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## Short Communication

# Biology of dominant weed species in direct seeded rice (*Oryza sativa* L.) in Chhattisgarh plains

**Vidhi Garg, Nitish Tiwari and Omprakash Rajwade**

**Abstract**
A field experiment was conducted at Raipur to study the Biology of dominant weed species in direct seeded rice (*Oryza sativa* L.) in Chhattisgarh plains. Major weed flora were allowed to grow Echinochloa colona, Cyperus iria, Alternanthera triandra, Spilanthes acmella, Cyanotis axilaris). Studies on biology of different weed species at different intervals shows the growth pattern, life cycle, seed producing capacity of various dominant weeds, Echinochloa colona (4041 seeds plant -1), Cyperus iria (6550 seeds plant -1), Alternanthera triandra (1788 seeds plant -1), Spilanthes acmella (5920 seeds plant -1) and Cyanotis axillaris (470 seeds plant -1).

**Keywords:** Dominant weed, *Oryza sativa* L

## Introduction
Rice (*Oryza sativa* L.) is the most important and extensively grown crop in tropical and subtropical regions of the world as it is staple food for more than 60% of the world population. Rice occupies a prime position among food crops under diversified situation. About 90% of all rice grown in the world is produced and consumed in the Asian region. India is the second largest producer and consumer of rice in the world. Weeds compete for moisture, nutrients, light and space and a consequence, weeds infestation in direct seeded rice results in yield losses in the range of 30 to 90%, reduces grain quality and enhances the cost of production (Singh *et al.*, 2009 [8] Uncontrolled weeds cause up to 80% reduction in grain yield and sometime also results in complete failure of crop (Gopinath and Kundu, 2008) [2]. Major dominant weeds are *Echinochloa colona, Cyperus iria, Cyperus difformis*

*Echinochloa colona* is one of the most serious grass weeds of rice in the tropics. Greenhouse studies were conducted to evaluate growth and reproduction of jungle rice in response to water stress. Plant height, biomass, and seed production of jungle rice grown alone were reduced with increasing water stress. However, most stressed plants (irrigated at 12.5% of field capacity) still produced considerable biomass (8.5 g plant$^{-1}$) and seeds (>1,600 seeds plant$^{-1}$). When jungle rice and rice were grown together under water-stressed condition, jungle rice was taller than rice. *Cyperus iria* is most often found as a weed in Japan, the Pacific Islands and Australia to the south, and through India to the west. Outside Asia, it has been reported in southern and western Africa and in the USA. *Cyperus iria* is rated by Holm *et al.* (1977) [3] as one of the three most important weeds of rice in Sri Lanka, India and the Philippines. It is a principal weed in Indonesia and Japan and a common weed in Fiji, Thailand and the USA.

*Cyperus difformis* is a sedge which is listed in Holm's list of the world's worst weeds, being a problem especially in rice, sugarcane, tea and maize. It is a dominant weed in direct-seeded rice when it occurs in high plant densities; forms dense mats of vegetation in the young crop and can cause rice yield losses of 12-50%. According to NGRP (2002) [9] *Cyanotis axillaris* is native to South and East Asia and Australia, but Kostermans *et al*. (1987) [6] describe it as "pantropical." Presumably the wider distribution results from relatively recent introduction and naturalization. Based on these and other sources, the distribution of this species is classified as follows: Native in Asia (Bangladesh, Burma, Cambodia, China, India, Indonesia, Laos, Malaysia, Malesia, Philippines, Sri Lanka, Thailand, Vietnam).

## Material and Method
A field experiment was conducted at Research cum instructional farm Indira Gandhi Krishi Vishwavidyalay Raipur. The experimental field was sandy loam in texture, poor in organic carbon (0.45%), available nitrogen (205.4 kg ha$^{-1}$) and medium in available phosphorus (16.2kgha$^{-1}$) and potash (321 kg ha$^{-1}$).

