

Research Paper :

## **Influence of crop residue mulch along with nitrogen levels on soil productivity in groundnut -pearlmillet system under rainfed agriculture**

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### **ABSTRACT**

A field experiment was conducted at Dry Farming Research Station, Targhadia (Gujarat) during Kharif 1997-2002 to study the effect of crop residue recycling through organic mulches and their decomposition with varying levels of nitrogen on soil and crop productivity in groundnut-pearlmillet sequence under dry farming condition. It was noticed from results that mulching of farm waste found better for maintaining status of organic carbon, available nitrogen and potash while, wheat straw and groundnut shell found superior in case of available phosphorus and sulphur, respectively. Groundnut shell was found superior among various mulches in respect to physical parameters of soil

**Key words :** Crop sequence, Crop residue mulch, Soil productivity

Indiscriminate use of inorganic fertilizer alone creates unfavourable soil physical conditions and biological systems. Ultimately, soil health is deteriorating year after year. It can be overcome by use of organic crop residues as mulch along with mineral fertilizers for maintaining soil health and sustainable crop production. Decomposition of organic material is promptly depending upon C:N ratio of material, hence, addition of nitrogenous fertilizers along with organic residues is beneficial for decomposition process. Considering above matter, a study was undertaken on influence of crop residue mulch along with nitrogen levels on soil productivity in groundnut - pearlmillet system under rain fed agriculture at Dry Farming Research Station, Targhadia.

### **MATERIALS AND METHODS**

A field experiment was conducted at Dry Farming Research Station, Targhadia (Gujarat) to study the effect of crop residue recycling through mulch and their decomposition with varying levels of nitrogen on soil productivity in groundnut-pearlmillet sequence along with 16 treatment combinations having 4 levels of nitrogen (0, 50, 75 and 100 per cent recommended dose of respective crops) and 4 types of crop residue mulching (No mulch, wheat straw, farm waste and groundnut shell) during Kharif-1997 to 2002 on *Vertic Ustocrepts* under rain fed agriculture.

Groundnut and pearlmillet crops were sown alternate year. Mulching of various materials was given after first interculturing. Application of nitrogen was done as per treatment. Soil samples (0-20 cm depth) were collected after harvesting of crop (2002) from each plot for

estimation of organic carbon as well as available nutrients and various physical properties of the soil following standard procedure (Black, 1965 and Jackson, 1973).

### **RESULTS AND DISCUSSION**

The results obtained from the present investigation are summarized below :

#### **Physical properties:**

The results in Table 1 revealed that the various physical parameters could not significantly varied due to different levels of nitrogen fertilization while, these parameters remarkably affected due to incorporation of various residues as mulch. Lowest bulk density was found under groundnut shell treatment. Maximum water holding capacity and per cent expansion by weight were recorded under mulching of groundnut shell and farm waste, respectively. Application of organic residues reduced the depth and width of cracking. Interaction effects of nitrogen application and crop residues mulch could not remarkably influence in respect to various physical properties of soil. Similar effect of mulch on physical properties *viz.*, bulk density and porosity were observed by Bharadwaj and Omanawar (1992), Bharamble *et al.* (1999) and Rajkannan *et al.* (2001).

#### **Soil fertility:**

The results in Table 2 and 3 revealed that organic carbon as well as available nutrients of the soil after harvesting of crops could not remarkably altered due to different levels of nitrogen application while application of various crops residue as mulch, being at par,