BIBLIOGRAPHY

BAY-AN, CHARLES B. APRIL 2011. Evaluation of High Lysine Corn Varieties Under La Trinidad, Benguet Condition. Benguet State University, La Trinidad, Benguet.

Adviser: Leoncia L. Tandang, PhD.

ABSTRACT

The study was conducted to evaluate the growth and yield of high lysine corn varieties under La Trinidad condition; to determine the best varieties under La Trinidad; Benguet condition; and to determine the profitability of growing high lysine corn in La Trinidad from November 2009 to April 2010.

Highly significant differences among the seven high lysine corn varieties evaluated were observed in terms of ear diameter, number of kernel row per ear and number of marketable ear per plot. Significant differences among the seven varieties were also noted in terms of ear length, weight of marketable corn kernel, total weight of ear corn kernel and return on cash expenses.

No significant differences were observed on days from sowing to emergence, days from sowing to tasseling and to silking, plant height at maturity, number of ear harvested per plot, number of kernel per row, weight of 1000 kernel per plot, number of non-marketable ear per plot, total number of ear per plot and weight of non-marketable corn kernel per plot.

All the seven high lysine corn varieties could be planted in La Trinidad, Benguet condition because they all produced high yield and ROCE, although, IPBHy 446, IPBHW6OB and IPBY449 are most profitable to produce.

TABLE OF CONTENTS

INTRODUCTION

Corn (*Zea mays*) is second to rice as the major grain crop in the Philippines. It is also a good source of energy. In terms of uses, corn is a major component of animal feed and food for human consumption. The crop itself is a good source of roughage for livestock (Cayat, 2002).

Corn still plays an important role in the Cordillera because it is considered as a cash crop. In Benguet and some parts of Mountain Province, corn cultivation is only done in small scale due to limited source of planting materials that is high yielding and suitable in the area. Therefore, continuous introduction of new varieties is necessary (Agayam, 2005).

Corn is a staple food for 20% (or 12 million) of the Filipinos. It constitutes about 50% of the feeds for the local livestock and poultry industries. As for the yellow corn, it accounts for about 70% of livestock mixed feeds. The production of corn from 1999 to 2003 ranges from 4,584,593 metric tons to 4,615,625 metric tons with an average annual growth rate of 0.14%. The Philippines contributes about 1% to world's corn production or about 22% of the total corn produced by the South-East Asian Nations (BPRE, 2009).

At present, we need to have open pollinated varieties of corn that are highly acceptable with great quality specifically high quality protein. Since people of today are aware of their diet, production of nutritious corn varieties is a necessity.

Corn contains vitamins, minerals and protein such as lysine and tryptophan. Lysine that is present in corn is a natural amino acid man and animals must acquire to be healthy. Foods such as meat and lentils are high in proteins that contain lysine. When we eat such foods, we break down the proteins and scavenge the lysine for use in building our own proteins. The way high lysine corn is genetically modified causes it to accumulate free lysine, not just proteins that are rich in lysine (Sherrell, 2006).

Lysine or L-lysine is an essential amino acid that it is necessary for human health but cannot be made by the body. For this reason, lysine must be obtained from food. Amino acids are the building blocks of protein. Lysine is important for proper growth, and it plays an essential role in the production of carnitine, a nutrient responsible for converting fatty acids into energy and helping to lower cholesterol. Lysine appears to help the body absorb and conserve calcium, and it plays an important role in the formation of collagen, a substance important for bones and connective tissues including skin, tendon, and cartilage (Bernardo, 2009).

If there is too little lysine in the diet, kidney stones and other health related problems may develop including fatigue, nausea, dizziness, loss of appetite, agitation, bloodshot eyes, slow growth, anemia, and reproductive disorders. It is extremely rare, and corn is one of the best sources of lysine (ADAM, 2007).

The study was conducted to evaluate the growth and yield of high lysine corn varieties under La Trinidad condition, determine the best varieties under La Trinidad, Benguet condition and to determine the profitability of growing high lysine protein corn in La Trinidad.

The study was conducted at the Benguet State University-Institute of Plant Breeding (BSU-IPB-HCRS) from December 2009 to March 2010.

REVIEW OF LITERATURE

Corn Plant

Corn stems superficially resemble bamboo canes and the internodes can reach 20–30 centimeters (8–12 in). Corn has a very distinct growth form; the lower leaves being like broad flags, 50–100 centimeters long and 5–10 centimeters wide (2–4 ft by 2–4 in); the stems are erect, conventionally 2–3 meters (7–10 ft) in height, with many nodes, casting off flag-leaves at every node. Under these leaves and close to the stem grow the ears. They grow about 3 millimeters a day. Because of its shallow roots, maize is susceptible to droughts, intolerant of nutrient-deficient soils, and prone to be uprooted by severe winds (BPRE, 2009).

Climatic and Soil Requirement

The best soil for corn production is a well-drained silt loam or loam type of soil. It should be a type of soil with a high moisture holding capacity, high amount of organic matter and be slightly acidic (pH 5.3 to 7.3). A rainfall of 200 to 1,500 mm is required during its growing period. However, the optimum requirement of corn is 400 to 600 mm per growing period. In time of moisture deficiency, irrigation is essential (DA, 1999).

Nutritional Attributes of Corn

In the Philippines, more than eight million people or 20% of the country's population consume 79% of the corn produced. As a cereal grain, corn is second to rice as a source of carbohydrates in the Filipino diet. It is largely consumed in the form of corn grits' and grain corn. Corns produced for food are processed into corn flakes, popcorn, crackers, cakes and bread. From 1970 to 1973, rice and rice products accounted for an average of 104 kilos per

capita per year, while corn and corn products accounted to an average of 21 kilos or 14.3 % of the total cereal production (Colado *et al*., 1981).

High carbohydrates, low protein and low fat causing malnutrition especially among the young characterize the average Filipino diet. The Filipino family has a daily cereal intake of 395 grams. To enhance the nutritional value of corn grain emphasis on high lysine content has made in worldwide breeding efforts. Resulting varieties are expected to yield not only a substantial amount of carbohydrates but also high protein content. This development is a significant break through in many developing countries where malnutrition is a threat to economic and social stability (Colado *et al*., 1981).

As a source of energy, white and yellow corn contains about 128 and 188 calories respectively. Protein is about 4.4% in white and 4.9% in yellow corn. Good corn contains tryptophan and lysine. Fat and carbohydrates are usually higher in yellow corn compare to white corn; however, the calcium content of white corn is higher. The nutritional advantage of yellow corn over white corn and other cereal is that it contains carotene and crypthoxanthine vitamin A (Collado *et al*., 1981).

Varietal Evaluation

Varietal evaluation is necessary to observe characters such as yield, earliness, vigor, maturity and keeping quality because varieties have wide range of differences in size and in yielding performance (Carew, 1981). Vergara (1991) added that new varieties under good condition have greater yield potentials than the old ones. The use of fertilizer and improved farming practices will increase more yield in new varieties than the old ones. Furthermore, it is also necessary to determine adaptability of variety in a given location.

