BIBLIOGRAPHY

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ABSTRACT

The study was conducted to identify the best performing potato entries in terms of yield and resistance to pests and diseases; identify the potato entries which are best adapted at Loo, Buguias during the wet season; and to determine the profitability of potato entries under Loo, Buguias during wet season trial.

CIP 2.21.6.2 had the highest percentage survival. CIP 380241.17, PHIL 2.21.6.2, CIP 676070, PHIL 5.19.2.2 and CIP 573275 were observed as highly vigorous at 45 and 60 DAP. PHIL 2.21.6.2, CIP 380241.17 and PHIL 5.19.2.2 registered the widest canopy cover at 60 and 75 DAP. These entries were also highly resistant to late blight at 60 DAP.

CIP 380241.17 produced the highest yield and obtained a positive return on cash expense.

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INTRODUCTION

Potato (*Solanum tuberosum* L.) is the fourth most important food crop in the world after rice, wheat and maize. The potato production represents roughly half of the world's annual output of all roots and tubers. The crop is eaten by over one billion world wide. Potatoes are part of the diet of a half a billion consumers is developing countries (Burton, 1990).

Today, potato growers face many economic challenges including foreign competition, changes in consumers preferences, new environmental regulations, loss of crop protection chemicals, increased input costs, new pest and disease pressures as well as unpredictable growing conditions. These challenges resulted to the introduction of new varieties that should be evaluated to determine if they still need improvement to meet the changing demands of the industry and the consumers. Evaluating new varieties of potatoes will determine if the impact of these will be profitable and sustainable production for the grower. Varieties are released by both public and private breeders, that is marketed in particular regions and which varieties are chosen for use by farmers (Bolaguer, 2007).

In order to identify varieties that are adapted under Benguet condition, these must be evaluated in the key production areas and compared with the traditional varieties. The test of the new varieties from a range of sources under varying conditions offers the greatest probability of identifying superior varieties with improved pest resistance, higher yield and reduces production inputs.

The study aimed to:

1. identify the best performing potato entry based on yield and resistance to pests and diseases during wet season trial;

2. identify the potato entry that is best adapted under wet season trial at Loo, Buguias condition; and

3. determine the profitability of growing the different potato entries under wet season at Loo, Buguias.

The study was conducted from June to September 2008 at Loo, Buguias, Benguet.

REVIEW OF LITERATURE

Varietal Evaluation and Selection

PCARRD (1985) suggested that before planting, the first decision is to know the best variety that is adapted to the locality to have a profitable production. Excellent cultural management practices and favorable environmental factors may not compensate for a poor choice of variety. Using the right variety ensures high yield and better quality of produce.

The qualities of good stock of seed potatoes must be true to type free from possible insect pest and diseases and seed pieces should be properly stored. Varietal mixture and other undesirable variation will always give rise to mixed crop (PCARRD, 1985).

Accessions of Potato

Wild potatoes are important sources of genes for resistance to disease and insect pests. A collection of wild Mexican and South America, solanum species from the US potato Gene bank was evaluated under laboratory and/or field conditions for their reaction to late blight (*Phytophthora infestants*), Colorado Potato beetle (*CPB Leptinotarsa decemlineata*), and black leg (*Erwinia carotovora*) sub species *atroseptica* (Van Hall Dye) in order to identify individual genotypes with multiple resistance genes. Late blight inoculations using aggressive isolates (US-8/ AZ and VS-11/ A1 mating types) of *P. infestant* revealed a wide range of variation for resistance between and within the accession of the wild species tested. For late blight, susceptible as well as moderately to highly resistant genotypes were observed in all the species tested. However, at least one accession from the three Mexicans and South America wild diploid species tested

showed a relative uniform high level of resistance to potato infestants. These included *S. bulbacastanum, S. pinnatisectum, S. cardiophyllum and S. circaefolium*. Two accessions from South America species S. commersonii were highly susceptible to late blight. For the Colorado potato beetle test, only one species, *S. pinu atisectum* appeared uniformly resistant to CPB under field conditions. Results of screening for blackleg resistance showed that there were major differences between genotypes in the wild species (Sahajdak and Uznan's , 2003)

Potato Production

The Philippine imports about 15% of its total seed potato requirements in accordance with government regulation while 85% comes from domestic production. This means that the seed requirement of most potato farmer must be met by setting aside part of their crop for the succeeding on or by procuring planting from local sources.

In Benguet, Mountain Province and other areas, it has been observed that a great part of the seed potatoes produced locally are of poor quality, low varietal purity and are contaminated with seed-borne diseases. These are the main causes for the prevailing low yields in the growing areas.

To improve the situation, the government is encouraging the production of seed potatoes in appropriate areas in Benguet following the procedure and standards set by the Philippine-German Seed Potato Program and the seed potato certifying mechanism of the Philippine Potato Program.

Seed potato production is currently being undertaken by selected contract farmers in Benguet who enjoy a premium price for their produced. To participate, certain requirements have to be met, foremost of which is that the farmer must posses sufficient

experience and knowledge to be able to recognized and manage such factors as seed size and quality, soil fertility, plant density and plant nutrition, moisture supply, weed population and other cultural factors for optimum yield of quality seed potato (free from virus diseases and other limiting factors) prescribed by the seed certification scheme (PCARRD, 1982).

According to Tad-awan, *et al.* (2008), the following agro-ecological zones in Benguet: low mountain zone (1001 – 1500 m asl), mid-mountain zone (1501 -2000 m asl) and high mountain zone (above 2000 m asl) were all suited for potato production. In addition, Gonzales, *et al.* (2006), reported that before a clone will be released for variety, it should be conducted in three or more locations representing the low, mid and high elevation for wet and dry in order to obtain stable growth, yield and processing qualities.

As cited by Gayao, (1989) higher yields were obtained during dry season due to great solar radiation and canopy cover and lower late blight infection. Likewise Simongo, 2007 cited that the potato grows best with temperatures ranging from 17 to 22 ^{o}C and with average relative humidity requirement of 86%.

Beukema and Vander Zaag (1979) reported that light intensity used assimilation depends on the light available and the light intercepted by the green leaves. Furthermore, findings of Sano, (1980) revealed that large foliage develop before tuber initiation, the ultimate potential yield will be higher. Conversely, if small foliage has developed before tuber production, this results to lower tuber yield.

