

THE GENUS *ALTERNANTHERA* FORSSK. (AMARANTHACEAE) IN INDIA

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A B S T R A C T

A taxonomic revision of the genus *Alternanthera* Forssk. in India is presented here. A key to the seven species found in India is provided along with detailed descriptions and critical notes on nomenclature, distribution, ecology and potential uses, if any. Line-drawings of different floral parts are also given so as to facilitate a morphological comparison. The species under study are : *Alternanthera sessilis* (L.) R. Br. ex DC., *A. pungens* Kunth, *A. paronychioides* St. - Hil., *A. tenella* Colla, *A. philoxeroides* (Mart.) Gris., *A. caracasana* Kunth and *A. bettzichiana* (Regel) Nicolson.

INTRODUCTION

The genus *Alternanthera* was established by Forsskal (1775) based on the species now called *A. sessilis* (L.) R. Br. ex DC. For many years it was thought that *Alternanthera* Forssk. was based on *Achyranthes repens* L. now known as *Alternanthera pungens* Kunth. *Alternanthera* is distinguished from rest of the Indian genera of the family Amaranthaceae by having opposite leaves, flowers with 2-5 stamens alternating with the staminodes, monothealous anthers and simple ovary bearing capitate stigma. *Alternanthera* Forssk. is readily distinguished from rest of the Indian genera of the family Amaranthaceae in having 2-chambered anthers (except *Gomphrena* L.). From *Gomphrena* it differs markedly due to presence of short staminal tube and solitary capitate stigma.

The genus comprises approximately 80 species which are widespread in the tropical and subtropical regions of New World (Mears, 1977).

A. pungens is a native of tropical America, introduced in India near about 1913, and now naturalised. It was collected first from Salem Dist., Malagiri Hills, Tamil Nadu (Raizada, 1959). *A. philoxeroides*, a Brazilian species was recorded first from the eastern part of India i.e., Manipur. Like other American weeds it might have reached India along with the packing materials during the second World War years (Maheshwari, 1964). *A. sessilis*, a native of Brazil, has been illustrated by Rheede in his

'*Hortus Malabaricus*' in 1690, since then it is reported from almost all parts of Indian plain. *A. paronychioides*, a Tropical American species, was recorded from Cawnpore and Banaras along the bank of the Ganges in late thirties (Raizada, 1939) and since then it has been found to occur also in other states of India. Following the first record of *A. tenella* from India by Srivastava & Santapau (1955), the species has undergone various name changes. Another species, *A. caracasana* was recorded for the first time from Indian subcontinent from Kashmir valley (Naqshi, 1981). *A. bettzichiana*, a horticultural species of many forms, is often found as an escape.

A large number of the amaranthaceous species are ubiquitous weeds. Several species are grown for their ornamental leaves which are variegated, green and yellow or bronze and green or red and pinkish brown. These are also grown for edging flower beds for ornamentation, for checking soil-erosion or for medicinal purposes. Some species like *A. sessilis*, *A. philoxeroides* and *A. tenella* are used as good fodder or sometimes as green vegetables. *A. philoxeroides* has been found to be quite rich in iron content (ca 2%) and may be used as salad. This species may also be used for production of methane gas and tertiary filtration system for domestic sewage.

ALTERNANTHERA FORSSK.

F1. Aeg.-Arab. 28. 1775; Lamk. Encycl. Method. 1 : 95. 1783 ; R. Br., Prodr. 416. 1810 ;

Blume, Bijdr. 546. 1825 ; Moq. in DC., Prodr. 13, 2 : 350. 1849 ; Miq., Fl. Ind. Bat. 1. 1 : 1047. 1858 ; Boiss., Fl. Or. 4 : 996. 1879 ; Hook. f., Fl. Brit. India 4 : 731. 1885 ; O. K. Rev. Gen. 2 : 535. 1891 ; Schinz in E. & P., Pflanzenfam. ed. 2, 16c : 71. 1934.

Annual or perennial herbs. Stems erect, prostrate or decumbent, often hairy. Leaves simple, opposite, entire, sessile or petioled. Inflorescences axillary, rarely terminal, sessile or peduncled, globose head or short spikes. Flowers bisexual, bracteate, bibracteolate. Bracts persistent, bracteoles persistent or not, both scarious, more or less similar except in size. Tepals 5, free, glabrous or hairy. Stamens 2 - 5, usually alternating with pseudo-staminodes ; filaments connate at base into a tube or a short cup; anthers small, 2-chambered, linear; pseudo-staminodes large and dentate or lacinate to very small. Ovary 1-loculed, 1-ovuled (pendulous), style short; stigma capitate. Fruit an indehiscent utricle, falling off with the perianth. Seeds lenticular, vertical.

KEY TO THE INDIAN SPECIES

- 1a. Flowers in axillary or terminal, long-peduncled heads
 4. *A. philoxeroides*
 - 1b. Flowers in axillary, sessile heads :
 - 2a. Bracts and bracteoles glabrous :
 - 2b. Bracts and bracteoles barbellately hairy :
 - 3a. Tepals nearly equal
 1. *A. sessilis*
 - 3b. Tepals very dissimilar both in form and shape :
 - 4a. Outer two tepals 4-5 mm, with sharp points at the apex ca 1/3 of the length of the whole
 2. *A. pungens*
 - 4b. Outer two tepals 2-2.5 mm, with sharp points at the apex ca 1/10 of the length of the whole
 6. *A. caracasana*
 - 5a. Prostrate herbs :
 - 5b. Erect tufted herbs
 7. *A. bettzichiana*
 - 6a. Pseudo-staminodes as long as the stamens or slightly exceeding the Stamen s
 5. *A. tenella*
 - 6b. Pseudo-staminodes shorter than the Stamen s
 3. *A. paronychioides*
1. ***Alternanthera sessilis* (L.) R. Br. ex DC., Cat. Hort. Monsp. 4 : 77. 1813 ; Wight, Ic. Pen. Ind. Or. t. 727. 1843; Hook. f., Fl. Brit. India 4 : 731. 1885; Prain, Bengal Pl. 2 : 875. 1903; Backer in Steenis, Fl. Males ser. 1. 4 : 92. 1949; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1 : 49. 1980; Saldanha & Eswar Rao in Saldanha, Fl. Karnataka 1 : 166. 1984; Saldanha & Nicolson, Fl. Hassan Dt. 106. 1976; Matthew, Ill. Fl. Tamil Nadu Carnatic t. 584. 1982; *Gomphrena sessilis* L., Sp. Pl. ed. 1 : 225. 1753; *Alternanthera***

triandra Lam., Encycl. 1 : 95. 1783; Cooke, Fl. Pres. Bombay 2 : 584. 1906; Gamble, Fl. Pres. Madras 2 : 1179. 1925; *Alternanthera nodiflora* R. Br., Prodr. 417. 1810, *A. sessilis* (L.) R. Br., Prodr. 417. 1810; *nomen nud.* Coluppa Rheede, Hort. Malab. 10 : 21-22, t. 11. 1690. (Plate-I, Figs. 1-8)

Type : Ceylon, Hermann Herbarium 2 : 78 (BM, lectotype).

