

How Many Medicinal Plant Species in Malay Peninsula?

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Abstract: Malaysia is endowed with rich flora, ranking 12th in the world. The flora of Peninsula Malaya is fairly well known and details are reviewed and published from time to time. Altogether it is estimated that there are about 180 families, 1500 genera and 9000 species of flowering plants.

Based on the pioneer work of Ridley on the Flora of the Malay Peninsula, Burkill enumerated the register of medicinal plant species in the well known Dictionary of the Economic products of the Malay Peninsula. The dictionary remains as a standard source of reference even today. The vast literature that Burkill referred to gather the details are briefly summarised as background information.

Taxonomic revisions are necessary and inevitable to draw the data up to date on plant wealth. In the process, the status and sizes of families, genera and species are revised, or further divided or regrouped with old or new names. The changes that have been made on local medicinal plant species both in terms of numbers as well as nomenclature are summarised. The results of the present exercise has helped to identify and determine the uses of about 500 (± 100) medicinal plant species in Malaya, including the native and introduced ones.

INTRODUCTION

Malay Peninsula including Singapore has a land area of 132,800² kilometres and the flora is very rich. During the Earth Summit Meeting in Rio de Janeiro, 1992, it was stated by Datuk Law Hieng Ding, the then Minister of Science and Technology, Malaysia, that "Malaysia is one of the 12 megadiversity countries of the world which collectively and where endemism is highest. At least a quarter of our tree flora is not found elsewhere in the world and many of our herbaceous flora, orchids and other groups of species are unique". (Zakri, 1995, Salleh, 1998). Various botanical publications that have come out since then would support the above statement.

How many plant species were recorded or used medicinally in Malaya? How many of them are native and how many are introduced? These are some of the questions repeatedly asked at every medicinal plant seminar or conference. Approximate numbers of 1000-2000 are given as answers. Similar figures are stated in some of the published papers (Drewe, 1998, Lajis and Ismail, 1998, Ibrahim, 1998).

For the last few years, especially after presuming the responsibility of editing the Journal of Tropical Medicinal Plants, my mind was preoccupied to approximately determine the number of plant species that have been recorded and used medicinally in Malaya. The botanical Malesian region is vast and adorned with large number of plant species, a small

part of which are used medicinally and still a smaller part of them chemically analysed to determine the quality of their products or to determine their worth scientifically and economically.

In spite of many occasional publications that are published from time to time, there is no single comprehensive publication that can exceed the quality and quantity of information covered in Burkill's Dictionary. (Burkill, 1966). It forms the bedrock and main source of reference, which others also have used, to answer some of the questions posed earlier.

After reviewing the available literature, the present paper evaluates the number of plant species recorded as medicinally used in Malaya. Unambiguous use is the criterion. Background information that helped earlier workers to record the details are summarised. The number of flowering plants species in the country ascertained.

Taxonomic revisions of plants are inevitable and many changes are made in determining the status of family, genera and species. Many of the species are even eliminated or renamed. Taking all these points into consideration the total number of plant species recorded as medicinally used in the country are classified under four categories namely:

- a) Plant species with the same botanical names as they were registered in 1920s - 1930s.**
- b) Introduced plant species, not native, but used**

medicinally.

c) Plant species with different names than what they were known at the times of Ridley and Burkill.

d) Plant species excluded (in the recent taxonomic treatment) but continued to be used medicinally with the old names.

The introduced plant species are excluded in the taxonomic treatments, starting from Ridley's flora and in the later publications.

Taxonomic revisions and appraisals

About 25 years ago, my former colleague and plant taxonomist, Dr. Keng in Department of Botany, University of Singapore published an article accounting the number of flowering plant species in W. Malaysia and Singapore (Keng, 1974). Ridley's flora was the basis to determine the number of families, genera and species. Even at that time, Ridley's data was considered as "very much out of date". Ridley followed the system of Bentham and Hooker (British) while the later workers followed Engler and Prantl (German).

Keng randomly selected 12 families of flowering plants to count the latest number of genera and species. They had more genera and species than what Ridley had recorded in the flora.

A new tree flora of Malaya was published by Whitmore, (1973). The census of 47 families was audited to find out and record more number of species than what Ridley had registered. Summarising all those details, it was concluded that Angiosperms in Malaya comprised 178 families, 1450 (± 50) genera, and 8000 (± 500) species. Compared with the world flora it amounted to 2.79% of the total (Keng, 1974, Grant, 1963).

In some of the other papers the estimated number of angiosperms in Malaysia was reported to be 10,000 species (Bidin and Latiff, 1995; Lajis and Kiew, 1995). Of these, about 1200 species in Peninsula Malaysia and 2000 in Sabah and Sarawak are said to be used medicinally (Ibrahim, 1998; Drew, 1998).

In 1995, a catalogue of vascular plants of Malaya was published by Turner who was a staff member of the Botany department, University of Singapore (Turner, 1995). The main intention of the author was to prepare a compilation that "would prove useful to people interested in the plants of Malay Peninsula". It was reasoned that such a publication was necessary to bring together the vascular plant flora of Malay Peninsula in a single published list. Many new species have been described by several authors working on the flora of

Malaysia in general and details are published in several international Journals. Most of the authors are from European countries. The taxonomic progress made through the publication of Flora Malesiana is well known and the work is still continuing.

To consolidate the information (Turner, 1995) for the catalogue important references and "other disparate literature relevant to the Malayan Flora" were collected. (disparate=essentially different, unrelated.) The vascular plants that are believed to exist were included in the catalogue. The classification system followed was a new system (Brummit, 1992). Altogether 166 families of dicotyledons and 45 of monocotyledons (Total 211) are included in the catalogue. Likewise 1533 genera (1125 of dicots, 408 monocots) and 7506 species (5494 of dicots and 1012 of monocots) are enumerated (Table 1).

Revisory studies form one of the basic aspects of plant taxonomy and from time to time such researches are very much needed. For revision of flora or to check or revise the names of the plants the herbarium specimens are comparatively studied most of the time. Visiting the same area from where the type specimens were collected would be very arduous. Changes in the habitat are frequent and chances of finding the plants of same species in the same or particular area are very remote. Searching for a particular species of *Calophyllum* recently in Sarawak proved the above statement (Lajis and Kiew, 1995).

In the recent catalogue (Turner, 1995) more number of families have been erected. Families with a single genus with one or few species are very common totalling to about 80 of them or about 38% of all the families. Some of the revised families have new names named after the genus in most cases. For this and other details followed, to implement the new classification system, some of the species mentioned in Burkill's dictionary are totally eliminated. Another intensive scrutiny is well required to determine and justify the new system followed.

In the meanwhile it is necessary to use the plants medicinally with the names given in the dictionary. Our understanding of plant classification system may change from time to time but the species cannot disappear totally and remain as unaccounted. Many of the species listed in the list 'D' of the present paper need to be discerned by valid reasons.

Table 1. Number of flowering plant species in Malaya and Singapore.

	Families	Genera	Species
Keng 1974	178	1450(±50)	8507(±500)
Turner 1995	211	1533	7506

BACKGROUND

Burkill's dictionary on economic products of Malay Peninsula is a great compendium, first published in 1935 in London and the second edition in 1966 by the Ministry of Agriculture, Government of Malaysia. The dictionary details information on plants, animals, minerals, fossils and various other products arising therefrom. Introduced and cultivated plants like rubber, oil palm are dealt with in great detail besides rice, sugar cane and other local plant species. With regards to forest products, timber was the main focus or produce (both in quality and quantity) besides identifying the proper or suitable sources for fibres, latex (Rubber), spices, gums, oils, resins and others.

