*Pleione* 2(1): 77 - 86. 2008.


# Survey of weed flora of Atrai river bed in Dakshin-Dinajpur in District of West Bengal, India

**Parasuram Kamilya**
Department of Botany, Balurghat College, Balurghat, Dakshindinajpur-733 101, West Bengal, India

**Abstract**

About 96 species of angiosperms under 63 genera of 31 families are studied on the river bed of Atrai. Major attention is given to migratory nature of weed taxa linking subhimalayan tract to Bangladesh and West Bengal. The silty-sandy riverbed is helpful for the perennation of these weeds by their seeds or other propagules. Indented keys have been made for genera and species under many families for their easy identification.
***Keywords:*** Atrai, riverbed, weeds, perennation, identification.

## INTRODUCTION

The river Atrai is originated from the famous Himalayan River Tista at Jalpaiguri District of West Bengal and flows towards south and enters into Bangladesh where it is merged to Karotawa. Then within Bangladesh further in the south direction it is splitted into two branches, one branch as Punarbhaba at Dinajpur district of Bangladesh and other one as Atrai enters into West Bengal in the Kumarganj block of Dakshindinajpur district. It then flows towards Bangladesh through Balurghat subdivision. The study area of riverbed was from Patiram to Fatepur via Balurghat.

The Balurghat of Dakshindinajpur lies at 25º13.03 N latitude and 88º47.03 E longitude. The whitish-sandy-silty-riverbed is wide enough for the growth of weeds- because it is partly dried up during winter to summer although remain full of water during monsoon and extending to Autumn. The approximate annual rainfall in this area is about 1921 mm and the mean minimum and maximum annual temperature is about 7º C to 39º C.

There were some workers (Prain 1903; Culshaw 1950; Chakravarty 1957) who contributed to the flora of West Bengal in different ways. Although there are some district floras of West Bengal, but for Dakshindinajpur district there is no such published record. This district is significant because it is a pocket area of West Bengal (India), and covered three sides by Bangladesh. Hence, an effort has been made to study the flora that may link sub-himalayan tract of Bangladesh and India partly.

## MATERIALS AND METHODS

The riverbed from Patiram to Fatepur is nearest to Balurghat college. The bed is thoroughly explored during 2005 to 2007 round the year. The specimen collected from the field are accorded with proper field numbers and then pressed, dried and made into herbarium sheets. Morphological data are taken from field as well as from herbarium sheets. Some of the herbarium sheets have been deposited in the herbarium section of Balurghat College. The herbarium sheets have been identified following different relevant floras and manuals (Prain 1903; Chakravarty 1957; Cook 1996; Kamilya & Paria 1994; Hooker 1872-1897; Khan & Halim 1987; Hajra *et al.* 1995, 1997; Singh *et al.* 2000; Das 2004) and matched at CAL. Then search for relevant literature including recent ones for determining the correct names of taxa was followed as per mandatory articles of ICBN (Greuter et al 2000) with the aid of Appendix II and other literatures including Bennet (1987).

In the "Systematic enumeration" of the taxa, the arrangement of families is followed principally according to Takhtajan (1997), one of the recent systems of phylogenetic classification of angiosperms. The artificial keys for genera and species are given and these are valid for the studied taxa only. Under each species the correct name is given first in bold italics with reference to author(s), which is followed by the relevant synonyms, if any, with author(s). After the correct and synonyms, the field numbers along with the surname of the collector, abbreviated as 'K' for *Kamilya*, has been given within the parenthesis. A 'map' showing the course of the river within the district of Dakshindinajpur has been presented (Fig. I).


