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**Journal of Bangladesh Agricultural University**Journal home page: <http://baures.bau.edu.bd/jbau>, [www.banglajol.info/index.php/JBAU](http://www.banglajol.info/index.php/JBAU)**Survey on Asteraceae weeds at Bangladesh Agricultural University campus and reviewed their ethno-botanical uses**

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✉: [drsarwar@bau.edu.bd](mailto:drsarwar@bau.edu.bd)**ABSTRACT**

The cosmopolitan family Asteraceae is the largest family of flowering plants. As a part of taxonomic investigation on the “Weed flora of Bangladesh Agricultural University Campus”, the Asteraceae weed diversity was studied and their ethno-botanical, ethno-medicinal and other uses, and importance were reviewed from published literature. A total of 26 species belongs to 21 genera of this family was collected and identified. In context to the number of species, *Blumea* was the most dominant genus (with 4 species) followed by *Gnaphalium* (with 3 species); while 19 genera were represented by single species each at this campus. Among the species, *Ageratum conyzoides*, *Blumea lacera*, *Mikania cordata*, *Spilanthes calva*, *Vernonia cinerea*, *Xanthium indicum* and *Youngia japonica* were the most population rich and found mostly in the fallow lands, roadsides and levees of crop field. The knowledge of flowering time/period could be helpful for the effective management of the particular weed species. Some of these weed species have ethno-botanical uses e.g., high medicinal value, consumed as vegetable and salad, feed, fodder, etc. The rigorous taxonomic studies would be helpful for the sustainable management of Asteraceae weed species at this campus as well as the country as a whole, which will ensure higher economic returns without disturbing the agro-ecosystems.



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**Introduction**

Family Asteraceae (alternate name Compositae), also known as daisy family, sunflower family or thistle family, is the largest family of the flowering plants with more than 24,000–30,000 species and 1,600–1,700 genera (Funk *et al.*, 2005). It has cosmopolitan distribution and found almost every environment and continent except Antarctica. The greater proportions are herbaceous, although approximately 2% are trees or shrubs (Lawrence, 1973). Although some obnoxious weeds of crop fields belong to this family, plants of this family have a wide ethno-botanical importance, providing products such as food and vegetable, cooking oils, lettuce, sunflower seeds, artichokes, sweetening agents, coffee substitutes and herbal teas. Some of the genera of this family e.g., *Tagetes*, *Aster*, *Helianthus*, *Chrysanthemum*, etc. are ornamentals and most of them have medicinal values e.g., antibacterial, antifungal, anti-inflammatory, insecticide, antitumor capacities, etc. Many members of Asteraceae are shown to have pharmacological activity which contained important phytochemical compounds such as polyphenols, flavonoids, and diterpenoids (Singh *et al.*, 2002).

In Bangladesh, Asteraceae is the largest family of broadleaf weeds in context to number of species which

represented about 22 weed species belong to 19 genera while 16 genera were represented by single species (Karim and Kabir, 1995).

However, the detailed taxonomic study of weeds is being overlooked by both the practising plant taxonomists (botanists) and/or the agronomists. Recently, a survey of members of family Asteraceae have been made by Rahman *et al.* (2008) in Rajshahi Division and 27 Asteraceae weed species was identified from Rajshahi District (Rahman, 2013). A few studies were carried out on the occurrences of sedges (Sarwar and Prodhon, 2011; Jannat-E-Tajkia *et al.*, 2018), grasses (Sagar *et al.*, 2018), broad-leaf weed (Khatun *et al.*, 2019) and aquatic weeds (Islam *et al.*, 2017) at the Bangladesh Agricultural University (BAU) campus also. Hitherto, the diversity of Asteraceae family weeds has not been studied yet at this campus. Moreover, the knowledge on flowering periods is much more effective for planning and implementation of effective weed control measures below the economic threshold level. Therefore, the present survey was undertaken to know the diversity of Asteraceae weed species and their flowering time/period by an intensive field survey and to understand their alternate uses through ethno-botanical literature review.

