A Contribution to Trees and Shrubs Checklist in Kuala Keniam at Taman Negara, Pahang, Malaysia

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Abstract. The forested area around Kuala Keniam is a part of Taman Negara (Pahang) and is categorized as a primary lowland dipterocarp, riparian fringe and limestone forests. A study of flora that focuses on the trees and shrubs was conducted during the scientific expedition in September 2020, organised by Universiti Teknologi MARA (UiTM). The results identified as many as 187 taxa of trees and shrubs consisting of 124 genera and 49 plant families from the lowland dipterocarp forest. A total of nine endemic taxa to Peninsular Malaysia were also recorded namely Aporosa globifera, Baccaurea pyriformis, Cinnamomum mollissimum, Enicosanthum fuscinum, Lithocarpus curtissii, Mallotus griffithianus, M. penangensis, Ryparosa fasciculata and Schoutenia kunstleri. Another three taxa viz. Elaeocarpus obtusatus ssp. apiculatus, Popowia tomentosa and Sterculia rubiginosa var. setistipula were considered as the new additional record for Pahang state. It is hoped that the information from this study can be used as references to help other researchers as well as stakeholders in ecotourism management and forest conservation plan.

1. Introduction
Taman Negara with an area of 434,351 ha of primary forest is the largest protected area in Peninsular Malaysia. These areas straddle across three states, namely, Pahang, Kedah and Terengganu. The highest point in this forest is notably located on Gunung Tahan with the elevation of 2,187 m above sea level, the highest mountain in Peninsular Malaysia. These areas are also considered as one of the oldest rain forests in Peninsular Malaysia of more than 130 million years old. Based on classification by Symington [1] and Wyatt-Smith [2], there are several forest types which can be found in Taman Negara.
Negara such as lowland dipterocarp, hill dipterocarp, upper hill dipterocarp, montane ericaceous, riparian fringe and limestone forests. Several rivers drain from Taman Negara (Pahang), viz. Sungai Tembeling, Sungai Tahan, Sungai Riul, Sungai Sat, Sungai Kenyam, Sungai Sepia and Sungai Teku. It has been considered as a hotspot for biodiversity as it hosts many species of flora and fauna and many of them are endemic and rare in Malaysia. Therefore, further studies on flora should be conducted to gather more information from these areas. The objective of this study is to record the diversity of trees and shrubs species found in Taman Negara at Kuala Keniam. The collection was then compared to other previous studies done in Pahang.

2. Materials and Methods
The study of flora was conducted in Taman Negara at Kuala Keniam for four days during a scientific expedition from 4th to 8th September 2020. Specimens of flowering or fruiting plants were collected around the permanent forest trails. Additional data were also obtained from five ecological plots with the size of 25 m x 20 m each. All trees with DBH ≥ 5 cm were tagged and measured. Samples were collected and marked with number tags, together with relevant information and photos were also captured. All specimens collected were identified by their family, genus and species. The identification method used was by matching the morphological similarities of the specimens with the existing collection from Herbarium, Universiti Kebangsaan Malaysia (UKMB) and Herbarium of Forest Research Institute Malaysia (KEP) as well as by using several publications on the morphological features that have been provided by taxonomists. In general, references for all plants are as described by Turner [3] and other verification references for tree species were referred to Ng [4] [5] and Whitmore [6] [7]. All voucher specimens were dried, identified and then deposited at the Herbarium of Universiti Kebangsaan Malaysia (UKMB). We have Brummit [8] for the classification of the flora with only a few exceptions for the recognition of genera [3]. Floristic compositions were tabulated into families, genera and species. The status of endemic species was derived from [3].

3. Results and Discussion
3.1 The floristic composition
A survey of flora conducted in Kuala Keniam at Taman Negara (Pahang) has found a total of 187 taxa of trees and shrubs consisting of 124 genera and 49 plant families (Table 1). The most speciose family species is Euphorbiaceae with 24 species, followed by Annonaceae with 12 species, Rubiaceae with 11 species and Leguminosae and Myrtaceae with 8 species each. The largest genus is Syzygium with eight species followed by Aporosa with seven species and Diospyros with five species (Table 2).

