

WEED FLORA AND THEIR RELATIVE DOMINANCE IN SEMI-DRY RICE CULTURE

Semi-dry system of rice culture, in which rice is grown just like an upland crop during its initial stages and as a continuously flooded crop during the later stages, is widely practised in the low lands of Kerala during the first crop (*Virippu*) season. In this culture, dry seed is sown directly in moist soil during the pre-monsoon showers in April-May. The water accumulates as the rainy season progresses and the crop may end its life cycle in a wet land set up. The germination and initial growth of seedlings are dependent entirely on moisture obtained through pre-monsoon rains. Thus, during the initial stages, the soil has moist and aerobic condition, which is ideal for the germination of both upland and aquatic system of

rice culture. Rice-weed competition for moisture is heavy during initial stages and yield losses from uncontrolled weeds can be as high as 74% (Ampong-Nyarko and De Datta, 1991). This indicates the necessity of a sound and timely weed management programme for the control of weeds in semi-dry rice. For planning the weed management strategy, a knowledge on the major weeds and their relative importance in the crop-weed system is a prerequisite.

Available information on this aspect is very little. The present study was conducted to understand the composition of weed flora and also their relative importance in semi-dry rice.

Table 1. Weed flora of semi-dry rice in the central region of Kerala

Name of weed	Local names	Type*	SDR**	RF	RDe
<i>Isachne miliacea</i> Roth	Naringa, Chengalipullu, Njammal	PG	13.94	8.76	19.11
<i>Sacciolepis interrupta</i> (Wild) Stapf.	Pollakkala, polla	AG	9.27	9.19	9.35
<i>Eriocaulon quinquangulare</i> L.		AB	5.86	2.78	8.93
<i>Ludwigia perennis</i> L.	Marakkala, Neergrampoo	AB	5.45	8.12	2.78
<i>Ammania baccifera</i> L.	Nellicheera	AB	4.22	3.63	4.79
<i>Cyperus albomarginatus</i> (Nees) Steud.	Pathayakkala	AS	4.11	5.34	2.87
<i>Dopatrium junceum</i> (Roxh.) Buch. ex Benth	Soochikkala	AB	4.01	2.56	5.46
<i>Eriocaulon cuspidatum</i> Datz.		AB	3.95	2.14	5.76
<i>Echinochloa colona</i> (L.) Link	Kavada	AG	3.91	5.34	2.48
<i>Cyperus haspan</i> L.	Korappullu	PS	3.86	4.27	3.45
<i>Monochoria vaginalis</i> (Burm. f.) Presl. ex Kunth	Karimkoovalam, Neelolpalam	A-PB	3.74	4.27	3.19
<i>Oryza rufipogon</i> Griff.	Varinellu	AG	3.41	4.71	2.11
<i>Salvinia molesta</i> Mitchell	African Payal	PF	3.38	1.07	5.69
<i>Marsilia quadrifoliata</i> L.	Nalilakodiyyan	PF	2.72	3.42	2.01
<i>Fimbristylis miliacea</i> (L.) Vahl.	Mung	AS	2.61	3.42	1.80
<i>Cyperus difformis</i> L.	Thalekkettan	AS	2.59	2.56	2.61
<i>Cyperus iria</i> L.	Manjakkora	AS	2.51	3.42	1.60

Table 1 (contd.)

