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**V Ekka**

Department of Agronomy,  
Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India.

**N Tiwari**

Department of Agronomy,  
Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India.

**S Kujur**

Department of Agronomy,  
Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India.

**D Nayak**

Department of vegetable science,  
Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India.

**Madan Jha**

Department of vegetable science,  
Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India.

**Corresponding Author:****V Ekka**

Department of Agronomy,  
Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India.

## Bioefficacy of Quinchlorac herbicide against weeds in transplanted rice on economics

V Ekka, N Tiwari, S Kujur, D Nayak and Madan Jha

**Abstract**

The Field experiment was conducted during Kharif season 2015 at Research Cum Instructional farm of Indira Gandhi Krishi Vishwavidyalaya, Raipur C.G. to evaluate the quinchlorac herbicide against weeds in transplanted rice. Ten weed control treatments were laid out in randomized block design with three replications. The result revealed that the major weed species in experimental site were *Cyperus iria* L, *Cyanotis axillaris* L, *Alternanthera triandra* L, *Echinochloa colona* L, *Ischaemum rugosum* Salisbury, and *Caesulia axillaris* Roxb. The highest gross return, net return and benefit cost ratio was obtained under treatment quinchlorac 250 g/l SC @ 250 g ha<sup>-1</sup> + bispyribac sodium (10% SC) @ 20 g ha<sup>-1</sup> (T<sub>5</sub>) followed by quinchlorac 250 g/l SC @ 250 g ha<sup>-1</sup> + ethoxysulfuron (15% WP) @ 15 g ha<sup>-1</sup> (T<sub>4</sub>) and lowest gross return was noted under control (T<sub>10</sub>).

**Keywords:** Transplanted Rice, Herbicide, gross return, net return and benefit cost ratio

**Introduction**

Rice is the most important staple food crop of millions of mankind from down of civilization (Chakravarti *et al.* 2012) [5]. Among the cereal crops, it serves as the principal source of nourishment for over half of the global population (Davla *et al.* 2013) [6]. In world, rice is the second most widely consumed cereal next to wheat and it has occupied an area of 160.60 million hectares, with a total production of 738.20 million tonnes and productivity 3424.41 kg ha<sup>-1</sup> (Anonymous, a2015) [2]. 80 per cent of the world rice production mainly comes from Asian countries and Brazil. Among these countries, China is the largest producer of rice with a production of 197.3 million tonne and occupying an area of 29.9 million ha with a productivity of 6.59 tonne ha<sup>-1</sup>. India is the second largest rice producer after China and has an area of over 44.1 million hectare with a production of 105.48 million tonnes with a productivity of 3020 kg ha<sup>-1</sup> (Anonymous b, 2015) [3] contributing 26.0 per cent of world rice production. Chhattisgarh state is popularly known as "Rice bowl" because of maximum area covered during *kharif* under rice contributing major share in national rice production. Rice occupies an area of 3.64 million hectare with the production of 7.65 million tonnes and productivity of 1517 kg ha<sup>-1</sup> (Anonymous c, 2015) [4].

The productivity of rice per unit area is poor, despite of suitable environmental conditions. Yield reduction in transplanted rice due to unchecked weed growth is 47 per cent (Mukharjee and Singh, 2004) [8]. Weeds not only cause quantitative but they also hamper the quality of produce due to competition for nutrient, moisture, light and to some extent for space. Weed problem is generally of lower magnitude in transplanted system if puddling and proper water management is followed. In transplanted rice, weeds germinate few days after transplanting of seedling. Hand weeding is the most common and effective method of weed control in rice but it is being difficult and uneconomical day-by-day due to high wages and non-availability of labours at peak period of farm operation. Herbicide is the most effective and economic means of weed control, but inappropriate or wrong application may not only increase production cost and yield penalty but also may cause development of herbicide resistant weeds and environmental hazard (Karim *et al.* 2004) [7].

Herbicide weed control methods offer an advantage to save man power and money, as a result, regarded as cost effective method of weed control (Ahmed *et al.* 2000) [1]. Therefore, timely weed control is imperative for realizing optimum level of productivity. In Chhattisgarh state, application of new herbicides (molecules) is very limited. A new formulation named Quinchlorac has been identified as early post emergence herbicide for controlling annual grassy weeds especially *Echinochloa* sp.

The relevant information on the use of new herbicide to control the post emergence weeds of transplanted rice is not available, especially under the agro-climatic conditions of Chhattisgarh plains.

## Materials and methods

### Economics

Cost of cultivation for each treatment was calculated separately. Gross return (Rs) was obtained by converting the harvested produce into monetary terms at the prevailing market rate during the course of studies for every treatment. Net return was obtained by deducting cost of cultivation from the gross return. The benefit: cost ratio was calculated with the help of the following formula:

Benefit: cost ratio = Gross return (Rs) / Total cost of cultivation (Rs)

## Results and discussion

### Economics

The data on cost of cultivation, gross return, net return and benefit cost ratio from rice as affected by different weed management treatments are presented in Table 1. The highest cost of cultivation was recorded under treatment two hand weeding (T<sub>9</sub>) followed by the application of quinchlorac 250g/l SC + bispyribac sodium (10% SC) and minimum was noted under control (T<sub>10</sub>).

The highest gross return, net return and benefit cost ratio was obtained under treatment quinchlorac 250 g/l SC @ 250 g ha<sup>-1</sup> + bispyribac sodium (10% SC) @ 20 g ha<sup>-1</sup> (T<sub>5</sub>) followed by quinchlorac 250 g/l SC @ 250 g ha<sup>-1</sup> + ethoxysulfuron (15 % WP) @ 15 g ha<sup>-1</sup> (T<sub>4</sub>) and lowest gross return was noted under control (T<sub>10</sub>).

**Table 1:** Economics of transplanted rice as influenced by weed management practices

	Treatments	Dose	Total Cost of Cultivation (₹ ha <sup>-1</sup> )	Gross Returns (₹ ha <sup>-1</sup> )	Net Return (₹ ha <sup>-1</sup> )	B:C Ratio
T <sub>1</sub>	Quinchlorac 250 g/l SC	125	24500	61301	36801	2.50
T <sub>2</sub>	Quinchlorac 250 g/l SC	187.5	24550	63935	39385	2.60
T <sub>3</sub>	Quinchlorac 250 g/l SC	250	24600	71833	47233	2.92
T <sub>4</sub>	Quinchlorac 250 g/l SC + Ethoxysulfuron (15	250 + 15	25170	78168	52998	3.11
T <sub>5</sub>	Quinchlorac 250g/l SC + Bispyribac sodium(10	250 + 20	26480	82364	55884	3.11
T <sub>6</sub>	Quinchlorac 250 g/l SC	312.5	24650	74079	49429	3.01
T <sub>7</sub>	Cyhalofop butyl 10% EC	100	26100	47192	21092	1.81
T <sub>8</sub>	Penoxsulam 21.7% SC	20	25739	75399	49660	2.93
T <sub>9</sub>	Hand weeding twice	20 & 40	29200	79488	50288	2.72
T <sub>10</sub>	Control	-	23800	25390	1590	1.07

Value of rice grain: Rs. 1350/-Value of straw: Rs. 150/-q

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