**Plant Diversity Assessment and Traditional Knowledge Documentation of Home Gardens in Parit Raja, Batu Pahat, Johor**

**S Ganesan**1, **S F Sabran**1,2, and **M H Mazlun**1,2

1 Department of Technology and Natural Resources, Faculty of Applied Sciences and Technology, Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia
2 Centre of Research, Sustainable Uses of Natural Resources (SUNR), Universiti Tun Hussein Onn Malaysia, Malaysia

Email: fatimahsb@uthm.edu.my

**Abstract.** Home gardens act as an important *ex situ* conservation for biodiversity. While many home gardens are based on traditional knowledge system, the erosion of traditional knowledge posts serious challenges to the preservation and conservation of plant diversity. Therefore, this study aimed to document ethnobotanical knowledge of cultivated plants and to assess their species diversity in the selected home gardens. A total of 50 home gardens in the center of Parit Raja, Johor were selected and the plant uses were documented using semi-structured questionnaires. In total, 127 plant species belonging to 55 families were recorded from the study area. Euphorbiaceae had the highest number of species (12), followed by the families of Rutaceae (8), and Zingiberaceae (6). The most cited plant species were *Codiaeum* sp. (35), *Cymbopogan citratus* (30), and *Capsicum annuum* (27). Of the recorded plant species, 51% were used as sources of food, 31% as ornamentals, 27% as medicinal, and 1% as dye and in ritual. The study shows that properly managed home gardens have high productivity and sustainability which help in conserving plant diversity, traditional knowledge, and food sufficiency.

1. **Introduction**

   Home gardens are dynamic in their evolution, composition and uses [1]. The home gardens are where people grow variety of plants in their own land and such as vegetables, F, herbs or ornamental plants, most probably for subsistence to the families that maintain them. They also play as an important *ex situ* sites of plant diversity conservation and perhaps serve as germplasm bank of rare plant species. Besides that, home gardens can also be turned into a commercial purpose to secure food sufficiency. The United Nations estimated that the global population has been increasing and it is expected to reach nine billion in 2050 [2]. Consequently, food production demand will increase significantly to fulfil the basic requirement. Several strategies need to be addressed to mitigate any scarcity of food. Therefore, the practice of home gardening could be one of the strategies. Although the home garden practices are not globally exhaustive, they have been appreciated well around the world such as Indonesia, India, and Mexico.
Malay is a majority ethnic group in Malaysia which makes up to 50.2% of its population [3]. Johor state is situated in the southern part of Malaysia. In Johor, the Malays are commonly categorized into four subgroups which are Javanese-Malay, Bugis-Malay, Riau-Malay, and Banjar-Malay. Most of them still live in Malay kampung or villages located at suburban and rural areas. Due to rapid development and urbanization, the ‘traditional’ rural Malay community are regularly being transformed into a ‘modern’ urban one [4]. In relation to home garden studies in Malaysia, there are some reports on the home gardens in several villages in the state of Pahang and Negeri Sembilan, focusing on the ethnic minority such as Orang Asli and perhaps Malay-Minang [5][6]. Although different ethnics perform different traditional practices pertaining to home gardening, the lack of practices currently leads to erosion of this precious knowledge. Hence, more detailed and comprehensive studies on home gardens are urgently needed as an approach to monitor the role of the local community in the conservation of plant species and Malaysian natural heritage either in rural or urban settings. The objectives of this paper are to document ethnobotanical knowledge of cultivated plants in Johor, Malaysia and to assess their species diversity.

2. Methodology

2.1 Study Area

Data were collected between May, 2017 and August, 2017. The area of study was Parit Raja, a small town located at Batu Pahat district in the state of Johor. There were five villages which were Kampung Parit Haji Abdul Kadir, Kampung Parit Haji Rais, Kampung Parit Bengkok, Kampung Parit Haji Salleh Ros, and Kampung Parit Rasipan were selected based on high accessibility for this study. Parit Raja is approximately located 20 kilometer away from the main municipality of Batu Pahat and seven kilometers away from Ayer Hitam. The average distance between the five selected villages is 0.392 km. The selection of household were based on the presence and absence of their home gardens. In this study, ten households were selected for each village by convenience sampling. Population of all five villages were 1,095 people where most probably engaged with their own business, as farmers, and housewives.

2.2 Documentation of ethnobotanical knowledge

2.2.1 Prior informed Consent (PIC). The purpose of the home garden study were explained to the home garden owner and Prior Informed Consent (PIC) was obtained from each home garden owner before starting the data collection.