The enumeration of medicinal plant species by Burkill was based on Ridley's flora in Malaya (1922-25) published in England. Ridley himself published a series of papers on medicinal plants in various journals chief of which was the Journal of Straits Settlements. FMS.

At his disposal, Burkill had plenty of published literature on medicinal plants, recorded by British, Dutch, German and other scientists working both in Europe and in various Asian countries. Burkill was transferred to Singapore Botanic Gardens from Royal Botanic Gardens, Calcutta. At that time that is 1920s, the Botanical heritage at Calcutta was very great with well published literature by pioneers like Hooker, Watt, and others. On Malay forests, Malay Archipelago, Malay people, certain historical records were already available (Sweetenham, 1903, 1907, Wallace 1906, Maxwell 1907). Watt's dictionary on economic plants of India and other publications on Western Ghats of India by pioneers like Fyson, Gamble and others appear to have provided incitement to Burkill since these references are frequently quoted in supporting the various details in the dictionary.

Earlier to Burkill, there were some noted personalities in Malaya, appointed by the Colonial government, to collect the information on medicinal plants. Ridley the Director of Singapore Botanic Gardens was the pioneer. The officers went round the country, developed alliance with the local people and learnt about the ethnobotanical uses of plants. Two other personalities need to be mentioned. One was Alvins, plant collector stationed in Malacca.

The other was Hooper who specialised in Medicinal plants used by Chinese in Malaya; Hooper was the officer to identify the botanical identity of medicinal plants imported from China to Malaya and even to U.K. Hooper's paper published in Gardnes Bulletin (1929) provides wealth of information.(Rao, 2004). There was considerable vigilance and restriction in opium trade.

Among the Malays who helped Burkill to record the medicinal uses of plants was Haniff, who was the joint author for the paper published in Gardens Bulletin (1930). Besides there were a few Hakims about whom references are made in the dictionary (see the references below). (Rao, 2004).

By 1925-1930, plenty of books and research papers on medicinal plants were already published in the surrounding countries of Malaya in South East Asia. From Indonesia, Philippines, Indochina, there were many papers published by the colonial scientists. In addition, papers published in Americas and Africa were also used. Such publications provided a great wealth of information. Some of the well known historical publications cited by Burkill were as follows:

1.	Abdullah, Dato Sediah Rajah. 1926. Jour. Roy, Soc. Mal. Branch
2.	Bishopp, 1925. Mal. Agri. Jour.
3.	Boorsma, 1902. Bull. Inst. Bot. Buitenzorg.
4.	Boorsma, 1908. Bull. Dep. Agric. aved. Ind.
5.	Boorsma, 1918. Teysmannia
6.	Broarn, A.R. 1922. Andaman Islanders
7.	Bull. Imp. Inst. 1920. Material Analysis
8.	Burkill and Haniff 1930. Gard. Bull. SS.
9.	Burn, Murdoch. 1912. Trees and Timber Malaya
10.	Burns, Kulkarni, Godbole. 1925. Mem. Dept. Agric. Ind. Bot.
11.	Brown, W.H. 1900, 1920. Bull. For. Phillipp.
12.	Cammerlohen. 1923. Bull. Jard. Bot. Buitenzorg
13.	Capanin. 1925. Philipp. Agric.
14.	Cleeve, Green, Tutin. 1915. Trans. Chem. Soc. (Colchicine).
15.	Cook. R.C. 1918. Jour. Washington Acad. Sci.
16.	Corner. 1933. Jour. Roy. As. Soc. Mal. Branch
17.	Crawford. 1820. Hist. Ind. Archipel.
18.	Crevost. 1924. Bull. Econ. Indochine
19.	Crevost and Petelot. 1929. Bull. Econ. Indochine
20.	Cubitt. 1918. Jour. Roy. As. Soc, Straits Branch
21.	Decandolle. 1886. Origin des Plantes Cultiv.
22.	Evans. 1915. Jour. FMS. Mus.
23.	Foxworthy. 1922. Mal. Indian Timbers.
24.	Foxworthy and Woolley. 1930. Mal. For. Rec.

25.	Gamble. 1922. Mal. Indian Timbers.
26.	Gildemeister. 1931. Aether. ode.
27.	Greshoff. 1900. Mededeel Islands Plantentuin
28.	Guerrero. 1921. Bul. Forestry. Philipp.
29.	Hadji Ahmad. 1907. Agric. Bull. Straits. FMS
30.	Hadji Bidah. 1907. Agric. Bull. Straits. FMS
31.	Harland. 1932. Bibl. Genet.
32.	Henry. 1913. Plant Alkaloids
33.	Heyne. 1917, 1927. Nutt. Plant. Ned. Ind.
34.	Holmes (Ed). 1892. Meldrum's list of Johore Medicines. Bull. Pharm
35.	Hooker. 1898. Trimen Handbook Ceylon Flora
36.	Hooper. 1904. Ann. Rep. Ind. Mus.
37.	Hooper. 1905, 1906, 1910. Ann. Rep. Ind. Mus.
38.	Hooper. 1907. Agric Ledger
39.	Hooper. 1929. Gard. Bull. S.S
40.	Hunter. 1800. Jour. Roy. As. Soc. Straits, Branch
41.	Joret. 1897. Plantes dans l' Antiquite
42.	King. 1888. Ann. Roy. Soc. Gard. Calcutta
43.	King. 1919. Philip. Jour. Sci.
44.	Koorders and Valetton. 1903. Mededeel Slands Plantetuin
45.	Kurz. 1877. For. Flora, Burma
46.	Leschenault. 1810. Ann. Mus. Paris
47.	Low. Sir. Hugh. 1848. Sarawak.
48.	Low. 1836. Soil and Agric. Penang
49.	Maxwell, Sir. George, 1906. Mantra Gajah. Trans. Journ. Roy. As. Soc. Straits Branch
50.	Maxwell. C.N. 1921. Jour. Roy. As. Soc. Straits Branch.
51.	Meldrum. 1890. List of Johore Medicines
52.	Menaut. 1929. Bull. Econ. Indochine
53.	Merrill. 1926. Enum Philipp. Flow. Plants
54.	Moll and Jansonmus. 1906. Milkro. d. Holzes. Java
55.	Ochse. 1931. Vegetables Dutch E. Ind.
56.	Oxley. 1851. Logans. Jour. (Agar Agar)
57.	Perrott and Vogt. 1913. Trav. Lab. Mat. Med. Paris.
58.	Petric. 1912. Proc. Linn. Soc. NS Wales.
59.	Piso. 1648. De Medicine Brasiliense.
60.	Puran Singh. 1916. Rep. Board. Sci. Adv. Ind.
61.	Raffles. 1817. Hist. Java.
62.	Reinhortz. 1904. Agric. Ledger
63.	Reintgen. 1905. Beihefte Zum Tropen Pflanzen
64.	Ridley. 1898, 1901, 1902, 1906. Agric. Bull. Straits and FMS.
65.	Ridley. 1896. Selangor Journal.
66.	Ridley. 1911. Mal. Med. Jour.
67.	Robinson. 1919. Philip. Jour. Sci.

