

*Full Length Research Paper*

# **Studies on agrestal diversity in the sugarcane field of Howrah district, West Bengal, India: use as an important bioresource for human welfare**

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**Agrestals are small plants (weeds) in the agricultural field which have had a huge impact on agriculture through the ages, and they continue to effect agricultural practices today. Generally, weeds are plants said to grow where they are not wanted. They compete with crops for water, nutrients, light and space thus reduce crop yields, but not all weeds are undesirable. In many systems, weeds are useful elements. Their useful roles are; raising the level of soil organic matter, improving the level of nitrogen availability, conserving moisture in the soil, serving as alternate edible and medicinal plant sources, they repel insects and other pests through their smell, act as trap crops, as well as, being inhabited by beneficial insects and some other are useful plants for mankind. The present study reveals that we surveyed (collection, identification, proper documentation and their uses) and details about these valuable weeds. A total twenty five (25) species were properly documented. These beneficial roles may build the agrestals a future bioresource for human welfare directly or indirectly.**

**Key words:** Agrestals, organic matter, edible, medicinal plant, repel insects, trap crops, bioresource.

## **INTRODUCTION**

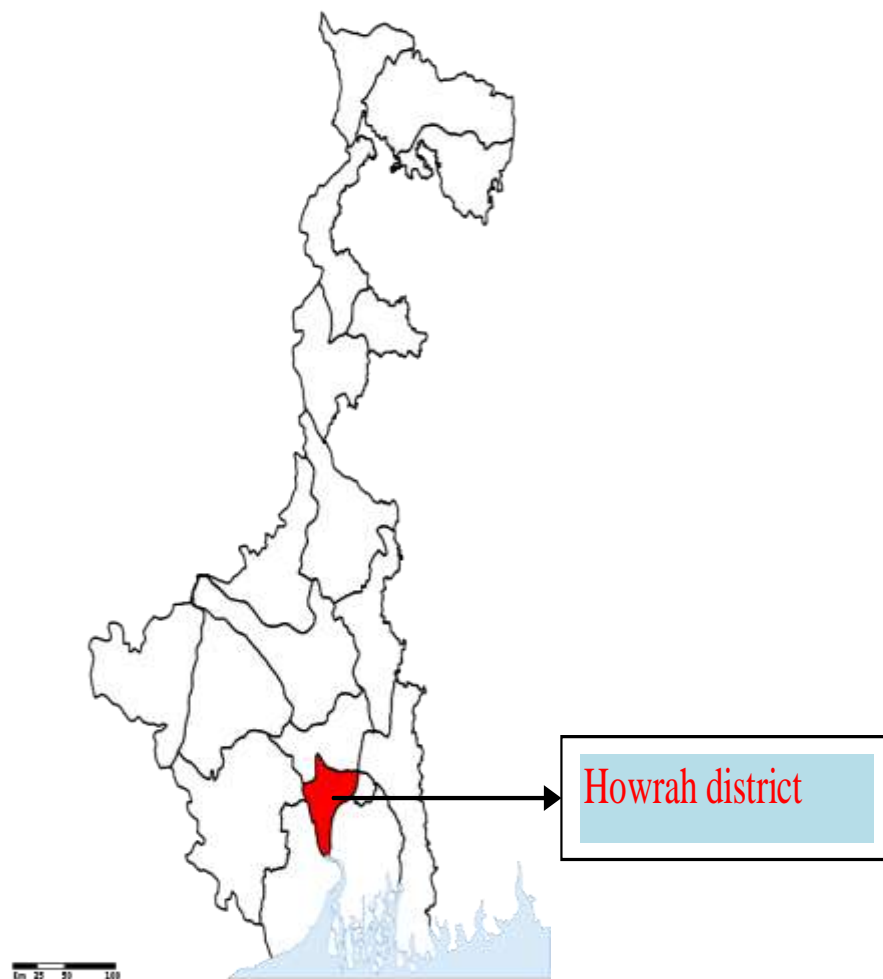
Weeds have had a huge impact on agriculture through the ages, and they continue to effect agricultural practices today. Agriculture pushes succession back to its early stages, providing prime colonizing opportunities for weeds, and hence, weeds will continue to be present in agricultural pursuits in the future. Weeds have been defined many times, and in many ways. Literally, agrestal means agricultural weed (Rao et al., 2008). A weed is a plant which, in any specified geographical area, belongs to a population which grows entirely or predominantly in situations markedly disturbed by men (Baker, 1965). But not all weeds are undesirable. In many systems, particularly in the tropics, weeds are useful elements in agricultural systems. Certain weeds have been shown to increase the profitability of a system (Showler and Reagan, 1991). Weeds are often used in tropical systems as cover crops and to minimize nutrient and soil loss