Javar (2005) evaluated the growth and yield of five green corn varieties fertilized with different animal manures under Sta. Cruz, Ilocus Sur condition. The growth and yield of five varieties of green corn significantly differed from each other. Carabuguis, LB lagkitan and DLU Pearl sweet corn were the earliest to produce tassel and silk with in 44 days after sowing. It also produced the highest number and heaviest marketable ears per plot. These varieties also registered the highest return on total cash expense per plot basis and most acceptable green corn under Sta. Cruz Ilocos Sur. Application of carabao manure, cow manure, and goat manure in corn, produced the heaviest marketable ears per plot and total yield per hectare. Carabuguis variety applied with cow manure and goat manure registered the highest return on total cash expense.

Lomadeo (2005) studied the yield and other characteristics of glutinous corn under La Trinidad condition. Highly significant differences among the six glutinous corn varieties was recorded in terms of days from sowing to tasseling and silking, plant height and ear height at maturity, number of leaves per plant, number of internodes, middle stem diameter, number of kernel rows, leaf width and leaf area, ear diameter and number of non-marketable ears per plot. Significant differences were noted on ear length, number of kernels per ear, number and weight of marketable ears per plot. No significant differences were observed in terms of days to emergence, leaf length, total number of corn ears, weight of non-marketable ears per plot and total yield per plot and computed yield per hectare.

Among the six varieties of corn studied, Sagada Yellow was the earliest to produce tassel and silk, emerged and reached maturity. Isabela Lagkitan had the highest number of leaves, longest and widest leaf and biggest leaf area. Los Banos Lagkitan produced the longest ears. All the six variety had comparable ear diameter. Kernel color of glutinous corn varied from the white

to cream and yellow. Los Banos lagkitan and Isabela lagkitan registered the highest kernel per ear. They also had similar number and weight of marketable ears per plot except for Sagada Yellow. Isabela lagkitan registered the highest yield per hectare and highest return on investment (ROI). All the varieties of corn were resistant to leaf blight and ear worm. Among the varieties studied, La Union Glutinous was very much liked by the taste panel.

Among the ten correlation coefficients worked out between yield and ten other characters of corn positive and significant correlation coefficients between yield and leaf length, leaf width and leaf area were noted indicating that the leaf length, leaf width, leaf area could be used as selection indices when selecting for high yielding varieties of glutinous corn.

Lumetic (2005) studied the post harvest qualities of five varieties of corn as affected by harvesting method in Liwan West, Rizal, and Kalinga. He revealed that all the varieties were rated highly resistant to corn smut. Pioneer 3013 were significantly rated highly resistant to rat infestation than the other varieties tasted. All the varieties of corn evaluated took only two days of sun drying to reach around 14% MC and 86%DMC. The same is true with corn ears harvested using the three methods of harvesting. Pioneer 3013 and Ayala Dekalb 888 produced significantly higher seed yield of 3.5 kg/5m2 plot and 70 t/ha. The lowest seed yield was obtained from Asian Hybrid 140 with 3 kg with 5m2 and 6 t/ha, which was statistically lower than seed yield of Cargil 818 and Corn World 208.

Mamuri (2003) evaluated five corn varieties using five organic fertilizers under Bacnotan, La Union condition. Highly significant differences among the five varieties were recorded in terms of days to silking and tasseling. No significant difference was observed in terms of days to maturity.

Highly significant differences among the five varieties of corn were also recorded in terms of length of corn ear and ear diameter, number of marketable and non-marketable corn ears harvested and computed yield per hectare. Among the five varieties tasted, BS 9900 was the earliest to produce tassel and silk. The numbers of days to maturity were similar in all the varieties tested. The five varieties of corn were all resistant to downy mildew. In terms of plant height at maturity, IPB variety 1 was the tallest among the five varieties tested. IPB 929 recorded the longest ear and BS 9900 recorded the widest ear. NT 4201 recorded the highest number of marketable ear and the lowest in terms of non-marketable ears harvested. The weights of 1000 kernels are similar in all the varieties tested. In terms of computed yield per hectare, IPB 929 gave the highest in terms of return on cash investment.

In terms of days to silking and tasseling, plant height at maturity and length of corn ears highly significant differences among the five organic fertilizers were observed. Significant differences among the five organic fertilizers were recorded in ear diameter and weight of 1000 kernels. No significant difference was observed among the organic fertilizers used in the days to maturity, number of marketable and non-marketable corn ears harvested and computed yield per hectare. Plants applied with Sagana 100 recorded the earliest to produce tassel and silk, tallest at maturity, longest ear length, widest ear diameter and had the highest weight of 1000 kernels. Plants applied with chicken dung gave the highest return on investment (ROI). No significant interaction effects of variety and organic fertilizer in all the parameters measured were observed. Economically, NT 4201 variety applied with hog manure gave the highest return on cash investment (531.38% ROI).

MATERIALS AND METHODS

An area of 420 m^2 was thoroughly prepared and divided into four blocks consisting 28 plots measuring 15m^2 each including six border plots. The experiment was laid out following Randomized Complete Block Design (RCBD) with four replications. There were four rows per plot measuring 0.75m^2 x5m^2 each.

Planting and Planting Distance

Planting was done in single row with 25 hills per row with the seeding rate of four seeds per hill at the distance of 75 cm between furrows and 20cm between hills. Three weeks after emergence, the corn seedlings were thinned out leaving only one healthy plant per hill.

Cultural Management

Fertilizer application, irrigation, cultivation, and weeding were done uniformly and as necessary in all the furrows.

The seven high lysine varieties of corn obtained from the Institute of plant breeding, University of the Philippines Los Baños served as treatments as follows:

Treatment	Variety (V)
V_1	IPB Hy 446
V_2	IPB Hy 449
V_3	IPB Hy 576
V_4	IPB Hy 6411
V_5	IPB HW 60B
V_6	IPB HW 10W16
V_7	IPB Var. 6 (YAP CORN)

Data Gathered:

1. Meteorological data. Daily temperature (ºC), relative humidity (%), rainfall (mm), and sunshine duration (hr, min) were taken at the Philippine Atmospheric Geological Service Administration (PAG-ASA) station based at Benguet State University.

2. Plant vigor. This was taken by visual rating at 30 days after planting (DAP) using the following scale:

Rating Scale	Description
1	Very poor growth
2	Poor growth
3	Moderately vigorous
4	Vigorous growth
5	Highly vigorous

3. Days from sowing to emergence. This was taken by counting the number of days from sowing to emergence when at least 80% of the plants in a plot emerged.

4. Plant height at maturity. This was taken by measuring the height of ten sample plants two weeks before harvesting from the ground level to the tassel tip using meter stick.

5. Days from sowing to silking and tasseling. This was taken by counting the number of days from sowing to silking and tasseling when at least 50% of the plants in a plot starts to show their silk and tassel.

6. Days to maturity. This was taken by counting the number of days from sowing up to harvesting when 80% of the husk turned yellow.

7. Plant height at maturity. This was taken by measuring the height of ten sample plants two weeks before harvesting from the ground level to the tassel tip using meter stick.

8. Ear characters. This was gathered using ten sample ears per plot selected at random at harvesting time.

a. Ear length. This was taken by measuring ten sample ears from the point of attachment to the tip of the husked ear per treatment selected at random.

b. Number of kernel per ear. This was gathered by counting all the kernels per ear of ten samples per treatment at harvest time.

c. Ear diameter (cm). This was taken by measuring the widest part of ten random sample ear per plot using vernier caliper.

