

## **Biodiversity of Medicinal Weeds in Chonburi Region, Thailand**

P. Prayoonrat  
Department of Biology, Faculty of Science  
Burapha University, Bangsaen  
Chonburi 20131  
Thailand

**Keywords:** agricultural lands, aquatic habitats, plantations, residential areas, seashore

### **Abstract**

**A survey was conducted to categorize medicinal weeds found in Chonburi Province, Thailand. Places sampled were residential areas, agricultural lands, plantations, along the seashore and some aquatic habitats were also included. In total 227 species were cataloged belonging to 174 genera in 63 families. Of these weeds, 10 families, 36 genera and 40 species were monocotyledon contrasted to 53 families, 138 genera and 187 species for dicotyledon plants. From the total of weeds catalogued 8 species were found only in the coastal area. The medicinal characteristics of each weed species were studied in collaboration with traditional herb doctors as well as from historical manuscripts. Frequency of occurrence and medicinal characteristics of the weeds are discussed.**

### **INTRODUCTION**

The plants for medicine have been utilized for many diseases such as antipyretics, cardiovascular effect, gastrointestinal effect, pregnant tonic and treatment for postnatal symptoms, anti-emetic and treatment for epilepsies etc. (Pantarod et al., 2001; Pichiansunthorn et al., 1999). The medicinal plants have been used for agricultural science were about extracting for inhibit or against organism, microorganism such as insects, mites, ticks, nematodes, and other invertebrates including bacteria, fungi, virus, viroid respectively (Prayoonrat, 1993-2001; Kummee et al., 2002; Panutat and Vatanyospaisain, 2002). On the other hand they could be as allelopathy with higher plants parasite and weed etc.

The diversity of medicinal plants in tropical zone is high including crop plant, forest, uninhibited area, residential area, along the road, seashores, watersides, and several water sources etc. (Prayoonrat, 1993-2002).

In Thailand, there are a lot of medicinal plants which used parts of plants as stem, brance, leaf, flower, fruit and root etc. to be cure many diseases in direct or indirect (Saralamp et al., 1996; Prayoonrat, 1993-2001). Some was used to be compose with urban area, especially rural area like to be use by traditional herb doctors. Many serious diseases can succeed from medicinal plant which can not cure by ordinary doctors.

The various medicinal plants are common plants in Thailand and can be found almost everywhere, many plants are ignored by researchers and people, because of the people did not know those plants to be useful. Usually, the various plants in nonagricultural areas and agricultural lands are weeds, which pose a threat to the health and welfare of man. Weeds can reduce the yield and the quality value of the crops, decrease production and increase harvesting costs. In addition, weeds are a host plant of pests, hay plant of pests, hay fever, dermatitis, poisonous plants, livestock poisoning etc. (Prayoonrat, 1993-2001; Parson and Cuthbertson, 1992).

However, most weeds are very fast growing, good competitus, strong, reproductive, and tolerance to environment. Various weeds are useful to man and animal as a food fertile and can protect soil erosion, including balance of nature and medicinal weeds (Wee, 1984; Anderson, 1995). Survey of weeds in Thailand was done in rice field, cotton field in the crop plant, but never survey on medicinal weeds in particular. Therefore, medicinal weeds should be surveyed in the eastern region, especially in Chonburi region.

## **MATERIALS AND METHODS**

Twentyfour stations were established to represent the ecological subregions within Chonburi region. A survey of plants was conducted in Nong-Kho, Bang-La-Mung in Bang-La-Mung district; Ban-Bueng, Nong-Chak, Nong-Sum-Sak in Bang-Bueng district; Ta-Kam, Tung-Khang, Bang-Chang, Na-Ma-Toom, Phanut-Nikom in Phanut-Nikom district; Bang-Koa, Pan-Tong, Map-Pong in Pan-Tong district; Bang-Phra in Sri-Ra-Cha district; Na-Jom-Tien, Sut-Ta-Heep in Sut-Ta-Heep district; and Khong-Tum-Rhu, Ban-Puek, Bangsaen, San-Suk, Nong-Khang-Kok, Hauey-Kha-Pi, Mueng, Ang-Si-La in Mueng district. Data were collected 144 times per year in 24 index stations. Weeds collections were sedge and grass, herb board leaf weeds, shrumb and tree weeds, aquatic weeds. Some kind of weeds were grown in the laboratory. Data were recorded on collecting, preserving keying, effecting and so on.

