Convolvulaceae flora of Shuklaphanta National Park and adjoining areas

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Abstract

A short description of the species of family Convolvulaceae of Shuklaphanta National Park and adjoining area of western Tarai Nepal is given in this work. Six genus and sixteen species in total have been documented. Among them, *Ipomoea* is the most common genera. *Ipomoea sagittifolia* Burm.fil. is recently added as a record for the flora of Nepal from this area.

Keywords: Convolvulaceae, flora, Morning glory, Tarai, West

1. Introduction

Convolvulaceae can be recognized by their simple and alternate leaves without stipules, funnel-shaped and radially symmetrical corolla and fruit can be capsule, berry, or nut, all containing only two seeds per locule [1]. Convolvulaceae, also referred to as the bindweed or morning glory family [2]. The Convolvulaceae family comprises 1,977 recognized species under 60 genera and 12 tribes [3, 4]. Members of Convolvuaceae are nearly cosmopolitan in distribution, but its members are primarily tropical plants, with many genera endemic to tropical zones of individual continents [5]. The species are distributed quite unevenly throughout the genera and tribes, with the tribe Ipomoeeae alone accounting for about half of the family's diversity, followed by Convolvuleae and Cuscuteae [6]. Majority of the species of family are perennial herbs, vines, or woody lianas, rarely annual herbs, shrubs, or trees that are endemic to the tropical regions [5] although weedy taxa from temperate regions are also known [7].

Nepal is represented by 48 species of family Convolvulaceae among 12 genera [8]. In the recent study, about 16 species of this family are reported from different areas of Shuklaphanta National Park and adjoining areas.

2. Materials and Methods

During fieldwork in Nepal's Western Tarai, plant specimens from the Convolvulaceae family were collected and are preserved as herbarium specimens following the standard methods [9] and are housed in the Tribhuvan University Central Herbarium (TUCH), for future reference. They were carefully identified using various floras [10, 11] and consulting collections from different herbaria (KATH, TUCH, CAL) and various databases. The paper includes scientific names, distinguishing characters, phenology, habitat, locality of collection, voucher specimen and photographs.

3. Results and Discussion

In present study, a total of 16 species belonging to 6 genera of Convolvulaceae family have been recorded. The conspicuous, radially symmetrical, funnel-shaped, fused petals with usually twining herbaceous stems make it easy to identify the members of this family. The list of plant species of Convolvulaceae family was prepared based on the visual observation followed by photography and specimens' collection.

3.1 Key to genera

1a. Plant parasitic; leaves scale-like, lacking chlorophyll ..... **Cuscuta**
1b. Plant autotrophic; leaves foliaceous, with chlorophyll 2
2a. Pollen spiny ..... **Ipomoea**
2b. Pollen smooth 3
3a. Fruit indehiscent; seed 1 ..... **Poranopsis**
3b. Fruit dehiscent by valves or breaking irregularly; seeds usually 4 4
4a. Style 2, filiform ..... **Evolvulus**
4b. Style 1, globose 5

5a. Stem winged..... **Operculina**

5b. Stem terete, not winged..... **Merremia**

Cuscuta L.

Cuscuta reflexa Roxb., *Pl. Coromandel* 2:3, pl.104.1798. [Fig. 1A]

Parasitic climbers with yellow slender stems and branches. Flowers in umbellate clusters. Calyx cupular. Corolla white, tubular. Capsules conical-globose.

Fl. and Fr.: November-April

Ecology: Occurs on open places on herbs, shrubs and trees.

Locality: Shuklaphanta National Park, Kanchanpur.

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.94° N, 80.16° E, 242 m, 25 November 2022, D. Paneru CON0221 (TUCH).

Evolvulus L.

Key to species

1a. Leaves nearly circular. Corolla white..... ..... **E. nummularius**

1b. Leaves oblong. Corolla blue..... **E. alsinoides**

Evolvulus alsinoides (L.) L., *Sp. Pl.* (ed.2) 1:392.1762. [Fig. 1B]

Annual herb with prostrate spreading branches. Leaves oblong or lanceolate. Flowers blue and axillary. Fruit capsular, globose.

Fl. and Fr.: July-December

Ecology: Open grasslands and under Sal forest canopy.

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.811° N, 80.224° E, 200 m, 17 October 2022, D. Paneru CON0222 (TUCH).

Evolvulus nummularius (L.) L., *Sp. Pl.* (ed.2) 1:391.1762. [Fig. 1C]

Perennial herb with broad alternate leaves. Flowers usually solitary in leaf axil, petals fused and lobed, white. Ovary 2-celled. Fruit a capsule, 4-seeded.