through erosion and leaching. Traditionally, weeds have been controlled in order to improve crop yield and quality. Weeds compete with the crop for the available water, nutrients, light and space (Raju, 1998). Weed control in crops, and application of herbicides in particular, is associated with a tendency to provoke environmental and ecotoxicological effects. However, not all weeds have a negative effect on the crop, and it is important to consider the individual system when assessing the impact and losses due to weeds in order to determine the ideal treatment (Dutta and Banerjee, 1978). At low densities, weeds often don't affect the yield (Altieri, 1988). Firstly, the effect of the weed must be assessed. In many areas, weeds have both positive and negative effects. It is often possible to leave weeds with the crop for a certain period of time, the period threshold before using control methods.

## **MATERIALS AND METHODS**

The preliminary field surveys were made in different places of

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**Figure 1.** Howrah district (study area) in red color within West Bengal.

Howrah district (Figure 1) following blocks during 2008 to 2011: Udaynarayanpur, Amta I and II, 22.34°N latitude and 88.0°E longitude; Bagnan I and II, 22.47°N latitude and 87.97°E longitude; Uluberia I and II, 22.47°N latitude and 88.11°E longitude; Balijagacha, 22.65°N latitude and 88.34°E longitude; Domjur, 22.64°N latitude and 88.22°E longitude; Panchla, 22.54°N latitude and 88.14°E longitude; Sankrail, 22.58°N latitude and 88.24°E longitude. Various data about the importance of agricultural weed were recorded from field survey and resourceful persons (farmers and land owners). Collected voucher specimens were deposited in the herbarium of the Department of Botany and Forestry, Vidyasagar University. Plants were identified with the help of herbarium specimen of different weeds with the help of the experts. Herbarium specimens prepared and deposited for future reference. The present paper deals with the valuable function of agricultural weed to crop plant and many others.

## RESULTS

After detailed survey throughout the district, it was found that the sugarcane fields of this district contain many valuable weeds, which can be used directly or indirectly

as bioresource for human welfare presently and in the near future. Weeds can be used directly as medicinal, as food, fodder, ornamental and other human uses. Indirectly some of these weeds were found to act as bioresource, which can save the main crop plant and also help to increase the yield. Out of 39 species of agrestals collected from sugarcane field, 24 sp. of agrestals possess economic importance in various ways (Table 1). The different uses of these agrestals are medicinal, edible, fodder, ornamental, pest repeler, narcotic drug and trap crop which are enumerated thus:

### Medicinal plants

#### *Monocots*

##### 1) *Commelina benghaensis* L. (Figure 2)

Local name: Kanchira; Family: Commelinaceae;  
Medicinal uses: Leaf juice used as an antidote to

**Table 1.** Collected and reported of all the Plant species from study area (Bentham and Hooker system of classification, 1883).