Slides, herbariums and photographs were taken and the morphology of each plant was studied. Plants were examined for species diversity using the taxonomic keys (Simitinand and Larsen, 1970-1998; Smitinand, 2001). The specimens were kept in dried form (herbarium) and in 5% formaline solutions (Prayoonrat, 1993-2001). The common name and locally used plants as folk medicine of medicinal weeds were studied by interviewing the local people and the traditional herb doctors in that district.

## **RESULTS**

A survey of medicinal weeds in Chonburi region on 24 stations in 6 districts was done in agricultural lands, nonagricultural areas, residential areas along the seashore and some aquatic habitats along the road forest and mangrove forest. After these medicinal weeds had been collected, their scientific names were identified by taxonomic keys. Additional information about local name and medicinal properties were searched from many reports and publications, a number of local people and 16 traditional herb doctors.

It was found that there were many monocotyledonous weeds and dicotyledonous weeds. Some could also be found in the other regions of Thailand and some of them were exotic species.

Two hundred and twenty seven species were catalogued belonging to 174 genera in 63 families of these weeds. 10 families, 36 genera and 40 species were monocotyledon (Table 1) contrasted with 53 families, 138 genera and 187 species for dicotyledon weeds (Table 2). The total of weeds that formed numerous in 58 species (Table 4), moderate in 87 species (Table 5) and little in 49 species, especially 8 species were found only in the coastal area (Table 3).

## **CONCLUSIONS AND DISCUSSION**

A survey was conducted to categorize medicinal weeds found in Chonburi region, Thailand. There were a lot of medicinal weeds: 227 species, 174 genera and 63 families.

10 families, 36 genera and 40 species were monocotyledonous weeds, which contrasted to 53 families, 138 genera and 187 species of dicotyledonous weeds. The total of these weeds catalogued 58 species numerous medicinal weeds, 87 species moderate medicinal weeds and 49 species little number medicinal weeds. Furthermore, there are 8 species which were found only in the coastal area.

The medicinal characteristics of each weed species were studied in collaboration with 16 traditional herb doctors as well as from historical manuscripts. Frequency of occurrence and medicinal characteristics of the weeds were discussed.

Many medicinal weeds were found in Chonburi region, because it has a diversity of places such as seaside, forest, mangrove forest, agricultural areas, nonagricultural lands, uninhibited lands, mountain hill, seashore, reservoir, and other places. The differentiation of atmosphere of this region has effect on species of weed and various medicinal weeds (Prayoonrat, 1993-2001; Anderson, 1995).

Accept that soil texture was composed by sandy, sandy clay, clay, silt clay etc. So diversity of medicinal weed occurred a numerous weeds.

Various medicinal weeds were used for food and composed in daily food

preparation. Some species are dangerous for eating as some species have toxic substance in part of plant and the whole plant. Some species must be eaten after passing the process. Factors of use of medicinal weeds are time of harvesting, part of plant, dosage etc.

For properties of medicinal weeds, there are a lot of researchers and recommendations of the people and traditional herb doctors. Chonburi region has a lot of traditional herb doctors. These doctors can use many weeds to cure noxious diseases and common diseases, and should be researching in another places, and extract some medicinal weeds to know properties for drugs including studies for plant and animal protection.

#### **ACKNOWLEDGEMENTS**

Thanks to the sixteen traditional herb doctors who aided with the identification of weeds and Dr. Kashane Chalermwat, Dean of Faculty of Science, Burapha University, for editorial assistance.

