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REGULAR ARTICLE

PHYTOSOCIOLOGICAL STUDY OF WEED FLORA IN LOW LAND RICE ECO-SYSTEMS IN ANNAMALAI NAGAR, TAMIL NADU, INDIA

R. KAVITHA*, M. THIRUPPATHI, K. THANUNATHAN

Department of Agronomy, Faculty of Agriculture, Annamalai University, Annamalai Nagar 608 002, Tamil Nadu, India

ABSTRACT

Phytosociological study was carried out to estimate the dominant of weed flora in low land rice eco-system under varing climatic condition. The survey was conducted at Annamalai University experimental farm, Department of Agronomy, Annamalainagar during 2016 and 2017. The identified numbers were 11 and 14 during 2016 and 2017 wet season. *Cyperus rotundus, Cyperus irria, Cyperus difformis, Echinocoloa colonum, Eclipta alba, Echinocoloa crusgali* were the densely populated in 2016 while *Cyperus rotundus, Cyperus irria, Echinocoloa colonum, Cyperus difformis, Marsilia quatrifolia, Echinocola crusgali and Bergia capensis,* were the most densed in 2017. IVI computed for individual weed species in 2016 at annamalai nagar indicated that *Cyperus rotundus* was the predominant weed species with highest Relative abundance (RA) of 10.54 %, Relative density (RDE) of 18.97%, Relative frequency (RF) of 16% and Important value index (IVI) of 45.50 while in 2017 also obtained the *Cyperus rotundus* was the predominant weed species with highest Relative abundance (RA) of 10.61 %, Relative density (RDE) of 19.64%, Relative frequency (RF) of 1615.38% and Important value index (IVI) of 45.63. All other weed species were low in IVI and also rare in their occurrence with lesser frequency.

Keywords: Phytosociological, Weed survey, Rice ecosystems, RF, RDo, RDe and IVI

INTROUCTION

Rice (*Oryza sativa* L.) is stuff of life and its serves as the principle source of nourishment for over half of the global population [1]. Rice is used in industrial products like starch, rice bran oil, puffed rice and rice husks etc [2]. Rice crop suffers from various biotic and abiotic constraints in production and one of the biological constraints are the competition through weeds [3]. Weeds are the unwanted plants and are problematic in places of crop production [4,5].

Transplanted rice, in particulars infested by heterogeneous type of weed flora under low land eco-systems. Which reduced the yields upto 48 per cent and a yearly loss of 15 million tonnes [6]. Phytosociological study is the study which provide the significance of plants of an area with fact and fig. and their role and distribution in the ecosystems [7]. In the present investigation a phytosociological study was conducted in rice grown areas for weed flora for effective management of the weeds in rice ecosystem.

MATERIALS AND METHODS

Experiment was conducted during wet season 2016 and 2017 at Annamalai University experimental farm, Department of Agronomy, Annamalainagar.

Methodology

Weed phytosociological parameters like dominance, density and frequency and their relative values like Relative dominance (%), Relative density (%), Relative frequency (%) and important value index (IVI) were computed using the following principles as presented by Das [8] and as explained previously [4].

RESULTS AND DISCUSSION

Distributions of weed flora

Table 1 and 2 shows the field attributes of weeds. A total of 11 and 13 weed species were identified in the experimental field. The weeds with the rice crop in the study area are of grasses, sedges and broad leaved weeds. Their distribution in rice eco system were 25, 41 and 34 percent respectively in 2016 and 24, 50 and 26 percent in 2017 respectively (fig. 1.).

Relative frequency

The relative frequency (RF) computed for individual weed species in 2016 and 2017 at Annamalainagar exhibited that *Cyperus rotundus* was the predominant weed species with highest Relative frequency (RF) of 16.00 and 15.38 per cent, respectively. *Cyperus irria* was during 2017 and 201, respectively found to be next in merit. *sphenoclea zeylanica, Rotala densiflora* were the species registered the least value of relative frequency in both the years.

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*Corresponding Author

R. Kavitha

Department of Agronomy, Faculty of Agriculture, Annamalai University, Annamalai Nagar 608 002, Tamil Nadu, India

Email: kavi42972@gmail.com

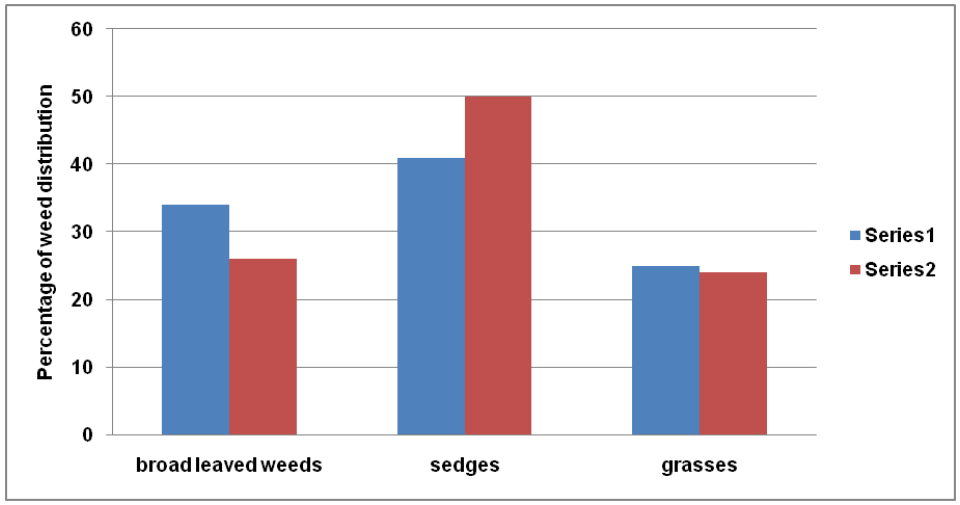

Fig. 1: Percentage distribution of weed flora at Annamalainagar in 2016 and 2017

Relative dominance

Based on the result revealed the relative dominance (RD) of individual weed species in 2016 and 2017 at Annamalainagar the *Cyperus rotundus* was the predominant weed species with highest Relative dominance (RD) of 10.54 and 10.61 per cent, respectively. *Cyperus irria* was during 2016 and 2017, respectively found to be next in merit. *sphenoclea zeylanica*, *Rotala densiflora* were the species registered the least value of relative dominance in both the years.