Aquatic, marshy or terrestrial, prostrate or procumbent, perennial or short-lived (under unfavourable condition) herbs, c. 80 cm long. Stems obtusely 4-angular, fistular in the lower portions when growing in inundated areas, often tinged with reddish-purple colour, glabrous except 2-lines of hairs along the longitudinal grooves and a ring of nodal hairs. Leaves in equal pairs, very variable in size and shape, 0.8-6 × 0.3-3 cm, linear-lanceolate to oblong or oblanceolate-obovate to ovate-elliptic, apex obtuse, base acute, petiole obsolete to 5 mm colour green or suffused with purple along the margin, glabrous or thinly pilose. Inflorescence 1-4 together, 3-5 mm in diam., globose or cylindrical with age, sessile or peduncled by the falling of lower flowers, rachis axillary, densely hairy. Flowers 2-3 mm long, white. Bracts 0.8-1 mm, ovate, finely acuminate, glabrous; bracteoles 1-1.5 mm, lanceolate, deltoid-ovate, mucronate with excurrent midrib. Tepals 5, subequal, 1.5-3 mm, ovate-lanceolate, acuminate or round or mucronate with excurrent midrib, glabrous, 1-nerved or at the very base 3-nerved. Stamens 5, but only 2-3 fertile; filaments 0.6-0.8 mm (incl. tube); anthers minute, 0.2 mm, ovoid-oblong; pseudo-staminodes 0.5-0.6 mm, entire or irregularly lobed. Ovary 2 mm, obovoid, compressed; style very short, elongating in fruits; stigma capitate. Utricle obcordate, emarginate at the apex with the persistent style in the sinus, falling off with the perianth.

Flowering & Fruiting : Throughout the year.

Distribution : This species is widely distributed in the tropics and subtropics of both the new and old World and is common throughout India.

Ecology : A very common species in humid places, wet paddy fields, ditches, swamps, fallow lands, roadsides and low lands.

Vernacular names : Beng. Shanchi; Guj. - Jalajambo, Rani ni bhaji; Kan. - Honagone soppa;

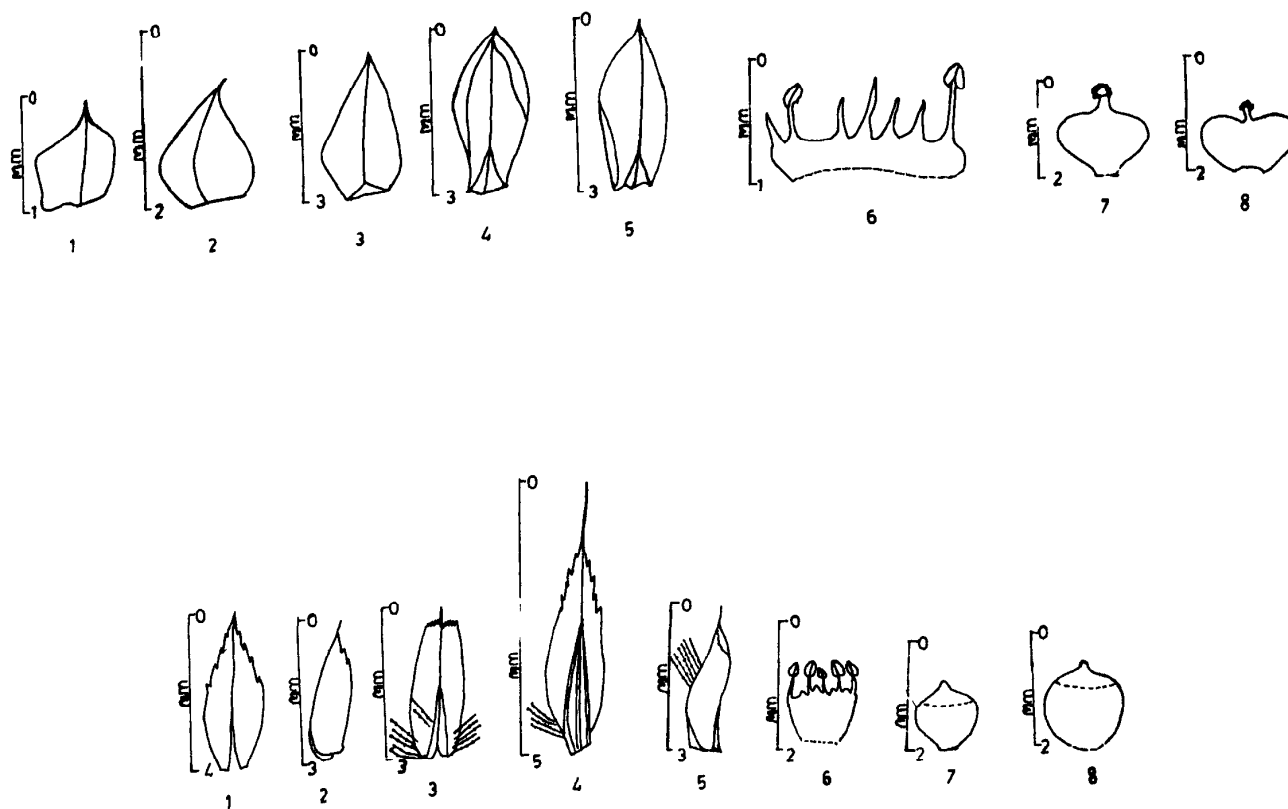


PLATE - I

Alternanthera sessilis (L.) R. Br.

Figs. 1-8. 1. Bract. 2. Bracteole. 3. Inner tepal. 4-5. Outer tepal. 6. Staminal cup along with pseudostaminodes. 7. Ovary. 8. Fruit.