Harvesting

PCARRD (1982), reported further that the maturity period of potato vary depending on the variety and the conditions under which crop is grown in Benguet and Mountain Province are ready for harvest about 90 days after planting.

Losses in terms of quantity and quality can occur from the time the crop is harvested until it is finally used because of physical, physiological or pathological causes or combinations of these. A greater amount of the produce can reach the consumer if harvesting and subsequent handling are done correctly.

Gayao (1989) cited that, in order to attain the best yield of potato crop should be fully matured because the transfer of food to the leafy areas and stems to the tubers continues until the plants are dead or have dried up and fall to the ground.

MATERIALS AND METHODS

An area of 135 m^2 was thoroughly prepared and divided into three blocks. Each block was subdivided into 8 plots measuring 1m x 5 m. Double row planting was used. The experimental designed was laid-out following the randomized complete block design (RCBD).

The potato entries evaluated were:

Code	Entry	Place of Collection
E_1	PHIL 2.21.6.2	Philippines
E_2	PHIL 5.19.2.2	Philippines
E_3	CIP 380241.17	CIP
E_4	CIP 573275	CIP
E_5	CIP 676070	CIP
E_6	Ganza (check)	CIP
E_7	Granola (check)	CIP
E_8	Igorota (check)	Philippines

Pre-sprouted tubers acquired from the Northern Philippine Root Crops Research and Training Center, Benguet State University (NPRCRTC-BSU) were planted at 25 cm x 30 cm between hills and rows (Figure1).

Before planting, chicken dung was thoroughly mixed with the soil following the farmers practice at 1 can per plot during land preparation. Irrigation, fertilizer application, weeding and control of pest and diseases were strictly followed. Applications of fungicides and insecticides were stopped two weeks before the harvest.

Figure 1. Planting of the eight potato entries at Loo, Buguias

Data Gathered:

A. Meteorological data. Temperature and relative humidity were taken using a compact hygrometer. Rainfall was taken by placing cans in the field to collect water when precipitation occurs. The volume of water collected was measured using a beaker and was recorded by getting the volume of the water collected.

B. Vegetative characters

1. Percent survival. This was the number of plants that survived one month after planting and computed using the formula.

$$\% \text{ Survival} = \frac{\text{No. of plants survived}}{\text{Total number of plants planted}} \times 100$$

2. Plant vigor. This was taken at 30, 45, and 60 days after planting using the rating

scale by CIP (2004) as follows:

Scale	Description	Remarks
1	Plants strong with robust stems and leaves and light to dark green	Highly vigorous
2	Plants are moderately strong with robust stems and leaves are light green in color	Moderately vigorous
3	Better than Vigorous	Vigorous
4	Plants are weak with few thin stems and leaves are pale	Less vigorous
5	Plants are weak with few stems and leaves are very pale	Poor vigor

3. Canopy cover. This was taken at 30, 45, 60 and 75 days after planting (DAP) by using a wooden frame of 120 cm x 60 cm wide and with 12 cm x 6 cm grids.

4. Initial and final plant height (cm). Plant height was measured from the base to the tip of ten sample plants one month after planting and a week before harvesting.

5. Dry matter content (DMC). Fifty grams tubers were weighed per sample, sliced into cubes, and oven dried at 80 ^{o}C for 48 hours. This was recorded and computed using the following formula:

% Dry matter content (DMC) = 100% - %MC

Where:

$$\% \text{ Moisture Content (MC)} = \frac{\text{Fresh weight} - \text{Oven dry weight}}{\text{Fresh Weight}} \times 100$$

B. Yield and Yield Components

6. Number and weight of marketable tubers per plot (kg). Tubers were classified and weighed based on the following grading system:

a. Large tuber-weight of 90-99 grams

b. Big tubers-weight of 70-89 grams

c. Medium tubers-weight of 50-69 grams

d. Small tubers-weight of 20-49 grams

7. Number and weight of non-marketable tubers per plot (kg). This was obtained by counting and weighing all tubers that are malformed and damaged by insect and diseases.

8. Total yield per plot. The sum of the weight of marketable and non-marketable tubers was recorded.

9. Computed yield (t/ha). This was the computed yield by converting the yield per plot using the formula:

$$\text{Yield t ha}^{-1} = \frac{(\text{Total yield/plot} \times 10,000)/1000}{\text{Plot size (m}^2\text{)}}$$

C. Reaction to Leaf Miner and Late Blight

10. Reaction to Leaf miner. This was taken at 30, 45, 60 and 75 DAP and was rated using the scale of 1 – 5 (CIP, 2001).

Scale	Description	Remarks
1	Less than 20% of the plants per plot infested	Highly Resistant
2	21-40% of the plants per plot infested	Moderately resistant
3	41-60% of the plants per plot infested	Susceptible
4	61-80% of the plants per plot infested	Moderately susceptible
5	81 – 100% of the plants per plot infested	Very susceptible

11. Reaction to Late blight. This was observed and recorded at 30, 45, 60 and 75 DAP using the CIP scale (Henfling, 1987).

CIP scale value	Blight (%) Mean	limits	Symptoms
1	0		No late blight observable
2	2.5	Traces -< 5	Late blight present. Maximum 10 lesions per plant
3	10	5 -< 15	Plants look healthy, but lesions are easily seen at closer distance. Maximum foliage area affected by lesions or destroyed corresponds to more than 20 leaflets.
4	25	15 -< 35	Late blight easily seen on most plants. About 25% of foliages is covered with lesions or destroyed.
5	50	35 -< 65	Plot looks green; however, all plants are affected. Lower leaves are dead. About half the foliage area is destroyed.
6	75	65 -< 85	Plots look green with brown flecks. About 75% of each plant is affected. Leaves of the lower half of plants are destroyed.
7	90	85 -< 95	Plot neither predominantly green nor brown. Only top leaves are green. Many stems have large lesions.
8	97.5	95 -< 100	Plot is brown-colored. A few top leaves still have some green areas. Most stems have lesions or are dead.
9	100		All leaves and stems dead.

*The description of symptoms is based on plants with 4 stems and 10 to 12 leaves per stem.

