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Comparative study on yield of different varieties of potato (*Solanum tuberosum* L.) in Manipur condition

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Abstract

A field experiment entitled “Comparative study on yield of different varieties of potato (*Solanum tuberosum* L.) in Manipur condition” was conducted during *rabi* season of 2014-15 at the Research Farm of College of Agriculture, Central Agricultural University, Imphal, Manipur. The treatment consists of Kufri Jyoti (T₁), Kufri Kanchan (T₂), Kufri Himalini (T₃), *Aberchaibi* (T₄), Kufri Giridhari (T₅) and Kufri Shailja (T₆) with four replications under Randomized Block design. Observations on yield parameters such as number of tubers per plant, fresh weight of tubers per plant (g), tuber yields (q/ha) and Harvest index (%) were recorded for testing the significance of variance of the different treatments. The number of tubers per plant was significantly higher in Kufri Kanchan (T₂), which was recorded 10.86 followed by Kufri Jyoti (T₁) which was recorded 10.49 at the time of harvesting. The highest fresh weight of tubers per plant was observed in Kufri Kanchan (130.86 and 264.15) and followed by Kufri Jyoti (121.39 and 248.70) and Kufri (110.88 and 235.35) at 60 and 90 DAS respectively. Among these varieties highest yield was obtained from Kufri Kanchan (176.10 q/ha) and the highest harvest index was recorded in Kufri Jyoti with a value of 65.94%.

Keywords: Comparative, yield, varieties and potato

Introduction

Potato (*Solanum tuberosum* L.) is the fourth most important food crop in the World after rice, wheat and maize in terms of human consumption. More than a billion people Worldwide consume potatoes and its global total crop production exceeds 300 billion tonnes. Potato seems to have evolved through geographical and ecological isolation. While the cultivated species were at one time confined to Andes of South America and the lowlands of Southern Chile, adapted to the cool temperature climates of these regions. Potato is well adapted to temperate regions but it can also be cultivated successfully under sub-tropical areas. It thrives best under short day condition coupled with abundant sunshine and cool nights.

In Manipur area, production and productivity of potato recorded 1.7 ha, 15.2 tonnes and 89.4 q/ha respectively (Anonymous, 2010) [2]. The productivity of potato in Manipur region is very low compared to national productivity of potato. This may be due to high cost of cultivation, high input of seeds and chemical fertilizers and use of less yielding variety etc. For reducing the costs of cultivation of many potato growers are using high yielding varieties. But no systemic work has been done to determine the suitable variety for a particular region which has a great impact on the yield of the crop.

Though, during the recent past the productivity of potato in India has registered noticeable increase but can this level be sustained or enhanced in future, is a matter of concern today. Knowledge of the past trends in area, production and productivity will aid the planners in deciding the growth rates to be achieved in accordance with the planned targets. Besides these, trends in area, production and productivity provide basis for country as a whole. An attempt has also been made to evaluate the mean yield and yield variability with respect to potato in these states of India and to assess the relative contribution of area and yield on growth production of potato in these states.

Materials and Methods

The field experiment was conducted during *rabi* season of 2014-15 at the Research Farm of College of Agriculture, Central Agricultural University, Imphal situated at about 24°46' N latitude and 93°54' E longitude and an altitude of about 760 metres above Mean Sea Level. The experimental field was acidic in reaction, high in organic carbon (1.20%), medium in

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available nitrogen (282.53 kg/ha), medium in available P₂O₅ (18.55 kg/ha) and medium in K₂O (125.69 kg/ha). The treatment consist of six treatments such as Kufri Jyoti (T₁), Kufri Kanchan (T₂), Kufri Himalini (T₃), *Aberchaibi* (T₄), Kufri Giridhari (T₅) and Kufri Shailja (T₆) with four replications under Randomized Block design. During the period of sowing season of 2013-2014, minimum temperature was found to be 6.2 °C in the month of January and maximum temperature 28.5 °C in the month of March. In the following year i.e 2014-2015, during the crop season, minimum temperature was found to be 4.6 °C in the month of January and maximum temperature of 30.5 °C was recorded in the month of April.