Alternanthera pungens Kunth

Figs. 1-8. 1. Bract. 2. Bracteole. 3. Outer (adaxial) tepal (1). 4. Outer (adaxial) tepal. (2). 5. Lateral tepal or inner tepal (2). 6. Staminal cup along with pseudostaminodes. 7. Ovary. 8. Fruit.

Mal. & Tam.-Ponnanganni-Keeray ; Mar.-Kanchari ; Sans.-Gjojihra ; Tel.-Ponnagantikura.

Illustration : Wt., Ic. Pen. Ind. Or. 2, Pl. 727. 1843.

Note : In finalising the nomenclature of *A. sessilis* it is observed that there is no uniformity in citing the authorship to the taxon. In most of the cases R. Brown's name has been omitted due to the fact that A. P. de Candolle did not attribute the name for *A. sessilis* to R. Brown on page 77 of *Catalogus Plantarum Horti Botanici Monopeliensis* 1813, but credited to R. Brown only in a list on page 4, the reason for such omission, however, is a matter of personal judgement. It is thought there is no justification in ignoring his association in naming the taxon and credit is given also to R. Br. in this treatment.

Specimens examined : ANDHRA PRADESH : Krishna River bank, Nalconda, 16.12.1959, K. M. Sebastine, 9814 (CAL). ARUNACHAL PRADESH : Jairampur, Tirap, 11.10.1959, R. S. Rao, 19985 (CAL). ASSAM : Gauhati, South Kamrup, 2.7.1969, A. S. Rao, 46056 (CAL). BIHAR : Ramgarh, Hazaribagh, 14.11.1964, K. C. Kanodia, 1193 (CAL). GUJARAT : Ahmedabad, 24.10.1903, G. A. Gammie, 16409 (BSI). HARYANA : Chonibir, Hissar, 23.9.1946, M. B. Raizada, 21040 (DD). JAMMU & KASHMIR : Udhampur city, Udhampur, 28.3.1986, Ajai Swami 957 (BSD). KARNATAKA : Kotagal, 1.10.1958, B. M. Wadhwa, 4636 (BSI). KERALA : Annalur Mala Route, Trichur, 9.2.1984, K. Ramamurthy, 80435 (MH). MADHYA PRADESH : Indore, 14.12.1961, A. S. Rao, 79066 (BSI). ORISSA : Jashpur, 1.10.1941, H. E. Mooney, 1917 (DD). PUNJAB : Larcha, Jollundur, Feb. Mar. 1954, T. S. Bakshi, s.n. (DD). RAJASTHAN : Zohangal, Sept. 1960, N. C. Nair, 989 (BSD). TAMIL NADU : Punagadu, 295 m, N. Arcot, 23.3.1978, E. Vajravelu, 54872 (MH). UTTAR PRADESH : Jalal Shah, Dehra Dun, 7.5.1986, J. P. Sharma, 79462 (BSD). WEST BENGAL : Arambagh, Hooghly, 22.11.1961, P. K. Hajra, 116 (CAL). Kalyani, Nadia, 19.6.1966, D. B. Deb, 479 (CAL).

2. *Alternanthera pungens* Kunth in H. B. & K., Nov. Gen. Sp. 2 : 206. 1818 ; Melville, Kew Bull. 12 : 172. 1958 ; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1 : 47. 1980 and in Nasir & Ali, Fl. W. Pakistan Fasc. 71 : 39.

1974. *Achyranthes repens* L., Sp. Pl. ed. 1 : 205. 1753. *Illecebrum achyrantha* L., Sp. Pl. ed. 2 : 299. 1762. *Alternanthera achyrantha* (L.) R. Br. ex Sweet, Hort. Suburb. London 48. 1818 ; Moq. in DC., Prodr. 13. 2 : 358. 1849. *Alternanthera echinata* Sm. in Rees., Cycl. Suppl. 41 : 10. 1819 ; Mooney, Suppl. Bot. Bihar and Orissa 128. 1950. *Alternanthera repens* (L.) Link, Enum. Pl. Hort. Berol. alt. 1 : 154. 1821 non Gmelin, Syst. Nat. ed. 13.2. 8 : 106. 1791 ; Backer, in Steenis Fl. Males. ser. 1. 4 : 91. 1949 ; Santapau, Rec. Bot. Surv. India 16 : 200. 1960.

Type : Colombia (Maypur waterfall, R. Orinoco), Humboldt and Bonpland (P. isotype).

Prostrate, mat forming perennial herb, 12-45 cm across, often rooting at nodes, densely villous-pubescent with long erect to patent, often curved, dentate, white hairs. Leaves in unequal pairs, 1-4 × 0.5-3 cm, elliptic-obovate or rhomboid-ovate, apex obtuse or rounded with mucro, base narrowed into 0.5-1 cm, long petiole, often purplish tinged along the margins, glabrous or appressed pilose above and thinly hairy below. Inflorescence 1-3 together, 0.5-1.5 × 0.5-1 cm in diam., globose or shortly cylindrical, sessile, axillary or terminal. Flowers sessile, 4-6 mm long, laterally compressed. Bracts 3.5-5 mm, lanceolate-ovate, spine tipped, glabrous, minutely serrulate in the upper half along the margins ; bracteoles similar but smaller in size, 3-4 mm. Tepals 5, very unequal, outer 2 abaxial tepals 4-5 mm, deltoid-lanceolate, spine-tipped, serrulate in the upper half, with small tuft of hairs on either side - a little above the base, 3-5-nerved from the base which converge well below the apex, indurate at the base ; outer 1 adaxial tepal 3-3.6 mm, flat, oblong, dentate near tip, mucronate, tufts of hairs on either side - a little above the base, the 2 inner ones smaller, 3 mm and deeply concave, closely embracing the ovary, acuminate with a tuft of hairs at the middle on the back. Stamens 5, 0.5-0.6 mm (excluding tube) ; anthers minute, oblong ; pseudo-staminodes 0.2 - 0.3 mm, broad, much shorter toothed at the apex. Ovary small, 1.4-1.5 mm, obovoid ; stigma subsessile. Utricle 1.6 mm long, obovoid, falling away with the perianth and bracteoles.

Flowering & Fruiting : Throughout the year.

Distribution : India : Andhra Pradesh, Delhi, Haryana, Jammu & Kashmir, Kerala, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal. A native of tropical America, now naturalised in Asia, Europe and the East Indies.

Ecology : Naturalised in India, frequent in dry sandy places, roadsides, and waste places.

Vernacular names : Kan. - Mullu honagonne.

