

Chapter V

RESULTS

PLATE I

Habits of some species of Convolvulaceae



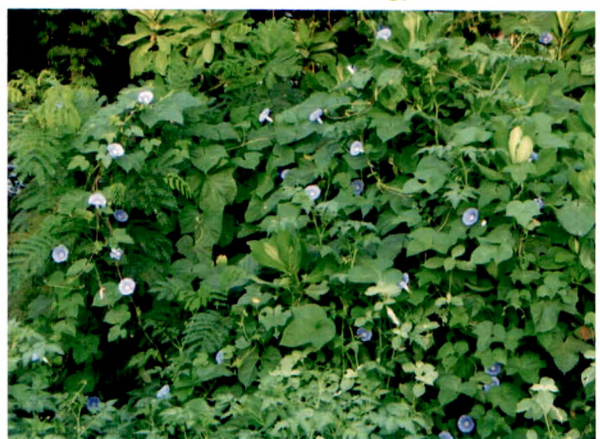
Argyreia elliptica



Bonamia semidigyna



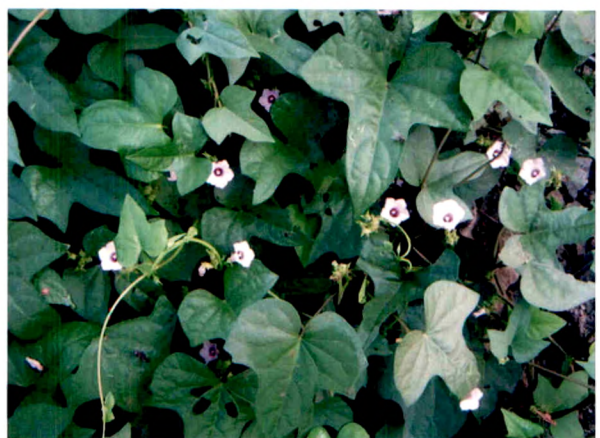
Ipomoea hederifolia



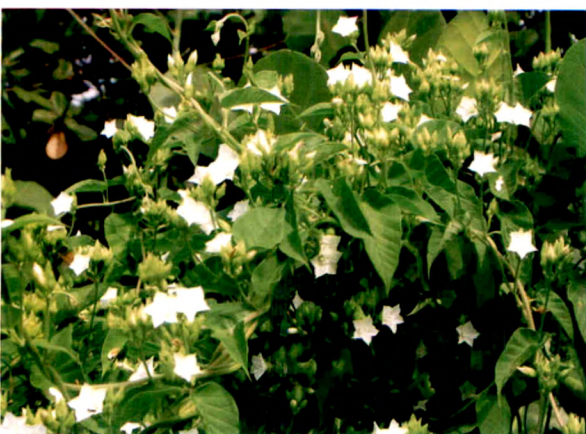
Ipomoea nil



Ipomoea pes-caprae



Ipomoea triloba



Jacquemontia paniculata



Merremia quinquefolia

- Capsule 8 valved.....*Jacquemontia*
4. Stigma capitate or globose.....6
6. Anthers mostly spiral when dehisced,
 style not divided.....*Merremia*
6. Anthers straight when dehisced,
 style divided from middle.....*Bonamia*

Argyreia Lour.

Key to species of Argyreia

1. Erect, shrubs.....*A. cuneata*
1. Climbers, twinners.....2
2. Calyx linear-lanceolate or oblong.....*A. sericea*
2. Calyx not as above.....3
3. Calyx and corolla densely strigose outside.....*A. strigosa*
3. Calyx pubescent and corolla hairy outside.....*A. elliptica*

Argyreia cuneata (Willd.) Ker.- Gawl. in Bot. Reg. 8,t. 661. 1822; Cl. in Hook. f. fl. Brit. India 4: 191. 1833;Cooke, Fl. Pres. Bombay 2:327.1958 (Repr.); Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 441. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist. 305, 2002. *Convolvulus cuneata* Willd. Sp. Pl.1:873.1798. 'Maha-lungi' **Plate II: 1**

Shrubs, branchlets glaucous, usually erect but with a tendency to climb when near support; stems softly silky pubescent. Leaves 4-8 x 3-5 cm, subcoriaceous, strigose above, sericeous below, retuse or apiculate at apex, cuneate at base. Flowers in few-flowered cymes. Calyx unequal 5 lobed, orbicular, obtuse, thick, pubescent outside. Corolla dark-purple; 3.5-5 cm long, tubular infundibuliform. Stamens 5 unequal; filaments short hairy at base. Fruits pointed at tip and shining, ellipsoid.

Fls. and Frts.: July – December

Exsiccata: MMA 1

Note: Rare on dry hill slopes of dry deciduous forest. Flowers dark colored and attractive.

Localities: Amboli, Gargoti, Mahabaleshwar.

PLATE II

Flowers of Convolvulaceae



Argyreia cuneata



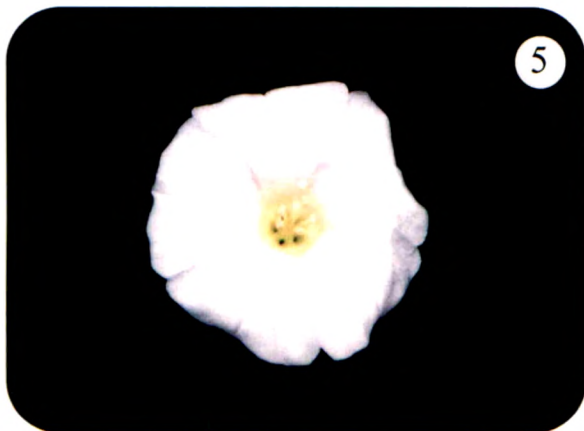
Argyreia elliptica



Argyreia sericea



Argyreia strigosa



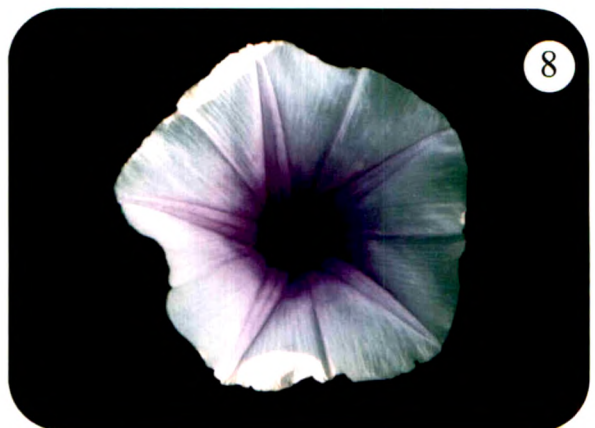
Bonamia semidigyna



Convolvulus arvensis



Ipomoea alba



Ipomoea aquatica

Argyreia strigosa (Roth.) Roberty in Candollea 14: 44. 1952; Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 448. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist.305, 2002. *Ipomoea strigosa* Roth, Nov. Sp. Pl. 113. 1821. *Lettsomia setosa* Roxb. Fl. Ind. 2: 80. 1824; Cl. in Hook. f. Fl. Brit. India 4: 194. 1883; Cooke, Fl. Pres. Bombay 2: 330. 1958 (Repr.). 'Dhudh-vel', 'Sambar-vel'

Plate II: 4

Extensive twinning shrubs with milky juice; stem and branches sparsely hairy. Leaves 10-13 x 9-12 cm, broadly ovate, cordate, acute or sub-obtuse, hairy beneath. Flowers numerous in corymbose cymes. Calyx unequal, densely strigose outside, oblong-obtuse. Corolla tubular-funnel shaped, pink-purple, 3.5-5 cm long, campanulate, hairy outside. Stamens 5; filaments pilose at base. Berries subglobose, seeds smooth.

Fls.: August-October

Exsiccata: MMA 4

Note: Common climber in deciduous forest as well as thorny scrub.

Localities: Kolhapur, Satara Sindhudurg.

Bonamia Thou. (nom. cons.)

Bonamia semidigyna (Roxb.) Hall. F. in Bot. Jahrb. Syst.16: 528. 1893; Austin in Dassan. and Fosb. Rev. Handb. Fl. Ceylon 1: 303. 1980. Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 448, 2001. *Convolvulus semidigynus* Roxb. Fl. Ind. 2:47. 1824. *Breweria cordata* Bl. Bijdr. 722. 1825; Cl. in Hook. f. Fl. Brit. India 4:223. 1883; Cooke, Fl. Pres. Bombay 2: 298. 1958 (Repr.). **Plate II: 5**

Twinning, fulvous-pubescent, Leaves 6.5-13 x 4-10 cm, oblong-ovate, acuminate, finely pubescent above, velvety with fulvous hairs beneath, base cordate or truncate. Flowers in umbellate cymes; pedicel pubescent. Calyx subequal, ovate, acute, silky at outside. Corolla 3-4 cm. long, campanulate, hairy outside, pure white colored. Stamens 5. Style united up to middle then bifurcated. Stigma capitate. Capsule globose or ovoid. Seeds 4, blackish brown, small protuberance on dorsal surface.

Fls and Frts.: October-March

Exsiccata: MMA 5

Note: Frequent along hedges.

Locality: Sindhudurg.

- cordate flowers red.....*I. hederifolia*
- 8. Leaves 5-7 lobed
 - flowers deep pink.....*I. horsfalliae*
- 7. Stamens included.....9
 - 9. Upper leaves trilobed and
 - lower cordate, flower small,
 - calyx tuberculate,
 - plants not tuberous.....*I. triloba*
 - 9. Leaves 5-more lobed,
 - flower large, calyx not
 - as above plants tuberous.....10.
 - 10. Tubers large.....*I. mauritiana*
 - 10. Tubers small.....*I. batatas*
- 4. Leaves not lobed.....11
 - 11. Plant erect.....*I. carnea*
 - subsp. *fistulosa*
 - 11. Plants climber, twinners.....12
 - 12. Flower sessile or on short peduncle.....*I. eriocarpa*
 - 12. Flowers not as above.....13
 - 13. Leaves densely woolly beneath.....*I. arachnosperma*
 - 13. Leaves not as above.....14
 - 14. Stem muricate.....15
 - 15. Calyx aristate.....*I. turbinata*
 - 15. Calyx not aristate.....*I. campanulata*
 - 14. Stem not muricate.....16
 - 16. Calyx heart shaped.....*I. sinensis*
 - 16. Calyx not as above.....17
 - 17. Pedicles thickened
 - in to calyx,18
 - 18. Corolla salver shaped,
 - white, 10cm long.....*I. alba*
 - 18. Corolla pink
 - and purple darker
 - within, 2 cm long.....*I. marginata*

oblong, obtuse with thin margins. Corolla pink-purple, 3.5-5 cm long, funnel shaped, glabrous. Stamens unequal, hairy at base. Capsules ovoid, glabrous, seeds glabrous.

Fls. and Frts.: Throughout the year.

Exsiccata: MMA 8

Note: Common in ponds, sometimes cultivated for stem and leaves used as vegetable.

Localities: Kagal, Kolhapur, Pune, Satara.

Ipomoea arachnosperma Welw. Apont. Phyto-Geogr. 588.1859; Naik, Fl. Marathwada 1:585. 1998, Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 457. 2001. *I. pilosa* (Roxb.) Sweet, Cl. in Hook f. Fl. Brit. India 4:213. 1883; Cooke, Fl. Pres. Bombay 2:3131958(Repr.). 'Bohori', 'Utarani' **Plate III: 1**

Large twiners, extensively covered with glandular hairs. Leaves 4-7.5 x 2.5-6.5 cm, ovate, shape variable, entire or shallowly 3-lobed, Pubescent on outer surface; cottony woolly at lowers surface. Flowers axillary, lax, bracteate cymes. Calyx lanceolate, acuminate, glandular hairs present on outer surface. Corolla pink or pale purple with dark ink centre, 1.5 cm long, hairy outside, tips of lobes are acute. Stamens 5, hairy at base. Capsule globose, Seeds 4, black covered with white pubescence.

Fls. and Frts.: September-December

Exsiccata: MMA 9

Note: Rare on hedges and on low shrubs.

Locality: Devthan (Sangamner).

***Ipomoea batatas** (L.) Lam. Tab. Encycl. 1: 465. 1791; Cl. in Hook.f. Fl. Brit. India 4: 202. 1883; Cooke, Fl. Pres. Bombay 2: 320. 1958 (Repr.); Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 484. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist. 308, 2002. *Convolvulus batatus* L. Sp. Pl. 154. 1753. 'Ratali', 'Sweet Potato' **Plate III: 2**

Creeping, prostrate, perennial herbs with elongate, fusiform, tuberous roots. Stem terete, rooting at nodes. Leaves 5-15 x 4.5-10 cm, entire, angular or more often deeply 3-7-lobed; lobes ovate to linear oblong, glabrous or pubescent. Flowers axillary, solitary or in few to many-flowered cymes. Calyx subequal, elliptic-oblong, acute, mucronate, fimbriate. Corolla pale purple, 3-5 cm long, glabrous. Capsule ovoid, seeds black glabrous.

