ABSTRACT

Weed management and ecophysiological studies of *Rottboellia cochinchinensis* in *Zea mays*.

Puran Bridgemohan

Weed management and ecophysiological studies of Rottboellia cochinchinensis [Lour.] W.D. Clayton in Zea mays were conducted from 1986 to 1991. Chemical, mechanical and cultural weed control measures had no adverse effect on the growth and development of maize up to tasselling . Pendimethalin [1.5 kg a.i.ha^{-1}] and inter-row cultivation gave satisfactory control of the weed in the crop, while the other treatments were ineffective. Metolachlor improved crop yield in the wet season compared to the weed-free treatment.The critical threshold level of the weed at a crop density of 55,000 plants.ha^{-1} was 13 plants.m^{-2} and estimated crop yield of 7.2 t.ha^{-1}

A fter 1 year of burial, it was found that 40 - 60% of the weed seed population persisted in the soil as a result of innate (8.5%) and enforced (35%) dormancy. Seeds of the weed also showed ability to remain viable at depths of 45cm.

The presence or absence of the weed for varying periods had no significant effect on the crop plant height, net assimilation rate, relative growth rate and crop growth rate. However, there was a

consistent trend of lower leaf area index [LAI] and shoot dry weight in the weed infested treatments. The study demonstrated a critical period of weed interference during the crop growth cycle from 0 to 63 days after emergence [DAE].

Under conditions of adequate moisture and mineral nutrients supply the uptake and accumulation of mineral nutrients by the crop and weed was not affected by interspecific competition. The high crop LAI and its height advantage over the weed made it more competitive for light. However, the prolonged presence of the weed can reduce the crop LAI and result in a consequent reduction in light interception and total photosynthesis. The Relative Yield Total model suggested that the crop and weed were exploiting the resources in mutual antagonism or that allelopathy was occuring.

Preliminary experiments carried out showed that stem extracts of the weed inhibited seedling germination only, while both stem and root extracts tended to promote seedling growth. It has been suggested that experiments should be conducted using different methods of extraction and/or purification and that a possible allepopathic effect of the weed on early reproductive growth of the crop should be investigated.

It is concluded that a successful weed management strategy to reduce the negative effect of the weed on crop yield should include establishment of the crop on weed-free areas, and the use of pre-emergence/soil acting herbicides to control the establishment of weeds from the seedbank as well as post-emergence control between 5 - 60 DAE to reduce weed competition and the addition of weed

seeds to the seed bank.