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RESEARCH ARTICLE

A PRELIMINARY CHECKLIST OF *Ficus* L. SPECIES IN KUANTAN, PAHANG

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ABSTRACT

Ficus is the largest genus in the Moraceae family, with more than 700 species worldwide. It was classified into a distinct genus based on the unique nature of its inflorescence. Until recently, there was no official record of the *Ficus* checklist in Kuantan, Pahang. Therefore, this study aims to develop the preliminary checklist of *Ficus* species in Kuantan Pahang. Plant samples were collected from selected areas of Kuantan. Plant samples were pressed, dried and mounted on a herbarium board and processed as specimen vouchers. Based on this study, 14 species of *Ficus* were recorded. The list of *Ficus* presented in this study could be used for future research and as a reference source for conservation activities.

KEYWORDS

Preliminary checklist, *Ficus*, Kuantan.

1. INTRODUCTION

Ficus or the Figs plant is one of the most widely used genera in the world. It was classified in the mulberry family (Moraceae) together with white mulberry (*Morus alba*), jackfruit (*Artocarpus heterophyllus*) and also breadfruit (*Artocarpus altilis*). With more than 700 species worldwide, it is by far the most prominent genus in the family. Morphologically, it is known as a sap-bearing plant, in which most of its species produce sap when injured. However, this character might resemble a few other genera in Moraceae, such as *Morus* and *Artocarpus*. Some of its species are also widely known for its strangling characteristics (hemi-epiphytic habit). *Ficus* species are recognized based on their syconia structure, in which these unique enclosed inflorescences are lined with numerous flowers (Pothagin et al., 2014).

Ficus can be found in primary and secondary forest terrestrial vegetation (Berg and Corner, 2005). Apart from being a source of medicine in traditional and modern medicine, figs are also known as a source of nutrition for mammals' diet (Berg and Corner, 2005). Previous research recorded *F. benjamina* as the primary food source for hornbills and barbets in Kuala Atok, Taman Negara Pahang (Pan et al., 2008). The previous study also reported that the soft shoots of *Ficus lacor* are used as vegetables, the latex of *Ficus benjamina* is used to inhibit the distribution of malarial mosquitoes, while the latex of *Ficus variegata* is used to produce 'Godang' wax in batik dye (Tarachai et al., 2011). Known as an important medicinal plant, figs were used in pharmaceutical studies (Saadiyah et al., 2016; Hlai et al., 2014; Azmil and Juliana, 2013; Hani and Noraini, 2013; Arora, 2018). Berg and Corner intensively documented the *Ficus* species in Flora Malesiana, which includes the species in Peninsula Malaysia. However, until now, there is no official record of the distribution of *Ficus* in Kuantan (Berg and Corner, 2005). The recorded collection of

plant species is essential for some regions, as it could be one of the steps taken to conserve the ecosystem of that area (Arora, 2018). An increased number of studies on the diversity and distribution of plant species could lead to increased awareness of plant species. This awareness is essential, especially in the conservation of nature. Therefore, the documentation on the diversity and distribution of *Ficus* in Kuantan Pahang appears to be an essential part of biodiversity studies. Thus, the objective of this study is to provide a preliminary checklist of *Ficus* species available in Kuantan, Pahang.

2. MATERIAL AND METHOD

The sampling of the plant was carried out from July 2017 until May 2018. Plants were collected from selected areas in Kuantan, like Cherok Paloh, Pantai Cherating, IIUM Kuantan Campus, Bukit Goh, Bukit Sagu, Sungai Pandan, and Sungai Lembing. The specimens were then pressed, dried, and mounted, and processed into specimens voucher. Data were recorded regarding the vegetative and reproductive structure of each species collected. Species identification was checked based on the description by Berg and Corner (Berg and Corner, 2005).

3. RESULT AND DISCUSSION

The morphological study of the vegetative and reproductive structure of *Ficus* species presents diagnostic characteristics for classification. A total of 14 species have been recorded in the areas sampled. They were *F. grossularioides*, *F. vasculosa*, *F. hispida*, *F. fistulosa*, *F. deltoidea*, *F. benjamina*, *F. religiosa*, *F. microcarpa*, *F. kerkhovenii*, *F. caulocarpa*, *F. aurata*, *F. heteropleura*, *F. obscura* and *F. auriculata*. All species collected were shrubs, trees or hemi-epiphytic, usually with brown bark with multiple white spots. The leaves have always been simple and petiolate,

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but with different characteristics. Syconia was usually shaped urceolate, but with varying sizes and colours (Figure 1).



Figure 1: Fruit of *Ficus*. A. *Ficus fistulosa* B. *Ficus hispida*

3.1 Plant Description

3.1.1 *Ficus glossularioides* Burm. F.