	Series	Cohorts	Family/Order	Species	Importance
Dicotyledonum polypetalorum	Series iii. calyciflorae	Cohors xiii. passiflorales	Lxxv. cucurbitaceae	1) <i>Coccinia indica</i> wight and arn	Medicinal
		Cohors xv. umbellales	lxxx Umbeliferae	2) <i>Centella asiatica</i> (Linn) urban	Medicinal
	series i. inferae	Cohors I. rubiales	Lxxxiv rubiaceae	3) <i>Oldenlandia corymbosa</i> L	Medicinal
		Cohors li. Asterales	Lxxxviii. compositae	4) <i>Eclipta prostrata</i> L	Medicinal
Dicotyledones Gamopetalae	series iii. bicapellatae	Cohors VIII. polemoniales	Cxiv. Solanaceae	5) <i>Eupatorium odoratum</i> L	Medicinal and trap crop
				6) <i>Mikania cordata</i> L	Medicinal
				7) <i>Enhydra fluctuens</i> Lour	Edible
				8) <i>Ageratum conyzoides</i> L	Ornamental and pest repellent
				9) <i>Ageratum houstonianum</i>	Ornamental
				10) <i>Spilanthes paniculata</i> Wall. ex DC	Ornamental
Dicotyledones monochlamideae	Series I. curvembryeae	Cohors IX. Personales	Cxxv. Scrophulariaceae	11) <i>Solanum nigrum</i> Linn	Medicinal
				12) <i>Nicotianatabacum</i> L	Narcotic
	Series vii. unisexuales	Cxxx. amarantaceae	13) <i>Scopariadulcis</i> L	Medicinal	
			14) <i>Mazus reptans</i> N.E.Br	Ornamental	
			15) <i>Alternanthera sessilis</i> (l) dc	Medicinal and edible	
Series iii coronarieae	Cli. euphorbiaceae	16) <i>Phyllanthus urinaria</i> Linn.	Medicinal		
Series v. nudifloreae	Clxxxiii. commelinaceae	17) <i>Commelina benghaensis</i> Linn	Medicinal		
	Cxci. aroidae	18) <i>Colocasia esculenta</i> (Linn) schott	Edible		

Table 1. Contd.

Monocotyledones	Series vii. glumaceae	Cxcix. cyparaceae	19) <i>Kylinga monocephala</i> Rottb.	Medicinal
			20) <i>Cyperus rotundus</i> L	Medicinal and fodder
		Cc. Graminae	21) <i>Dactyloctenium aegypticum</i> (L) Beauv	Medicinal
			22) <i>Sporobolus diander</i> R.Br	Fodder
			23) <i>Brachiaria mutica</i> (Forsskil) Stapf	Fodder
			24) <i>Cynodon Dactylon</i> (L) Pers	Medicinal and fodder

Figure 2. Vegetative twig of *Commelina benghaensis* L.

snakebite and whole plant used to treat leprosy (Paria, 2005).

2) ***Dactyloctenium aegypticum* (L) Beauv.** (Figure 3)

Local name: Makra; Family: Poaceae; Medicinal uses: Parched grains are administered to women who suffer

from stomach ache after child birth (Paria, 2005).

3) ***Kylinga monocephala* Rottb.** (Figure 4)

Local name: Nirbish; Family: Cyperaceae; Medicinal uses: whole plant used as an antidote to snakebite, root useful in fever, extract with water taken to treat excessive



Figure 3. Flowering twig of *Dactyloctenium aegypticum* (L) Beauv.



Figure 4. Flowering twig of *Kylinga monocephala* Rottb.

thirst in fever and diabetes, diuretic (Paria, 2005).

4) ***Cynodon Dactylon* (L) Pers.** (Figure 5)

Local name: Durba; Family: Poaceae; Medicinal uses: Plant juice is astringent, diuretic, used in dropsy;

hysteria.epilepsia and so on. Root-Decoction is diuretic (Paria, 2005).

5) ***Cyperus rotundus* L.** (Figure 6)

Local name: Motha; Family: Cyperaceae; Medicinal uses: Whole plant is antidiysenteric, appetizer, used to treat fever, ulcers, eye inflammation, itching (Paria, 2005).

**Dicots**

1) ***Eclipta prostrata* L.** (Figure 7)

Local name: Keshute; Family: Asteraceae; Medicinal uses: Leaves used in jaundice, fever and help to promote hair growth (Joy et al., 1998).

2) ***Phyllanthus urinaria* L.** (Figure 8)

Local name: Bhui amla; Family: Euphorbiaceae; Medicinal uses: Whole plant used as uretic, antibacterial, used in gonorrhoea, bronchitis, asthma. Immature leaves used in night blindness (Paria, 2005).

