

EFFECT OF SPLIT APPLICATION OF POTASSIUM ON THE YIELD AND YIELD ATTRIBUTING CHARACTERS OF RICE VARIETY 'TRIVENI'

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Before the introduction of high yielding varieties of rice, little response to potash was observed in most parts of India. But during the last few years, from experiments on cultivators field using new high yielding rice varieties, significant yield increase due to potash application has been reported, (Raheja *et al.*, 1970).

Although the rice plant absorbs potassium continuously from beginning to harvest, there are certain critical growth stages at which an insufficient potassium supply would result in yield depression. Noguchi and Sugawara (1957) reported that potassium absorbed at maximum tillering stage, ear formation and panicle formation stages had maximum effect on yield. Trials conducted in Taiwan (Anonymous, 1969) also showed that split application of potassium is better than single basal application. The present investigation was therefore taken up to study the effect of split application of potash at different stages of growth of rice.

Materials and Methods

The experiment was conducted at the farm attached to the Agricultural College and Research Institute, Vellayani, Kerala State during the first and second crop seasons of 1972. The soil of the experimental area was sandy clay loam containing 0.091 per cent nitrogen, 0.057 per cent phosphoric acid and 0.189 per cent potash with a pH of 5.4. The trial was laid out in a randomised block design with 3 replications. The treatments were five levels of potassium viz; (1) no potassium, (2) 20 kg K_2O/ha , (3) 40 kg K_2O/ha , (4) 60 kg K_2O/ha and (5) 80 kg K_2O/ha and three times of application viz: (1) entire quantity as basal. (2) half basal + half at active tillering stage and (3) one third basal + one third at active tillering + one third at flower initiation stage.

All treatments received a uniform dose of 80 kg nitrogen and 50 kg

A per hectare in addition to above fertilizers. Nitrogen was applied in three split doses, i. e. half as basal, one fourth at active tillering stage and the remaining one fourth at flower initiation stage. The full dose of P_2O_5 was applied as basal dressing.

Table 1

Effect of time of application and different levels of potash on some yield components of rice

Treatment	No. of effective tillers per plant		No. of grains per ear head		No. of filled grains per ear head		Thousand grain weight in gms	
	First crop	Second crop	First crop	Second crop	First crop	Second crop	First crop	Second crop
<i>Levels of potash</i>								
0 kg/ha	9.40	7.93	98.40	116.80	66.80	95.66	20.86	24.40
20 „	7.26	6.68	99.45	122.78	59.40	103.51	21.74	24.59
40 „	7.29	6.51	111.80	120.86	73.80	104.55	21.78	24.37
60 „	7.31	6.88	103.46	123.06	66.26	106.89	21.69	24.68
80 „	7.51	6.77	102.69	117.21	67.58	100.11	22.00	24.36
F test	N. S.	N. S.	N. S.	N. S.	N. S.	N. S.	N. S.	N. S.
S. Em	± 0.733	± 0.485	± 4.16	± 4.128	± 3.935	± 4.357	± 0.353	± 0.238
<i>Time of application</i>								
Full basal	7.55	7.21	103.68	114.23	64.23	107.21	21.27	24.42
*Half basal	6.90	6.31	110.92	118.45	71.18	103.23	21.61	24.42
**One third basal	7.58	6.61	98.45	120.26	64.86	100.84	22.10	24.65
F test	N. S.	N. S.	N. S.	N. S.	N. S.	N. S.	N. S.	N. S.
S. Em	± 0.634	± 0.421	± 3.602	± 3.575	± 3.409	± 3.773	± 0.306	± 0.206

*Half basal $\frac{1}{2}$ half at active tillering

**One third basal + one third at active tillering $\frac{1}{3}$ one third at flower initiation stage.

The rice variety 'Triveni' which is of short duration (90 to 100 days) and high yielding was used for the trial during both the seasons.

Results and Discussion

The data presented in Table 1 (yield components) show that the rates of potash as well as time of application brought about no significant variation in almost all the yield attributes during both the seasons. However, the number of grains per ear head increased with increasing levels of potash application. During both the seasons, the minimum number of grains per ear head was observed in treatments receiving no potash, whereas, treatments receiving 40 and 60 kg K_2O per hectare recorded maximum number of grains per ear head. But the time of application or split application had no effect on the number of grains per ear head.