2.2.2 Surveys. Surveys were conducted using semi-structured questionnaires [7] (Figure 1 and Figure 2) with 50 randomly selected home garden households. The semi-structured questionnaires consisted of two parts. The first part was collecting details of the households such as status, gender and occupation. The second part was documenting the ethnobotanical knowledge which consists of botanical information (local name, scientific name, family and type of plants), traditional uses, plant part used, method of preparation and ways of administration. Audio recordings were recorded from the home garden owners as evidence for this study. The number of individual plants were also recorded.

2.3 Assessment of plant diversity

2.3.1 Preparation of herbarium specimens. Herbarium specimens of each plant described by the home garden owners were prepared in triplicates. Photographs and morphological characteristics of each species were noted for species identification.

2.3.2 Identification of plant species. The plant species were identified using the standard plant identification references such as The Plant List (http://www.theplantlist.org).
2.3.3 Data analysis. Ethnobotanical data were analyzed using Microsoft Excel Software and presented as qualitative descriptive analysis. Shannon Wiener Index and Simpson Index formula were used to determine species evenness of plants and to determine species diversity of plants, respectively. Shannon Wiener Index, \( H = \sum (P \log nP) \) with \( P \) is proportion of total sample belonging to its species while Simpson Index, \( D = \frac{\sum n(n-1)}{N(N-1)} \) with \( n \) is the total number of organism of particular species and \( N \) is the total number of organism of all species.

**Figure 1.** Survey session with one of the home garden owners

**Figure 2.** The home garden owner was showing the plants from her home garden area
3. Results
Among the 50 home garden owners, 35 female home garden owners were surveyed as compared to 15 male home garden owners. All the five villages were dominated by Javanese-Malay and Riau-Malay home garden owners which were 50% and 48%, respectively and only one home garden owner (2%) was Indian-Muslim. 94% of them were married and only three home garden owners were mentioned as single status. 46% of home garden owners said that they have finished their basic education until secondary level and only six home garden owners managed to pursue their higher education level. In this study, the higher percentage of female home garden owners indicates that gender plays a role in conserving home gardens. The role of women in maintaining the family’s wellbeing have been highlighted especially in preparation of food. The home garden owners with age of more than 61 years old was the highest frequency with 42%. Based on this present study, the older generation is more engaged to home garden practices and they use plants which are cultivated in their home gardens as their primary medicine as compared to modern medicine. In addition, older generation also have better ethnobotanical knowledge rather than the younger generation in the survey areas. By applying convenience sampling technique, the Javanese-Malay dominated the home garden study areas and they have approximately 10 to 20 years of experiences on cultivating home gardens. This finding indicates that the Javanese-Malay people are familiar with their own traditional knowledge particularly on the plant uses.

The 127 recorded species belong to 53 families and 97 genera (Table 1). The most common families are Euphorbiaceae (12 species), followed by Rutaceae (5 species), Fabaceae (4 species), Zingiberaceae (6 species), Apocynaceae, Fabaceae, and Malvaceae (2 species each). The most frequently used parts are fruits (53 species), whole plant (37 species), leaves (29 species), rhizome (3 species), flowers (3 species), tuber (2 species), and stem (1 species). The occurrence of ‘uncertain’ for the parts used as shown in Table 1 indicates that some of the traditional knowledge are probably not being practiced anymore.

In a few cases a single plant part has multiple uses, e.g., the mashed or sliced rhizome of Zingiber aromaticum is used by the locals to treat stomach ache, reduce flatulence, maintain healthcare, and used in cooking. The results also show that local home gardens are important reservoirs of plant species cultivated for food sources (51%), ornamentals (31%), medicines (27%), dye (1%), and in ritual (1%). Interestingly, 12% of all recorded plants have more than one use category. These multiple uses demonstrate the importance of these plants for subsistence and as a part of local cultural heritage. Even though almost 200 to 800 species of ethnobotanically-used plants were recorded in Malaysia [9], this study documented 127 cultivated plants. Some of these plants are common home garden plants but now being commercialized for herbal products and highlighted as among the ten most important plants in National Key Research Area [10] such as Morinda citrifolia and Hibiscus sabdariffa.

