



Observations On The Seedling Morphology Of *Ajuga bracteosa* Wall. ex Benth. (Lamiaceae)

Vijai Malik*¹ and ²Seema Anand

¹Department of Botany, M. S. College, Saharanpur U.P. India

²Department of Botany, S. V. College, Aligarh U.P. India

Received for publication: May 11, 2014; **Accepted:** May 27, 2014.

Abstract: This paper provides information on morphotaxonomic observations of juvenile stages and seedlings in *Ajuga bracteosa* Wall. ex Benth. Seedling morphology was observed upto 5th leaf stages. Morphological features of seedling like collet, hypocotyl, epicotyl, shape and arrangement of paracotyledons, leaf base, colour, phyllotaxy, number of veins etc. represent high level of constancy within taxon and, thus, have been found useful from taxonomic point of view in delimitation, identification and eradication of taxa at juvenile stage.

Key Words: *Ajuga bracteosa*, Seedling morphology.

Introduction

A weed is a wild plant growing where it is not wanted and in competition with cultivated plants. So long as a plant is growing at a place and time without interfering with man's interest, it is not looked upon as a weed. In other words, while all weeds are unwanted plants, all unwanted plants may not be weeds. In this sense it is very important that plants listed as weeds are qualified by the situation in which they adversely affect man's affairs. This situation may be a crop field, roadside, railway tracks, air field, water bodies, woodland, garden, orchard etc. Besides very harmful effects in crop fields etc., weeds have many useful aspects also. For instance, fruits and rhizomes of certain weeds are used as vegetables, food material and medicines. *Ajuga bracteosa* is an evergreen perennial herb. The flowers are hermaphrodite and are pollinated by insects. It is a low herb with soft covered hair with erect and ascending stem. Genus *Ajuga* includes about 40-50 species. *Ajuga bracteosa* flowers from March to December and is distributed from E. Asia, E. Afghanistan, Pakistan, Kashmir, Himalayas to Bhutan, Burma, Nepal, China and Malaysia. The juice of the root is used in the treatment of diarrhoea and dysentery. The leaves are used in the treatment of fever as a substitute for quinine.

The knowledge of seedling morphology can be beneficial in delimitation,

identification, conservation and eradication of taxa before flowering and fruiting stages. Keeping these facts in mind an attempt has been made to explain the morphology of seedlings of *Ajuga bracteosa* Wall. ex Benth.

Material and Methods

The mature and ripen seeds were collected from natural habitat in Saharanpur forest division (U. P.) in January, 2012 and dried in the sun for one week. Morphological observations have been made with the help of hand- lens, dissecting and compound microscope. For correct identification, seedlings were collected from natural habitat and were compared and identified with the help of seedling raised from identified seeds. For the morphological observations of seedling, seeds were sown in the garden soil at a depth of 0.5 cm in February, 2012 (08.02.2012). Seedlings started protruding above the soil on 8th day. The seedlings took another 54 days to reach the 5th true leaf stage. In the present study morphological features of the seedlings has been described according to the terminology proposed by Burger (1972), Hickey (1973) and Vogel (1980). Besides, deeds on seedling morphology of several other authors like Troup (1921), Sampath (1982), Canne (1983), Augustine (2004), Das and Paria (2008) and Singh et al (2008 a, b) have been followed in this study. Day and date of appearance of leaves upto 5th true leaf stage

*Corresponding Author:

Dr. Vijai Malik,
Assistant Professor,
Department of Botany,
M. S. College, Saharanpur,
U.P. India.

were also recorded (Table 1). Observations have been made on six seedlings.

Table 1: Day and date of appearance of different leaves.

S. No.	Appearance of different leaves	Day	Date
1.	Seed leaf	8 th day	16.02.2012
2.	1 st true leaf	17 th day	25.02.2012
3.	2 nd true leaf	26 th day	06.03.2012
4.	3 rd true leaf	35 th day	15.03.2012
5.	4 th true leaf	44 th day	24.03.2012
6.	5 th true leaf	54 th day	03.04.2012

Results

Ajuga bracteosa Wall. (cat. 2032) ex Benth. in wall., Pl. As. Rar. 1: 59. 1830. Benth. in DC., prodr, 12: 598.1848; Hook. f., I. c.702.

Vernacular name: Kauri Booti, Neel Kanthi

Common name: Bugleweed

Life form: Herb

Type of fruit: Nutlet

Seedlings: Epigeal, macranga type, seed coat persistent up to first true leaf stage; primary root non-fibrous, branched, white-opaque, smooth, teret; secondaries many, fine, non-fibrous; root length 2.6 cm at paracotyledon stage, 2.8 cm at first true leaf stage, 3.2 cm at second true leaf stage, 3.9 cm at third true leaf stage, 4.2 cm at fourth true leaf stage, 4.9 cm at fifth true leaf stage; *collet distinct white-opaque, teret, smooth, without ring*; hypocotyl green, straight, smooth, teret; hypocotyl length 1.0 cm at paracotyledon stage, 1.1 cm at first true leaf stage, 1.3 cm at second true leaf stage, 1.5 cm at third true leaf stage, 1.6 cm at fourth true leaf stage, 1.7 cm at fifth true leaf stage. Paracotyledons 2, phanerocotylar, isocotylar, opposite, exstipulate, leafy, petiolate, persist up to fifth true leaf stage.