12. Return on Cash Expense (ROCE). This was computed by dividing the net profit over the total cost of production multiplied by 100.

$$\text{ROCE} = \frac{\text{Net profit}}{\text{Total cost of production}} \times 100$$

Analysis of Data

All quantitative data was analyzed through the analysis of variance (ANOVA) for Randomized Complete Block Design (RCBD) with three replications. 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

Meteorological Data

Table 1 shows the meteorological data from July to September 2008 at Loo, Buguias, Benguet.

Air temperature (Cº). Temperature recorded from July to September 2008 ranges from 16 ^{o}C to 19 ^{o}C. The variability of the temperature during the conduct of the study might be due to the variable rainfall occurrence.

Rainfall Amount (ml). Rainfall amount was noted from July to September and the highest was recorded during the last week of August while the lowest was during the second week of September with a rainfall amount of 1.960 L and 0.070 L, respectively.

Relative Humidity (%). Highest relative humidity was observed during 1st week of September (81.5%) while the lowest was recorded during the 3rd week of July (62.20%) (Table 1).

Table 1. Rainfall, temperature and relative humidity during the conduct of the study from July to September 2008

MONTH	WEEK	AIR TEMP. (^{o}C)	RELATIVE HUMIDITY (%)	RAINFALL AMOUNT (L)
July	1	19	73.40	0.25
July	2	18	72.70	0.44
July	3	17	62.20	1.25
July	4	16	80.40	0.95
August	1	16	80.40	0.79
August	2	17	81.00	1.28
August	3	17	81.00	0.91
August	4	16	80.40	1.96
September	1	18	81.50	0.47
September	2	17	81.00	0.07
September	3	16	80.40	0.99
September	4	19	73.40	0.45

Percent Survival

Percent plant survival of the different entries of potato was not significant.

Plant Vigor

Significant differences were observed on the plant vigor of the eight potato entries evaluated. All the entries exhibited increasing vigor from 30 to 60 DAP except for Granola (Table 2). CIP 676070 and CIP 380241.17 had a comparable growth stand with the Ganza (check) with a rating of 3 (moderately vigorous) at 30 DAP while PHIL 5.19.2.2 had a poor growth stand. The check variety Granola was observed to have a decreasing plant stand from 30 to 60 DAP which might be due to early late blight infection at 45 DAP.

Canopy Cover

Significant differences were observed on the canopy cover of the different entries at 30, 45, 60, and 75 DAP. An increasing canopy cover was noted from 30 to 65 DAP in most of the entries except for the check variety Granola which had no canopy cover at 60 DAP.

At 75 DAP, PHIL 2.21.6.2, PHIL 5.19.2.2 and CIP 380241.17 had significantly the highest canopy cover but comparable with Igorota (Figure 2).

The decrease in the canopy cover in CIP 676070, CIP 573275, Ganza and Granola could be due to the high late blight infection caused by the high amount of rainfall during the conduct of the study.

Table 2. Percentage survival and plant vigor at 30, 45, and 60 DAP of the eight potato entries grown at Loo, Buguias

ENTRY	SURVIVAL (%)	PLANT VIGOR DAYS AFTER PLANTING		
		30	45	60
PHIL 2.21.6.2	100	2[c]	4[a]	5[a]
PHIL 5.19.2.2	95	1[d]	4[a]	5[a]
CIP 380241.17	98	3[b]	4[a]	5[a]
CIP 676070	98	3[b]	4[a]	5[a]
CIP 573275	98	2[c]	4[a]	5[a]
Ganza	100	3[b]	4[a]	5[a]
Granola	100	4[a]	3[b]	2[b]
Igorota	96	2[c]	4[a]	5[a]
CV (%)	3.26	19.58	5.32	24.36

*Means with the same letter are not significantly different at 5% level by DMRT.
Rating Scale: 1–very poor; 2– less vigorous; 3–moderately vigorous; 4-vigorous; 5 – Highly vigorous

Figure2 .Plant stand of the eight potato entries at 75 DAP

Table 3. Canopy cover at 30, 45, 60 and 75 days after planting of the eight potato entries grown at Loo, Buguias

ENTRY	CANOPY COVER DAYS AFTER PLANTING			
	30	45	60	75
PHIL 2.21.6.2	49[bc]	99[a]	100[a]	100[a]
PHIL 5.19.2.2	24[d]	45[d]	100[a]	100[a]
CIP 380241.17	75[a]	100[a]	100[a]	100[a]
CIP 676070	46[c]	86[ab]	100[a]	58[b]
CIP 573275	60[b]	100[a]	100[a]	61[b]
Ganza	61[b]	100[a]	100[a]	81[ab]
Granola	39[c]	60[cd]	-	-
Igorota	41[c]	72[bc]	100[a]	100[a]
CV (%)	14.56	11.04	0.23	22.35

*Means with the same letter are not significantly different at 5% level by DMRT.
- = no canopy cover

Plant Height

The potato entries had significant differences on the plant height at 30 and 90 DAP (Table 4). CIP 380241.17 significantly had the tallest plants of 282 cm but comparable with entry 2.21.6.2 (230 cm) followed by CIP 573275 (216 cm) which was also comparable with the check variety Granola and Ganza with respective initial plant height of 198 cm and 191 cm. The shortest plants were recorded from PHIL 5.19.2.2.

CIP 380241.17 significantly registered the tallest final plants (895 cm) outranking the check varieties Ganza and Granola but comparable with the check variety Igorota (890 cm). It was observed that most of the entries are tall at 90 DAP indicating that the

Table 4. Plant height at 30 and 90 DAP of the eight potato entries grown at Loo, Buguias

ENTRY	HEIGHT (cm)	
	INITIAL	FINAL
PHIL 2.21.6.2	230[ab]	820[ab]
PHIL 5.19.2.2	177[bc]	678[c]
CIP 380241.17	282[a]	895[a]
CIP 676070	64[d]	884[a]
CIP 573275	198[b]	370[d]
Granola	134[c]	721[bc]
Ganza	216[b]	756[bc]
Igorota	191[b]	890[a]
CV (%)	17.25	9.45

*Means with the same letter are not significantly different at 5% level by DMRT.

entries were affected by the long photoperiods. This growth pattern in most of the entries validated the observations of some farmers as reported by Simongo and Gayao (2006) that during wet season, variety Solibao had tall vegetative growth, longer maturity (120 days), susceptibility to late blight and lower yield.