The top-five cultivated plants were Codiaeum sp. (34 home gardens), Cymbopogon citratus (30 home gardens), Capsicum annum (27 home gardens), followed by Hibiscus rosa-sinensis and Musa sp. (25 home gardens each). Codiaeum sp. (pokok puding) was basically used as ornamental plants in the home gardens due to its attractive colors and easy to plant. All 127 cultivated plants were cited a total of 758 times by the respondents or home garden owners. The most cited multipurpose species was Clinacanthus nutans whose leaves decoction are used to treat diabetes, cancer, high blood pressure and eaten raw to treat diabetes and dizziness. In this research, medicinal plants were less recorded as compared to food plants and ornamentals. This is probably because modern medicine are higher in demand as compared to traditional herbal medicine. This study also documented Clitoria ternatea whose flower part is used as dye for food coloring. This species is unlikely utilized in Johor as it is traditionally used as food coloring by Kelantan-Malay subgroup for preparation of nasi kerabu, a local cuisine in Kelantan (eastern part of Peninsular Malaysia) [11] and also used by Baba and Nyonya ethnic to prepare kueh tekan, a traditional desert.

The average Shannon-Wiener index (H= 1.5399) of cultivated plant diversity in the selected home gardens showed high evenness while Simpson index (D= 0.0486) depicted high abundance (Table 2). Among the five selected Malay villages, the Shannon-Wiener index value of Kampung Parit Haji
Salleh Ros (H= 1.573) indicated that the village has higher species evenness as compared to the other four villages. On the other hand, for Simpson index, Kampung Parit Salleh Ros showed higher species richness (D= 0.0397) as compared to other villages.

4. Conclusion

In conclusion, 127 species of cultivated plants documented in this study showed that the home gardens in these five selected Malay villages in Johor are high in diversity. Various uses of plants in the home gardens, particularly for food, ornamental, and medicine provide household sustenance that support economic status of Parit Raja local community as well as strengthen their role in sustaining food security. Although the uncertainties occurred in the documentation, the traditional practices of home garden is still being practiced by the households or home garden owners and continue to contribute to the preservation and conservation of Malaysian natural heritage.

Table 1. List of cultivated plants in home gardens of Malay villages in Johor, Malaysia.

