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STUDY ON NITROGEN MANAGEMENT IN WHEAT AND LINSEED INTERCROPPING SYSTEM

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ABSTRACT

This Article entitled "studies on nitrogen management in Wheat + linseed intercropping systems under dry land conditions of West U.P." was conducted at the crop Research Block of A.5.College, Lakhaoti, Bulandshahr, (U.P.) during rabi seasons of 1989-90 and 1990-91. The treatments consisted of five planting systems/row ratios (1) wheat (w), (2) Linseed (L), (3) Wheat + linseed (WL), (4) Wheat + linseed (W_2:L) and (5) Wheat + linseed (WL) with four nitrogen levels (0,25,50 and 75 kg/ha) with an uniform basal dressing of 40 kg/ha each of phosphorus and potassium. The wheat and linseed crops were planted in rows 30 cm apart and linseed was planted in between, to give these row ratios. The 20 treatment combinations were tested in a Randomised Block Design with three replications. The crops were planted on November 6 in 1989-90 and November 9 in 1990-91. All cultural practices other than the treatments were adopted as per normal recommendations. The salient results of the investigation are briefed in this Article.

KEYWORDS: Nitrogen, Wheat and Linseed, Yield, Soil moisture, Intercropping.

INTRODUCTION

It is hard to foresee the yield accessible nitrogen (N) from yard composts applied to soil. The point of this review was to survey the convenience of the proximal sensors, Yara N-TesterTM and RapidScan CS-45, for diagnosing the N wholesome status of wheat after the utilization of composts at planting. The proximal detecting apparatuses were utilized at stem lengthening before the utilization of mineral N. Standardized upsides of the proximal detecting look encouraging for changing mineral N application rates at stem extension. For dairy slurry, when either proximal sensor readings were 60-65% of the reference plants with non-restricting N, the ideal N rate for augmenting yield was 118-128 kg N ha−1. At the point when the readings were 85-90%, the ideal N rate dropped to 100-110 kg N ha−1 for both dairy slurry and ordinary medicines. It was hard to track down a reasonable connection between sensor readings and yield for sheep excrement medicines. Estimations taken with Rapid Scan C-45 were less tedious and better address the spatial variety, as they are taken on the plant overhang. Routine estimations all through the developing season are especially required in environments with variable precipitation. The utilization of 40 kg N ha−1 toward the finish of winter is important to guarantee an ideal N status from the very start of wheat crop improvement. These exploration discoveries could be utilized in utensil mounted sensors to make variable-rate N applications.

PLANT GROWTH AND DRY MATTER PRODUCTION

Wheat and linseed in a pure stand performed better and registered higher number of tillers/branches per plant, leaf number and dry matter weight. The values of all plant character were decreased, significantly in inter cropping except linseed height. Maximum reduction for wheat was observed in WL system and least in WL, in linseed the opposite was true. Nitrogen application at a dressing of 75 kg N in wheat and 50 kg N in linseed improved growth and development and the values obtained were maximum. Improvement was more in wheat than in linseed.

YIELD COMPONENTS

The yield components (ears/plant, spiketes/ear, grains/ ear, ear length and its weight and grain weight/plant and test weight in wheat and number of total, filled and unfilled capsules/plant, grain weight/plant, capsule and grain weight/ plant, grains/capsule and test weight in linseed) were higher in pure stand. In intercropping systems, the values in both crops reduced significantly. In wheat, W:L_1 recorded least reduction and in linseed it was in W_1:L. Nitrogen application improved yield components of both the crops, 75 kg N recorded

improvement in wheat and in linseed more improvement was observed at 50 kg N. Higher rate of nitrogen to linseed produced more unfilled capsule number/plant, this trend undesirable for grain yield.