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## Materials and Methods

A field survey for taxonomic investigation on the weed species of the family Asteraceae growing throughout BAU campus was carried out during the period from August 2018 to July 2019. The campus was divided into five subunits viz. research fields, farm areas, office area/premises, roadsides & fallow lands, and residential areas, on the basis of area coverage to make a complete survey of the whole campus and was visited frequently (once a week) to study the phenology of the Asteraceae weed species. During the survey, fresh flowering samples were collected when available. Relevant information e.g., collection location & date, habitat, crop/plant association, etc., were recorded during field collection. Field photographs of live specimens were also taken during collection (Fig. 1, Fig. 2, and Fig. 3). Herbarium specimens were prepared as vouchers by drying the fresh samples properly. The dried specimens were mounted on the herbarium sheet and preserved in Prof. Dr. Arshad Ali Herbarium at the Botanical Garden, Department of Crop Botany, Bangladesh Agricultural University. The collected fresh (or dried) specimens were identified in the field or by comparing with herbarium specimens or published literature or consulting with experienced taxonomist at the Bangladesh National Herbarium, Dhaka. The ethno-botanical, viz. ethno-medicinal and other uses, importance of the identified species were included after thorough review of published literature. The major literature consulted was “Encyclopedia of Flora and Fauna of Bangladesh” (Ahmed *et al.*, 2008) and other taxonomy related books (BrindhaDevi and Amutha, 2011; GuhaBakshi *et al.*, 1999; Sarwar and Prodhan, 2011 for detail).

## Results and Discussion

A total 26 Asteraceae weed species under 21 genera and were found in BAU campus (Table 1). The number of Asteraceae weed taxa reported in recent studies (this article; Rahman, 2013) is larger compared to Karim and Kabir (1995); it might due to introduction or invasion of new taxon as a weed. Anthropogenic activities may act as a vector to introduce new weeds from other location (country) with various crop seeds. For example, the *Parthenium* (*P. hysterophorus* L.) weed was introduced from the USA via India or Australia through wheat import ([https://www.apwss.org/documents/newsletters/parthenium/Parthenium\\_News\\_Jan\\_2010.pdf](https://www.apwss.org/documents/newsletters/parthenium/Parthenium_News_Jan_2010.pdf)). The misidentification of taxon (pl. taxa) might be another possibility of lower weed number reported in the previous study (Karim and Kabir, 1995). Among these 21 genera, the most dominant genera were *Blumea* with 4 species followed by *Gnaphalium* having 3 species; and these two genera together account for 26.9% of total weed species of this family in the BAU campus (Table 1). Nineteen genera were represented by single species each at BAU campus, of which 14 genera viz. *Ageratum*, *Chromolaena*, *Cotula*, *Crassocephalum*,

*Eclipta*, *Enhydra*, *Grangea*, *Hemistepta*, *Ixeris*, *Mikania*, *Syndrella*, *Tridax*, *Xanthium* and *Youngia*, were represented by single species only in Bangladesh as well (Ahmed *et al.*, 2008). Among the reported weed species, population density of *Ageratum conyzoides*, *Blumea lacera*, *Mikania cordata*, *Spilanthes calva*, *Vernonia cinerea*, *Xanthium indicum* and *Youngia japonica* was higher at BAU campus. Some of these weed species are common and major weeds in the wheat, boro rice and other crop fields (Huda *et al.*, 2017; Salam and Begum, 2017). Weed species found in the study area occupy diverse habitat including roadsides, fallow lands, various crop fields, open fields, levees of crop field, nursery beds, bushy areas, dry lands, shallow water bodies, etc. (Table 1). Most of the weeds are very common in roadsides, crop fields, levees of the crop field, fallow lands especially the species of the genus *Ageratum*, *Vernonia*, *Blumea*, *Gnaphalium*, *Eclipta*, *Mikania*, *Youngia*, *Xanthium*, etc. Only three aquatic species viz. *Enhydra fluctuans*, *Eclipta alba* and *Spilanthes calva*, were found in this habitat, drying-up of the area could be used as a means of physical control of these weeds. Rest of the twenty three species were reported to occur in more or less dry habitat that can be submerged by irrigation as a method of physical control.