Table 1. Total number of genus/genera dan species for all families of trees and shrubs in Kuala Keniam at Taman Negara Pahang.

| Family                | Total number of genus/genera | Total number of species |
|-----------------------|------------------------------|-------------------------|
| Anacardiaceae         | 5                            | 5                       |
| Annonaceae            | 8                            | 12                      |
| Apocynaceae           | 1                            | 1                       |
| Araliaceae            | 2                            | 2                       |
| Araliidaceae          | 1                            | 1                       |
| Bombacaceae           | 1                            | 1                       |
| Burseraceae           | 5                            | 6                       |
| Chrysobalanaceae      | 1                            | 1                       |
| Dipterocarpaceae      | 3                            | 6                       |
| Ebenaceae             | 1                            | 5                       |
| Elaeocarpaceae        | 1                            | 2                       |
| Euphorbiaceae         | 12                           | 24                      |
Table 2. The 15 most speciose genera in Kuala Keniam at Taman Negara Pahang.

| Genus          | Family      | Total number of species |
|----------------|-------------|-------------------------|
| Syzygium       | Myrtaceae   | 8                       |
| Aporosa        | Euphorbiaceae | 7                      |
| Diospyros      | Ebenaceae   | 5                       |
| Garcinia       | Guttiferae  | 4                       |
| Shorea         | Dipterocarpaceae | 4                   |
| Antidesma      | Euphorbiaceae | 3                      |
| Artocarpus     | Moraceae    | 3                       |
| Baccaurea      | Euphorbiaceae | 3                      |
| Ixora          | Rubiaceae   | 3                       |
### 3.2 The common species

The common tree species in this study include *Aporosa arborea*, *Aporosa microstachya*, *Baccaurea brevipes*, *Champereia manillana*, *Diplospora malaccensis*, *Elateriospermum tapos*, *Gironniera parvifolia*, *Gomphandra quadridifida*, *Hopea pubescens*, *Horsfieldia tomentosa*, *Knema hookeriana*, *Koompassia malaccensis*, *Macaranga lowii*, *Mallotus leucodermis*, *Mallotus penangensis*, *Payena lucida*, *Saraca cauliflora* and *Xerospermum noronhianum*. The common shrubs are *Chassalia chartacea* and *Ixora* spp. The pictures of selected species found during this study are shown in Figure 1. For saplings, the common species listed are *Aidia densiflora*, *Aquilaria malaccensis*, *Artocarpus lanceifolius*, *Cynometra malaccensis*, *Gonystylus maingayi* and *Shorea leprosula*.

![Figure 1](image-url)

**Figure 1.** Some species of trees and shrubs found around Kuala Keniam at Taman Negara (Pahang). A. *Clerodendrum deflexum* (Verbenaceae); B. *Cynometra malaccensis* (Leguminosae); C. *Dipterocarpus crinitus* (Dipterocarpaceae); D. *Chassalia chartacea* (Rubiaceae).
3.3 The pioneer species
As the forest is not disturbed, the pioneer species stands are rare and the species that can be found include *Arthrophyllum diversifolium*, *Cratoxylum formosum* and *Macaranga hypoleuca*. Both *A. diversifolium* and *M. hypoleuca* are short-live pioneers that usually be found in the forest margin or secondary forest [3], [9].

3.4 The endemic taxa
From the total 187 taxa of flowering plants in the lowland forest at Kuala Keniam, nine species are identified as endemic species for Peninsular Malaysia (Table 3).

