Response of Seedling Tuber Size and Level of Potash on Growth and Yield of Clonal Progeny of True Potato Seed under Chitwan Condition

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ABSTRACT

A field investigation was carried out during winter season of 2007/08 in the upland of Horticulture Farm of Institute of the Agriculture and Animal Science, Rampur, Chitwan, Nepal to evaluate the effect of seedling tuber size and level of potash on ware potato production of a clonal progeny of hybrid TPS, HPS II/67. The experiment was laid out in a completely randomized block design having two factors with sixteen treatment combinations replicated thrice. The treatment comprised of four seedling tuber size (<5 g, 5-10 g, 10-15 g and >15 g) and four level of potash (30 kg K_2O/ha, 60 kg K_2O/ha, 90 kg K_2O/ha and 120 kg K_2O/ha). Different sizes of seedling tuber and level of potash significantly affected emergence, growth, yield and yield attributing characters. Growth parameters like plant height, number of stem per hill, stem diameter, number of leaves per plant were found to be influenced significantly due to variation in seedling tuber size and level of potash. Most of the growth parameters increased with an increase in seeding tuber size and level of potash. An increase in the level of potash increases the crop's resistance power against late blight and also helps in earlier tuber initiation. The highest tuber yield (1.36 kg) per plant was obtained in treatment combination of >15g seedling tuber size and 120kg K_2O/ha. Increasing the size of seedling tuber and level of potash increases the yield of different classes of tuber. However, potash is responsible for increasing the tuber size. The maximum tuber yield was obtained when 10-15 g seedling tuber was used as a planting material and 120 kg K_2O/ha applied. Similarly, the treatment in combination of 10-15 g seedling tuber size and 120 kg K_2O/ha was found most effective that gave the highest potato yield (30.03 mt/ha).

Key words: Seedling tuber size, Level of potash, Clonal progeny of potato

INTRODUCTION

Potato (*Solanum tuberosum* L.) ranks 6th position in terms of total cultivated area, 4th position in terms of production and 1st position in terms of productivity (APP, 1995). According to ABPD (2006) the area under potato is 1, 50,864 ha and total production is 19, 74,755 mt with an average productivity of 13.090 mt/ha. Out of the total area under potato, approximately 18% is in high hills, 42% in mid hills and 40% in terai area. The potato crop is grown in all seasons over a wide range of agro-ecological zones ranging from 70 masl to 4000 masl. Besides these, potatoes are also cultivated at other times of the year in areas where growing conditions are favorable, such as monsoon planting in the dry high hills and autumn planting in Kathmandu valley.

It is cultivated as winter crop in tropical and subtropical region and as summer crops in the temperate region of Nepal (Dhakal, 2002). It is staple food in high hills where as it is a major vegetable crop in hills and plains. About 730 million people are unable to obtain enough calories to lead a fully productive life. Potato could make a major contribution in improving world health and productivity (FAO, 1997). Potato provides significant amount of protein, vitamin, carbohydrates and iron. Increased production

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and productivity of potato may create local employment for men and women and market for agribusiness promotion. Based on all these factors, Agricultural Perspective Plan (APP, 1995) of Nepal has identified potato as the priority crop.

In Nepal, True Potato Seed (TPS) technology was started since 1978 but research activities geared up only after 1985. The area under TPS is 6,000 ha, which is 4 % of total land occupied by potato. The productivity of potato from TPS is about 25 mt/ha while from traditional methods it is only 11 mt/ha (NPDP, 2006). Poudel (1996) reported that the valuable traits of hybrid TPS can be utilized to increase the national productivity of potato. The tuberlets produced by applying seed plot techniques are valuable source of tuber seed. Still the productivity of this crop in Nepal is very low as compared to neighboring country. Unavailability of quality planting materials, lack of suitable high yielding varieties, lack of varietal resistance to incidence of late blight, low and declining soil fertility and poor adoption of improve management practices, poor transportation facility, higher cost of seed tuber and viral degeneration of the seed tubers are main causes of low productivity of potato (PDS, 1998).

TPS an alternate seed source for potato production technology, is cost effective and equally or more productive as compared to traditional method of potato production (Singh, 1988). Tuberlets are produced directly from botanical seed and are thus free from the degenerative diseases (Khaurana and Pandita, 1989). It has gained significance because unlike seed tubers, TPS can be produced in all parts of the country according to climatic condition and season. It can be easily stored over long periods of time. Disease transmission by TPS is negligible and it provides cheap planting material.