Fls.: September-December

Exsiccata: MMA 10

Note: Cultivated for edible tuberous roots.

PLATE III

Flowers of Convolvulaceae



Ipomoea arachnosperma



Ipomoea batatas



Ipomoea cairica



Ipomoea campanulata



Ipomoea carnea subsp. *fistulosa*



Ipomoea eriocarpa



Ipomoea hederifolia



Ipomoea horsfalliae

Ipomoea carnea Jacq. subsp. **fistulosa** (Mart ex Choisy) Austin in Taxon 26: 237. 1977; Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 459. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist. 308, 2002. *I. fistulosa* Mart ex Choisy in DC. Prodr. 9: 349. 1845. *I. carnea* Jacq. Enumer. Pl. Carib. 13. 1760; Cooke, Fl. Pres. Bombay 2: 321. 1958 (Repr.). 'Garvel' **Plate III: 5**

Erect or scandent shrubs; stems fistular, glabrous. Leaves 8-24 x 5-14 cm, ovate or ovate-oblong, base cordate to truncate, apex acuminate, puberulent mainly on nerves beneath, upper surface pubescent. Flowers in axillary and terminal, many flowered cymes. Calyx subequal, orbicular, puberulent. Corolla tubular, funnel shaped, 5-8 cm long, pink or entirely faint pinkish-white, dark purple within. Stamens 5, included, filaments hairy at dilated base. Capsules ovoid, apiculate, pale brown, 4-valved. Seeds 2-4, black, densely brown villous.

Fls. and Frts.: Throughout year

Exsiccata: MMA 13

Note: Common in wet and marshy places.

Localities: Kolhapur, Radhanagari, Satara.

Ipomoea eriocarpa R. Br., Prodr. 484. 1810; Cl. in Hook. f. Fl. Brit. India 4: 204. 1883; Cooke, Fl. Pres. Bombay 2: 312. 1958 (Repr.); Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 463. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist. 308, 2002. 'Ranbhorli' **Plate III: 6**

Herbs, twinning or prostrate, pilose. Stem herbaceous, slender, clothed with spreading hairs. Leaves 4.5-8 x 2-4 cm, ovate-lanceolate to oblong, cordate at base, entire, acute or acuminate apex, pubescent on both surface. Flowers small; axillary in sessile or short pedunculate cymes. Calyx unequal, hairy on outer surface, ovate acuminate. Corolla 1 cm long, tubular, campanulate, pink-purple, pilose outside, darker within. Stamens included unequal, hairy at base. Ovary densely hairy at base. Capsule globose, pubescent. Seeds blackish brown colored, reticulate.

Fls. and Frts.: July-August

Exsiccata: MMA 14

Note: Common amidst grasses and on bunds of fields.

Localities: Kagal, Kolhapur.

Ipomoea hederifolia L. Syst. Nat. ed. 10: 925. 1759; Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 463. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist. 308, 2002. *I. coccinea* Cl. in Hook. f. Fl. Brit. India 4: 199. 1883 non L.

obtuse with thin margins. Corolla pure white, 2.5-3.5 cm long, tubular, lobes shortly apiculate. Stamens and styles included, Stamens 5, filaments hairy at base. Capsule globular, apiculate, brown, smooth. Seeds velvety black.

Fls. and Frts.: September-April.

Exsiccata: MMA 17

Note: This distinct form with pure white corolla. Found occasional on moist places, in grassland.

Locality: Kolhapur.

Ipomoea marginata (Desr.) H. Manitz in Feddes Repert. 85 (9-10): 638. 1974 forma **marginata**; Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 464. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist. 309, 2002. *Convolvulus marginatus* Desr. in Lam. Encycl. 3: 558. 1792. *Ipomoea sepiaria* Koen. ex Roxb. Fl. Ind. 2:90. 1824; Cl. in Hook. f. Fl. Brit. India, 4: 209. 1883; Cooke, Fl. Pres. Bombay 2: 315. 1958 (Repr.). **Plate IV: 2**

Perennial climbing herbs. Stem glabrous. Leaves 4-6 x 5-7 cm, broadly ovate-orbicular, deeply cordate at base, acuminate at apex, margins hairy. Flower few to many in axillary cymes. Calyx unequal, tuberculate, ovate-ovate. Corolla pale lilac with purple center, 2-3 cm long, glabrous outside. Stamens 5, unequal, hairy at base. Capsule globose, seeds covered with white tomentum.

Fls. and Frts.: August-December

Exsiccata: MMA 18

Note: Occasional on moist places.

Locality: Dajipur, Malwan, Ratnagiri.

Ipomoea mauritiana Jacq. Collect. 4: 216.1791 and in Hort. Schoenbr. 2: 39. t. 200, 1797; Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 465. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist. 309, 2002. *I. digitata* auct. Non L., 1753; Cl. in Hook. f. Fl. Brit. India. 4: 202. 1883; Cooke, Fl. Pres. Bombay 2: 318. 1958 (Repr.). 'Bhui Kohala', 'Vidari Kand' **Plate IV: 3**

Perennial, with large ovoid or elongated tuberous roots; stems long, thick, twinning, glabrous. Leaves 8.5-11 x 9-10 cm, often broader than long, deeply palmately divided; lobes 5-7, glabrous, entire. Flowers in many-flowered corymbosely paniculate cymes. Calyx subequal, coriaceous, orbicular-oblong, concave, glabrous. Corolla purple and darker within, 4-6 cm long, campanulate-

PLATE IV

Flowers of Convolvulaceae



Ipomoea marginata forma *candida*



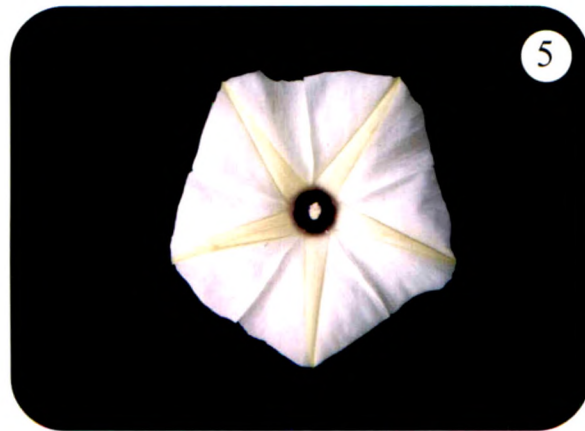
Ipomoea marginata forma *marginata*



Ipomoea mauritiana



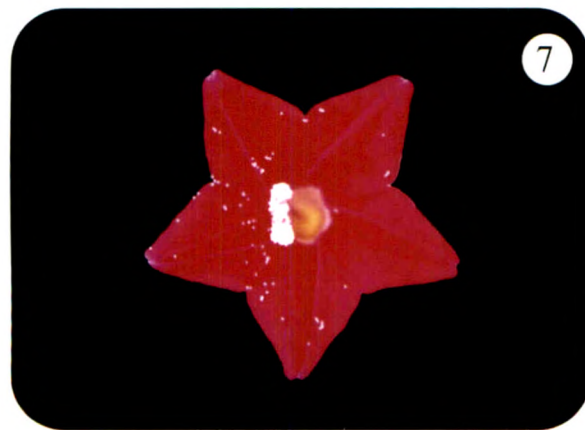
Ipomoea nil



Ipomoea obscura forma *obscura*



Ipomoea pes-caprae



Ipomoea quamoclit



Ipomoea sinensis

Note: Common along roadsides and hedges.

Localities: Ichalkaranji, Kagal, Kolhapur, Satara.

***Ipomoea pes-caprae* (L.) R. Br.** Turkey Narr. Exped. R. Zaire 477, 1818; Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 467. 2001. *Convolvulus pes-caprae* L. Sp. Pl. 159. 1753. *Ipomoea biloba* Feorssk. Cl. in Hook.f. Fl. Brit. India 4: 212. 1883; Cooke, Fl. Pres. Bombay 2: 317. 1958 (Repr.). 'Maryadavel', 'Samudraphen' **Plate IV: 6**

Prostrate herbs; stem trailing and rooting at nodes, glabrous, very long. Leaves 4-5 x 6-10 cm or variable, usually broader than long, cuneate or truncate at base, deeply two lobed, lobes ovate, abovate, elliptic, elliptic to reniform, fleshy, glabrous. Flower solitary sometimes 2-3. Calyx unequal, glabrous, subcoriaceous, oblong, obtuse, apiculate. Corolla 4-6 cm long, tubular-infundibuliform, pink to purple with deeper color in tube. Stamens 5, unequal, hairy at base. Capsule 1-2cm long, ovoid to globose. Seeds brownish black, wooly.

Fls. and Frts.: Throughout year

Exsiccata: MMA 22

Note: Common along coastal sand places.

Localities: Ganapatipule, Nivati-fort, Ratnagiri, Sindhudurg.

****Ipomoea quamoclit* L. Sp. Pl. 159. 1753; Cl. in Hook.f. Fl. Brit. India 4: 199. 1883;** Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 486. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist. 309, 2002. *Quamoclit vulgaris* Choisy in Mem. Soc. Phys. Genev. 6: 434. 1834; Cooke. Fl. Pres. Bombay 2: 330. 1958 (Repr.). 'Ganesh Pushp', 'Ganeshvel' **Plate IV: 7**

Annual glabrous twiner; stems slender. Leaves 4.5-6.5 x 3-4.5 cm, pinnately divided in to many segments. Flowers in axillary, 1-few-flowered cymes. Calyx glabrous, unequal, oblong, mucronate at apex. Corolla, 1.5-2.5 cm long, tubular funnel shaped, scarlet, tube glabrous outside. Stamens 5, hairy at base. Style shortly exerted. Capsules 0.6 cm long, ovoid, apiculate. Seeds 4 or less, dark brown, minutely tuberculate.

Fls. and Frts.: September-December

Exsiccata: MMA 23

Note: Planted in gardens, also running wild.

Localities: Ichalkaranji, Kolhapur, Malakapur.

PLATE V

Flowers of Convolvulaceae



Ipomoea staphylina



Ipomoea triloba



Ipomoea turbinata



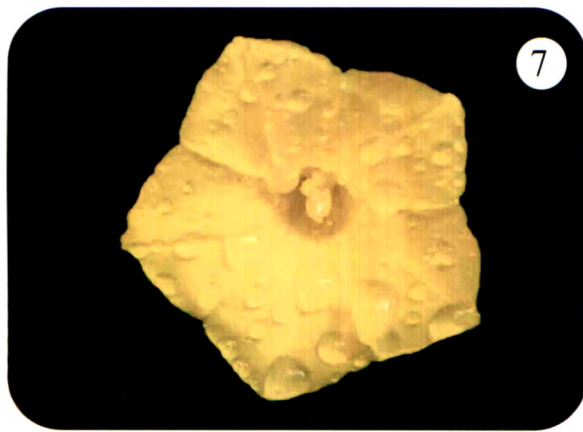
Jacquemontia paniculata



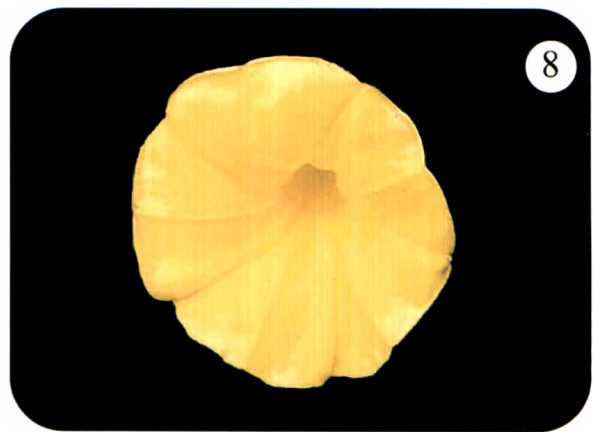
Merremia aegyptica



Merremia quinquefolia



Merremia rhyncorhiza



Merremia tuberosa

calyx. Calyx subequal, aristae, elliptic-oblong. Corolla 6-8 cm long, funnel to salver shaped with narrow tube, rose-purple colored, glabrous outside. Stamens 5, hairy at base. Capsule ovoid, 2cm long, seeds glabrous, black.

Fls. and Frts.: Sept-Jan.

Exsiccata: MMA 26

Note: Common along hedges and waste places.

Localities: Sangamner, Pune, Khopoli, Nashik.