Petiole green, smooth, teret, very short, 0.2 cm long; blade oblong, 0.6 × 0.4cm, broad base, apex obtuse, entire,

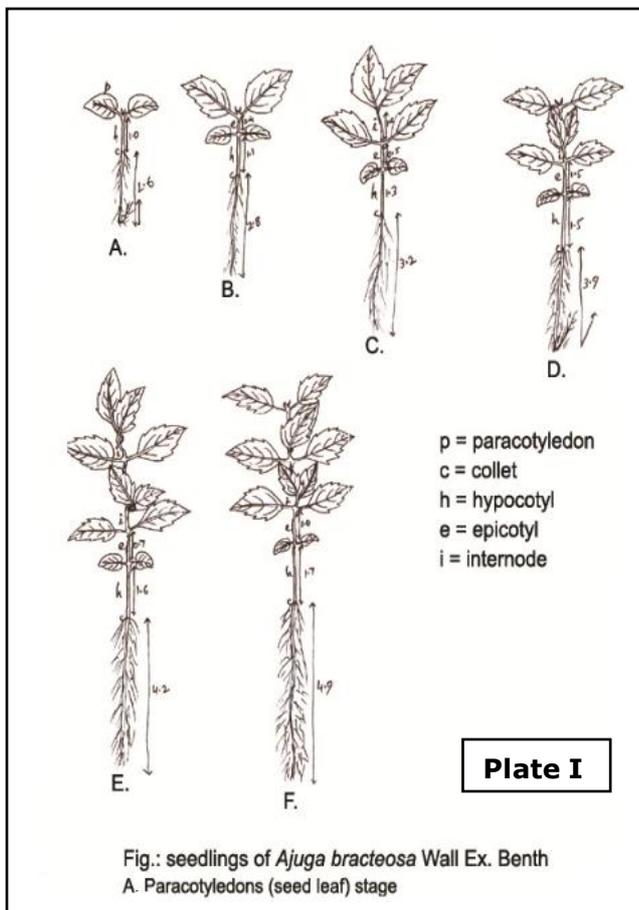
adaxial surface dark green but abaxial surface light green, smooth, reticulate venation with 9 (1+8) strands.

Epicotyl green, smooth, solid, very short, teret; epicotyl length 0.4 cm at first true leaf stage, 0.5 cm at second true leaf stage, 0.6 cm at third true leaf stage, 0.7 cm at fourth true leaf stage, 1.0 cm at fifth true leaf stage; length of internodes 1.0 cm in all true leaf stages.

First true leaves simple, exstipulate, petiolate, opposite; petiole green, hairy, semi-circular, very short, 0.1 cm long; blade, ovate, 2.5×1.6 cm, margin serrate, apex acute, adaxial surface dark green, abaxial surface light green, hairy; multicostate reticulate venation. Other features of subsequent true leaves are same as first true leaf (Plate I & II).



Plate II: *Ajuga bracteosa* Wall. (cat. 2032) ex Benth.



Total Observation period: 54 days (Table-1).

Acknowledgements

The author grateful to Prof. N. D. Paria of Kolkata University and Dr. A. K. Singh of U. P. Autonomous College, Varanasi for encouragement.

References

1. Vogel de EF, Seedlings of Dicotyledons. PUDOC, Wageningen, 1980, 456.
2. Augustine KT, Seedling Morphology of *Cassytha filiformis* (Lauraceae) from Thumba, Thiruvananthapuram, Kerala, J Econ Taxon Bot, 2004, 28(1), 254-256.
3. Burger H, Seedlings of some tropical trees and shrubs, mainly of South East Asia, PUDOC Wageningen, 1972, 399.
4. Canne MJ, The taxonomic significance of seedling morphology in *Agalinis* (Scrophulariaceae), Canadian Journal of Botany, 1983, 61(7), 1868-1874.
5. Das DC, Paria ND, Seedling morphology in identification of some Indian species of *Bauhinia* L. (Caesalpiniaceae), Feddes Reportium, 2008, 110(5-6), 375-379.
6. Hickey LJ, Classification of the architecture of dicotyledonous leaves, American Journal of Botany, 1973, 60, 17-31.
7. Sampath KR, Studies on the cotyledonary leaves of some Convolvulaceae, Taxon, 1982, 31, 53-56.
8. Singh AK, Singh S, Devi Y, Morpho- Taxonomic observations on seedlings of two common weeds- *Croton bonplandianus* Baill. and *Xanthium indicum* Koeing from Varanasi (U. P.), J Econ Taxon Bot, 2008a, 32(2), 311-315.
9. Singh AK, Singh S, Srivastava M, Srivastava S, Seed and seedling morphology of a medicinal plant *Catharanthus roseus*, Indian Forester, 2008b, 34(4), 537-541.
10. Troup RS, The Silviculture of Indian Trees, Vol. III, Clarendon Press, Oxford, 1921, 311.

Source of support: Nil

Conflict of interest: None Declared