#### **Literature Cited**

- Anderson, W.P. 1995. Weed Science Principle. West Pupliching Co. p.598.
- Kummee, S., Ongsakul, M., Supavita, T. and Pungrasamee, P. 2002. Antibacterial activity of some medicinal plants against *Shigella* spp. Extended Abstracts, 28<sup>th</sup> Congress on Science and Technology of Thailand. p.418.
- Pantarod, B., Trisonti, P. and Trisonti, C. 2001. A survey of medicinal plants of Nakwang Village. Bangleua district, Nan Province, Extended Abstracts, 27<sup>th</sup> Congress on Science and Technology of Thailand. p.443.
- Panutat, P. and Vatanyospaisain, S. 2002. Biocidal activity of herb and spice extract against *E. coli* and *S. aurius*. Extended Abstracts, 28<sup>th</sup> Congress on Science and Technology of Thailand. p.463.
- Parsons, W.T. and Cuthbertson, E.G. 1992. Noxious Weeds of Australia. Inkata Press, Melbourn, Sydney. p.692.
- Pichiansunthorn, C., Chavalit, M. and Jeerawong, V. 1999. Text book of Medicinal plants. (in Thai). Amarin Printing and publishing Co. p.775.
- Prayoonrat, P. 1993-2001. Weeds and weed controls. (in Thai). SWU. Press : 385.
- Sarlamp, P., Chakul, W., Temsiririrkkul, R. and Clayton, T. 1996. Medicinal Plants in Thailand. Volume I. Siambooks and Publication Co, Ltd. Thailand.
- Smitinand, T. and Larsen, K. 1970-1998. Flora of Thailand vol. 2-6. Bangkok: Chutima Press and Rumthai Press.
- Smitinand, T. 2001. Thai Plant Names (Botanical names – Vernacular names). The Forest Herbarium Royal Forest Department, Bangkok.
- Wee, Y.C. 1984. Weed management in lawns. Proc. 1<sup>st</sup> Tropical Weed Science Conf. 5(1):188-196.

## Tables

Table 1. Monocotyledonous Weeds - 40 Species, 36 Genera, 10 Families.

---

Araceae:	<i>Acorus calamus</i> Linn., <i>Amorphophallus campanulatus</i> El. Ex Decne., <i>Lasia spinosa</i> Thw., <i>Pistia stratiotes</i> Linn., <i>Typhonium trilobatum</i> Schott.
Commelinaceae:	<i>Commelina diffusa</i> Burm.f., <i>Cyanotis axillaris</i> Polm & Schult., <i>Murdannia nudiflora</i> Brenan.
Cyperaceae:	<i>Bulbostylis barbata</i> Clarke., <i>Cyperus alternifolius</i> Linn., <i>C. kyllingia</i> Endl., <i>C. rotundus</i> Linn., <i>Fimbristylis miliacea</i> Vahl.
Dioscoreaceae:	<i>Disocorea hispida</i> Dennst.
Gramineae:	<i>Acrachne racemosa</i> Willd., <i>Apluda mutica</i> Linn., <i>Arundo donax</i> Linn., <i>Chloris barbata</i> Sw., <i>Cynodon dactylon</i> Pers., <i>Dactyloctenium aegyptiacum</i> Willd., <i>Echinochloa colonum</i> Link, <i>Eleusine indica</i> Gaertn., <i>Eragrostis tenella</i> P. Beauv., <i>Imperata cylindrica</i> Beauv., <i>Leersia hexandra</i> Sw., <i>Leptochloa chinensis</i> Nees., <i>Panicum repens</i> Linn., <i>Pennisetum pedicellatum</i> Trin., <i>P. polystachyon</i> Schult., <i>Phragmites australis</i> Trin. Ex Steud., <i>Saccharum spontaneum</i> Linn., <i>Sclerostachya fusca</i> A. Camus.
Hydrocharitaceae:	<i>Ohelia alismoides</i> (Linn.) Pers.
Liliaceae:	<i>Gloriosa superba</i> Linn.
Pontederiaceae:	<i>Eichhornia crassipes</i> Solms., <i>Monochoria hastata</i> Solms.
Taccaceae:	<i>Tacca leontopetaloides</i> Ktze.
Zingiberaceae:	<i>Amomum villosum</i> Lour., <i>A. xanthioides</i> Wall., <i>Zingiber zerumbet</i> Smith.

---

Table 3. Weeds in the Coastal Area - 8 Species.

