

**Research article**

# Morphological study of some members of family Convolvulaceae from the state of Punjab, India

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[Accepted: 10 July 2024]

**Abstract:** A total of eight species member of 3 genera of the family Convolvulaceae recorded as weed species from different kharif and rabi crops from Malwa region of Punjab India during the year 2018–2021. Morphological parameters of documented species were studied for accurate identification. Out of three genera, *Ipomoea* was dominant with four species and *Convolvulus* and *Merremia* with two species each. This information about different species of the family Convolvulaceae from state of Punjab will be useful for taxonomists, researchers, botanists etc. as an additional and updated knowledge of the regional flora.

**Keywords:** Flora - Plant - Ipomoea - Weed - Herb - Angiosperm.

[Cite as: Dhillon RS (2024) Morphological study of some members of family Convolvulaceae from the state of Punjab, India. *Tropical Plant Research* 11(2): 29–33]

## INTRODUCTION

Punjab state is spread in an area of 50362 km<sup>2</sup> and is located in the Northern part of India. It has been divided into Majha, Malwa and Doaba regions. Malwa is the largest and lies south to river Sutlej. Agriculture is the main economic source of the Malwa Region. The common cultivated crops of this region include wheat, rice, sugarcane, maize, cotton etc. A large number of weed species are growing in the crop land and wild habitat.

Floristic diversity of Punjab was studied by different researchers such as Bamber (1916), Nair (1978), Sharma (1990), Sidhu (1991), Kaur *et al.* (2017), Singh & Singh (2019), Singh & Singh (2020), Sidhu & Singh (2020), Sidhu & Singh (2021a, b), Sharma (2021), Singh (2022), Singh & Sidhu (2022), Singh & Sharma (2023), Singh (2023) and Dhillon (2024). However, the detailed morphological information about the family Convolvulaceae is incomplete. Keeping this in view present study was planned for documentation of weed flora of the region with special references to the family Convolvulaceae.

## MATERIALS AND METHODS

### *Study area*

The present study was conducted in selected areas of the Malwa region of Punjab, India (districts Bathinda, Faridkot, Fazilka, Ferozpur, Moga and Sri Muktsar Sahib) for documentation weed species. The temperature of this zone varies from 3°C to 47°C in specific areas in different seasons. The average rainfall ranges between 480 mm to 960 mm. According to the Census of 2021 the population of the state of Punjab is 30,73,7851.

### *Survey and Collection*

Plant species were documented as weeds from Kharif crops (Rice, Maize, Cotton, Sorghum and Sugarcane) and Rabi crops (Wheat, Mustard, Berseem, gram and Sugarcane) in the years 2018–2021.

### *Morphological Study*

Various morphological parameters such as habit, leaf (arrangement, shape, type, color and edge), stem (pubescent, trailing, erect, hairy, glabrous), flower (color, shape, size), sepals (shape, number, color, hairy, glabrous) petals (shape, number, color, nature), inflorescence, stamens (number and nature), stigma (number, nature), fruit (shape, color, glabrous, hairy), seed (shape, color, nature) etc. were analyzed for identification.

### Identification

Documented species were identified based on available floras, manuals, books and other available sources (Stewart 1869, Hooker 1872–1897, Collet 1902, Bamber 1916, Nair 1978, Chowdhery & Wadhwa 1984, Sharma 1990, Sidhu 1991, Jayeola & Oladunjoye 2012, Okereke *et al.* 2015, Kaur *et al.* 2017, Ashfaq *et al.* 2020, Ekwealor *et al.* 2020, Sharma 2021). Herbaria, Department of Botany, Panjab University, Chandigarh, Punjabi University Patiala and online herbaria such as Janaki Ammal Herbarium ([www.iiim.res.in](http://www.iiim.res.in)), Kew Herbarium Catalogue-Kew Garden ([apps.kew.org](http://apps.kew.org)) and Botanical Survey of India Herbarium ([bsi.gov.in](http://bsi.gov.in)) were also consulted for proper identification of species.

## RESULTS AND DISCUSSION

There were eight species (3 genera) of the family Convolvulaceae documented from Malwa region of Punjab India during the year 2018–2021. Out of three genera, *Ipomoea* was dominant with four species and *Convolvulus* and *Merremia* with two species each. All the recorded species are climbers and behaves as a parasitic nature on the crop plants. Morphological characterization for identification of seven *Ipomoea* species (*I. carnea*, *I. involucrate*, *I. vagans*, *I. asarifolia*, *I. triloba*, *I. hederifolia* and *I. aquatica*) were studied by Jayeola & Oladunjoye (2012) from Nigeria. Okereke *et al.* (2015) considered length of plant, shape and size of leaves and flowers for identification of some species of family Convolvulaceae. Ashfaq *et al.* (2020) differentiated two species of genus *Convolvulus* (*C. arvensis* and *C. prostratus*) from Pakistan on the basis of habitat, leaves, flowers and trichomes. Ekwealor *et al.* (2020) identified three species of *Ipomoea* (*I. involucreta*, *I. asarifolia* and *I. aquatica*) based on habit, leaf (shape and size, margins, venation, petiole) and flowers (color and size). Therefore, morphological study of plants is a need of the hour.

