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Assessment of Seedling Morphology in relation to Taxonomy of Leonotis nepetaefolia (L.) R. Br.

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Abstract

This paper provides information on morpho taxonomic observations of juvenile stages and seedlings in Leonotis nepetaefolia (L.) R. Br. Seedling morphology was observed upto 5th leaf stages. Morphological features of seedling like collet, hypocotyle, epicotyle, shape and arrangement of paracotyledons, leaf base, colour, phyllotaxy, number of veins etc. represent high level of constansy within taxon and, thus, have been found useful from taxonomic point of view in identification and eradication of weed at juvenile stage. Leonotis nepetaefolia is a species of semi- succulent, perennial plant in the family Lamiaceae. It has a pungent Oregano like flavor and odor. Leonotis nepetaefolia is considered to be native to parts of Africa, the Arabian Peninsula, and India, although it is widely cultivated and naturalized elsewhere in the tropics where it is used as a spice and ornamental plant. Leonotis nepetifolia (L.) R. Br, commonly called dagga, klip dagga, or lion's ear, has been used to effectively treat various diseases and other health problems for a long time because of its antimicrobial, anti-inflammatory, antioxidant, and analgesic activities. Several studies have attributed these biological activities to L. nepetifolia's constituent secondary metabolites, such as alkaloids, phenolics, flavonoids, tannins, steroids, glycosides, coumarins, anthocyanins, and saponins. This review aims to examine the evidence-based ethnopharmacological uses of L. nepetifolia in the treatment of bronchial asthma, diarrhea, skin diseases, malaria, burns, cancer, diabetes mellitus, and rheumatism. However, although L. nepetifolia has great potential to treat these diseases, further isolation and identification of its therapeutic phytochemical constituents are required. In addition, the performance of its extracts and phytochemicals should be thoroughly tested in preclinical and clinical trials in order to ascertain their safety and efficacy, which will prove valuable in developing new medicines.

Key words: Leonotis nepetaefolia (L.) R. Br., Morphology, Juvenile, Taxonomy.

1. Introduction:

A weed is a plant growing where it is not desired. 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. Lion's Ear is an erect, branched herb that can grow 8 ft tall. The stems are strongly 4-angled. Oppostely arranged are smooth with coarsely toothed margins, triangular in shape and 2-5 in long. The flowers are borne in rounded, spiny clusters, 2-

4 in across, that encircle the stems so that it looks like the stems are growing right through the middle of the clusters. As the stems elongate, new flower clusters continue to develop above the older ones. Orange, furry, tubular flowers that emerge out of the spiny heads look like a lion's ear, with some imagination. The flowers are about 1 in long and curve downward. Lion's Ear originated in tropical Africa, but is now naturalized worldwide. Flowering: November-December. The native range of this species is Africa, Indian Subcontinent. It is an annual, perennial or subshrub and grows primarily in the seasonally dry tropical biome. It is used to treat unspecified medicinal disorders, as animal food, a poison and a medicine, has environmental uses and social uses and for food. The knowledge of seedling morphology can be beneficial in management and eradication of this weed before flowering and fruiting stages. Keeping these facts in mind an attempt has been made to explain the morphology of seedlings of Leonotis nepetifolia (L.) R. Br.

2. Material and Methods:

The mature and ripen seeds were collected from natural habitat in Saharanpur forest division (U. P.) 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. Seedlings started protruding above the soil on 8th day. The seedlings took another 54 days (Table 1) to reach the 5th true leaf stage. In the present study morphological features of the seedlings have been described according to the terminology proposed by Burger (1972), Hickey (1973) and Vogel (1980). Besides these deeds on seedling morphology, several other authors like Troup (1921), Sampath (1982), Canne (1983), Augustine (2004a, b), Das and Paria (2008) and Singh et al (2008a, b, c) have been followed in this study. Day and date of appearance of leaves up to 5th true leaf stage were also recorded. Observations have been made on three seedlings.

3. Observations:

Leonotis nepetaefolia (L.) R. Br. Prodr. 504. 1810; Duthie, F.I.U. Gang. Pl. 253 Repr. ed. 1960; Verma, Pant and Hanfi, Fl., Raipur 302. 1984- Phlomis nepetaefolia L. sp. Pl. 586. 1753.

Vernacular name: Bara Gumma, Shandilya.

Common name: Lion's Ear, Christmas Candlestick.