Plant: shrub, up to 4 m tall, grown in shady forest and open area. **Stem:** smooth, frutescent with monopodial branching. **Leaves:** simple, petiolate, 10-21 cm x 3-7 cm, spirally arranged. **Lamina:** ovate to obovate, 15-18 cm x 3-7 cm wide, chartaceous, green, base narrowly cuneate, apex narrowly acute, margin serrate. **Syconia:** axillary, shortly pedicellate to completely sessile, green to reddish-green when young, orange as matured, oblate to completely globose to ellipsoid. 0.8cm-1.5 cm long, 0.8-1.3 cm wide, red inside.

3.1.2 *Ficus vasculosa* Wall. ex Miq.

Plant: a tree, up to 15 m tall, shady forest. **Stems:** arborescent with monopodial branching. **Leaves:** simple, alternate, spirally arranged, petiolate, 13.5-16.5 cm x 5.5-7.0 cm, glabrous. **Lamina:** elliptic, 10.5-14.0 cm x 5.5-7.0 cm, green, base obtuse, apex caudate, margin entire, absent apical process. **Syconia:** axillary usually in pairs of new shoots, both mature and young syconia green, globose to turbinate, 1.2-1.3 cm long, 1.0-1.2 cm wide.

3.1.3 *Ficus hispida* L.

Plant: a shrub up to 7m in height. **Stems:** frutescent with a monopodial branching. **Leaves:** simple, petiolate, 26.5-39.5 cm x 8.5-12.5 cm wide opposite, spirally arranged. **Lamina:** elliptical to oblong, 22-34 cm x 8.5-12.5 cm, chartaceous, reticulate, green, base obtuse to rounded, apex acuminate, whole margin to denticulate with minutely spinous hair. **Syconia:** green while young and turns red as matured, pedicellate, turbinate, ostiole slightly indented inwards, few bracts formed near the ostiole, 2.4-3.0 cm long, 2.5-3.0 cm diameter, pedicel 0.5-1.5 cm long, inside white.

3.1.4 *Ficus fistulosa* Reinw. ex Blume.

Plant: a shrub up to 6 m tall. **Stem:** smooth, frutescent with monopodial branching. **Leaves:** simple, petiolate, alternate and subopposite, 19.0-21.5 cm x 8.0-8.5 cm spirally arranged. **Lamina:** elliptic to oblong, 16.0-17.0 cm x 8.0-9.0 cm, reticulate, green, base obtuse to rounded, apex acuminate to caudate, margin entire. **Syconia:** pedicellate, light green with lenticel spots, fleshy, red as ripe, oval sideways to completely spherical in shape, apex flat with slightly indented ostiole, 2.5 cm in diameter, 1.5 cm long, pedicel 2.0-3.0 cm long.

3.1.5 *Ficus deltoidea* Jack.

Plant: a shrub up to 3 m tall. **Stems:** frutescent with monopodial branching. **Leaves:** simple, petiolate, 5.0-8.0 cm x 2.0- 4.0 cm, spirally arranged to distichous. **Lamina:** obovate, 4.0-7.5 cm x 2.0-4.0 cm, coriaceous, glabrous, green to dark green adaxially, golden yellow to orange abaxially, base cuneate, apex rounded to emarginate, margin entire. **Syconia:** axillary, pedicellate with 0.5-1.2 cm pedicel, on each node of last season twigs, green when young, red as ripe, globose to ellipsoid, 1.3-2.0 cm long, 0.5-1.2 cm in diameter, red inside.

3.1.6 *Ficus benjamina* L.

Plant: a hemi-epiphytic, on another plant or a building or in a drainage, exclusive of roots may grow a height of up to 10 m tall. **Leaves:** simple, alternate, 5-10 cm x 2-6 cm, spirally arranged to distichous. **Lamina:** slightly thick, elliptic, 3.5-8 cm x 2-6 cm, symmetric to slightly asymmetric, hypodromous, coriaceous, green adaxially, lighter green abaxially, base rounded to obtuse, apex acuminate, margin entire. **Syconia:** axillary on previous season stem or new growth, paired, sessile, whitish-green when young and whitish red when mature, globose to slightly ellipsoid to obovoid, apex rounded to flat, ostiole slightly indented.

3.1.7 *Ficus religiosa* L.

Plant: a hemi-epiphytic, 5 m tall. **Stem:** smooth, frutescent with monopodial branching. **Leaves:** simple, alternate, 20-29 cm x 14.0-15.5 cm, spirally arranged, petiolate. **Lamina:** widely ovate to widely cordate, 20-22 cm x 14-15.5 cm, symmetric, reticulate, actinodromous, coriaceous, green, glabrous, base usually cordate to rarely truncated, apex caudate, margin entire.