Results and Discussion

Comparison on yield parameters of potato varieties

Number of tubers per plant

The maximum number of tubers per plant was in Kufri Kanchan (T₂) which was recorded 10.86 followed by Kufri Jyoti (T₁). The minimum number of tubers per plant was in Kufri Himalini (T₃) which was recorded 8.45. The difference in number of tubers per plant was influenced by their genetical factors.

Table 1: Comparison on number of tubers per plant among the varieties

Treatments	Number of tubers per plant
Kufri Jyoti (T ₁)	10.49
Kufri Kanchan (T ₂)	10.86
Kufri Himalini (T ₃)	8.45
<i>Aberchaibi</i> (T ₄)	9.28
Kufri Giridhari (T ₅)	9.98
Kufri Shailja (T ₆)	8.99
S.E(d)(±)	0.13
CD _(p=0.05)	0.28

Fresh weight of tubers per plant (g)

The maximum fresh weight tuber per plant (g) was found in Kufri Kanchan (T₂) followed by Kufri Jyoti (T₁) and Kufri Giridhari (T₅) respectively at 60 and 90 DAS. The minimum weight of tubers per plant was observed in *Aberchaibi* (T₄) which produced only 82.84 to 145.05 at 60 and 90 DAS. This might be due to better growth with more number of leaves per plant of the crop when planted with bigger tuber seed along with their genetic factors. The more numbers of leaves might increase photosynthetic activity to promote reserve food materials in the tubers. Similar observations were reported by Singh *et al.* (2003) [6] and Gulluoglu and Arioglu (2009) [4].

Table 2: Comparison among the varieties on fresh weight tubers per plant (g) at different days interval

Treatments	60 DAS	90 DAS
Kufri Jyoti (T ₁)	121.39	248.70
Kufri Kanchan (T ₂)	130.86	264.15
Kufri Himalini (T ₃)	95.68	201.45
<i>Aberchaibi</i> (T ₄)	82.84	145.05
Kufri Giridhari (T ₅)	110.88	235.35
Kufri Shailja (T ₆)	105.82	205.05
S.E(d)(±)	1.32	2.68
CD _(p=0.05)	2.81	5.71

Tuber yields (q/ha)

The maximum yield was obtained from Kufri Kanchan (176.10 q/ha) followed by Kufri Jyoti (165.80q/ha), Kufri

Giridhari (156.90 q/ha), Kufri Shailja (136.70 q/ha) and Kufri Himalini (134.30 q/ha) respectively, which indicated that the yield produced was highly significant. Minimum tuber yield was recorded in *Aberchaibi* variety, which produced only 96.70 q/ha. The seed tuber size of Kufri Kanchan was bigger than *Aberchaibi* variety and its genetic factors. This the reason why *Aberchaibi* variety gave minimum yield compare to other varieties. Similar observations were reported by Khalafalla (2001) [5], Gray (1972) [3] and Al-Hadini and Qasawi (1989) [1]. Gulluoglu and Arioglu (2009) [4] also reported the tuber yields (per plant and per hectare) of early potato were significantly affected by seed size. Both tuber yields per plant and per hectare consistently increased with increasing seed size.

Table 3: Comparison on tuber yield (q/ha) and Harvest index (%) among the varieties

Treatments	Yield (q/ha)	Harvest index (%)
Kufri Jyoti (T ₁)	165.80	65.94
Kufri Kanchan (T ₂)	176.10	64.09
Kufri Himalini (T ₃)	134.30	55.92
<i>Aberchaibi</i> (T ₄)	96.70	58.90
Kufri Giridhari (T ₅)	156.90	62.99
Kufri Shailja (T ₆)	136.70	60.90
S.E(d)(±)	1.78	0.79
CD _(p=0.05)	3.80	1.69

Harvest index (%)

Harvest index was recorded in Kufri Jyoti with a value of 65.94% followed by Kufri Kanchan (64.05%), Kufri Giridhari (62.99%), Kufri Shailja (60.90%) and *Aberchaibi* (58.90%) respectively. The lowest harvest index was observed in Kufri Himalini, which was only 55.92%. The harvest index influenced by the production of biomass and tuber yield per plant.

Conclusion

On the basis of results from the present investigation, it can be concluded the growth and development increased significantly with Kufri Giridhari due to its genetic factors. The tuber yield per hectare increased in Kufri Kanchan as the seed size was bigger, however, the tubers yield per hectare decreased as the smaller size tuber variety *Aberchaibi*.

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