68.	Rock. 1922. Bull. U.S. Dept. Agric.
69.	Skeat and Blagden. 1906. Pagan Races
70.	Teixiera. 1927. Oleos Veg. Bras.
71.	Tschirch. 1910. Handbuch der Pharmacognosie
72.	Umney. 1897. Pharm. Jour.
73.	Van Dangen. 1913. Bekn. Overz. Genesmidd. Nedd. Osst. Ind.
74.	Vernet. 1920. Bull. Agric. Inst. Sci. Saigon.
75.	Vuillet. 1914. Proc. 3rd. Intl. Cong. Trop. Africa
76.	Watson. 1913. Agric. Bull. FMS.
77.	Watt. 1890. Dictionary of Economic Plants.
78.	Watt. J.M. and Breyer B. 1932. Med and Poisonous Plants of S. Africa.
79.	Wester. 1912, 1913, 1919. Philip. Agric. Rev. Agric. Bull. FMS.
80.	Wray. 1894, 1897. Perak Mus. Notes.

While going through the dictionary it becomes obvious that much credit was given for the data obtained from previous authors. Many a time comments were made or objections raised or corrections suggested regarding the validity of information recorded. Particular criticisms were either about the correct identification of plant species or the methods employed to administer the medicines. Perception and expertise of using Malay language by Burkill appears to be very great in evaluating the correctness of Malay names of plants used and their proper meanings and the contexts.

In preparing the present list of Medicinal Plants, some of the unreliable details mentioned in the dictionary are totally eliminated. With regards to uses, plants that possess big and thick leaves were very commonly used for poulticing. Large number of plants were also used for medicinal bath. Many others were used in a variety of ways for external use including ear drops, eye drops, etc. Results of such usages appear to be precarious and obscure, such cases are totally omitted. Plants used for veterinary medicines and for Mantra Gajah are also excluded.

There are four major methods followed to record the medicinal uses of plant species. The species are listed alphabetically. (Tables 2-5).

Method 1. Direct experience gained or recorded, based on the facts or experiences of the users. These were published in Garden's Bulletin 1930.

Method 2. Evidences recorded by predecessors like Ridley, Alvin, Hooper, Heyne, who obtained the information directly or indirectly from the local people. These four authors are very frequently cited

in a number of cases. Uses of plants as tonics for childbirth before and after pregnancy and plants used for venereal diseases were very common.

Method 3. Earlier literature published by Dutch, and other European authors, in the immediate neighbouring countries are cited to compare or increase the uses of certain local plant species.

Method 4. The plant materials were collected, dried and sent to Imperial Institute of chemistry in England or other European countries for analysis. Most of them were for gums, resins, alkaloids and others. Results obtained are recorded under each species.

Table 2. Local plant species names as recorded in Burkill (1966) and they are valid at present.

1.	<i>Abroma angusta</i>	Sterculiaceae
2.	<i>Abrus precatorius</i>	Papilionaceae
3.	<i>Abrus pulchellus</i>	Papilionaceae
4.	<i>Abutilon indicum</i>	Malvaceae
5.	<i>Acacia fornesiana</i>	Mimosaceae
6.	<i>Acalypha indica</i>	Euphorbiaceae
7.	<i>Acalypha siamensis</i>	Euphorbiaceae
8.	<i>Acanthus ebracteatus</i>	Acanthaceae
9.	<i>Acanthus ilicifolius</i>	Acanthaceae
10.	<i>Acrotrema costatum</i>	Dilleniaceae
11.	<i>Adenantha pavonia</i>	Mimosaceae
12.	<i>Adenosma caeruleum</i>	Scrophulariaceae
13.	<i>Aganosma marginata</i>	Apocyanaceae
14.	<i>Ageratum conyzoides</i>	Compositae
15.	<i>Alangium salvifolium</i>	Cornaceae
16.	<i>Albizia lebeck</i>	Mimosaceae
17.	<i>Albizia myriophylla</i>	Mimosaceae
18.	<i>Alchornea rugosa</i>	Euphorbiaceae
19.	<i>Alstonia scholaris</i>	Apocynaceae
20.	<i>Altingia excelsa</i>	Hamamelidaceae
21.	<i>Alysicarpus vaginalis</i>	Papilionaceae
22.	<i>Amaranthus spinosus</i>	Amaranthaceae
23.	<i>Ammania baccifera</i>	Lythraceae
24.	<i>Anacardium occidentale</i>	Anacardiaceae
25.	<i>Anadendrum montanum</i>	Araceae
26.	<i>Andrographis paniculata</i>	Acanthaceae
27.	<i>Anisomeles indica</i>	Labiatae
28.	<i>Anisophyllea disticha</i>	Anisophyllaceae (Rhizophoraceae)
29.	<i>Annona reticulata</i>	Annonaceae
30.	<i>Aquilaria malaccensis</i>	Thymeleaceae
31.	<i>Arcangelisia flava</i>	Menispermaceae
32.	<i>Ardisia colorata</i>	Myrsinaceae

33.	<i>Ardisia ridleyi</i>	Myrsinaceae
34.	<i>Ardisia villosa</i>	Myrsinaceae (2 varieties)
35.	<i>Arenga pinnata</i>	Palmae
36.	<i>Artocarpus integer</i>	Moraceae
37.	<i>Asparagus racemosus</i>	Liliaceae
38.	<i>Averrhoa bilimbi</i>	Oxalidaceae
39.	<i>Barleria prionitis</i>	Acanthaceae
40.	<i>Bauhinia bidentata</i>	Caesalpinaceae
41.	<i>Belschmedia pahangensis</i>	Lauraceae
42.	<i>Bidens pilosa</i>	Compositae
43.	<i>Blumea balsamifera</i>	Compositae
44.	<i>Boerhavia diffusa</i>	Nyctaginaceae
45.	<i>Brassica juncea</i>	Cruciferae
46.	<i>Bruguiera sexangula</i>	Rhizophoraceae
47.	<i>Caesalpinia bonduc</i>	Caesalpinaceae
48.	<i>Caesalpinia cristata</i>	Caesalpinaceae
49.	<i>Callicarpa longifolia</i>	Verbenaceae
50.	<i>Calophyllum inophyllum</i>	Guttiferae
51.	<i>Canthium aciculatum</i>	Rubiaceae
52.	<i>Canthium horidum</i>	Rubiaceae
53.	<i>Capparis micracantha</i>	Capparidaceae
54.	<i>Carallia brachiata</i>	Rhizophoraceae
55.	<i>Cardiospermum helicacabum</i>	Sapindaceae
56.	<i>Cassytha filiformis</i>	Lauraceae
57.	<i>Celosia argentea</i>	Amaranthaceae
58.	<i>Cerebera menghas</i>	Apocynaceae
59.	<i>Chassalia cartacea</i>	Rubiaceae
60.	<i>Chrysopogon aciculatus</i>	Gramineae
61.	<i>Cinnamomum iners</i>	Lauraceae
62.	<i>Citrus aurantifolia</i>	Rutaceae
63.	<i>Clausena excavata</i>	Rutaceae
64.	<i>Clerodendron umbratile</i>	Verbenaceae
65.	<i>Clitoria ternetea</i>	Papilionaceae
66.	<i>Cnestis palala</i>	Connaraceae
67.	<i>Coix lachrymajobi</i>	Gramineae
68.	<i>Connarus grandis</i>	Connaraceae
69.	<i>Connarus semidecandrus</i>	Connaraceae
70.	<i>Coptosarpelta tomentosa</i>	Rubiaceae
71.	<i>Costus speciosus</i> Zingiberaceae to Costaceae	Costaceae
72.	<i>Crinum asiaticum</i>	Amaryllidaceae
73.	<i>Croton argyратum</i>	Euphorbiaceae
74.	<i>Curcuma zeodaria</i>	Zingiberaceae
75.	<i>Cyathula prostrata</i>	Amaranthaceae
76.	<i>Cyclia laxiflora</i>	Menispermaceae
77.	<i>Cyperus rotundus</i>	Cyperaceae
78.	<i>Daemonorops propinquus</i>	Palmae