Illustration : Tadulingam & Venkatanarayana, Handb. S. Indian Weeds 274, pl. 114, as *A. echinata*.

Note : The oldest available name for this plant is *Achyranthes repens* L. (1753). According to rule of ICBN the name should have been *Alternanthera repens* (L.) Link. 1821. But the name *Alternanthera repens* Gmel. (1791) is preoccupied by a different plant viz., *A. sessilis*, hence the oldest name applicable to the species becomes invalid. The next oldest available name for the species is *Alternanthera pungens* Kunth (1818) as such its nomenclature has been settled accordingly.

Specimens examined : ANDHRA PRADESH : Rusthempet-Narsapur, Madak, 27.9.1958, K. M. Sebastine, 6784 (CAL). GUJARAT : Nasik, 7.5.1922, W. T. Saxton, 2979 (CAL). HARYANA : Hissar, 19.10.1967, V. J. Nair, 36667 (BSD). JAMMU & KASHMIR : Ramban, 1400 m, 20.8.1970, U. C. Bhattacharyya, 41260 (BSD). KERALA : Sheucottai, 18.5.1961, K. N. Subramaniam, 71227 (MH). MAHARASHTRA : Nasik, 7.5.1922, W. T. Saxton, 2979 (CAL) ; BSI compound, Poona, 30.7.1960, P. J. Cherian 63495 (CAL). ORISSA : Kanghatta, Kalahandi, 22.9.1956, S. K. Mukherjee, 4326 (CAL). RAJASTHAN : Ajmer, 8.1947, B. Tiagi, 16 (DD). TAMIL NADU : Kannikatti, Tinnevely, 10.7.1959, K. M. Sebastine, 8441 (CAL) ; Varapalayam, Coimbatore, 6.7.1956, K. Subramanyam, 104 (CAL). Uttar Pradesh : Garh Road side, Meerut, 15.8.1949, Y. D. Tyagi, 3 (DD). WEST BENGAL : Murshidabad, 19.9.1968, D. N. Guhabakshi, 978 (CAL) ; Thana Makua, Shibpur, 12.5.1923, N. Mandal, s.n. (CAL) ; Baluhati, Howrah, 5.11.1963, S. S. R. Bennet, 416 (CAL).

3. *Alternanthera paronychioides* St. Hil., Voy. Distr. Diamans Bresil 2. 2 : 43. 1833 ; Sundararaj in J. Bombay nat. Hist. Soc. 53 : 525. 1956 ; Dutta and Misra, Ind. Forester 87 : 304. 1961 ; Veldk. in Blumea 19 : 167. 1971 ; Teldkamp, Fl. Males. ser. 1. 6(6) : 916. 1972, add corr ;

Backer in Steenis, Fl. Males. ser. 1. 6 : 816. 1972 ; Deb and Dutta, J. Bombay nat. Hist. Soc. 70 : 88. 1973 ; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1 : 50. 1980. *Gomphrena ficoidea* L., Sp. Pl. ed. 1. 1 : 225. 1753. *Illecebram ficoideum* (L.) L. Sp. Pl. ed. 2. 1. 300. 1762. *Alternanthera ficoidea* (L.) Sm. 41 : 8. 1819, non *A. ficoidea* (Beauv.) 51, d'Oware et de Benin 2 : 66. t. 99. f.l. 1818. *A. pilosa* Moq. in DC., Prodr. 13. 2 : 347. 1849.

(Plate - II, Figs. 1-7.)

Type : Roadside near the sea, Rio de Janeiro, Brazil, St. Hilaire 223 (P, holotype).

Marshy or terrestrial, prostrate or procumbent, spreading, perennial herb, up to 100 cm tall. Stem terete, much branched, often tinged with reddish-purple, prostrate or decumbent and rooting below, ascending or suberect upwards, glabrous or appressed-hairy on the other parts, densely white-villous on woolly with long fine dentate hairs at the nodes and on the young parts. Leaves 0.5 - 5 × 0.3 - 1.2 cm, spatulate-oblongate, obovate or lanceolate, obtuse or subacute at the apex, base narrowed into the indistinguishable petiole elongating with age, 0.3- 2 cm long. Heads solitary or 2-3 together, 0.5-1.5 cm, globose to cylindrical, sessile, axillary, whitish. Bracts 1.8-2 mm long, ovate-lanceolate, acute, mucronate with excurrent-midrib, membranous, firm ; bracteoles 1.5-2 mm, ovato-lanceolate, acute, mucronate. Tepals 5, subequal, laterally compressed, outer 3, 3-4 mm, ovate-lanceolate, acute, minutely mucronate or not, 3-nerved, hairy in the lower half with dentate hairs, slightly indurate at the base in fruiting ; inner two tepals narrower, 3 mm, lanceolate, 1-3-nerved, glabrous or with few hairs only at the base. Stamens 5, 1 mm long ; filaments 0.3 - 0.4 mm long ; anthers minute, 0.2 mm long, ovoid, pseudo-staminodes minute, 0.2 mm, strap-shaped. Ovary 0.7-0.9 mm, obovoid ; style very short, 0.1-0.2 mm long ; stigma capitate. Utricle 0.8-1.2 - 1.5 mm, obovoid-ellipsoid, obcordate, compressed. Seed 1 mm across, discoid, brown, testa faintly reticulate.

Flowering & Fruiting : Dec. - Feb.,

Distribution : A native of tropical America ; naturalised in USA, India, Java and other parts of the old World. In India it is recorded from Andhra