**Fig. I**. Map of Dakshin Dinajpur District of West Bengal (not to the scale).

## ENUMERATION OF FLORA

## MAGNOLIOPSIDA

### CERATOPHYLLACEAE

***Ceratophyllum demersum*** L. (K 20)

### RANUNCULACEAE

***Ranunculus sceleratus*** L. (K 336)

### MOLLUGINACEAE

***Glinus lotoides*** L. (K 241); ***Glinus oppositifolius*** (L.) A. DC., [= *Mollugo spergula* L. (K 428).

1. Flowers pedicelled; leaves glabrous …. *G. oppositifolius*

1a. Flowers sessile; leaves with wooly-tomentose hairs …. *G. lotoides*

### CARYOPHYLLACEAE

***Polycarpon prostratum*** (Forsk.) Asch. & Schweinf. (K 238)

**AMARANTHACEAE**

1. Leaves opposite; plants suberect to prostrate; perianth papery …. *Alternanthera*
1a. Leaves alternate, petioled; plants erect; perianth not papery …. *Amaranthus*

***Alternanthera paronychioides*** St. Hil. (K 274); ***A. philoxeroides*** (Mart.) Griseb., [= *Tilanthera philoxeroides* Moq. (K 230); ***A. sessilis*** (L.) R. Br. *ex* DC. (K 185); ***Amaranthus spinosus*** L. (K 242); ***A. viridis*** L. (K 444).

***Alternanthera***: Key to the species:

1. Tepals 1-nerved; leaves narrow-oblong or shortly oblong: …… 2
1a. Tepals 3-nerved; leaves oblanceolate…. *A. paronychioides*
2. Stem hollow; heads long-peduncled; leaves narrow-oblong …. *A. philoxeroides*
2a. Stem solid; heads sessile or peduncle 0.2-0.3 cm; leaves short-oblong …. *A. sessilis*

***Amaranthus***: Key to the species:

1. Leaf axils with spines …. . *A. spinosus*
1a. Leaf axils without spines …… *A. viridis*

**CHENOPODIACEAE**

***Chenopodium album*** L. (K 211); ***C. ambrosioides*** L. (K 216).

***Chenopodium***: Key to the species:

1. Plants aromatic; glandular-trichomes throughout; leaves shortly-petioled, oblong to lanceolate …. *C. ambrosioides*
1a. Plants not aromatic; hairs not glandular leaves long petioled, rhomboid-deltoid …. *C. album*

**POLYGONACEAE**

1. Tepals 6, inner 3 much toothed; stigmas fimbriate …. *Rumex dentatus*
1a. Tepals 4-5, inner tepals not toothed; stigmas capitellate …. *Polygonum*

***Persicaria barbata*** **(**L.) Hara (K 304); ***Persicaria hydropiper*** **(**L.) Spach (K 202); ***Persicaria orientalis*** (L.) Spach (K 207); ***Polygonum plebeium*** R. Brown (K 364); ***Rumex dentatus*** L. (K 173).

***Persicaria***: Key to the species:

1. Leaves ovate, long-petioled; nutlets biconvex …. *P. orientalis*
1a. Leaves linear-oblong, sessile to sub-sessile; nutlets distinctly trigonous: …… 3
2. Pseudospikes lax; cilia of the ochrea small or rudimentary …. *P. hydropiper*
2a. Pseudospikes dense; cilia of the ochrea large ….. *P. barbatum*

**HYPERICACEAE**

***Hypericum japonicum*** Thunb. *ex* Murr. (K 378).

**ELATINACEAE**

***Bergia capensis*** L. (K 209)

**BRASSICACEAE**

***Rorippa dubia*** (Persoon) Hara, [=*Nasturtium indicum* DC.] (K 101); ***R. palustris*** (L.) Besser, [= *Nasturtium palustre* DC.] (K 213).

***Rorippa***: Key to the species:

1. Pods short, broad, hardly longer than pedicels …. *R. islandica*
1a. Pods long, narrow, atleast twice as long as the pedicels ….. *R. dubia*

**EUPHORBIACEAE**

1. Flowers in cyathia; plants suberect or prostrate; latex milky; leaves opposite without glands …. ..... ..... ..... ..... *Euphorbia*
1a. Flowers in raceme; plants erect; latex watery or watery milky; leaves alternate with domatia: …….. ..... ..... ..... 2
2. Lamina broadly ovate, lobed; filaments connate below in a column in 1-3-series ..…..... ..... ..... *Chrozophora rottleri*
2a. Lamina lanceolate; filaments free ……... ..... *Croton bonplandianum*

***Chrozophora rottleri*** (Geiseler) Juss. *ex* Spreng., [= *C. plicata* Hook. *f.*] (K 176); ***Croton bonplandianum*** Baillon (K 188); ***Euphorbia hirta*** L. (K 194); ***E. heyneana*** Spreng. (K 155).

