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LABI, NEILMAR A. October 2012. Growth and Yield of Potato Varieties Applied with Goat Manure and Sunflower Leaves in Guinaoang, Mankayan, Benguet. Benguet State University, La Trinidad Benguet.

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ABSTRACT

The study was conducted at Guinaoang, Mankayan, Benguet from October2011to February 2012. The study was conducted to determine the growth and yield of potato varieties applied with goat manure and sunflower compost; identify the best potato variety based on growth; yield and resistance to pest and diseases; and determine the profitability of potato entries applied with goat manure and sunflower leaves.

The results revealed that the potato varieties showed significant differences in terms of plant height, canopy cover, number of marketable and non-marketable tubers, weight of marketable and non-marketable tubers, total yield per plot and computed yield per hectare.

Potato varieties Montańosa and Bengueta produced the highest yield and ROCE despite their low resistance to late blight and leaf miner.

INTRODUCTION

The potato (*Solanum tuberosum* L.) is a tuberous plant grown in many countries as an annual agronomic crop (Sonac News, 2008). Potato is also a staple food in the diet of the world's population, thus affirming the need to focus world attention on the role that the potato can play in providing food security and eradicating poverty (FAO, 2008).

Potato production in Benguet is mainly conventional which involves the use of synthetic fertilizers that are readily available in the market. These fertilizers are also believed to be more effective on the plant growth. However, using these fertilizers often may cause problems such as soil acidity, soil pollution and gradual depletion of the soil nutrients (TACC, 2009).

The use of goat manure and sunflower leaves can be a real asset in alleviating the problem in soil degradation. In the naturally dry, pellet state, goat manure can be easily handled, stored or directly applied in potato as fertilizer and to increase water holding capacity of the soil. Unlike chicken manure, goat manure do not normally attract flies or serve as breeding sites for maggots. Goat manure added with sunflower leaves are also high in ammonia that may result to larger plant fruits (Haenlein, 1992).

Thus, studying the effect of goat manure and sunflower leaves on the growth and development of potato could be the best alternative to the use of inorganic fertilizers.

The objectives of the study were to:

1. determine the growth and yield of potato varieties applied with goat manure and sunflower leaves;

2. identify the best potato variety based on growth, yield and resistance to pest and diseases; and

3. determine the profitability of potato entries applied with goat manure and sunflower leaves.

This study was conducted at Guinaoang, Mankayan, Benguet from November 2011 to October 2012.

REVIEW OF LITERATURE

Climatic and Soil Requirement

The potato has a wide range of soil adaptation for optimum yield, deep well drained or a sandy loam soil with pH of 5.5 to 6.0 is required. A fertile soil rich in organic matter is essential for good growth. Average temperature ranges between 15 °C to 18°C (PCARRD, 1979) but also grows best at temperature of 17°C to 22°C (NPRCRTC, 1998).

A fertile soil rich in organic materials is essential for good growth of potato. Maximum yields are normally obtained when the average temperature throughout the growing seasons ranges between 15°C to 18°C. A cool night temperature appears to be most important than cool day time temperature. High temperature during the day reduces yield (PCARRD, 1985).

Varietal Evaluation

Singh (1999) stated that the proposed standard variety selection in organic farming is to be adapted locally in the area. The selected variety must be resistant to pest and diseases so that the crop planted produces high yield. However, organic farmers need the varieties that are adapted to specific soil fertility condition. To some production circumstances, varieties that do not perform well in organic system have different yielding ranks. In selecting the right variety that the farmers must also consider the consumers requirement, supermarket requirement and the variety maturity in order to achieve the best production needed.

Organic Farming

Organic farming encompasses all agricultural systems that promote environmentally, socially and economically sound production of food and fibers. These systems take soil fertility as a key to successful production. It aims to optimize quality in all aspects of agriculture and environment. Organic farming reduces external inputs by avoiding from the use of chemo – synthetic fertilizers, pesticides and pharmaceuticals (PCARRD, 2006).

Benefits of Goat Manure

For gardening, goat manure can be a real asset. In their naturally dry, pellet state, goat feces are easily handled, stored or directly applied on vegetables, trees, and flower gardens, as mulch, organic matter, fertilizer, or just to increase the water holding capacity of the soil; and goat feces do not normally attract flies or breed maggots. A daily raking or sweeping of the goat yard keeps the goats clean and free from parasites; and the garden will soon show its appreciation (Haenlein, 1992).