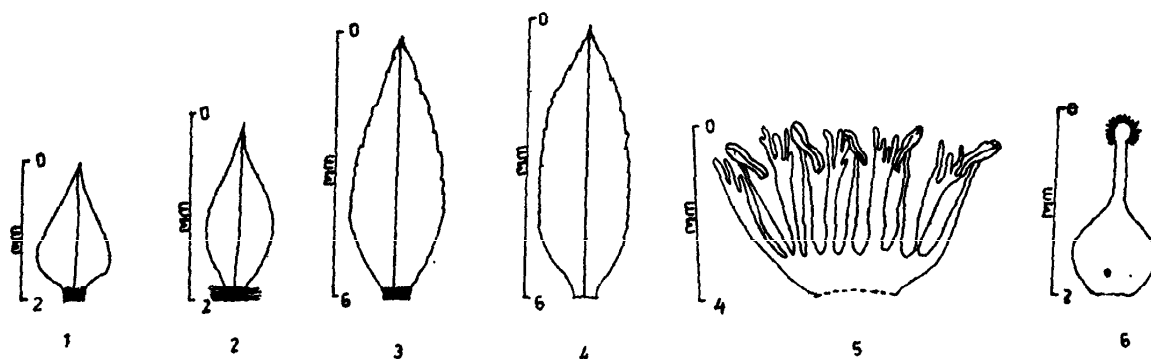
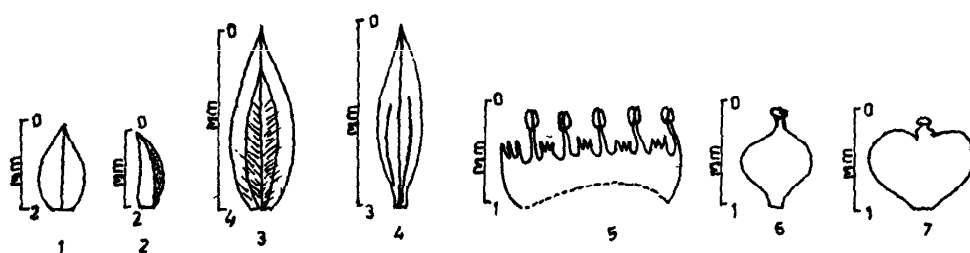


PLATE -II

Alternanthera paronychioides St. Hil.

Figs. 1-7. 1. Bract. 2. Bracteole. 3. Outer tepal. 4. Inner tepal. 5. Staminal tube along with pseudostaminodes. 6. Ovary. 7. Fruit.

Alternanthera philoxeroides (Mart.) Griseb.

Figs. 1-6. 1. Bract. 2. Bracteole. 3. Outer tepal. 4. Inner tepal. 5. Staminal cup along with pseudostaminodes. 6. Ovary.

Pradesh, Assam, Bihar, Delhi, Haryana, Jammu & Kashmir, Karnataka, Madhy Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal.

Ecology : Common in waste places in dry sandy ground. rapidly spreading throughout the country.

Illustration : Mart., Fl. Brasil 5. 1, t. 56. 1875.

Specimens examined : ANDHRA PRADESH : Kollern Lake, West Godavari, 24.1.1958, K. Subramanyam (CAL). ASSAM : Assam, 1.2.1938, S. N. Bal, 303 (CAL). BIHAR : Jallah, Patna, 11.3.1960, V. Thakur, VT/93/1960 (CAL). DELHI : Anand Pashat, 10. 1951, s.l., 14 (CAL). HARYANA : Hissar, 19.10.1967, V. J. Nair, 36663 (BSD), JAMMU & KASHMIR : Nishat, 1800 m, Srinagar, M. V. Viswanathan, 55707 (BSD). MADHAY PRADESH : Marble Rock - Bheraghat, Jabbalpur, 16.1.1961, J. K. Maheshwari, 4568 (CAL). RAJASTHAN : Kota Barrage, Kota, 24.5.1965, B. M. Wadhwa, 9479 (CAL). TAMIL NADU : Varapalayam, Coimbatore, 2.8.1956, K. Subramanyam, 448 (CAL). UTTAR PRADESH : Nepalgunj, 9.3.1964, G. Panigrahi, 2245 (CAL). WEST BENGAL : Barasat, 24-Parganas, 29.2.1940, Kirat Ram, 13310 (DD).

Note : The name of *Alternanthera ficoidea* (L.) Smith is not taken into consideration for use for this taxon and no other species has been recommended for acceptance under the recent international rules of nomenclature. Since the name was long applied to a species (now *A. tenella* Colla) which does not include the type (Mears-1980). *Alternanthera paronychioides* St. Hil. is the earliest legitimate name of this taxon. The specific epithet was spelt as "paronichyoides" by St. Hilaire, but has been corrected in subsequent literature and also in this treatment.

4. *Alternanthera philoxeroides* (Mart.) Gris. in Abh. Ges. Wiss. Goett. 24 : 36. 1879 ; Kuntz., Rev. Gen. Pl. 2 : 540. 1891 ; Backer in Steenis, Fl. Males. ser. 1. 4 : 93. 1949 ; Duke in Ann. Miss. Bot. Gdn. 48. fasc. 4 : 43. 1961 ; Guha Bakshi, Fl. Murshidabad 263. 1964 ; Maheshwari in Bull. Bot. Surv. India 6 : 313. 1965. *Bucholzia philoxeroides* Mart. in Nova Acta Leop. - Carol 13. 1 : 315. 1826. *Telanthera philoxeroides* Moq. in DC. Prodr. 13. 2 : 362. 1849. *Achyranthes philoxeroides* (Mart.) Standl. in J. Wash. Acad. Sci. 5 : 74. 1915. Plate II,

Figs. 1-6

Type : Sellow (BR, lectotype).

Aquatic or marshy, perennial herb, to c 100 cm long. Stem decumbent, creeping or floating and rooting below, ascending or suberect upwards, simple or branched, subterete, striate, glabrous except 2 lines of hairs along the longitudinal grooves of internodes and a ring of smooth hairs around the nodal ridges. Leaves 5-12 × 0.8-1.8 cm, oblong-ob lanceolate to spathulate-obovate, apex obtuse, acute or submucronate, base attenuate or narrowed into a short petiole (1-5 mm), connate at the base, axils with a transverse row of white smooth hairs, glabrous or sparsely hairy when young, entire or minutely remotely denticulate, nerves faint above, midrib prominent beneath. Inflorescence usually 0.9-1.5 cm long, ovoid-globular. White heads, peduncled, peduncles slender, 1.5-3.5 cm, glabrous except a line of hairs along the adaxial grooves, axillary or rarely terminal, rachis hairy, flowers 7 mm, whitish. Bract 2-3 mm, ovate, acute, glabrous, 1-nerved ; bracteoles ovate-lanceolate, 2-2.5 mm, acuminate, glabrous, 1-nerved. Tapals 5, subequal, 5-7 mm, lanceolate-oblong, subsessile with very short stalk-like structure at the base, dorsally compressed, outer 3 flat, inner 2 conduplicate, subacute, glabrous, serrulate in the upper half. Stamens 5, 4 - 4.2 mm long including 1 mm long tube ; filaments 2.25 - 2.5 mm (excluding tube), linear, flat ; anthers yellowish 0.5-1 mm, linear; pseudo-staminodes 2.3-2.6 mm, strap-shaped, 2-3-fid into subulate segments. Ovary 1 mm, obovoid-cuneate, compressed ; style stout 0.05-0.09 cm ; stigma capitate, globose. fruits not seen.

