

# IDENTIFICATION OF TEAK MISTLETOE SPECIES AND BASIC INFORMATION OF UTILIZATION AS MEDICINAL PLANT

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## ABSTRACT

Mistletoe is hemiparasitic plants (macroparasite) on seasonal and annual plants include trees, however, mistletoes are also beneficial as key species that fill in the ecological niche, and a potential to non-wood forest product such as medicinal plants as one of them. The objectives of this research are to identify species of teak mistletoes at Padangan Clonal Seed Orchard (CSO) in Perum Perhutani and to aim its possibilities as medicinal plant. The inventory methods on species of teak mistletoes was carried out in compartments/blocks of teak clones that are designated as Observation Sample Plots (OSPs/PCP) of the attack intensity from low, medium, high, control; and four units Observation Measurement Plots (OMPs/PUP) on each OSPs/PCP. Continuously, it was analyzed by comparing the same species of mistletoes on other host trees as reference which was efficacious to be used as medicinal plant. Three species of mistletoes parasitizing teak clone stands were identified as *Dendrophthoe pentandra* (L.) Miq. of family of Loranthaceae which is also attacking other host trees, *Macrosolen tetragonus* (Blume) Miq. of family of Loranthaceae too, *Viscum articulatum* Burm. F. of family of Santalaceae/Viscaceae that is hyperparasite on two other mistletoes. The comparison with the same teak mistletoe but on different host trees shows that including *D. pentandra* and *V. articulatum* have the potential for hypertension treatment. *D. pentandra* is used too for medicine to cure illness, wounds, fester and recovery from parturition. Known that chemical content this mistletoe comprise of flavonoid ingredient, fenolat acid (terulat acid, para hidroksi benzoate acid, kumarat acid, protokatekuat acid and vanilat acid. As for the utilization of *M. tetragonus* hasn't been discovered up to this moment.

Key words: mistletoe, identification, teak clone, non-wood forest product, medicinal plant

## INTRODUCTION

Mistletoe has not yet reached offensive explosion (outbreak). Parasite attack data ranged from 10.7 to 49.6%; covering 650.3 ha of 144 trees clones. The numbers of attacked trees (17 338 trees) showed almost  $\frac{1}{3}$  (one third) of total existing trees (59 944 trees). The purpose of this research are: 1) to identify species of teak mistletoe based of morphology character especially variety of leaf, 2) to analyze basic data relating of potential usage teak mistletoe as medicinal plant.

## MATERIAL AND METHOD

### Materials and Instruments

Materials used include: mistletoe attacking map of Padangan CSO 1 : 13000 scale; alcohol 70% and cutton, newspaper, plastic 40 x 60 cm size for making herbarium, etc. Instruments used include: compass, GPS Garmin Oregon 550, altimeter, binokuler, etc.

## Time and Location

Field research will be carried out in compartments of teak forest in CSO Padangan, defined as PCP consisting of and PUP's (50 x 50 metre size) amount of 4 (four) that are placed and spread in PCP refer to EFForTS/CRC990 (2012). Before, those plots were made by Muttaqin (2014); research conducted for 10 months from September 2014 until June 2015.

## Research Procedures

### (1). Identify mistletoe species

At every PUP amount of 12 PUP, chosen only one specimen of one mistletoe species that have good feature, so there were 12 specimens. On every mistletoe species that founded, observe directly morphology characteristics and suite with book reference of mistletoe identification such as Flora Malesiana Series I-Seed Plants Volume 13 -1997 Loranthaceae dan Viscaceae; and Flora of Java Volume 2-1965. For species identification more detail, so take specimen herbarium sample which of parts were preserved in alcohol 70 %, further for identification in Herbarium Bogoriense, Biology Research Center-LIPI, Bogor.

Table 1. Leaf morphology characteristics *D. pentandra* and *M. tetragonus*

| No | Mistletoe species              | LL (cm) | STL (cm) | LW (cm) | WLWL (cm) | VA (°) | SSV  | SL   | TLF | BLF | LA (cm <sup>2</sup> ) | LS (cm) | AR  | FF  | PR  |
|----|--------------------------------|---------|----------|---------|-----------|--------|------|------|-----|-----|-----------------------|---------|-----|-----|-----|
| 1  | <i>D. pentandra</i> ,<br>mean  | 8.3     | 1.4      | 4.1     | 3.9       | 44.2   | 9.0  | 11.6 | 2.5 | 2.5 | 58.0                  | 19.6    | 2.1 | 1.8 | 4.8 |
|    | SD                             | 2.6     | 0.4      | 1.3     | 1.1       | 4.6    | 1.4  | 3.3  | 0.9 | 0.5 | 33.2                  | 5.7     | 0.4 | 0.1 | 0.7 |
| 2  | <i>M. tetragonus</i> ,<br>mean | 8.5     | 0.3      | 3.7     | 4.1       | 43.8   | 12.0 | 13.7 | 2.5 | 2.8 | 53.9                  | 19.2    | 2.3 | 1.7 | 5.2 |
|    | SD                             | 2.7     | 0.3      | 1.2     | 1.2       | 5.1    | 2.4  | 4.2  | 1.2 | 0.5 | 31.2                  | 5.9     | 0.5 | 0.1 | 0.8 |

Description: LL (lamina length), STL (stalk length), LW (leaf width), WLWL (widest of leaf width length), AV (arch of primer and seconder vein), SSV (sum of secondary vein), SL (sum of leaf), TLF (tip of leaf form), BLF (base of leaf form), LA (leaf area), LS (leaf surrounding), aspect ratio (AR), form factor (FF), perimeter ratio (PR); SD = standard deviasi