9. Number of corn ears harvested per plant. This was counted from ten sample plants selected at random at harvest time per plot.

10. Number of non-marketable ear per plot. This was taken by counting the corn ears with damage per plot. Non-marketable corn ears are those ears that are malformed and damage by pest and diseases.

11. Number of marketable ear per plot. This was taken by counting the corn ears with fully developed kernels that are free from any damaged or disease during the time of harvest.

12. Reaction to downy mildew. This was determined and rate at 30, 45, and 60 DAP using the following formula and scale, respectively.

$$\frac{\text{Number of Plant/Plot Infected}}{\text{Total Number of Plants/Plot}} \times 100$$

Rating Scale	Description	Remarks
1	Not infected or less than	Resistant

2	10% of plant is infected	Moderate resistant
3	11-15% of the plant is infected	Susceptible
4	51% or nearly at the plant infected	very susceptible

Percent Infection Index =

13. Reaction to corn ear borer. The damage of corn borer on was observed during harvest using the following rating scale:

Rating Scale	Description	Remarks
1	Less than 1% damage	Highly Resistant
2	1-5% damage	Moderate resistant
3	6-10% damage	Resistant
4	11-20% damage	Very susceptible
5	21-30%damage	

14. Kernel characters. These was done by getting ten random sample ears per plot.

a. Total number of kernel per row. The number of kernel per row on ear was counted.

b. Total number of kernel row per ear. This was gathered by counting the entire kernel per ear of ten samples per treatment at harvest time.

14. Weight of 1000 kernels. This was done by weighing 1000 kernels per treatment per replication after harvesting.

16. Seed yield per plot (kg/ $15m^2$). This was taken by weighing the seed per plot.

17. Seed Yield per hectare (t/hc). This will be obtained base on the yield per plot (kg/$15m^2$) using the following formula: yield/hectare (t/ha)=yield/plot x 0.66.

Where .66 is a factor to be use to convert yield/plot in kg/15m^2 to yield/ha in t/ha.

18. Return on cash expense (ROCE). This was computed using the formula:

$$ROCE = \frac{\text{Net Profit}}{\text{Total Cost of Production}} \times 100$$

Data Analysis

All quantitative data were analyzed using the analysis of variance (ANOVA) for Randomized Complete Block Design (RCBD) with four replications. The significance of difference among the treatment means was tested using the Duncan's Multiple Range Test (DMRT) at 5% level of significance.

RESULTS AND DISCUSSION

Agro Climatic Requirement

The monthly temperature, relative humidity amount of rainfall and Sun shine duration throughout the conduct of the study are shown in table 1. There is increasing minimum and maximum temperature during the growing period of corn on January to April. The relative humidity was similar during the month of January and February then increased during the month of March and decrease again during the month of April. There were rainfall in January to February than March to April. The highest amount of sunlight was observed during the month of March and the lowest amount of sunshine duration was recorded in April (Table 1.)Apparently this climatic condition was observed to be suitable in growing corn in Trinidad as manifested by its good growth and development throughout the duration of the study.

Table 1. Temperature, relative humidity, rainfall and sunshine duration

MONTH	TEMPERATURE		RELATIVE HUMIDITY	RAINFALL (mm)	SUNSHINE DURATION (min)
	Min(^{0}C)	Max (^{o}C)			
January	12.65	23.30	84.25	7.00	250.5
February	18.92	24.75	84.50	7.00	238.7
March	20.00	25.32	86.75	6.17	416.96
April	20.42	26.17	82.25	6.20	166.48

Days from Sowing to Emergence,Tasseling, and Silking

The days from sowing to emergence was recorded when 80% of the seeds sown emerged. There was no significant difference in days on sowing to emergence noted among the seven high lysine varieties of corn evaluated in this study. However, it was observed that varieties IPBHy 449 and IPBHW60B emerged one day later than the other varieties evaluated which emerged in 7 days after sowing. The seven corn varieties evaluated did not show any significant differences in terms of days from sowing to tasseling. They took 80 to 82 DAP. In terms of silking, the seven high lysine corn varieties evaluated also did not show any significant difference on the days from sowing to silking. They took 84 to 85 days to silking.

Table 2. Days from sowing to emergence, Tasseling and silking of seven high lysine corn varieties

VARIETY	DAYS FROM SOWING TO		
	EMERGENCE	TASSELING	SILKING
IPBHy 446	7	80	85
IPBY 449	8	81	84
IPBHy 546	7	81	84
IPBHy 6411	7	82	85
IPBHW60B	8	80	85
IPBHW10W16	7	81	85
IPBVar 6 ck	7	80	84
CV (%)	6.46	1.04	1.03

Means with common letters are not significantly different at5 % by DMRT

Days from Sowing to Maturity

This is the time were the plants is ready to harvest. No significant differences were observed among the seven high lysine varieties of corn evaluated on days from sowing to maturity. They took 153 days to maturity.

Plant Vigor

All the seven corn varieties evaluated were highly vigorous at 30 DAP. This could be due to the effect of the chicken dung and complete fertilizer applied which provided the sufficient nutrients to the corn plant (Mamuri, 2008).

Plant Height at Maturity

The seven high lysine corn varieties did not show any significant difference in plant height at maturity (Table 3). Numerically, variety IPBHW60B was the tallest, while the shortest plant was measured evaluated in IPBHy 449.

Table 3. Plant height (cm) at maturity of seven high lysine corn varieties evaluated

VARIETY	PLANT HEIGHT (cm)	
IPBHy446	103.60	
IPBHy449	100.90	IPBHy546
	103.05	
IPBHY6411	103.65	
IPBHW6OB	121.03	
IPBHW10W16	102.53	
IPBVar6 ck	106.03	
CV (%)	13.00	

Means with common letter are not significantly different at 5% by DMRT.

Ear Characters of the Seven high lysine Corn Varieties Evaluated

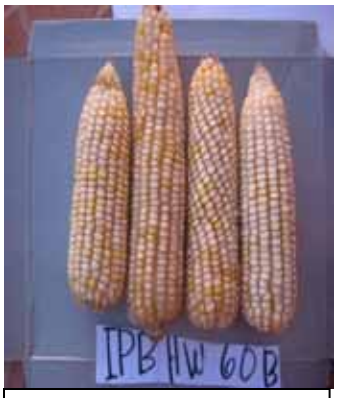
Ear Length and Diameter

Statistical analysis showed that IPBVar 6 significantly had the longest ear. The shortest ear was measured in IPBHy 546 (Table 4).In terms diameter highly significant differences were noted on ear diameter of seven varieties evaluated. IPBVar 6 and IPBHyW60B had the highest ear diameter. IPBHy 546 and IPBHy 6411 obtained the lowest ear diameter.