79.	<i>Dalbergia parviflora</i>	Papilionaceae
80.	<i>Dendrobium crumenatum</i>	Orchidaceae
81.	<i>Desmodium gangeticum</i>	Papilionaceae
82.	<i>Desmos chinensis</i>	Annonaceae
83.	<i>Dianella ensifolia</i>	Liliaceae
84.	<i>Dichapetalum griffithii</i>	Dichapetalaceae
85.	<i>Dysoxylon cauliflorum</i>	Meliaceae
86.	<i>Elephantopus scaber</i>	Compositae
87.	<i>Eleusine indica</i>	Gramineae
88.	<i>Emilia sonchifolia</i>	Compositae
89.	<i>Enhydra fluctuans</i>	Compositae
90.	<i>Erythrina subumbrans</i>	Papiliaceae
91.	<i>Euphorbia heterophylla</i>	Euphorbiaceae
92.	<i>Euphorbia hirta</i>	Euphorbiaceae
93.	<i>Fagraea racemosa</i>	Loganiaceae
94.	<i>Ficus elastica</i>	Moraceae
95.	<i>Ficus hispida</i>	Moraceae
96.	<i>Ficus obpyramidata</i>	Moraceae
97.	<i>Ficus parietalis</i>	Moraceae
98.	<i>Ficus racemosa</i>	Moraceae
99.	<i>Fissistigma lanuginosum</i>	Annonaceae
100.	<i>Flacourtia rukam</i>	Flacourtiaceae
101.	<i>Flemingia strobilifera</i>	Papilionaceae
102.	<i>Floscopa scandens</i>	Commelinaceae
103.	<i>Garcinia hombroniana</i>	Guttiferae
104.	<i>Gigantochloa scortechnii</i>	Gramineae
105.	<i>Glochidion obscurm</i>	Euphorbiaceae
106.	<i>Gomphostemma crinitum</i>	Olacaceae
107.	<i>Goniothalamus macrophyllus</i>	Annonaceae
108.	<i>Gonystilus maingayi</i>	Gonystilaceae
109.	<i>Guioa pleuropteris</i>	Sapindaceae
110.	<i>Gynochthodes sublanceolata</i>	Rubiaceae
111.	<i>Gynura procumbens</i>	Compositae
112.	<i>Hedyotis capitellata</i>	Rubiaceae
113.	<i>Helecteres isora</i>	Sterculiaceae
114.	<i>Heliotropium indicum</i>	Boraginaceae
115.	<i>Hibiscus tiliaceus</i>	Malvaceae
116.	<i>Homalomena griffithii</i>	Araceae
117.	<i>Homonoia riparia</i>	Euphorbiaceae
118.	<i>Hoya coriacea</i>	Euphorbiaceae
119.	<i>Hypericum japonicum</i>	Hypericaceae
120.	<i>Hyptis suaveolens</i>	Labiatae
121.	<i>Ilex cymosa</i>	Ilicaceae (Aquifoliaceae)
122.	<i>Imperata cylindrica</i>	Gramineae
123.	<i>Intsia bijuga</i>	Caesalpiniaceae
124.	<i>Ixora grandifolia</i>	Rubiaceae
125.	<i>Ixora lobbi</i>	Rubiaceae

126.	<i>Kadsura scandens</i>	Schizandraceae
127.	<i>Kopsia fruticosa</i>	Apocynaceae
128.	<i>Kyllingia brevifolia</i>	Cyperaceae
129.	<i>Labisia pothoina</i>	Myrsinaceae
130.	<i>Lagerstroemia speciosa</i>	Lythraceae
131.	<i>Lansium domesticum</i>	Meliaceae
132.	<i>Lantana camara</i>	Verbenaceae
133.	<i>Lasia spinosa</i>	Araceae
134.	<i>Lasianthus filiformis</i>	Rubiaceae
135.	<i>Licuala triphylla</i>	Palmae
136.	<i>Limnophila rugosa</i>	Scrophulariaceae
137.	<i>Lindernia crustacea</i>	Scrophulariaceae
138.	<i>Litsea spathacea</i>	Lauraceae
139.	<i>Luvanga scandens</i>	Rutaceae
140.	<i>Macaranga huelletti</i>	Euphorbiaceae
141.	<i>Macaranga denticulata</i>	Euphorbiaceae
142.	<i>Macaranga gigantea</i>	Euphorbiaceae
143.	<i>Macaranga hypoleuca</i>	Euphorbiaceae
144.	<i>Mallotus floribundus</i>	Euphorbiaceae
145.	<i>Melastoma malabathricum</i>	Melastomaceae
146.	<i>Melochia corchorifolia</i>	Sterculiaceae
147.	<i>Memecylon dichotomum</i>	Melastomaceae
148.	<i>Memecylon minutiflorum</i>	Melastomaceae
149.	<i>Merremia vitifolia</i>	Convolvulaceae
150.	<i>Michelia champaka</i>	Magnoliaceae
151.	<i>Micromelum hirsutum</i>	Rutaceae
152.	<i>Mimusops elengi</i>	Sapotaceae
153.	<i>Monochoria vaginalis</i>	Pontederiaceae
154.	<i>Morinda citrifolia</i>	Rubiaceae
155.	<i>Murraya paniculata</i>	Rutaceae
156.	<i>Mussaenda mutabilis</i>	Rubiaceae
157.	<i>Myxopyrum nervosum</i>	Oleaceae
158.	<i>Neesia altissima</i>	Bombacaceae
159.	<i>Nepenthes species</i> (Ten sps recorded)	Nepenthaceae
160.	<i>Nephelium lappaceum</i>	Sapindaceae
161.	<i>Nypa fruticans</i>	Palmae
162.	<i>Ocimum basilicum</i>	Labiatae
163.	<i>Ophiorhiza communis</i>	Rubiaceae
164.	<i>Oroxylum indicum</i>	Bignoniaceae
165.	<i>Paedaria foetida</i>	Rubiaceae
166.	<i>Pandanus klossi</i>	Pandanaceae
167.	<i>Panicum sarmentosum</i>	Gramineae
168.	<i>Payena lucida</i>	Sapotaceae
169.	<i>Peristrophe acuminata</i>	Acanthaceae
170.	<i>Peronema canescens</i>	Verbenaceae
171.	<i>Phyllagathis rotundifolia</i>	Melastomaceae
172.	<i>Phyllanthus reticulatus</i>	Euphorbiaceae