3.1.8 *Ficus microcarpa* L. f.

Plant: hemi-epiphytic, up to 13 m tall. **Stem:** smooth, frutescent with monopodial branching. **Leaves:** simple, alternate, 11-12 cm x 4.5-5.0 cm, spirally arranged, petiolate. **Lamina:** elliptic to obovate, 10-11 cm x 4.5-5.0 cm, coriaceous, green, base narrowly cuneate to cuneate, apex cuspidate, no apical process, margin entire. **Syconia:** axillary, on last season growth, in pairs in each node of last season's twigs, green to white while young, whitish globulous, 1.0-1.2 cm diameter, apex convex, white inside.

3.1.9 *Ficus kerkhovenii* Koord & Valetton.

Plant: hemi-epiphytic, up to 14 m tall. **Stem:** smooth, frutescent with monopodial branching. **Leaves:** simple, alternate, 16.0-18.0 cm x 4.5-5.0 cm, spirally arranged, petiolate. **Lamina:** elliptic to narrowly elliptic, 13.5-14.5 cm x 4.5-5.0 cm, green. **Syconia:** axillary, sessile, in pairs at each node of last season growth, orange when young, red as matured, widely prolate, 1.4-1.7 cm long, 1.2-1.4 cm diameter, apex convex, ostiole not indented, yellow inside.

3.1.10 *Ficus caulocarpa* (Miq.) Miq.

Plant: a hemi-epiphytic. **Leaves:** simple, alternate, 18-22 cm x 4-6 cm, spirally arranged, petiolate. **Lamina:** elliptic to narrowly elliptic to oblong, 14-16 cm x 4-6 cm, glabrous, green, base cuneate to obtuse, apex cuspidate, margin entire, slightly undulate.

3.1.11 *Ficus aurata* (Miq.) Miq.

Plant: a tall shrub, up to 10 m tall. **Stem:** smooth, frutescent to arborescent with monopodial branching. **Leaves:** simple, alternate, spirally arranged, petiolate, 24-30 x 23-25 cm. **Lamina:** thick, chartaceous, widely ovate, 17-20 cm x 23-25 cm, green, apex acute to obtuse, margin serrulate. **Syconia:** tomentose, axillary, in pairs at each node of new growth, green when young, orange as matured, red and dehiscent to show its inside when ripe, prolate while young and gradually turn oblate as older, apex concave, ostiole not indented, red inside.

3.1.12 *Ficus heteropleura* Blume.

Plant: a hemi-epiphytic, with oil palm up to 10 m tall. **Stems:** smooth, frutescent with monopodial branching. **Leaves:** simple, alternate, 10-12 cm x 3-6 cm, spirally arranged, petiolate. **Lamina:** elliptic to slightly obovate, 8-10 cm x 3-6 cm, green, base cuneate to obtuse, apex cuspidate, margin entire. **Syconia:** axillary, green while young, orange as matured, globose, 1 cm diameter, 1 cm long, pedicellate with 0.6-1.0 cm pedicel, white inside.

3.1.13 *Ficus obscura* Blume.

Plant: a hemi-epiphytic up to 5 m tall. **Stem:** pubescent, especially at new shoots and nodes, frutescent with monopodial branching. **Leaves:** simple,

alternate, 30-36 cm x 12-15 cm spirally arranged, petiolate. **Lamina:** elliptic to slightly obovate, 30-34 cm x 12-15 cm, green, base oblique to oblique-cordate, apex cuspidate to caudate, margin entire to slightly dentate. **Syconia:** axillary, rise on fascicle on the main branches, whitish-green when young, orange to red-when mature, globulose, 0.6-0.8 cm diameter, pedicellate with 0.5 to 1.0 cm pedicel, red inside.

3.1.14 *Ficus auriculata* Lour.

Plant: a shrub with 4.31 m to 5.36 m tall. **Stem:** monopodial branching and light brown in colour. **Leaves:** simple, hairy, 18.5-47.2 cm x 16.2 - 33.1 cm, petiolate, opposite. **Lamina:** ovate, green, base cordate to rounded to broadly cuneate, apex acuminate to acute, margin entire to serrate. **Syconia:** branches or on spurs that continuously grow and branches from the main stem, clustered, green while young and turns reddish to red-brown when matured, pedicellate, turbinate, 2.8 - 3.7 cm length, 3.2 - 3.8 cm width.

CONCLUSION AND FUTURE WORKS

In conclusion, an updated checklist of 14 species of *Ficus* was provided in this study. In order to monitor the optimal number of *Ficus* distributed to Kuantan and to collect full plant samples, sampling sites and frequency of sampling activities need to be increased. Presumably, the list of the *Ficus* in Kuantan presented in this study will be used for future research and preferences.

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