| NO | SPECIES | LOCAL NAME | FAMILY | USES (PARTS USED) | a |
|----|---------|------------|--------|------------------|---|
| 1  | Strobilanthes crispus | Pokok pecah kaca | Acanthaceae | Medicine i | 3 |
| 2  | Ruellia simplex C. Wright | Pokok bunga Mexican | Acanthaceae | Ornamental g | 1 |
| 3  | Clinacanthus nutans (Burm.f.) Lindau | Belalai gajah | Acanthaceae | Medicine i | 11 |
| 4  | Celosia sp. | Bunga balung padi | Amaranthaceae | Ornamental g | 1 |
| 5  | Celosia argentea L. | Bunga balung ayam | Amaranthaceae | Ornamental g | 2 |
| 6  | Gomphrena globosa L. | Pokok bunga butang | Amaranthaceae | Ornamental g | 2 |
| 7  | Mangifera sp. | Pokok pelam | Anacardiaceae | Food c | 16 |
| 8  | Anacardium occidentale | Pokok gajus | Anacardiaceae | Food c; Ornamental g; Medicine h | 2 |
| 9  | Spondias dulcis Parkinson | Pokok kedondong | Anacardiaceae | Food c; Medicine h | 5 |
| 10 | Mangifera sp. | Pokok mangga | Anacardiaceae | Food c | 8 |
| 11 | Canangium odorata (Lam.) Hook.f. & Thomson | Pokok bunga kenanga | Annonaceae | Ornamental g | 5 |
| 12 | Annona sp. | Pokok nona | Annonaceae | Food c | 2 |
| 13 | Annona muricata L. | Pokok durian belanda | Annonaceae | Food c | 8 |
| 14 | Lochnera rosea (L.) Rchb. ex Endl | Pokok kemunting cina | Apocynaceae | Medicine i; Ornamental g | 4 |
| 15 | Allamanda sp. | Alamanda oren | Apocynaceae | Ornamental g | 1 |
| 16 | Allamanda blanchetii A.DC | Alamanda ungu | Apocynaceae | Ornamental g | 1 |
| 17 | Allamanda angustifolia Pohl | Alamanda kuning | Apocynaceae | Ornamental g | 1 |
| 18 | Thevetia peruviana (Pers.) K.Schum | Pokok Jepun | Apocynaceae | Ornamental g | 1 |
| 19 | Lochnera rosea (L.) Rchb. ex Endl | Pokok kemunting cina | Apocynaceae | Medicine i; Ornamental g | 4 |
| 20 | Alocasia macrorrhizos (L.) G.Don | Keladi birah | Araceae | Food c; Ornamental g | 11 |
| No | Scientific Name                        | Common Name                      | Family           | Category      | Page |
|----|---------------------------------------|----------------------------------|------------------|---------------|------|
| 23 | Nothopanax scutellarius (Burm.f.) Merr. | Pokok puding mangkuk            | Araliaceae       | Food          | 2    |
| 24 | Impatiens balsamina L.                | Pokok keembong                   | Balsaminaceae    | Ornamental    | 5    |
| 25 | Ananas sp.                            | Nanas                            | Bromeliaceae     | Food          | 1    |
| 26 | Hylocereus undatus (Haw.) Britton & Rose | Naga                            | Cactaceae        | Food          | 4    |
| 27 | Canna sp.                             | Pokok bunga ganyong              | Cannaceae        | Ornamental    | 1    |
| 28 | Carica papaya L.                      | Pokok betik                      | Caricaceae       | Food          | 14   |
| 29 | Casuarina sp.                         | Pokok ru                         | Casuarinaceae    | Ornamental    | 1    |
| 30 | Cleome gynandra L.                    | Pokok maman                      | Cleomaceae       | Food          | 1    |
| 31 | Garcinia sp.                          | Pokok manggis                    | Clusiaceae       | Food          | 4    |
| 32 | Quisqualis indica L.                  | Pokok akar dani                  | Combretaceae     | Ornamental    | 1    |
| 33 | Cosmos caudatus Kunth                 | Pokok ulam raja                  | Compositae       | Food          | 11   |
| 34 | Luffa acutangula (L.) Roxb.           | Petola                           | Cucurbitaceae    | Food          | 2    |
| 35 | Cycas sp.                             | Pokok cycas                      | Cycadaceae       | Ornamental    | 1    |
| 36 | Euphorbia hirta L.                    | Susu nabi                        | Euphorbiaceae    | Medicine      | 1    |
| 37 | Codiaeum sp.                          | Pokok puding                     | Euphorbiaceae    | Ornamental    | 34   |