---

<i>Acanthus ebracteatus</i> Vahl., <i>Excoecaria agallocha</i> Linn., <i>Heritiera littoralis</i> Dry., <i>Hibiscus tiliaceus</i> Linn., <i>Ipomoea pes-caprae</i> Sweet, <i>Melaleuca leucadendron</i> Linn., <i>Pluchea indica</i> Less., <i>Vertex trifolia</i> Linn. var. <i>simplicifolia</i> Cham.
--

---

Table 2. Dicotyledonous Weeds - 187 Species, 138 Genera, 53 Families.

Acanthaceae:	<i>Acanthus ebracteatus</i> Vahl., <i>A. ilicifolius</i> Linn., <i>Andrographis paniculata</i> Wall.ex Nees., <i>Asystasia gangetica</i> T. Anders., <i>Barleria cristata</i> Linn., <i>B. lupulina</i> Lindl., <i>B. prionitis</i> Linn., <i>B. strigosa</i> Willd., <i>Hygrophila erecta</i> Hochr., <i>Rhinacanthus nasutus</i> (Linn.) Curz., <i>Ruellia tuberosa</i> Linn.
Aizoaceae:	<i>Glinus oppositifolius</i> A.DC., <i>Mollugo pentaphylla</i> Linn., <i>Trianthema portulacastrum</i> Linn., <i>T. triguetra</i> Wild. ex Rottles.
Amaranthaceae:	<i>Achyranthes aspera</i> Linn., <i>Alternanthera sessilis</i> DC., <i>Amaranthus gracilis</i> Desf., <i>A. spinosus</i> Linn., <i>Celosia argentea</i> Linn., <i>Cyathula prostrata</i> Bl., <i>Gomphrena celosioides</i> Mart., <i>G. globosa</i> Linn.
Apocynaceae:	<i>Catharanthus roseus</i> G. Don., <i>Ervatamia luensis</i> Kerr., <i>E. microphylla</i> Kerr., <i>Thevetia peruviana</i> K.Schum.
Asclepiadaceae:	<i>Atherolepsis pierrei</i> Cost., <i>Calotropis gigantea</i> R.Br., <i>C. procera</i> R.Br., <i>Oxystelma esculentum</i> E.Br.
Balsaminaceae:	<i>Impatiens balsamina</i> Linn.
Basellaceae:	<i>Basella alba</i> Linn., <i>B. rubra</i> Linn.
Borraginaceae:	<i>Heliotropium indicum</i> Linn.
Caesalpiniaceae:	<i>Caesalpinia pulcherrina</i> Sw., <i>Cassia alata</i> Linn., <i>C. occidentalis</i> Linn., <i>C. tora</i> Linn.
Campanulaceae:	<i>Lobelia chinensis</i> Lour.
Cleomaceae:	<i>Cleome gynandra</i> Linn., <i>C. viscosa</i> Linn.
Compositae:	<i>Ageratum conyzoides</i> Linn., <i>Blumea balsamifera</i> DC., <i>Eclipta prostrata</i> Linn., <i>Elephantopus scaber</i> Linn., <i>Emilia sonchifolia</i> DC., <i>Enydra fluctuans</i> Lour., <i>Eupatorium odoratum</i> Linn., <i>Pluchea indica</i> Less., <i>Spilanthes acmella</i> Murr., <i>Synedrella nodiflora</i> Gaertn., <i>Vernonia cinerea</i> Less., <i>V. elliptica</i> DC., <i>Wedelia urticifolia</i> DC., <i>Xanthium strumarium</i> Linn.
Convolvulaceae:	<i>Cuscuta chinensis</i> Lamk., <i>Ipomoea aquatica</i> Forsk., <i>I. obscura</i> Ker-Gawl., <i>I. pes-caprae</i> Sweet, <i>Merremia umbellata</i> (Linn.) Haller f., <i>Operculina turpethum</i> S. Manso.
Costaceae:	<i>Costus speciosus</i> Smith.
Cucurbitaceae:	<i>Coccinia grandis</i> Voigt., <i>Melothria affinis</i> King., <i>Momordica charantia</i> Linn., <i>Mukia maderaspatana</i> Roem., <i>Solena heterophylla</i> Lour., <i>Trichosanthes cordata</i> Roxb., <i>T. tricuspidata</i> Lour.
Euphorbiaceae:	<i>Acalypha indica</i> Linn., <i>Cladogynos orientalis</i> Zipp.ex. Span., <i>Euphorbia antiquorum</i> Linn., <i>E. heterophylla</i> Linn., <i>E. hirta</i> Linn., <i>E. thymifolia</i> Linn., <i>E. tirucalli</i> Linn., <i>Excoecaria agallocha</i> Linn., <i>Jatropha curcas</i> Linn., <i>J. gossypifolia</i> Linn., <i>Phyllanthus niruri</i> Linn., <i>P. urinaria</i> Linn., <i>P. virgatus</i> Forst. f., <i>Sauropus androgynus</i> Merr., <i>Trigonostemon reidioides</i> Craib.
Hydrophyllaceae:	<i>Hydrolea zeylanica</i> Vahl.
Labiatae:	<i>Hyptis suaveolens</i> Poit., <i>Leonotis nepetaefolia</i> R. Br., <i>Leucas aspera</i> (Willd.) Spreng., <i>Ocimum americana</i> Linn., <i>O. basilicum</i> Linn., <i>O. gratissimum</i> Linn., <i>O. sanctum</i> Linn.
Malvaceae:	<i>Abutilon indicum</i> (Linn.) Sweet., <i>Hibiscus sabdariffa</i> Linn., <i>H. tiliaceus</i> Linn., <i>Sida acuta</i> Burm. f., <i>S. cordifolia</i> Linn., <i>S. rhombifolia</i> Linn., <i>Urena lobata</i> Linn.
Melastomataceae:	<i>Melastoma villosum</i> Lodd.
Menispermaceae:	<i>Tiliacora triandra</i> Diels.
Mimosaceae:	<i>Adenanthera pavonina</i> Linn., <i>Albizia procera</i> Benth., <i>Leucaena leucocephala</i> de Wit., <i>Mimosa pudica</i> Linn., <i>Neptunia oleracea</i> Lour., <i>Pithecellobium dulce</i> Benth.