Table 4. Ear characters of the seven high lysine corn varieties evaluated

VARIETY	EAR		NUMBER OF KERNEL PER ROW	NUMBER OF KERNEL ROW PER EAR	NUMBER OF CORN EAR PER PLANT
	LENGHT (cm)	DIAMETER (cm)			
IPBHy446	180.20^{ab}	4.99^{a}	31	16^{a}	1.75
IPBY449	168.20^{abc}	5.25^{ab}	33	14^{bc}	2.00
IPBHy546	165.90^{abc}	4.94^{a}	30	14^{bc}	2.00
IPBHy6411	180.03^{ab}	4.96^{a}	32	13^{bcd}	1.50
IPBHW60B	187.70^{a}	5.53^{b}	30	15^{abc}	2.00
IPBHW10W16	181.20^{ab}	5.29^{ab}	30	16^{a}	2.00
IPBVar6 ck	201.08^{a}	5.55^{b}	33	14^{bc}	1.75
CV (%)	7.22	4.81	6.46	4.89	18.86

Means with common letter are not significantly different at 5% by DMRT.
Ns-not significant *-significant **-Highly significant



IPBHY60B

IPBHy446

IPBVar6

Figure 1. Overview of the seven high lysine corn varieties evaluated

Kernel Character of Seven High Lysine Corn Varieties Evaluated

Number of Kernel per Row

Statistically, all the seven corn varieties studied had no significant differences on the number of kernel per row. They had 30 to 33 kernels per row. Numerically both IPBHy 449 and IPBVar6 similarly had the highest number of kernels per row (Table 4).

Number of Kernel Row

Statistical analysis revealed that highly significant differences on the number of kernels row per ear among the seven varieties of corn evaluated. IPBHY 446 and IPBH10W16 produced the highest number of kernel row per ear together with IPBHW60B variety which had comparable number of kernel row per ear with the other varieties evaluated(Table 4).

Number of Corn Ears Harvested Per Plant

No significant differences were noted on the number of corn ears harvested per plant among the seven varieties evaluated. Almost all the varieties evaluated produce two corn ears per plant (Table 4).

Total Number of Corn Ears Per Plot

No significant difference was noted on the total number of corn ears harvested per 15 m^2 among the seven varieties of corn tested in range from 68 to 97 (Table 4).

Weight of Marketable Corn Kernel per Plot

Statistical analysis showed that significant differences on weight of marketable corn kernel existed among the seven varieties evaluated (Table 5). IPBHy 446 produced

Table 5. Corn kernel yield per plot (kg/15m^2) of seven high lysine corn varieties evaluated

VARIETY	CORN KERNEL YEILD PER PLOT(kg/15m^2)		
	Marketable	Non-Marketable	TOTAL
IPBHy446	20.26[a]	2.40	22.66[a]
IPBY449	19.29[ab]	2.41	21.70[a]
IPBHy546	17.15[abc]	2.75	19.90[a]
IPBHy6411	15.91[abc]	2.95	18.86[ab]
IPBHW60B	14.37[bc]	2.88	18.75[ab]
IPBHW10W16	17.58[ab]	4.98	22.55[a]
IPBVar6 ck	12.05[c]	2.80	14.84[b]
Cv (%)	19.10	42.22	15.31

Means with common letter are not significantly different at 5% by DMRT.
*-significant **-Highly significant

the heaviest marketable corn kernel per plot followed by IPBHy 449 and IPBHy10W16. The lowest weight of marketable corn kernel per plot was obtained by IPBVar 6.

Weight of Non-Marketable Corn Kernel per Plot

The weight of non-marketable corn kernel per plot did not differ significantly among the seven varieties evaluated (Table 4). It ranged from 2.40kg/15m^2 to 4.98 kg/15m^2. IPBHy 446 and IPBHy 449 produced the lowest non- marketable corn kernels while IPBHW10W16 obtained the heaviest non-marketable corn kernels per plot.

Total Weight of Corn Kernels per Plot

Significant differences were noted on the total weight of corn kernels among the seven varieties of corn evaluated (Table 5). IPBHy 446, IPBHW10W16, IPBHy 449, IPBHy 546 produced the highest total weight of corn kernels per plot (kg/15m$^{2)}$ .They were followed by IPBHy 6411 and IPBHW60B. Among the seven varieties evaluated, IPBVar 6 obtained the lowest total weight of corn kernels per plot.

Number of Marketable Ears per Plot

Table 5 shows significant differences in the number of marketable ears per plot among the seven varieties of corn evaluated. IPBHy446 registered the highest number of corn ears followed by IPBHy449 and IPBHy449 while the rest of the varieties had 42 to 59 (kg15m^2) marketable corn per15m^2 plot. IPBVar6 obtained the lowest number of marketable ear per plot.

Number of Non-Marketable Ear Per Plot

Table 6 also shows no significant difference in the number of non-marketable ear per plot among the seven varieties of corn evaluated. IPBHy446, IPBHy449 and IPBVar 6 produced the lowest number of non-marketable corn ears while the other varieties evaluated (Table 6) had 21 to 38 non-marketable corn ear per plot.

Total Number of Ear per Plot

No significant deference was noted in the total number of corn ear per plot (kg/15m^2) among the seven high lysine corn varieties evaluated.

Table 6. Number of marketable and non marketable ear per $15m^2$ plot and total number of ear per $15m^2$ plot of seven varieties of corn

VARIETY	NUMBER OF EARS PER PLOT ($15m^2$)		
	Marketable	Non Marketable	TOTAL
IPBHy446	77[a]	21	98[a]
IPBHy449	69[a b]	21	89[ab]
IPBHy546	64[ab]	25	89[ab]
IPBHy6411	58[b]	24	82[bc]
IPBHW6OB	42[c]	25	67[ab]
IPBHW10W16	59[b]	38	94[ab]
IPBVar6 ck	36[c]	21	57[d]
CV (%)	16.91	36.04	16.80

Means with common letter are not significantly different at 5% by DMRT.

Seed Yield per Plot and per Hectare

The seed yield per plot did not differ significantly among the varieties evaluated in this study. It ranged 12 kg to 25 kg (Table7).

Table 7 shows that IPBHy 446 and IPBHy 449 produced the highest while IPBVar 6 obtained the lowest seed yield per plot. In terms of computed yield per hectare IPBHy446 had the highest yield per hectare which was not significantly different but numerically higher than IPBHy449, while the lowest was obtained by IPBVar6.

Weight of 1000 Kernels of Seven Corn Varieties

The weight of 1000 kernels did not differ significantly among the varieties evaluated in this study (Table 7). It ranged from 437.50 to 562.56g. The table shows that

Table 7. Seed yield per plot (kg/15m^2) and per hectare (t/ha) and weight of 1000 kernels and of seven high lysine corn varieties evaluated

VARIETY	SEED YIELD PER PLOT (kg/15m^2	YIELD PER HECTARE (T/ha)	WEIGHT OF 1000 KERNELS (g)
IPBHy446	22.66	14.95	462.50
IPBHy449	21.70	14.32	462.50
IPBHy546	19.86	13.10	485.00
IPBHy6411	18.86	12.44	462.50
IPBHW60B	22.55	14.88	477.50
IPBHW10W16	14.84	9.79	437.50
IPBVar6 ck	12.05	7.95	562.50
CV(%)	19.10	16.91	13.64

Means with common letter are not significantly different at 5% by DMRT.

IPBVar6 had the highest weight of 562.50g while the lowest weight was obtained by IPBHW10W16 variety with 437.50g.

Reaction to Downy Mildew and corn borer

Results revealed that no significant differences between the corn varieties. This may be contributed by the high vigor of the corn plant at vegetative stage.

In terms of corn borer, no significant on the seven high lysine corn varieties evaluated. They were all highly resistant to corn borer.

