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Management of chocolate weed (*Melochia corchorifolia* L) in rice

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ABSTRACT

Chocolate weed (Melochia corchorifolia L.), hitherto a minor weed in upland rice, banana and sesame, is now common in both upland and lowland rice in the kharif season. An experiment was conducted to develop appropriate management measures for Melochia corchorifolia and the efficacy ofphysical, mechanical, and chemical methods was tested individually to identify the most economic and efficient method to control the weed in rice. Highest dry weight of weeds at 40 days after sowing was observed in the weedy check. Lowest dry matter production was observed in oxyfluorfen treated plots. This was followed by the herbicide treatments pretilachlor + benzsulfuron methyl, 2,4-D, carfentrazone-ethyl and bispyribac sodium. Hand hoeing and soil solarization were on a par with these herbicides. Lowest dry matter production of Melochiacorchorifolia was obtained with the herbicides oxyfluorfen, 2,4-D, pretilachlor + benzsulfuron methyl, carfentrazone-ethyl, and pretilachlor followed by hand hoeing. Highest rice grain yields was obtained in the treatmentcarfentrazone ethyl (4.3 t ha^{-1}) and oxyfluorfen (4.15 t ha^{-1}), followed by hand hoeing, which resulted in 3.66 t ha^{-1} of grain yield. Hence the best treatment for controlling chocolate weed as well as other weeds in rice, and for obtaining high grain yields was pre emergence application of oxyfluorfen.

Keywords: Chocolate weed, *Melochiacorchorifolia*, oxyfluorfen.

Environmental variations have been identified as the major factor leading to variations in weed species composition in a plant community. Increasing agricultural intensification also leads to changes in the composition and diversity of weed communities, and formerly minor weeds gain the status of problematic ones in comparatively short periods of time. One such potential plant is chocolate weed or red weed *(Melochia corchorifolia* L.), a weedy tropical plant, usually seen in waste lands. It is an erect to spreading perennial woody shrub growing up to 2 metres tall. Itcan also produce herbaceous stems from a woody rootstock. It flowers and fruits throughout the year. Pullaiah (2014) reported that it could quickly infest cultivated areas because of a short life cycle, production of plenty of seeds and adaptation to a wide range of soils. It usually occurs in sunny or slightly shaded regions, and in humid areas in fields and waste places.

A report from Philippines showed that annual weeds including *M. corchorifolia* reduced the yield of upland rice by 67 per cent (De Datta and Llagas, 1984). Yakubu *et al.* (2006) conducted a survey of commonly seen weeds in carrot, potato, and wheat during 2001-02 and 2002-03 in Sokoto-Rima Valley, Nigeria, and observed 38 major weed spp., out of which broad leaved weeds had the highest frequency (24 spp.). Among these, *M. corchorifolia* was one of the most frequent weeds in all the crops during both seasons.

In Kerala, it is a common weed in banana, sesame and rice. Earlier seen only in upland areas, *M. corchorifolia* is now a common rice weed both in uplands and lowlands during the *Kharif* season. A state wide survey revealed that *Melochia corchorifolia*, which was present only in localized patches a decade ago, had spread to large areas and was now a problem weed in rice and sesame (NIWSP, 2011).

Knowledge of the ecological conditions for germination and the absence or presence of dormancy is a requirement to develop proper management strategies for the weed. Studies revealed that when buried at different soil depths, seeds upto 5 cm had the greatest opportunity to germinate. *M. corchorifolia* was found to exhibit dormancy and failed to germinate when sown for up to one year after maturity. Hot water treatment was found to be effective in breaking dormancy (Menon and Kavitha, 2018).

The incidence of chocolate weed in rice is increasing rapidly and it is essential to develop an integrated management strategy to contain it. An experiment was conducted in *kharif* 2016 at the College of Horticulture, Kerala Agricultural University, Vellanikkara, Kerala, to develop appropriate management measures for *Melochia corchorifolia* and the efficacy of physical, mechanical, and chemical methods was tested individually to identify the most economic and efficient method to control the weed in rice.