TPS, as hybrid progeny, needs specific agronomical requirements such as seed rate, spacing, tuber size, fertilizer dose other than conventional clonal verities for better production. Therefore, the standardization of adequate agronomical practices suited in our own conditions is needed for raising commercial crop. Investigation regarding size of seedling tubers and level of potash may be right approach towards this direction. Keeping above points in view, the present study was designed to find out the appropriate seedling tuber size and level of potash in potato production.

MATERIALS AND METHODS

The experiment was carried out at the Institute of Agriculture and Animal Science (IAAS), Horticulture Farm, Rampur, Chitwan during September, 2007 to April, 2008. The experimental site lies in the subtropical climatic zone of Nepal. Sufficient quantity of clonal progenies (seedling tubers) of TPS family (HPS II/67) was collected from National Potato Development Programme (NPDP), Khumaltar during October, 2007.

The experiment was laid out in factorial RCBD, where seedling tuber size and level of potash were the two factors. There were four levels in each factor, thus all together 16 treatments, replicated thrice. The treatments were randomly allocated by using random number table (Gomez and Gomez, 1984) in experimental plots of gross and net area of 4.8m^2 and 1.92m^2 respectively. Well sprouted and healthy seedling tubers were planted in the plot at the geometry of (60cm×20cm). Thus there were 40 plants in a plot with 4 rows and 10 plants standing in a row. Out of 4 rows, one row from each side of the plot was left as border row. Similarly one column from each side was left as border. Two rows and eight columns i.e. altogether (2×8)=16 plants in the middle of the experimental unit was considered for recording net yield per plot.

Well rotted FYM was applied in the plots @ 20t/ha, 3-4 weeks before planting. Half dose of nitrogen and full dose of phosphorus and potash @100:100:30kg NPK/ha, 100:100:60kg NPK/ha, 100:100:90kg NPK/ha and 100:100:120kg NPK/ha was applied as the basal dose. The remaining half dose of nitrogen was applied as top dressing in split dose at the time of 1st and 2nd earthing up of the crop (Rai, 1999).

Table 1: Detail of the treatments and their symbol in potato production during 2007/08 at IAAS, Rampur, Chitwan, Nepal.

Treatments	Combination	Symbols
	Size Fertilizer dose	
T_1	(<5gm) + 100:100:30 Kg NPK	S_1K_1
T_2	(<5gm) + 100:100:60 Kg NPK	S_1K_2
T_3	(<5gm) + 100:100:90 Kg NPK	S_1K_3
T_4	(<5gm) + 100:100:120 Kg NPK	S_1K_4
T_5	(5gm–10gm) +100:100:30 Kg NPK	S_2K_1
T_6	(5gm–10gm) + 100:100:60 Kg NPK	S_2K_2
T_7	(5gm–10gm) + 100:100:90 Kg NPK	S_2K_3
T_8	(5gm–10gm) + 100:100:120 Kg NPK	S_2K_4
T_9	(10gm–15gm) + 100:100:30 Kg NPK	S_3K_1
T_{10}	(10gm–15gm) + 100:100:60 Kg NPK	S_3K_2
T_{11}	(10gm–15gm) + 100:100:90 Kg NPK	S_3K_3
T_{12}	(10gm–15gm) + 100:100:120 Kg NPK	S_3K_4
T_{13}	(>15gm) + 100:100:30 Kg NPK	S_4K_1
T_{14}	(>15gm) + 100:100:60 Kg NPK	S_4K_2
T_{15}	(>15gm) + 100:100:90 Kg NPK	S_4K_3
T_{16}	(>15gm) + 100:100:120 Kg NPK	S_4K_4

The planting materials were prepared according to treatment combination one day prior to planting day and the planting was done on 25th Oct, 2007. All the agronomic and cultural practices were done as prescribed.

The plant characters such as germination percentage, plant height, number of leaf per plant, number of stem per hill, stem diameter, plant uniformity, disease severity percentage, days to tuber initiation, ground coverage, flowering percentage, number and weight of tuber per plant, number and weight of tuber per plot, number and weight of tuber per plot by tuber classes, tuber yield (mt/ha) were recorded under vegetative and yield attributing character. Post harvest characters such as dry matter content of tuber, number of green tubers, weight loss, number of sprouted tubers, and spoilage loss were recorded at lab condition.