**Table 3.** Endemic species of trees and shrubs for Peninsular Malaysia around Kuala Keniam at Taman Negara Pahang.

| Species                  | Family      | Distribution |
|--------------------------|-------------|--------------|
| *Enicosanthum fuscum*    | Annonaceae  | Pk, Ph       |
| *Aporosa globifera*      | Euphorbiaceae | Kd, Pn, Kl, Pk, Ph |
| *Baccaurea pyriformis*   | Euphorbiaceae | Pn, Ph, Sl, Ml, Jh |
| *Mallotus griffithianus* | Euphorbiaceae | Throughout |
| *Mallotus penangensis*   | Euphorbiaceae | Throughout |
| *Lithocarpus curtisi*    | Fagaceae    | Pn, Kl, Tg, Pk, Ph, Sl |
| *Ryparosa fasciculata*   | Flacourtiaecae | Ml and Ph northward |
| *Cinnamomum mollissimum* | Lauraceae   | Pn, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh |
| *Schoutenia kunstleri*   | Tiliaceae   | Pn, Tg, Pk, Ph, Jh |

* Legend: Kd = Kedah, Pn = Pulau Pinang, Pk = Perak, Sl = Selangor, Ml = Melaka, NS = Negeri Sembilan, Jh = Johor; Ph = Pahang, Tg = Terengganu, Kl = Kelantan

3.5 Additional new records for Pahang
A total of three taxa are the new records for Pahang after being compared with the checklist of [3] namely *Elaeocarpus obtusatus* ssp. *apiculatus*, *Popowia tomentosa* and *Sterculia rubiginosa* var. *setistipula*. According to [10], *Elaeocarpus obtusatus* ssp. *apiculatus* was previously recorded in Kedah, Kelantan, Terengganu and Perak. Meanwhile, *Popowia tomentosa* was previously documented in three states, viz. Pulau Pinang, Perak and Melaka [11]. *Sterculia rubiginosa* var. *setistipula* was only found in Selangor state [12].

3.6 The checklist of Trees and Shrubs
List of families, genera and species of flowering plants in alphabetical order are presented in Table 4. Habit of all taxon is also given either trees or shrubs.