Relative density

The relative density (RDe) computed for individual weed species in 2016 and 2017 at Annamalainagar indicated that *Cyperus rotundus* was the predominant weed species with registered the highest Relative density (RDe) of 18.97 per cent, respectively. *Cyperus irria* was found to be next merit in the both the years. *sphenoclea zeylanica was* the species registered the least value of relative density (RDe) of 3.44 and 1.78 per cent, respectively in 2016 and 2017.

Important value index (IVI)

The IVI computed for individual weed species in 2016 and 2017 at Annamalainagar exhibited that *Cyperus rotundus* was the predominant weed species with highest important value index (IVI) of 45.50 and 45.63 per cent, respectively. *Cyperus irria* was found to be next merit in the both the years. *shenoclea zeylanica* was the species registered the least value of important value index (IVI) of 15.11 and 9.49 per cent, respectively in 2016 and 2017.

Table 1: Phytosociological attributes of weeds at low land rice eco-systems (2016)

S. No.	Name of the weed species	TNI	DE (m^{-1})	DO	F (%)	R DE (%)	RDO (%)	RF (%)	IVI
Grasses									
1	*Echinocholaa colonum*	7	1.75	2.33	75	12.07	8.94	12.00	33.01
2	*Echinochola crusgalli*	4	1.00	2.00	50	6.89	7.66	8.00	22.56
3	*Leptochloa chinensis*	3	0.75	1.5	50	5.17	5.75	8.00	18.92
Sedges									
4	*Cyperus rotundus*	11	2.75	2.75	100	18.97	10.54	16.00	45.50
5	*Cyperus irria*	9	2.25	3.00	75	15.52	11.50	12.00	39.01
6	*Cyperus deformis*	8	2.00	2.00	100	13.79	7.66	16.00	37.46
Broad leaved weeds									
7	*Marsilea quatrifolia*	4	1.00	2.00	50	6.89	7.66	8.00	22.56
8	*Bergia capensis*	3	0.75	1.50	50	5.17	5.75	8.00	18.92
9	*Sphenoclea zeylanica*	2	0.5	2.00	25	3.44	7.66	4.00	15.11
10	*Eclipta alba*	5	1.25	5.00	25	8.62	19.16	4.00	31.79
11	*Rotala densiflora*	2	0.5	2.00	25	3.44	7.66	4.00	15.11

TNI-Total number of individual weeds; D-Density; F-Frequency; D-Dominance; RD-Relative density; RF-Relative frequency; RA-Relative dominance; IVI-Importance value index.

Table 2: Phytosociological attributes of weeds at low land rice eco-systems (2017)

S. No.	Name of the weed species	TNI	DE (m^{-1})	DO	FR (%)	R. DE (%)	R. DO (%)	R. FR (%)	IVI
Grasses									
1	*Echinochola colonum*	8	2.00	0.66	0.75	14.28	10.28	11.53	36.11
2	*Echinochola crusgali*	3	0.75	0.37	0.5	5.35	5.78	7.69	18.83
3	*Leptochloa chinensis*	2	0.5	0.5	0.25	3.57	7.71	3.84	15.13
Sedges									
4	*Cyperus rotundus*	11	2.75	0.68	1.00	19.64	10.61	15.38	45.63
5	*Cyperus irria*	9	2.25	0.75	0.75	16.07	11.57	11.53	39.18
6	*Cyperus deformis*	7	1.75	0.87	0.5	12.5	13.50	7.69	33.69
7	*Fimbristylis littoralis*	2	0.5	0.25	0.5	3.57	3.85	7.69	15.12
8	*Ischaemum rugosum*	2	0.5	0.5	0.25	3.57	7.71	3.84	15.13
Broad leaved weeds									
9	*Marsilea quatrifoliata*	4	1.00	0.5	0.5	7.14	7.71	7.69	22.55
10	*Bergia capensis*	3	0.75	0.37	0.5	5.35	5.78	7.69	18.83
11	*Sphenoclea zeylanica*	1	0.25	0.25	0.25	1.78	3.85	3.84	9.49
12	*Eclipta alba*	2	0.5	0.5	0.25	3.57	7.71	3.84	15.13
13	*Rotala densiflora*	2	0.50	0.25	0.5	3.57	3.85	7.69	15.12

The results identified the important species of weeds, sedges and grasses associated with paddy in the ecosystem. Alhassan *et al*. [4] studied the weeds of paddy in Nigeria, and the results showed more weeds than in our study. IVI computed for individual weed species in 2016 and 2017 at Annamalainagar indicated that *Cyperus rotundus* was the predominant weed species in low land rice eco-system. Effective weed management methods in the study area should strategize on the effective control of weeds in the low land rice ecosystems. Our results will help in effective weed management programs in the rice cultivation.

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