Figure 2. Overview of 1000 corn kernel of seven high lysine corn varieties evaluated

Profitability of Growing High Lysine in La Trinidad Benguet

The return on cash expenses of the seven different varieties evaluated is shown in Table 7. IPBHy446 and IPBY449 had the highest ROCE compared to other varieties that which is lower than 100. This result indicates that all the rice landraces are profitable to be produced under La Trinidad, Benguet.

Table 7. Return on cash expense of seven corn varieties evaluated

VARIETY	SEED YIELD/PLOT ($kg/15m^2$)	COST OF PRODUCTION (Php)	GROSS INCOME (Php)	NET PROFIT (Php)	ROCE (%)
IPBHy446	22.66	189.25	453.20[a]	263.95[a]	139.47
IPBY449	21.70	189.25	434.20[ab]	244.75[ab]	129.32
IPBHy546	19.86	189.25	398.00[abc]	204.75[abc]	108.19
IPBHy6411	18.86	189.25	377.20[abc]	187.95[abc]	99.31
IPBHW60B	22.55	189.25	451.00[bc]	261.75[bc]	138.30
IPBHW10W16	14.84	189.25	2968.00[ab]	107.55[bc]	56.82
IPBVar6(ck)	12.05	189.25	241.00[c]	51.75[c]	27.34

All seed was sold at Php20.00 per kilo.

SUMMARY CONCLUSION AND RECOMMENDATION

Summary

Highly significant differences among the seven varieties evaluated were recorded in terms of ear diameter, number of kernel per row ear and number of marketable ear per plot. Significant difference among the seven varieties were observed in terms of ear height, weight of marketable corn kernel per row, total weight of ear corn kernel and return on cash expenses.

No significant differences were observed on height of maturity, number of ear harvested per plot, number of kernel per row, days from emergence to tasseling and silking, weight of 1000 kernel per plot, number of non-marketable ear per plot, total ear, weight of non-marketable corn kernel per row, days to emergence and total seed yield per plot.

All the seven varieties were emerge seven DAP except for IPBHy 546 and IPBHW6OB which emerge one day after, in terms of tasseling,IPBHy6411 is the first to produce tassel. The seven varieties of corn all produce silk 85 DAP except for IPB Var 6, IPBHyp449 and IPBHy 546 which silk 84 DAP. All the seven varieties reached maturity at 153 DAP.

All the seven varieties of corn evaluated were highly vigorous at 30 DAP. This could be the effect of the chicken dung and complete fertilizer applied which provided enough nutrients to the corn plant. These varieties were rated resistant to downy mildew. The different corn varieties did not show any significant difference in the plant height at maturity. Numerically, variety IPBHW60B was the tallest followed by IPB Var 6 while the shortest plant exhibited by IPBHy449. Ear character of seven varieties of corn evaluated shows that IPB Var 6 had significantly longest ear than the other varieties evaluated. It has also the biggest ear diameter together with IPBHW60B, IPBHW10W16, and IPBHy449.

Statistically all the seven varieties of corn evaluated had high significant difference on the number of kernel row per ear. IPBHy446 together with IPBHW10W16 produce the highest number of corn kernel row per ear. IPBHy546 and IPBHy 6411 has similar kernel row per ear.

Among the seven varieties evaluated , IPBHy446 registered the highest number of corn ears followed by IPBHy449,IPBHy546 while the rest had 42 to 59 marketable corn ears per plot , revealed IPB Var 6 recorded the lowest number of marketable ear per plot.

Number of corn kernel were evaluated and it shows that IPB Var 6 had the highest weight of 562.509 while the lowest weight was obtained byIPBHW10W16 with 437.50 g. in terms of seed yield per plot,IPBHy446 is the highest with 18 kg per plot while IPB Var 6 obtained only 11kg per plot.

The seven high lysine corn varieties in this study showed that variety IPBHy446 obtained the highest ROCE followed by IPBHy546, IPBHW60B, IPBHy6411, while IPB Var 6 gave the lowest ROCE.

Conclusion

No significant difference among the seven varieties evaluated in terms of days from sowing to tasseling, days from sowing to silking, number of corn ear harvested per plant, number of kernel per row, height at maturity, and weight of 1000 corn kernel.

Significant difference among the seven varieties evaluated in terms of ear length, total weight of corn kernel, and return on cash expense.

Highly significant among the seven verities evaluated in terms of ear diameter, number of kernel row per ear, and number of marketable ear per plot.

Among the seven varieties of corn evaluated, IPBHy 446 registered the best performing variety bassed on weight of marketable corn kernel, seed yield per plot, return on cash expenses and net profit.

Recommendation

All the seven varieties of corn could be planted in La Trinidad, Benguet condition because they all produce a higher ROCE. But IPBHy 446 and IPBY449 are most profitable to produce.

LITERATURE CITED

AGAYAM, J.D. 2005. Varietal response of corn to bio-N as supplement fertilizer under Tuao, Cagayan condition. BS Thesis. Benguet State University, La Trinidad, Benguet. P. 42.

BERNARDO, E.B. 2009. UPLB Horizone. All in a bowl of yap corn. April-June. Vol. 11. Number 2. Pp. 2-4.

CAYAT, E.A. 2002. Growth and yield of corn for grain production under La Trinidad, Benguet Condition. BS Thesis. Benguet State University, La Trinidad, Benguet. P. 36.

COLLADO, G.M. 1981. Agribusiness corn systems Philippines and Thailand. Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) College, Laguna, Philippines. P .673.

DA. 1999. Young corn production guide. Interview with Mr. Benny Cadiz. Retrieved October 2009 from http://www.da.gov.ph/tips/young_corn.html.

JAVAR. J.U. 2005. Growth and yield of five green corn varieties fertilized with different animal manure. BS Thesis. Benguet State University, La Trinidad, Benguet. P. 4.

LOMADEO, A. P. 2005. Yield and other characteristics of glutinous corn under La Trinidad condition. BS Thesis. Benguet State University, La Trinidad, Benguet. P. 4.

LUMETIC, J.B. 2005. Post harvest qualities of five varieties of corn as affected by harvesting method at Liwan West, Rizal, Kalinga. BS Thesis. Benguet State University, La Trinidad, Benguet. P. 4.

MAMURI, M.G. 2003. Performance of five corn varieties using five organic fertilizers under Bacnotan, La Union. BS Thesis. Benguet State University, La Trinidad, Benguet. P. 21.

FIELD, J. 1996. Philippine Post harvest Industry Profile: CORN. Retrieved July 2009 from http://www.bpre.gov.ph/phindustry/corn.pdf.

QUILLOY, G.I. 1990. Performance of young corn production under two densities. BS Thesis. Benguet State University, La Trinidad, Benguet. P. 3.

SHERRELL, C.T. 2006. Green Party of Oaters New Zealand. Interview with Dr. Jack Heinemann regarding Monsanto's high lysine corn. Retrieved August 16, 2009 from http://www.greens.org.nz.

VERGARA, 1991. Raising the yield potential of rice. Philippines. Journal techno guide. Retrieved July 25, 2009 from http://books.google.com.ph/books.id/fulltext.

ZIEVE, D.G., G. JUHN and D. RELTZ. 2008. A.D.A.M. Editorial Team: Lysine Overview. University of Maryland Medical Center. 22 S. Greene Street, Baltimore Retrieved September 2009 from http://www. umm. edu/ altmed/ articles/lysine-000312.html.