Flowering : April - Nov.

Distribution : A native of Brazil, now naturalized in Malesia, India and other parts of the tropics. India : Assam, Bihar, Karnataka, Madhya Pradesh, Manipur, Meghalaya, West Bengal.

Ecology : A weed in stagnant or slow-moving shallow water, pools, ditches and marshy places.

Vernacular name : Beng. - Burma Sag.

Illustration : Mart., Fl. Brasil 5(1), t. 51, 52. 1875.

Note : the plant is known as 'Burma Sag' in W. Bengal. It is often sold as green vegetable in local markets. This species propagates vegetatively by

means of subterranean shoots and in favourable condition forms dense masses. Often the stamens are replaced by as many sterile spurious ovaries surrounding the true ovary. This malformation was described by Costerus and Smith (1910).

Specimens examined : MADHYA PRADĒSH : Doodhadhani Tank, Raipur, 8, 1971, K. Sankaran Unni, 301 (DD). MANIPUR : Laktak Lake, 2.6.1961, V. Singh, s.n. (CAL). MEGHALAYA : Shillong, 14.9.1967, P. K. Hajra 37350 (CAL) ; Shillong, 17.5.1962, G. K. Deka, 25693 (CAL). WEST BENGAL : Eden Garden, Calcutta, 24.3.1974, H.B. Naithani, 93 (DD); Shibpur, Howrah, 10.1967, B. Naskar, s.n. (CAL); Andul, Howrah, 17.4.1963, S. S. R. Bennet, 97 (CAL).

5. *Alternanthera tenella* Colla Mem. Acad. Sci. Torino. Turin 33 : 131. t. 9. 1829. Mears in Acad. Nat. Sci. Philadelphia 129. 19. 1977. *Bucholzia polygonoides* var. *diffusa* Mart. Nov. Gen. Sp. Bras. 2 : 51. t. 149, 151. 1826. *Telanthera polygonoides* var. *brachiata* Moq. in DC., Prodr. 13. 2 : 364. 1849. *Telanthera polygonoides* var. *diffusa* (Mart.) Moq. l. c. *Telanthera polygonoides* var. *erecta* (Mart.) Moq. l.c. non Shrivastava & Santapau (1955). *Alternanthera ficoidea* var. *diffusa* (Mart.) Kuntze Rev. Gen. Pl. 1 : 539. 1891. (Plate - III, Figs. 1-7).
Type : Colla (P, Lectotype).

Prostrate perennial herb with extensive diffuse branches. Stem terete below, subterete to obtuse angular upwards, striate, decumbent and rooting below, glabrous except 2 longitudinal lines of hairs along the internodes and nodes. Leaves 1.5 - 4.5 × 0.5 - 2 cm, oblong, lanceolate or elliptic, apex acute, acute to cuneate or attenuate at base, hairy on the upper surface becoming glabrous at maturity, nerves faint above and prominent beneath. Heads 1-5 together, 5-6 mm diam. ovoid-subglobose, sessile, axillary, whitish. Bracts 2.3 - 3 mm long, elliptic lanceolate, acuminate, spinescent, 1-nerved, glabrous or hairy in the upper half of the back; bractcoles 2.5 - 3 mm long, lanceolate, acuminate, spinescent, hairy on the back. Tepals 5, outer 3 tepals 3.3-4 mm long, lanceolate, 3-nerved from base, nerves visible up to the lower half, hairy on the back, inner 2 tepals 2.7 - 3 mm long, nearly flat, glabrous or with few hairs on the back. Stamens 5, 2.7 - 2.9 mm long (incl. tube);

filaments linear; anthers 0.9 - 1 mm long, linear, yellowish; pseudo-staminodes 2.7 - 3 mm long (incl. basal tube), strap-shaped, laciniate at apex. Ovary ovoid, 1 mm, style 0.3-0.5 mm long, stigma capitate, papillose.

Flowering : Almost throughout the year.

Distribution : Kerala, Orissa, Tamil Nadu, West Bengal.

Ecology : Found near humid places, wet paddy fields, fallow land and railway tracks.

Illustration : Mart. Nov. Gen. Bras. 2 : 51. t. 149. 151. 1826.

Note : The nomenclature of *A. tenella* Colla created a great problem for the scientists due to the fact that the name *Alternanthera ficoidea* (L.) R. Br. ex R. et S. has been consistently used for more than 150 years for the species now called *A. tenella* Colla. Beauvois published *A. ficoidea* dealing with a specimen of *A. sessilis* (L.) R. Br. ex DC. in 1818 which (*A. ficoidea*) became synonymous with *A. sessilis* (1813) again *A. ficoidea* (L.) R. Br. ex R. et S. (1819) is a homonymous orthographic variant of *A. ficoidea* Beauv. The name *A. ficoidea* was based on *Gomphrena ficoidea* L. It has been verified that the type of *G. ficoidea* L. is *Alternanthera paronychioides* St. Hil. In 1978 J. F. Veldkamp (Taxon 27 : 310 - 314. 1978) made a proposal to reject the name *A. ficoidea* (L.) Beauv. in favour of *A. tenella* Colla. The committee for spermatophyta has recommended for acceptance of Veldkamp's proposal. But still the confusion is there, because 3 Amaranthaceae specialists did not agree with this change and opined that this case should be looked into again. Anyway, the name *A. tenella* Colla has been adopted here.

Specimens examined : Shibpur, Howrah, 25.4.1989 G. Maiti 5442, 5445 (CAL).

6. *A. bettzichiana* (Regel) Nicolson, Ill. Dict. Gard. 1 : 51. 1885; Voss in Sieb and Voss, Vilmorin's Blumengartnerel 869, 1896; Mears, Proc. Acad. Nat. Sci. Philadelphia 129 : 16. 1977; Townsend in Nasir & Ali, Fl. W. Pakistan Fasc. 71 : 42. 1974 and in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 1 : 52. 1980. *Telanthera bettzichiana* Regel, Ind. Sem. Hort. Petrop. 1862 : 28 : 1862 et Gartenflora 11 : 178. 1862. *Telanthera versicolor* (Lem.) Regel Ind. Sem.