The effective management activities for Asteraceae weeds have a wide range of variation. Proper control of weeds requires persistence and vigilance as well as an understanding of weed management principles and the weed's life cycle. Different cultural methods such as mowing, roguing, hoeing, tillage, different mulches or cover crop, draft ploughing, etc. are still used in the world to manage weeds including grasses, sedges and many broadleaf weeds (Shear, 1985). The knowledge of phenology (flowering period) may play a very important role for the management of weeds (Jannat-E-Tajkia *et al.*, 2018; Sagar *et al.*, 2018; Khatun *et al.*, 2019). It is also essential to understand the flowering period of Asteraceae weeds to select the time of roughing and other management practices. The flowering periods of most of the collected weed species were throughout the experimental period i.e. from the month of August-July (Table 1). Population of Asteraceae weeds can be maintained below the economic threshold level, if these weeds can be managed before flowering. Plants (weeds) of the family Asteraceae have much diversified ethno-medicinal and other uses (Ahmed *et al.*, 2008; Table 2). Out of 26 species, about 19 species have high ethno-medicinal uses. Interestingly some plants (/plant parts) are used to cure different diseases; on contrary, different plants (/plant parts) are also used for the same disease. For example, *Ageratum conyzoides*, *Blumea lacera*, *Blumea mollis*, *Crassocephalum crepidiodes*, *Eclipta alba*, *Emilia sonchifolia*, *Enhydra fluctuans*, *Spilanthes calva*, *Xanthium indicum* have higher ethno-medicinal value and different plant parts and its derivatives are being used for the treatment of multiple diseases (Table 2). Leaf juice of *Ageratum conyzoides*, leaf paste of *Chromolaena odorata*, leaf sap of *Crassocephalum*

*crepidiodes*, leaves of *Gnaphalium luteoalbum*, leaf paste of *Gnaphalium polycaulon* and leaves of *Mikania cordata* are being practiced for curing different kind of wounds. For the remedy of fever, leaf juice of *Blumea lacera*, decoction of *Eclipta alba* and *Emilia sonchifolia* plant, plant juice of *Ixeris polycephala* and *Youngia japonica* plant are consumed. Stomach pain is relieved by the use of plant juice of *Ageratum conyzoides*, leaf sap of *Crassocephalum crepidiodes*, leaves of *Grangea maderaspatana*, *Senecio vulgaris* plant and leaf juice of *Syndrella nodiflora*. Whole plant decoction of *Ageratum conyzoides*, leaf of *Blumea mollis* and *Enhydra fluctuans* are utilized for the treatment of skin diseases. Diarrhoea is recovered by the swallowing of plant juice of

*Ageratum conyzoides*, boiled herb of *Blumea mollis* and roots of *Emilia sonchifolia*. About 7 species are consumed as vegetable and 3 species as salad by the ethnic peoples (Table 2). Young shoot of *Blumea lacera*, tender leaves of *Crassocephalum crepidiodes*, leaves of *Enhydra fluctuans* and *Mikania cordata*, leaves and young stem of *Ixeris polycephala*, shoot of *Vernonia cinerea* and young leaves of *Youngia japonica* are eaten as vegetable. Tender leaves of *Crassocephalum crepidiodes*, leaves of *Emilia sonchifolia* and young leaves of *Senecio vulgaris* are consumed as salad. Some of them are used as food, fodder, feed, head hair restorer, repellent and weed suppressor.

Table 1. Weeds from the family Asteraceae recorded in the Bangladesh Agricultural University campus

