

## Influence of cropping systems and fertilizer doses on dry matter accumulation and nutrient uptake by maize (*Zea mays* L.)

G.L. SAWARGAONKAR\*, D.K. SHELKE AND S.A. SHINDE

Department of Agronomy, Marathawada Agricultural University, PARBHANI (M.S.) INDIA

### ABSTRACT

Field studies carried out during *kharif* 2004-05 and 2005-06 revealed that the total dry matter production of maize per plant was significantly higher in sole maize as compared to maize intercropped with either soybean, blackgram or greengram. Application of 125 per cent and 100 per cent RDF were at par and recorded significantly higher total dry matter production as compared to application of 75 per cent RDF, during both the years. As far as contribution of various plant parts to total dry matter was concerned, contribution of cob was higher (57 and 59 per cent) as compared to contribution from stem (33 and 32 per cent) and leaf (9 and 9 per cent) during 2004-05 and 2005-06, respectively. As regards to nutrient uptake, no significant differences were observed due to cropping system whereas profound influence on nutrient uptake was observed due to different doses of fertilizer application, during both the years. Increased fertilizer dose from 75 per cent to 100 per cent RDF significantly increased N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O uptake by maize however, no significant differences were observed among 100 per cent and 125 per cent RDF. The total dry matter of maize was found better with sole maize and applied with 125 per cent and 100 per cent RDF, in both the years.

**Key words :** Influence of cropping system, Dry matter accumulation, Solar energy, Nutrient uptake.

### INTRODUCTION

Maize (*Zea mays* L.) being a C<sub>4</sub> plant has tremendous yield potential and is capable of utilizing solar energy more efficiently. It is one of the most important cereal crop of World's Agricultural economy for human consumption and feed for animal. Among the cereal grain crops, maize ranks third in production in world being surpassed only by rice and wheat. Maize, because of its wider adaptability, is grown under temperate to tropical regions of the world. Besides this, it contains about 10 % albuminoides, 1.4- % ash, vitamin A, vitamin E and riboflavin. Maize is known for its wider adaptability and multipurpose uses as food, feed, fodder and over 35 daily used industrial products. Maize grain is utilized in many ways like making *roti*, *rawa*, *maida*, pop corns and some industrial products like protein foods, glucose powder, starch, alcohol, etc. The green cobs are roasted and eaten by people being delicious in taste. It is also a good feed for piggery, poultry and other animals. Besides the grain, stalk serve as a good fodder for cattle and as such it called proudly as 'Queen of Cereals' and 'King of Fodder'.

Intercropping has been proved to be more stable and remunerative over sole cropping under weather aberrations (Willey, 1979). The advantage was 50-80%

from intercropping of crops having long duration such as pigeonpea with cereals (Sexena and Yadav, 1975) and 25 - 40 % in combination of maize or sorghum with low canopy legumes (Willey and Osiru, 1972). Maize being C<sub>4</sub> plant, is an exhaustive crop which removes large quantity of nutrients from soil. It is being recognized that 'High Technology Agriculture' may not be feasible for all countries and situations, because of its high resource intensity, but intercropping gave best results at low fertilizer application levels (Reddy *et al.*, 1982).

The information about dry matter production of maize in intercropping systems under different doses of fertilizer application is meager. Hence the present study was initiated to find out the effect of legume intercropping with maize on its dry matter accumulation, nutrient uptake and grain yield when grown under different doses of fertilizer application.

### MATERIALS AND METHODS

Field experiments were carried out in Vertisol at Agricultural College Farm, Marathawada Agricultural University, Parbhani (19°16' N latitude, 76° 47' E longitude and 409 m above sea level) during *kharif* 2004-05 and 2005-06. The physical and chemical properties of soil type

---

\* Author for correspondence.