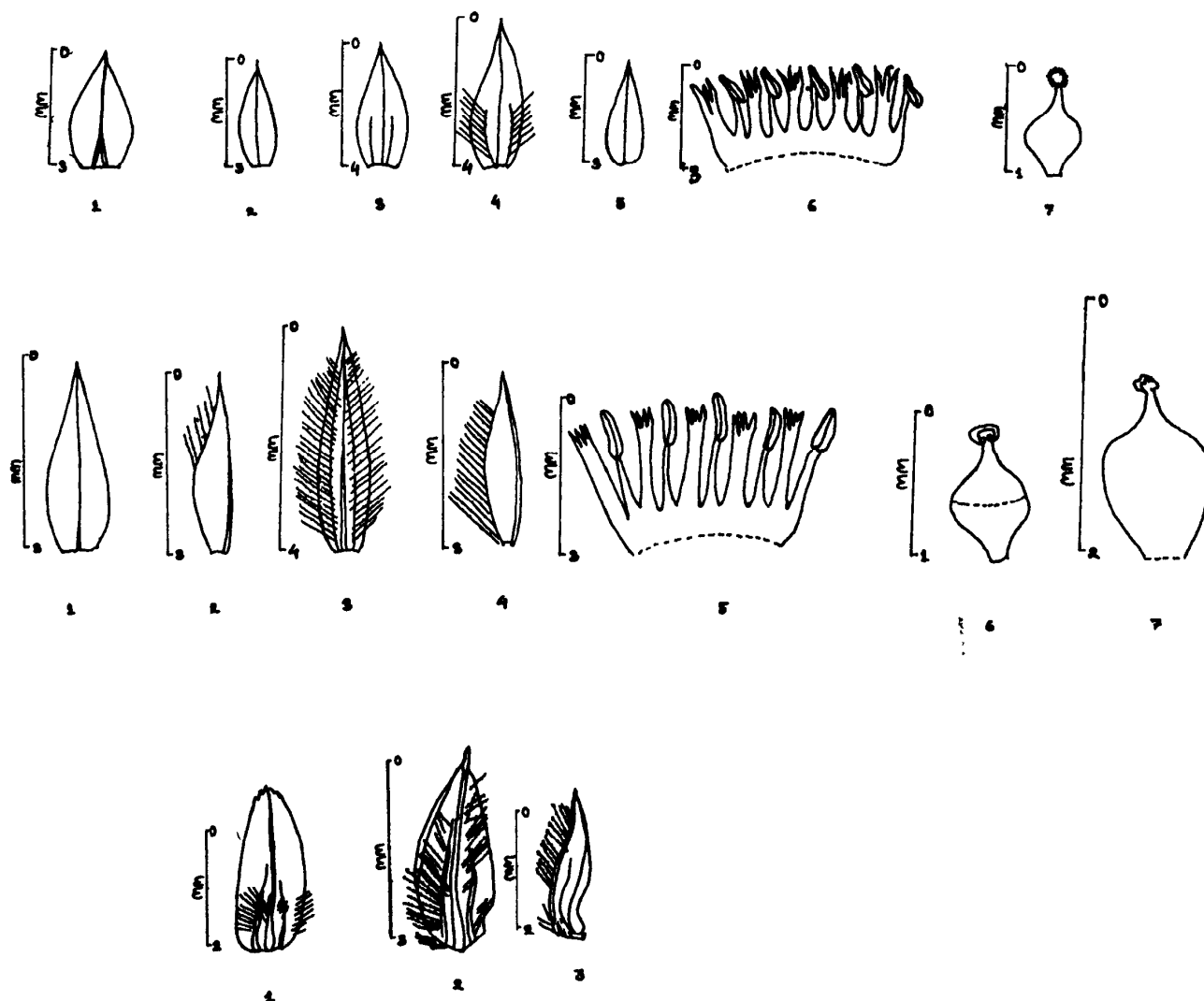


PLATE -III

Alternanthera tenella Colla

Figs. 1-7. 1. Bract. 2. Bracteole. 3. Outer tepal-front view. 4. Outer tepal - back view. 5. Inner tepal. 6. Staminal cup along with pseudostaminodes. 7. Ovary.

Alternanthera bettzichiana (Regal) Nicolson.

Figs. 1-7. 1. Bract. 2. Bracteole. 3. Outer tepal-back view. 4. Inner tepal. 5. Staminal cup along with pseudostaminodes. 6. Ovary. 7. Fruit.

Alternanthera caracasana Kunth from Melville (1958)

Figs. 1-3. 1. Outer (adaxial) tepal. 2. Outer (abaxial) tepal. 3. Lateral tepal.

Hort. Petrop. 83. 1868. *Alternanthera ficoidea* auct. non. (L.) R. Br. ex R. & S. Babu, Bull. Bot. Surv. India 6 : 7. 1964 and Herb. Fl. Dehra Dun 428. 1977 ; Naithani & Raizada, Ind. For. 102 : 679. 1976. Plate-III, Figs. (1-7)

Type : Cultivated specimen from St. Petersburg Botanic Garden (LE, Holotype).

Erect or semi-erect, much-branched perennial herbs, up to 50 cm tall. Stem pilose and becoming glabrous with age but hairy along two vertical lines. Leaves 1.22-7.6 × 0.5-4 cm, elliptic, oblanceolate, rhomboid-ovate, acute or acuminate at the apex, base attenuate into a hairy petiole (0.3-1.5 cm), often purple stuffed or variegated with brownish red, bright red, or yellow. Heads 1-5 together, globose, sessile, axillary or terminal. Bracts 2-3 mm, lanceolate, ovate-lanceolate or ovate, acute to acuminate, mucronate with the excurrent midrib; hairy on the back. Bracteoles 2-3 mm lanceolate, ovate-lanceolate, acute to acuminate, mucronate, 1-nerved, glabrous or hairy on the back. Tepals 5, unequal. Outer 3, 3.3-4 mm, lanceolate, ovate-lanceolate, acute to acuminate, mucronate 3-nerved from the base up to half the length or more, brown base, pilose, inner 2 shorter (3 mm), lanceolate, 1-nerved, glabrous or with few hairs. Stamens 5, 2.3-3 mm long (including tube); filaments 1.7-2.4 mm long ; anthers 1 mm long; pseudo-staminodes 2.3-3.2 mm long (incl. tube), apically irregularly toothed. Ovary 1-1.3 mm, obovoid; style shoot, 0.5 mm ; stigma capitate. Utricle 1.5 mm, obovoid.

Flowering : Jan. - Dec.

Distribution : Native of Brazil ; naturalised in India. In India it is recorded from Jammu & Kashmir, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Punjab, Uttar Pradesh, West Bengal.