**Table 4.** The checklist of trees and shrubs around Kuala Keniam at Taman Negara Pahang.

| No. | Family         | Species                                      | Habit |
|-----|----------------|----------------------------------------------|-------|
| 1   | Anacardiaceae  | *Bouea macrophylla* Griff.                   | Tree  |
| 2   | Anacardiaceae  | *Buchanania sessifolia* Blume                | Tree  |
| 3   | Anacardiaceae  | *Dracontomelon dao* (Blanco) Merr. & Rolfe | Tree  |
| 4   | Anacardiaceae  | *Pentaspadon motleyi* Hook.f.                | Tree  |
| 5   | Anacardiaceae  | *Swintonia floribunda* Griff.               | Tree  |
| 6   | Annonaceae     | *Desmos cochinchenis* Lour.                 | Shrub |
| 7   | Annonaceae     | *Enicosanthum fuscum* (King) Airy Shaw      | Tree  |
8 Annonaceae Goniothalamus macrophyllus (Blume) Hook.f. & Thomson Tree
9 Annonaceae Monocarpia marginalis (Scheff.) J. Sinclair Tree
10 Annonaceae Polyalthia cauliflora Hook.f. & Thomson Tree
11 Annonaceae Polyalthia obliqua Hook.f. & Thomson Tree
12 Annonaceae Polyalthia sumatrantha (Miq.) Kurz Tree
13 Annonaceae Popowia pisocarpa (Blume) Endl. Tree
14 Annonaceae Popowia tomentosa Maingay ex Hook.f. & Thomson Tree
15 Annonaceae Trivalvaria macrophylla (Blume) Miq. Tree
16 Annonaceae Xylopia magna Maingay ex Hook.f. & Thomson Tree
17 Annonaceae Xylopia stenopetala Oliv. Tree
18 Apocynaceae Dyera costulata (Miq.) Hook.f. Tree
19 Araliaceae Arthrophyllum diversifolium Blume Tree
20 Araliaceae Trevesia burckii Boerl. Treelet
21 Araliaceae Trevesia burckii Boerl. Treelet
22 Bombacaceae Neesia synandra Mast. Tree
23 Burseraceae Canarium littorale Blume Tree
24 Burseraceae Canarium pilosum Benn. Tree
25 Burseraceae Dacryodes rugosa (Blume) H.J. Lam Tree
26 Burseraceae Santiria laevigata Blume Tree
27 Burseraceae Scutinanthe brunnea Thwaites Tree
28 Burseraceae Triomma malaccensis Hook.f. Tree
29 Chrysobalanaceae Parinari costata (Korth.) Blume Tree
30 Dipterocarpaceae Dipterocarpus crinitus Dyer Tree
31 Dipterocarpaceae Shorea hopefolia (F. Heim) Symington Tree
32 Dipterocarpaceae Shorea leprosula Miq. Tree
33 Dipterocarpaceae Shorea ovata (Korth.) Blume Tree
34 Dipterocarpaceae Shorea parvifolia Dyer ssp. parvifolia Tree
35 Dipterocarpaceae Vatica maingayi Dyer Tree
36 Ebenaceae Diospyros buxifolia (Blume) Hiern Tree
37 Ebenaceae Diospyros latisepala Ridl. Tree
38 Ebenaceae Diospyros pendula Hasselt ex Hassk. Tree
39 Ebenaceae Diospyros pilosantha Blanco var. oblonga (Wall. ex G. Don) Ng Tree
40 Ebenaceae Diospyros sumatrantha Miq. Tree
41 Elaeocarpaceae Elaeocarpus obtusatus Blume ssp. apiculatus (Mast.) Coode Tree
42 Elaeocarpaceae Elaeocarpus petiolatus (Jack) Wall. Tree
43 Euphorbiaceae Agrostistachys gaudichaudii Müll.Arg. Tree
44 Euphorbiaceae Antidesma coriaceum Tul. Tree
45 Euphorbiaceae Antidesma japonicum Siebold & Zucc. Tree
46 Euphorbiaceae Antidesma velutinosum Blume Tree
47 Euphorbiaceae Aporosa arborea (Blume) Müll.Arg. Tree
48 Euphorbiaceae Aporosa aurea Hook.f. Tree
49 Euphorbiaceae Aporosa benthamiana Hook.f. Tree
50 Euphorbiaceae Aporosa globifera Hook.f. Tree
51 Euphorbiaceae Aporosa microstachya (Tul.) Müll.Arg. Tree
52 Euphorbiaceae Aporosa nigricans Hook.f. Tree
53 Euphorbiaceae Aporosa symplocoides (Hook.f.) Gage Tree
54 Euphorbiaceae Baccaurea brevipes Hook.f. Tree
55 Euphorbiaceae Baccaurea pyriformis Gage Tree
56 Euphorbiaceae Baccaurea sumatrana Müll.Arg. Tree
57 Euphorbiaceae Blumeodendron subrotundifolium (Elmer) Merr. Tree
58 Euphorbiaceae  Croton argyratus Blume  Tree
59 Euphorbiaceae  Drypetes longifolia (Blume) Pax & K. Hoffm. Tree
