

ABSTRACT

Soybean is one of the important oilseed crop now established its potential in India. The main reason for the popularity of this crop is its richest protein content and high oil content as compared to other oilseeds as well as pulse crops. Adequate information regarding moisture regime in the rootzone, phosphorus fertilization and suitable tillage system and their mutual interaction is not available for soybean cultivation in the lateritic sandy loam soil of south-west region of West Bengal.

In order to evolve an appropriate technology for soybean cultivation in this tract, studies were undertaken with a view to find out the best irrigation schedule in terms of depth and frequency of irrigation based on IW/CPE ratio, and also to find out the optimum dose of P-fertilizer to be applied under various soil surface condition generated through mulching and tillage operation.

Three sets of field experiment were carried out during the summer and winter seasons of 1988 and 1989. In the first set of experiment, the treatment comprised of three irrigation depths, viz., 4, 6 and 8 cm and IW/CPE ratio of 0.6, 0.8 and 1.0. In the second set of experiment, the same irrigation schedule was applied with the irrigation depth of 6 cm in combination with three levels of P-fertilization and mulch treatments. In the third set of experiment, four levels of P-fertilization (30, 60, 90 and 120 kg P₂O₅ per ha) were combined with the various levels of tillage.

It was revealed from the first set of experiment that the 6 cm depth of irrigation at 75 mm cumulative pan evaporation value (IW/CPE =0.8) was the optimum irrigation schedule for obtaining the highest yield of soybean in summer season as it satisfies the moisture storage capacity of the effective root zone. Too frequent irrigation increased the vegetative growth and thus, hampered the development of pods. The protein content of bean was not affected significantly by irrigation treatments. In the second set of experiment, it was observed that the plastic mulch, which improved the physical edaphic environment of the root zone through moisture conservation, caused significant increase in bean yield and water use efficiency. The application of 90 kg P₂O₅ per ha and 6 cm irrigation at IW/CPE ratio of 0.8 was found to be the best fertiliser regime under the agro-climatic region of Kharagpur. The result of experiment three showed that the optimum yield and water use efficiency could be attained in wedge plough ploughed field with 90 kg P₂O₅ per ha. The incremental response with P₁₂₀ was not significant. It is concluded that the most conducive and desirable soil physical environment was provided in plots tilled with wedge plough (clod MWD 9.05 mm) which helped in maintenance of lower bulk density, higher porosity and greater moisture retention in the soil throughout the growth period. The bulk density around 1.35, 1.43 and 1.47 gm cm⁻³ was most favourable during vegetative, flowering and pod formation phase respectively.