3) ***Alternanthera sessilis* (L) Dc.** (Figure 9)

Local name: Sanchi; Family: Amaranthaceae; Medicinal uses: Whole plants used to treat night blindness, snake bite. Cooked juice given to treat eye disease (Paria, 2005).

4) ***Solanum nigrum* L.** (Figure 10)

Local name: Kakmachi; Family: Solanaceae; Medicinal uses: Whole plants used in asthma, bronchitis, diarrhea, heart and kidney disease. Root used in urinary troubles. Leaf is used as a laxative (Joy et al., 1998).

5) ***Centella asiatica* (L) Urban.** (Figure 11)

Local name: Thankuni; Family: Apiaceae; Medicinal uses: Leaves juice used in fatigue, bloodless, weakness, indigestion, loss of memory, irregular menstruation, cold, cough, jaundice, fever (Joy et al., 1998).

6) ***Amaranthus spinosus* L.** (Figure 12)

Local name: Kantanotey; Family: Amaranthaceae; Medicinal uses: Whole plant used as laxative, diuretic and used in blood disease (Paria, 2005).

7) ***Oldenlandia corymbosa* L.** (Figure 13)

Local name: Snake-needle grass; Family: Rubiaceae; Medicinal uses: Whole plant used to clear body heat, resolve toxins, promoting blood circulation to subdue swelling, and promoting diuresis.It's good to treat sore throats, urinary tract infections, alterative herb that lowers



Figure-5: Patches of *Cynodon Dactylon* (L) Pers.



Figure 6. Vegetative part of *Cyperus rotundus* L.

fever (Tewari, 2000).

8) ***Eupatorium odoratum* L.** (Figure 14)

Family: Asteraceae; Medicinal uses: *Eupatorium Odoratum* Capsule reduce desire to smoke. The leaf juice is used topically by the Mizo as an antiseptic. The

juice is also applied externally to remove pinworm from the anus (Paria, 2005).

9) ***Mikania cordata* L.** (Figure 15)

Local name: Ravan lata; Family: Asteraceae; Medicinal uses: Leaves juice used to treat the wounded portion (Paria, 2005).

10) ***Scoparia dulcis* L.** (Figure 16)

Local name: Ban dhane; Family: Scropulariaceae; Medicinal uses: Whole plant used to treat stone in bladder. Leaves used to treat cough (Paria, 2005).

11) ***Coccinia indica* Wight and Arn.** (Figure 17)

Local name: Ban Kundri; Family: Cucurbitaceae; Medicinal uses: Roots and leaves used to treat cough, jaundice. Fruits used to treat cough, bad taste (Joy et al., 1998).

## II. Edible plants

1) ***Enhydra fluctuens* Lour.** (Figure 18)

Local name: Hince; Family: Asteraceae; Uses: Whole vegetative parts without root used as vegetable by local people.

2) ***Alternanthera sessilis* (L) DC.** (Figure 9)

Local name: Sanchi; Family: Amaranthaceae; Uses: Plant used as vegetable by local people.

3) ***Colocasia esculenta* (Linn) Schott.** (Figure 19)

Local name: Alti Kachu; Family: Araceae; Uses: Corm used as vegetable by local people.

## III. Fodder plants: (Patil and Janagoudar, 1993)

1) ***Cynodon dactylon* (L) Pers.** (Figure 5)

Local name: Durba; Family: Poaceae.

2) ***Brachiaria mutica* (Forsskil) Stapf.** (Figure 20)

Local name: Para; Family: Poaceae.

3) ***Sporobolus diander* R.Br.** (Figure 21)

Local name: Suri; Family: Poaceae.

4) ***Cyperus rotundus* L.** (Figure 6)

Local name: Motha; Family: Cyperaceae.