Fl. and Fr.: July-November

Ecology: Under Sal forest canopy.

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.811° N, 80.224° E, 200 m, 17 October 2022, D. Paneru CON0223 (TUCH).

Ipomoea L.

Key to species

1a. Leaves palmately divided..... 2

1b. Leaves simple, entire, lobed or divided..... 3

2a. Plant densely pubescent. Corolla white..... ..... **I. pes-tigridis**

2b. Plant glabrous. Corolla purple..... **I. cairica**

3a. Erect shrub. Stem woody ..... **I. carnea**

3b. Climbers. Stem herbaceous 4

4a. Plant aquatic. Stem fistulose..... **I. aquatica**

4b. Plant terrestrial. Stem solid 5

5a. Leaf blades pinnatisect. Corolla red..... ..... **I. quamoclit**

5b. Leaf blades entire. Corolla other than red 6

6a. Leaves linear. Corolla less than 2 cm..... ..... **I. eriocarpa**

6b. Leaves cordate. Corolla more than 2 cm..... 7

7a. Sepals long attenuate. Corolla bluish 8

7b. Sepals acute. Corolla pink or white..... 9

8a. Sepals apex acute. Corolla dark blue .... **I. purpurea**

8b. Sepals apex acuminate. Corolla light blue .... **I. nil**

9a. Leaves with purple blotches at center and margins. Corolla white ..... **I. sagittifolia**

9b. Leaves with no blotches. Corolla pink..... ..... **I. triloba**

Ipomoea aquatica Forssk., *Fl. Aegypt.-Arab.* 44.1775. [Fig. 2A]

Semi-aquatic, perennial herbaceous creeping vines. Leaves smooth and arrowhead shaped, simple and alternate. Flowers purplish-white, solitary or few in cymes. Capsules ovoid to globose.

Fl. and Fr.: July-November

Ecology: Found in moist and marshy places.

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.83° N, 80.32° E, 200 m, 27 October 2022, D. Paneru CON0224 (TUCH).

Ipomoea cairica (L.) Sweet, *Hort. Brit.* 2: 287.1826. [Fig. 2B]

Perennial herbs, stems twining or sometimes prostrate, herbaceous. Leaves palmately divided, usually to base into 5-7 lobes. Flowers one to numerous, funnel shaped, dark pink to light purple in colour. Capsules brown, sub-globose. Seeds black, with long silky hairs along the margins.

Fl. and Fr.: January-April

Ecology: Found on roadsides and open areas.

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.83° N, 80.32° E, 181 m, 22 April 2022, D. Paneru CON0225 (TUCH).

Ipomoea carnea subsp**. fistulosa** (Mart. ex Choisy) D.F.Austin, *Taxon* 26(2-3):237.1977. [Fig. 2C]

Robust, fast-growing shrub with fistular stems. Stem woody, light brown, hollow, slender, glabrous. Flowers in cymes, trumpet-shaped, pink to purple. Seeds black, covered with trichomes.

Fl. and Fr.: Throughout the year

Ecology: Found in every habitat, mostly in moist and wetlands.

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.83° N, 80.32° E, 181 m, 22 April 2022, D. Paneru CON0226 (TUCH).

Note: It is problematic invasive alien species.

Ipomoea eriocarpa R.Br., *Prodr. Fl. Nov. Holland.* 484. 1810. [Fig. 2D]

Annual, twining or prostrate hairy herbs. Stems grow to 1-2 m long. Flowers are borne in 1-3 flowered cymes in leaf axils, pink or purplish in colour. Capsules broadly ovoid or globular, pubescent. Seeds glabrous.

Fl. and Fr.: October-November

Ecology: Found on open grasslands.

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.813° N, 80.172° E, 201 m, 19 October 2022, D. Paneru CON0227 (TUCH).

Ipomoea nil (L.) Roth, *Catal. Bot.* 1: 36. 1797. [Fig. 2E]

Annual or perennial herbaceous twinners. Inflorescences axillary. Flowers solitary or in cymes. Corolla pale to bright blue. Capsules globose or ovoid, glabrous.

Fl. and Fr.: September-January

Ecology: Common on Roadsides.

Locality: Mahendranagar, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Mahendranagar, 28.97° N, 80.17° E, 240 m, 11 September 2022, D. Paneru CON0228 (TUCH).

Ipomoea pes-tigridis L., *Sp. Pl.* 1: 162. 1753. [Fig. 2F-G]

Densely hispid herbaceous twiners. Leaves broadly orbicular, deeply 5-9-lobed. Flowers subsessile in axillary, capitate clusters, white in colour. Capsules ovoid. Seeds hairy.