RESULTS AND DISCUSSION

Weather condition

The maximum temperature (30.44°C) and minimum (30.32°C) was found during planting time (3rd weeks of October) and also maximum rainfall (10.61mm) was observed during that time. Maximum relative humidity (100%) was found during 2nd week of December to 2nd week of January i.e. the maximum growth period (55-85 DAP) at that time Krinoxil Gold was sprayed at an interval of 4-5 days.

Soil analysis

The soil analysis data showed that the experimental site was slightly acidic (6.0 pH). Soil texture was silty loam and had 2.8% organic matter, medium nitrogen (0.14), high phosphorus (292 kg/ha) and medium potash (150 kg/ha). The analysis of soil nutrients and organic matter content was done according to Khatri-Chhetri (1991).

Plant morphological and phenological characters

Germination percentage

The interaction effect of size of tuber and level of potash on germination percentage was found to be significant on 20 DAP. The highest germination percentage (91.67) was observed in S_4K_4 (>15 g seedling tuber and 120 kg K_2O/ha) and lowest (68.33) was found in S_1K_4 (<5 g seedling tuber and 120 kg K_20/ha) on 20 DAP. The interaction effect of tuber sizes with different level of potash on germination percentage was found non significant on 30 and 40 DAP. However 40 DAP the highest emergence percentage (99.17%) was observed in S2K4 (5-10 g tuber size and 120 kg K_2O/ha).

Increasing the size of tubers increases the emergence percentage, as large size seed provides more food materials for germination and early emergence of shoots. Similar result was also observed by Singh et al. (1993), that early emergence was observed with large size tubers.

Table 2. Weekly temperatures, rainfall, relative humidity and sunshine hours during research period at Rampur, Chitwan, Nepal (2007/08)

Month	Week	Mean Temperature (^oC)		Rainfall	RH (%)	Sunshine
		Maximum	Minimum	(mm)		(hrs)
October	III	30.44	20.32	10.61	90.14	5.50
	IV	30.90	18.67	0.00	96.20	5.57
November	I	31.11	17.60	0.00	94.28	6.80
	II	30.22	14.51	0.65	85.71	7.88
	III	29.27	11.94	0.00	89.00	9.05
	IV	29.27	11.94	0.00	89.00	9.05
December	I	24.98	9.90	0.00	98.42	4.88
	II	25.25	9.84	0.00	100.00	5.60
	III	24.25	6.75	0.00	100.00	6.20
	IV	23.55	9.14	0.00	100.00	4.91
January	I	24.11	7.77	0.00	100.00	5.36
	II	24.10	8.65	0.00	100.00	5.66
	III	23.01	10.25	2.90	98.42	3.52
	IV	19.12	7.62	7.10	100.00	3.06
February	I	22.77	6.05	0.35	98.14	5.83
	II	23.02	7.60	0.00	97.14	6.36

Source: National Maize Research Programme, Rampur, Chitwan, Nepal.

Plant height

Table 3 shows that greater the size of seedling tuber and higher the dose of potash significantly affects the height of the plant when compared with smallest sized tubers at the all stages of growth. It was observed that the maximum height of 67.00 cm was recorded in S_4K_4 with the minimum of 53.23 cm under S_1K_1 before harvesting. Similar trend was also recorded during earlier stages of growth of the crop.

The significant increase in plant height with larger sized seedling tubers and higher dose of potash when compared with smaller sized seedling tuber applied with lower dose of potash might be ascribed to more availability of reserved food materials and comparatively more amount of available plant nutrient which is also responsible for balancing the nitrogen and phosphorus availability. Similar findings were also obtained by other scientists (Khaurana, 1990; Batra et al., 1992 and Islam et al., 2000).

Table 3: Interaction effect of size of seeding tuber and level of potash on plant morphological and phonological characters at different DAP of seedling tuber for ware potato production at Rampur, Chitwan, Nepal (2007/08).