| Sl. | Botanical Name  | Local Name         | English Name               | Flowering Period    | Habitat  | Fig. |
|-----|---|--------------------|----------------------------|---------------------|--|------|
| 1   | <i>Ageratum conyzoides</i> (L.) L.                    | Fulkuri            | Billy Goat Weed            | November-February   | Open fields, roadsides   | 1A   |
| 2   | <i>Blumea lacera</i> (Burm. f.) DC.                   | Barokukshim        | Not known                  | November-February   | Wastelands like roadsides, fallow lands  | 1B   |
| 3   | <i>Blumea laciniata</i> (Roxb.) DC.                   | Not known          | Cutleaf False Oxtongue     | Throughout the year | Roadsides, Wastelands, levees of crop field  | 1C   |
| 4   | <i>Blumea mollis</i> (D. Don) Merr.                   | Not known          | Soft Blumea                | December-February   | Roadsides, fallow lands, levees of crop field  | 1D   |
| 5   | <i>Blumea oxyodonta</i> DC.                           | Not known          | Spiny Leaved Blumea        | February-March      | Open fields, dry lands   | 1E   |
| 6   | <i>Chromolaena odorata</i> (L.) King & Robinson       | Bara shialmuti     | Paraffin Weed              | November-February   | Roadsides, bushy areas   | 1F   |
| 7   | <i>Cotula hemisphaerica</i> Wall. ex Benth. & Hook.f. | Babuni             | Not known                  | December-February   | Dry sandy soil, fallow lands, roadsides  | 1G   |
| 8   | <i>Crassocephalum crepidiodes</i> (Benth.) S. Moore   | Not known          | Red flower Rag leaf        | September-February  | Dry soil, sandy soil, shady lands, roadsides   | 1H   |
| 9   | <i>Eclipta alba</i> (L.) Hassk.                       | Kesuti/ Kalokeshi  | False Daisy                | Throughout the year | Damp wastelands, cultivated fields, roadsides and drains                                 | 1I   |
| 10  | <i>Emilia sonchifolia</i> (L.) DC.                    | Mechitra/ Sadimudi | Lilac Tassel flower        | Throughout the year | Uncultivated open fields, edges of fallow lands, loose soil and sandy moist places.      | 2A   |
| 11  | <i>Enhydra fluctuans</i> Lour.                        | Helencha           | Water Cress                | January-February    | Aquatic in ponds, shallow water bodies   | 2B   |
| 12  | <i>Gnaphalium luteoalbum</i> L.                       | Bara Kamra         | Weedy Cudweed              | August-February     | Moist fallow lands, roadsides, open fields, sides of the rice field, levee of crop field | 2C   |
| 13  | <i>Gnaphalium pennsylvanicum</i> Willd.               | Not known          | Pennsylvania Cudweed       | January-February    | Roadsides and cultivated fields and nursery beds   | 2D   |
| 14  | <i>Gnaphalium polycaulon</i> Pers.                    | Not known          | Many-stem Cudweed          | December-February   | Shady moist soils, fallow lands and dry sandy soils                                      | 2E   |
| 15  | <i>Grangea maderaspatana</i> (L.) Poir.               | Nemuti             | Madras worm-wood           | January-February    | Moist and loose soil, levees of crop fields  | 2F   |
| 16  | <i>Hemistepta lyrata</i> Bunge ex Fischer et Mey.     | Not known          | Not known                  | February            | Cultivated beds, levees of crop field  | 2G   |
| 17  | <i>Ixeris polycephala</i> Cass.                       | Not known          | Not known                  | November-February   | Agricultural fields, levees of the crop fields and roadsides                             | 2H   |
| 18  | <i>Mikania cordata</i> (Burm.) Robinson               | Assam-lata         | Heartleaf Hemp vine        | October-February    | Roadsides, bank of ponds, fallow lands   | 2I   |
| 19  | <i>Senecio vulgaris</i> L.                            | Tasneirinha        | Common Groundsel           | December-February   | Crop fields, levees of crop fields, wastelands and road sides                            | 3A   |
| 20  | <i>Spilanthes calva</i> DC.                           | HoludNakful        | Toothache plant            | Throughout the year | Fields, wastelands, damp locations, fallows lands, semi-aquatic areas and roadsides.     | 3B   |
| 21  | <i>Syndrella nodiflora</i> (L.) Gaert.                | Not known          | Cinderella weed            | Throughout the year | Dry soils, roadsides, near hedges  | 3C   |
| 22  | <i>Tridax procumbens</i> L.                           | Tridhara           | Coat Button                | April-July          | Dry soils, roadsides   | 3D   |
| 23  | <i>Vernonia cinerea</i> (L.) Less.                    | Kuksim             | Little Ironweed            | Throughout the year | Sandy soil, roadsides, dry areas, waste places, open fields                              | 3E   |
| 24  | <i>Wedelia trilobata</i> (L.) A.S. Hitchc.            | Not known          | Creeping Daisy             | Throughout the year | Roadsides and gardens  | 3F   |
| 25  | <i>Xanthium indicum</i> Koen.                         | Ghagra             | Rough Cocklebur            | Throughout the year | Shady places, fallow lands, roadsides, and cultivated fields                             | 3G   |
| 26  | <i>Youngia japonica</i> (L.) DC.                      | Not known          | Oriental False Hawks beard | August-February     | Fallow lands, moist soil, open fields, roadsides   | 3H   |