Benefits of Using Organic Fertilizers

According to Newsome (2009), organic fertilizers add the nutrients to the soil that plant used to be more productive; these vital nutrients include phosphorus, nitrogen and potassium. These nutrients allow the plant to grow larger, blooming flowers and larger fruits. Not only does the quality increased, but so do the quantity allowing the grower to harvest more and better fruits and flowers. Plants receiving the proper amounts of nutrients potassium grow tougher cell walls and coarser vegetation. This makes them much more resistant to pest and diseases. Plants receiving enough phosphorus, water more efficiently, allows them to survive cold and dry spells. Organic fertilizers have positive effects on all

types of soil. Loosen soils such as sand, are held together better by a strong root system that promotes nitrogen. In this case, the fertilizer helps the plants grow stronger and also helps slow erosion. Soils that is denser and harder to penetrate, such as clay may be loosened up by similar as root structure. In this case, the soil becomes more easily markable for farming and also more oxygenated to promote synthesis. Organic fertilizer releases their nutrients slowly and consistently. Organic fertilizer keeps plant growing healthy and productive longer into the season despite changing weather and soil temperature. Organic fertilizer breakdown slowly, which means they need to be applied much less frequently than other types of fertilizer.

Organic Production practices maximize the use and recycling of a farm nutrients sources, including animal manure and green manures. Techniques such as accurate soil analysis and nutrients crediting help producers. Avoidance of excess fertilizer applications for sustainable farming methods includes building and conserving practices such as adding management (NSAI, 2005).

Effect of Organic Fertilizer to Soil Fertility

Soil organic matter has a variable effect on available water in soil. It is generally a positive relationship but soil properties, notably texture. One experiment, for example found organic matter to influence available water only in soils of medium to low clay content (Ohio State University, 2004).

MATERIALS AND METHODS

Land Preparation

An area of 280 m^2 was thoroughly prepared and divided into three blocks, which corresponds to three replications (Figure 1). Each block contains eight plots measuring 1m x 10m. A mixture of five kilograms and ten kilograms of goat manure and sunflower leaves and stems were applied as basal fertilizers in the entire area (Figure 2). The planting of potato tubers was done one week after fertilizer application while hilling up was done 25 days after planting. The potato seed tubers bearing 2-3 sprouts with 2-3 cm length were planted in double rows at a distance of 30 cm x 30 cm between hills and rows at 6 cm depth. The other cultural practices in potato organic production was undertaken from planting to maturity.

The different potato varieties which served as treatments were:

CODE	VARIETY	SOURCES
T_1	Watwat	NPRCRTC
T_2	Granola	Farmer
T_3	Gloria	Farmer
T_4	PO_3	Farmer
T_5	Bengueta	NPRCRTC
T_6	Montanosa	NPRCRTC
T_7	Ganza	Farmer
T_8	Raniag	Farmer

Figure 1. Land preparation during the conduct of the study

Figure 2. Application of dried sunflower leaves before planting

Data gathered

1. Meteorological data. Temperature, relative humidity, rainfall and light intensity were taken using a compact digital psychrometer and light meter. Rainfall was taken by placing 2 cans of 16 liters capacity in the field and measured using a graduated cylinder. Rainfall amount was obtained by getting the average volume of water from the 2 cans.

2. Soil Chemical Properties. Soil sample was taken from the experimental area before and right after harvest. The organic matter, nitrogen, phosphorous and potassium content of the soil and pH were analyzed at the Soils Laboratory Department of Agriculture, City of San Fernando, La Union.

3. Plant survival (%). The number of plants that survived were counted at 30 days after planting (DAP) and computed using the formula:

$$\% \text{ Plant Survival} = \frac{\text{Number of Plant Survived}}{\text{Total number of plants planted}} \times 100$$

4. Initial height. This was taken one month after planting (DAP). The plant height was measured from the base of the plant at ground level to the tip of ten sample plants.

5. Final height. This was taken at 60 days after planting (DAP) from the base to the tip of ten sample plants.

6. Canopy cover. This was obtained at 30, 45, and 60 days after planting using a wooden frame which measured 120cm x 60cm having equal-size grids.

7. Plant vigor. This was recorded at 30, 45, and 60 days after planting (DAP) using the CIP rating scale (Gonzales *et al*., 2004).