Dry Matter Content

Results showed significant differences on the dry matter content of the entries grown at Loo, Buguias during the wet season trial. All the entries evaluated had high dry matter content ranging from 21 to 23 % which was comparable with the check varieties

Table 5. Dry matter content of the eight potato entries grown

ENTRY	DRY MATTER CONTENT (%)
PHIL 2.21.6.2	23[a]
PHIL 5.19.2.2	20[ab]
CIP 380241.17	21[a]
CIP 676070	22[a]
CIP 573275	23[a]
Ganza	21[a]
Granola	17[b]
Igorota	23a
CV (%)	9.84

*Means with the same letter are not significantly different at 5% level by DMRT

Igorota and Ganza. Granola produced the lowest dry matter content of tubers (17%). Results showed that the dry matter content of the eight potato entries was not affected by the adverse climatic conditions, maybe because dry matter content is attributed to its genetic characteristics. Results validated the findings of Rastovski (1981) that dry matter content is very important factor in potatoes, since it is mainly determined genetically and thus, depends on the variety.

Reaction to Leaf Miner and Late Blight

Leaf miner infestation and bacterial wilt infection were not observed during the evaluation period. This might be due to the continuous rainfall during the conduct of the study.

Reaction to Late Blight

Entries PHIL 2.21.6.2, CIP 380241.17 and PHIL 5.19.2.2 at 30 to 60 DAP showed high resistance to late blight which was comparable with the check variety Igorota as reflected by their ratings ranging from 1 to 3. At 75 DAP, most of the entries except 676070 were noted to be resistant to late blight. The check variety Granola had shown susceptibility to late blight infection at 60 and 75 DAP with 95 to 100% damage. Results indicate that some of the entries including the check variety Granola were susceptible to late blight while CIP 380241.17, PHIL 5.19.2.2 and PHIL 2.21.6.2 were resistant to the disease. Results corroborate with the findings of Gayao (1989) that development of late blight disease was apparently faster in susceptible cultivars than in resistant ones.

On the other hand the high infection of late blight on some of the entries might be attributed with the prevalent occurrence of rainfall during the conduct of the study. Ganga *et al*. (1987 and 1989) reported that late blight pressure was great during heavy rains and the disease was prevalent during the wet and cool season.

Table 6. Reaction to late blight incidence at 30, 45, 60 and 75 DAP of the eight potato entries

ENTRY	REACTION TO LATE BLIGHT DAYS AFTER PLANTING			
	30	45	60	75
PHIL 2.21.6.2	1	1	1	2
PHIL 5.19.2.2	1	1	2	2
CIP 380241.17	1	1	1	2
CIP 676070	2	2	3	6
CIP 573275	1	1	2	5
Ganza	1	1	2	5
Granola	3	4	8	8
Igorota	1	1	2	3

Rating Scale: 1 –highly resistant; 2 – 3 – resistant; 4 – 5 – moderately resistant
6 – 7 - moderately susceptible; 8 – 9 – susceptible

Number of Marketable and Non-Marketable Tubers

Table 7 shows that CIP 380241.17 produced the highest number of super extra large tubers (150) significantly out numbering the check varieties Granola and Igorota, however, comparable with PHIL 2.21.6.2 and the check variety Ganza with a means of 106 and 120, respectively.

No significant differences were noted on the extra big and big tubers of the different entries evaluated. On the number of marble tubers, PHIL 2.21.6.2 significantly produced the highest number of 58 tubers but comparable with cv Igorota (44), outnumbering the two check varieties Granola and Ganza.

There were no significant differences observed on the number of non-marketable tubers of the different entries evaluated. The variability on the number of tubers on the different entries could be associated with the genetic characteristics of the different entries.

Weight of Marketable and Non-marketable Tubers

Weight of marketable tubers and non-marketable tubers classified according to size at harvest are presented in Table 8 and Figure 3 and 4. Significant differences were observed among the potato entries for the weight of super-extra large, extra large and big tubers. Heaviest weights were observed in CIP 380241.17 (15.33 kg) for super - extra large, PHIL 5.19.2.2 (3.13 kg) and CIP 573275 (4.55kg) for extra large and CIP 573275 (1.20 kg), CIP 380241.17 (1.27 kg) and PHIL 2.21.6.2 (1.40kg). These entries were either significantly comparable or out yielding the check varieties. Marble-sized tubers and non-marketable did not show significant differences among the potato entries.

The variation observed among the size classification of the different entries was greatly affected by the genetic characteristics associated with the environmental factors. Earlier results showed that the initial, final height and late blight was greatly affected by the day length and rainfall, respectively while the performance of the vegetative growth also affects the yield of the different entries.

Table 7. Number of marketable and non – marketable tubers of eight potato entries at Loo, Buguias

ENTRY	NUMBER OF MARKETABLE TUBERS				NUMBER OF NON-MARKETABLE TUBERS
	SUPER EXTRA-LARGE	EXTRA BIG	BIG	MARBLE	
PHIL 2.21.6.2	106[ab]	65	53	58[a]	22
PHIL 5.19.2.2	39[c]	22	20	10[c]	7
CIP 380241.17	150[a]	50	27	18[bc]	9
CIP 676070	77[bc]	66	43	26[bc]	6
CIP 573275	89[bc]	107	35	28[bc]	24
Ganza	120[ab]	44	31	19[bc]	6
Granola	52[c]	40	40	34[b]	19
Igorota	43[c]	57	53	44[ab]	15
CV (%)	19.63	22.69	18.86	24.80	25.06

*Means with the same letter are not significantly different at 5% level by DMRT

Table 8. Weight of marketable and non-marketable tubers of eight potato entries

ENTRY	MARKETABLE TUBERS (Kg $5m^{-2}$)				NON-MARKETABLE TUBERS (Kg $5m^{-2}$)
	SUPER EXTRA-LARGE	EXTRA BIG	BIG	MARBLE	
PHIL 2.21.6.2	8.32^{bcd}	2.37^{bc}	1.40^{ab}	0.43	0.05
PHIL 5.19.2.2	4.47^{d}	3.13^{b}	0.75^{b}	0.33	0.10
CIP 380241.17	15.33^{a}	2.47^{bc}	1.27^{ab}	0.45	0.37
CIP 676070	7.03^{cd}	1.50^{bc}	0.93^{b}	0.35	0.55
CIP 573275	9.97^{bc}	4.55^{a}	1.20^{ab}	0.47	0.40
Ganza	12.81^{ab}	1.00^{c}	0.50^{b}	0.22	0.05
Granola	4.70^{d}	2.71^{bc}	2.13^{a}	0.80	0.4-0
Igorota	4.10^{d}	2.27^{bc}	0.93^{b}	0.27	0.22
CV (%)	15.60	14.06	13.46	13.97	13.87