Table 2. Ethno-botanical uses of Asteraceae weeds recorded at the BAU campus

| Sl. | Botanical Name                    | Ethno-botanical uses   | References  |
|-----|-----------------------------------|--|---|
| 1   | <i>Ageratum conyzoides</i>        | Medicinal uses – wounds, sores and cuts, liver pain, skin diseases particularly in leprosy, diarrhoea, stomach pain, eye troubles, chronic ulcers, uterine troubles, anal propulsion, dysentery, child pneumonia and ague; harmful effects of perceived evil spirit in children. | Ahmed <i>et al.</i> , 2008                                    |
| 2   | <i>Blumea lacera</i>              | Vegetable; Medicinal uses – bronchitis, blood diseases, fever, burning sensation, anti-helminthic, astringent, stimulant, diuretic, febrifuge, bleeding piles; repellent of flies and other insects.   | Ahmed <i>et al.</i> , 2008                                    |
| 3   | <i>B. laciniata</i>               | Not known  |   |
| 4   | <i>B. mollis</i>                  | Medicinal uses – anti-inflammatory and anti-pyretic; skin diseases; diarrhoea.   | BrindhaDevi and Amutha, 2011; GuhaBakshi <i>et al.</i> , 1999 |
| 5   | <i>B. oxyodonta</i>               | Not known  |   |
| 6   | <i>Chromolaena odorata</i>        | Fish poison; Medicinal uses – cuts/wound healing   | Ahmed <i>et al.</i> , 2008                                    |
| 7   | <i>Cotula hemisphaerica</i>       | Not known  |   |
| 8   | <i>Crassocephalum crepidiodes</i> | Vegetable and salad; Medicinal uses – indigestion, stomach upset, headaches, epilepsy, fresh wounds, sleeping sickness and swollen lips.   | Tropical Plants Database                                      |
| 9   | <i>Eclipta alba</i>               | Hair growth and turning hair black; Medicinal uses – fever, eye troubles, suppuration, elephantiasis; laxative, tonic, deobstruent, astringent, emetic, purgative and antiseptic; cooling agent and purify blood   | Ahmed <i>et al.</i> , 2008                                    |
| 10  | <i>Emilia sonchifolia</i>         | Traditional salad; Medicinal uses – febrifuge, infantile timpanists and bowel complaints; astringent, anti-asthmatic, antipyretic and vulnerary; eye inflammation, night blindness and ear-sores; diarrhoea.   | Ahmed <i>et al.</i> , 2008                                    |
| 11  | <i>Enhydra fluctuans</i>          | Vegetable; cooling agent; Medicinal uses – laxative and diseases of skin and nervous system; gonorrhoea; torpidity of liver.   | Ahmed <i>et al.</i> , 2008                                    |
| 12  | <i>Gnaphalium luteoalbum</i>      | Medicinal uses – astringent and wounds healing; gout.  | Ahmed <i>et al.</i> , 2008                                    |
| 13  | <i>G. pennsylvanicum</i>          | Not known  |   |
| 14  | <i>G. polycaulon</i>              | Medicinal uses – healing of nerve related injuries and burns wounds.   | Rajan <i>et al.</i> , 2005                                    |
| 15  | <i>Grangeamader aspatana</i>      | Medicinal uses – stomachic, deobstruent, antiseptic antispasmodic, earache and emmenagogue; Prescribed in infusion and electuary.  | Ahmed <i>et al.</i> , 2008                                    |
| 16  | <i>Hemistepta lyrata</i>          | Not known  |   |
| 17  | <i>Ixeris polycephala</i>         | Vegetables; Medicinal uses – fever; scabies  | Tanaka, 1976; Manandhar, 2002                                 |
| 18  | <i>Mikania cordata</i>            | Vegetable; Medicinal uses – snake bite and scorpion sting; poulticing the wound of circumcision; suppressing weeds.  | Ahmed <i>et al.</i> , 2008                                    |
| 19  | <i>Senecio vulgaris</i>           | Salad; toxic to mammals, food for cage birds and poultry; Medicinal uses – stomach sickness, purgative, topical gout, menstrual disorders and nose bleeds.   | Mahr, 2006  |
| 20  | <i>Spilanthes calva</i>           | Alien invasive species; Medicinal uses – toothache, pain and swelling; headache, paralysis of the tongue and affection of throat; vulnerary, diuretic, resolves stones in the bladder and anti-scorbutic.  | Ahmed <i>et al.</i> , 2008                                    |
| 21  | <i>Syndrella nodiflora</i>        | Medicinal uses – sore-legs, headache, ear-ache and rheumatism; stomach-ache.   | Ahmed <i>et al.</i> , 2008                                    |
| 22  | <i>Tridax procumbens</i>          | Head hair restorer, fish poison.   | Ahmed <i>et al.</i> , 2008                                    |
| 23  | <i>Vernonia cinerea</i>           | Vegetable; fodder.   | Ahmed <i>et al.</i> , 2008                                    |
| 24  | <i>Wedelia trilobata</i>          | Ground cover; Medicinal uses – chest colds and cough   | DeFilipps, 2004   |
| 25  | <i>Xanthium indicum</i>           | Food; poisonous plant, acting on the heart; fruits lightly narcotic; Medicinal uses – hernia and ulcers; tonic, diuretic, diaphoretic, sedative and drug.  | Ahmed <i>et al.</i> , 2008                                    |
| 26  | <i>Youngia japonica</i>           | Vegetable; Medicinal uses – anti-tussive and febrifuge; treatment of boils and snakebites.   | Manandhar, 2002; Duke and Ayensu, 1985                        |



