained on the weight of non-marketable pods between the six garden pea varieties tested as shown in Table 8. Numerically however, pods gathered from Chinese garden pea (white), CGP-11, and Betag varieties had the heaviest weight of non-marketable pods. It was followed by CGP-13 variety having a mean of 0.24 kg. Pods from CGP-110 and Lapad had the lowest weight of non-marketable pods with a mean of 0.20 kg due to the higher pod defects. Small seeds produced the smallest vines which correspondingly produced smaller pods especially towards the tip of the vines which were classified as non-marketable.

Total Yield Per Plot (kg)

As presented in Table 9, the results showed that there were no significant differences observed among the variety means. Nevertheless, data reflects that garden pea pods harvested from Betag variety had the heaviest total yield per plot with a mean of 1.25 kg followed by pods obtained from Chinese garden pea (white) and CGP-11 varieties having the same means of 1.24 kg/plot. Plants grown from CGP-110 produced pods having the lowest total yield among the varieties.



Table 8. Weight of non-marketable pods (kg)

VARIETY	MEAN (kg)
Chinese garden pea (White)	0.28 ^a
CGP-11	0.28 ^a
Betag	0.28 ^a
CGP-13	0.24 ^a
CGP-110	0.20 ^a
Lapad	0.20 ^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT

Number of Picking

Table 10 shows that there were no significant differences observed among the varieties on the number of picking. It indicated that all the six garden pea varieties had the same number of pickings of 5 from the very first harvest up to the last harvest of pods.

Table 9. Total yield per plot (kg)

VARIETY	MEAN (kg)
Chinese garden pea (White)	1.24 ^a
CGP-11	1.24 ^a
Betag	1.25 ^a
CGP-13	1.19 ^a
CGP-110	1.13 ^a
Lapad	1.15 ^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT



Table 10. Number of picking

VARIETY	MEAN
Chinese garden pea (White)	5 ^a
CGP-11	5 ^a
Betag	5 ^a
CGP-13	5 ^a
CGP-110	5 ^a
Lapad	5 ^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT.

Table 11. Computed Yield Per Hectare (t/ha)

Computed yield per hectare is presented in Table 11. The different varieties of garden pea did not show any significant differences from each other. However, results show that Betag variety obtained the highest computed yield of 1.95t/ha. Followed by varieties Chinese garden pea (White), CGP-11, and CGP-13 all having equal means of 1.92t/ha. Lowest computed yield were produced from CGP-110 variety with a mean of 1.85t/ha.

Meteorological Data

Table 12 shows the climatological conditions gathered at WS admin meteorological station located at San Roque dam during the period of the study.

Mean temperature (maximum) per month ranged from 26.7°C (January) to 27.4°C (November). Mean relative humidity was high in the month of November (87%) and lowest in the month of January (79%). There was no rain recorded in the month of November and December. The sun rosed at the time of 6.02 and sunset at 6.07 during the study.



Table 11. Computed yield per hectare (t/ha)

VARIETY	MEAN (t/ha)
Chinese garden pea (White)	1.92 ^a
CGP-11	1.92 ^a
Betag	1.95 ^a
CGP-13	1.92 ^a
CGP-110	1.85 ^a
Lapad	1.90 ^a

Means with a common letter/s are not significantly different at 0.05% level of DMRT

Physiological Disorder

Curling of pods was observed during the harvesting stage of the six garden pea varieties evaluated which are considered non-marketable pods.

Table 12. Meteorological data

Month	Relative Humidity (%)	Temperature (°C)		Rainfall (mm)	Day Length	
		Maximum	Minimum		Sunrise	Sunset
November	87	27.4	19.0	0.00	6:03	6:06
December	84	27.0	18.4	1.80	6:04	6:07
January	79	26.7	18.0	0.00	6:00	6:09
Mean	83	27.0	18.47	0.6	6.02	6.07

Means with a common letter/s are not significantly different at 0.05% level of DMR



Cost and Return Analysis

Table 13 shows the cost and return analysis of the study. Result revealed that Betag variety obtained the highest return of investment of 260.53% followed by the varieties Chinese Garden Pea (White), CGP-11, and CGP-13 with an ROI of 253.17%. The CGP-110 variety produced the lowest return of investment of 242.14%.

Table 13. Cost and return analysis

Particular	Chinese Garden Pea (White)	CGP-11	Betag	CGP-13	CGP-110	Lapad
Yield (Kg)	14.40	14.40	14.70	14.40	13.95	14.25
Sales (Php)	216.00	216.00	220.50	216.00	209.25	213.75
Expenses (Php)						
Seeds	4.5	4.5	4.5	4.5	4.5	4.5
14-14-14	3.33	3.33	3.33	3.33	3.33	3.33
Chicken Manure	16.67	16.67	16.67	16.67	16.67	16.67
Trellis	-	-	-	-	-	-
Padan 50 SP	-	-	-	-	-	-
Cumulus	3.33	3.33	3.33	3.33	3.33	3.33
Labor Cost						
Land Preparation	8.33	8.33	8.33	8.33	8.33	8.33
Planting	16.67	16.67	16.67	16.67	16.67	16.67
Thinning	-	-	-	-	-	-
Fertilizer application	-	-	-	-	-	-
Hilling up	-	-	-	-	-	-
Harvesting	8.33	8.33	8.33	8.33	8.33	8.33
Expenses (Php)	16.16	16.16	16.16	16.16	16.16	16.16



Net Income (Php)	154.84	154.84	159.34	154.84	148.09	152.59
ROI (%)	253.17	253.17	260.53	253.17	242.14	249.49
RANK	2	2	1	2	4	3