APPENDICES

Appendix Table 1. Days from sowing to emergence of seven high lysine corn varieties

TREATMENT	REPLICATION I	II	III	IV	TOTAL	MEAN
IPBHy446	7	7	8	7	29	7.25
IPBy449	8	8	7	8	31	7.75
IPBHy546	8	7	7	7	29	7.25
IPBHy6411	7	7	7	7	28	7.00
IPBHW60B	7	8	8	8	31	7.75
IPBHW10W16	7	8	7	7	29	7.25
IPBvar6	7	8	7	7	29	7.25
REP TOTAL	51	53	51	51		
GRAND TOTAL					206	
GRAND MEAN						7.36

ANALYSIS OF VARIANCE

SV	DF	SS	MS	FC	F_{TAB} 5%	F_{TAB} 1%
Replication	3	0.428571	0.142857			
Treatment	6	1.928571	0.321429	1.421053^{ns}	2.6613	4.0146
Error	18	4.071429	0.22619			
Total	27	6.428571				

^{ns} – Not significant Cv = 6.46%

Appendix Table 2. Days to from sowing to silking of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	85	83	83	85	336	84.50
IPBy449	85	85	84	85	339	84.25
IPBHy546	83	85	84	84	336	84.00
IPBHy6411	85	85	85	86	341	85.25
IPBHW60B	84	84	83	84	335	85.25
IPBHW10W16	84	85	85	83	337	84.75
IPBvar6	83	84	84	86	337	84.00
REP TOTAL	589	591	558	593		
GRAND TOTAL					2361.00	
GRAND MEAN						84.32

ANALYSIS OF VARIANCE

SV	DF	SS	MS	Fc	F_{TAB} 5%	F_{TAB} 1%
Replication	3	2.107143	0.702381			
Treatment	6	6.357143	1.059524	1.397906^{ns}	2.6613	40.146
Error	18	13.64286	0.757937			
TOTAL	27	22.10714				

^{Ns}-not significant CV = 1.03%

Appendix Table 3. Days from sowing to tasseling of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	82	80	79	80	321	80.25
IPBy449	82	81	80	80	323	80.75
IPBHy546	80	81	81	80	322	80.50
IPBHy6411	82	80	81	83	326	81.50
IPBHW60B	81	80	80	79	320	80.00
IPBHW10W16	81	81	81	80	323	80.75
IPBvar6	80	80	80	80	320	80.00
REP TOTAL	568	563	562	562		
GRAND TOTAL					2255.00	
GRAND MEAN						80.54

ANALYSIS OF VARIANCE

SV	DF	SS	MS	Fc	F_{TAB} 5%	F_{TAB} 1%
Replication	3	3.535714	1.178571			
Treatment	6	6.714286	1.119048	1.58427^{ns}	2.6613	40.146
Error	18	12.71429	0.706349			
TOTAL	27	22.96429				

^{ns} - not significant CV = 1.04%

Appendix Table 4. Plant height (cm) at maturity of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	103.10	103.20	105.70	102.40	414.40	103.60
IPBy449	100.40	102.50	100.30	100.40	403.60	100.90
IPBHy546	104.80	106.30	101.90	99.20	412.20	103.05
IPBHy6411	104.70	106.70	101.30	101.90	414.60	103.65
IPBHW60B	173.60	107.40	103.00	100.10	484.10	121.03
IPBHW10W16	104.50	102.30	103.30	100.00	410.10	102.53
IPBvar6	108.00	104.70	105.80	105.60	424.10	106.03
REP TOTAL	799.10	733.10	721.30	709.60		
GRAND TOTAL					2963.10	
GRAND MEAN						105.83

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	F_{TAB} 5%	F_{TAB} 1%
Replication	3	687.4096	229.1365			
Treatment	6	1134.43	189.0717	1.097703^{ns}	2.66	4.01
Error	18	3100.373				
TOTAL	27	4922.213				

^{ns} – not significant CV = 13%

Appendix Table 5. Ear length (cm) of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	180.20	168.60	183.00	189.20	721.00	180.25[b]
IPBy449	167.30	191.10	157.20	157.20	672.80	168.20[b]
IPBHy546	154.20	163.20	173.10	173.10	663.60	165.90[b]
IPBHy6411	189.50	175.80	177.40	177.40	720.10	180.03[ab]
IPBHW60B	199.40	184.10	171.70	171.70	726.90	181.73[b]
IPBHW10W16	185.50	175.30	182.00	182.00	725.00	181.25[ab]
IPBvar6	177.90	192.40	217.20	217.20	804.50	201.13[a]
REP TOTAL	1254.00	1250.50	1268.00			
GRAND TOTAL				5033.90		
GRAND MEAN						179.78

ANALYSIS OF VARIANCE

SV	DF	SS	MS	Fc	F_{TAB} 5%	F_{TAB} 1%
Replication	3	26.12964	8.709881			
Treatment	6	3154.339	525.7231	3.119326*	2.6613	40.146
Error	18	3033.673	168.5374			
TOTAL	27	6214.141				

* - Significant

CV = 7.22%

Appendix Table 6. Ear diameter (cm) of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	4.48	5.07	4.85	5.54	19.94	4.99
IPBHy5449	5.19	5.45	5.08	5.29	21.01	5.25
IPBHy546	4.94	4.89	5.23	4.70	19.76	4.94
IPBHy6411	4.89	5.10	4.91	4.95	19.85	4.96
IPBHW60B	5.62	5.51	5.45	5.54	22.12	5.53
IPBHW10W16	5.43	5.17	5.25	5.29	21.14	5.29
IPBvar6	5.34	5.45	6.03	5.36	22.18	5.55
REP TOTAL	35.89	36.64	36.80	36.67		
GRAND TOTAL					146.00	
GRAND MEAN						5.22

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	F_{TAB} 5%	F_{TAB} 1%
Replication	3	0.072943	0.024314			
Treatment	6	1.626836	0.271139	4.311756**	2.66	4.01
Error	18	1.131907	0.062884			
TOTAL	27	2.831686				

** - Highly significant CV = 4.81%

Appendix Table 7. Number of kernel/row per ear of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	33.32	24.96	30.06	31.88	120.22	30.06
IPBHy449	35.85	28.93	34.58	33.84	133.20	33.30
IPBHy546	30.98	26.40	30.02	32.58	119.98	30.00
IPBHy6411	31.00	30.90	32.30	35.54	129.74	32.44
IPBHW60B	30.22	25.40	30.84	34.96	121.42	30.36
IPBHW10W16	26.34	29.74	30.09	32.66	118.83	29.71
IPBvar6	33.94	29.60	35.96	33.34	132.84	33.21
REP TOTAL	221.65	195.93	223.85	234.80		
GRAND TOTAL					876.23	
GRAND MEAN						31.29

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	F_{TAB} 5%	F_{TAB} 1%
Replication	3	116.056	38.6855			
Treatment	6	62.4727	10.4121	2.552167^{ns}	2.6	4.01
Error	18	73.4350	4.07972			
TOTAL	27	251.9645				