**Figure 7.** Flowering twig of *Eclipta prostrata* L.



**Figure 8.** Vegetative twig of *Phyllanthus urinaria* L.



**Figure 9.** Flowering twig of *Alternanthera sessilis* (L) Dc.



**Figure 10.** Twig of *Solanum nigrum* L. with fruits





**Figure 11.** Patch of *Centella asiatica* (L) Urban.



**Figure 12.** Flowering twig of *Amaranthus spinosus* L.



**Figure 13.** Flowering twig of *Oldenlandia corymbosa* L.



**Figure 14.** Flowering twig of *Eupatorium odoratum* L.



**Figure 15.** Climbing view of *Mikania cordata* L.



**Figure 16.** Flowering twig of *Scoparia dulcis* L.



**Figure 17.** Flowering twig of *Coccinia indica* Wight & Arn.



**Figure 18.** Vegetative twig of *Enhydra fluctuens* Lour.



**Figure 19.** Vegetative twig of *Colocasia esculenta* (Linn) Schott.



**Figure 20.** Flowering twig of *Brachiaria mutica* (Forsskil) Stapf.



Figure 21. Flowering twig of *Sporobolus diander* R.Br.

#### IV. Ornamental plants

1) ***Ageratum conyzoides* L.** (Figure 22)

Family: Asteraceae.

2) ***Ageratum houstonianum* Mill.** (Figure 23)

Family: Asteraceae.

3) ***Mazus reptans* N.E.Br.** (Figure 24)

Family: Scrophulariaceae.

4) ***Spilanthes paniculata* Wall. ex DC.** (Figure-25)

Family: Asteraceae.

#### V. Pest repelling plants

1) ***Ageratum conyzoides* L.** (Figure 22)

Family: Asteraceae. This weed may increase the population of predatory mite *Amblyseius newsami*, an effective natural enemy of *Panonychus citri*, and keep the population of *P. citri* at low and noninjurious levels.

2) ***Ageratum houstonianum* Mill.** (Figure 23)

Family: Asteraceae. This plant repels insects (mosquito) due to their coumarin.

#### VI. Trap crops

1) ***Eupatorium odoratum* L.** (Showler et al., 1990). (Figure 26)

Family: Asteraceae.

#### VII. Narcotic drug

1) ***Nicotiana tabacum* L.** (Figure 27)

Common name: Tobacco; Family: Solanaceae; Use: Plants grown commercially in many countries for its leaves are to be processed into tobacco. Every plant part except seed contains nicotine.

#### DISCUSSION

The study thus reveals that the sugarcane fields contain many valuable weeds, which we could use as



**Figure 22.** Flowering twig of *Ageratum conyzoides* L.



**Figure 23.** Flowering twig of *Ageratum houstonianum* Mill.



**Figure 24.** Flowering twig of *Mazus reptans* N.E.Br.



**Figure 25.** Flowering twig of *Spilanthes paniculata* Wall. ex DC.

bioresource for human welfare. Local people and local drug collectors can use these fields for collection of

various medicinal (16 species), edible (03 species), fodder (04 species) and ornamental plants (04 species).