Fl. and Fr.: September-December

Ecology: Common in open grasslands.

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.818° N, 80.219° E, 205 m, 18 October 2022, D. Paneru CON0229 (TUCH).

Ipomoea purpurea (L.) Roth, *Bot. Abh. Beobacht*. 27. 1787. [Fig. 2H]

Annual herbaceous climbers, up to 2 m in length. Leaves are cordate. The flower is trumpet-shaped with dark blue colour. Capsules globose. Seeds glabrous.

Fl. and Fr.: May-January

Ecology: Found commonly in roadsides and open areas.

Locality: Mahendranagar, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Mahendranagar, 28.97° N, 80.17° E, 240 m, 1 November 2022, D. Paneru CON02210 (TUCH).

Ipomoea quamoclit L., *Sp. Pl.* 1: 159. 1753. [Fig. 3A-B]

Herbaceous plants with slender twining stems. Leaves deeply pinnati-sect, multiple pairs of opposite or sub-opposite leaflets. Inflorescence axillary, solitary to 3-5 flowered cyme, red in colour. Capsules ovoid.

Fl. and Fr.: May-December

Ecology: Common on roadsides and forest edges.

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.81° N, 80.22° E, 181 m, 2 November 2022, D. Paneru CON02211 (TUCH)

Ipomoea sagittifolia Burm.f., *Fl. Ind*. 50. 1768. [Fig. 3C-D]

Annual herbs with deeply cordate leaves with purple blotches on the center and bears purplish margin and with white large flowers with pinkish anther lobes. Capsules globose, glabrous.

Fl. and Fr.: September-November

Habitat: Found in open grasslands

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphanta National Park, 28.818° N, 80.219° E, 205 m, 17 October 2022, D. Paneru SNPIP02 (TUCH).

Note: It is recently reported as new record for the flora of Nepal [12].

Ipomoea triloba L., *Sp. Pl*. 1: 161. 1753. [Fig. 3E]

Herbaceous twinner. Leaves broadly ovate, entire to deeply 3-lobed. Flowers aggregated in umbellate cymes, pinkish purple. Capsules globose, pubescent.

Fl. and Fr.: September-November

Habitat: Found on roadsides and open grasslands.

Locality: Mahendranagar, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Mahendranagar, 28.97° N, 80.17° E, 240 m, 21 September 2022, D. Paneru CON02212 (TUCH).

Merremia Dennst. ex Endl.

Merremia hederacea (Burm.f.) Hallier f., *Bot. Jahrb. Syst.* 18(1-2): 118. 1893. [Fig. 3F-G]

Twining herb. Inflorescences one or few to many flowered, umbelliform. Corolla yellow, campanulate. Capsules ovoid. Seeds trigonous-globose.

Fl. and Fr.: October-April

Habitat: Found on roadsides and open grasslands.

Locality: Jhalari, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Jhalari, 28.84° N, 80.32° E, 181m, 15 November 2022, D. Paneru CON02213 (TUCH).

Operculina Silva Manso

Operculina turpethum (L.) Silva Manso, *Enum. Subst. Braz.* 16. 1836. [Fig. 4A-B]

Perennial climbers. Stem narrowly 3-5-winged. Flowers solitary or cymose. Corolla white. Fruit enclosed in cupular calyx, depressed globose.

Fl. and Fr.: Throughout the year

Habitat: Found on roadsides and marshy places.

Locality: Belauri, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Beldandi, 28.79° N, 80.26° E, 210 m, 15 November 2022, D. Paneru CON02214 (TUCH).

Poranopsis paniculata (Roxb.) Roberty, *Candollea* 14: 26. 1953. [Fig. 3H]

Perennial climbers. Leaves cordate-circular. Panicle crowded. Corolla white, funnelform. Fruits globose-ellipsoid.

Fl. and Fr.: October-March

Habitat: Found on forest and open grasslands.

Locality: Shuklaphanta National Park, Kanchanpur

Voucher specimen: Sudur Paschim Province, Kanchanpur district, Shuklaphata National Park, 28.825° N, 80.156° E, 204 m, 19 October 2022, D. Paneru CON02215 (TUCH).

4. Conclusion

The outcomes of the study so far clearly indicated that the overall diversity of the species of Convolvulaceae in this area is pretty good as the area is protected. From the present study a total of 6 genera belonging to 16 species of Convolvulaceae flora were recorded. Out of the collected species three species viz. *Ipomoea eriocarpa*, *Ipomoea triloba* and *Merremia hederacea* have been added as new record to the flora of Western Nepal. Out of the 16 species *Ipomoea* is represented by 10 species, with *Ipomoea sagittifolia* recently published as new record for the flora of Nepal followed by *Evolvulus* with 2 species and *Cuscuta*, *Merremia*, *Operculina* and *Poranopsis* by one each. The invasive alien species *Ipomoea carnea* subsp. *fistulosa* was seen problematic to many aquatic bodies in the study area.