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Table 1: Effect of treatments on dry weight of weeds and *Melochiacorchorifolia*

Sl. No.	Treatment	Total weed dry weight (kg.ha^{-1})	Dry weight of *M. corchorifolia* (kg.ha^{-1})
1.	Hand hoeing, 20 & 45 DAS	1.913 (3.90*)	0.346 (0.10)
2.	Soil solarization	2.267 (5.20)	1.553 (2.83)
3.	Straw mulching	3.370 (12.27)	2.050 (4.37)
4.	Pretilachlor, 0.075 kg.ha^{-1}, 0-6 DAS	3.867 (14.99)	0.917 (1.27)
5.	Oxyfluorfen, 1.015 kg.ha^{-1}, 0-6 DAS	0.737 (0.52)	0.224 (0)
6.	Pyrazosulfuron ethyl, 0.02 kg/ha, 6-9 DAS	3.598 (13.43)	1.499 (2.23)
7.	2,4 D, 0.80 kg.ha^{-1}, 20-25 DAS	2.472 (6.13)	0.224 (0)
8.	Bispyribac sodium, 0.025 kg.ha^{-1}, 20 DAS	3.017 (9.31)	1.535 (3.20)
9.	Carfentrazone ethyl, 0.020 kg.ha^{-1}, 20-25 DAS	2.547 (6.59)	0.671 (0.80)
10.	Penoxsulam, 0.025 kg.ha^{-1}, 20-25 DAS	3.284 (11.40)	1.373 (2.17)
11.	Pretilachlor+benzsulfuron methyl, 0.06 kg.ha^{-1}, 0-6 DAS	2.128 (4.73)	0.536 (0.43)
12.	Unweeded control	4.728 (22.33)	2.730 (7.43)
	LSD(0.05)	**1.090**	**1.152**

*Note: *"x+1 transformed values. Original values are given in parentheses.*

Table 2. Effect of treatments on grain and straw yields of rice

Sl. No.	Treatment	Grain yield (t ha^{-1})	Straw yield (t ha^{-1}))
1	Hand hoeing, 20 & 45 DAS	3.660	4.250
2.	Soil solarization	3.100	4.110
3.	Straw mulching	2.620	3.860
4.	Pretilachlor, 0.075 kg.ha^{-1}, 0-6 DAS	2.600	3.200
5.	Oxyfluorfen, 1.015 kg.ha^{-1}, 0-6 DAS	4.150	6.050
6.	Pyrazosulfuron ethyl, 0.02 kg.ha^{-1}, 6-9 DAS	2.580	3.150
7.	2,4 D, 0.80 kg.ha^{-1}, 20-25 DAS	2.920	3.550
8.	Bispyribac sodium, 0.025 kg.ha^{-1}, 20 DAS	2.740	3.800
9.	Carfentrazone ethyl, 0.020 kg.ha^{-1}, 20-25 DAS	4.300	5.240
10.	Penoxsulam, 0.025 kg.ha^{-1}, 20-25 DAS	2.550	2.980
11.	Pretilachlor+benzsulfuron methyl, 0.06 kg.ha^{-1}, 0-6 DAS	3.410	4.500
12.	Unweeded control	1.980	2.160
	LSD(0.05)	**0.170**	**0.499**

The experimental area had been regularly croppedwith rice during the *kharif* and *rabi* seasons, and was severely infested with *M. corchorifolia* during the first season. The soil is sandy loam, with a pH of 5.4. The available N, P and K contents of the soil were 210, 22 and 104 k ha^{-1} respectively. The treatments included weeding with hand hoe at 20 and 40 days after sowing (DAS), soil solarization for 30 days in the month of April, mulching with paddy straw immediately after sowing, application of the pre-emergence herbicides pretilachlor (0.750 kg ha^{-1}) 0 to 6 DAS and oxyfluorfen (0.150 kg ha^{-1}) 0 to 6 DAS, and thepost-emergence herbicides pyrazosulfuron-ethyl (0.020 kg ha^{-1}) 6 to 9 DAS, 2,4-D (0.800 kg ha^{-1}) 20 to 25 DAS, bispyribac sodium (0.025 kg ha^{-1}) 20 DAS, carfentrazone-ethyl (0.020 kg ha^{-1}) 20 to 25 DAS, penoxsulam (0.025 kg ha^{-1}) 15 to 20 DAS, and Pretilachlor (0.600 kg ha^{-1}) + Benzsulfuron methyl (0.060 kg ha^{-1}) 0 to 6 DAS. A weedy check was also included.Randomised Block Design with three replications was adopted. Rice variety '*Jyothi*' was dry sown in May 2016 and harvested in August 2016. Observations were recorded on the weed species composition in the experimental area. Total dry weights of weeds as well dry weight of *Melochia cochorifolia* were noted at 40 days after sowing of rice. Grain and straw yields of rice were also recorded at harvest.