YIELD AND HARVEST INDEX

Grain, straw/stalk yields and harvest index of both, wheat and linseed were more in pure crop in first year than in second year due to favourable rainfall conditions. Intercropping systems recorded a marked reduction in these parameters in both the years, W:L system had lowest reduction in wheat and that of linseed in WL, system. Application of nitrogen increased the yields of both crops in inter-cropping, in wheat the increase was noticed upto 75 kg N and in linseed upto 50 kg N rate. Of the two components, yield Improvement with nitrogen was more dominant in wheat than in linseed, the yields were comparable to pure wheat but linseed yields even in WL system did not approach to the level of pure crop showing thereby that wheat responded more favourably to change in crop environment and seasons than linseed.

NUTRIENT CONTENT AND UPTAKE

Nitrogen application upto 75 kg improved N in plant between 90 days and harvest; cropping system did not influence the contents of N or P and K at any stage. N and P contents were more in grain than straw but it was low in x than in straw. As compared to the contents, the trend of results in nutrient uptake was different. This was because uptake is a function of the amount of dry matter produced and the percentage of nutrients in components crops. The uptake was, therefore, improved by inter planted system and nitrogen application. W: L_1 system recorded more uptake and it was more than in pure crop.

QUALITY

Planting systems and nitrogen rates did not influence the protein in wheat and protein and oil in linseed, but protein and oil yield registered more in treatments where the grain production were more.

SOIL MOISTURE USE

Total soil moisture used by crops in the two seasons due to large seasonal differences in the rainfall differed, markedly (1989-90-151-02 mm; 1990-91-141.06 mm), the consumptive use (CU) in the two crop seasons did not change due to planting systems. Crops in WL system used water most efficiently. 50 kg N application improved the water use in both the crops.

WHEAT EQUIVALENT, LAND EQUIVALENT RATIO AND ECONOMICS

WL system showed higher values of wheat equivalent and land equivalent ratio (LER) of its optimum (wheat equivalent yield, 24.29 g/ha, LER, 0.99). Application of 75 kg N improved both values the wheat equivalent yield increased by 38.67%, the LER by 37.4%. The net return worked out also indicated superiority of this system (Rs.456.75/ha during 1990-91). Application of 50 kg N/ha increased profits to Rs.2617.45/ha in 1989-90 and to Rs.1039.40/ha in 1990-91. It also enhanced the return per rupee spent to Rs.1.91.

CONCLUSION

On the basis of the results of the present Article, the following conclusions can be the planting of wheat and linseed in W4:L_1 row ratio appeared technically more feasible and economically most viable intercropping system over the pure cropping of either wheat or linseed under dry land conditions of West U.P. the yield reductions in wheat and linseed in W4:L system were improved at 75 kg N to wheat and 50 kg N to linseed, the nitrogen application increased wheat yield to the level of pure crop in a favourable rainfall season (1989-90) and recorded fairly good yield in a dry season (1990-91). On the other hand, the yield of linseed were more or less constant in these two seasons. Wheat and linseed differed in their demands of nitrogen and moisture. Wheat responded more to change in soil and crop environment and linseed crop showed a higher degree of stability of production, the qualities make the component crops more suitable as intercrops, where nutrients and moisture available in soil, decreased during the crop season. W4L system was found more effective in growth resource utilization and gave maximum profit than pure wheat.

In the present article due to difficulties in sampling, particularly during the later period when soil became very dry, no observations were recorded on nutrient removal and root growth. Such observations were desirable to provide better understanding of the nutrient requirements of the component crops. For this, a separate set of treatments with small plots was necessary where both root and soil studies could be done without disturbing the main experiment. The response was quadratic in 1989-90 in pure crop and in W_2LW4L, row ratios and in 1990-91 the response was linear. The optimum rate of N at 33.30 g/ha. The production level was 65.6 kg/ha.

The change in cultivars and studies on nutrient requirements of the two components in inter cropping, could form a basis of planning of future in dry lands of West U.P. Nitrogen manure has empowered current farming to deliver adequate nourishment for a developing populace. In any case, natural harms from the deficiency of nitrous oxide, a powerful ozone depleting substance, and nitrate, a water quality poison, increment the requirement for further developed administration of farming that limits misfortunes and further develops proficiency. Strategies and projects intended to decrease N misfortunes from horticulture should be founded on great logical data to guarantee the most ideal enhancements in water and air quality.

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