*Means with the same letter are not significantly different at 5% level by DMRT

Figure 3. Harvesting of the eight potato entries grown at Loo, Buguias

2.21.6.2

5.19.2.2

380241.17

676070

573275

Ganza

Granola

Igorota

Figure 4. Tubers of potato entries

Total Yield (kg/5m^2) and Computed Yield (tons/ha)

Analysis revealed significant differences on the yield of the different entries of potato (Table 9). CIP 380241.17 produced the highest total yield with 19.65 kg as compared to the check varieties Granola (7.48) and Igorota (8.28). The rest of the entries had a total yield ranging from 6.18 to 16.18 kg which was either comparable or outranking the check varieties Granola (7.48 kg) and Igorota (8.28 kg).

On the computed marketable yield of the eight entries of potato, CIP 380241.17 had the highest marketable yield of 39.30 kg significantly out yielding the check varieties Granola and Igorota with 14.97 and 16.57 t ha^{-1}, respectively. The lowest was noted from PHIL 5.19.2.2 with computed yield of 12.37 t ha^{-1} which was comparable with the yield of the three check varieties.

Table 9. Total and computed yield of eight potato entries grown at Loo, Buguias

ENTRY	TOTAL YIELD (5 m^{-2})	COMPUTED YIELD (t ha^{-1})
PHIL 2.21.6.2	13.97^{bc}	27.93^{bc}
PHIL 5.19.2.2	6.18^{e}	12.37^{e}
CIP 380241.17	19.65^{a}	39.30^{a}
CIP 676070	11.23^{cd}	22.47^{cd}
CIP 573275	16.18^{ab}	32.37^{ab}
Granola	7.48^{de}	14.97^{de}
Ganza	16.08^{ab}	32.57^{ab}
Igorota	8.28^{de}	16.57^{de}
CV (%)	20.78	21.02

*Means with the same letter are not significantly different at 5% level by DMRT.

Return on Cash Expense

Only entry CIP 380241.17 had a positive return on cash expense while the rest of the different entries evaluated gave a negative return. The negative return on cash expense maybe attributed to the low yield and high late blight incidence. On the other hand, the vegetative growth of most entries was very tall which contributes to the increase volume of fungicides used attributing to the increased cost of production. Reports of Simongo and Gayao (2006) stated that the very tall vegetative growth harbored rodents, enhanced stem rot and breakage, and entailed higher labor and pesticide costs (Table 10).

Table 10. Return on cash expense of the eight potato entries grown at Loo, Buguias

ENTRY	COST OF PRODUC-TION (PhP)	MARKETABLE TUBERS (kg/5m^2)	GROSS SALE (PhP)	NET INCOME (PhP)	ROCE (%)
PHIL 2.21.6.2	510.00	12.52	375.60	-73.65	-14.44
PHIL 5.19.2.2	510.00	8.68	260.00	-249.60	-48.94
CIP 380241.17	510.00	19.52	585.60	75.60	14.82
CIP 676070	510.00	9.81	294.90	-215.70	-42.29
CIP 573275	510.00	10.34	310.20	-199.80	-39.14
Granola	510.00	14.53	435.90	-74.10	-14.53
Ganza	510.00	16.19	485.70	-24.30	-4.76
Igorota	510.00	7.27	227.10	-282.90	-55.47

* Total cost of production includes cost of planting materials, insecticides, fertilizers and labor.
* Selling price of potato tubers is based in PhP 30.00 per kilo

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The study was conducted to identify the best performing potato entry based on yield and resistance to pests and diseases; identify which entries are best adapted under wet season at Loo, Buguias and to determine the profitability of growing different potato entries under the wet season trial. The study was conducted at Loo, Buguias from July to September 2008.

CIP 380241.17, PHIL 2.21.6.2, PHIL 5.19.2.2, CIP 676070 and CIP 573275 were observed to have highly vigorous plant stand at 45 and 65 DAP. CIP 380241.17 and PHIL 5.19.2.2 had the widest canopy cover at 75 DAP while PHIL 2.21.6.2, CIP 380241.17 was moderately resistant to late blight at 75 DAP.

CIP 380241.17 produced the highest number, heaviest weight of marketable tubers and positive return on cash expense while the rest of the entries had negative return on cash expense. All the entries had high dry matter content.

Conclusion

The best performing potato entries are CIP 380241.17, CIP 5732.75 and PHIL 2.21.6.2 based on yield and resistance to late blight.

CIP 380241.17, PHIL 21.6.2.2 and PHIL 573275 are best adapted at Loo, Buguias as evidenced by its high yield, dry matter content and resistant to late blight.

In terms of profitability, CIP 380241.17 has positive return on cash expense while the rest have negative return.

Recommendation

CIP 380241.17, PHIL 2.21.6.2.2 and CIP 573275 could be recommended for wet season planting under Loo, Buguias condition.

There should be a continuous evaluation and selection of potato entries until a variety with stable performance will be recommended for wet season planting.