60 Euphorbiaceae  Elateriospermum tapos Blume Tree
61 Euphorbiaceae  Macaranga hypoleuca (Rchb.f. & Zoll.) Müll.Arg. Tree
62 Euphorbiaceae  Mallotus griffithianus Hook.f. Tree
63 Euphorbiaceae  Mallotus kingii Hook.f. Tree
64 Euphorbiaceae  Mallotus penangensis Müll.Arg. Tree
65 Euphorbiaceae  Pimeleodendron griffithianum (Müll.Arg.) Benth. Tree
66 Euphorbiaceae  Ptychopyxis caput-medusae (Hook.f.) Ridl. Tree
67 Fagaceae  Castanopsis nephelioides King ex Hook.f. Tree
68 Fagaceae  Lithocarpus curtisii (King ex Hook.f.) A. Camus Tree
69 Fagaceae  Lithocarpus walliianus (Lindl. ex Hance) Rehder Tree
70 Flacourtiaceae  Flacourtia rukam Zoll. & Moritzi Tree
71 Flacourtiaceae  Homalium longifolium Benth. Tree
72 Flacourtiaceae  Hydnocarpus castanea Hook.f. & Thomson Tree
73 Flacourtiaceae  Ryparosa fasciculata King Tree
74 Guttiferae  Cratoxylum formosum (Jack) Dyer Tree
75 Guttiferae  Garcinia cowa Roxb. Tree
76 Guttiferae  Garcinia griffithii T. Anderson Tree
77 Guttiferae  Garcinia parvifolia (Miq.) Miq. Tree
78 Guttiferae  Garcinia prainiana King Tree
79 Guttiferae  Mesua ferrea L. Tree
80 Guttiferae  Mesua racemosa (Planch. & Triana) Kosterm. Tree
81 Icacinaceae  Gomphandra quadrifida (Blume) Sleumer Tree
82 Icacinaceae  Stemonurus malaccensis (Mast.) Sleumer Tree
83 Irvingiaceae  Irvingia malayana Oliv. ex Benn. Tree
84 Ixonanthaceae  Ixonanthes icosandra Jack Tree
85 Lauraceae  Cinnamomum iners Reinw. Tree
86 Lauraceae  Cinnamomum mollissimum Hook.f. Tree
87 Lauraceae  Cryptocarya ferrea Blume Tree
88 Lauraceae  Dehaasia cuneata (Blume) Blume Tree
89 Lauraceae  Litsea elliptica Blume Tree
90 Lauraceae  Litsea umbellata (Lour.) Merr. var. fuscotomentosa (Meisn.) Tree
91 Lecythidaceae  Lijndenia laurina Zoll. & Moritzi Tree
92 Lecythidaceae  Memecylon edule Roxb. Tree
93 Melastomataceae  Callerya atropurpurea (Wall.) Schot Tree
94 Melastomataceae  Cynometra malaccensis Meeuwen Tree
95 Melastomataceae  Dialium platysepalum Baker Tree
96 Melastomataceae  Intsia palembanica Miq. Tree
97 Melastomataceae  Koompassia excelsa (Becc.) Taub. Tree
98 Melastomataceae  Koompassia malaccensis Maing. ex Benth. Tree
99 Melastomataceae  Sindora coriacea (Baker) Maingay ex Prain Tree
100 Melastomataceae  Lijndenia laurina Zoll. & Moritzi Tree
101 Melastomataceae  Memecylon edule Roxb. Tree
102 Melastomataceae  Memecylon megacarpum Furtado Tree
103 Melastomataceae  Pterandra echinata Jack Tree
104 Meliaceae  Aglaia leptantha Miq. Tree
105 Meliaceae  Aglaia tomentosa Teijsm. & Binn. Tree
106 Meliaceae  Chisocheton erythrocarpus Hiern Tree
107 Meliaceae  Chisocheton tomentosus (Roxb.) Mabb. Tree
| 108 | Meliaceae | *Lansium domesticum* Corrêa | Tree |
| 109 | Meliaceae | *Walsura pinnata* Hassk. | Tree |
| 110 | Moraceae  | *Artocarpus dadah* Miq. | Tree |
| 111 | Moraceae  | *Artocarpus lanceifolius* Roxb. | Tree |
| 112 | Moraceae  | *Artocarpus scortechinii* King | Tree |
| 113 | Moraceae  | *Ficus fistulosa* Reinn. ex Blume var. *fistulosa* | Treelet |
| 114 | Myristicaceae | *Gymnacranthera farquhariana* (Hook.f. & Thomson) Warb. | Tree |
| 115 | Myristicaceae | *Horsfieldia sucosa* (King) Warb. | Tree |
| 116 | Myristicaceae | *Knema conferta* (King) Warb. | Tree |
| 117 | Myristicaceae | *Knema hookeriana* (Wall. ex Hook.f. & Thomson) Warb. | Tree |
| 118 | Myristicaceae | *Knema patentinervia* (J. Sinclair) W.J. de Wilde | Tree |
| 119 | Myristicaceae | *Myristica farquhariana* (Hook.f. & Thomson) Warb. | Tree |
| 120 | Myrtaceae  | *Syzygium cerasiforme* (Blume) M. & L.M. Perry | Tree |
| 121 | Myrtaceae  | *Syzygium claviflorum* (Roxb.) Wall. ex A.M. Cowan & Cowan | Tree |
