Wild Fruit Trees in Kuala Keniam at Taman Negara, Pahang, Malaysia

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Abstract. A study was conducted to determine the composition of wild fruit tree in Kuala Keniam, Taman Negara (National Park) Pahang. A method of field specimen collection was used in this study. Five plots of 0.05ha (25 m x 20 m) were established. Trees of ≥ 1 cm diameter at breast height (dbh) were measured within the plot. Additional data was also obtained from a general survey around the forest trails. A total of 41 species from 19 genera and 11 families of wild fruit trees were recorded. Guttiferae was listed the highest with 10 species (24.4%). It was followed by Euphorbiaceae and Sapindaceae with seven species (17.1%). Genus-wise, Garcinia has recorded the highest total number of species with 10 species followed by Baccaurea (six species), and Artocarpus (four species). The low total number of species in this study is due to the limitation time for sampling. A detailed study on the composition of fruit trees in the plot is needed in the future to get more information on the importance of wild fruit trees in Kuala Keniam in Taman Negara Pahang.

Keywords: Wild fruit tree, tree, primary forest, Taman Negara Pahang

1. Introduction
Malaysia’s forest is known as one of the most complex biological ecosystems in the world and has evolved over million years. This forest resource houses a wide array of flora and fauna, which includes commercial timber trees, medicinal plants, and wild fruit trees. A wild fruit tree can be defined as those trees which provide edible fruits or seeds, or their relatives are cultivated to produce edible fruit and seeds. About 3.2% or 90 tree species have edible fruit or seeds out of the total 2830 tree species found in Peninsular Malaysia [1]. These wild fruit trees are important as a food source for humans [2] frugivorous animals and also for genetic resources. Some of the species have commercial value and have become a source of side income to the local community, especially Orang Asli such as petai (Parkia speciosa) or Kerdas (Archidendron bubalinum). Certain genus are also popular among the people and
widely cultivated for the fruits such as Artocarpus spp., Baccaurea spp., Castanopsis spp., Durio spp.,
Garcinia spp., Mangifera spp. and Nephelium spp.

The composition and diversity of wild fruit trees in the lowland dipterocarp forest of Peninsular
Malaysia have been well documented [3] [4]. In the primary lowland forest of Ulu Kelantan, several
important wild fruit trees were listed by Whitmore [3] including species from the Euphorbiaceae and
Moraceae. In a lowland dipterocarp forest at Pasoh Forest Reserve, Saw [4] listed a total of 76 species
of wild fruit trees as edible. The species that bear edible fruits include wild mangoes (Mangifera, 12
species), mangosteen (Garcinia, 13 species), Jack fruit (Artocarpus, 10 species) and rambutan
(Nephelium, five species). In Taman Negara, Kochummen [5] have gone through the four volumes of
tree Flora of Malaya [6] [7] [8] [9] and made a list of wild fruit trees that are recorded from Pahang,
99% of which are presented in Taman Negara. This study recorded 42 species of edible fruits with
Anacardiaceae being the biggest contributor (16 species) followed by Sapindaceae (six species) and
Moraceae (five species).

The objective of this study was to determine the composition of wild fruit trees species in Kuala
Keniam in Taman Negara (National Park) Pahang. The knowledge gained from this study is expected
to add more information related to the composition of wild fruit trees, especially in Taman Negara. This
information is also important in the aspect of conservation of wild fruit tree species which in turn helps
in the management of this forest.

2. Materials and Methods
Data of wild fruit species were collected around the forest trails during the Taman Negara Scientific
Expedition on 4 - 8 September 2020. The data were also obtained from five ecology plots (0.05 ha each)
in the study area. The orientation of the plot was 25 m long x 20 m wide. All tree ≥ 1 cm dbh were
measured. The voucher specimens were collected for identification. Common specimens were recorded
directly in the field without involving the collection of specimens. Status of wild fruit trees species
determined based on Whitmore [3] [6] [7], Ng [8-10], Kiew [11-13], Kochummen [14] [5], Salma [15]
[16], Saw [4], Rukayah [2], Corner [17], Yap [18] and Chung and Soepadmo [19].

3. Results and Discussion
A total of 151 fruit trees with a diameter at breast height (dbh) of 1 cm and above was measured and
identified in all five 0.05 ha plots in Kuala Keniam, in Taman Negara during the scientific expedition.
This number represents 19 genera of 41 species from 11 families. A summary of fruits tree taxa present
in 0.25 ha plot in Kuala Keniam, Taman Negara forest is shown (Table 1). From this study, the most
speciose families are Guttiferae (one genus, 10 species) followed by Euphorbiaceae (two genera, seven
species) and Sapindaceae (four genera, seven species). Garcinia had the highest number of species with
10 at the genus level. This is followed by Baccaurea (six species) and Artocarpus (four species). The
list of the genus with total species of wild fruit trees recorded in Kuala Keniam, in Taman Negara,
Pahang is given (Table 2). Additionally, Fagaceae and Meliaceae are the families which only represented
by one species each, and as for genus; there were a total of 11 (58%) genera represented by only a single
species in this study area. All species of wild fruit trees recorded in Kuala Keniam, Taman Negara are
listed in Table 3. During the expedition, some species are observed bearing mature fruit (Figure 1).