Treatments	Germination percentage at 20 DAP	Plant height (cm) at 90 DAP	Number of stem/hill at 90 DAP	Number of leaf/plant at 90 DAP	Days to tuber initiation
S_1K_1	88.33^{ab}	53.93^{de}	1.20^{g}	15.40	49.00
S_1K_2	84.17^{ab}	54.63^{de}	1.63f^{g}	16.10	46.67
S_1K_3	85.83^{ab}	54.27^{de}	2.60^{cde}	16.37	40.33
S_1K_4	68.33^{c}	53.23^{de}	1.37^{g}	16.43	37.67
S_2K_1	76.67^{bc}	53.81^{de}	1.47^{g}	16.40	47.67
S_2K_2	84.17^{ab}	56.23^{cde}	1.87^{efg}	17.57	44.00
S_2K_3	80.83^{ab}	59.60^{bc}	1.37^{g}	18.03	41.33
S_2K_4	84.17^{ab}	62.73^{ab}	1.80^{efg}	18.10	38.67
S_3K_1	86.67^{ab}	52.60^{e}	2.67^{bcde}	17.27	45.00
S_3K_2	82.50^{ab}	54.70^{de}	2.63^{bcde}	17.33	44.00
S_3K_3	81.67^{ab}	57.67^{cd}	2.37^{def}	17.90	43.00
S_3K_4	84.17^{ab}	62.47^{ab}	2.60^{cde}	17.87	36.00
S_4K_1	88.33^{ab}	51.90^{e}	4.23^{a}	18.70	44.67
S_4K_2	85.00^{ab}	57.57^{cd}	3.47^{b}	18.97	44.33
S_4K_3	90.83^{a}	63.70^{ab}	3.27^{bc}	19.23	42.33
S_4K_4	91.67^{a}	67.00^{a}	3.07^{cd}	19.27	34.67
Mean	83.958	57.253	2.35	17.558	42.458
SE m ±	3.728	1.472	0.2646	0.2799	1.263
$LSD_{0.05}$	10.77*	4.251**	0.7641**	NS	NS
CV%	7.69	4.45	19.48	2.76	5.15

Note: S_1 = <5 g, S_2 = 5-10 g, S_3 = 10-15 g and S_4 = >15 g seedling tubers; K_1 = 30 kg K_2O/ha, K_2 = 60 kg K_2O/ha, K_3 = 90 kg K_2O/ha and K_4 = 120 kg K_2O/ha.

[a]Means in the column followed by same letter in each treatments do not differ significantly at (p=0.05) by DMRT. DAP=Days after planting, SEm=Standard error of mean, LSD=Least significant difference and CV=Coefficient of Variance.

Number of stem per hill

Mean table (Table 3) shows that the highest number of stem was recorded when large sized tubers applied with low potassic level (S_4K_1) were used as a planting material. It can be concluded that in spite of potassic level, larger tuber size had a significant effect on the production of number of stem per plant. The highest number of stems per hill (4.23) was recorded under S_4K_1 with the lowest of 1.20 under S_1K_1 on 90 days after planting. This increase in stem per hill with bigger size of seedling tubers might be attributed to more number of eyes on large sized tubers as compared to smaller ones. Such results were also obtained in earlier investigations (Khaurana and Pandit, 1989; Khaurana, 1990; Batra et al., 1992 and Singh et al., 1993).

Number of leaf per plant

The interaction effect of seedling tuber size and level of potash on number of leaves was found to be non significant (Table 3) among the treatments. Mean table shows that the highest numbers of leaves were recorded at S4K4 and which was at par with S_4K_1, S_4K_2 and S_4K_3 on 90 DAP. Increasing the seeding tuber size and level of potash increases the number of leaf in increasing rate. Like wise irrespective of size, increased potash level also has positive effect in increasing the number of leaves per plant. The lowest number of leaves was observed in S_1K_1 (smallest seedling tuber size and lowest level of potash). The higher number of leaves per plant in bigger sized seedling tubers along with higher level of potash attributed with higher availability of food materials and nutrient, as large sized seedling tuber contains more number of

eyes producing more number of stem per hill. Similar findings reported earlier also (Batra et al., 1992).

Days to tuber initiation

The non significant interaction effect was observed between size of tuber and level of potash on days to tuber initiation (Table 3). The earliest tuber initiation (34.67 days) was observed in S_4K_4 as compared to other treatment combination. The treatment S_1K_1 took more days (49.0 days) for tuber initiation as compared to other treatments (Table 3).