| 122 | Myrtaceae  | *Syzygium fastigiatum* (Blume) Merr. & L.M. Perry | Tree |
| 123 | Myrtaceae  | *Syzygium griffithii* (Dutchie) Merr. & L.M. Perry | Tree |
| 124 | Myrtaceae  | *Syzygium pseudoforosum* (King) Merr. & L.M. Perry | Tree |
| 125 | Myrtaceae  | *Syzygium pycnanthum* Merr. & L.M. Perry | Tree |
| 126 | Myrtaceae  | *Syzygium pyrifolium* (Blume) DC. | Tree |
| 127 | Myrtaceae  | *Syzygium ridleyi* (King) P. Chantaranothai & J. Parn. | Tree |
| 128 | Ochnaceae  | *Campylospormum serratum* (Gaertn.) Bittrich & M.C.E. Amaral | Tree |
| 129 | Olacaceae  | *Strombosia ceylanica* Gardn. | Tree |
| 130 | Olacaceae  | *Strombosia javanica* Blume | Tree |
| 131 | Opiliaceae | *Champereia manillana* (Blume) Merr. | Tree |
| 132 | Oxalidaceae | *Sarcotheca griffithii* (Planch. ex Hook.f.) Hallier f. | Tree |
| 133 | Pandaceae  | *Galearia maingayi* Hook.f. | Tree |
| 134 | Pandaceae  | *Microdesmis casearifolia* Planch. | Tree |
| 135 | Passifloraceae | *Paropsis vareciforums* (Griff.) Mast. | Tree |
| 136 | Polygalaceae | *Xanthophyllum affine* Korth. ex Miq. | Tree |
| 137 | Polygalaceae | *Xanthophyllum eurhynchum* Miq. | Tree |
| 138 | Polygalaceae | *Xanthophyllum griffithii* Hook.f. ex A.W. Benn. | Tree |
| 139 | Proteaceae  | *Helicia attenuata* (Jack) Blume | Tree |
| 140 | Proteaceae  | *Helicia petiolaris* Benn. | Tree |
| 141 | Rosaceae   | *Prunus grisea* (Blume) Kalkman var. *tomentosa* (Koord. & Valeton) Kalkman | Tree |
| 142 | Rubiaceae  | *Aidia densiflora* (Wall.) Masam. | Tree |
| 143 | Rubiaceae  | *Chassalia chartacea* Craib | Shrub |
| 144 | Rubiaceae  | *Diplospora malaccensis* Hook.f. | Tree |
| 145 | Rubiaceae  | *Ixora congesta* Roxb. | Shrub |
| 146 | Rubiaceae  | *Ixora grandifolia* Zoll. & Moritzi | Shrub |
| 147 | Rubiaceae  | *Ixora javanica* (Blume) DC. | Shrub |
| 148 | Rubiaceae  | *Nauclea officinalis* (Pierre ex Pit.) Merr. & Chun | Tree |
| 149 | Rubiaceae  | *Pavetta graciliflora* Wall. ex Ridl. | Tree |
| 150 | Rubiaceae  | *Porterandia anisophylla* (Jack ex Roxb.) Ridl. | Tree |
| 151 | Rubiaceae  | *Rennellia elliptica* Korth. | Shrub |
| 152 | Rubiaceae  | *Saprosma sp.* | Shrub |
| 153 | Rutaceae   | *Glycosmis chlorosperma* Spreng. | Tree |
| 154 | Sapindaceae | *Allophylus cobbe* (L.) Raesch. | Tree |
| 155 | Sapindaceae | *Lepisanthes tetraphylla* (Vahl) Radlk. | Tree |
| No. | Family               | Genus                        | Species                        | Type   |
|-----|---------------------|------------------------------|--------------------------------|--------|
| 156 | Sapindaceae         | Litchi                        | chinensis Sonn.                | Tree   |
| 157 | Sapindaceae         | Nephelium                     | cuspidatum Blume var. eriopetalum (Miq.) | Tree   |
| 158 | Sapindaceae         | Nephelium                     | lappaceum L. var. lappaceum    | Tree   |
| 159 | Sapindaceae         | Xerospermum                   | laevigatum Radlk.              | Tree   |
| 160 | Sapindaceae         | Xerospermum                   | noronhianum (Blume) Blume      | Tree   |
| 161 | Sapotaceae          | Palaquium                     | clarkeanum King & Gamble       | Tree   |
| 162 | Sapotaceae          | Palaquium                     | gutta (Hook.f.) Baill.         | Tree   |
| 163 | Sapotaceae          | Palaquium                     | hispidum H.J. Lam              | Tree   |
| 164 | Sapotaceae          | Payena                        | lucida A. DC.                  | Tree   |
| 165 | Sapotaceae          | Pouteria                       | malaccensis (C.B. Clarke) Baehni | Tree   |