Ipomoea triloba L. Sp. Pl. 161, 1753, V. N. Naik, Fl. Marathwada 595, 1998, Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 472, 2001. **Plate V: 3**

Herbs, twinning or prostrate, glabrous. Leaves 3-10 x 4-8 cm, ovate, entire, cordate base, upper leaves mostly 3-lobed; but sometimes 5-7 lobed, lower entire, glabrous. Flowers in axillary 1-few flowered cymes. Calyx unequal, hairy, tuberculate, elliptic-oblong, obtuse. Corolla 2 cm long, funnel shaped, pink with dark purple within. Stamens 5, unequal, hairy at base. Capsule subglobose, pubescent, apiculate, seeds glabrous; brown colored.

Fls. and Frts.: August-December

Exsiccata: MMA 27

Common along hedges, waste places and roadsides.

Localities: Kolhapur, Satara, Sindhudurg.

Jacquemontia Choisy

Jacquemontia paniculata (Burm.f.) Hall. F. in Engl. Jahrb. 16: 541. 1893; Cooke, Fl. Pres. Bombay 2: 303. 1958 (Repr.), V. N. Naik, Fl. Marathwada 596, Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 473, 2001. *Convolvulus parviflorus* Vahl. Cl. in Hook. f. Fl. Brit. India 4:220. 1883. **Plate V: 4**

Climbers, slender; stems twinning, pubescent. Leaves 3-7.5 x 2.5-4 cm, broadly ovate, apex acuminate, entire, puberulous on both surface. Flowers in axillary few to many flowered cymes. Calyx unequal, ovate, pubescent. Corolla 1cm long, funnel shaped, glabrous outside. Stamens and style exerted, stamens 5 unequal, hairy at base. Stigma elliptic; recurved. Capsule globose or ovoid, 8 valved, papery, pubescent. Seeds 4, trigonous, slightly tuberculate with transparent winged margin.

Fls. and Frts.: July-October

Exsiccata: MMA 28

Note: Rare, in hedges and bushes in ghats.

Merremia rhyncorhiza (Dalz.) Hall.f. in Engl. Bot. Jahrb. 16: 552. 1893; Cooke, Fl. Pres. Bombay 2: 307. 1958 (Repr.), Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 477, 2001, *Ipomoea rhyncorhiza* Dalz. Cl. in Hook. f. Fl. Brit. India 4:214. 1883. 'Amativel' **Plate V: 6**

Twinnings; stem filiform, tuberous plants. Tubers compressed and beaked. Leaves about 4-8 cm in diameter, palmately divided in to 5-7 lobes, lobes further divided small lobes, pubescent on both surfaces. Flowers in axillary 1-few flowered cymes. Calyx unequal, oblong-lanceolate, acute, glabrous. Corolla 3-4.5cm long, yellow colored, glabrous outside. Stamens 5, hairy at base. Capsules oblong.

Fls. and Frts.: August-October

Exsiccata: MMA 30

Note: Rare on rocky substratum in open areas.

Locality: Choukul.

Merremia quinquefolia (L.) Hall.f. Engl. Bot. Jahrb. Syst.16: 552. 1893, V. N. Naik, Fl. Marathwada 1:598, 1998, Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 487. 2001, S. R. Yadav and M. M. Sardesai in Fl. Kolhapur Dist. 312, 2002. *Ipomoea quinquefolia* L. Sp. Pl. 462. 1753. **Plate V: 7**

An herbaceous climber, stem slender, twinning, glabrous or hairy. Leaves 3-8 x 3-5 cm in diameter, palmately compound, Leaflets sessile or sub-sessile, glabrous, margin serrate, elliptic-oblong, narrow at both ends. Flowers in 3-5 flowered axillary cymose, peduncle glandular in upper portion. Calyx unequal, ovate, elongate, acute, mucronate, glabrous. Corolla 2.5 cm long, funnel shaped or infundibuliform, lemon yellow colored, glabrous outside. Stamens 5, subequal, included, filament hairy at base. Capsule globose, tetragonous, straw colored, seeds gray colored, glabrous.

Fls. and Frts.: November-April

Exsiccata: MMA 31

Note: Common found in hedges on roadside.

Locality: Kolhapur, Sangamner, Nashik.

***Merremia tuberosa** (L.) Rendle, Fl. Trop. Afr. 4, 2: 104.1905, V. N. Naik, Fl. Marathwada 1:600. 1998, Venkanna and Das Das in Singh *et al.* Fl. Maharashtra St. Dicot. 2: 488. 2001. *Ipomoea tuberosa* L. Cooke, Fl. Pres. Bombay 2: 320. 1958 (Repr.). 'Wood rose', 'Lakadi Gulab' **Plate V: 8**

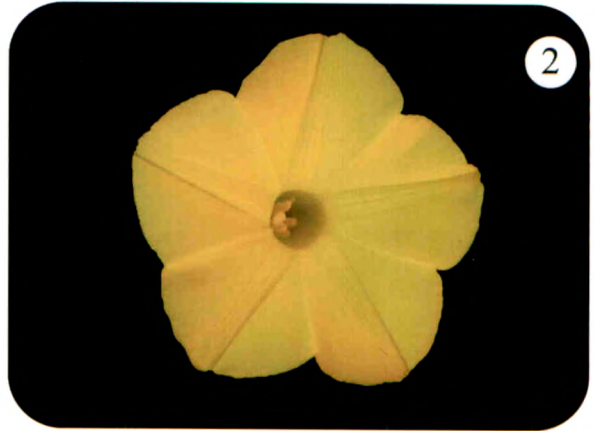
Huge twinnings, glabrous, stem woody, tuberous. Tubers large, underground. Leaves 9-18 x 12-20cm, palmately 5-7 lobed; lobes oblong-lanceolate, narrowed at

PLATE VI

Flowers of Convolvulaceae



Merremia umbellata



Merremia vitifolia



Stictocardia tiliaefolia

hairy at base. Capsules ovoid with persistent spreading calyx lobes. Seeds glabrous blackish-gray.

Fls. and Frts.: November-April

Exsiccata: MMA 34

Note: Common along ghats, hedges.

Localities: Amba, Bamabvade, Kolhapur, Radhanagari.

Stictocardia Hall. f.

***Stictocardia tiliaefolia** (Desr.) Hall. F. in Bot. Jahrb. 18:159. 1894; Venkanna and Das Das in Singh *et al.*. Fl. Maharashtra St. Dicot. 2: 482. 2001. *Argyria tiliaefolia* Wight; Ic. T. 1358. 1848; Cl. in Hook. f. Fl. Brit. India 4: 184. 1883. **Plate VI: 3**

Twinnings, woody, young stem terete, pubescent. Leaves 6-18 x 5-20 cm, orbicular, base cordate, apex obtuse to mucronulate, both surfaces pubescent. Flowers in axillary 1-few flowered cymes. Calyx orbicular, pubescent. Corolla funnel shaped, 7-9 cm long, reddish-purple with dark center. Stamens 5 unequal, hairy at the base.

Fls. and Frts.: Dec.-May

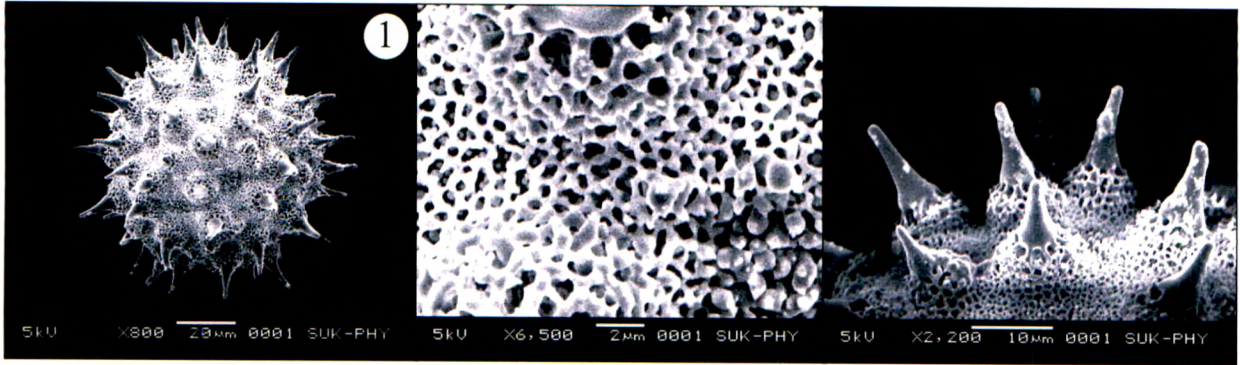
Exsiccata: MMA 35

Note: Cultivated in Gardens and homes.

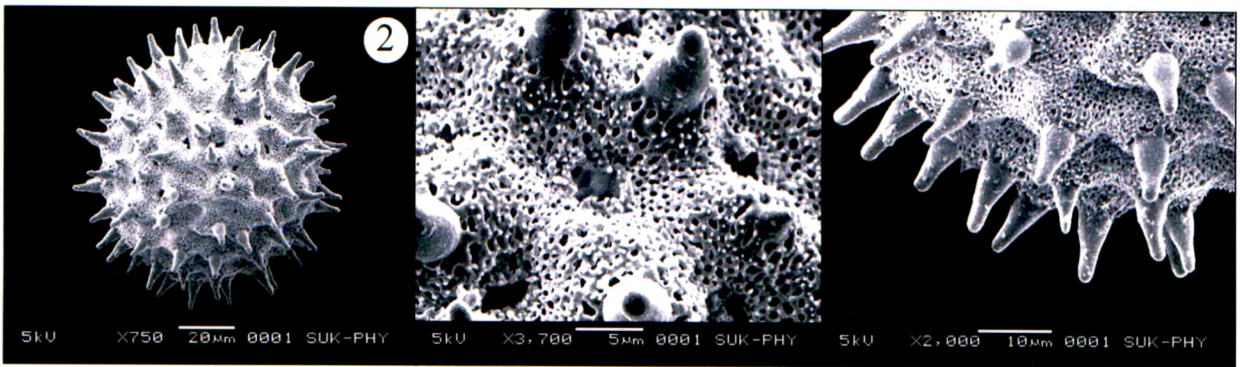
Localities: Kolhapur, Pune, Satara.

PLATE VII

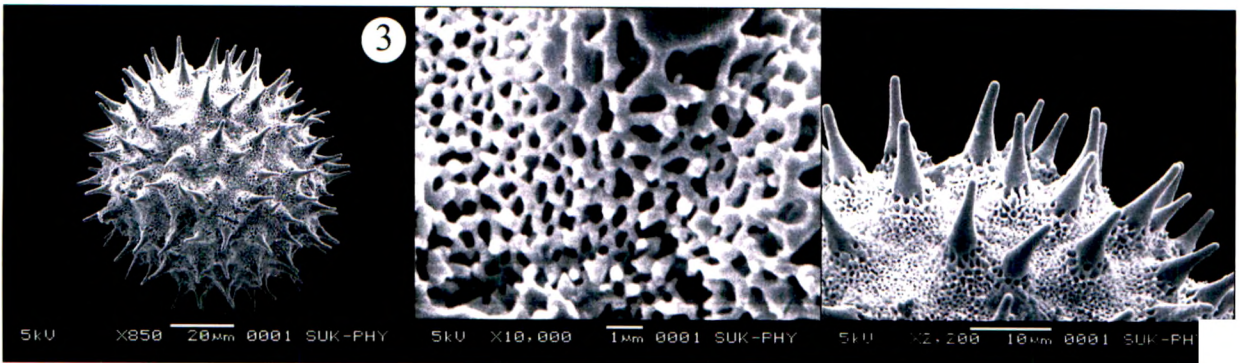
SEM photographs of pollen grains of Convolvulaceae