Generally, almost all species of wild fruit trees recorded in Kuala Keniam forest can be eaten raw. Only
the seeds of Elateriospermum tapos must be cooked before eaten. Mature seeds of E. tapos are
sometimes sold on a small scale at farmers’ markets during the fruiting season. Garcinia cowa is
also used in cooking as a seasoning which the same function as G. atroviridis (asam keping). Baccaurea
brevipes also have a very sour taste with the edible pericarp that is sometimes used as a flavor in cooking.
It gives a tangy substitute of asam keping (Garcinia atroviridis). Despite having a rather sour taste than
the other widely grown commercial sweet cultivars, the wild Lansium domesticum and Nephelium
lappaceum are also often planted in villages for its fruits.
Table 1. List of families with total genus and species of wild fruit trees recorded in Kuala Keniam at Taman Negara, Pahang.

| No. | Family           | Total number of genus/genera | Total number of species |
|-----|------------------|------------------------------|------------------------|
| 1   | Anacardiaceae    | 2                            | 2                      |
| 2   | Burseraceae      | 3                            | 3                      |
| 3   | Euphorbiaceae    | 2                            | 7                      |
| 4   | Fagaceae         | 1                            | 1                      |
| 5   | Guttiferae       | 1                            | 10                     |
| 6   | Leguminosae      | 2                            | 2                      |
| 7   | Meliaceae        | 1                            | 1                      |
| 8   | Moraceae         | 1                            | 4                      |
| 9   | Sapindaceae      | 4                            | 7                      |
| 10  | Sterculiaceae    | 1                            | 2                      |
| 11  | Tiliaceae        | 1                            | 2                      |
|     |                  |                              | 19                     |

|     |                  |                              | 41                     |

Based on data obtained, the number of species of wild fruit trees in Kuala Keniam was lower and similar to other lowland forests. For example, the study by Ahmad Fitri [20] in a lowland dipterocarp forest at Gunung Tebu Forest Reserve, Terengganu, recorded a total of 34 species from 15 genera and 12 families. The same situation was also reported by Ahmad Fitri [21] in the lowland dipterocarp forest at Kledang Saiong Forest Reserve, Perak, where as many as 31 species of wild fruit trees from 13 genera and 10 families were recorded. Similar low total numbers of species were also reported by Ahmad Fitri [22] in the lowland dipterocarp forest at Gunung Basor Forest Reserve, Kelantan with 31 species of wild fruit trees from 19 genera and 11 families were recorded. Thirty-four species are new records for wild fruit trees in Kuala Keniam.
fruit tree species for the Taman Negara Pahang, which were not reported in the list of wild fruit trees by Kochummen [5].

Table 3. List of wild fruit trees found in study plots and general survey at Kuala Keniam, Taman Negara, Pahang.

| No. | Family/Species         | Plot | General Survey |
|-----|------------------------|------|----------------|
| 1   | ANACARDIACEAE          |      |                |
| 2   | Bouea macrophylla      |      | X              |
| 3   | Mangifera subsessilifolia |      | X              |
| 4   | BURSERACEAE            |      |                |
| 6   | Canarium litorale      |      | X              |
| 7   | Dacryodes rostrata     |      | X              |
| 8   | Santiria laevigata     |      | X              |
| 9   | EUPHORBIACEAE          |      |                |
| 10  | Baccaurea brevipes     |      | X X            |
| 11  | Baccaurea parviflora   |      | X              |
| 12  | Baccaurea pyriformis   |      | X              |
| 13  | Baccaurea racemosa     |      | X              |
| 14  | Baccaurea reticulata   |      | X              |
| 15  | Baccaurea sumatrana    |      | X X            |
| 16  | Elateriospermum tapos  |      | X X            |
| 17  | FAGACEAE               |      |                |
| 18  | Castanopsis nephelioides |      | X              |
| 19  | GUTTIFERAES            |      |                |
| 20  | Garcinia bancana       |      | X              |
| 21  | Garcinia cowa          |      | X              |
| 22  | Garcinia cuspidata     |      | X              |
| 23  | Garcinia eugeniifolia  |      | X X            |
| 24  | Garcinia griffithii    |      | X X            |
| 25  | Garcinia malaccensis   |      | X              |
| 26  | Garcinia parvifolia    |      | X X            |
| 27  | LEGUMINOSAE            |      |                |
| 28  | Dialium platysepalum   |      | X              |
| 29  | Parkia speciosa        |      | X              |
| 30  | MORACEAE               |      |                |
| 31  | Lansium domesticicum   |      | X              |
| 32  | MORACEAE               |      |                |
| 33  | Artocarpus dadah       |      | X              |
| 34  | Artocarpus lancefolius |      | X              |
4. Conclusion
The diversity of wild fruit trees species in Kuala Keniam, Taman Negara, Pahang was considered low but similar to other lowland dipterocarp forests in Peninsular Malaysia. Such results could be due to the limitation of time with only two days for data collection. A further detailed study on larger area should be covered to elucidate a more conclusive species richness of wild fruit trees in this area.

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Appendices
Figure 1. Some fruit trees found in Kuala Keniam, Taman Negara Pahang: A. Fruits of Xerospermum noronhianum; B. Fallen ripe fruit of Parkia speciosa; C. Fallen fruits of Castanopsis nepheioiodes.

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