173.	<i>Pinanga disticha</i>	Palmae
174.	<i>Piper caninum</i>	Piperaceae
175.	<i>Piper porphyrophyllum</i>	Piperaceae
176.	<i>Piper retrofractum</i>	Piperaceae
177.	<i>Plantago major</i>	Plantaginaceae
178.	<i>Pogostemon heyneanus</i>	Labiatae
179.	<i>Polyathia hypoleuca</i>	Annonaceae
180.	<i>Pongamia pinnata</i>	Papilionaceae
181.	<i>Portulaca oleracea</i>	Portulacaceae
182.	<i>Premna tomentosa</i>	Verbenaceae
183.	<i>Pseuderanthemum gracilifolium</i>	Acanthaceae
184.	<i>Psychotria cantleyi</i>	Rubiaceae
185.	<i>Pternandra echinata</i>	Melastomaceae
186.	<i>Pterocarpus indicus</i>	Papilionaceae
187.	<i>Pueraria phaseoloides</i>	Papilionaceae
188.	<i>Quisqualis indica</i>	Combretaceae
189.	<i>Rhaphidophora minor</i>	Araceae
190.	<i>Rhinacanthus nasutus</i>	Acanthaceae
191.	<i>Rhodomyrtus tomentosa</i>	Myrtaceae
192.	<i>Rinorea angulifera</i>	Violaceae
193.	<i>Rubus alceifolius</i>	Rosaceae
194.	<i>Sandoricum koetjape</i>	Meliaceae
195.	<i>Saprosma scortechinii</i>	Rubiaceae
196.	<i>Sauropus androgynous</i>	Euphorbiaceae
197.	<i>Scleria sumatrensis</i>	Cyperaceae
198.	<i>Scoparia dulcis</i>	Scrophulariaceae
199.	<i>Setaria palmifolia</i>	Gramineae
200.	<i>Sida rhombifolia</i>	Malvaceae
201.	<i>Smilax calophylla</i>	Liliaceae to Smilacaceae
202.	<i>Sonerila heterostemom</i>	Melastomaceae
203.	<i>Sonneratia caeseolaris</i>	Lythraceae
204.	<i>Sophora tomentosa</i>	Papilionaceae
205.	<i>Spathoglothis plicata</i>	Orchidaceae
206.	<i>Spondias pinnata</i>	Anacardiaceae
207.	<i>Stereospermum fimbriatum</i>	Bignoniaceae
208.	<i>Terminalia bellirica</i>	Combretaceae
209.	<i>Terminalia catappa</i>	Combretaceae
210.	<i>Thottea grandiflora</i>	Aristolochiaceae
211.	<i>Thunbergia grandiflora</i>	Acanthaceae
212.	<i>Uraria crinita</i>	Leguminosae
213.	<i>Urena lobata</i>	Malvaceae
214.	<i>Vernonia cinerea</i>	Compositae
215.	<i>Wikstroemia ridleyi</i>	Thymeleaceae
216.	<i>Xylopia ferruginea</i>	Annonaceae
217.	<i>Ziziphus calophylla</i>	Rhamnaceae

Table 3. Introduced-cultivated plant species or their products used medicinally as recorded in Burkill's Dictionary (1966).

1.	<i>Acacia catechu</i>	Mimosaceae
2.	<i>Achras sapota</i>	Sapotaceae
3.	<i>Aeginetia pedunculata</i>	Orobanchaceae
4.	<i>Aegle marmelos</i>	Rutaceae
5.	<i>Aleurites moluccana</i>	Euphorbiaceae
6.	<i>Allamanda cathartica</i>	Apocynaceae
7.	<i>Allium ascalonicum</i>	Liliaceae
8.	<i>Allium sativum</i>	Liliaceae
9.	<i>Aloe vera</i>	Liliaceae
10.	<i>Ananas comosus</i>	Bromeliaceae
11.	<i>Anthocephalus cadamba</i>	Rubiaceae
12.	<i>Antidesma bunius</i>	Euphorbiaceae
13.	<i>Arachis hypogea</i>	Papilionaceae
14.	<i>Averrhoa carambola</i>	Oxalidaceae
15.	<i>Boehmeria nivea</i>	Urticaceae
16.	<i>Bombax malabarica</i>	Malvaceae Bombacaceae
17.	<i>Brassica chinensis</i>	Cruciferae
18.	<i>Bridelia mowoiica</i>	Euphorbiaceae
19.	<i>Brucea amarissima</i>	Simarubaceae
20.	<i>Cajanus indicus</i>	Papilionaceae
21.	<i>Capsicum annuum</i>	Solanaceae
22.	<i>Carica papaya</i>	Caricaceae
23.	<i>Carthamus tinctorius</i>	Compositae
24.	<i>Casuarina equisetifolia</i>	Casuarinaceae
25.	<i>Ceiba pentandra</i>	Bombacaceae
26.	<i>Cinnamomum burmanni</i>	Lauraceae
27.	<i>Cinnamomum cassia</i>	Lauraceae
28.	<i>Cocos nucifera</i>	Palmae
29.	<i>Codiaeum variegatum</i>	Euphorbiaceae
30.	<i>Coleus amboinicus</i>	Labiatae
31.	<i>Coriandrum sativum</i>	Umbelliferae
32.	<i>Cucumis sativus</i>	Cucurbitaceae
33.	<i>Curcuma domestica</i>	Zingiberaceae
34.	<i>Cymbopogon citratus</i>	Gramineae
35.	<i>Datura metel</i>	Solanaceae
36.	<i>Diospyros kaki</i>	Ebenaceae
37.	<i>Dolichos lablab</i>	Papilionaceae
38.	<i>Eugenia aromatica</i>	Myrtaceae
39.	<i>Euphorbia tirucalli</i>	Euphorbiaceae
40.	<i>Feronia elephantum</i>	Rutaceae
41.	<i>Foeniculum vulgare</i>	Umbelliferae
42.	<i>Fragaria indica</i>	Rosaceae
43.	<i>Hibiscus cannabinus</i>	Malvaceae
44.	<i>Hibiscus esculentus</i>	Malvaceae

45.	Hibiscus rosasinensis	Malvaceae
46.	Hydnocarpus anthelmintica	Flacourtiaceae
47.	Illicium verum	Magnoliaceae
48.	Jasminum sambac	Oleaceae
49.	Lagenaria leucantha	Cucurbitaceae
50.	Lawsonia inermis (=L.alba)	Lythraceae
51.	Leonurus sibiricus	Labiatae
52.	Ligustrum lucidum	Oleaceae
53.	Luffa acutangula	Cucurbitaceae
54.	Melia azadirachta (=M.indica)	Meliaceae
55.	Michelia alba	Magnoliaceae
56.	Mirabilis jalapa	Nyctaginaceae
57.	Momordica charantia	Cucurbitaceae
58.	Moringa oleifera	Moringaceae
59.	Morus alba	Moraceae
60.	Musa sapientum	Musaceae
61.	Myristica fragrans	Myristicaceae
62.	Nelumbium nelumbo	Nymphaeaceae
63.	Nyctanthes arbortristis	Oleaceae
64.	Oryza sativa	Gramineae
65.	Papaver somniferum	Papaveraceae
66.	Pedilanthus tythimoloides	Euphorbiaceae
67.	Peucedanum japonicum	Umbelliferae
68.	Phaseolus aureus	Papilionaceae
69.	Piper chiba	Piperaceae
70.	Piper cubeba	Piperaceae
71.	Piper nigrum	Piperaceae
72.	Sidium guajava	Myrtaceae
73.	Psophocarpus tetragonolobus	Papilionaceae
74.	Punica granatum	Punicaceae
75.	Ruta graveolens	Rutaceae
76.	Saccharum officinarum	Gramineae
77.	Saussurea lappa	Compositae
78.	Sesamum indicum	Pedaliaceae
79.	Sesbania grandiflora	Papilionaceae
80.	Solanum melongena	Solanaceae
81.	Tamarindus indica	Caesalpiniaceae
82.	Tectona grandis	Verbenaceae
83.	Trachyspermum ammi	Umbelliferae
84.	Trema orientalis	Umbelliferae
85.	Zea mays	Gramineae