Fig. 1. Photographs of Asteraceae weeds in natural habitat. A. *Ageratum conyzoides*; B. *Blumea lacera*; C. *Blumea laciniata*; D. *Blumea mollis*, E. *Blumea oxyodonta*; F. *Chromolaena odorata*; G. *Cotula hemisphaerica*; H. *Crassocephalum crepidioides*; I. *Eclipta alba*.



Fig. 2. Photographs of Asteraceae weeds in natural habitat. A. *Emilia sonchifolia*; B. *Enhydra fluctuans*; C. *Gnaphalium luteoalbum*; D. *Gnaphalium pensylvanicum*; E. *Gnaphalium polycaulon*; F. *Grangea maderaspatana*; G. *Hemistepta lyrata*; H. *Ixeris polycephala*; I. *Mikania cordata*.



Fig. 3. Photographs of Asteraceae weeds in natural habitat. A. *Senecio vulgaris*; B. *Spilanthes calva*; C. *Syndrella nodiflora*; D. *Tridax procumbens*; E. *Vernonia cinerea*; F. *Wedelia trilobata*; G. *Xanthium indicum*; H. *Youngia japonica*.

### Conclusion

The result revealed that the BAU campus is rich in Asteraceae genetic resources. *Ageratum conyzoides*, *Vernonia cinerea*, *Spilanthes calva*, *Blumea lacera*, *Youngia japonica*, *Xanthium indicum* and *Mikania cordata* were the most dominant weed species in context to its abundance. Although some species are major and common obnoxious weeds of different crop fields, many of these species have diversified uses such as medicinal values, vegetables and salad, feed and fodder, etc. The knowledge generated from the present research would be helpful for the sustainable management of Asteraceae weeds at this campus as well as the country as a whole,

which will ensure higher economic returns without affecting the agro-ecosystems.

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