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APPENDICES

Appendix Table 1. Percent survival at 30 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	100	100	100	300	100
PHIL 5.19.2.2	93	98	95	286	95
CIP 380241.17	100	100	95	295	98
CIP 676070	95	100	100	295	98
CIP 573275	100	95	100	295	98
Granola	100	100	100	300	100
Ganza	100	100	100	300	100
Igorota	100	100	88	288	96
TOTAL	788	793	778	2359	98

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	14.583	7.292			
Treatment	7	68.292	9.756	0.95^{ns}	2.77	4.28
Error	14	144.083	10.292			
TOTAL	23	226.958				

^{ns}= Not significant Coefficient of Variation (%) = 3.26

Appendix Table 2a. Plant vigor at 30 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	4	2	2	8	3
PHIL 5.19.2.2	1	2	1	4	1
CIP 380241.17	3	3	3	9	3
CIP 676070	3	3	2	8	3
CIP 573275	2	2	3	7	4
Granola	2	4	3	9	3
Ganza	1	4	4	9	3
Igorota	2	3	2	7	2
TOTAL	18	23	20	61	3

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	1.083	0.542			
Treatment	7	13.167	1.881	7.35**	2.77	4.28
Error	14	3.583	0.256			
TOTAL	23	17.833				

**= Highly significant Coefficient of Variation (%) = 19.58

Appendix Table 2b. Plant vigor at 45 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	4	4	3	11	4
PHIL 5.19.2.2	4	4	4	12	4
CIP 380241.17	4	4	4	12	4
CIP 676070	4	4	4	12	4
CIP 573275	4	4	4	12	4
Granola	4	4	4	12	4
Ganza	3	3	3	9	3
Igorota	4	4	4	12	4
TOTAL	31	31	30	92	4

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	0.083	0.042			
Treatment	7	2.667	0.381	9.14**	2.77	4.28
Error	14	0.583	0.042			
TOTAL	23	3.333				

**= Highly significant Coefficient of Variation (%) = 5.32

Appendix Table 2c. Plant vigor at 60 DAP.

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	5	5	5	15	5
PHIL 5.19.2.2	5	5	5	15	5
CIP 380241.17	5	5	4	14	5
CIP 676070	5	5	4	14	5
CIP 573275	5	5	5	15	5
Granola	5	5	5	15	5
Ganza	2	2	2	6	2
Igorota	5	5	5	15	5
TOTAL	37	37	35	109	5

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	0.333	0.167			
Treatment	7	22.625	3.232	45.25**	2.77	4.28
Error	14	1.000	0.071			
TOTAL	23	23.958				

**= Highly significant Coefficient of Variation (%) = 5.88

Appendix Table 3a. Canopy cover at 30 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	59	45	44	148	74
PHIL 5.19.2.2	32	10	31	73	37
CIP 380241.17	75	75	77	227	76
CIP 676070	54	50	33	137	69
CIP 573275	60	65	33	158	79
Granola	67	67	49	183	61
Ganza	40	40	37	117	39
Igorota	49	42	33	124	62
TOTAL	436	394	337	1167	62

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	362.333	181.167			
Treatment	7	5277.833	753.976	14.47**	2.77	4.28
Error	14	729.667	52.119			
TOTAL	23	6369.833				

**= Highly significant Coefficient of Variation (%) = 14.56

Appendix Table 3b. Canopy cover at 45 DAP.

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	100	100	97	297	99
PHIL 5.19.2.2	47	23	65	135	45
CIP 380241.17	100	100	100	300	100
CIP 676070	96	85	79	260	87
CIP 573275	100	100	100	300	100
Granola	100	100	100	300	100
Ganza	58	63	59	180	60
Igorota	68	81	66	215	72
TOTAL	669	652	666	1987	83

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	20.583	10.292			
Treatment	7	9712.625	1387.518	16.62**	2.77	4.28
Error	14	1168.750	83.482			
TOTAL	23	10901.958				

**= Highly significant Coefficient of Variation (%) = 0.23

Appendix Table 3c. Canopy cover at 60 DAP.

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	100	100	100	300	100
PHIL 5.19.2.2	100	100	100	300	100
CIP 380241.17	100	100	100	300	100
CIP 676070	100	100	100	300	100
CIP 573275	100	100	100	300	100
Granola	100	100	100	300	100
Ganza	0	0	0	0	0
Igorota	100	100	100	300	100
TOTAL	700	700	700	2100	100

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	0.083	0.042			
Treatment	7	26225.292	3746.470	89915.28**	2.77	4.28
Error	14	0.583	0.042			
TOTAL	23	26225.958				

**= Highly significant Coefficient of Variation (%) = 0.23

Appendix Table 3d. Canopy cover at 75 DAP.

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	100	100	100	300	100
PHIL 5.19.2.2	100	100	100	300	100
CIP 380241.17	100	100	100	300	100
CIP 676070	100	90	23	173	58
CIP 573275	50	100	34	184	61
Granola	100	80	63	243	81
Ganza	0	0	0	0	0
Igorota	100	100	100	300	100
TOTAL	650	670	520	1800	75

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	1425.000	712.500			
Treatment	7	25944.667	3706.381	13.36**	2.77	4.28
Error	14	3884.333	277.452			
TOTAL	23	31254.000				

**= Highly significant Coefficient of Variation (%) = 19.58

Appendix Table 4a. Initial Plant height at 30 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	285	224.5	180	180	689.5
PHIL 5.19.2.2	76.5	39	77.5	77.5	193
CIP 380241.17	338	223.5	284	284	845.5
CIP 676070	211	168	151	151	530
CIP 573275	256	167	226	226	649
Granola	217.6	169	186	186	572.6
Ganza	254	190	150	150	594
Igorota	146	175	80	80	401
TOTAL	1784.1	1356	1334.5	559.3	1784.1

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	16078.001	8039.001			
Treatment	7	89460.872	12780.125	12.36**	2.77	4.28
Error	14	14477.006	1034.072			
TOTAL	23	120015.859				

**=Highly significant Coefficient of Variation (%) = 17.25

Appendix Table 4 b. Final Height at 75 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	881.6	882.5	694.4	2458.5	819.5
PHIL 5.19.2.2	881.5	827.3	943.5	2652.3	884.1
CIP 380241.17	885.6	859.7	938.5	2683.8	1341.9
CIP 676070	725.6	729.6	579.5	2034.7	678.2
CIP 573275	742.6	679.5	844.4	2266.5	755.5
Granola	856.6	854.4	958.4	2669.4	889.8
Ganza	254	190	150	150	594
Igorota	735.5	746.4	682.5	2164.4	721.5
TOTAL	5745.38	5939.7	6028.3	17713.4	794

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	25189.801	12594.901			
Treatment	7	96957.138	13851.020	7.60**	2.77	4.28
Error	14	25197.740	1799.839			
TOTAL	23	147344.740				

** =Highly significant Coefficient of Variation (%) = 9.45

Appendix Table 5a. Late blight incidence at 30 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	1	1	1	3	1
PHIL 5.19.2.2	1	1	1	3	1
CIP 380241.17	1	1	2	4	1
CIP 676070	2	2	2	6	2
CIP 573275	1	1	2	4	1
Granola	1	2	2	5	2
Ganza	3	3	3	9	3
Igorota	1	2	1	4	1
TOTAL	11	13	14	38	2