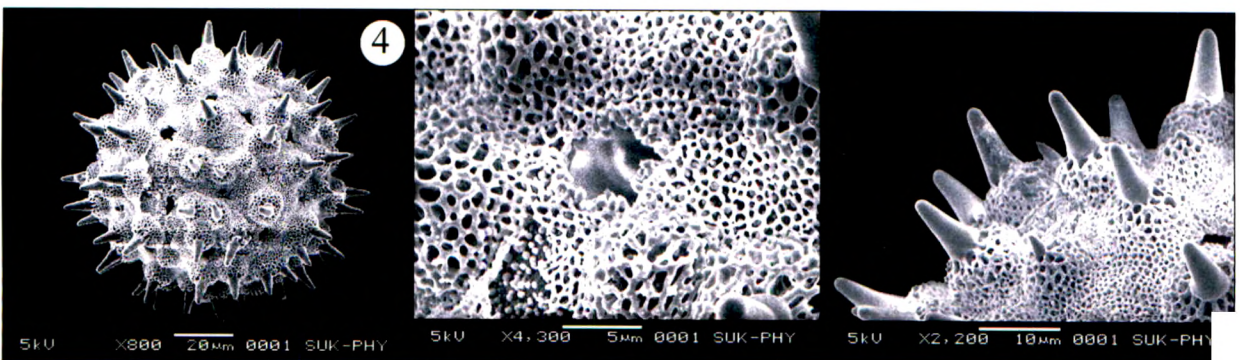
Argyreia cuneata



Argyreia elliptica



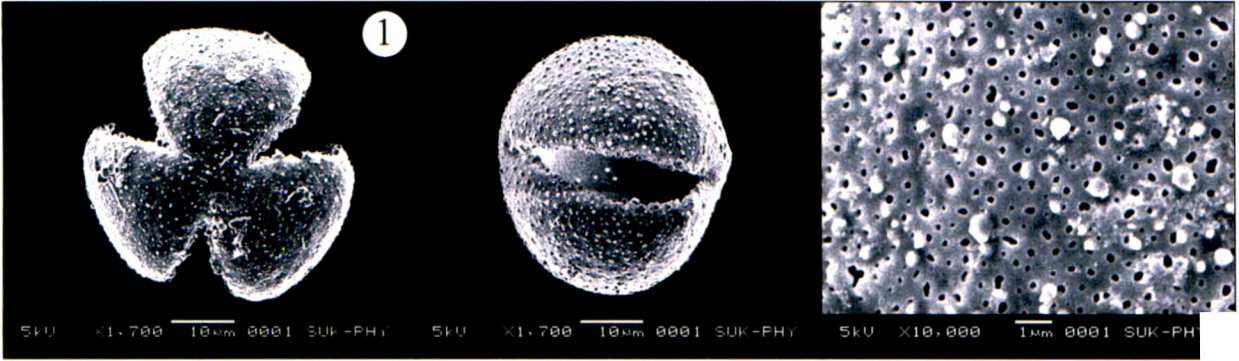
Argyreia sericea



Argyreia strigosa

PLATE VIII

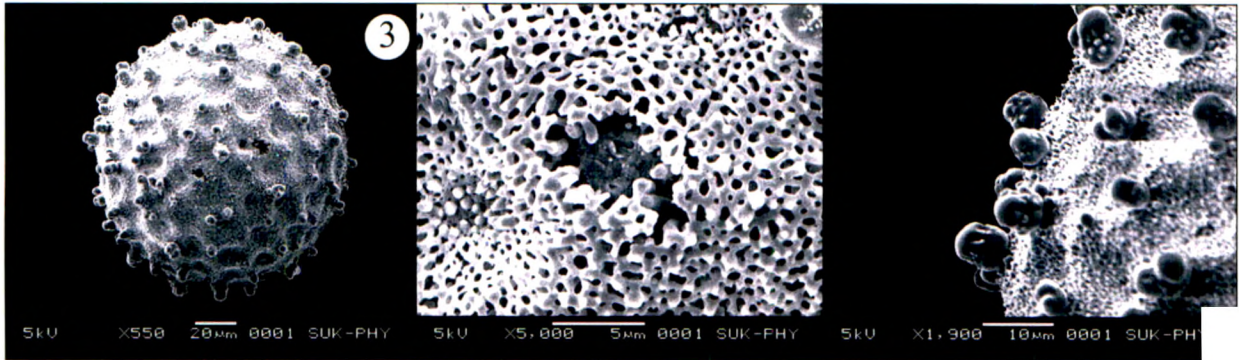
SEM photographs of pollen grains of Convolvulaceae



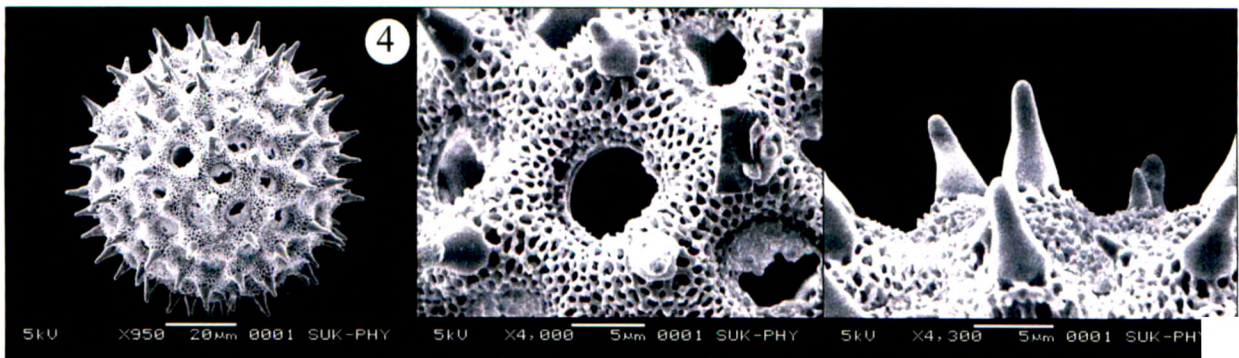
Bonamia semidigyna



Convolvulus arvensis



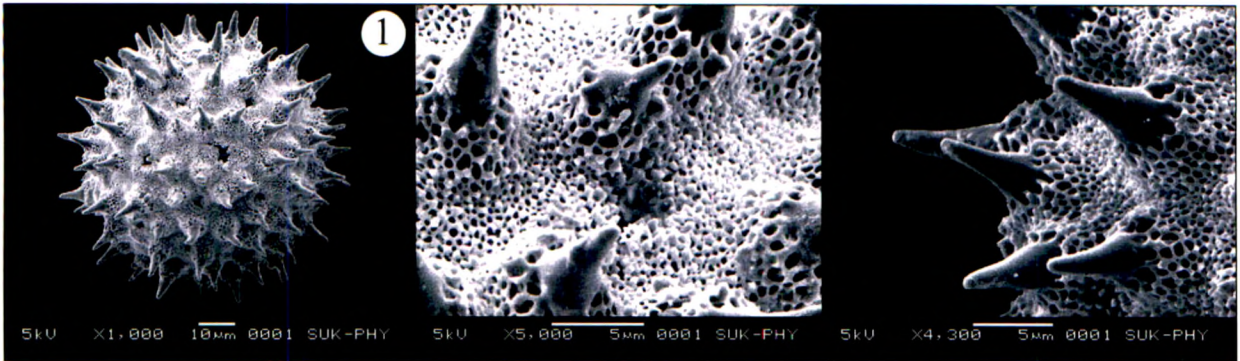
Ipomoea alba



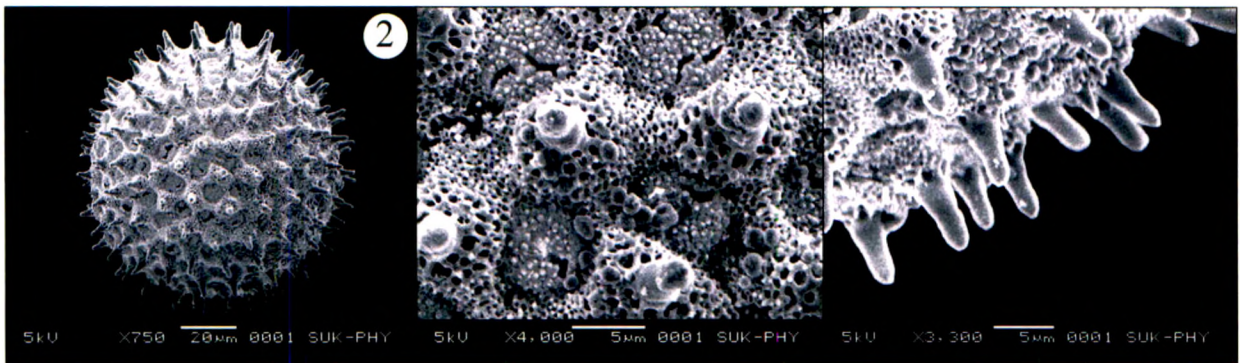
Ipomoea aquatica

PLATE IX

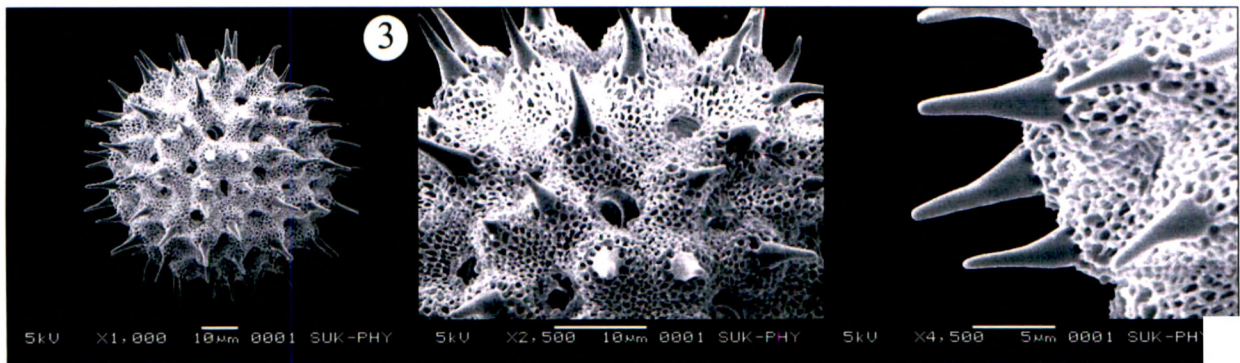
SEM photographs of pollen grains of Convolvulaceae