Scale	Description	Remarks
1	Plants are weak with few stem and leaves; very pale	Poor vigor
2	Plants are weak with few thin stems and leaves pale	Less vigorous
3	Better than less vigorous	Moderate vigorous
4	Plants are moderately strong with robust stems and leaves:	Vigorous
5	Plants are strong with robust stem and leaves; Leaves are light to dark green color	highly vigorous

8. Leaf miner incidence. The reaction of leaf miner was recorded at 30, 45, and 60 days DAP using the following rating scale of 1- 5 (CIP, 2000).

Scale	Description	Remarks
1	Leaf Infested (1-20%)	Highly Resistant
2	Infested (21-40%)	Moderately Resistant
3	Moderately Infested (41-60%)	Susceptible
4	Severely Infested (61-80%)	Moderately Susceptible
5	Most Serious (81-100%)	Very Susceptible

9. Late blight incidence. Rating was done at 30, 45, and 60 DAP using the CIP rating scales by Henfling, 1987:

% Blight	CIP	Description of Corresponding Symptoms
0	1	No late blight observed
Traces-<5	2	Late blight present maximum 10 lesions per plot
5-<15	3	Plant look, healthy but lesions are easily seen at closer distance. Maximum foliage is one affected by lesions or destroyed corresponds to more than 2 leaflets.
15->35	4	Late blight is easily seen on most plants. About 25% of foliage is covered with lesions.
35->65	5	Treatments look green; however all plants are affected leaves are dead. About half the foliage are destroyed.
65-<85	6	Treatments look green with brown flecks. About 75% of each plant is affected. Leaves of the lower half of the plants are destroyed.
85->95	7	Treatments are neither predominantly green Nor brown. Only top leaves are green. Many have larger lesions.
95-< 100	8	Treatments are brown-colored. A few top leaves still have green areas. Most stems have lesions or are dead.
95-< 100	9	All leaves and stems are dead.

Description: 1 = Highly resistant: 2-3 = Resistant; 4-5 = Moderately resistant; 6-7 = Moderately Susceptible; 8-9 = Susceptible

10. Number and weight of marketable tubers per plot (kg). All the different sizes of tubers that were not malformed, free from cracks, cuts and have no more than 10% greening of the total surface were counted and weighed.

11. Number and weight of non marketable tubers per plot (kg). This was obtained by counting and weighing all the tubers that were malformed, cracked and damaged by insects and diseases.

12. Total yield per plot (kg). This was the sum of the weight of both marketable and non marketable tubers taken at harvest.

13. Computed Yield (t/ha). This was computed using the formula:

$$\text{Yield (t/ha)} = \frac{\text{Total Yield per Plot}}{10\ m^2 / 1000 m^2} \times 10,000 m$$

14. Return on Cash Expense (ROCE). This was computed using the formula:

$$\text{ROCE} = \frac{\text{Gross Sales} - \text{Total Expenses}}{\text{Total Cost of Production}} \times 100$$

Data Analysis

All quantitative data were analyzed using the Analysis of Variance for the Randomized Complete Block Design (RCBD) with three replications. The significance and differences among treatment means were 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 November 2011 to January 2012 at Guinaoang, Mankayan, Benguet. During the conduct of the study, the minimum and maximum temperatures ranged from 19.5°C to 23.4°C. The lowest relative humidity was noted in the month of November at 76% while the highest was noted in the month of December at 78%. A little rainfall of 1832 ml was noted during the month of January thus irrigation was imployed while a high amount of rainfall at 3349 ml was noted during the month of November. The lowest light intensity was noted in the month of January at 2232 foot candle while the highest was noted in the month of November at 2693 foot candle.

According to HARRDEC (1996), potato grows best in areas with a temperature ranging from 17°C to 22°C and a relative humidity of 86%. Temperature is important in potato plants because it enhances the accumulation of carbohydrates and dry matter in the tubers.