Appendix Table 5b. Late blight incidence at 45 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	1	1	1	3	1
PHIL 5.19.2.2	1	1	1	3	1
CIP 380241.17	1	1	2	4	1
CIP 676070	3	2	2	7	2
CIP 573275	1	1	2	4	1
Granola	1	2	2	5	2
Ganza	3	4	5	12	4
Igorota	1	2	1	4	1
TOTAL	12	14	16	33	2

Appendix Table 5c. Late blight incidence at 60 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	1	1	1	3	1
PHIL 5.19.2.2	1	1	1	3	1
CIP 380241.17	1	1	2	4	1
CIP 676070	3	3	3	9	3
CIP 573275	2	1	3	6	2
Granola	2	3	2	7	2
Ganza	8	8	8	24	8
Igorota	2	3	2	7	2
TOTAL	20	21	22	63	3

Appendix Table 5d. Late blight incidence at 75 DAP

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	2	2	2	6	2
PHIL 5.19.2.2	1	1	3	5	2
CIP 380241.17	1	2	3	6	2
CIP 676070	6	4	7	17	6
CIP 573275	7	1	6	14	5
Granola	2	7	7	16	5
Ganza	8	8	8	24	8
Igorota	3	3	4	10	3
TOTAL	30	28	40	98	4

Appendix Table 6. Number of super extra-large tubers per plot

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	140	79	100	319	106
PHIL 5.19.2.2	53	21	43	117	39
CIP 380241.17	126	171	154	456	150
CIP 676070	104	50	76	230	77
CIP 573275	138	93	35	266	89
Granola	164	109	88	361	120
Ganza	78	34	43	155	52
Igorota	21	30	77	128	43
TOTAL	824	587	616	2032	85

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	4178.083	2089.042			
Treatment	7	33215.292	4745.042	5.50**	2.77	4.28
Error	14	12072.583	862.327			
TOTAL	23	49465.958				

**= Highly significant Coefficient of Variation (%) = 19.63

Appendix Table 7. Number of extra large tubers per plot

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	81	56	59	196	65
PHIL 5.19.2.2	23	24	18	65	22
CIP 380241.17	47	30	74	151	50
CIP 676070	89	54	54	197	66
CIP 573275	41	106	175	322	107
Granola	42	52	39	133	44
Ganza	33	55	33	121	40
Igorota	36	83	52	111	57
TOTAL	392	460	504	1296	56

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	796.000	398.000			
Treatment	7	13221.333	1888.762	2.21^{ns}	2.77	4.28
Error	14	11936.667	852.619			
TOTAL	23	25954.000				

^{ns}= Not significant Coefficient of Variation (%) = 22.69

Appendix Table 8. Number of big tubers per plot

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	66	74	20	160	53
PHIL 5.19.2.2	21	12	28	61	20
CIP 380241.17	45	21	16	82	27
CIP 676070	50	44	34	128	43
CIP 573275	37	35	33	105	35
Granola	31	31	31	93	31
Ganza	40	40	39	199	40
Igorota	81	56	22	159	53
TOTAL	371	313	223	987	38

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	1390.333	695.167			
Treatment	7	2904.625	414.946	2.07^{ns}	2.77	4.28
Error	14	2811.000	200.786			
TOTAL	23	7105.958				

^{ns}= Not significant Coefficient of Variation (%) = 18.56

Appendix Table 9. Number of marble tubers per plot

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	52	51	70	137	58
PHIL 5.19.2.2	6	15	10	31	10
CIP 380241.17	11	31	12	54	18
CIP 676070	28	33	18	79	26
CIP 573275	13	41	30	84	28
Granola	16	21	20	57	19
Ganza	21	40	41	102	34
Igorota	65	12	55	132	44
TOTAL	212	244	256	676	30

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	129.333	64.667			
Treatment	7	4937.333	705.333	3.57*	2.77	4.28
Error	14	2762.667	197.333			
TOTAL	23	7829.333				

*= Significant Coefficient of Variation (%) = 24.80

Appendix Table 10. Number of non-marketable tubers per plot

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	26	25	15	66	22
PHIL 5.19.2.2	0	16	5	21	7
CIP 380241.17	14	6	7	27	9
CIP 676070	3	11	4	18	6
CIP 573275	23	26	26	72	24
Granola	3	1	16	20	7
Ganza	16	40	2	58	19
Igorota	3	11	12	46	15
TOTAL	88	136	87	328	14

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	153.583	76.792			
Treatment	7	1155.333	165.048	2.07^{ns}	2.77	4.28
Error	14	1114.417	79.601			
TOTAL	23	2423.333				

^{ns}= Not significant Coefficient of Variation (%) = 21.71

Appendix Table 11. Total number of marketable tubers kg/5m^2

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	339	260	249	848	283
PHIL 5.19.2.2	103	72	102	277	92
CIP 380241.17	119	253	256	628	209
CIP 676070	271	181	182	272	91
CIP 573275	229	275	273	777	259
Granola	253	213	178	644	215
Ganza	156	169	156	484	161
Igorota	203	181	206	590	197
TOTAL	1673	1604	1602	4520	188

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	408.583	204.292			
Treatment	7	71506.292	10215.185	5.24**	2.77	4.28
Error	14	27272.083	1948.006			
TOTAL	23	99186.958				

**= Highly significant Coefficient of Variation (%) = 21.71

Appendix Table 12. Weight of super extra-large tubers per plot (kg)

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	11.75	5.50	7.70	24.95	8.32
PHIL 5.19.2.2	6.10	2.10	5.20	13.40	6.70
CIP 380241.17	14.50	13.00	18.50	46.00	15.33
CIP 676070	10.25	5.00	5.85	21.10	7.03
CIP 573275	17.30	7.10	5.50	29.90	14.95
Granola	15.25	12.20	11.00	38.45	12.82
Ganza	7.95	2.75	2.340	13.04	4.35
Igorota	2.50	2.80	7.00	12.30	4.10
TOTAL	85.60	50.45	63.09	199.14	9.20