Fig. 1: *Cuscuta reflexa* Roxb (A); *Evolvulus nummularius* (L.) L. (B); *Evolvulus alsinoides* (L.) L. (C)

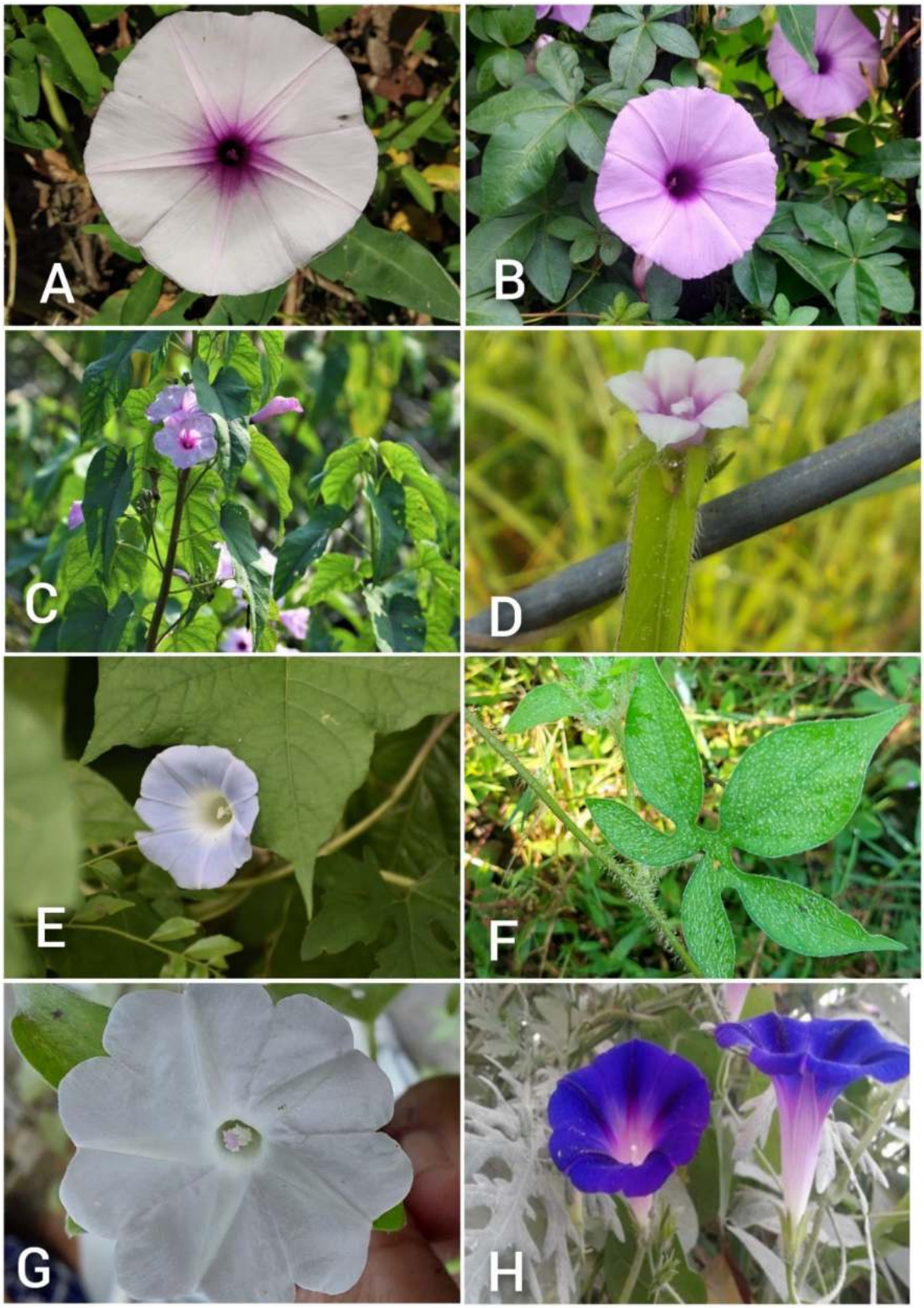

Fig. 2: *Ipomoea aquatica* Forssk. (A); *Ipomoea cairica* (L.) Sweet (B); *Ipomoea carnea* subsp. *fistulosa* (Mart. ex Choisy) D.F.Austin (C); *Ipomoea eriocarpa* R. Br. (D); *Ipomoea nil* (L.) Roth (E); *Ipomoea pes-tigridis* L. (F-G); *Ipomoea purpurea* (L.) Roth (H)