Most tuber initiation occurs during a two week period, other tuber may begin to develop at later period (Moorby and Milthorpe, 1975). The maximum tuber bulking rate (TBR) was obtained in large sized seedling tuber with maximum dose of potash that might be due to large size tuber which gives more ground coverage causing more photosynthesis which increases the accumulation of assimilates. Similar results also made by (Banerjee et al., 1983). Potash is responsible for formation of carbohydrates and translocation of sugar (Pun and Karmacharya, 1988). It might be the cause of earlier tuber initiation with increasing dose of potash.

Yield and yield attributing characters

Number of tuber/plant

Result of statistical analysis shows that, there was highly significant effect (Table 4) of seedling tuber size on increasing the number of tubers per plant. The highest number of tubers (10.82) per plant was produced when >15g tubers were used as a planting material which was at par with 10-15g tuber size. The lowest number of

Table 4. Effect of seedling tuber size and level of potash on yield and yield attributing characters at Rampur, Chitwan, Nepal (2007/08).

Treatments	Yield (per plant)		Yield (per plot)		Yield (ton/ha)
	Number	Weight (Kg)	Number	Weight (Kg)	
Seedling tuber size (g) (Fa)					
S_1 (<5)	9.56[c]	0.40[c]	146.20	4.62[b]	24.09[b]
S_2 (5-10)	9.96[bc]	0.54[bc]	146.90	4.95[a]	25.78[a]
S_3 (10-15)	10.38[ab]	0.70[ab]	148.50	5.20[a]	27.13[a]
S_4 (>15)	10.82[a]	0.89[a]	155.10	5.20[a]	27.08[a]
$LSD_{0.05}$	0.71**	0.23**	5.14*	0.29*	1.47**
Level of potash (Kg/ha) (Fb)					
K_1 (30)	9.61[b]	0.37[c]	147.70	4.59[b]	23.91[b]
K_2 (60)	9.83[b]	0.44[c]	148.80	4.85[b]	25.26[b]
K_3 (90)	10.21[b]	0.65[b]	150.20	5.14[a]	26.78[a]
K_4 (120)	11.07[a]	1.09[a]	150.00	5.40[a]	28.13[a]
mean	10.18	0.64	149.16	4.97	26.020
SE m ±	0.24	0.08	1.78	0.10	0.5098
$LSD_{0.05}$	0.72*	0.24**	NS	0.29**	1.472**
CV%	8.43	14.60	4.13	6.87	6.87

[a]Means in the column followed by same letter in each treatments do not differ significantly at (p=0.05) by DMRT. DAP=Days after planting, SEm=Standard error of mean, LSD=Least significant difference and CV=Coefficient of Variance.

tubers (9.56) per plant was produced when found at <5g tuber size was used as a planting material. Similarly the effect of level of potash on number of tubers per plant was also found to be highly significant (p=0.01) among the treatments. The highest number of tubers (11.07) were produced at 120 kg K2O/ha which is significantly differed with the lower doses of potash at 1% level of significance. The lowest

number of tubers (9.611) per plant was recorded at 30 kg K2O/ha which was at par with 60 and 90 kg K_2O/ha. Increasing the level of potash increases the number of tuber per plant that could be due to more availability of the plant nutrient. Potash helps in formation of carbohydrates and translocation of sugar. Similar effect was also reported by Singh et al. (1993). Potassium is necessary for many plant function including carbohydrates metabolism, enzyme activation, osmotic regulation and efficient use of water, nitrogen up take and protein synthesis and translocation of assimilates (Singh, 1991).

Weight of tuber/plant

The effect of seedling tuber size on weight of tubers/plant was found to be highly significant among the treatment (Table 4). The highest tuber weight (0.8966 kg) was obtained with >15g seedling tuber size, which was at par with 10-15 g seedling tuber size. However the effect of largest seedling tuber size on weight of tuber per plant differed significantly with the effect of tuber size <10g at 1% level of significant. Least (0.4025kg) was obtained under <5g seedling tuber size.

Similarly, the effect of level of potash on weight of tubers/plant was also found to be highly significant (Table 4). The maximum tuber weight per plant (1.094kg) was recorded from the plots treated with 120 kg K_2O/ha which was significantly different with lower doses of potash. 90 kg K_2O/ha gave (0.6483 kg) per plant which was second highest and was at par with 60 kg K_2O/ha. The minimum tuber weight (0.3733kg) was recorded from the plots treated with 30 kg K_2O/ha. It was found that increase in level of potash increases the weight of tuber per plant.