### CONVOLVULUS L.

#### *Convolvulus arvensis* L.

[Fig. 1A]

It is a herbaceous annual climber with deep root system. Stem is slender, long, twining, glabrous or finely pubescent. Leaves are alternate, petiolate, and variable in shape, lanceolate or ovate to narrow-oblong, long acute apex, glabrous to hairy. Flowers are bisexual, complete, axillary, solitary, peduncles are long, slender with a pair of small linear bracts at the apex from which the pedicels arise. Sepals-5, green, fused, glabrous to hairy; petals-5, fused, creamy white to light pinkish; stamens-5, epipetalous, pink; stigma bifid, style-1. Fruit is capsule, globose and glabrous. Seeds are small in size, dark reddish-brown, glabrous.

#### *Convolvulus prostratus* Forrsk.

[Fig. 1B]

It is a slender, procumbent or sub-erect herb. The stem is hairy, green, and long with a woody rootstock. Leaves are long, linear-oblong, elliptic, hairy, short-petioled. Flowers are bisexual, complete, axillary or on short lateral branches, sessile or short-pedicelled. Sepals-5, gamosepalous, green and hairy; petals-5, gamopetalous, white; stamens-5, epipetalous, white; stigma bifid, style-1. Fruits are ellipsoid or globose, long. Seeds are brown to black, oval, flat.

### IPOMOEA L.

#### *Ipomoea aquatica* Forrsk.

[Fig. 1C]

It is annual to perennial climber herb mostly found in water channels of crops. Stem is cylinder, branched, smooth, green, herbaceous. Leaves triangular to lanceolate, smooth, glabrous, apex acute. Flowers complete, bisexual, tubular corolla. Sepals-5, green, glabrous to slightly hairy; petals-5, white or lightpink in color. Stamens are five, white with long filaments; stigma-1 with long style. Capsule globose with long bracts. Seed trigonous, smooth, black.

#### *Ipomoea nil* (L.) Roth

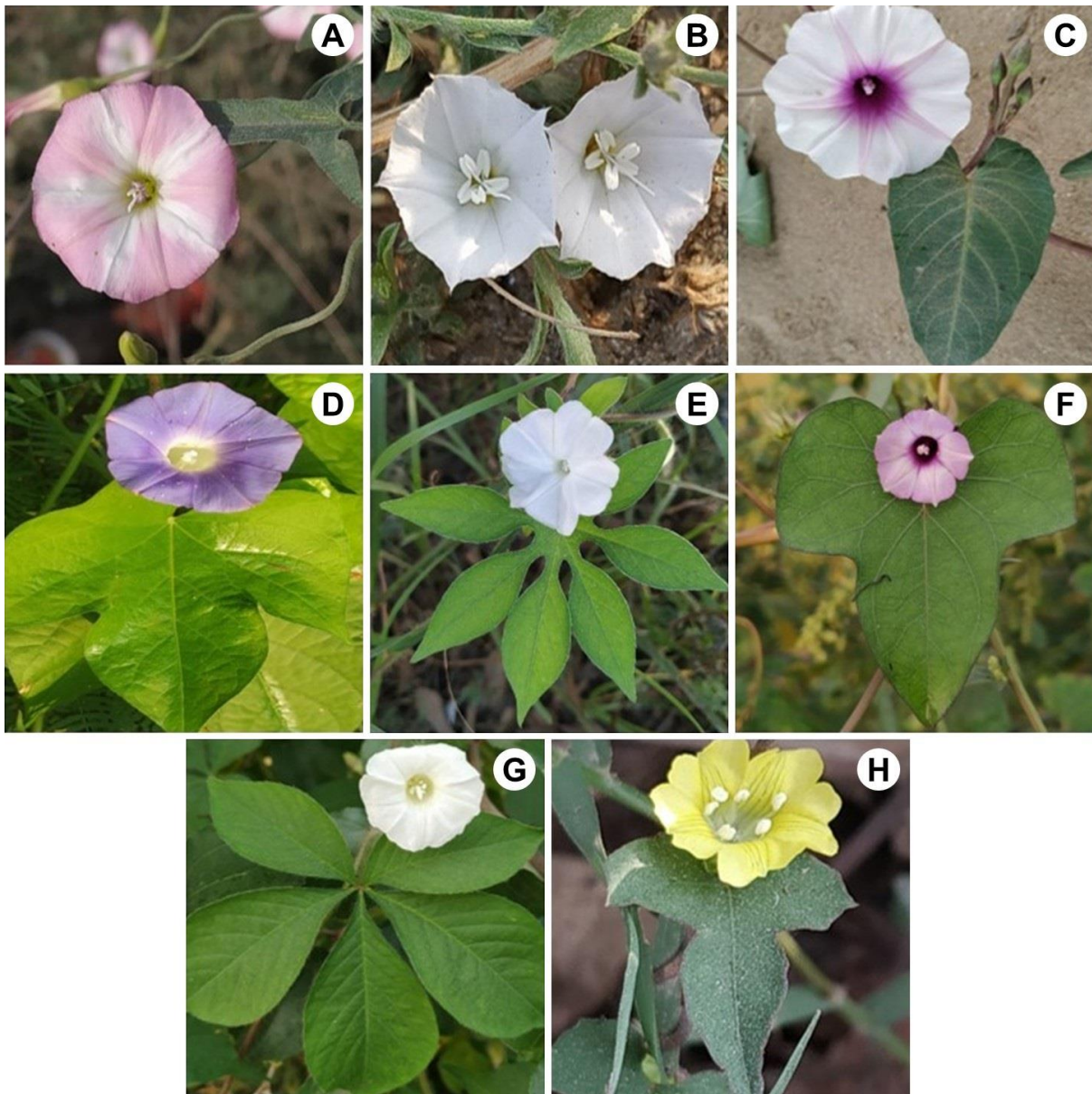
[Fig. 1D]