***Euphorbia***: Key to the species:

1. Plants procumbent; lamina distinctly nerved, above 1.8 cm long …... *E. hirta*
1a. Plants prostrate; lamina indistinctly nerved, below 1 cm long …… *E. microphylla*

**ONAGRACEAE**

***Ludwigia adscendens*** (L.) Hara, [= *Jussiea repens* L.] (K 140); ***L. perennis*** L., [= *L. parviflora* Roxb.] (K 171).

***Ludwigia***: Key to the species:

1. Plants erect herbs in marshy areas; stem angular; leaves lanceolate …. *L. perennis*
1a. Plants floating or on marshy areas; stem round spongy; leaves oblong-elliptic .. *L. adscendens*

**VITACEAE**

***Cayratia trifolia*** (L.) Domin. (K 343).

**APIACEAE**

***Seseli diffusum*** (Roxb. ex Sm.) Santapau & Wagh, [= *S. indicum* Wight & Arn.] (K. 199).

**ASTERACEAE**

1. Capitula homogamous: ……. 2
1a. Capitula homogamous or heterogamous: …… 3
2. Pappus paleaceous; plants erect herbs … *Ageratum* (*conyzoides*)
2a. Pappus of slender hairs; plants twining herb …. *Mikania* (*cordata*)
3. Anthers appendages at the apex; pappus present or absent: ……. 4
3a. Anthers not appendaged at the apex; pappus absent …. *Centipeda* (*minima*)
4. Receptacle naked: …… …… 5
4a. Receptacle paleaceous: …… …… 6
5. Plants diffuse-prostrate; style of hermaphrodite flowers with flattened cuneate arms .. *Grangea maderaspatana*
5a. Plants erect; style of hermaphrodite flowers with truncate or capitate arms…. *Gnaphaliu*
6. Anthers free or nearly so; cypsela enclosed in hardened involucral cell; leaves alternate … *Xanthium indicum*
6a. Anthers united in a tube; cypsela not enclosed in hardened involucral cell; leaves opposite:

7. Petals of ray florets white; style of hermaphrodite florets with flattened arms …. *Eclipta prostrata*

7a. Petals of ray florets yellow; style of hermaphrodite florets truncate ... *Spilanthes paniculata*

***Ageratum conyzoides*** L. (K 321); ***Centipeda minima*** (L.) A. Brown & Ascherson, [=*C. orbicularis* Lour.] (K 39); ***Eclipta prostrata*** (L.) L. (K 221); ***Pseudognaphalium affine*** (D. Don) Anderberg (K 212); ***Gnaphalium polycaulon*** Pers., [=*G. indicum auct. non* L.] (K 29); ***Grangea maderaspatana*** (L.) Poir. (K 203); ***Mikania micrantha*** Kunth [= *M. cordata* (Burman f.) Robinson, *M. scandens* Hook. *f., non* Willd.] (K 465); ***Spilanthes paniculata*** Wall. *ex* DC., **[=***S. acmella* var. *paniculata* (DC.) C.B. Clarke] (K 325); ***Xanthium indicum*** Koen. *ex* Roxb., [=*X. strumarium auct. non* L.] (K 402).

**RUBIACEAE**

1. Flowers densely verticelled at the node …. …*Mitracarpus hirtus*

1a. Flowers solitary or on umbel-like inflorescence: ….. ….. 2

2. Petals 5; fruits indehiscent globose, berry-like, hairy; plants prostrate .... *Dentella repens* var. *repens*

2a. Petals 4, entire; fruits dehiscent capsule; plants erect or prostrate …. *Oldenlandia*

***Dentella repens*** (L.) J. & G. Forst. var. ***repens*** Verdc. (K 291); ***Mitracarpus hirtus*** (L.) DC., [= *M. verticillatatus* (Schum. & Thonn.) Vatke] (K 204); ***Oldenlandia corymbosa*** L. (K 247); ***O. diffusa*** (Willd.) Roxb. (K 212)