Regarding number of filled grains per ear head, although there is no significant difference, there was a higher number of filled grains per ear head in treatments receiving 40 kg K_2O per hectare during both the seasons when compared to treatments receiving no potash. Govindarajan (1955) found that the use of potash was beneficial as it improved grain setting and reduced percentage of chaff.

The thousand grain weight was not affected by the application of different levels of potassium as well as by split application.

From the data on yield of grain and straw presented in Table 2, it is seen that there is no significant increase in yield of grain due to different levels of potassium or split application of potassium. However, it is seen that there is a trend to increase the yield of grain due to the application of 40 kg K_2O per hectare during both the seasons.

As far as the yield of straw was concerned, it is observed that neither the different levels of potash nor the split application of potash had any effect on straw yield. But, it is seen that during both the seasons, the application of full dose of potash at planting gave increased yield of straw.

The lack of significant response to the application of different levels of potash as well as to the time of application may be because of the fact that sufficient amount of available potassium was already present in the soil to meet the requirements of the crop. Moreover flooding increases the availability of potassium in the soil (Ponnamperuma, 1965),

Table 2

Effect of time of application and different levels of potash on the grain and straw yield of rice variety 'Triveni'

Treatment	Yield of grain in Kg/ha		Yield of straw in kg/ha	
	First crop	Second crop	First crop	Second crop
<i>Levels of potash</i>				
0 kg/ha	3117.5	2276.5	9625.0	3500.0
20 „	3251.5	2242.0	8208.5	3600.0
40 „	3341.0	2441.0	8208.5	4270.0
60 „	3255.0	2271.5	8875.0	3530.0
80 „	3451.0	2348.5	7458.5	3630.0
F test	N. S.	N. S.	N. S.	N. S.
S. Em	+122.5	±101.0	+559.0	+225.0
<i>Time of application</i>				
Full basal	32630	2283.5	8406.0	3870.0
* Half basal	3454.5	2359.0	8031.0	3750.0
** One third basal	3256.5	2335.0	8125.0	3650.0
F test	N. S.	N.S.	N. S.	N. S.
S. Em	± 106.0	+88.0	+484.0	± 194.0

N. S Not significant

* Half basal + half at active tillering

** One third basal + one third at active tillering + one third at flower initiation stage

Summary

An experiment was conducted at the Agricultural College and Research Institute, Vellayani, Kerala to study the effect of split application of potash on the yield of rice variety 'Triveni' during the first and second crop seasons of 1972.

It was found that there was no advantage by split dose application of potassium for the short duration variety of rice 'Triveni'. A single basal dose application of 20 kg K₂O per hectare will be sufficient to get high yields.

സംഗ്രഹം

നെൽച്ചെടിയ്ക്ക് പൊട്ടാഷ് തവണകളായി നല്കുന്നതു കൊണ്ട് വിളവിലുണ്ടാകുന്ന വ്യത്യാസം മനസ്സിലാക്കുന്നതിനുള്ള പരീക്ഷണങ്ങൾ 1972-ലെ ഒന്നാം വിളയിലും, രണ്ടാം വിളയിലും നടത്തുകയുണ്ടായി. 'ത്രിവേണി' നെൽവിത്തുപയോഗിച്ച് വെള്ളായണി കാർഷിക കോളേജിൽ വച്ച് നടത്തിയ ടി പരീക്ഷണങ്ങളിൽ നിന്നും മനസ്സിലായതു് മുപ്പകറഞ്ഞ ഇനമായ ത്രിവേണിയിൽ പൊട്ടാഷ് തവണകളായി നല്കുന്നതുകൊണ്ട് പ്രമുഖമായി ഗുണമൊന്നുമില്ലെന്നാണ്. കൂടാതെ, വർദ്ധിച്ച വിളവിന് ഹെക്ടറൊന്നിന് കിലോഗ്രാം പൊട്ടാഷ് ഓത്തവണയായി അടിസ്ഥാനവളമായി നൽകുന്നതു മതിയായിരിക്കുമെന്നും തെളിഞ്ഞു.

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