| 38 | Manihot sp.                           | Pokok ubi                        | Euphorbiaceae    | Food          | 16   |
| 39 | Euphorbia mili var. splendens (Bojer ex Hook.) Ursch & Leandri | Jejarum                        | Euphorbiaceae    | Ornamental    | 10   |
| 40 | Jatropha podagrica Hook               | Jarak buntingF                   | Euphorbiaceae    | Ornamental    | 1    |
| 41 | Manihot esculenta Crantz             | Pokok ubi kapak                  | Euphorbiaceae    | Food          | 4    |
| 42 | Pedilanthus tithymaloides (L.) Poit.  | Pokok lelipan                    | Euphorbiaceae    | Ornamental    | 1    |
| 43 | Euphorbia tithymaloides L.            | Pokok meeting bird               | Euphorbiaceae    | Ornamental    | 1    |
| 44 | Phyllanthus pulcher Wall. ex Müll.Arg. | Pokok naga buana                | Euphorbiaceae    | Medicine      | 1    |
| 45 | Baccaurea motleyana (Müll.Arg.) Müll.Arg. | Pokok rambai               | Euphorbiaceae    | Food          | 1    |
| 46 | Sauropus androgynus (L.) Merr.        | Cekur manis/ pucuk manis         | Euphorbiaceae    | Food          | 15   |
| 47 | Hura crepitans L.                     | Pokok payung Indonesia           | Euphorbiaceae    | Ornamental    | 1    |
| 48 | Christia vespertilionis (L.f.) Bakh.f | Pokok rama-rama                  | Fabaceae         | Medicine      | 3    |
| 49 | Psophocarpus tetragonolobus (L.) DC. Vigna sp. | Kacang botol                   | Fabaceae         | Food          | 6    |
| 50 | Delonix regia (Hook.) Raf.            | Kacang panjang                   | Fabaceae         | Food          | 2    |
| 51 | Coleus sp.                            | Pokok semarak api                | Fabaceae         | Ornamental    | 1    |
| 52 | Erythrina fusca Lour.                 | Pokok dedap                      | Fabaceae         | Ornamental    | 1    |
| 53 | Coleus sp.                            | Pokok ati-ati (hijau)            | Labiatae         | Medicine      | 5    |
| 54 | Coleus atropurpureus Benth           | Pokok ati-ati (merah)            | Labiatae         | Ornamental    | 7    |
55. *Leucaena leucocephala* (Lam.) de Wit
   Petai belalang  Leguminaceae  Medicine\(^c\); Food\(^i\)  7
56. *Clitoria ternatea* L.
   Bunga telang  Leguminaceae  Food\(^d\)  2
57. *Aloe vera* (L.) Burm.f.
   Lidah buaya  Liliaceae  Medicine\(^i\)  18
58. *Sansevieria trifasciata* Prain
   Pokok lendah jin  Liliaceae  Ornamental\(^g\)  3
59. *Allium* sp.
   Bawang  Liliaceae  Ornamental\(^g\)  1
60. *Punica granatum* L.
   Pokok Delima  Lythraceae  Medicine\(^c\); Food\(^c\)  5
61. *Lawsonia inermis* L.
   Pokok inai  Lythraceae  Medicine\(^g\)  3
62. *Hibiscus rosa-sinensis* L.
   Pokok bunga raya (merah)  Malvaceae  Medicine\(^i\); Ornamental\(^g\)  25
63. *Hibiscus sabdariffa* L.
   Pokok roselle  Malvaceae  Food\(^c\)  3
64. *Tinospora crispa* (L.) Hook. f. & Thomson
   Patawali  Menispermaceae  Medicine\(^h\)  2
65. *Lansium parasiticum* (Osbeck) K.C.Sahni & Bennet
   Dukung langsat  Meliaceae  Food\(^c\)  1
66. *Artocarpus heterophyllus* Lam.
   Pokok nangka  Moraceae  Food\(^c\)  15
67. *Artocarpus integer* (Thunb.) Merr.
   Pokok cempedak  Moraceae  Food\(^c\)  5
68. *Ficus* sp.
   Pokok buah tin  Moraceae  Food\(^c\)  1
69. *Artocarpus altilis* (Parkinson ex F.A.Zorn) Fosberg
   Pokok sukun  Moraceae  Food\(^c\)  1
70. *Moringa oleifera* Lam.
   Pokok kelor  Moringaceae  Medicine\(^i\)  1
71. *Musa* sp.
   Pokok pisang liin  Musaceae  Food\(^c\)  25
72. *Heliconia rostrata* Ruiz & Pav.
   Pokok sepit udang  Musaceae  Ornamental\(^g\)  1
73. *Psidium guajava* L.
   Pokok jambu batu  Myrtaceae  Medicine\(^i\); Food\(^c\)  19
74. *Eugenia papillosa* Duthie
   Pokok kelat paya  Myrtaceae  Ornamental\(^g\)  3
75. *Syzygium malaccense* (L.) Merr. & L.M.Perry
   Pokok jambu bol  Myrtaceae  Food\(^c\)  1
76. *Syzygium jambos* (L.) Alston
   Pokok jambu mawar  Myrtaceae  Food\(^c\)  1
77. *Syzygium aqueum* (Burm.f.) Alston