Number of tuber per plot

The effect of seedling tuber size on number of tuber per plot was found to be significant among the treatment (Table 4). Highest number of tuber per plot (155.1) was obtained when >15g tuber sizes were used as planting materials which was significantly different with the effect of rest of the sizes at 1% level of significance. Lowest tuber number (146.2) was recorded from the smallest seedling tuber, which was at par with 5-10g and 10-15g seedling tuber size.

The effect of level of potash on the number of tubers per plot was found to be non significant (Table 4). However the highest number of tubers (150.2) was obtained from the plots treated with 90kg K_2O/ha with the lowest of (147.7) under 30kg K_2O/ha.

Weight of tuber per plot

The effect of size of tuber on weight of tuber per plot was also found to be highly significant (Table 4). The highest tuber weight (5.208kg) was recorded under 10-15g tuber size which was at par with 5-10g and >15g seedling tuber size. The lowest tuber weight (4.625kg) was recorded from the plots in which <5g tuber size were used as a planting materials.

The effect of level of potash on weight of total tuber per plot (Table 4) was found to be highly significant. The highest tuber weight (5.4kg) was recorded from the plots applied with highest level of potash which was at par with 90kg K_2O/ha. The lowest weight of tuber (4.592kg) was observed at the lowest level of potash (30kg K_2O/ha) which was at par with 60kg K_2O/ha.

Tuber yield (mt/ha)

The effect of size of tuber on tuber yield (mt/ha) was found to be highly significant (Table 4) among the treatments at 1% level of significance. The maximum tuber yield (27.13 mt/ha) was recorded from the plots in which 10-15 g seedling tubers were used as a planting materials which was at par with the effect of 5-10g and >15g tuber size. The minimum tuber yield (24.09t/ha) was obtained from <5g seedling tubers which significantly differed with the effect of larger sized seedling tubers.

Similarly, the effect of level of potash on tuber yield was found to be highly significant among the treatment (Table 4). The maximum tuber yield (28.13t/ha) was obtained at highest level of potash 120kg K_2O/ha which significantly differed with the effect of 30 and 60kg K_2O/ha but was at par with the effect of 90kg K_2O/ha. Minimum tuber yield (23.91t/ha) was obtained at lowest level of potash which did not differ significantly with 60kg K_2O/ha. Increase in yield of potato with increasing level of potash which is due to its positive response in increasing the plant height, number of leaves per plant, increased rate of photosynthesis and delay senescence which increases the photosynthetic area of the plant. This maximum tuber yield (28.13t/ha) recorded in the present experiment is corroborated with the finding (Singh et al., 1993, Basnet et al., 2001). According to (Sharma et al., 1976; Grewal and Trehan, 1993) potash assist to increase the yield of large sized tubers and total yield of potato. However the effectiveness of potassium application varies with cultivars, soil and climatic conditions of growing region.

SUMMARY AND CONCLUSION

Early emergence and better plant establishment was observed in largest seedling tuber size (>15g) and highest level of potash (120kg K_2O/ha). Greater the size of seedling tuber and higher the dose of potash application significantly affects the height of the plant when compared with smallest size tubers at all the stages of growth. Similarly, number of stem per hill, number of leaves per plant and stem diameter were significantly increased with larger sized seedling tuber and higher dose of potash. It shows that potash have minimum role on plant uniformity. Potash level is very important for affecting the severity of the disease. The result showed that increase in the level of potash increased the resistance power of crop. The number of tuber and weight of tuber per plant was found increasing with the increasing level of potash. The maximum number (11.82), and weight (1.36kg) was observed in treatment combination S_4K_4 (>15g seedling tuber and 120kg K_2O/ha). The number and weight of tuber per plot also showed similar trend as increasing seedling tuber size increased the total number and weight of tuber per plot. Ultimately, total yield was found highest (27.13t/ha) when 10-15g seedling tuber was used as a planting material and 28.13t/ha at 120kg K_2O/ha.

From this study, the conclusion have been drawn that increase in the seedling tuber size and level of potash increase the emergence percentage, plant height, number of leaves per plant, number of stem per hill, plant uniformity and ground coverage. Increasing the seedling tuber size and level of potash increases the number and weight of tuber per plant and per plot. Finally it can be concluded that to increase the productivity with less cost of production, one should use seed tubers weighing >10g most especially with 10-15g seedling tuber size and potash ranging between 90-120kg K_2O/ha.

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