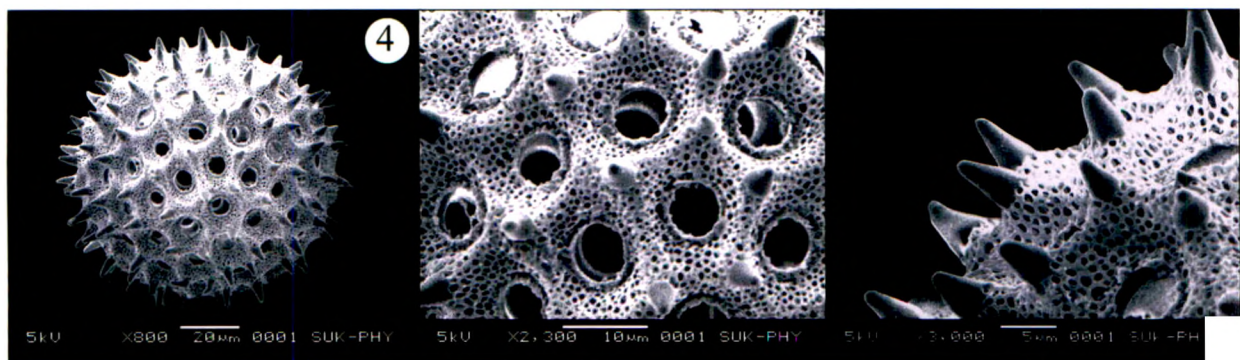
Ipomoea arachnosperma



Ipomoea batatas



Ipomoea cairica

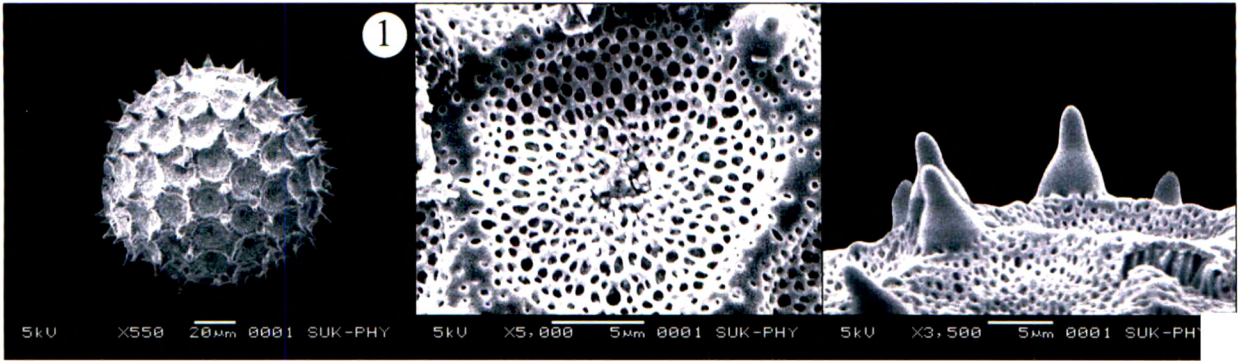


Ipomoea campanulata

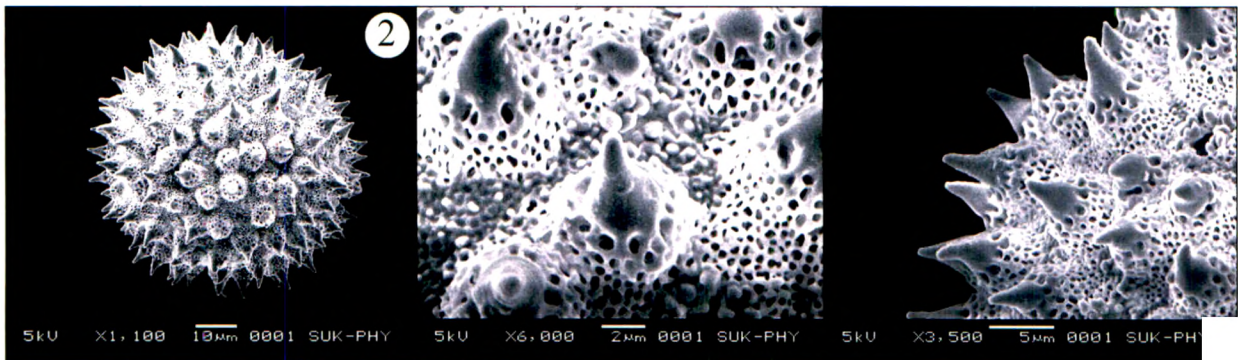
6. *Convolvulus arvensis*: (Plate VIII: 2) Pollen grains 3-zonocolpate, oblate spheroidal, 51.66 x 50 μm , exine reticulate, ectoaperture long with acute to obtuse apex, margin regular.
7. *Ipomoea alba*: (Plate VIII: 3) Pollen grains oblate spheroidal, pantoporate, spinulose, 127.27 x 141.81 μm , ectoaperture porous, more or less circular in outline, 4.16 μm in diameter, margin irregular, reticulate, spines pear-shaped; base 6.6 μm broad, 7.22 μm in length, apex broad and flattened.
8. *Ipomoea aquatica*: (Plate VIII: 4) Pollen grains prolate spheroidal, pantoporate, spinulose, 84.44 x 84.44 μm , ectoaperture porous, nearly circular, 5.78 μm in diameter, margin nearly regular, reticulate, spine broad at base and gradually tapering towards apex; base 3.5 μm broad, 7 μm in length, apex blunt. The spines and the bacula around each extraporal region form a distinct hexagonal area.
9. *Ipomoea arachnosperma*: (Plate IX: 1) Pollen grains prolate spheroidal, pantoporate, spinulose, 76 x 76 μm , ectoaperture porous, more or less circular, 3.75 μm in diameter, margin regular, reticulate, spine broad at base and gradually tapering towards apex with more or less rounded tips; base 3 μm broad, 6.5 μm in length.
10. *Ipomoea batatas*: (Plate IX: 2) Pollen grains prolate spheroidal, pantoporate, spinulose, 144 x 144 μm , ectoaperture porous, more or less circular, 7.89 μm in diameter, margin nearly regular, reticulate, spine broad or bulbous at base and gradually tapering towards apex; base 3.12 μm broad, 6.25 μm in length, apex blunt. The spines and the bacula around each extraporal region form a distinct hexagonal area.
11. *Ipomoea cairica*: (Plate IX: 3) Pollen grains prolate spheroidal, pantoporate, spinulose, 70 x 70 μm , ectoaperture porous, nearly circular, 5 μm in diameter, margin nearly regular, reticulate, spine slightly bulbous at

PLATE X

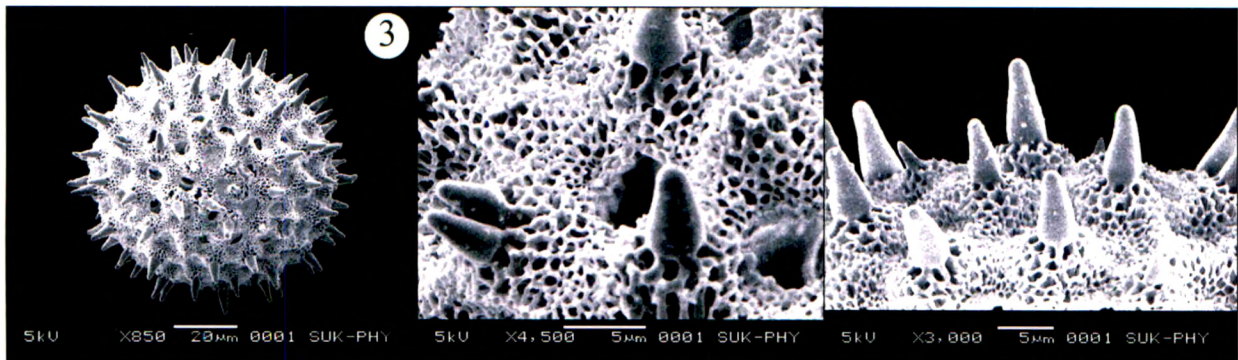
SEM photographs of pollen grains of Convolvulaceae



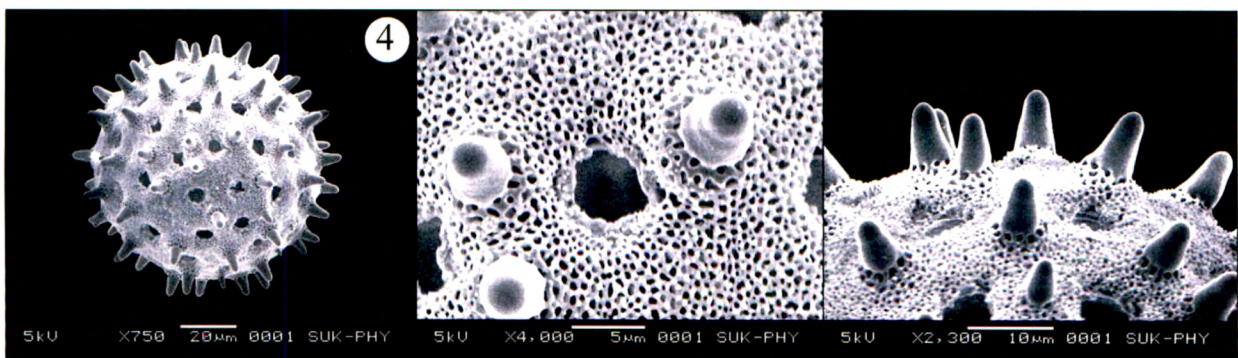
Ipomoea carnea subsp. *fistulosa*



Ipomoea eriocarpa



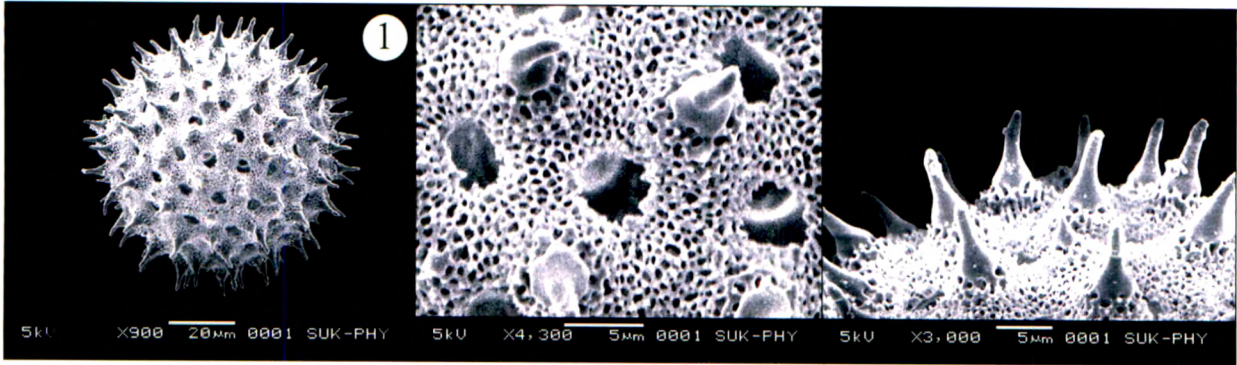
Ipomoea hederifolia



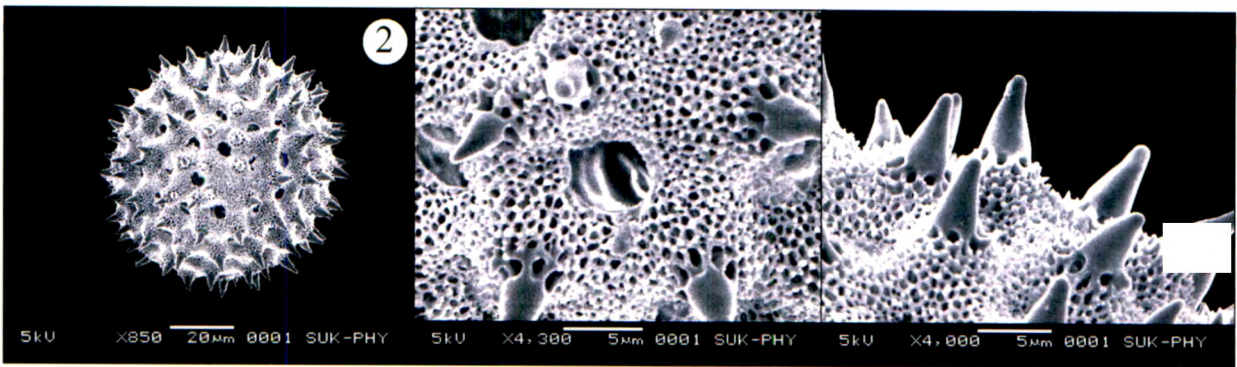
Ipomoea horsfalliae

PLATE XI

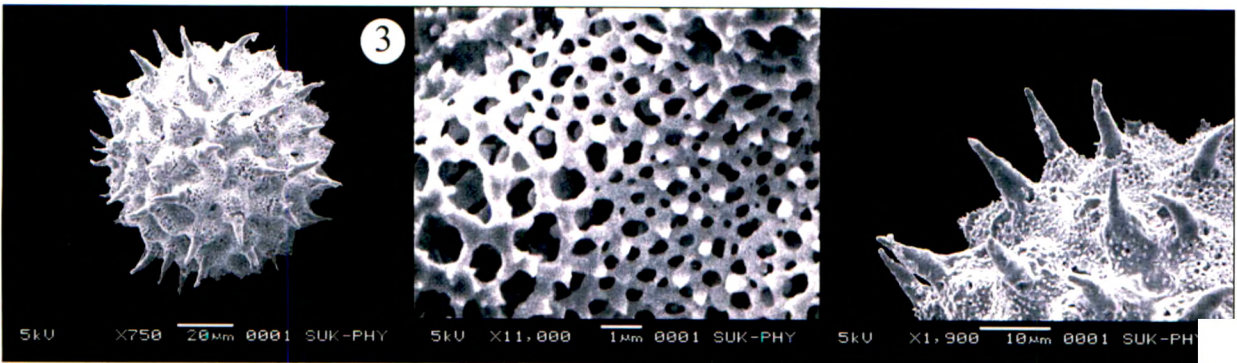
SEM photographs of pollen grains of Convolvulaceae