| 166 | Sterculiaceae       | Leptonychia                    | caudata (Wall. ex G. Don) Burret | Treelet|
| 167 | Sterculiaceae       | Scaphium                      | macropodum (Miq.) Beumée ex Heyne | Tree   |
| 168 | Sterculiaceae       | Sterculia                      | coccinea Jack                  | Shrub  |
| 169 | Sterculiaceae       | Sterculia                      | rubiginosa Vent. var. rubiginosa | Tree   |
| 170 | Sterculiaceae       | Sterculia                      | rubiginosa Vent. var. setistipula (Merr.) Tantra | Tree |
| 171 | Styracaceae         | Styrox                         | benzoin Dryand. var. benzoin   | Tree   |
| 172 | Symplocaceae        | Symplocos                      | crassipes C.B. Clarke          | Tree   |
| 173 | Symplocaceae        | Symplocos                      | fasciculata Zoll.              | Tree   |
| 174 | Theaceae            | Pyrenaria                      | acuminata Planch.              | Tree   |
| 175 | Thymelaeaceae       | Aquilaria                      | malaccensis Lam.               | Tree   |
| 176 | Thymelaeaceae       | Gonystylus                     | maingayi Hook.f.               | Tree   |
| 177 | Tiliaceae           | Brownlowia                     | helferiana Pierre              | Tree   |
| 178 | Tiliaceae           | Microcos                       | fibrocarpa (Mast.) Burret      | Tree   |
| 179 | Tiliaceae           | Microcos                       | lanceolata (Miq.) Burret       | Tree   |
| 180 | Tiliaceae           | Pentace                        | triptera Mast.                 | Tree   |
| 181 | Tiliaceae           | Schoutenia                     | accrescens (Mast.) C.H. Curtis ssp. accrescens | Tree |
| 182 | Tiliaceae           | Schoutenia                     | kunstleri King                 | Tree   |
| 183 | Trigonieae          | Trigoniastrum                  | hypoleucum Miq.                | Tree   |
| 184 | Ulmaceae            | Gironniera                     | nervosa Planch.                | Tree   |
| 185 | Ulmaceae            | Gironniera                     | subaequalis Planch.            | Tree   |
| 186 | Verbenaceae         | Clerodendrum                   | deflexum Wall.                 | Shrub  |
| 187 | Verbenaceae         | Teijsmanniodendron             | coriaceum (C.B. Clarke) Kosterm. | Tree   |

### 3.7 Comparison with other studies
Compared to plant inventories of several localities in primary lowland forest of Peninsular Malaysia such as in Bukit Nanas Forest Reserve, Kuala Lumpur, the total number of trees and shrubs is quite similar. For instance, Ahmad Fitri et al. [13] reported 183 of trees and shrubs from 232 species of flowering plants in Bukit Nanas Forest Reserve. However, Kochummen et al. [14] reported more than 800 species of trees and shrubs in Pasoh Forest Reserve in the 50-ha plot.

### 4. Conclusion
This study recorded a total of more than 150 species of trees and shrubs around Kuala Keniam in Taman Negara (Pahang) including nine endemic taxa for Peninsular Malaysia and three additional new records for Pahang state. The findings emphasised that further studies on the flora in Taman Negara need to be conducted as many new records from the collection of plant specimens were found although the expedition was carried out in a short time (four days). Almost all of the plants found in this study are often seen in other lowland dipterocarp forest such as *Baccaurea brevipes*, *Elateriospermum tapos* and *Xerospermum noronhianum.*
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