Table 4. Medicinal plants species - Their names recently changed (including Family-Genus and/or species) [Turner, 1995]

1.	Acacia pinnata changed to A. concinna	Mimosaceae
2.	Acriopsis javanica to Acriopsis liliiflora	Orchidaceae
3.	Adenia acuminata	Adenia macrophylla Passifloraceae
4.	Adenostemma laevenia	Ade. viscosum Compositae
5.	Agelaea wallichii	Ag. macrophylla Connaraceae
6.	Aglaonema angustifolium	Ag. simplex. Araceae
7.	Aglaonema pictum Aglaonema nebulosum	Araceae
8.	Allomorpha exigua	Oxyspora exigua Melastomaceae
9.	Alocasia macrorhiza	Alo. macrorhizus Araceae
10.	Alyxia forbesii	Aly. reinwardtii Apocynaceae
11.	Amaranthus gangeticus	Am. tricolor Amaranthaceae
12.	Amorphophallus campanulatus	Amo. paeonifolius Araceae
13.	Anaxagorea scortechinii	Ana. javanica Annonaceae
14.	Aneilema lineolatum	Murdannia japonica Commelinaceae
15.	Anplectrum annulatum Crochiton anomala	Melastomaceae
16.	Apama corymbosa	Thottea corymbosa Aristolochiaceae
17.	Archytaea vahlii	Ploiarium alternifolium Ternstroemiaceae
18.	Ardisia littoralis	Ard. elliptica Myrsinaceae
19.	Bauhinia griffithiana	Bau. ferruginea Caesalpiniaceae
20.	Callicarpa cana	Callicarpa candicans Verbenaceae
21.	Cananjiium odoratum	Species excluded Cananjiium- changed Cananga. Annonaceae

22.	Cassia nodosa	Cassia javanica ssp. nodosa Caesalpiniaceae
23.	Cicca acida	Euphorbiaceae- Genus not catalogued
24.	Coleus atropurpureus	Solenostemon scutellarioides Labiatae
25.	Crataeva nurvala	Crataeva magna Capparaceae (Capparidaceae)
26.	Cratoxylon cochinchinensis	Cratoxylum cochinchinense. Guttiferae
27.	Croton caudatum	Croton caudatus Euphorbiaceae
28.	Cudrania javensis Family changed from Urticaceae to Moraceae	Maclura cochinsinensis
29.	Curanga felterre Genus name changed to Picria	Scrophulariaceae
30.	Curculigo latifolia Genus name changed - Molineria latifolia	Amaryllidaceae Family Name: Hypoxidaceae
31.	Dendrobium pumilum Den. pachyphyllum	Orchidaceae
32.	Didymocarpus crinita	Di. crinitus Gesneriaceae
33.	Didymosperma hastata	changed to Arenga hastata and Arenga hookeriana Palmae
34.	Dischidia rafflesiana	Dischidia major Asclepiadaceae
35.	Dracaena congesta Liliaceae - changed to Dracaenaceae	Dr. chiniana
36.	Dysophylla auricularia	Pogostemon Auricularia Labiatae
37.	Eclipta alba	Eclipta prostrata Compositae
38.	Elaeocarpus petiolatus	Elaeocarpaceae Tiliaceae
39.	Emblica officinalis	Phyllanthus emblica Euphorbiaceae
40.	Erigeron sumatrensis	Conyza bonariensis Compositae
41.	Erioglossum rubiginosum Lepisanthes rubiginosa	Sapindaceae

42.	Ervatamia coronaria	Tabernaemontana divericata Apocynaceae
43.	Eugenia longifolia	Syzygium lineatum Myrtaceae
44.	Eugenia polyantha	Syz. polyanthum Myrtaceae
45.	Eugenia urceolata	Syz. leptostemon Myrtaceae
46.	Eugenia zeylanica	Syz. zeylanicum Myrtaceae
47.	Fagraea fragrans (Tembusu)	Fagraea gigantea- Loganiaceae
48.	Fimbristylis asperima	Fim. dura Cyperaceae
49.	Forrestia gracilis	Anisotolype gracilis Commelinaceae
50.	Galearia affinis changed to Galearia fulva	Euphorbiaceae to Pandaceae
51.	Gastrochilus panduratum Boesenbergia rotundata	Zingiberaceae
52.	Gelonium glomerulatum Suregada multiflora	Euphorbiaceae
53.	Gendarussa vulgaris	Justicia gendarussa Acanthaceae
54.	Geunsia farrinosa	Callicarpa pentandra Verbenaceae
55.	Globba aurantiaca Globba patens	Zingiberaceae
56.	Glycosmis citrifolia- Glycosmis lanceolata	Rutaceae
57.	Gomphandra affinis- Gomphandra quadrifida	Olacaceae
58.	Grewia paniculata Microcos tomentosa	Tiliaceae
59.	Gymnopetalum cochinchinensis Gymnopetalum chinense	Cucurbitaceae
60.	Henslowia umbellata Dendrotrophe umbellata	Santalaceae
61.	Herpestis monnieri Bacopa monnieri	Scrophulariaceae
62.	Hippocratea indica Reissantia indica	Celastraceae
63.	Hodgsonia capniocarpa Hodgsonia macrocarpa	Cucurbitaceae
64.	Hydrocotyle asiatica- Centella asiatica	Umbelliferae
65.	Ignanura geonomaeformis- Ign. wallichiana	Palmae
66.	Ipomoea digitata Ipo. mauritiana	Convolvulaceae

