

INTRODUCTION

Upland paddy, a short lived, rain-fed variety of Oryza sativa L., is grown like other non-irrigated cereals in India. The crop is heavily infested with weeds. The major weed population consists of annual grassy weeds, Panicum crusgalli, Panicum capillare and Paspalum sanguinale. These weeds appear simultaneously with the crop seedlings and grow along with them. Since their nature of growth is similar to that of the crop, there is little possibility of using chemicals to control them. Further to the farmers of India, at present, control of weeds with tillage treatments appears more promising than the use of chemicals, as the latter requires technical ability. The Cyperaceae weeds, Cyperus rotundus and Cyperus iria appear about 3 weeks after seeding of the crop.

It goes without saying that the main purpose of cultivating the land annually for seedbed preparation is to suppress the weed growth. Robbins et al. (1952) estimated the cost of tillage to be 16 percent of the total value of the crop. According to Arakeri et al. (1959) the cost of tillage in India amounts to 30 percent of the total expenditure of crop production. Some workers (Bowers et al., 1960) are of the opinion that a higher degree of soil manipulation creates a favourable condition for weed growth,

whereas soil manipulation below a certain degree hampers the establishment and growth of crops. As a compromise, suitable tillage methods have been developed for certain crops. Free et al. (1963) suggested that the studies on the possibility of reduced tillage for different soil and climatic condition and for different cropping practices should be conducted.

Researches on cultural practices and use of chemicals for controlling weeds in low land paddy are in progress in many paddy growing countries of the world but information on this aspect for upland paddy is lacking. This crop is planted in rows 25 to 30 cm. apart. The use of intercultivating equipment is limited due to narrow passage between the crop rows. The farmers resort to manual weeding, which, undoubtedly accomplishes the job effectively, but is costly and painstaking. Most of the weeds under reference appear from the self sown weed seeds present in the surface soil. Russel (1950) is of the opinion that deep ploughing often reduces the amount of grassy weeds by burying the weed seeds deeper in the soil. When the crop plants occupy the soil earlier than the weeds, and grow vigorously, the weed growth is retarded. Thus any procedure, which would induce vigorous stand of crop, would tend to diminish the ill effects of weeds. Among the other factors determining the vigorous stand of crop, soil

fertility and density of crop plants play an important role. Since little information is available on requirement of cultural practices for upland paddy, the following three experiments were designed to ascertain the lower limit of soil manipulation, depth of tillage, spacing between crop rows and levels of fertilization, providing thereby vigorous stand of crop to combat weeds. The three experiments embodied in the thesis are : (1) Effect of varying degree of soil manipulation on yield of upland paddy and on associated weeds, (2) Effect of depth of tillage on yield of upland paddy and on associated weeds, and (3) Effect of varying populations of crop plants and levels of fertilisation on yield of upland paddy and on associated weeds.