Table 1. Meteorological data during the conduct of the study from November 2011 to January 2012

MONTHS	TEMPERATURE (°C)			RELATIVE HUMIDITY (%)	RAINFALL (ml)	LIGHT INTENSITY (foot candle)
	MIN	MAX	AVE.			
November	20.4	23.6	22	76	3349	2693
December	16.3	22.7	19.5	78	3161	2357
January	20.2	26.6	23.4	75.3	1832	2232

Soil Chemical Analysis

The soil, before it was applied with goat manure and chopped sunflower leaves, had a medium texture with a ph of 6.0, 2.0% organic matter, 0.1% nitrogen, 299 and 174 parts per million potassium and phosphorous, respectively. After harvesting, the soil texture, ph, organic matter and nitrogen were consistent while the phosphorous decreased from 299 to 181 parts per million and potassium increased from 174 to 311 parts per million. The consistent amount of organic matter after harvesting could imply that the organic matter in the soil was replaced by the fertilizers used. Goat manure and sunflower leaves have relatively high organic matter (Haenlein, 1992). The reduced phosphorous content of the soil could be attributed to crop utilization while the increase in potassium could be due to the applied goat manure and sunflower leaves.

Percent Survival

The percent survival of all the potato varieties applied with goat manure and chopped sunflower leaves shows no significant differences. Plant survival ranged from 98% to 100% (Table 3).

Table 2. Soil analysis before and after the study of potato varieties applied with goat manure and sunflower leaves

	SOIL TEXTURE	pH	OM (%)	N (%)	P ppm	K ppm
Before Planting	Medium	6	2	0.1	299	174
After Harvesting	Medium	6	2	0.1	181	311

Analyzed by the Department of Agriculture, City of San Fernando, La Union.

Plant Height

Table 3 shows the plant height of all the potato varieties applied with goat manure and sunflower leaves. At 30 and 60 DAP, variety Gloria was the tallest (44 cm) while the shortest was variety Ganza. The result could be attributed more on the genotypic traits of the varieties.

Table 3. Plant survival and plant height of the different potato varieties applied with goat manure and sunflower leaves

VARIETY	PERCENT SURVIVAL	PLANT HEIGHT (cm)	
		30 DAP	60 DAP
Watwat	100.00	29.00^{cd}	33.00^{cd}
Granola	98.44	26.68^{dc}	29.67^{de}
Gloria	100.00	36.33^{a}	44.00^{a}
PO3	98.44	27.67^{cde}	36.00^{bc}
Bengueta	100.00	31.67^{bc}	36.00^{bc}
Montańosa	100.00	31.00^{bcd}	35.67^{bc}
Ganza	99.48	24.33^{e}	27.33^{e}
Raniag	100.00	35.33^{ab}	39.00^{b}
CV%	0.90%	7.94%	7.48%

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

Plant Vigor

As shown in Table 4 at 30 DAP, the varieties are highly vigorous and vigorous where plants are moderately strong to strong with robust stem and leaves. At 45 DAP, varieties were rated moderately vigorous while at 60 DAP, plants have poor vigor. The decrease in vigor was attributed to late blight infection wherein plants are susceptible at 60 DAP except for variety Gloria which is moderately susceptible.

Table 4. Plant vigor of potato varieties applied with goat manure and sunflower leaves

VARIETY	PLANT VIGOR RATING		
	30 DAP	45 DAP	60 DAP
Watwat	Highly Vigorous	Moderately Vigorous	Poor Vigor
Granola	Vigorous	Less Vigorous	Poor Vigor
Gloria	Highly Vigorous	Vigorous	Less Vigorous
PO3	Vigorous	Less Vigorous	Poor Vigor
Bengueta	Highly Vigorous	Moderately Vigorous	Poor Vigor
Montańosa	Highly Vigorous	Moderately Vigorous	Poor Vigor
Ganza	Vigorous	Moderately Vigorous	Poor Vigor
Raniag	Vigorous	Moderately Vigorous	Poor Vigor

Canopy Cover

Table 5 shows the canopy cover of all the different potato varieties applied with goat manure and sunflower leaves. Statistically, significant differences were observed in all the different treatments. Consistently, Gloria had the widest canopy cover at 30 to 60 DAP attributed to high plant vigor rating (41.33). Comparable canopy cover was observed in variety Bengueta (36.67) at 30 DAP. The narrowest canopy cover was noted in varieties Ganza and Granola.

Generally, the decrease in canopy cover in potato varieties at 60 DAP is may be due to their susceptibility to late blight and leaf miner that affects also the plant vigor.

