

Research Paper :

Survey of chilli growing areas in Guntur district for variations in input and yield levels, soil properties and microbial populations

A. LALITA KUMARI AND G. SWARAJYA LAKSHMI

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ABSTRACT

A survey was conducted in chilli growing areas of Guntur district on soil properties, nutrient status and microbial populations besides collection of rhizosphere samples for isolation of *Azospirillum* inoculants. The survey indicated that out of 50 rhizosphere soils surveyed, 40 samples were heavy black or mixed black, the rest of 10 were sandy or red sandy loams. All the soils were neutral to alkaline in reaction, non saline and high in potassium status. Only 12 and 18 per cent of the surveyed samples were medium in organic carbon and available nitrogen, respectively. Rest were low in both the parameters. Only 8 per cent of samples recorded medium in available P_2O_5 and the rest were high. Population of *Azospirillum* ranged from 3.53 to 5.82 \log_{10} CFU. High population of *Azospirillum* ($>5 \log_{10}$ CFU) was noticed in rhizosphere of chilli grown in heavy black soils. Comparatively, higher populations of other bacteria, fungi and actinomycetes were noticed where the crop was grown on heavy black soils under high level of input utilization. A non significant negative correlation was observed between the soil pH and EC and microbial population. Significant positive correlation was noticed between organic carbon and population of *Azospirillum*, other bacteria and fungi. Similar significant positive correlation was noticed between soil N and *Azospirillum*, other bacteria and fungi.

See end of the article for authors' affiliations

Correspondence to :

A. LALITA KUMARI

Department of Soil Science, Regional Research Unit (Chemistry) Regional Agricultural Research Station, Lam, GUNTUR (A.P.) INDIA

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Chilli is one of the most important commercial crops grown in Andhra Pradesh. Targetting higher yields, heavy doses of fertilizers and pesticides are used in intensively cropped areas. Reduction in fertilizer N use by 25-50 % can be achieved by better utilization of other organic and biological sources of nutrients. Associative nitrogen fixing diazotrophs Like *Azospirillum* improves nitrogen supply to crops by fixing atmospheric nitrogen. It also improves plant growth by production of plant growth hormones. In view of this a detailed survey was undertaken to study the soil properties and their nutrient status in chilli growing areas of Guntur district.

MATERIALS AND METHODS

A random survey was conducted to study the soil properties and their nutrient status in chilli growing areas of Guntur district. The levels and variations in input management and corresponding yield levels obtained were also studied. The different soil properties like pH, EC, OC, available N, P_2O_5 and K_2O and the microbial populations of *Azospirillum*, other bacteria, fungi and Actinomycetes were studied. Simple correlations were worked out to understand the relationship between different soil properties and microbial population levels. Surface soil samples of 0-15cm depth were collected from

different villages covering different mandals of Guntur district.

RESULTS AND DISCUSSION

Majority of the soils surveyed under chilli growing areas were black soils or mixed black soils. Sandy loams and red sandy loams were also under chillies cultivation in some of the mandals surveyed.

Input level :

Data on the cost of cultivation of chillies in terms of fertilizers, use of plant protection chemicals and irrigation were recorded. In general cost of cultivation ranged from 10000–25000/- per acre depending on use of inputs. Most of the chilli growing areas are under medium or high level of input utilization. Very few areas of the surveyed mandals where irrigation facilities were not available and chilli crop was grown under rain fed areas in light textured soils, the input levels were low. Use of fertilizers and pesticides and cost of cultivation under different categories are presented in Table 1.

The villages which have low level of input management were Utukuru, Uppalapadu, Mandadi and Veldurti where chilli crop was grown in sandy loams / red sandy loams under rain fed conditions.