   Pokok jambu air  Myrtaceae  Food\(^c\)  2
78. *Bougainvilla* sp.
   Bunga kertas  Nyctaginaceae  Medicine\(^d\); Ornamental\(^g\)  23
79. *Jasminum polyanthum* Franch.
   Pokok melati  Oleaceae  Medicine\(^d\); Ornamental\(^g\)  3
80. *Jasminum sambac* (L.) Aiton
   Pokok melor  Oleaceae  Ornamental\(^g\)  3
81. *Orchis* sp.
   Anggerik  Orchidaceae  Ornamental\(^g\)  12
82. *Averrhoa carambola* L.
   Pokok belimbing  Oxalidaceae  Food\(^c\)  11
83. *Averrhoa bilimbi* L.
   Pokok belimbing buluh  Oxalidaceae  Food\(^c\)  4
85 Pandanus amaryllifolius Roxb. Pandan Pandanaceae Medicine¹ 13
86 Piper betle L. Sireh Piperaceae Medicine¹ 5
87 Piper sarmentosum Roxb. Kaduk Piperaceae Food¹ 3
88 Piper nigrum L. Lada salah Piperaceae Food¹ 1
89 Saccharum sp. Tebu Poaceae Food⁶ 6
90 Cymbopogon citratus (DC.) Stapf Serai Poaceae Food¹ 30
91 Talinum paniculatum (Jacq.) Gaertn. Akar ginseng jawa Portulacaceae Ornamental⁸ 1
92 Passiflora edulis Sims Pokok markisa Pussifloraceae Food⁹ 3
93 Rosa sp. Pokok bunga ros Rosaceae Ornamental⁸ 8
94 Prunus sp. Pokok cherry Rosaceae Food⁹; Ornamental⁸ 6
95 Morinda citrifolia L. Pokok mengkudu Rubiaceae Medicine⁰; Food⁹ 7
96 Mitragyna sp. Ketum cina Rubiaceae Medicine¹ 1
97 Ruta graveolens L. Pokok garuda Rutaceae Medicine¹ 2
98 Citrus microcarpa Bunge Pokok limau kasturi Rutaceae Medicine⁰; Food⁹ 19
99 Citrus sp. Pokok limau madu Rutaceae Food⁹ 1
100 Citrus maxima (Burm.) Merr. Pokok limau bali Rutaceae Food⁹ 1
101 Citrus reticulata Blanco Pokok limau cina Rutaceae Food⁹ 2
102 Citrus hystrix DC. Pokok limau purut Rutaceae Food⁹ 16
103 Citrus aurantiifolia (Christm.) Swingle Pokok limau nipsis Rutaceae Food⁹ 16
104 Murraya koenigii (L.) Spreng. Pokok daun kari Rutaceae Food⁹ 21
105 Ziziphus sp. Pokok epal bidara Rhamnaceae Food⁹ 1
106 Ziziphus mauritiana Lam Pokok bidara Rhamnaceae Ornamental⁸ 1
107 Manilkara zapota (L.) P.Royen Pokok ciku Sapotaceae Food⁹ 14
108 Nephelium mutabile Blume Pokok pulasan Sapindaceae Food⁹ 9
109 Nephelium lappaceum L. Pokok rambutan Sapindaceae Food⁹ 11
110 Dimocarpus sp. Pokok longan Sapindaceae Food⁹ 6
111 Solanum sp. Kentang Solanaceae Food⁹ 1
112 Capsicum annuum L. Pokok cili Solanaceae Food⁹ 27
113 Datura metel L. Kecubong Solanaceae Medicine⁸ 1
114 Solanum mammosum L. Terung pipit Solanaceae Medicine⁰ 3
115 Cestrum sp. Pokok santalia / harummalam Solanaceae Ornamental⁸ 14
116 Physalis angulata L. Pokok ciplokan Solanaceae Medicine⁰ 2
117 Phaleria macrocarpa (Scheff.) Boerl. Pokok mahkota dewa Thymelaeaceae Medicine⁰ 5
118 Anethum graveolens L. Adas manis Umbelliferae Medicine⁸ 2
119 Lantara sp. Pokok bunga tahi ayam Verbenaceae Ornamental 4
120 Premna foetida Reinw. ex Blume Pokok bebuas Verbenaceae Food 4
121 Vitis sp. Anggur Vitaceae Food 1
122 Kaempferia pulchra Ridl. Cekurmas Zingiberaceae Food 2
123 Phaeomeria speciosa (Blume) Koord. Kantan Zingiberaceae Food 6
124 Zingiber aromaticum Noronha Lempoyang Zingiberaceae Medicine; Food 8
125 Zingiber cassumunar Roxb. Halia bara Zingiberaceae Medicine 6
126 Zingiber sp. Bonglai Zingiberaceae Medicine; Ritual 4
127 Kaempferia galanga L. Cekur Zingiberaceae Food 7

* Frequency of citation
  b Rhizome
  c Fruit
  d Flower
  e Stem
  f Tuber
  g Whole plant
  h Uncertain
  i Leaves

Table 2. List of cultivated plants in home gardens of Malay villages in Johor, Malaysia.

| VILLAGES               | SHANNON WIENER INDEX (H) | SIMPSON INDEX (D) |
|------------------------|--------------------------|-------------------|
| Kampung Parit Bengkok  | 1.3972                   | 0.0595            |
| Kampung Parit Haji Salleh Ros | 1.573                | 0.0397            |
| Kampung Parit Haji Rais | 1.3394                   | 0.0706            |
| Kampung Parit Abdul Kadir | 1.3063                | 0.0740            |
| Kampung Parit Rasipan  | 1.1998                   | 0.0995            |
| Overall                | 1.5399                   | 0.0486            |

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