Ecology : Found near roadsides and waste places. Ornamental forms found in garden-borders or in beds.

Illustration : Makino, Illustr. Fl. Japan ed. 2 : 606, f. 1816. 1948.

Notes : This species is found in two morphologically distinguishable forms. The naturalized form produces viable seeds and the ornamental form is generally sterile and propagates through formation of clones.

Specimens examined : PUNJAB : Khanna, 9.3.1966, N. C. Nair, 35977. WEST BENGAL : Gopalnagar, 24-Pgs. (N), 19.5.1990. G. Chaudhury, 312 (CAL).

7. *Alternanthera caracasana* Kunth in H. B. & K., Nov. Gen. Sp. 2 : 205. 1818 ; Naqshi in J. Econ. Tax. Bot. 2 : 249. 1981. *Celosia humifusa* Humb. & Bonp. ex R. & S. Syst. 5 : 531. 1820. *Illecebrum peploides* Willd. ex R. & S. Syst. 5 : 517. 1820 ; Melville, Kew Bull. 12 : 175. 1958. *Telanthera caracasana* (Kunth) Moq. in DC., Prodr. 13. 2 : 370. 1849. (Plate-III, Figs. 1-3)

Type : Caracas, Bonpland (P, Holotype).

Prostrate mat forming herb, 11-36 cm long. Stems herbaceous simple and branched, lax or dense often rooting at nodes. Leaves in whorls of 2-3, lanceolate, spatulate, 1-4 × 0.5-1.2 cm, rarely mucronate, entire, narrowed to a long petiole. Spikes 1-1.5 cm, ovoid. Flowers sessile, 2-2.5 mm subrudded by 2 linear-ovate, 1-1.5 mm long, bracteoles. Perianth hairy, lanceolate to ovate-lanceolate, 2-2.6 × 1 mm, outer and inner pairs and intermediate one different from each other, smaller pair with acute tips ; stamens included 5 ; filaments 1 mm, longer than anthers; ovary ovoid to sub-globose ; stigma capitate. Utricle obcordate to orbicular, ca 1.2 mm, glabrous, slightly winged. Seeds orbicular, 0.7-1 mm.

Common near wet places, on the borders of irrigating channels, rice-fields and old temporary drains.

All specimens examined are placed in the herbarium of the Dept. of Botany, University of Kashmir, Srinagar (KASH).

Note : the specimen is not available to the authors. So, the description is taken from the J. Econ. Tax. Bot. 2 : 249-250. 1981.

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REFERENCES

- BABU, C. R. Notes on some new distributional records for North India. *Bull. Bot. Surv. India* 3 : 200-201. 1966.
- COSTERUS, J. C. AND J. J. SMITH. Studies in Tropical Teratology (with 8 plates). *Ann. Jard. Bot. Buitenz.* 23 : 1-19. 1910.
- MAHESHWARI, J. K. *Alternanthera philoxeroides* (Mart.) Griseb. - a new record for India. *Bull. Bot. Surv. India* 6 : 313-314. 1964.
- MEARS, J. A. The nomenclature and type collections of the widespread taxa of *Alternanthera* (Amaranthaceae). *Proc. Acad. Nat. Sci. Philadelphia* 129 : 1-21. 1977.
- NAIR, N. C. AND V. J. NAIR. Some plant records for the Punjab Plain. *Bull. Bot. Surv. India* 5 : 219-222. 1963.
- NAITHANI, N. Occurrence of *Alternanthera paronychioides* St. Hil. in Garhwal Himalayas. *Indian J. of Forestry* 3 : 23. 1980.
- NAITHANI, H. B. AND S. S. R. BENNET. Interesting distributional records of seven species of flowering plants from Arunachal Pradesh. *Ibid.* 4(2) : 160. 1981.
- AND M. B. RAIZADA. New distributional records of eleven plants in India. *Indian Forester* 102 : 675-691. 1976.
- NAUTIYAL, K. N. A new distributional record for *Alternanthera pungens* H. B. & K. from North Garhwal. *J. Bombay nat. Hist. Soc.* 73 : 429. 1977.
- NAQSHI, A. R. *Alternanthera caracasana* H. B. & K. (Amaranthaceae) from Indian Subcontinent. *J. Econ. Tax. Bot.* 2 : 249-250. 1981.
- PEDERSON, T. M. Comment on proposal on *Alternanthera ficoidea* (L.) Beauv. *Taxon* 29 : 326-328. 1980.
- RAIZADA, M. B. Recently introduced or otherwise imperfectly known plants from the Upper Gangetic Plain. *Indian For. Records* 1 : 223-226. 1939.
- New or noteworthy plants from the Upper Gangetic Plain. *Indian Forester* 76 : 495. 1950.
- RHEEDE, H. VAN. *Hortus Indicus Malabaricus*, vol. X t. 11. Amsterdam. 1692.
- SANKARAN, T. AND E. NARAYANAN. Occurrence of the alligator weed in South India. *Curr. Sci.* 40 : 641. 1971.
- SANTAPAU, H. *Alternanthera paronychioides* St. Hil. - A correction. *J. Bombay nat. Hist. Soc.* 54 : 476-477. 1956.
- AND G. L. SHAH. New Plant Records from Bombay. *Alternanthera pungens* H. B. & K. *Ibid.* 58 : 551-555. 1961.
- SHARMA, B. M. AND P. S. JAMWAL. *Alternanthera tenella* Colla. var. *versicolor* Veldk. - A new record to the flora of Jammu and Kashmir State. *Indian J. of Forestry* 2(1) : 84-86. 1988.
- SHRIVASTAVA, G. P. AND H. SANTAPAU. *Alternanthera polygonoides* R. Br. var. *erecta* Mart. - A new record for Bombay State. *J. Bombay nat. Hist. Soc.* 52 : 957. 1954.
- SRIVARAJAN, V. V. AND P. MATTHEW. Notes on Indian species of *Alternanthera* Forsk. (Amaranthaceae) (Kashmir valley excluded) with a new record. *Indian J. of Forestry* 7(1) : 46-53. 1984.
- SUNDERARAJ, D. D. New Plant records for South India. *J. Bombay nat. Hist. Soc.* 53 : 523-525. 1955.
- VELDKAMP, J. F. A proposal to reject the name *Alternanthera ficoidea* (L.) Beauv. (Amaranthaceae) in favour of *A. tenella* Colla. *Taxon* 27 : 310-314. 1978.