67.	<i>Ixora arguta</i> <i>Ixo. nigricans</i>	Rubiaceae
68.	<i>Ixora crassifolia</i> <i>Ixo. grandifolia</i>	Rubiaceae
69.	<i>Jasminum bifarium</i> <i>Jas. elongatum</i>	Oleaceae
70.	<i>Languas cannifolia</i> <i>Alpinia vitellina</i>	Zingiberaceae
71.	<i>Languas galanga</i> <i>Alpinia galanga</i>	Zingiberaceae
72.	<i>Leptospermum flavescens</i> split into 2 species <i>Lept. amboinense</i> and <i>Lept. javanicum</i>	Myrtaceae
73.	<i>Leucopogon malayanus</i> changed to <i>Styphelia malayana</i>	Epacridaceae
74.	<i>Lochnera rosea</i> <i>Catharanthus roseus</i>	Apocynaceae
75.	<i>Loranthus ferrugineus</i> <i>Scurrula ferruginea</i>	Loranthaceae
76.	<i>Maba buxifolia</i> <i>Diospyros ferrea</i>	Ebenaceae
77.	<i>Macaranga populifolia</i> <i>Mac. conifera</i>	Euphorbiaceae
78.	<i>Marumia nemorosa</i> <i>Macrolenes nemorosa</i>	Melastomaceae
79.	<i>Mezoneuron sumatranum</i> <i>Caesalpinia sumatrana</i>	Caesalpinaceae
80.	<i>Microglossa volubilis</i> <i>Micro pyrifolia</i>	Compositae
81.	<i>Mischocarpus lassertianus</i> <i>Misch. sundaicus</i>	Sapindaceae
82.	<i>Olax scandens</i> <i>Olax pittacorum</i>	Olacaceae
83.	<i>Oldenlandia corymbosa</i> <i>Hedyotis corymbosa</i>	Rubiaceae
84.	<i>Oncosperma horrida</i> <i>Onc. horridum</i>	Palmae
85.	<i>Orthosiphon grandiflorus</i> <i>Ortho. aristatus</i>	Labiatae
86.	<i>Oxymitra latifolia</i> <i>Freisodielsia latifolia</i>	Annonaceae
87.	<i>Pandanus aurantiacus</i> <i>Pandanus affinis</i>	Pandanaceae
88.	<i>Parkia javanica</i> <i>Parkia timoriana</i>	Mimosaceae
89.	<i>Phyllanthus frondosus</i> <i>Phy. oxyphyllus</i>	Euphorbiaceae
90.	<i>Phyllanthus niruri</i> <i>Phy. amarus</i>	Euphorbiaceae
91.	<i>Pithecellobium confertum</i> <i>Albizia splendens</i>	Mimosaceae

92.	<i>Planchonella obovata</i> <i>Pouteria obovata</i>	Sapotaceae
93.	<i>Polygonum minus</i> <i>Persicaria tenella</i>	Polygonaceae
94.	<i>Polytrema vulgare</i> <i>Ptyssiglottis kunthiana</i>	Acanthaceae
95.	<i>Rennellia speciosa</i> <i>Rennellia eliptica</i>	Rubiaceae
96.	<i>Roucheria griffithiana</i> <i>Indorouchera griffithiana</i>	Linaceae
97.	<i>Scaphium affine</i> <i>Sca. macropodum</i>	Sterculiaceae
98.	<i>Schfleera affinis</i> <i>Sch. simulans</i>	Araliaceae
99.	<i>Schima noronhae</i> <i>Sch. wallichii</i>	Ternstroemiaceae
100.	<i>Solanum verbascifolium</i> <i>Solanum erianthum</i>	Solanaceae
101.	<i>Stephania rotunda</i> <i>Ste. venosa</i>	Menispermaceae
102.	<i>Trevisia cheirantha</i> <i>Tre. burckii</i>	Araliaceae
103.	<i>Uncaria ferrea</i> <i>Uncaria lanosa</i>	Rubiaceae
104.	<i>Vitex pubescens</i> <i>Vit. pinnata</i>	Verbenaceae
105.	<i>Vitis cinnamomea</i> <i>Ampelocissus cinnamomea</i>	Vitaceae
106.	<i>Vitis novenifolia</i> <i>Cayratia novenifolia</i>	Vitaceae
107.	<i>Vitis trifolia</i> <i>Cayratia trifolia</i>	Vitaceae
108.	<i>Wedelia biflora</i> <i>Wollastonia biflora</i>	Compositae
109.	<i>Willughbeia firma</i> <i>Will. edulis</i>	Apocynaceae
110.	<i>Xerospermum intermedium</i> <i>Xer. noronhianum</i>	Sapindaceae
111.	<i>Zanthoxylum hortellum</i> <i>Zan. nitidum</i>	Rutaceae

Table 5. Species included in Ridley's flora and Burkill's dictionary but not catalogued recently or omitted in reclassification.

1.	<i>Acalypha hispida</i> Only 4 species recorded	Euphorbiaceae
2.	<i>Acorus calamus</i>	Araceae
3.	<i>Aglaia odorata</i> About 45 species listed	Meliaceae
4.	<i>Alternanthera triandra</i> 3 other species listed	Amaranthaceae

5.	Amonum kepulaga 18 other species listed	Zingiberaceae
6.	Ancistrocladus extensus A. tectroius listed	Ancistrocadaceae
7.	Areca catechu 4 other species listed	Palmae
8.	Avicennia alba Family name changed Avicenniaceae	Verbenaceae
9.	Bonnaya antipoda	Scroplunlarineae
10.	Bonnaya seroata	Scrophulariaceae
11.	Borreria articularis	Rubiaceae
12.	Canthium dicoccum	Rubiaceae
13.	Cassia alata	Caesalpiniaceae
14.	Cassia fistula	Caesalpiniaceae
15.	Cleome icosandra	Capparidaceae
16.	Conocephalus suaveolens	Urticaeae
17.	Cratoxylon ligustrum Hypericaceae	Hypericeae Guttiferae
18.	Croton tiglium	Euphorbiaceae
19.	Curcuma aeruginosa	Zingiberaceae
20.	Curcuma xanthorrhiza	Zingiberaceae
21.	Cymbopogon nardus	Gramineae
22.	Cynometra cauliflora	Leguminosae
23.	Delima scandens Genus name changed to Tetracera	Dilleniaceae
24.	Desmodium pulchellum	Papilionaceae
25.	Dinochloa scandens	Gramineae
26.	Dioscorea Japonica	Dioscoreaceae
27.	Durio zibethinus	Malvaceae Bombacaceae
28.	Euphorbia nerifolia	Euphorbiaceae
29.	Euodia roxburghiana	Rutaceae
30.	Ficus alba	Urticaeae Moraceae
31.	Fissistigma cylindricum	Annonaceae
32.	Flacourtia jangomans	Flacourtiaceae
33.	Flagellaria indica	Flagellariaceae
34.	Gironniera hirta	Urticaeae
35.	Graptophyllum pictum	Acanthaceae
36.	Hemigraphis colarata	Acanthaceae
37.	Hibiscus abelmoschus	Malvaceae
38.	Hibiscus syriacus	Malvaceae
39.	Hullettia dumosa	Urticaeae
40.	Hypoxis aurea	Amaryllidaceae
41.	Impatiens polypetala	Balsaminaceae
42.	Inocarpus edulis	Leguminosae
43.	Ixora chinensis	Rubiaceae
44.	Jussiaea linifolia	Onagraceae

45.	Justicia bracteata	Acanthaceae
46.	Kaempferia galanga	Zingiberaceae
47.	Kalanehoe laciniata	Crassulaceae
48.	Leea gigantea	Vitaceae
49.	Lepidagathis cuneata	Sapindaceae
50.	Leptaspis urceolata	Gramineae
51.	Leptomychia heterochita	Steculiaceae
52.	Leucas lavendulifolia	Labiatae
53.	Melia dubia	Meliaceae
54.	Millettia sirecia	Papilionaceae
55.	Orophea setosa	Annonaceae
56.	Parameria barbata	Apocynaceae
57.	Pavetta indica	Rubiaceae
58.	Petunga vemulosa	Rubiaceae
59.	Plumbago indica	Plumbaginaceae
60.	Randia racemosa	Rubiaceae
61.	Rheum officinale	Polygonaceae
62.	Rhodamnia trinervia	Myrtaceae
63.	Santaloides floridum	Connaraceae
64.	Scaveola frutescens	Goodeniaceae
65.	Solanum sumatranum	Solanaceae
66.	Spilanthes acmella	Compositae
67.	Strobilanthes flaccidifolius	Acanthaceae
68.	Tinospora cordifolia	Menispermaceae
69.	Uvaria micrantha	Annonaceae
70.	Woodfordia fruticosa	Lythraceae
71.	Xanthium strumarium	Compositae
72.	Zingiber consummar	Zingiberaceae
73.	Zingiber officinale	Zingiberaceae