Table 2. (Continued) Dicotyledonous Weeds - 187 Species, 138 Genera, 53 Families.

---

Moraceae:	<i>Ficus religiosa</i> Linn., <i>Streblus asper</i> Lour.
Myrtaceae:	<i>Melaleuca leucadendron</i> Linn.
Nelumbonaceae:	<i>Nelumbo nucifera</i> Gaertn.
Nyctaginaceae:	<i>Boerhavia diffusa</i> Linn.
Onagraceae:	<i>Fissendocarpa linifolia</i> Bennet., <i>Jussiaea repens</i> Linn.
Opiliaceae:	<i>Melientha suavis</i> Pierre
Oxalidaceae:	<i>Biophytum sensitivum</i> DC., <i>Oxalis corniculata</i> Linn.
Papilionaceae:	<i>Abrus precatorius</i> Linn., <i>Clitorea ternatea</i> Linn., <i>Derris scandens</i> Benth., <i>D. trifoliata</i> Lour., <i>Desmodium triflorum</i> DC., <i>Geissaspis cristata</i> Wight & Arn., <i>Indigofera hirsuta</i> Linn., <i>I. suffruticosa</i> Mill., <i>Mucuna pruriens</i> DC., <i>Sesbania grandiflora</i> Desv., <i>S. javanica</i> Miq., <i>S. sesban</i> Merr.
Passifloraceae:	<i>Passiflora foetida</i> Linn.
Pedaliaceae:	<i>Sesamum indicum</i> Linn.
Piperaceae:	<i>Piper sarmentosum</i> Roxb.
Portulacaceae:	<i>Portulaca oleracea</i> Linn.
Rhamnaceae:	<i>Zizyphus jujuba</i> Mill.
Rubiaceae:	<i>Hedyotis biflora</i> Lamk., <i>H. corymbosa</i> Lamk., <i>Paederia foetida</i> Linn., <i>P. linearis</i> Hook. f., <i>Randia siamensis</i> Craib.
Rutaceae:	<i>Glycosmis pentaphylla</i> Corr.
Salicaceae:	<i>Salix babylonica</i> Linn.
Salvadoraceae:	<i>Azima sarmentosa</i> Benth. & Hook.
Sapindaceae:	<i>Cardiospermum helicacabum</i> Linn.
Scrophulariaceae:	<i>Limnophylla aromatica</i> (Lam.) Merr., <i>L. rugosa</i> (Roth.) Merr., <i>Lindenbergia philippensis</i> Benth., <i>Lindernia ciliata</i> Pennell., <i>Scoparia dulcis</i> Linn.
Solanaceae:	<i>Datura metel</i> Linn., <i>Physalis minima</i> Linn., <i>Solanum aculeatissimum</i> Jacq., <i>S. erianthum</i> D. Don., <i>S. ferox</i> Linn., <i>S. incanum</i> Linn., <i>S. indicum</i> Linn., <i>S. nigrum</i> Linn., <i>S. sanitwongsei</i> Craib., <i>S. torvum</i> Sw., <i>S. trilobatum</i> Linn.
Sphenocleaceae:	<i>Sphenoclea zeylanica</i> Gaertn.
Stemonaceae:	<i>Stemona burkillii</i> Prain, <i>S. collinsae</i> Craib., <i>S. tuberosa</i> Lour.
Sterculiaceae:	<i>Helicteres isora</i> Linn., <i>Heritiera littoralis</i> Dry., <i>Melochia corchorifolia</i> Linn., <i>Pentapetes phoenicea</i> Linn., <i>Sterculia foetida</i> Linn.
Thunbergiaceae:	<i>Thunbergia laurifolia</i> Linn.