The treatments consist of Infestation of *Echinochloa colona* ($T_1$), Infestation of *Cyperus iria* ($T_2$), Infestation of *Alternanthera triandra* ($T_3$), Infestation of *Spilanthes acmella* ($T_4$), Infestation of *Cyanotis axilaris* ($T_5$), Infestation of grasses ($T_6$), Infestation of broad leaved weeds ($T_7$),control (Mixed flora) ($T_8$) and weed free (3 Hand weeding) ($T_9$). The experiment was laid out in a randomized block design with three replications. The crop was sown on 27.06.16 and harvested on 03.11.16. The rice variety "Rajeshwari" with a seed rate of 40 kg $ha^{-1}$ was used for sowing and fertilized with NPK @ 100: 50: 30 kg $ha^{-1}$. Half of nitrogen and full dose of phosphorus and potash was applied at the time of sowing. The rest half of nitrogen was applied at 25 and 50 days after sowing... Weed management was done by only manual hand weeding at 20, 40 and 60 DAS to check the flush of undesirable weeds and to maintain the desirable weed population into the respective plots. The weed height of three randomly selected weed plants from each plot was measured at harvest. The height was measured in cm from ground level to tip from the longest leaf. Afterward the average height was worked out by taking mean. The number of tillers/branches per plant was counted at harvest from each plot from three randomly selected plants and then average number of tillers/branches per plant was worked out. The main stem was also included to calculate the total number of branches per plant. Randomly selected weed plant were harvested separately and seeds were manually removed from the panicle/fruits. Total numbers of seeds $plant^{-1}$ were counted and the mean was calculated. A random seed sample was taken from lot of cleaned seeds and of which 1000 seeds were counted for each species and weighed for test weight.

**Result and Discussion**

Data with respect to biology of various dominant weeds at harvest are presented in Table-1

*Echinochloa colona*: It was observed that the reproductive phase of *Echinochloa colona* started at 25-30 DAS and it matured at 60-70 DAS. It produced average plant height of 88.97 cm with 5.81 tillers $plant^{-1}$ and produced 4041 seeds $plant^{-1}$ with 1000 seed weight of 0.76 g. Bhagirath *et al*. (2010) also reported that *Echinochloa colona* produced >1,600 seeds $plant^{-1}$

*Cyperus iria*: It was observed that the reproductive phase of *Cyperus iria* started at 40-45 DAS, and matured at 80-90 DAS. It recorded average height of 81.24 cm and 6.68 tillers $plant^{-1}$ and produced 6550 seeds $plant^{-1}$ with 1000 seed weight of 0.30 g. Holm *et al*. (1977) [4] also reported that *Cyperus iria* can produce up to 5000 progeny.

*Alternanthera triandra*: Similarly *Alternanthera triandra* achieved average height of 120.00 cm with.10.93 tillers $plant^{-1}$. Its reproductive phase start from 50-55 days and matured after the crop harvest and produced 1788 seed $plant^{-1}$ with 1000 weight of 0.12g. Moody *et al*. (1984) [7] also reported that the average number of seeds produced per plant is about 2000.

*Spilanthes acmella*: It was observed that average height of 115.20 cm with 7.71 tiller $plant^{-1}$. Its flowering start from 65-75 days matured after the crop harvest and produced 490 seed plant-1 with 1000 seed weight of 0.11 g.

*Cyanotis axillaris*: It was observed that the height of *Cyanotis axillaris* at harvest was 101.00 cm, with 10.30 tillers $plant^{-1}$. And took 100-110 days to maturity and produced 470 seeds $plant^{-1}$ with 1000 seed weight of 2.89

**Table 1:** Biology of various dominant weed species in direct seeded rice.

| | Name of weeds | | | | |
|---|---|---|---|---|---|
| **Name of character** | ***Echinochloa colona*** | ***Cyperus iria*** | ***Alternanthera triandra*** | ***Spilanthes acmella*** | ***Cyanotis axillaris*** |
| Plant height (cm) | 88.97 | 81.24 | 120.00 | 115.2 | 101.00 |
| Tillers/branches | 5.81 | 6.68 | 10.93 | 7.71 | 10.30 |
| Flowering time | 25-30 DAS | 40-45 DAS | 50-55 DAS | 65-70 DAS | 45-50 DAS |
| Maturity time | 60-70 DAS | 80-90 DAS | After crop harvest | After crop harvest | 100-110 DAS |
| No of seed $plant^{-1}$ | 4041 | 6550 | 1788 | 5920 | 470 |
| Test weight (g) | 0.76 | 0.30 | 0.12 | 0.11 | 2.89 |

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