***Oldenlandia***: Key to the species:

1. Leaf margins flat; flowers 2-6 in long peduncled umbellate cyme …..... *O. corymbosa* var. *corymbosa*

1a. Leaf margins recurved; flowers solitary on short peduncle ……. *O. diffusa*

**SOLANACEAE**

1. Plants glabrous; leaves petiolate, ovate; corolla rotate or with campanulate: ……. 2

1a. Plants with simple glandular hairs; leaves sessile, broadly oblong-oblanceolate to pandurate; corolla narrow campanulate .. *Nicotiana plumbaginifolia*

2. Flowers on supra-axillary cymes; calyx not accrescent …. *Solanum nigrum*

2a. Flowers solitary; calyx accrescent …. *Physalis minima*

***Nicotiana plumbaginifolia*** Viv. (K 222); ***Physalis divaricata*** D. Don (K 219); ***Solanum nigrum*** L. (K 221).

**BORAGINACEAE**

1. Leaves all alternate; flowers on inflorescence: …… 2

1a. Leaves basally opposite, then alternate; flowers solitary-axillary, but passing into terminal racemes by gradual reduction of the floral leaves …. *Trichodesma indicum*

2. Flowers purplish-blue; basal leaves more crowded, radical but upper leaves cauline; plants erect ….. *Cynoglossum lanceolatum*

2a. Flowers white; leaves cauline; plants erect or prostrate ……. *Heliotropium*

***Cynoglossum lanceolatum*** Forssk. (K 50); ***Heliotropium indicum*** L. (K 419); ***H. strigosum*** Willd. (K 115); ***Trichodesma indicum*** R. Br. (K 428).

***Heliotropium***: Key to the species:

1. Fruits divided into four 1-seeded nutlets; plants erect; lamina ovate …. *H. indicum*

1a. Fruits divided into two 2-seeded pyrenes; plants prostrate; lamina lanceolate to linear-lanceolate …. *H. strigosum*

**SCROPHULARIACEAE**

1. Plants aquatic or semi-aquatic; submerged leaves multifid and aerial leaves entire or serrate margin …. *Limnophila*

1a. Plants terrestrial i.e. on sandy riverbed; leaves not heterophyllous: ……. 2

2. Plants prostrate; calyx quincuncial, basally connate, enlarging with the fruit; flowers yellow .. *Mecardonia procumbens*

2a. Plants erect; calyx valvate, connate totally or partially; flowers white or with-violet tinge .. .. 3

3. Corolla tube short, subrotate: ……. 4

3a. Corolla tube broad, distinctly 2-lipped to personate: …… 5

4. Corolla lobes 4; stamens 4, subequal; fruits globose, septicidal capsule …. *Scoparia dulcis*

4a. Corolla lobes 4-5; stamens 2; fruits 2-grooved loculicidal capsule …. *Veronica anagallis -aquatica*

5. Basal leaves radical, spreading, long petioled, spathulate, upper leaves alternate; corolla white; calyx wide campanulate …. *Mazus japonicas*

5b. Leaves throughout opposite-decussate; corolla white or violet outside; calyx covering the fruit …. *Lindernia*

***Limnophila heterophylla*** (Roxb.) Benth. (K 245); ***L. indica*** (L.) Druce (K 229); ***Lindernia crustacea*** (L.) F. Muell., [= *Vandellia crustacea* Benth.] (K 214); ***L. hyssopioides*** (L.) Haines, [= *Ilysanthes hyssopioides* (L.) Benth.] (K 186); ***L. parviflora*** (Roxb.) Haines, [= *Ilysanthes parviflora* (Roxb.) Benth.] (K 209); ***L. pyxidaria*** All., [= *Vandellia pyxidaria* Maxim.] (K 188); ***L. sessiliflora*** (Benth.) Wettst., [= *Vandellia sessiliflora* Benth.] (K 207); ***Mazus pumilus*** (Burm.f.) Steenis (K 122); ***Mecardonia procumbens*** (Miller) Small, [= *Herpestis chamaedroides* Kunth] (K 111); ***Scoparia dulcis*** L. (K 75); ***Veronica anagallis-aquatica*** L., [= *V. anagalis* Benth.] (K 489).