Tiliaceae:	<i>Corchorus aestuans</i> Linn., <i>C. capsularis</i> Linn., <i>Triumfetta rhomboidea</i> Jacq.
Turneraceae:	<i>Turnera subulata</i> G.E. Smith.
Umbelliferae:	<i>Centella asiatica</i> Urban., <i>Hydrocotyle siphorpioides</i> Lamk.
Urticaceae:	<i>Pouzolzia pentandra</i> Benn.
Verbenaceae:	<i>Clerodendrum inerme</i> Gaertn., <i>C. petasites</i> S. Moore., <i>Lantana camara</i> Linn., <i>Phyla nodiflora</i> Greene, <i>Stachytarpheta indica</i> Vahl., <i>Vertex trifolia</i> Linn. var. <i>simplicifolia</i> Cham., <i>Vitex pinnata</i> Linn.
Vitidaceae:	<i>Cissus carnososa</i> Roxb., <i>Parthenocissus vitacea</i> Aitch.
Zygophyllaceae:	<i>Tribulus terrestris</i> Linn.

---

Table 4. Numerous Medicinal Weeds - 58 Species.

*Glinus oppositifolius* A.DC., *Trianthema portulacastrum* Linn., *Achyranthes aspera* Linn., *Alternanthera sessilis* DC., *Amaranthus gracilis* Desf., *A. spinosus* Linn., *Catharanthus roseus* G. Don., *Pistia stratiotes* Linn., *Oxystelma esculentum* E.Br., *Heliotropium indicum* Linn., *Cleome gynandra* Linn., *C. viscosa* Linn., *Commelina diffusa* Burm.f., *Ageratum conyzoides* Linn., *Emilia sonchifolia* DC., *Eupatorium odoratum* Linn., *Pluchea indica* Less., *Spilanthes acmella* Murr., *Synedrella nodiflora* Gaertn., *Vernonia cinerea* Less., *Ipomoea aquatica* Forsk., *Coccinia grandis* Voigt., *Cyperus rotundus* Linn., *Ephorbia heterophylla* Linn., *E. hirta* Linn., *E. thymifolia* Linn., *Phyllanthus niruri* Linn., *P. urinaria* Linn., *P. virgatus* Forst. f., *Dactyloctenium aegyptiacum* Willd., *Eleusine indica* Gaertn., *Imperata cylindrica* Beauv., *Panicum repens* Linn., *Sida acuta* Burm. f., *S. cordifolia* Linn., *S. rhombifolia* Linn., *Mimosa pudica* Linn., *Pithecellobium dulce* Benth., *Boerhavia diffusa* Linn., *Fissendocarpa linifolia* Bennet., *Biophytum sensitivum* DC., *Clitorea ternatea* Linn., *Desmodium triflorum* DC., *Geissaspis cristata* Wight & Arn., *Sesbania javanica* Miq., *Passiflora foetida* Linn., *Eichhornia crassipes* Solms., *Portulaca oleracea* Linn., *Hedyotis corymbosa* Lamk., *Paederia foetida* Linn., *P. linearis* Hook. f., *Lindernia ciliata* Pennell., *Scoparia dulcis* Linn., *Turnera subulata* G.E. Smith., *Lantana camara* Linn., *Stachytarpheta indica* Vahl., *Vitex pinnata* Linn., *Tribulus terrestris* Linn.