Table 5. Canopy cover of potato varieties applied with goat manure and sunflower leaves

VARIETY	CANOPY COVER		
	30 DAP	45 DAP	60 DAP
Watwat	35.33^{bc}	37.33^{b}	12.67^{e}
Granola	32.00^{cd}	27.33^{c}	9.33^{f}
Gloria	41.33^{a}	43.33^{a}	31.33^{a}
PO3	34.33^{bcd}	31.00^{c}	12.33^{e}
Bengueta	36.67^{ab}	39.00^{b}	20.33^{b}
Montańosa	36.00^{bc}	37.67^{b}	16.00^{c}
Ganza	30.00^{d}	27.33^{c}	10.00^{f}
Raniag	32.33^{cd}	29.00^{c}	14.33^{d}
CV%	6.77%	6.40%	5.78%

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

Reaction to Leaf Miner Incidence

Table 6 shows the reaction of potato plants to leaf miner incidence at 30, 45 and 60 DAP. At 30 DAP, all the potato varieties were highly resistant to leaf miner but at 45 and 60 DAP, all the plants were rated moderately resistant and susceptible, respectively. The high resistance of the plants at 30 DAP may be attributed to the low occurrence of the insects. As commonly observed, insect population increases with high temperature. Low temperature was recorded in December but high temperature was noted in January (60 DAP) that contribute to the reaction of the different potato varieties to the leaf miner incidence.

Table 6. Reaction to leaf miner of potato varieties applied with goat manure and sunflower leaves

VARIETY	REACTION LEAF MINER INCIDENCE		
	30 DAP	45 DAP	60 DAP
Watwat	Highly Resistant	Moderately Resistant	Susceptible
Granola	Highly Resistant	Moderately Resistant	Susceptible
Gloria	Highly Resistant	Moderately Resistant	Moderately Resistant
PO3	Highly Resistant	Moderately Resistant	Susceptible
Bengueta	Highly Resistant	Moderately Resistant	Susceptible
Montańosa	Highly Resistant	Moderately Resistant	Susceptible
Ganza	Highly Resistant	Moderately Resistant	Susceptible
Raniag	Highly Resistant	Moderately Resistant	Susceptible

Reaction to Late Blight Infection

Most of the varieties were resistant to late blight except Ganza which was moderately resistant at 30 DAP. At 45 DAP, all the treatments were moderately susceptible to potato late blight. At 60DAP, all the treatments became susceptible to late blight due to low light intensity, rainfall and unfavorable relative humidity that favor the incidence of the disease.

Table 7. Reaction to late blight incidence of potato varieties applied with goat manure and sunflower leaves

VARIETY	REACTION TO LATE BLIGHT INFECTION		
	30 DAP	45 DAP	60 DAP
Watwat	Resistant	Moderately Susceptible	Susceptible
Granola	Resistant	Moderately Susceptible	Susceptible
Gloria	Resistant	Moderately Resistant	Moderately Susceptible
PO3	Resistant	Moderately Susceptible	Susceptible
Bengueta	Resistant	Moderately Susceptible	Susceptible
Montańosa	Resistant	Moderately Susceptible	Susceptible
Ganza	Moderately resistant	Moderately Susceptible	Susceptible
Raniag	Resistant	Moderately Susceptible	Susceptible

Number of Marketable and Non-marketable Tubers

No significant differences were observed on the number of marketable potato tubers applied with goat manure and sunflower leaves (Table 8). Numerically, Montańosa and Bengueta obtained the most numerous marketable tubers of 298 and 272, respectively (Figure 3 and 4). Granola had the least number of non-marketable tubers. The low yield was attributed to the severe late blight damage and leaf miner infestation on the plant foliage.

Table 8. Number of marketable and non-marketable tubers of potato varieties applied with goat manure and sunflower leaves

VARIETY	MARKETABLE TUBERS (per $10m^2$)	NON-MARKETABLE TUBERS (per $10m^2$)
Watwat	158	30
Granola	21	10
Gloria	123	33
PO3	70	23
Bengueta	272	13
Montańosa	298	24
Ganza	23	14
Raniag	71	26
CV%	42.14%	33.32%

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

Figure 3. Harvesting of the different potato varieties

Watwat

Granola

Gloria

PO3

Bengueta

Montańosa

Ganza

Raniag

Figure 4. Marketable and non-marketable tubers of the different potato varieties harvested

Weight of Marketable and Non-marketable Tubers

Significant differences were observed on the weight of marketable potato tubers as presented in Table 9. Varieties Bengueta, Watwat, Montańosa and Gloria obtained the heaviest marketable tubers of 3.95 kg, 3.77 kg, 2.92 kg and 3.09 kg, respectively (Figure 4). The lowest yield was obtained from Granola and Ganza varieties due to low plant vigor and susceptibility to pest.