***Limnophila***: Key to the species:

1. Few upper leaves opposite, remaining alternate; flowers long-pedicelled; pedicels usually longer than calyx …. *L. indica*

1a. All upper leaves opposite; flowers sessile …. *L. heterophylla*

***Lindernia*:** Key to the species:

1. Leaves palmately 3-5-nerved: ……. ……. 2

1a. Leaves penninerved or 3-5-parallel nerved: ……. ….. 4

2. Leaves suborbicular to broadly ovate-cordate; flowers sessile …. *L. sessiliflora*

2a. Leaves ovate or lanceolate; flowers pedicelled: …… ….. 3

3. Fruiting pedicel 1.5 cm long; corolla 0.5 cm long; lower leaves ovate, rounded at the base …. *L. parviflora*

3a. Fruiting pedicels 2-4 cm long; corolla over 1 cm long; lower leaves lanceolate, acute at the base …. *L. hyssopioides*

4. Leaves penni-nerved, petioled; flowers pale violet; fruit oblong-cylindrical …. *L. crustacean*

4a. Leaves 3-5-parallel nerved, sessile; flowers white; fruits ovoid or orbicular …. *L. pyxidaria*

**PEDALIACEAE**
***Sesamum orientale*** L. (K 104)

**ACANTHACEAE**
***Hygrophila schulli*** (Hamilt.) M. R. & S. M. Almeida; [= *H. spinosa* T. Anders.] (K 203); ***H. polysperma*** (Roxb.) T. Anders. (K 162).

***Hygrophila***: Key to the species:

1. Plants armed with strong axillary spines; all leaves lanceolate; stamens 4 ….. *H. auriculata*

1a. Plants unarmed, small, glabrous to puberous herbs; leaves oblong; stamens 2 ..…. *H. polysperma*

**LENTIBULARIACEAE**
***Utricularia stellaris*** L. *f.* (K 217)

**VERBENACEAE**

1. Plants aromatic, erect, softly strigose; leaves ovate-oblong, crenate; bracts ovate-acuminate …..…. *Lippia alba*

1a. Plants not aromatic, creeping, minutely hairy; leaves crenate-spathulate, serrate; bracts obovate-acute …. *Phyla nodiflora*

***Lippia javanica*** (Burm.f.) Spreng., [= *L. geminata* H.B.K.] (K 223); ***Phyla nodiflora*** (L.) Greene, [= *Lippia nodiflora* Rich.] (K 228).

**LAMIACEAE**

1. Plants aromatic; leaves ovate: ….. …… 2

1a. Plants not aromatic; leaves linear …. *Leucas aspera*

2. Stamens 4, connective discrete of anther lobes; calyx ovoid …. *Ocimum americanum*

2a. Stamens 2, connective distructile of antherlobes; calyx 2-lipped ..... *Salvia plebej*

***Leucas aspera*** (Willd.) Link (K 105); ***Ocimum americanum*** L., [= *O. canum* Syms.] (K 180); ***Salvia plebeia*** R. Br. (K 201).

## LILIOPSISA

**PONTEDERIACEAE**

1. Flowers sessile; perianth strongly zygomorphic, posteri- or tepals with a discolourous blotch …. *Eichhornia crassipes*

1a. Flowers distinctly pedicelled; perianth actinomorphic, posterior tepals not with a discolourous blotch …. *Monochoria*

***Eichhornia crassipes*** (Mart.) Solms. (K 250); ***Monochoria hastata*** (L.) Solms. (K 333); ***M. vaginalis*** (N. Burm.) Presl. (M 302).

***Monochoria***: Key to the species:

1. Leaves sagittate or hastate; flowers maturing in succession …. *M. hastata*

1a. Leaves oblong-lanceolate; flowers mostly maturing simultaneously …. *M. vaginalis*

**CYPERACEAE**

1. Flowering glumes distichous: …… 2

1a. Flowering glumes spirally arranged …. *Fimbristylis*
2. Style 2-fid …. *Kyllinga*
2a. Style 3-fid: …… …… 3
3. Rachilla of spikelet persistent …. *Cyperus*
3a. Rachilla of spikelet deciduous …. *Mariscus cyperinus*