*Note Selling Price = Php P150.00/kg



Figure 1. During planting



Figure 2. During hilling-up

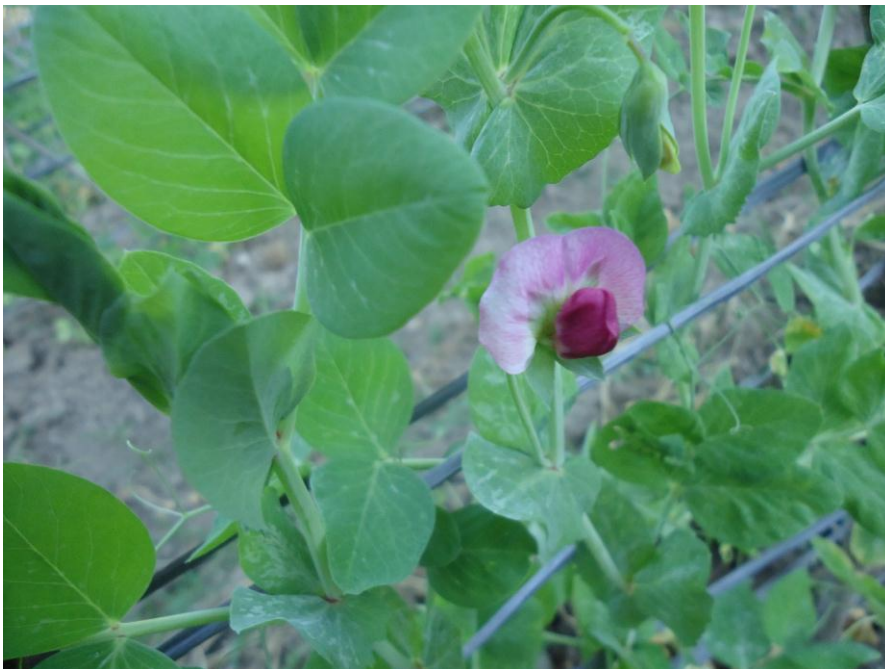


Figure 3. Flowering stage



Figure 4. Harvesting the pods

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted at Lac-lac, San Roque, San Manuel, Pangasinan from November 2012 to January 2013 to evaluate the growth and yield performance of six different varieties of garden pea and to identify the varieties that are most adapted at San Manuel, Pangasinan condition.

The number of days from sowing to seedling emergence, from sowing to flowering, and days to maturity of pods of the six different garden pea varieties did not differ significantly. However, numerically, varieties that emerged, flowered and matured earlier were observed from the varieties CGP-11, Betag, CGP-13, and CGP-110 with comparable means of 5 days to emerged, 39 days to flower and 74 days to reach maturity as compared to Chinese garden pea (white) and Lapad varieties having comparable means of 7 days to emerged, 37 days to flower, and 78 days to reach maturity.

Likewise, there were no significant differences observed on the numbers of days to first harvesting of garden pea pods. However, pods that were harvested earlier were from the varieties Chinese garden pea (white), CGP-11, CGP-13, and CGP-110 having comparable means of 57 days. It was followed by the pods produced from Betag varieties with a mean of 58 days while the pods obtained from Lapad variety with a mean of 59 days attained the first harvesting stage after one day.

Results show that there were highly significant differences observed with regards to the pod length of six the varieties of garden pea. Betag variety produced the longest pods with a mean of 7.17 cm followed by CGP-13 with a mean of 6.81 cm. It was followed further



by Lapad variety but statistically comparable to CPG 11 variety with a mean of 6.45 and 6.47 cm. The CGP-110 variety registered the shortest pod length with a mean of 5.99 cm. With regards to the weight of marketable and non-marketable pods among the garden pea varieties evaluated were not statistically significant. However, numerical results indicated that pods from Betag variety had the heaviest marketable and non-marketable weight with a mean of 0.98 kg (marketable) and 0.28 kg (non-marketable). It was followed by the pods grown from Chinese garden pea (white), CGP-11, and CGP-13 having the same means of 0.96 kg (marketable yield). Pods obtained from the variety CGP-110 and Lapad had the lowest non-marketable yield of 0.20 kg.

Results showed that there were no significant differences observed among the variety means with regards to the total yield per plot and computed yield per hectare. Nevertheless, data reflects that garden pea pods harvested from Betag variety had the heaviest total yield per plot and computed yield per hectare with a mean of 1.25 kg and 1.95 t/ha followed by pods obtained from Chinese garden pea (white) and CGP-11 and CPG-13 varieties having the same means of 1.24 kg/plot and 1.92 t/ha. Plants grown from CGP-110 produced pods having the lowest total yield with a mean of 1.13 kg/plot and 1.85 t/ha among the varieties evaluated.

Result revealed that Betag variety obtained the highest return of investment of 260.53% followed by the varieties Chinese Garden Pea (White), CGP-11, and CGP-13 with an ROI of 253.17%. The CGP-110 variety produced the lowest return of investment of 242.14%.



Conclusion

It is therefore concluded that based on the results presented, Betag variety produced slightly higher number and length of pods per plant, with heavier marketable yield, produced the higher computed yield and highest return on investment among the varieties evaluated.

Recommendation

Although no significant differences were observed among the various varieties evaluated, it is therefore recommended as per the data obtained on the cost of return analysis, number of pods per plant, length of pods, weight of marketable pods and computed yield per hectare, Betag variety is suitable garden pea production at Lac-lac, San Roque, San Manuel, Pangasinan.



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