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Phenology of Some Broad Leaved Kharif Weeds of Alluvium Zone of West Bengal

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Abstract- The present paper deals with the phenological study on broad leaved kharif weeds of randomly selected fifty one species of angiosperms from the agricultural farm of Zonal Adaptive Research Station, Krishnagar, Nadia and different blocks and village area like Bhaluka, Nabadwip and other adjoining areas of Krishnagar, Nadia, West Bengal during June 2008 to May 2011. The emergence of weeds took place from June to September showing early arrival in case of Amaranthus spinosus, Croton bonplandianum and Jatropa multifida and late arrival in case of Aerva lenata, Utricularia bifida and Wahlenbergia marginata. Initiation of flower bud blooming was early in Evolvulous, Bacopa, Hydrilla and Bromus while late emerging weeds had late initiation of floral buds and blooming. The earliest commencement of fruiting was in July in E. alsinoides while it was as late as December in seven species. Percentage of dicotyledonous plants was more than that of the monocots. Most of the members are edible and have more or less good local medicinal uses in the village areas. A good number of weeds belonging to the families which are prevalent in this alluvial zone are Amaranthaceae, Rubiaceae, Liguminaceae, Pappilionaceae, Solanaceae, Malvaceae, Labiateae, Scophulariaceae and Compositeae.

Index Terms- Phenology, Nadia, weeds, scophulariaceae, solanaceae, medicinal value

I. INTRODUCTION

The weeds are found everywhere both in urban and rural surroundings; their contact with human is unavoidable. The families which were prevalent in Alluvium zone of West Bengal *viz*. the Nadia district include Campanulaceae, Compositeae, Malvaceae, Convolulaceae, Euphorbiaceae, Labiateae, Scophulariaceae, Polygonaceae, Rubiaceae and Liguminaceae. Among these, some broad-leaved weeds pose serious problems both in arable and non-arable areas including pasture lands. Limited work on the phenology of weeds flora of this zone has been carried out. Such studies help in understanding the biology, ecology, floristic composition and the local uses of weeds and also provide information regarding scheduling of weed management practices. This study will also provide information on economic value of these weeds which are prevalent but their uses are still very little known or unknown.

II. MATERIALS AND METHODS

Regular survey were made from June 2008 to May 2011 at the Research Farm of Zonal Adaptive Research Station, Krishnagar and the other allied village areas attached to Krishnagar, Nadia, West Bengal. Among the collected weed plants, 51 broad-leaved species of Kharif season were randomly selected based on propagation by seeds, for the study of phenology (Table 1). Data on the time of emergence (E), flower bud initiation (Fi), cessation of shoot elongation(C), commencement of flowering (F), commencement of fruiting (Fr), seed dispersal (Sd) and complete death (D) of the plants were recorded . The present survey work was also done to know the local uses of the plants. It has been found that member of some families like Scophulariaceae, Hydrocharitaceae, compositeae, Xyridaceae, Gentianaceae and Commelinaceae are used as medicinal plants while members of some family *viz*. Polygonaceae, caryophylaceae, campanulaceae and gramineae are used as fodder and are edible.

III. RESULTS AND DISCUSSION

Emergence: Out of 51 weed specie, 27 came up during June, 16 in July, 5 in August and 3 in September. Weeds such as *Amaranthus spinosus*, *Croton bonplandianum* and *Jatropa multifida* were early to the season (Table 1).

Commencement of floral bud: Floral buds initiated in five plants such as *Evolvulous*, *Bacopa*, *Hydrilla* and *Bromus* during Jun while in 30 species during July, 11 during August, 5 during September and one species like *Wahlenbergia* during October (Table 1). In general, late emerging species bud late initiation of floral buds.

Commencement of Blooming : The early occurring five species bloomed early, that is, during June while 29 species during July, 10 in August, 5 in September and two species viz., *A. lenata* L. and *Wahlenbergia* among late emerging weeds commenced blooming during October.

Cessation of Shoot Elongation : The elongation of shoot was ceased in two species, viz *Mollygo* and *Evolvulous* during July while in 13 species in August, 22 in September, 11inOctober, 2 in November and in *Melochia corchorifolia* it took place in December.

Commencement of fruiting: Fruiting commenced during July in *E. alsinoides* while it commenced in 11, 20, 12 and 7 species during August, September,October and November respectively

Seed dispersal: Seed dispersal started during September in 10 species while it commenced during October in 15, November in 18 and during December in 8 species. All the long duration species were non synchronous in seed dispersal.

Death of Weeds: Death of *Gnaphalium indicum* took place in October (earliest), 16 species took place in November while in *E. alsinoides* and *Sida cordifolia* died as late as in May.

A total of 51 species belong to 23 different families. It was found during investigation that species which belong to the families like Euphorbiaceae, Liguminaceae, Labiateae, Scophulariaceae, Amaranthaceae and Compositeaea are more frequently available to the area of collection. Most of the species have either medicinal uses or have the capability of fixing nitrogen. Many species are also used as a fodder. So there is a requirement to have a holistic research on these different plant collections. Further analysis based on biochemical or molecular aspect is necessary to find out their distribution, diversity and uses which will be beneficial to the nation.

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Table 1. Phenology of the weeds during different months. C, Ceasation of shoot elongation; D, Death; E, Emergence; F, Commencement of flowering; Fi, Floral bud initiation; Fr, Commencement of fruiting; Sd, Seed dispersal.