Life form: Herb

Type of fruit: Nutlet

Seed: Brown with whitish- brown patches, obovoid- oblong, 0.40×0.20 cm, tetrafaced; one face convex, other two lateral faces obliquely flat, fourth apical face slightly depressed, minutely pitted and glabrous on margins, surface glabrous, slightly velvety and glaucous, base oblique- truncate, apex oblique obtuse, margin entire. Hilum not distinct.

Seedlings: Epigeal. Seed coat persistent upto second true leaf stage. Primary root non-fibrous, branched, white-opaque, smooth, teret; secondaries many, fine, non-fibrous. Root length 2.9 cm at paracotyledon stage; 3.9 cm at first true leaf stage; 4.6 cm at second true leaf stage; 5.4 cm at third true leaf stage; 6.0

cm at fourth true leaf stage; 6.6 cm at fifth true leaf stage. Collet distinct whiteopaque, teret, smooth, without ring. Hypocotyl upper half green; lower half white, straight, smooth, angled. Hypocotyl length 1.3 cm at paracotyledon stage; 1.9 cm at first true leaf stage; 2.3 cm at second true leaf stage; 3.5 cmat third true leaf stage; 4.1 cm at fourth true leaf stage; 4.8 cm at fifth true leaf stage. Paracotyledons 2, phanerocotylar, isocotylar, opposite, exstipulate, leafy, petiolate, persist upto third true leaf stage. Petiole green, smooth, teret, very short, 0.2cm long. Blade oblong, 0.6 × a.4 cm, apex acute, entire, adaxial surfuce dark green but abaxial surface light green; smooth, reticulate venation. Epicotyl green, smooth, solid, short, angular. Epicotyl length 0.4 cm at first true leafstage; 0.6 cm at second true leaf stage and 1.0 cm at third, fourth and fifth true leaf stage. Length of internodes 1.4 cm in all true leaf stages. First true leaves simple, exstipulate, petiolate, opposite. Petiole green, hairy, semi-circular, 0.9 cm long. Blade, lanceolate, 3.1×2.1 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 (Table 2).

Total Observation period: 60 days (Table- 1).

Flowering period: October- January.

Distribution: Africa, China, India, Nepal, Pakistan, Sri Lanka, Tropical America.
Uses: The leaves are brewed as a tea for fever, coughs, womb prolapsed and malaria. Paste of flower and seeds used for immediately stop bleeding and relieves pain.

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

S. No.	Appearance of different leaves	Day	Date
1.	Seed leaf	15th day	22.03.2011
2.	1st true leaf	21st day	28.03.2011
3.	2nd true leaf	30th day	06.04.2011
4.	3rd true leaf	42nd day	18.04.2011
5.	4th true leaf	52nd day	28.04.2011
6.	5th true leaf	60th day	05.05.2011

Table 2: Length of different parameters at different leaf stages of seedlings.

S. No.	Different leaf stages	Primary & secondary root (cm)	Hypocotyl (cm)	Epicotyl (cm)	Internode (cm)
	Variant-1				
1.	Length at paracotyledon stage	2.9	1.3	-	-
2.	Length at first true leaf stage	4.0	1.9	0.4	-
3.	Length at second true leaf stage	4.9	2.3	0.7	1.4
4.	Length at third true leaf stage	5.8	3.5	1.0	1.4
5.	Length at fourth true leaf stage	6.5	4.1	1.0	1.4
6.	Length at fifth true leaf stage	7.0	4.8	1.0	1.4
	Variant-2				
1.	Length at paracotyledon stage	3.0	1.5	-	-
2.	Length at first true leaf stage	3.9	2.0	0.4	-
3.	Length at second true leaf stage	4.2	2.3	0.6	1.4
4.	Length at third true leaf stage	4.9	3.5	1.0	1.4
5.	Length at fourth true leaf stage	5.8	4.1	1.0	1.4
6.	Length at fifth true leaf stage	6.5	4.8	1.0	1.4
	Variant-3				
1.	Length at paracotyledon stage	3.0	1.3	-	-
2.	Length at first true leaf stage	3.9	2.0	0.4	-
3.	Length at second true leaf stage	4.2	2.5	0.7	1.4
4.	Length at third true leaf stage	4.9	3.5	1.0	1.4
5.	Length at fourth true leaf stage	5.8	4.5	1.0	1.4
6.	Length at fifth true leaf stage	6.5	5.0	1.0	1.4

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