***Cyperus compressus*** L. (K 602); ***C. corymbosus*** Rottb. (K 402); ***C. distans*** L. f. (K 298); ***C. pilosus*** Vahl (K 227); ***C. platystylis*** R. Br. (K 303); ***C. procerus*** Rottb. (K 332); ***C. rotundus*** L. (K 7); ***C. tegetiformis*** Roxb. (K 309); ***Fimbristylis aestivalis*** (Retz.) Vahl (K 85); ***F. dichotoma*** (L.) Vahl (K 86); ***F. eragrostis*** (Nees & Meyen ex Nees) Hance (K 311); ***F. fuscinux*** C. B. Clarke (K 312); ***Kyllinga brevifolia*** Rottb. (K 430); ***K. nemoralis*** (J. R. & G. Forster) Dandy ex Hutch. & Dalz. (K 294); ***K. triceps*** Rottb. (K 472); ***Cyperus cyperinus*** (Reetzius) J. V. Suringar (K 298).

***Cyperus***: Key to the species:

1. Rooting in still water; nut corky below …. *C. platystylis*
1a. Rooting in marshy soil; nut not corky at base: …… …… 2
2. Rachilla of spikelets not prominently winged: …… ….. 3
3. Annuals with tufted stem …. *C. compressus*
3a. Perennials with woody rhizome and often long stolons: …. …. 4
4. Spikelets compressed: ……. …… 5
5. Corymbs close-set …. *C. pilosus*
5a. Corymbs lax …. *C. procerus*
4a. Spikelets spicate …. *C. distans*
2a. Rachilla of spikelets distinctly winged: ….. …… 6
6. Leaves short, rarely half as long as the stem: ….. …… 7
7. Spikelets pale straw coloured; bracts very short …. *C. tagetiformis*
7a. Spikelets rusty brown; bracts at least half as long as umbel rays …. *C. corymbosus*
6a. Leaves long, almost always more than half as long as stem …. *C. rotundus*

***Fimbristylis***: Key to the species:

1. Lower glumes distichous, upper ones irregularly subspiral …. *F. eragrostis*
1a. Glumes all regularly spiral: …… …… 2
2. Ligules present; nuts tuberculate …. *F. dichotoma*
2a. Ligules absent; nuts not tuberculate: ….. …… 3
3. Nuts straw-coloured …. *F. aestivalis*
3a. Nuts finely black …. *F. fuscinux*

***Kyllinga***: Key to the species:

1. Nut bearing glume winged in upper half of keel …. *K. nemoralis*
1a. Nut bearing glume not winged in upper half of keel: ….. … 2
2. Rhizome creeping, elongated …. *K. brevifolia*
2a. Rhizome very short …. *K. triceps*

**POACEAE**

1. Spikelets 2-flowered, falling entire at maturity: …… ……. 2
1a. Spikelets 1- to many flowered, breaking up at maturity above persistent glumes: … 3
2. Lower glumes turned away from rachis ……. *Paspalidium flavidum*
2a. Lower glumes turned towards the rachis…. *Brachiaria reptans*
3. Inflorescence of open or contracted panicle …. *Eragrostis tenella*
3a. Inflorescence of digitate spikes …. *Eleusine indica*

***Brachiaria reptans*** (L.) Gard. & Hubb. (K 23); ***Eleusine indica*** (L.) Gaertn. (K 393); ***Eragrostis tenella*** (L.) Beauv. *ex* Roem. *et* Schult. (K 38); ***Paspalidium flavidum*** (Retz.) A. Camus (K 147).

**HYDROCHARITACEAE**

1. Leaves cauline, linear to lanceolate, whorled; female flowers subsessile ..... *Hydrilla verticillata*

1a. Leaves radical, ribbon-like, spirally arranged; female flowers on long spirally twisted pedicels …. …… *Vallisneria spiralis*