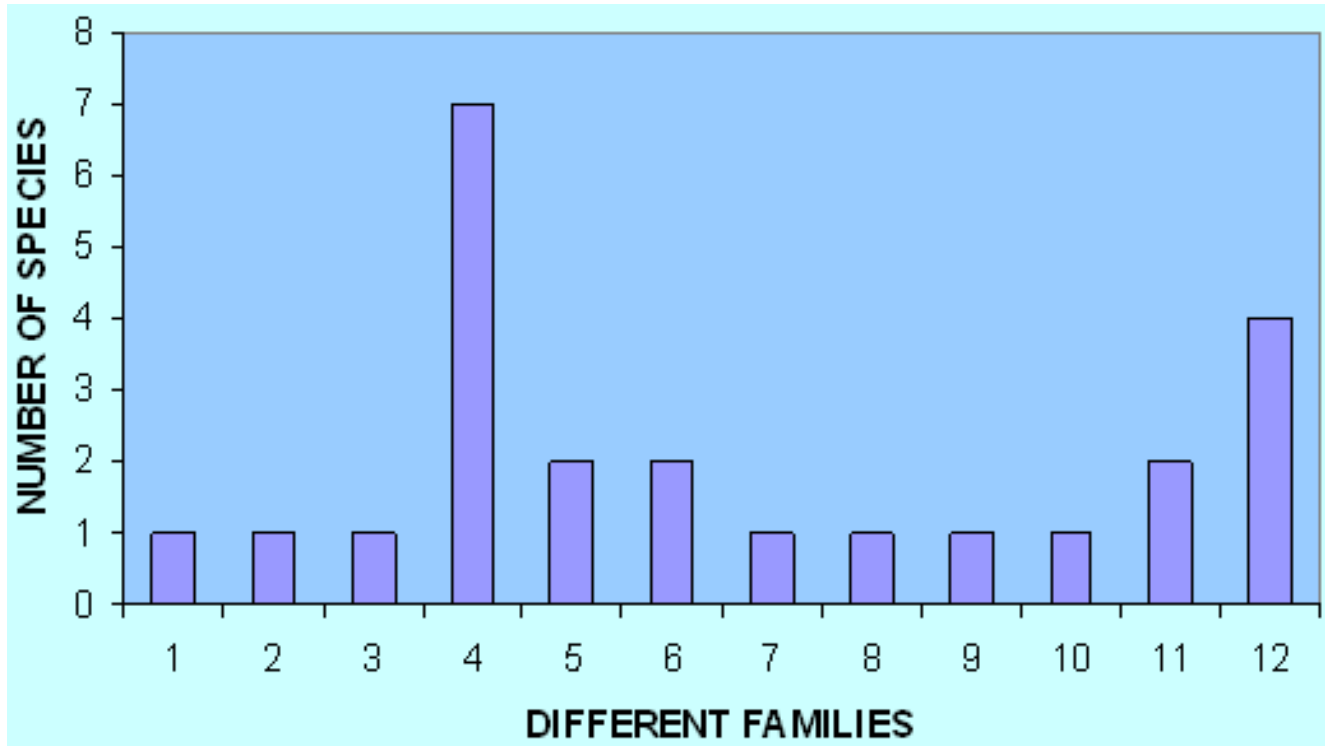
**Figure 26.** Flowering twig of *Eupatorium odoratum* L. with trap insects



**Figure 27.** Flowering twig of *Nicotiana tabacum* L.

Collected plants are arranged according to Bentham and Hooker system of classification (Table 1). Different species representation through classification system helps us to understand the overall structure and function of this study area at a glance also get accurate and

precise information of the reported plant species. The study also reveals that some weeds of this fields help to protect sugarcane plant. *Ageratum conyzoides* Linn protects sugarcane plants by repelling insects and other pests through their special smell. *Eupatorium odoratum* s



**Graph 1.** Graphical representation of total number of species belonging to different families. Viz. 1. Cucurbitaceae, 2. Apiaceae, 3. Rubiaceae, 4. Asteraceae, 5. Solanaceae, 6. Scrophulariaceae, 7. Amaranthaceae, 8. Euphorbiaceae, 9. Commelinaceae, 10. Araceae, 11. Cyperaceae, 12. Poaceae.

acts as trap crops, distracting pests away from sugarcane plants. Insects search for these weed plants by their smell, and then land on them. After landing they use these weeds as substratum for reproduction. They thus avoid the main crop by staying on these weeds instead of going on to the intended victim. *Ageratum conyzoides* Linn have another function due their alkaloid they repel mosquitoes if they planted in garden then they remove mosquitoes naturally. Among three food plants of this field, uses of *Enhydra fluctuans* Lour are more than other two species. *Brachiaria mutica* (Forsskil) Stapf, is the one of the best tropical forage grass found in this field (Dwari and Mondal, 2011). In the sugarcane field of this district, Asteraceae and Poaceae are the dominant families from dicot and monocot respectively (Graph 1). So, from this study it is clear in low density of these weeds are valuable and up to certain level there is no requirement to remove these weeds for ecological sustainability.

### Conclusion

We can conclude from this study that agrestals are not only harmful plants but also in some cases and locality they are beneficial also. Through their control activity, we can help to the main crop plant and by their uses local people also can gain benefit.

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