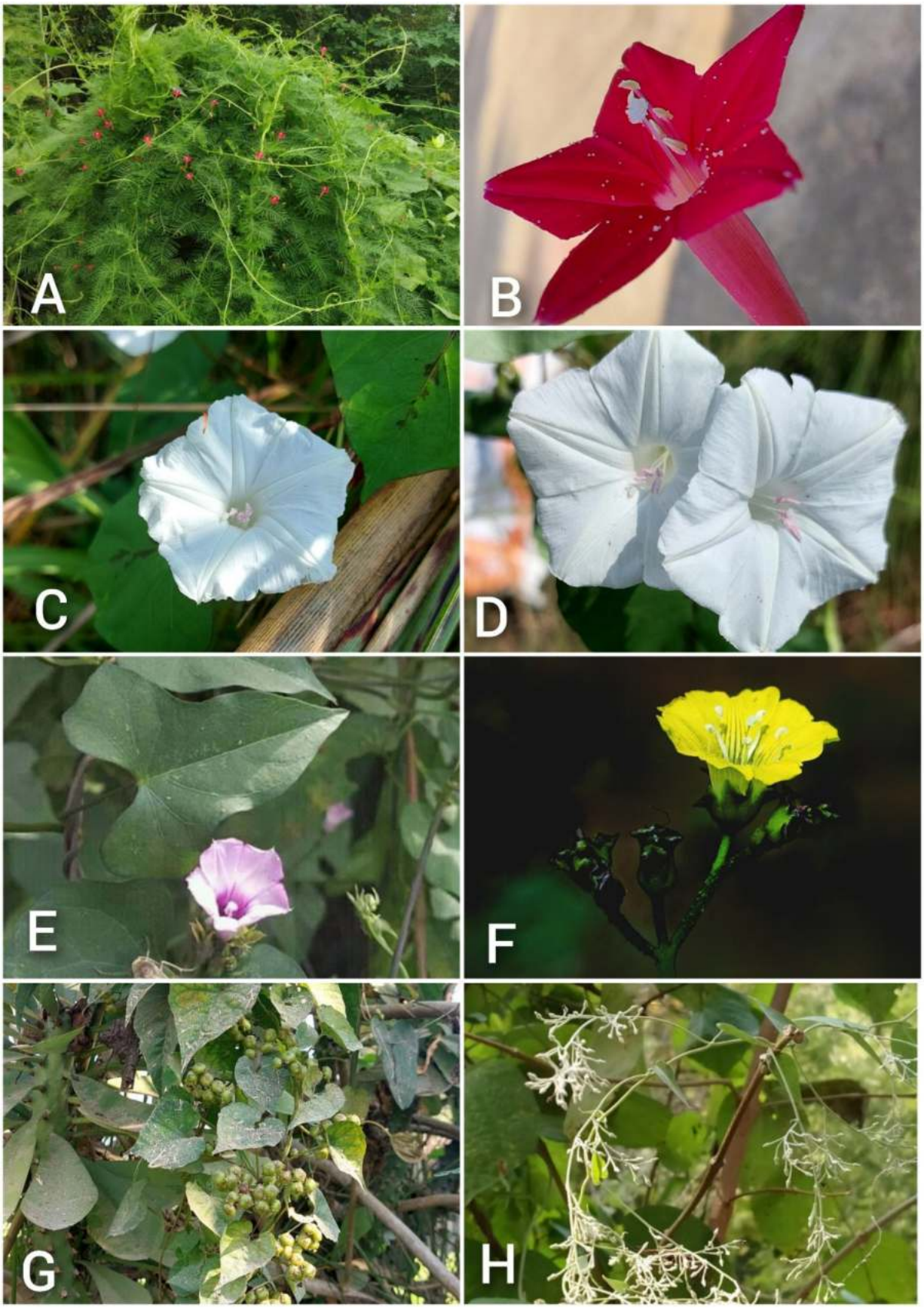

Fig. 3: *Ipomoea quamoclit* L. (A-B); *Ipomoea sagittifolia* Burm.f. (C-D); *Ipomoea triloba* L. (E); *Merremia hederacea* (Burm.f.) Hallier f. (F-G); *Poranopsis paniculata* (Roxb.) Roberty (H)

Fig. 4: *Operculina turpethum* (L.) Silva Manso (A-B)

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