No significant differences were observed on the weight of non-marketable tubers in all the potato plants applied with goat manure and sunflower leaves.

Table 9. Weight of marketable and non-marketable tubers of potato varieties applied with goat manure and sunflower leaves

TREATMENTS	MARKETABLE TUBERS (kg/10m^2)	NON-MARKETABLE TUBERS (kg/10m^2)
Watwat	2.92[a]	0.42
Granola	0.42[b]	0.18
Gloria	3.09[a]	0.59
PO3	1.97[ab]	0.54
Bengueta	3.95[a]	0.22
Montańosa	3.77[a]	0.46
Ganza	0.25[b]	0.24
Raniag	1.86[ab]	2.26
CV%	25.88%	35.43%

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

Total and Computed Yield

Significant differences were observed on the total and computed yield of the different potato varieties (Table 10). The highest total and computed yield were obtained from varieties Montańosa and Bengueta which was comparable with variety Gloria. The lowest yield was obtained from Ganza.

Table 10. Total and computed yield of potato varieties applied with goat manure and sunflower leaves

VARIETY	TOTAL YIELD ($kg/10m^2$)	COMPUTED YIELD (t/ha)
Watwat	3.337^{b}	3.337^{b}
Granola	0.603^{b}	0.603^{b}
Gloria	3.690^{ab}	3.690^{ab}
PO3	2.597^{c}	2.597^{c}
Bengueta	4.163^{a}	4.163^{a}
Montańosa	4.230^{a}	4.230^{a}
Ganza	0.463^{d}	0.463^{d}
Raniag	2.137^{c}	2.137^{c}
CV%	13.16%	13.16%

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

Return on Cash Expenses

As shown in Table 11, the highest return on cash expenses was obtained from variety Bengueta (34.48%) followed by Montańosa (27.83%) and Gloria (9.55%). The other potato varieties obtained negative returns on cash expenses due to high cost of production and low production of marketable tubers as affected by the susceptibility to leaf miner and late blight.

Table 11. Return on cash expense of the potato tubers obtained from the different varieties applied with goat manure and sunflower leaves

VARIETY	COST OF PRODUCTION[1] (Php)	MARKETABLE (kg/30m^2)	GROSS SALE[2] (Php)	NET INCOME (Php)	ROCE (%)
Watwat	115.00	8.76	113.50	-1.50	-1.3
Granola	110.00	1.26	16.00	-94.00	-85.45
Gloria	110.00	9.26	120.00	10.50	9.55
PO3	110.00	5.91	76.50	-33.50	-30.45
Bengueta	115.00	11.84	154.00	38.50	34.48
Montańosa	115.00	11.32	147.00	32.00	27.83
Ganza	110.00	0.74	9.50	-100.50	-91.36
Raniag	110.00	5.36	69.50	-40.50	-36.82

[1] Total cost of production includes the labor, planting materials and fertilizers.
[2] The average selling price was 13.00 pesos per kilogram of mixed sizes.

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted at Guinaoang, Mankayan, Benguet from November 2011to January 2012. The study determined the growth and yield of potato varieties applied with goat manure and sunflower compost; identified the best potato variety based on growth; yield and resistance to leaf miner and late blight and determined the profitability of potato entries applied with goat manure and sunflower leaves.

The results show that the varieties applied with goat manure and sunflower leaves had significant differences in terms of plant height, canopy cover, weight of marketable tubers, total yield per plot and computed yield per hectare. However, no significant differences were observed on plant survival, plant vigor, reaction to late blight infection and leaf miner incidence, number of marketable and non-marketable tubers, and the weight of non-marketable tubers. Furthermore, variety Bengueta realized the highest return on cash expense.

Conclusion

Potato varieties Montańosa and Bengueta produced the highest yield and realized the higher ROCE. All of the varieties were susceptible to late blight and leaf miner at 60 DAP.

Recommendation

Based on the results, production of potato varieties Montańosa and Bengueta could be recommended in Guinaoang, Mankayan, Benguet.

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