^{ns}- Not significant CV = 6.46%

Appendix Table 8. Number of corn ears harvested/plant of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	2	2	1	2	7	1.75
IPBHy449	2	2	2	2	8	2.00
IPBHy546	2	2	2	2	8	2.00
IPBHy6411	2	1	1	2	6	1.50
IPBHW60B	2	2	2	2	8	2.00
IPBHW10W16	2	2	2	2	8	2.00
IPBvar6	1	2	2	2	7	1.75
REP TOTAL	13	13	12	14		
GRAND TOTAL					52.00	
GRAND MEAN						1.86

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	F_{TAB}	
					5%	1%
Replication	3	0.28714	0.095238			
Treatment	6	0.928571	0.154762	1.258065^{ns}	2.6	4.01
Error	18	2.214286	0.123016			
TOTAL	27	3.428571				

^{ns}- Not significant CV = 18.86%

Appendix Table 9. Number of kernel row/ear of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	16	15	16	15	62	15.50
IPBHy449	14	13	15	15	57	14.25
IPBHy546	14	14	13	14	55	13.75
IPBHy6411	13	14	13	13	53	13.25
IPBHW60B	15	16	15	14	60	15.00
IPBHW10W16	16	16	15	15	62	15.50
IPBvar6	14	15	14	13	56	14.00
REP TOTAL	102.00	103.00	101.00	99.00		
GRAND TOTAL					405.00	
GRAND MEAN						14.46

ANALYSIS OF VARIANCE

SV	DF	SS	MS	Fc	F_{TAB} 5%	F_{TAB} 1%
Replication	3	1.25	0.416667			
Treatment	6	18.71429	3.119048	6.238095**	2.6613	40.146
Error	18	9	0.5			
TOTAL	27	28.96429				

ns-Not significant CV = 4.89%

Appendix Table 10. Weight of 1000 kernels/plot (g) of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	450.00	500.00	500.00	400.00	1850.00	462.50
IPBHy449	400.00	500.00	500.00	450.00	1850.00	462.50
IPBHy546	550.00	520.00	520.00	350.00	1940.00	485.00
IPBHy6411	550.00	450.00	520.00	330.00	1850.00	462.50
IPBHW60B	600.00	350.00	510.00	450.00	1910.00	477.50
IPBHW10W16	400.00	400.00	500.00	450.00	1750.00	437.50
IPBvar6	550.00	600.00	650.00	450.00	2250.00	562.50
REP TOTAL	3500.00	3320.00	3700.00	2880.00		
GRAND TOTAL					134.00	
GRAND MEAN						478.57

ANALYSIS OF VARIANCE

SV	DF	SS	MS	Fc	F_{TAB} 5%	F_{TAB} 1%
Replication	3	52400	17466.67			
Treatment	6	38192.86	6365.476	1.49288^{ns}	2.6613	40.146
Error	18	76750	4263.889			
TOTAL	27	167342.9				

^{ns} - Not significant CV = 13.64%

Appendix Table 11. Weight of marketable corn kernel per plot (kg/15m^2) of seven high lysine corn varieties

TREATMENT	REPLICATION I	II	III	IV	TOTAL	MEAN
IPBHy446	26.75	16.30	18.50	19.50	81.05	20.26[a]
IPBHy449	17.75	17.50	17.50	24.00	77.15	19.29[ab]
IPBHy546	20.50	16.00	14.50	17.60	68.60	17.15[abc]
IPBHy6411	15.50	19.05	17.60	11.47	63.62	15.91[abc]
IPBHW60B	14.10	13.08	12.80	17.50	57.48	14.37[bc]
IPBHW10W16	16.90	17.60	15.90	19.90	70.30	17.58[ab]
IPBvar6	10.50	13.90	15.00	8.80	48.20	12.05[c]
REP TOTAL	122.00	113.43	112.20	118.77		
GRAND TOTAL					466.40	
GRAND MEAN						16.66

ANALYSIS OF VARIANCE

SV	DF	SS	MS	FC	F_{TAB} 5%	F_{TAB} 1%
Replication	3	9.039686	3.013229			
Treatment	6	192.101	32.01684	3.162111*	2.6613	4.0146
Error	18	182.2527	10.12515			
TOTAL	27	383.3934				

* - Significant

Cv = 19.10%

Appendix Table 12. Weight of non-marketable corn kernel per plot (kg/15m^2) of seven high lysine corn varieties

TREATMENT	REPLICATION I	II	III	IV	TOTAL	MEAN
IPBHy446	2.50	2.50	2.00	2.60	9.60	2.40
IPBHy449	1.50	2.75	4.00	1.40	9.65	2.41
IPBHy546	2.50	3.00	3.50	2.00	11.00	2.75
IPBHy6411	2.00	1.40	2.20	6.20	11.80	2.95
IPBHW60B	3.40	4.60	2.00	1.50	11.50	2.88
IPBHW10W16	5.40	5.00	3.50	6.00	19.50	4.98
IPBvar6	3.20	2.75	2.50	2.75	11.20	2.80
REP TOTAL	20.50	22.00	19.70	22.45		
GRAND TOTAL					84.65	
MEAN TOTAL						3.02

ANALYISI OF VARIANCE

SV	DF	SS	MS	FC	F_{TAB} 5%	F_{TAB} 1%
Replication	3	0.705268	0.23089			
Treatment	6	18.89054	3.148423	1.937053^{ns}	2.6613	4.0146
Error	18	29.25661	1.625367			
TOTAL	27	48.85241				

^{ns} – Not significant Cv = 42.22%

Appendix Table 13. Total weight of corn kernel per plot(kg/15m$^{2)}$ of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	29.25	18.80	20.50	22.10	90.65	22.66[a]
IPBHy449	19.25	20.25	21.90	25.40	86.80	21.70[a]
IPBHy546	23.00	19.00	18.00	19.60	79.60	19.90[a]
IPBHy6411	17.50	20.45	19.80	17.67	75.42	18.86[ab]
IPBHW60B	17.50	17.68	16.30	23.50	74.98	18.75[ab]
IPBHW10W16	22.30	22.60	19.40	25.90	90.20	22.55[a]
IPBvar6	13.70	16/65	17.50	11.50	59.35	14.84[b]
REP TOTAL	142.50	135.43	133.40	145.67		
GRAND TOTAL					557.00	
GRAND MEAN						19.89

ANALYSIS OF VARIANCE

SV	DF	SS	MS	Fc	F_{TAB} 5%	F_{TAB} 1%
Replication	3	14.37054	4.790181			
Treatment	6	183.794	30.63234	3.304503*	2.6613	40.146
Error	18	166.8578	9.269878			
TOTAL	27	365.0224				

* - Significant CV = 15.31%

Appendix Table 14. Number of marketable ear/plot of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	94	76	63	75	308	77.00[a]
IPBHy449	63	64	57	90	274	68.40[ab]
IPBHy546	81	60	50	63	254	63.50[ab]
IPBHy6411	57	66	62	46	231	57.75[b]
IPBHW60B	46	39	36	46	167	41.75[c]
IPBHW10W16	55	55	55	69	234	58.50[b]
IPBvar6	37	37	39	31	144	36.00[c]
REP TOTAL	433	397	362	420		
GRAND TOTAL					1612.00	
GRAND MEAN						57.57

ANALYSIS OF VARIANCE

SV	DF	SS	MS	Fc	F_{TAB} 5%	F_{TAB} 1%
Replication	3	415.1429	138.381			
Treatment	6	4994.357	832.3929	8.785885**	2.6613	40.146
Error	18	170.357	94.74206			
TOTAL	27	7114.857				