DISCUSSION AND CONCLUSION

As mentioned earlier, Flora of Malaya is very rich representing 12th Mega Diversity Country in the whole world. As early as 1869, Wallace recorded "situated upon the equator and bathed in the tepid water of the great tropical oceans, this region enjoys a climate more uniformly hot and moist than almost any other part of the globe and teems with natural productions which are elsewhere unknown (Wallace, 1906)." Main reasons assigned for this luxuriousness of biota are three in number. 1. Uniform and humid climate prevailing throughout the year supplemented by altitudinal and edaphic factors that support the growth of rich tropical forests. 2. Flora of Malaya is the meeting point for joining the continental Asiatic flora with Malesian flora. 3. The region is a fairly stable one that supports the vegetation growth for the last 50 million years, from the tertiary period to the present; Any disturbance caused are made only by the human interferences. (Keng 1974; Whitmore, 1973, Salleh, 1995).

Over the last 70 years, due to taxonomic revisions the number of angiosperm families accounted in Malaya have been increased from 163 (Dicots 132, Monocots 31, Ridley 1922) to 178 (Keng, 1974) to 210 (Turner, 1995). Large number of species estimated among the dicotyledonous families are from Rubiaceae (± 570), Euphorbiaceae (± 370) and Leguminosae (± 300). Medicinal plant species from each of these families amount 30-40. Among the monocotyledons the highest number of species recorded is from Orchidaceae (± 860) but very few of them are of medicinal value. It is to be remembered that the number assigned above for each family is only tentative. Also some of the families have been more intensively investigated than others. Personal choices, selection, likes and dislikes, availability or accessibility of plant species have played a major role in such studies.

It is well known that the local species of *Anacardiaceae*, *Annonaceae*, *Araceae*, *Dioscoreaceae*, *Guttiferae*, *Labiatae*, *Meliaceae*, *Menispermaceae*, *Myristicaceae*, *Myrsinaceae*, *Piperaceae*, *Rubiaceae*, *Rutaceae*, *Simarubaceae*, *Solanaceae*, *Umbelliferae*, *Zingiberaceae* are richly endowed with many valuable chemical compounds. Large number of local species of these families remains uninvestigated. They need to be well explored.

While writing about products for medicine it was noted - "Today medical science is highly dependent on chemicals produced naturally by plants. One fourth of all U.S prescriptions contain ingredients from higher plants. In 1974, the United States imported U.S\$24.4 million worth of medicinal plants to produce about \$3 billion worth of drugs. The commercial value of these products is over \$8 billion per year. When non prescription items are included, the value doubles". (Farnsworth, 1982, 1983, OTA, 1984).

Certain family members of *Ancistrocladaceae*, *Aristolochiaceae*, *Icacinaceae*, *Rafflesiaceae* are of very regional importance. Besides being rare botanically, they also provide many useful substances that can be used medicinally, many are endemic.

It has taken enormous time and patience to sieve out the actual use of medicinal plants recorded in Burkill's dictionary. To begin with the publication is voluminous, total of 2444 pages in two volumes. The dictionary includes the use of plants, especially those that are concerned with agricultural products, industrial products including timber, other natural resources comprising wild and domesticated animals and other natural resources embodying soils, minerals, fossils, rocks, metals and

others. Plants used medicinally, either very superficially or with any serious objectives are well pointed out. Many of the uses stated are very anecdotal (Rao, 2002).

Taxonomic identification is always very important in determining the limits of plant species, varieties and to use them medicinally. As some of the points mentioned above indicate, that at present the taxonomic details and methods outlined or published are very divergent. Some of the species recorded by Ridley and Burkill are either omitted or they have become obscure or obsolete. Plant species do not or cannot disappear or become extinct without good reasons. Taxonomic perceptions may be wrong or methods followed may remain deficient. Such cases need to be well re-examined to confirm the taxonomic status and the proper nomenclature of certain species.

Such a revision would also help to publish a new list of medicinal plants of Malaya. (Rao, 2004, 2005). If possible attempts should be made to include medicinal plant species of East Malaysia also. Being aware of the limitations of scientific manpower as well as facilities available in the country, it is unrealistic to anticipate the publication of a good, complete reliable flora for East Malaysia in the near future. Research work on tree flora of Malaysia is continuing; several volumes have already been published (Whitemore, 1972, 1973; Ng 1978, 1979). As a compensation at least a realistic list of medicinal plant species need to be prepared and published for the whole country within a period of 3-5 years. (Rao, 2007, 2008).

The result of the present exercise has helped to well identify and determine about 500 (± 100) medicinal plant species of Malaya. The five tables embodied above indicate the taxonomic certainties, dilemmas and riddles involved. Some of the questions posed need to be well answered and other doubtful points to be refined and settled.

It is worthy to remember the forethought quoted by the well known taxonomic guru of Malaya "Nature's experiments - species - must not be thrown away like the blind girl's pearls, ignorant of their value". (Stone, 1967).

FOR FURTHER RESEARCH

The following suggestions may become very useful for reviewing and improvising the information on medicinal plant species in Malaysia.

Careful attention is necessary for planning further research on local medicinal plants. Based on the

information available both in East and West Malaysia, a priority list should be prepared to select some of the plant species (out of 500-600 species identified) that are already listed, since most of them may not yield the beneficial results equally well. Members of certain families should be investigated first. Due weightage should be given to tree species since they provide renewable resources of chemical compounds. Both species and varietable differences of plants should be well noted.

Gums and resins need to be further studied again since their uses have been greatly increased, of late, due to many biochronological methods employed.

List of poisonous plant species need to be prepared again in view of the recent progress made on their compounds. The research results obtained on *sapium sabiferum* and *Euphorbia antiquorum* (Both of Euphorbiaceae) would provide the guidelines (Wood et.al. 1990, Evans and Edwards, 1987).

By studying the grazing habit and others of animals, the early man learnt a great deal about medicinal plants. Observations and details recorded locally should revised and properly documented.

A list of local drugs prepared, sold and used locally be prepared including the plant parts used in such medicines whether they be fruits, seeds, leaves, stems, flowers, roots, bark and others. If known the medicines should be further classified according to their use - cardiaic stimulants, carminatives, antacids, sedatives, antidysentrics, would healing drugs, narcotics, antipoisonous components and others. A few model publications like Wahid and Siddiq (1961) may be followed.

Phytochemical constituents of many of the local plants were published (Rao, 2008). The data need to be further integrated by adding more details obtained by referring to well known international data bases (NAPRALERT 1998).

The details recorded on labels of herbarium sheets of medicinal plants should be read again to highlight the important details including the places of collection and the variety of uses, if any. This exercise helps the conservation of gene pools.

Including the above details and others, it is necessary to publish a handbook on Malaysian medications sold and used at present (Krikorian, 1998).

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