Name of weed	Local names	Type**	SDR*	RF	RDe
<i>Schoenoplectus lateriflorus</i> (Gmel.) Lye	Soochippullu	AS	1.72	1.28	2.15
<i>Sphenoclea zeylanica</i> Gaertn.	Pongankala	AB	1.59	1.28	1.90
<i>Azolla pinnata</i> R. Brown	Azolla	AF	1.48	0.43	2.52
<i>Alternanthera sessilis</i> (L.) DC	Kozhuppa	PB	1.28	2.14	0.42
<i>Rotala macrandra</i> Koehne		AB	1.23	1.28	1.18
<i>Amisophacelus axillaris</i> (L.) Rolla Rao & Kammathy	Vayalpadatty	AB	1.13	1.70	0.56
<i>Paspalum paspaloides</i> (Mich.) Scribner	Neervaraku	PG	1.08	1.70	0.46
<i>Limnophila indica</i> (L.) Druce		A-PB	0.96	0.85	1.06
<i>Undernia hyssopioides</i> (L.) Haines	Kakkapoovu	AB	0.90	1.28	0.50
<i>Ceratopteria thalictroides</i> Brong	Yakshipayal	PF	0.71	1.07	0.35
<i>Undernia parviflora</i> (Roxb.) Haines	Kakkapoovu	AB	0.64	0.85	0.42
<i>Leptochloachinensis</i> (L.) Nees		A-PG	0.66	0.86	0.46
<i>Ischaemum rugosum</i> Salish	Padappanpullu Manjapullu	AG	0.56	0.86	0.25
<i>Eclipta prostrata</i> (L.) L	Kayyumi	A-PB	0.54	0.86	0.21
<i>Undernia ciliata</i> (Colsm.) Pennel		AB	0.50	0.64	0.35
<i>Lobelia trigona</i> Roxb.		AB	0.50	0.64	0.35
<i>Nymphaea stellata</i> Wild.	Neyyambal	PB	0.50	0.64	0.35
<i>Melochia corchorifolia</i> L.		AB	0.47	0.64	0.30
<i>Mullugo pentaphylla</i> L.	Parpadakapullu	AB	0.47	0.64	0.30
<i>Sphaeranthus indicus</i> L.	Adakkamaniyan	AB	0.45	0.64	0.25
<i>Echinochloa crusgalli</i> (L.) Beauv.	Kavada	AG	0.40	0.64	0.16
<i>Echinochloa glabrescence</i> Munro. ex. Hook. f.	Kavada	AG	0.39	0.43	0.35
<i>Aeschynomene indica</i> L.		AB	0.30	0.43	0.16
<i>Hydrolea zeylanica</i> Vahl.	Cheruvalel	AB	0.29	0.43	0.14
<i>Limnophila repens</i> (Benth.) Benth.	Manganari	PB	0.23	0.21	0.25
<i>Geissaspis cristata</i> W & A		AB	0.18	0.21	0.14
<i>Hedyotis diffusa</i> L.		AB	0.18	0.21	0.14
<i>Hygrophila auriculata</i> (Schum.) Haine	Vayalchulli	AB	0.18	0.21	0.14
<i>Commeline jacobi</i> Fisher.	Vazhapadatti	PB	0.15	0.21	0.09
<i>Brachiaria mutica</i> Stapf.	Parappullu	PG	0.15	0.21	0.09
<i>Eragrostis tenella</i> (L.) Beauv. ex Roem & Sch.	Penpullu	AG	0.13	0.21	0.09

* A - annual, P - perennial, G - grass, S = sedge, B - broad leaf weed, and F = fern

**Mean ratio of relative frequency and relative density

The study was conceived as a phyto-sociological survey in the central region of Kerala consisting of Ernakulam, Trichur and Palakkad districts. The survey was conducted during 1990 kharif season when the crop was about 60-75 day old. Phyto-sociological characters were noted from rice fields approximately at 10 km intervals by travelling along the major

terrestrial routes of the region. Altogether 55 locations were covered. At each location, weed count was recorded from two 1 m² quadrats inside the rice field, on either side of the road. For each weed species, the relative density (RDe) and relative frequency (RF) were determined (Sen, 1981). The average of RDe plus RF was also estimated as summed

dominance ratio (SDR) to express the ecological success of the weed based on a single value.

Report of using SDR values successfully to compare the ecological significance of weeds in rice fields is already available (Dangol, 1991).

Relative frequency (RF) = [Frequency of species / sum frequency of all species] x 100

Relative density (RDe) = [Density of a species / sum density of all species] x 100

Summed dominance ratio (SDR) = (RF + RDe) / 2

Forty eight weeds were identified in the survey. The name of the weeds ranked according to SDR values along with local names, relative frequency and relative density are presented in Table 1. Out of the 48 weed species recorded, 11 were grasses, six were sedges, 27 were broad-leaf weeds and four were ferns. On the basis of high SDe values, *Isachne miliacea* and *Sacciolepis interrupta* - both grasses - were the most commonly occurring weeds. Together they constituted 23.2% of the SDR values, implying their relative importance in semi-dry rice cultiva-

tion. *Eriocaulon quinquangulare*, *Ludwigia perennis*, *Ammania baccifera*, *Dopatrium junceum* and *Eriocaulon cuspidatum* (total SDR 23.5%) were the top rankers among broad leaf weeds.

Among the sedges, *Cyperus albomarginatus* had the highest SDR value implying the importance over the common sedges like *Cyperus difformis*, *Cyperus iria* or *Cyperus haspan* usually found in rice growing areas.

The above mentioned eight weeds viz., *Isachne miliacea*, *Sacciolepis interrupta*, *Eriocaulon quinquangulare*, *Ludwigia perennis*, *Ammania baccifera*, *Cyperus albomarginatus*, *Dopatrium junceum* and *Eriocaulon cuspidatum* all together command an SDR of 51. All the other 40 weeds together had a total SDR of 49 only. The results thus showed the dominance of a handful of weed species in semi-dry rice culture. The weed management strategy for semi-dry rice must be formulated taking this aspect into consideration.

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REFERENCES

- Ampong-Nyarko, K. and De Datta, S. K. 1991. A. *Handbook for Weed Control in Rice*. IRRI, Philippines. pp. 83-89
- Dangol, D. R. 1991. Rice field weeds in Chitwan Valley, Nepal. *IRRN* 16 (3) : 27-28
- Sen, D. N., 1981. *Ecological Approaches to Indian Weeds*. Geobios International, Jodhpur, pp. 252-278