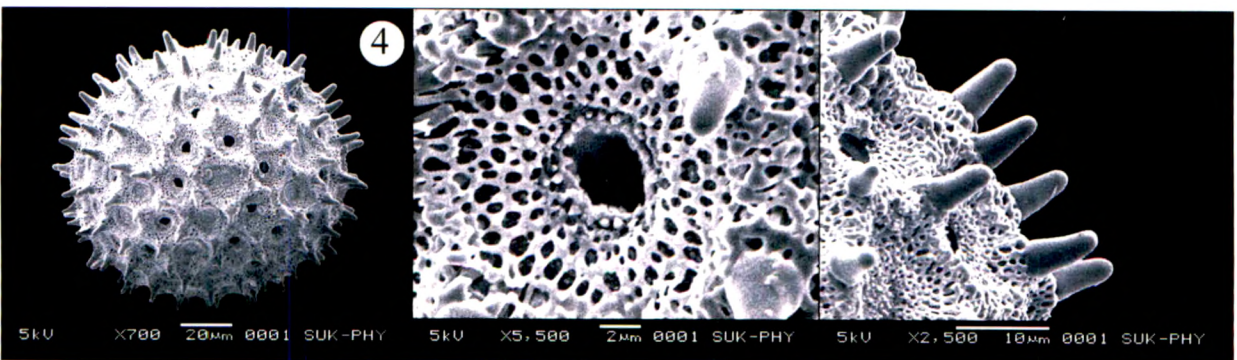
Ipomoea marginata forma *candida*



Ipomoea marginata forma *marginata*



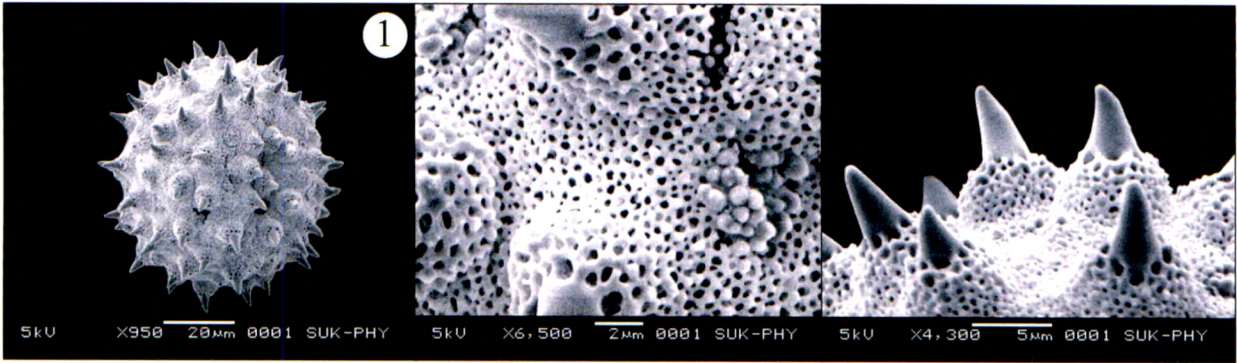
Ipomoea mauritiana



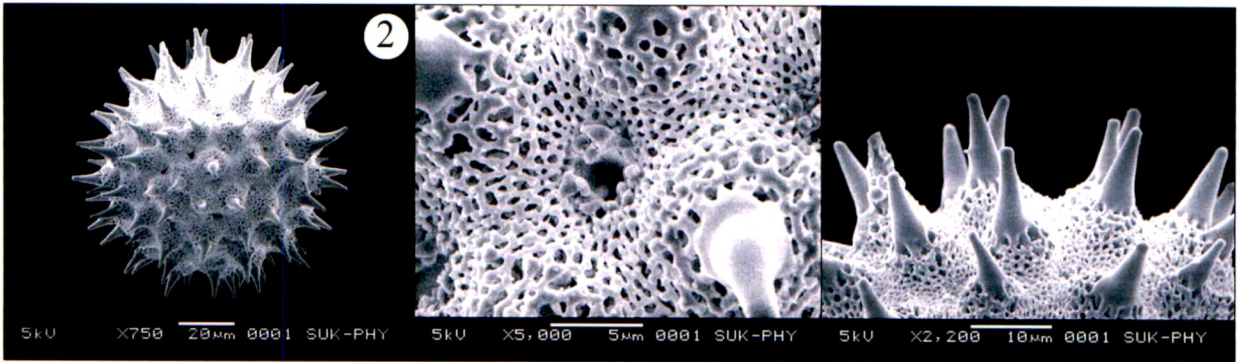
Ipomoea nil

PLATE XII

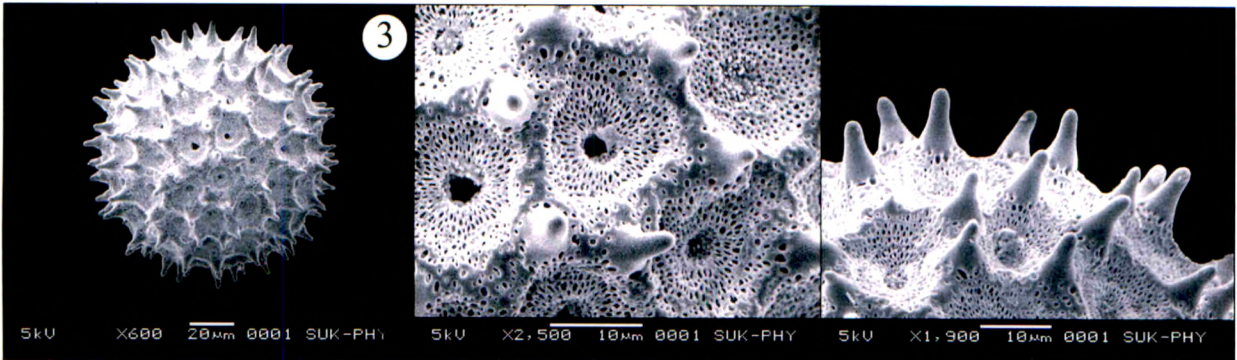
SEM photographs of pollen grains of Convolvulaceae



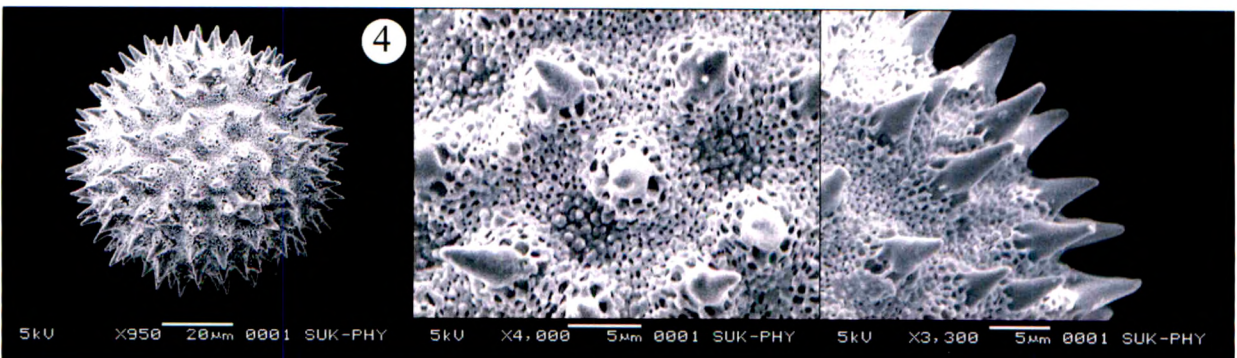
Ipomoea obscura forma *obscura*



Ipomoea pes-caprae



Ipomoea quamoclit

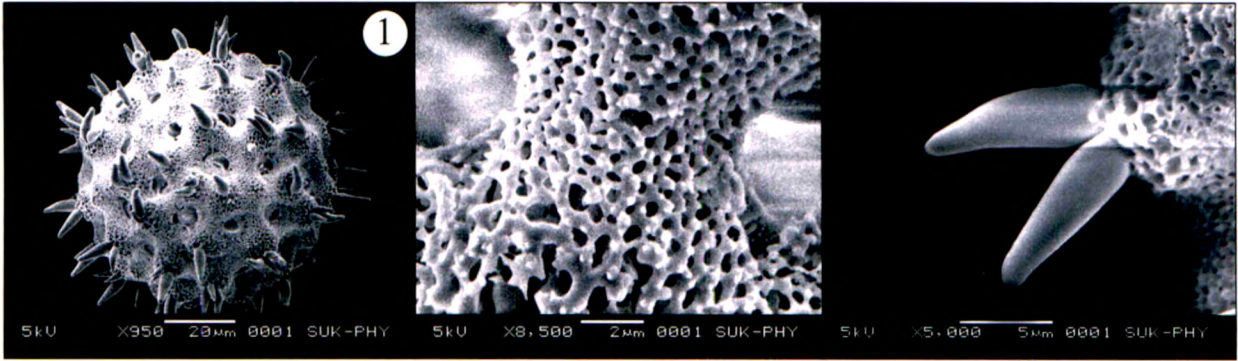


Ipomoea sinensis

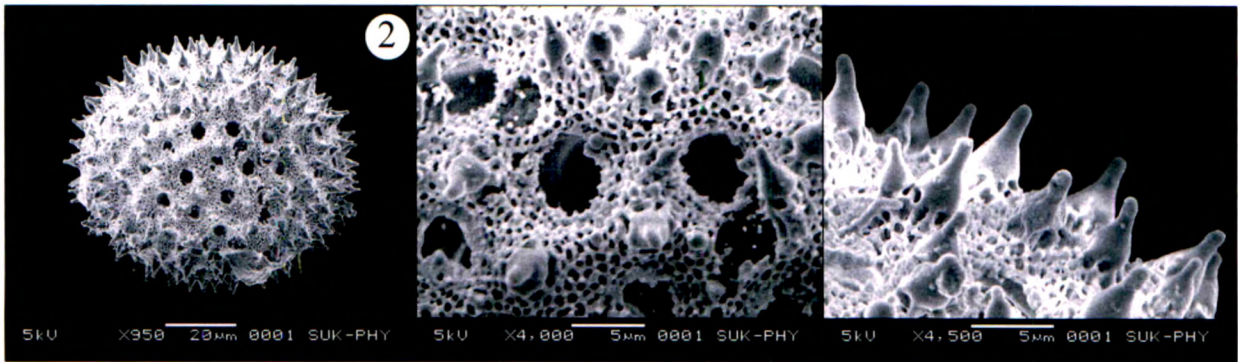
17. *Ipomoea marginata* forma *candida*: (Plate XI: 1) Pollen grains prolate spheroidal, pantoporate, spinulose, 100 x 100 μm , ectoaperture porous, circular, 5 μm in diameter, margin irregular, reticulate, spines forming more or less a flask-shaped structure at base, gradually tapering towards the apex; base 4.28 μm broad, 7.14 μm in length, apex pointed. The spines and the bacula around each extraporal region form a distinct hexagonal area.
18. *Ipomoea marginata* forma *marginata*: (Plate XI: 2) Pollen grains prolate spheroidal, pantoporate, spinulose, 91.42 x 91.42 μm , ectoaperture porous, more or less circular, 5.5 μm in diameter, margin irregular, reticulate, spines with broad base and blunt apex; base 3.5 μm broad, 5.5 μm in length. The spines and the bacula around each extraporal region form a distinct hexagonal area.
19. *Ipomoea mauritiana*: (Plate XI: 3) Pollen grains prolate spheroidal, pantoporate, spinulose, 91.42 x 88.57 μm , exine reticulate, spines slightly broad at base and gradually tapering towards apex; base 5 μm broad, 12.22 μm in length, apex pointed; some spines are with curved apex.
20. *Ipomoea nil*: (Plate XI: 4) Pollen grains sub-oblate, pantoporate, spinulose, 100 x 114.28 μm , ectoaperture porous, more or less circular, 4.66 μm in diameter, margin irregular, reticulate, spines broad at base and blunt apex; base 4.16 μm broad, 7.14 μm in length. The spines and the bacula around each extraporal region form a distinct hexagonal area.
21. *Ipomoea obscura* forma *obscura*: (Plate XII: 1) Pollen grains prolate spheroidal, pantoporate, spinulose, 73.33 x 66.16 μm , exine reticulate, spines broad at base and gradually tapering towards apex; base 3 μm broad, 7.14 μm in length, apex pointed.
22. *Ipomoea pes-caprae*: (Plate XII: 2) Pollen grains prolate spheroidal, pantoporate, spinulose, 111.42 x 100 μm , ectoaperture porous, irregular in shape, 3.33 μm in diameter, margin irregular, reticulate, spines broad at base

PLATE XIII

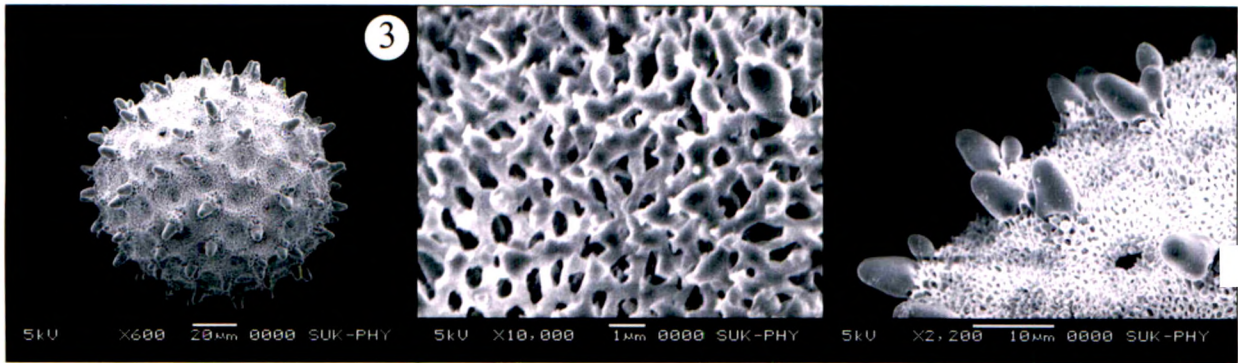
SEM photographs of pollen grains of Convolvulaceae



