

PROSPECTS OF DIAGNOSIS AND RECOMMENDATION INTEGRATED SYSTEM (DRIS) AS AN AID TO CONCEIVE STATISTICAL DECISIONS USING FOLIAR ANALYSIS.

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ABSTRACT

The DRIS approach utilizes nutrient interrelationships to determine nutrients that are most limiting to a specific goal e.g. yield. In present study, nutrient ratios of the high yielding treatment of an experiment were used as norms to which others were compared in explaining deviations. The foliar analysis comprised of nitrogen (N), phosphorus (P), potassium (K) and zinc (Zn) for wheat and P, K, Zn and sulphur (S) for maize and P, K, and chloride (Cl) for rice. The system explained the progressive diagnosis of the limiting nutrients i.e. P and Zn and their correction by encouraging availability through application of sulphuric acid in maize experiment, while analysis of variance (ANOVA) did not specify it. In wheat experiment, induction of P and K limitation by application of Zn at elevated rate was identified by DRIS. It also elucidated the role of Cl to improve P and K supply in rice plant. In all three independent sets of data, DRIS aids ANOVA to furnish the findings in clarity.

INTRODUCTION

Improved means are needed to diagnose plant nutrient response to treatments. The traditional techniques such as ANOVA, critical nutrient level (CNL) or sufficiency range (SR) concepts are often inconclusive because of their sensitivity to developmental and environmental conditions. Comparatively, DRIS approach (Beaufils, 1971) is less sensitive to developmental and environmental conditions and it provides the additional benefit of ranking the nutrients in order

fetch its ability in explaining phenomenon in plant tissue which could or could not be conceived with routine statistical methods. In a comparative study, forage concentrations of essential elements with critical values was not as useful in diagnosing the order of limiting nutrients as were DRIS indexes (Russel and Sheaffer, 1986). The primary objective was to find prospects of use of DRIS approach keeping high yielding plant nutrient ratios as an optimal (norms) alongwith use of ANOVA and to compare their sensitivities to sulphuric acid (H_2SO_4), P, Zn and Cl application to maize, wheat and rice respectively.

MATERIALS AND METHODS

Three experiments were conducted on maize, wheat and rice with assorted objectives during 1992-1994. The yield and foliar analysis data were used to test the usefulness of DRIS approach. The description is given below.

Experimental Procedures

Experiment-1: Three concentrations of H_2SO_4 i.e. 25, 50 and 75 mg kg^{-1} alongwith NPK were applied to soil in pots at sowing of maize to improve the nutrients availability by acidification of alkaline soil. Treatments of NPK alone and NPK + Zn were also included for comparison. Dry matter (DM) yield was recorded after 67 days and above ground plant material was analysed for P, K, Zn and S.

Experiment-2: Two levels of P i.e. 100 and