

Studies on Crop-Weed Competition in Rainfed Direct-Seeded Lowland Rice (*Oryza sativa*)

B. T. S. Moorthy and Sanjay Saha

Division of Agronomy

Central Rice Research Institute, Cuttack-753 006 (Orissa), India

Rice (*Oryza sativa* L.) is grown in shallow lowland (water depth 0-25 cm) situation in Orissa partly under direct-seeded condition. Weed problems are critical in this situation because initially (before water accumulation), it is just like upland situation which encourages grassy weeds, some sedges and dicots. In order to formulate an appropriate strategy for weed management, it is necessary to find out critical period of weed competition, which is the optimum time at which weeds should be removed to prevent possible loss in yield. Knowledge on critical period of weed competition helps in reducing the labour requirement for weeding operations and maximizes the economic returns. While considerable work on crop-weed competition in rainfed upland rice (where short duration varieties are grown) was reported (Sharma *et. al.*, 1977; Bhan, 1983; Tiwari and Singh, 1991), not much on rainfed lowlands, where long duration varieties are grown, was done. The present study embodies the research carried out in this direction.

A field experiment on rainfed lowland rice was carried out at the Central Rice Research Institute, Cuttack during wet season of 2000 in alluvial sandy loam soil of medium fertility. There were eight treatments comprising weed competition and weed-free periods maintained during the crop growth period. The test variety 'Gayatri' (160 days) was direct-seeded during the last week of May adopting a seed rate of 75 kg ha⁻¹. A fertilizer dose of 60 kg N and 30 kg P₂O₅ and 30 kg K₂O ha⁻¹ was given to the crop.

The weed flora observed in the experimental site included : jungle rice [*Echinochloa colona* (L.) Link], large crab grass [*Digitaria sanguinalis* (L.) Scop], rice flat sedge (*Cyperus iria* L.) and purple nutsedge (*Cyperus rotundus* L.) and marshy silk cotton paddy (*Sphenochlea zeylanica* Gaertn),

paddy clove (*Ludwigia perennis* L.) and some aquatic weeds which came up with water stagnation.

Highest grain yield of 5.75 t ha⁻¹ was recorded in the treatment where complete weed-free condition upto maturity was maintained. Next best was the treatment where weed-free condition was maintained upto 90 days after sowing and later weeds were allowed to grow (5.46 t ha⁻¹) (Fig. 1). The losses in grain yield due to weed competition for first 30, 60 and 90 days were 17.7, 11.8 and 5.0%, respectively. Thus, first 30-60 days after sowing period is considered critical period for crop-weed competition in case of rainfed lowland rice and to avoid grain yield losses, it is necessary to control weeds throughout this critical period and when herbicides are used their persistence should be long enough to cover this critical period of competition. The yield attributing characters like panicles m⁻² and panicle weight also showed a similar trend as that of grain yield. There was a significant and positive correlation between panicles m⁻² and grain yield ('r' value 0.861; d. f. 6) and panicle weight and grain yield ('r' value 0.95; d. f. 6). There was a negative and significant correlation between grain yield and cumulative dry weight of weeds (r value : -0.856; d. f. 6).

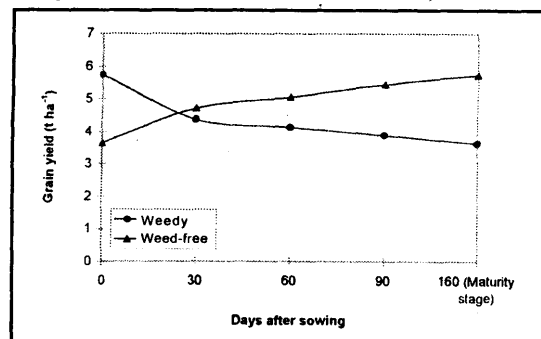


Fig. 1. Grain yield (t ha⁻¹) of rainfed direct-seeded lowland rice as affected by weedy and weed-free duration.

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