G.A.U. Res. J. 1977, 2 (2) : 127-128

Note on Response of Wheat 'J-1-7' to Different Levels and Times of Application of Phosphorus and Potash*

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Wheat is a very important cereal in India. Research results in recent years, especially on irrigated wheat, have revealed that there is tremendous scope for increasing yield of wheat in this country to meet the ever increasing need of food grains. A large number of factors influence the growth of wheat plant and ultimately its yield as well as quality of grain. Among these factors, nutrients as well as their time of application play an important role. Ample research on response of wheat to N application has been conducted so far. However, comparatively little evidence is available regarding phosphate and potash needs for wheat, particularly under Saurashtra conditions. Keeping this fact in mind, an investigation was conducted at the farm of the Gujarat Agricultural University at Junagadh campus (Gujarat) during *rabi* season of the year 1972-73 under field condition to study the response of wheat 'J-1-7' to different levels and times of application of phosphorus and potash.

The experiment consisted of twenty four treatment combinations of four different levels of phosphorus viz., P_0 (o kg P_2O_5/ha), P_1 (90 kg P_2O_5/ha), P_2 (180 kg P_2O_5/ha) and P_3 (270 kg P_2O_5/ha); three different levels of potash viz. K_0 (o kg K_2O/ha), K_1 (60 kg K_2O/ha) and K_2 (120 kg K_2O/ha) and two levels of time of application viz., T_0 (full at sowing) and T_1($\frac{1}{2}$ at sowing + $\frac{1}{2}$ at crown root initiation). The test crop was 'J-1-7' wheat. The experiment was laid out in $4 \times 3 \times 2$ factorial confounded design with three replications.

The studies indicated that application of phosphate did not show a significant response in relation to most of the characters studied including grain as well as straw yield. The treatment P_2 (180 kg P_2O_5/ha) produced longer spikes, increased number of grains/spike and maximum grain weight/spike. As a result, it produced the highest grain yield (40·47 q/ha). However, the same did not attain the level of significance in comparison with P_3, P_1 and P_0, the yields obtained from them being 39·54, 38·43 and 38·45 kg/ha, respectively.

In the case of straw yield, the treatment P_1 (90 kg P_2O_5/ha) produced the highest yield (54·43 q/ha) which did not differ significantly from P_3, P_1 and P_0, the yields obtained from these treatments being 54·20, 52·43 and 48·25 kg/ha,

* Part of M.Sc. (Agri.) thesis submitted by the senior author to the Gujarat Agricultural University.

(*Received on May 18, 1976*)

respectively.

The treatment P_1 (90 kg P_2O_5/ha) recorded slightly more protein content than that by the other treatments both in grain and straw.

From economic point of view, the highest net profit of Rs 4275/ha was obtained from P_0 which was more profitable than P_1, P_2 and P_3 which gave net profits of Rs 4029, 4038 and 3650/ha, respectively.

The studies have also indicated that different levels of potash did not show significant response in respect of most of the characters studied including grain as well as straw yield. The treatment K_0 produced the highest grain yield (39·69 q/ha) which was on a par with higher levels of potash application. The yields obtained from K_1 and K_2 were 38·63 and 39·36 kg/ha, respectively.

Maximum straw yield (52·21 q/ha) was produced under K_2 due to increased number of shoots per plant as well as per meter length than other treatments. However, the differences among different levels of potash were not significant.

The treatment K_1 slightly increased the protein content of grain, whereas the treatment K_2 increased the protein content of straw. But the differences were negligible.

From the economic point of view, the highest net profit of Rs 4146/ha was obtained from K_0. The treatments K_1 and K_2 gave net profit Rs 3894 and 3957/ha, respectively.

None of the growth as well as yield characters except straw yield was significantly influenced by times of application of phosphorus and potash. Application of fertilizers all at sowing showed significant increase in straw yield over split application. Though the grain yield was not significantly influenced by time of application of phosphorus and potash, the trend was in favour of applying all phosphorus and potash at the time of sowing, which was responsible for production of the highest number of productive shoots and increased number of grains/spike.

Full application of phosphate and potash at sowing also increased protein content of grain where as the split application increased protein content of straw. But these differences were not significant.

From economic point of view also applying the full dose of P and K fertilizers at sowing gave the highest net return.

In view of the results obtained in this investigation, it can be stated that application of phosphorus and potash to soils which are rich in these nutrients are not likely to respond to their application even at higher levels. Wheat being a short duration crop, application of full dose of P and K fertilizers at sowing produced the best results.