Table 5. Moderate Medicinal Weeds - 87 Species.

*Acanthus ebracteatus* Vahl., *A. ilicifolius* Linn., *Andrographis paniculata* Wall.ex Nees., *Asystasia gangetica* T. Anders., *Barleria cristata* Linn., *Hygrophila erecta* Hochr., *Mollugo pentaphylla* Linn., *Gomphrena globosa* Linn., *Atherolepsis pierrei* Cost., *Calotropis gigantea* R.Br., *C. procera* R.Br., *Basella alba* Linn., *B. rubra* Linn., *Caesalpinia pulcherrina* Sw., *Cassia alata* Linn., *C. tora* Linn., *Eclipta prostrata* Linn., *Elephantopus scaber* Linn., *Enydra fluctuans* Lour., *Vernonia elliptica* DC., *Cuscuta chinensis* Lamk., *Ipomoea obscura* Ker-Gawl., *Merremia umbellata* (Linn.) Haller f., *Operculina turpethum* S. Manso., *Costus speciosus* Smith., *Melothria affinis* King, *Momordica charantia* Linn., *Cyperus alternifolius* Linn., *C. kyllingia* Endl., *Fimbristylis miliacea* Vahl., *Arundo donax* Linn., *Cynodon dactylon* Pers., *Leersia hexandra* Sw., *Phragmites australis* Trin. Ex Steud., *Saccharum spontaneum* Linn., *Sclerostachya fusca* A. Camus., *Hydrolea zeylanica* Vahl., *Leonotis nepetaefolia* R. Br., *Ocimum americana* Linn., *O. basilicum* Linn., *O. gratissimum* Linn., *O. sanctum* Linn., *Gloriosa superba* Linn., *Abutilon indicum* (Linn.) Sweet., *Hibiscus sabdariffa* Linn., *Urena lobata* Linn., *Tiliacora triandra* Diels., *Leucaena leucocephala* de Wit., *Neptunia oleracea* Lour., *Nelumbo nucifera* Gaertn., *Jussiaea repens* Linn., *Oxalis corniculata* Linn., *Derris trifoliata* Lour., *Indigofera hirsuta* Linn., *Mucuna pruriens* DC., *Sesbania grandiflora* Desv., *Piper sarmentosum* Roxb., *Monochoria hastata* Solms., *Zizyphus jujuba* Mill., *Hedyotis biflora* Lamk., *Randia siamensis* Craib., *Glycosmis pentaphylla* Corr., *Azima sarmentosa* Benth. & Hook., *Cardiospermum helicacabum* Linn., *Linnophilla aromatica* (Lam.) Merr., *Lindenbergia philippensis* Benth., *Physalis minima* Linn., *Solanum aculeatissimum* Jacq., *S. ferox* Linn., *S. incanum* Linn., *S. indicum* Linn., *S. nigrum* Linn., *S. sanitwongsei* Craib., *S. torvum* Sw., *S. trilobatum* Linn., *Sphenoclea zeylanica* Gaertn., *Stemona burkillii* Prain, *Pentapetes phoenicea* Linn., *Corchorus aestuans* Linn., *C. capsularis* Linn., *Triumfetta rhomboidea* Jacq., *Centella asiatica* Urban., *Pouzolzia pentandra* Benn., *Clerodendrum petasites* S. Moore., *Phyla nodiflora* Greene, *Cissus carnosa* Roxb., *Parthenocissus vitacea* Aitch.