It is an annual, hairy, thick, branched climbing herb. The stem is herbaceous, hairy and green. Leaves ovate, 3–4 lobed, large, thin, hairy and green. Flowers bisexual with equal number of sepals and petals (5), corolla tubular and blue. Capsule globose, valvate, with long thick sepals consists of 4–5 seeds. Seeds trigonous, smooth, shiny and black.

#### *Ipomoea pes-tigridis* L.

[Fig. 1E]

It is spreading or twinning hirsute herb. Stem is herbaceous, light green, hairy, branched. Leaves are ovate, palmate, 5- to 7- lobed, hirsute on both surfaces; lobes elliptic, acuminate, narrowed at the base. Flowers white in long-peduncled heads; outer corolla funnel-shaped. Capsule globose and seeds glabrous.



**Figure 1.** A, *Convolvulus arvensis* L.; B, *Convolvulus prostratus* Forssk.; C, *Ipomoea aquatica* Forssk.; D, *Ipomoea nil* (L.) Roth; E, *Ipomoea pes-tigridis* L.; F, *Ipomoea triloba* L.; G, *Merremia aegyptia* (L.) Urb.; H, *Merremia hederacea* (Burm. f.) Haillier f.

***Ipomoea triloba* L.**

[Fig. 1F]

It is annual climber herb mostly seen in sorghum crop fields. Stem is cylinder, hairy, herbaceous, branched and green in color. Leaves, glabrous to hairy, deeply cordate to trilobed, green. Flowers are complete, pinkish-violet, tubular with five sepals and petals (5); stamens-5, long filaments; stigma-1, long style. Capsules are globose with long thick sepals consists of 4-5 seeds. Seeds are black, trigonous and smooth.

**MERREMIA Dennst.**

***Merremia aegyptia* (L.) Urb.**

[Fig. 1G]

It is twining, hirsute annual vine. Leaves are digitately 5- foliolate; leaflets broadly lanceolate or oblanceolate, broadest in the middle, acuminate, tapering at ends. Flowers are bisexual, complete; sepals-5, yellowish green, densely hairy; petals-5, gamopetalous, white or yellow-white, funnel-shaped, long; stamens-5, epipetalous, white; stigma-1. Capsules are ovoid, hairy with glabrous, black seeds.

***Merremia hederacea* (Burm. f.) Haillier f.**

[Fig. 1H]

It is annual, hirsute, climbing herb. Leaves are cordate to trilobed, green, glabrous or hairy with long petiole. Flower are bisexual, complete and dark yellow. Sepals are five (5), green and hairy; Petals-5, fused, glabrous outside but hairy inner side; Stamens-5, epipetalous, anthers white; stigma-1 with long style. Fruit is capsule, globose, covered with sepals. Seeds trigonous, shiny, smooth and black.

## CONCLUSION

Identification of plant on the basis of morphological characters is an easy and simple method which is useful for any level of student. This information informs about the accurate and authentication of species. Taxonomists, ethnobotanists, researchers etc. easily differentiate one species from another on behalf of morphology.

## ACKNOWLEDGMENTS

The author is thankful to the chairperson Department of Botany, Panjab University Chandigarh for providing the necessary facilities for this research work. The author is also grateful to Prof. (Dr.) M.I.S. Saggoo (Former professor and Head Department of Botany, Punjabi University Patiala) and Prof. (Dr.) Navdeep Shekhar (Former professor and Head Department of Botany, Govt. Brijindra College Faridkot, Punjab) for encouragement and moral support and scientific discussions during this research work.

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