The major broad-leavedweeds present were *M. corchorifolia*, *Ludwigiaperennis*, *Ecliptaalba* and *Aeschynomeneindica*, while the main sedges were species of *Cyperus*. The grass weeds included *Isachnemiliacea*, *Echinochloacolona*, *Sacciolepisinterrupta*, and *Digitaria* sp.

Dry weight of weeds at 40 days after sowing (Table 1) was highest in the weedy check. Lowest dry matter production was observed in oxyfluorfen treated plots. This was followed by the herbicide treatments pretilachlor + benzsulfuron methyl, 2,4-D, carfentrazone-ethyl and bispyribac sodium. Patel (1971) had reported that MCPA or 2,4-D gave good control of *Melochiacorchorifolia* in rice. Broad-leaved weeds dominated in the field and these herbicides were effective in controlling these as well as sedges. Hand hoeing and soil solarization yielded results on a par with these herbicides. Considering chocolate weed, oxyfluorfen, 2,4-D, pretilachlor + benzsulfuron methyl, carfentrazone-ethyl, and pretilachlor were effective in reducing the growth of the weed.aha (2005) had suggested application of pretilachlor at 50 DAS against *Melochiacorchorifolia* in rice. Hand hoeing also yielded good control, but soil solarization was not as effective.

Data on rice grain and straw yields are presented in table 2. Highest rice grain yield was obtained in the treatment carfentrazone ethyl (4.3 t ha^{-1}) which was on par with oxyfluorfen (4.15 t ha^{-1}).This was followed by hand hoeing, which resulted in 3.66 t ha^{-1} of grain yield.

Straw yield was also highest when pre-emergence application of oxyfluorfen was done. This was followed by the treatments pretilachlor+benzsulfuron methyl and hand hoeing.

Pre-emergence application of oxyfluorfen was thus found to be the best treatment for controlling chocolate weed as well as other weeds in rice, and for obtaining high grain yields.

REFERENCES

De Datta, S. K. and Liagas, M. A. 1984. Weed problems and weed control in upland rice in tropical Asia. In: *Proceedings of 1982 Upland Rice Workshop*, Bouake, Ivory Coast, IRRI, Los Banos, Philippines, pp. 321-341.

Menon, M.V. and Kavitha, P.R. 2018. Management of chocolate weed – an emerging weed in rice. Proceedings of the ISWS Golden Jubilee International Conference on "Weeds and Society: Challenges and Opportunities", Directorate of Weed Research, Jabalpur, 21-24 November, 2018.

NIWSP [National Invasive Weed Surveillance Programme Kerala Centre] 2011. *Final Report*, 2008-11, Kerala Agricultural University, Thrissur, 142p.

Patel, N. P. 1971. Rice weed control research in Fiji. In: *3rd Conference of the Asian- Pacific Weed Science Society*, Kuala Lumpur, **18**:10.

Pullaiah, T. 2014. Ethnobotony, phytochemistry and pharmacology of *Melochiacorchorifolia* L. *Int. Res. J. Pharm.* **5(7)**: 543-45.

Saha, S. 2005. Efficacy of certain new herbicide formulations in transplanted rice under rainfed shallow lowland. *Indian J. Weed Sci*. **37**(1/2) :109-10.

Yakubu, A. I., Alhassan, J., Lado, A. and Sarkindiya, S. 2006. Comparative weed density studies in irrigated carrot (*Daucuscarota* L.), potato (*Solanumtuberosum* L.) and wheat (*Triticumaestivum* L.) in Sokoto-Rima Valley, Sokoto State, Nigeria. *J. Pl. Sci*.**1(1)**: 14-21.