***Hydrilla verticillata*** (L. f.) Royle (K 12); ***Vallisneria natans*** (Lour.) Hara (K 72).

**NAJADACEAE**

***Najas graminea*** Del. (K 13).

**ALISMATACEAE**

***Sagittaria sagittifolia*** L. (K 11).

**POTAMOGETONACEAE**

***Potamogeton crispus*** L. (K 55); ***P. mucronatus*** Presl. (K 76).

***Potamogeton***: Key to the species:

1. Leaves sessile, semi-amplexicaul at base …… *P. crispus*

1a. Leaves distinctly petiolate, truncate or cuneate at base …. *P. mucronatus*

## CONCLUSION

It is evident from the present study that Atrai is a branch of the River Tista and flowing through Bangladesh, many migratory weeds common to sub-himalayan tract and Bangladesh are perennating in this river-bed. Some of the common Bagladesh flora are *Alternanthera* spp., *Amaranthus* spp., *Lindernia* spp., *Monochoria* spp., *Persicaria* spp., *Hygrophila* spp., *Sagittaria sagittifolia*, etc. Some of the common sub-himalayan species are *Ageratum conyzoides, Cynoglossum lanceolatum, Chenopodium ambrosioides, Gnaphalium luteo-album, Mitracarpus villosus* and *Persicaria* spp., Many species have been migrated from crop fields and waste areas nearer to the course of river and found proper habitat for their survival in such fertile silty bed. From the last three years' of observation, it is evident that the same species are arising in the same region of the river-bed indicating that the migrules perennate through the viable seeds or vegetative parts during unfavorable condition i.e. when the river remains full of water in the monsoon. Moreover, these species complete their life cycle within the favorable period and then disappear. In such connection some of the species may be referred to as ephemeral migrants. Thus, the river Atrai shows partial linking of floras of Himalaya, Bangladesh and India, and makes a safe habitat for many of such weeds.

**Acknowledgement**

The author is grateful to Dr. Tapas Chakravarty, Head, Department of Batany, Balurghat College and other colleagues Prof. Chapal Ghosh, Dr. Gouri Das of this department for their encouragement and facilities. The author is further indebted to Mr. Hemanta Sarkar, Assistant Director, Bureau of A.E. & Statistics, Balurghat, D. Dinajpur, for supplying map of this district and encouragement.

## LITERATURE CITED

Bennet, S.S.R. 1987. *Name changes in flowering plants of India and adjacent regions*. Triseas Publishers, Dehra Dun.

Chakravarty, A.K. 1957. Weed flora of the paddy fields of West Bengal. *Indian Agric*. 1: 19 – 25.

Cook, C.D.K. 1996. *Aquatic and Wetland Plants in India*. Oxford University Press.

Culshaw, J.S. 1950. Some West Bengal Plants. *J. Bomb. Nat. Hist. Soc*. 49: 188 – 196.

Das, A.P. 2004. Floristic studies in Darjeeling Hills. *Bull. Bot. Surv. India* 43(1-4): 1 – 18.

Greuter, W., McNeill, J.; Barrie, F. R.; Burdet, H. M.; Demoulin, V.; Filgueiras, T. S.;. Nicolson, D. H; Silva, P. C.; Skog, J. E.; Trehane, P.; Turland, N. J.& Hawksworth, D. L. (eds.) 2000. *International code of botanical nomenclature: Saint Louis code: adopted by the Sixteenth International Botanical Congress*, St Louis, Missouri, July-August 1999. *Regnum Veg*. vol. 138.

Hajra, P.K.; Rao, R.R.; Singh, D.K. & Uniyal, B.P. 1995. *Flora of India*, Vol. 12 & 13. BSI, Calcutta.

Hajra, P.K.; Nair, V.J. & Daniel, P. 1997. *Flora of India*, Vol. 4. BSI, Calcutta.

Hooker, J.D. 1872-1897. *Flora of British India*. Vol. I to VII. L. Reeve & Co., Ltd. London.

Kamilya, P. & Paria, N. 1994. Chilkigarh (Midnapore)- A vegetational pocket. *J. Natl. Bot. Soc*. 48: 41 – 68.

Khan, N.S. & Halim, M.N. 1987. Aquatic Angiosperms of Bangladesh. National Herbarium, Dhaka, Bangladesh.

Prain, D. 1903. *Bengal Plants*. Vol. I & II. N.B. & Co., Calcutta.

Singh, N.P.; Vohra, J.N.; Hajra, P.K. & Singh, D.K. 2000. *Flora of India*, Vol. 5. BSI, Calcutta.

Takhtajan, A. 1997. *Diversity and Classification of Flowering Plants*. Columbia University Press.