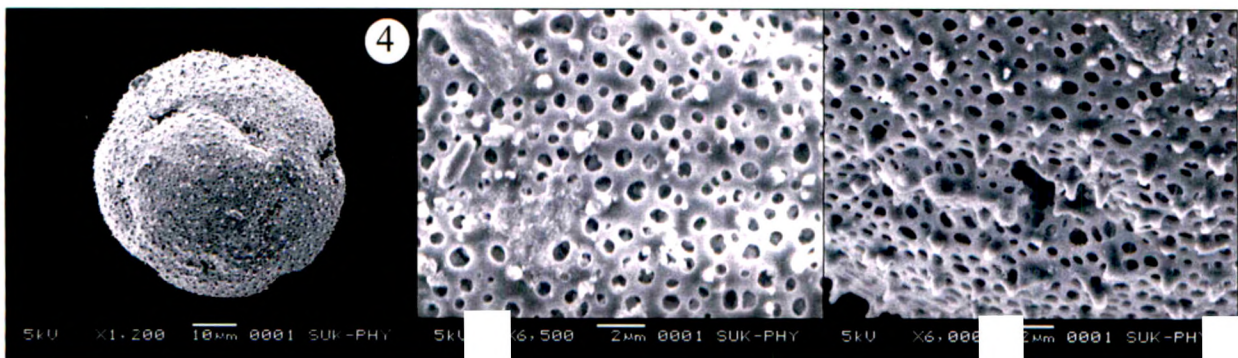
Ipomoea staphylina



Ipomoea triloba



Ipomoea turbinata



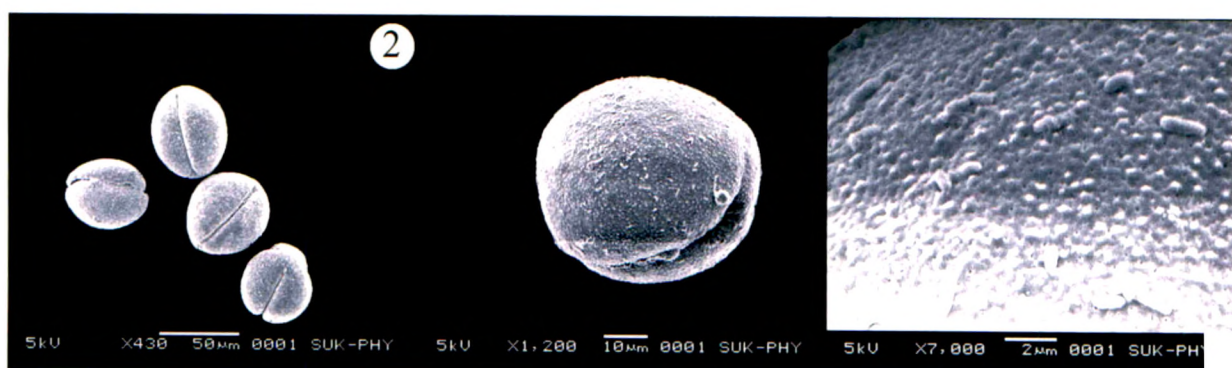
Jacquemontia paniculata

PLATE XIV

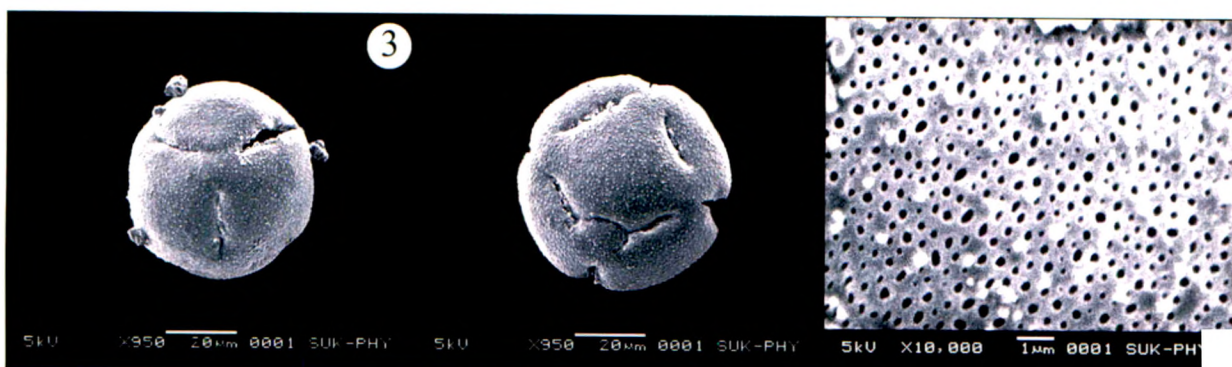
SEM photographs of pollen grains of Convolvulaceae



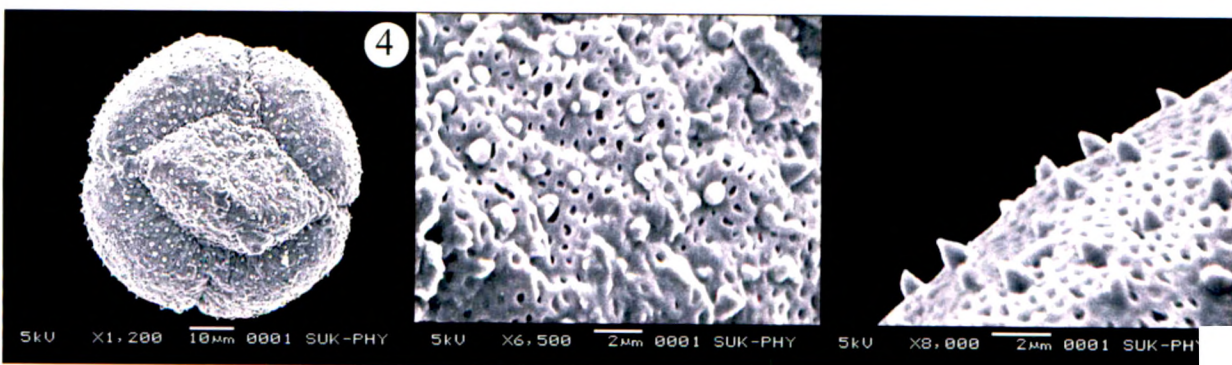
Merremia aegyptica



Merremia quinquefolia



Merremia rhyncorhiza



Merremia tuberosa

PLATE XV

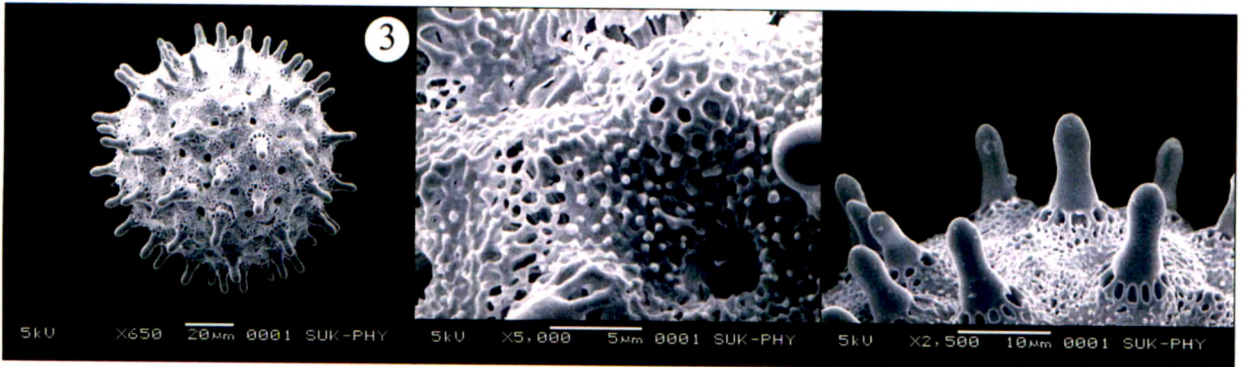
SEM photographs of pollen grains of Convolvulaceae



Merremia umbellata



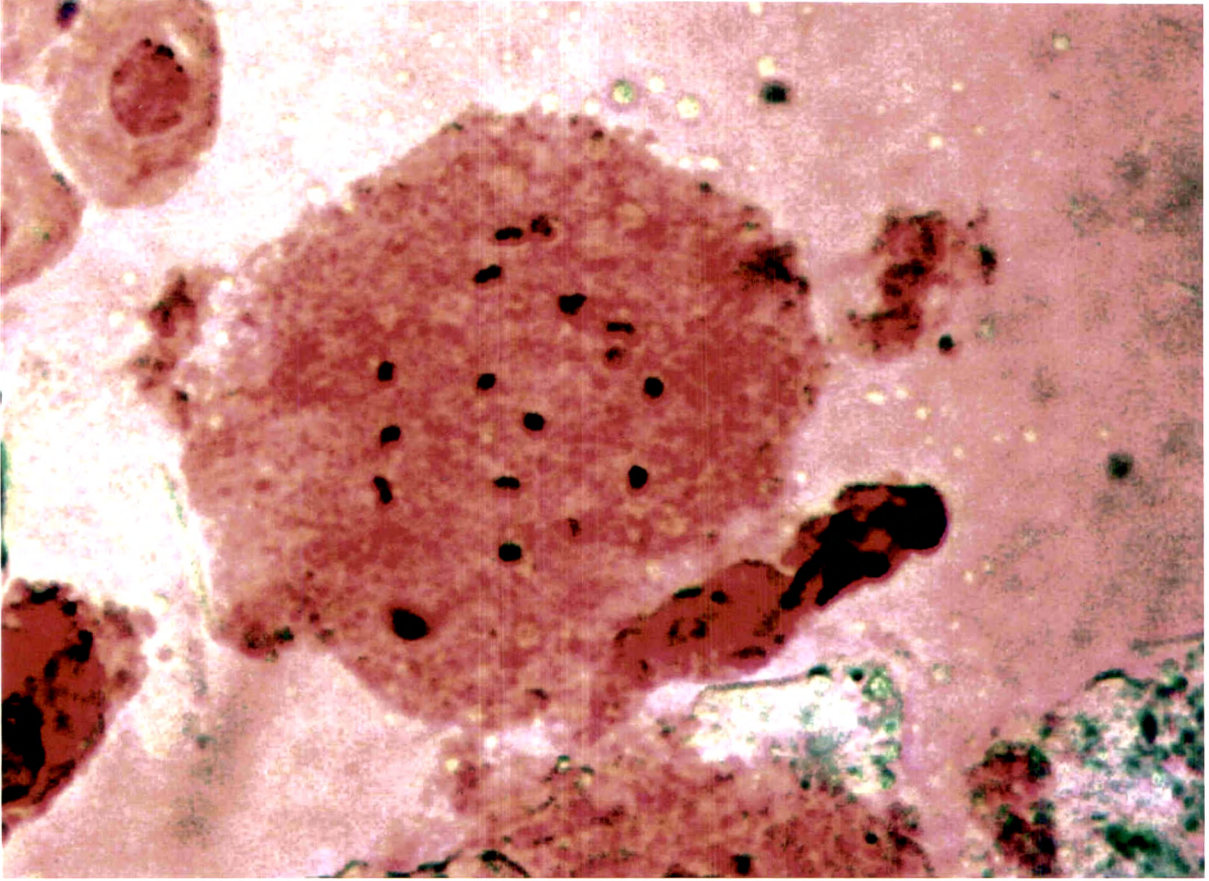
Merremia vitifolia



Stictocardia tiliaefolia

28. *Jacquemontia paniculata*: (Plate XIII: 4) Pollen grain prolate spheroidal, 5-zonocolpate, subporate, 62 x 62 μm , exine foveolate, slightly granular; granules are with pointed tip, 1.5 μm in length.
29. *Merremia aegyptica*: (Plate XIV: 1) Pollen grain elliptic, 3-zonocolpate subprolate, 52.14 x 41.42 μm , exine granulose, foveolate. Colpus 51.66 μm in length.
30. *Merremia quinquefolia*: (Plate XIV: 2) Pollen grain elliptic, 3-zonocolpate prolate, 60 x 45 μm , exine granulose. Colpus 50 μm in length.
31. *Merremia rhyncorhiza*: (Plate XIV: 3) Pollen grain prolate spheroidal, 4-zonocolpate, 62.22 x 60 μm , exine granulose. Colpus 22.22 μm in length.
32. *Merremia tuberosa*: (Plate XIV: 4) Pollen grain prolate spheroidal, 4-zonocolpate, 70 x 70 μm , exine granulose. Granules are with pointed tip, 0.94 μm in length.
33. *Merremia umbellata*: (Plate XV: 1) Pollen grain subprolate, elliptic, 6-zonocolpate, 60 x 51.42 μm , exine foveolate, coarsely granular. Colpus 51.42 μm in length.
34. *Merremia vitifolia*: (Plate XV: 2) Pollen grain prolate, elliptic, 5-zonocolpate, 64.28 x 46.42 μm , foveolate, coarsely granular. Colpus 57.14 μm in length.
35. *Stictocardia tiliaefolia*: (Plate XV: 3) Pollen grains prolate spheroidal, pantoporate, spinulose, 113.33 x 113.33 μm , ectoaperture porous, more or less circular, 4.16 μm in diameter, margin irregular, reticulate, spines slightly broad and bulbous at base and gradually tapering towards apex with blunt tip and constricted neck; base 5.41 μm broad, 10.41 μm in length.