** - Highly significant CV = 16.91%

Appendix Table 15. Number of non-marketable ear/plot of seven high lysine corn varieties

TREATMENT	REPLICATION I	II	III	IV	TOTAL	MEAN
IPBHy446	18	25	18	24	85	21.25
IPBHy449	16	27	25	15	83	20.75
IPBHy546	24	25	32	19	100	25.00
IPBHy6411	25	10	14	46	95	23.75
IPBHW60B	29	35	20	15	99	24.75
IPBHW10W16	46	41	26	42	155	38.75
IPBvar6	29	19	16	21	85	21.25
REP TOTAL	187	182	151	182		
GRAND TOTAL					702.00	
GRAND MEAN						25.07

ANALYSIS OF VARIANCE

SV	DF	SS	MS	FC	TABULAR F 5%	1%
Replication	3	116.7143	38.90476			
Treatment	6	947.3571	157.8929	1.933664^{ns}	2.6613	4.0146
Error	18	1469.786	81.65476			
TOTAL	27	2533.857				

^{ns} - Not significant CV = 36.04%

Appendix Table 16. Total number of Ear per plot(kg/15m^2) of seven high lysine corn varieties

TREATMENT	REPLICATION I	II	III	IV	TOTAL	MEAN
IPBHy446	112.00	105.00	76.00	96.00	389.00	97.25
IPBHy449	101.00	105.00	92.00	81.00	379.00	94.75
IPBHy546	81.00	85.00	75.00	111.00	352.00	88.00
IPBHy6411	99.00	82.00	74.00	66.00	321.00	80.025
IPBHW60B	79.00	82.00	56.00	56.00	273.00	68.25
IPBHW10W16	91.00	82.00	61.00	55.00	289.00	72.25
IPBvar6	82.00	76.00	101.00	52.00	311.00	77.75
REP TOTAL	645.00	617.00	535.00	517.00		
GRAND TOTAL					2314.00	
GRAND MEAN						82.64

ANALYSIS OF VARIANCE

SV	DF	SS	MS	FC	F_{TAB} 5%	F_{TAB} 1%
Replication	3	1654.143	551.381			
Treatment	6	2933.929	488.9881	1.536277^{ns}	2.6613	4.0146
Error	18	3470.357	192.7976			
TOTAL	27	8058.429				

^{ns} - Not significant CV = 16.80%

Appendix Table 17. Total yield per hectare of seven high lysine corn varieties

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
IPBHy446	94.00	76.00	63.00	75.00	308.00	77.00[a]
IPBHy449	63.00	64.00	57.00	90.00	274.00	68.40[ab]
IPBHy546	81.00	60.00	50.00	63.00	254.00	63.50[ab]
IPBHy6411	57.00	66.00	62.00	46.00	231.00	57.75[b]
IPBHW60B	46.00	39.00	36.00	46.00	167.00	41.75[c]
IPBHW10W16	55.00	55.00	55.00	69.00	234.00	58.50[b]
IPBvar6	37.00	37.00	39.00	31.00	144.00	36.00[c]
REP TOTAL	433.00	397.00	362.00	420.00		
GRAND TOTAL					1612.00	
GRAND MEAN						57.57

ANALYSIS OF VARIANCE

SV	DF	SS	MS	Fc	F_{TAB} 5%	F_{TAB} 1%
Replication	3	415.1429	138.381			
Treatment	6	4994.357	832.3929	8.785885**	2.6613	40.146
Error	18	170.357	94.74206			
TOTAL	27	7114.857				

** - Highly significant CV = 16.91%

Appendix Table 18. Gross income of seven high lysine corn varieties

TREATMENT	REPLICATION I	II	III	IV	TOTAL	MEAN
IPBHy446	535.00	326.00	270.00	390.00	1621.00	405.25[a]
IPBHy449	355.00	350.00	358.00	480.00	1543.00	385.75[ab]
IPBHy546	410.00	320.00	290.00	352.00	1372.00	343.00[abc]
IPBHy6411	310.00	381.00	352.00	229.00	1272.40	318.10[abc]
IPBHW60B	282.00	261.60	256.00	350.00	1149.60	287.40[bc]
IPBHW10W16	338.00	352.00	318.00	398.00	1406.00	351.50[ab]
IPBvar6	210.00	278.00	300.00	176.00	964.00	241.00[c]
REP TOTAL	2440.00	2268.60	2244.00	23375.40		
GRAND TOTAL					9328.00	
GRAND MEAN						333.14

ANALYSIS OF VARIANCE

SV	DF	SS	MS	FC	F_{TAB} 5%	1%
Replication	3	3615.874	1205.291			
Treatment	6	76840.41	12806.73	3.16211*	2.6613	4.0146
Error	18	72901.07	4050.059			
TOTAL	27	153357.3				

* - Significant Cv = 19.10%

Appendix Table 19. Net profit of seven high lysine corn varieties

TREATMENTS	REPLICATION I	II	III	IV	TOTAL	MEAN
IPBHy446	345.75	136.75	180.75	200.75	864.00	216.00[a]
IPBHy449	165.75	160.75	168.75	290.75	786.00	196.50[ab]
IPBHy546	220.75	130.75	100.75	162.75	615.00	153.75[abc]
IPBHy6411	120.75	191.75	162.75	40.15	515.40	128.85[abc]
IPBHW60B	92.75	72.35	66.75	160.75	392.60	98.15[bc]
IPBHW10W16	148.75	162.75	128..75	208.75	649.00	162.25[ab]
IPBvar6	20.75	88.75	110.75	13.25	207.00	51.75[c]
REP TOTAL	1115.25	943.85	919.25	1050.65		
GRAND TOTAL					4029.00	
GRAND MEAN						143.89

ANALYSIS OF VARIANCE

SV	DF	SS	MS	FC	F_{TAB} 5%	F_{TAB} 1%
Replication	3	3615.874	1205.291			
Treatment	6	76840.41	12806.73	3.162111[ns]	2.6613	4.0146
Error	18	72901.07	4050.059			
TOTAL	27	153357.3				

[ns] – Not significant

Cv = 44.23%

Table 20. Return on cash expense of seven high lysine corn varieties

TREATMENT	REPLICATION I	II	III	IV	TOTAL	MEAN
IPBHy446	182.69	72.26	95.51	106.08	456.54	114.14
IPBHy449	87.58	84.94	89.17	153.63	415.32	103.83
IPBHy546	116.64	69.09	53.24	86.00	324.97	81.24
IPBHy6411	63.80	101.32	86.00	21.22	272.34	68.09
IPBHW60B	49.01	38.23	35.27	84.94	207.45	51.86
IPBHW10W16	78.60	86.00	68.03	110.30	342.93	85.73
IPBvar6	10.96	46.90	58.52	-7.00	109.38	27.35
REP TOTAL	589.28	498.74	485.74	555.17		
GRAND TOTAL					2128.93	
GRAND MEAN						76.03

ANALYSIS OF VARIANCE

SV	DF	SS	MS	FC	F_{TAB} 5%	F_{TAB} 1%
Replication	3	1009.121	336.3736			
Treatment	6	21454.24	3575.707	3.16231*	2.6613	4.0146
Error	18	20353.07	1130.726			
TOTAL	27	42816.43				

* - Significant

Cv = 44.23%