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	79.471	39.236			
Treatment	7	358.598	51.228	6.98**	2.77	4.28
Error	14	102.749	7.339			
TOTAL	23	539.813				

**= Highly significant Coefficient of Variation (%) = 15.60

Appendix Table 13. Weight of extra large tubers per plot (kg)

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	3.95	2.20	2.00	8.15	4.08
PHIL 5.19.2.2	1.10	1.10	0.80	3.00	1.50
CIP 380241.17	2.30	3.30	3.80	9.40	4.70
CIP 676070	1.50	3.10	2.50	7.10	3.55
CIP 573275	3.00	3.85	6.80	13.65	6.83
Granola	2.00	2.90	1.90	6.80	3.40
Ganza	1.40	1.85	1.25	4.50	2.25
Igorota	1.90	3.40	2.10	7.40	3.70
TOTAL	17.15	21.70	21.15	60.00	3.75

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	1.542	0.771			
Treatment	7	23.922	3.417	3.58*	2.77	4.28
Error	14	13.376	0.955			
TOTAL	23	14.06				

*= Significant Coefficient of Variation (%) = 14.06

Appendix Table 14. Weight of big tubers per plot (kg)

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	1.70	1.80	2.90	6.40	2.13
PHIL 5.19.2.2	0.70	0.30	0.50	1.50	0.50
CIP 380241.17	1.05	0.80	0.40	2.25	0.75
CIP 676070	1.70	1.50	1.00	4.20	1.40
CIP 573275	2.25	0.80	0.55	3.60	1.20
Granola	0.90	1.10	0.80	2.80	0.93
Ganza	1.00	0.80	1.00	2.80	0.93
Igorota	2.30	0.90	0.60	3.80	1.27
TOTAL	11.6	8.00	7.75	27.35	1.14

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	1.160	0.580			
Treatment	7	5.163	0.738	2.80*	2.77	4.28
Error	14	3.686	0.263			
TOTAL	23	10.010				

*= Significant Coefficient of Variation (%) = 13.46

Appendix Table 15. Weight of marble tubers per plot (kg)

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	1.10	0.30	1.00	2.40	0.80
PHIL 5.19.2.2	0.20	0.30	0.15	0.65	0.22
CIP 380241.17	0.20	0.65	0.15	1.00	0.33
CIP 676070	0.50	0.50	0.30	1.30	0.43
CIP 573275	0.30	0.70	0.50	1.50	0.50
Granola	0.20	0.40	0.20	0.80	0.27
Ganza	0.20	0.35	0.50	1.05	0.35
Igorota	0.65	0.10	0.60	1.35	0.45
TOTAL	3.35	3.30	3.40	10.05	0.42

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	0.001	0.001			
Treatment	7	0.674	0.096	1.42^{ns}	2.77	4.28
Error	14	0.952	0.068			
TOTAL	23	1.627				

^{ns}= Not significant Coefficient of Variation (%) = 13.97

Appendix Table 16. Weight of non-marketable tubers per plot (kg)

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	0.10	0.20	0.90	1.20	0.40
PHIL 5.19.2.2	0.00	0.10	0.05	0.15	0.05
CIP 380241.17	0.20	0.05	0.05	0.30	0.10
CIP 676070	0.05	0.05	0.05	0.15	0.05
CIP 573275	0.30	0.100	0.20	0.60	0.20
Granola	0.05	0.05	0.10	0.20	0.07
Ganza	1.05	0.50	0.10	1.65	0.55
Igorota	0.20	0.45	0.45	1.10	0.37
TOTAL	1.95	1.50	1.90	5.35	0.22

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	0.051	0.025			
Treatment	7	0.695	0.099	1.41^{ns}	2.77	4.28
Error	14	0.987	0.071			
TOTAL	23	1.733				

^{ns}= Not significant Coefficient of Variation (%) = 28.63

Appendix Table 16. Total weight of marketable tubers per plot (kg)

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	18.50	9.80	13.60	41.90	13.97
PHIL 5.19.2.2	8.10	3.80	6.65	18.55	6.18
CIP 380241.17	18.25	17.80	22.90	58.95	19.65
CIP 676070	13.25	10.10	9.65	33.00	11.00
CIP 573275	22.75	12.45	13.35	48.55	16.18
Granola	18.25	16.60	13.90	48.75	16.25
Ganza	10.55	5.75	6.15	22.45	7.48
Igorota	7.35	7.20	10.30	24.85	8.28
TOTAL	117.00	83.50	96.50	297.00	12.38

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	77.361	38.680			
Treatment	7	492.072	70.296	10.62**	2.77	4.28
Error	14	92.671	6.619			
TOTAL	23	662.103				

**= Highly significant Coefficient of Variation (%) = 20.78

Appendix Table 17. Computed yield T ha^{-1}

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	37.0	19.6	27.2	83.80	27.93
PHIL 5.19.2.2	16.0	7.6	13.3	36.90	12.30
CIP 380241.17	36.5	35.6	15.8	87.90	29.30
CIP 676070	27.9	20.2	19.3	67.40	22.47
CIP 573275	45.5	24.9	26.7	97.10	32.37
Granola	36.7	33.2	27.8	97.70	32.57
Ganza	21.1	11.5	12.3	44.90	14.97
Igorota	14.7	14.4	20.6	49.70	16.57
TOTAL	235.40	167.00	163.00	565.40	23.56

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	299.963	149.932			
Treatment	7	1986.467	283.781	10.43**	2.77	4.28
Error	14	380.823	27.202			
TOTAL	23	2667.153				

**= Highly significant Coefficient of Variation (%) = 21.02

Appendix Table 18. Dry matter content of potato entries

ENTRY	BLOCK			TOTAL	MEAN
	I	II	III		
PHIL 2.21.6.2	24	26	20	70	23
PHIL 5.19.2.2	20	20	20	60	20
CIP 380241.17	22	22	20	64	21
CIP 676070	22	24	20	66	22
CIP 573275	22	22	25	69	23
Granola	24	18	20	62	21
Ganza	17	17	16	50	17
Igorota	20	24	24	68	23
TOTAL	171	173	165	509	21

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05	0.01
Block	2	4.333	2.1674			
Treatment	7	98.625	14.089	3.23*	2.77	4.28
Error	14	61.00	4.357			
TOTAL	23	163.958				

*= Significant Coefficient of Variation (%) = 9.84