PLATE XVI



15 bivalents of *Ipomoea cairica* $2n=30$

- distributed in small patches.....*I. hederifolia*
- 6. Seeds not as above..... 7
 - 7. Seeds black, not shiny;
 - pubescence white.....*I. eriocarpa*
 - 7. Seeds blackish brown, shiny;
 - pubescence whitish brown.....*I. arachno-*
-sperma
- 1. Seeds not hairy.....8
 - 8. Seeds tuberculate*I. quamoclit*
 - 8. Seeds not tuberculate.....9
 - 9. Seeds not blackish.....10
 - 10. Seeds brownish; funiculus distinct.....*I. triloba*
 - 10. Seeds creamy white; funiculus indistinct.....*I. alba*
 - 9. Seeds blackish..... 11
 - 11. Seeds black, grooved
 - at dorsal surface.....*I. nil*
 - 11. Seeds black, not grooved.....*I. campanulata*

Key to the species of Jacquemontia

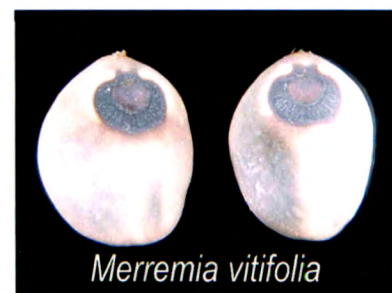
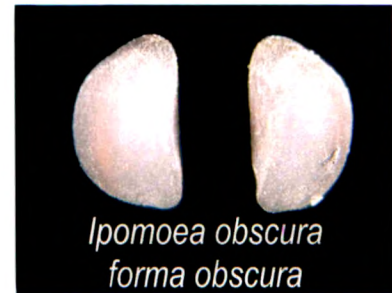
- Seeds small, slightly winged at margin.....*J. paniculata*

Key to the species of Merremia

- 1. Seeds large; black in color, shiny.....*M. tuberosa*
- 1. Seeds not as above.....2
 - 2. Seeds gray colored, hilum black colored,
 - small hairs present on the top of hilum.....*M. vitifolia*
 - 2. Seeds yellowish brown or black colored, smooth.....3
 - 3. Hilum distinct, seeds grooved at lower side.....*M. aegyptica*
 - 3. Hilum indistinct, seeds not grooved.....*M. quinquefolia*

PLATE XVII

Seed morphology of some members of Convolvulaceae



are orange-brown in color and grooved at lower side. Seeds of *Jacquemontia paniculata* are small, dark brown colored and slightly winged at the margin.

Seed morphology of 18 species of Convolvulaceae undertaken during the course of present work indicated considerable variation regarding seed morphology such as length and circumference of seed (Table No.: 1). *Merremia tuberosa* shows largest seed size (length 2.335 ± 0.0110 cm and circumference 3.49 ± 0.0167 cm) while *Jacquemontia paniculata* revealed smallest seed size (length 0.275 ± 0.0079 cm and circumference 0.41 ± 0.0063 cm). Among *Ipomoea* species *I. alba* has largest seed size (length 1.57 ± 0.0120 cm and circumference 2.61 ± 0.0411 cm) whereas *I. eriocarpa* shows smallest seed size (length 0.525 ± 0.0126 cm and circumference 0.61 ± 0.0063 cm)

Morphological Studies on Cotyledonary leaves of Convolvulaceae

Cotyledonary leaves in Convolvulaceae have very significant value in aid to identification during their germinating stage. The characters like area dimension, depth of lobing, angle between lobes, venation pattern etc are important characters in taxonomical studies. During seed germination members of Convolvulaceae shows two types of seed germination i.e. epigeal and hypogeal. In present investigation cotyledonary leaves of 14 species encompassing 3 genera have been studied (**Plate XVIII and XIX.**).

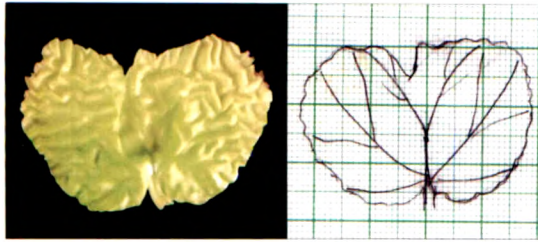
- 1) *Ipomoea alba*: Dicotyl, cotyledonary leaves wrinkled, not much lobed. Lobes obovate, nearly sinuate-crenate margin, rounded with subcordate base. Nerves distinct; two parallel nerves give rise to other small branches, which are distinct.
- 2) *Ipomoea arachnosperma*: Dicotyl, cotyledonary leaves not wrinkled, much lobed up to about $\frac{1}{3}$ of its length. Lobes fulcate, entire margin, obtuse with hastate base. Nerves distinct; two parallel nerves which are distinct but branches are indistinct.

PLATE XVIII

Seed germination study of some members of Convolvulaceae



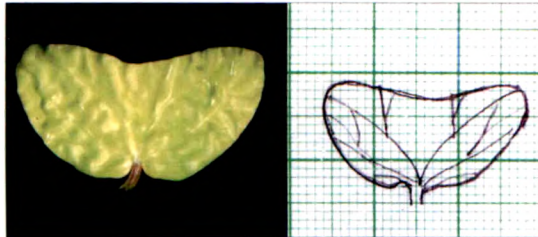
Cotyledonary leaf development of some members of Convolvulaceae



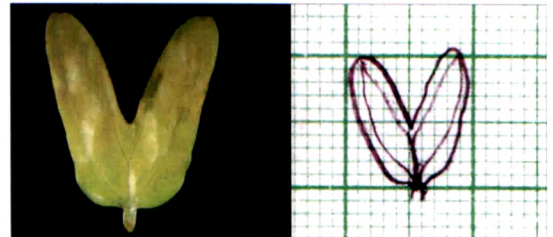
Ipomoea alba



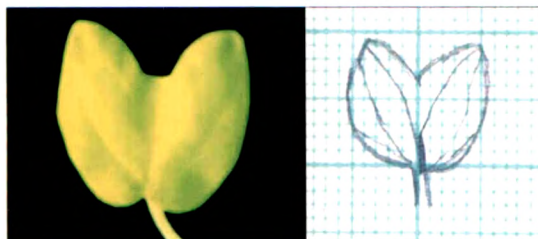
Ipomoea arachnosperma



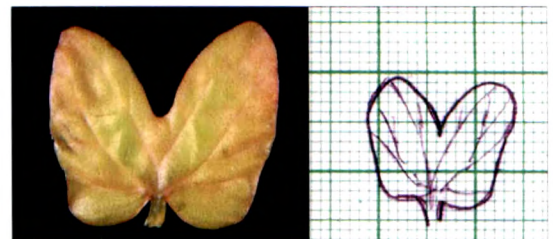
Ipomoea campanulata



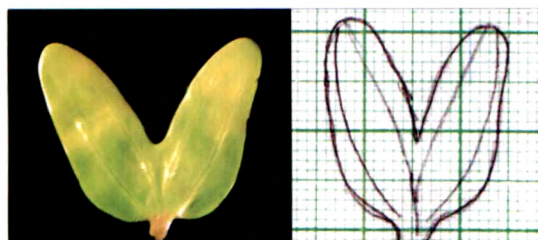
Ipomoea eriocarpa



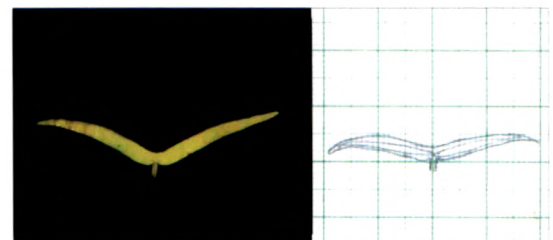
Ipomoea hederifolia



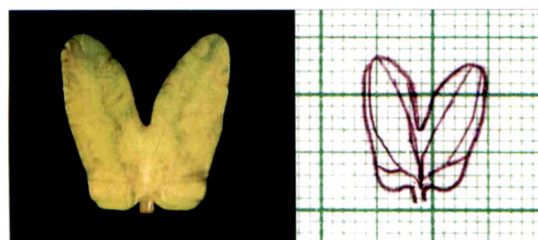
Ipomoea nil



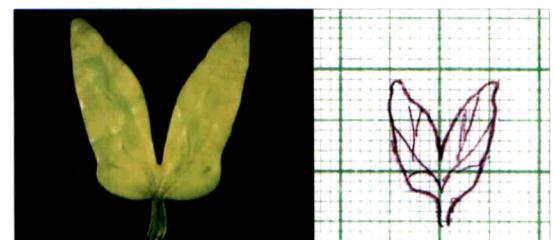
Ipomoea pes-caprae



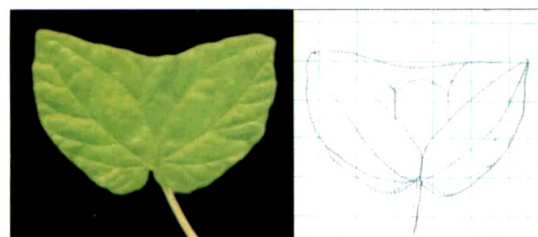
Ipomoea quamoclit



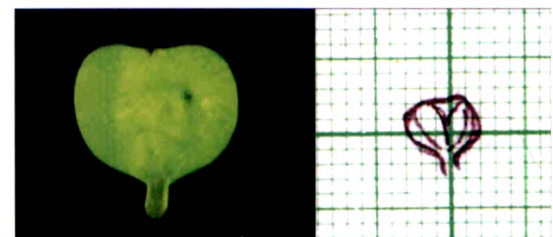
Ipomoea sinensis



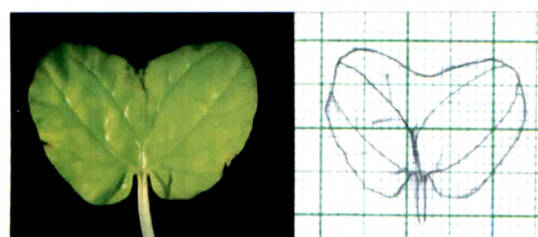
Ipomoea triloba



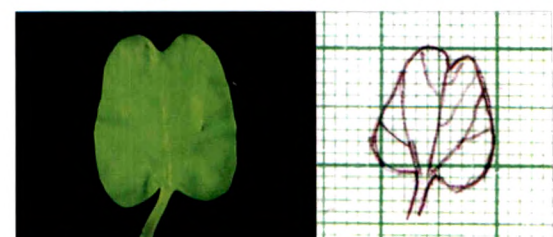
Ipomoea turbinata



Jacquemontia paniculata



Merremia aegyptica



Merremia quinquefolia

- 10) *Ipomoea triloba*: Dicotyl, cotyledonary leaves not wrinkled, much lobed up to just above $\frac{1}{3}$ of its length. Lobes elliptic, entire margin, obtuse with truncate base. Nerves distinct; two parallel nerves, which are distinct, but branches are indistinct.
- 11) *Ipomoea turbinata*: Dicotyl, cotyledonary leaves not wrinkled, nearly lobed. Lobes ovate, entire margin, acute with subcordate base. Nerves distinct; two parallel nerves give rise to other small branches, which are distinct.
- 12) *Jacquemontia paniculata*: Dicotyl, cotyledonary leaves very small, not wrinkled and unlobed. Leaf shows very small notch at its tip, entire margin, rounded or nearly reniform with obtuse base. Nerves distinct; two parallel nerves, which are distinct, but branches are indistinct.
- 13) *Merremia aegyptica*: Dicotyl, cotyledonary leaves not wrinkled, lobed up to $\frac{1}{4}$ of its length. Lobes ovate, entire margin, rounded with cordate base. Nerves distinct; two parallel nerves give rise to other small branches, which are distinct.
- 14) *Merremia quinquefolia*: Dicotyl, cotyledonary leaves not wrinkled, lobed below or up to $\frac{1}{4}$ of its length. Lobes elliptic, entire margin, rounded with subcordate base. Nerves distinct; two parallel nerves give rise to other small branches, which are distinct.

Protein content in seeds of Convolvulaceae member:

18 species of Convolvulaceae were screened for protein content according to biuret method (Layne, 1957).

It was observed that *Jacquemontia paniculata* carried lowest protein (60.63 mg/g of defatted seed powder) whereas *Merremia tuberosa* has the highest (280.31 mg/g of defatted seed powder) protein content (Table No. 2). Rest of the Convolvulaceae members could reveal protein content ranging from 60.63 to 280.31 mg/g of defatted seed powder.