Sl.No.	Family	Weed Species	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
1	Amaranthaceae	*Aerva lenata* L. Juss				E,C, Fi,	F	Fr Sd,	D					
		Amaranthus spinosus L.	E	F,Fi	C, Fr	Sd		D						
2	Commelinaceae	Amischophacelus axillaries L.			E,Fi	C,F	Fr,Sd	D						
		Murdannia nudiflora (L.) Brenan	E	F,Fi		C	Fr	Sd		D				
3	Rubiaceae	*Borreria articularis* (L.f.) F.N. Will.	E	Fi,F		C,Fr	Fr, Sd	Sd	D					
		Oldenlandia biflora L.	E	F,Fi		C	Fr		Sd	D				
		O.corymbosa L.	E	Fi		C,Sd	Fr, Sd		D					
		O. umbellate L.		E, Fi, F	C, Fr	Sd	D							
4	Burmanniaceae	*Burmannia coelestis* D.Don				E, Fi	C,Fi	Fr	Sd,D					
5	Liguminaceae	*Desmodium gangeticum*(L.) DC	E	F,Fi		C		Fr	Sd	D				
		Teprhosia purpurea (L.) Pers.		E	Fi,F	Fr	C,Sd							
6	Eriocaulaceae	*Ericaulon quinquangulare* L.			E	Fi,F	C,Fr		Sd	D				
7	Euphorbiaceae	*Croton bonplandianum* Baill	E	F,Fi		C		Fr, Sd	D					
		Tragia Involucrata L.		E	F,Fi ,C	Fr	Sd	D						
		Jatropa multifida L.	E	F,Fi	Fr, C		Sd		D					
8	Convolvulaceae	*Evolvulous alsinoides* (L.)	E,Fi,F	C,Fr			Sd							D
		E. nummularius L.		E,Fi,F	C	Fr		Sd					D	
9	Gentianaceae	*Hoppea dichotoma* willd.	E	F,Fi		C	Fr	Sd	D					
		Centaurium roxburghii (G.Don) Druce	E	F,Fi			CFr	Sd	D					
10	Labiateae	*Salvia coccinea* Juss. Ex Murr. And Sage	E	F,Fi		C	Fr	Sd	D					
		Hyptis suaveolens (L.) Poit		E	C,Fi,F	Fr,Sd				D				
		Leonurus sibricus L.	E	F,Fi		C	Fr	Sd	D					
11	Scophulariaceae	*Lindernia ciliate* Pennel		E		Fi,F,Fr	C,Sd	D						

		L. crustacean (L.) F.		E	Fi,F	C,Fr,Sd		D					
		Scoparia dulcis L.	E	F,Fi			C, Fr	Sd	D				
		Lindernia indica L.		E	F,Fi		C	Fr,Sd	D				

Table 1 Continued.

Sl.No.	Family	Weed Species	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
		Antirrhinum majos L.	E	F,Fi	Fr	Sd	C	D						
		Bacopa monnieri (L.)	E, F,Fi		C,Fr		Sd		D					
12	Sterculiaceae	*Melochia corchorifoliaia indica* L.	E	Fi,F	Fr			Sd	C		D			
13	Loganiaceae	*Mitrasacme alsinoides* R. Br.	E	F,Fi	Fr	C,Sd		D						
14	Polygonaceae	*Mollygo stricta* Linn.		E,Fi.C,F	Fr	Sd		D						
		Rumex dentatus L.	E	F,Fi	Fr	C,Sd		D						
15	Caryophyllaceae	*Polycarpaea corymbosa* Lamk.			E,Fi,F	C,Fr			Sd,D					
		Stellaria media (L.) vill.		E	F,Fi,C	Fr	Sd	D						
16	Polygalaceae	*Polygala chinensis* L.		E	F,Fi,C		Fr, Sd		D					
17	Malvaceae	*Sida cordifolia* L.	E	Fi,F		Fr	C	Sd					D	
		S. glutinosa Cav.	E	F,Fi		C,Fr		Sd,D						
18	Latibulariaceae	*Utricularia bifida* Linn.				E,Fi,F	C,Fr	Sd		D				
19	Compositeae	*Vernonia cinerea* (L.) less.	E	Fi,F	Fr	C		Sd	D					
		Tridex procumbens L.		E	Fi,F	Fr		C	Sd					D
		Gnaphalium indicum L.		E, F,Fi		C,Fr	Sd,D							
		G. Luteo-album L.		E, F,Fi		C,Fr	Sd	D						
		Grangea maderaspatana (L.) Poir	E	F,Fi	C,Fr	Sd		D						
20	Campanulaceae	*Wahlenbergia marginata* (Thunb) A.DC.				E	Fi,F	C,Fr	Sd	D				
21	Hydrocharitaceae	*Vallisneria spiralis* L.		E, F,Fi		C,Fr	Sd		D					
22	Gramineae	*Hydrilla verticillata* (L.f.) Royle.	E, F,Fi		C,Fr	Sd		D						

		Agrostis alba		E, F,Fi	C				
		Bromus inermis	E, F,Fi		C,Fr		Sd	D	
		Leptochloa panicea	E	F,Fi		C,Fr	Sd	D	
23	Xyridaceae	*Xyris indica* L.			E, F,Fi		C Fr	Sd	D
		Xyris pauciflora Willd.			E	Fi,F,Fr	C,Sd	D	