Table 2. Leaf morphology characteristics *V. articulatum*

| Mistletoe species               | LSC (cm) | LL (cm) | LW (cm) | SL   | TLF | BLF | LA (cm <sup>2</sup> ) | LS  | AR  | FF  | PR   |
|---------------------------------|----------|---------|---------|------|-----|-----|-----------------------|-----|-----|-----|------|
| <i>V. articulatum</i> ,<br>mean | 2.5      | 2.6     | 0.3     | Many | 4.0 | 1.0 | 1.3                   | 4.6 | 9.0 | 0.8 | 15.6 |
| SD                              | 0.6      | 0.6     | 0.1     |      | 4.0 | 1.0 | 0.5                   | 1.0 | 2.9 | 0.2 | 4.6  |

Description: LSC (length of stem section), LL (leaf length), LW (leaf width), SL (sum of leaf), TLF (tip of leaf form), BLF (base of leaf form), LA (leaf area), LS (leaf surrounding), aspect ratio (AR), form factor (FF), perimeter ratio (PR); SD = standard deviasi

## (2). Identify leaf of morphology characteristic

Methode of take leaf sample refer to Kremer *et al.* (2001), with taking one mistletoe plant that has good fenotipe, at least five leaves. Then do identify leaf morfologi more detail, refer to Kremer *et al.* (2001) with modification of methode Ellis *et al.* (2009), and Kadir *et al.* (2012). Variable that will measure and observe for every leaf as follows: lamina length, leaf stalk length, the widest leaf, the widest leaf to leaf beginning, arch of leaf veins; sum of leaf veins; leaf top form, leaf beginning form; leaf area, leaf surrounding, aspect ratio, form factor, perimeter ratio of diameter.

## (3). Collecting basic information of utilization as medicinal plant

It was analyzed by comparing the same species of mistletoes on other host trees as reference which was efficacious to be used as medicinal plant.

## RESULT AND DISCUSSION

### Identification and description of teak mistletoe species

According to result plant identification, there was three species teak mistletoes. They were *Dendrophthoe pentandra* (L.) Miq. include family Loranthaceae, *Macrosolen tetragonus* (Blume) Miq. include family Loranthaceae, *Viscum articulatum* Burm.f. include family Santalaceae/Viscaceae. *Dendrophthoe pentandra* (L.) Miq., synonyms *Loranthus pentandrus* L., only *Viscum articulatum* founded paratizing on other mistletoe are *Dendrophthoe pentandra* and *Macrosolen tetragonus*. The description of teak mistletoe based on result of identification of study literature (Backer and Bakhuizen van den Brink 1965), Uji (2007), and verify of field observation as follow: Completed description and usage especially as medicinal plant of *D. pentandra*

(Lemmens and Bunyapraphatsara 2003): Shrub, hemiparasite, rather stiff, many branches, 0.5 – 1.5 m tall. Variety of leaves, largely narrow until ellipsis widely, 6-13 x (1.5-)3-8 cm, petiole 0.5-2 cm length; every inflorescence of 6-12 flowers of raceme, axis 1-2(-3.5) cm length, corolla clavate, inflated at lower part, 12-20(-28) mm length, tip of obtuse, largely green or yellow - orange, rarely red, tube in flower open (2-)6-12 mm length, fruit of ovoid until 0 x 6 mm. Usage: mush of leaf part to cure pain wound, fester and infeksi on skin. Heating water of all part of plant if drink will can cure hipertensi and if mixed of a drink will can cure cough. In Peninsular Malaysia, the leaves are pounded and made into a poultice for treating small sores, ulcers and other skin affections. A decoction of the leaves is administered in Perak (Malaysia) as a protective medicine after childbirth. In Thailand, of *D. pentandra* or '*Kafak mamuang*' an infusion of the dried whole plant is drunk to relieve hypertension. In Vietnam the leaves are mixed with those of regular te to obtain an infusion to enough. Add description of Healthy Ministry of RI (2011), *D. pentandra* include of 100 medicinal plants. In Laos, Camboja and Vietnam were used to cough medicinal in tea drink, in Malaysia used as cure covery after utter, wound, sore. That mistletoe of chemical ingredient comprises ingredient of flavonoid, fenolat acid (terulat acid, para hidroksi benzoate acid, kumarat acid, protokate acid hard and vanilat acid).

*M. tetragonus* (Blume) Miq.: Shrub, hemiparasite, rather stiff, many branches. Leaf faced, taper or rather oval, 8 – 12 cm length and 3 – 6 cm width, thick, leaf base wedge – cut off, leaf stalk 5 mm length, leaf tip acute until obtuse. Flowering at internode, bunches arranged of 3 – 9 flower pairs. Petal of 6 merus, angular, tip cudgel and obtuse, greenish yellow, tube of petal is 6 – 11 mm length. Anther 1.5 – 2.5 mm length and obtuse.

Usage: until now not known. But compared of usage as medicinal plant of *M. cochinchinensis* (Lour.) v. Tiegh. that in Peninsular Malaysia pounded leaves are used as a poultice to treat headache. The stem juice is drunk to expel the afterbirth. In Indo-China fruits are employed as a cough medicine, and the leaves as a substitute for tea. Compared of *M. robinsonii* (Gamble) Danser that in Vietnam, the leaves of those are employed to prepare a diuretic tea, specifically to remedy an enlarged abdomen.

*V. articulatum* Burm. F.: Shrub, hemiparasite, slender, stem pendulous 1 metre length, leaves rudimentary, expanding, c. 0.5 mm length; inflorescence comprises single flower, generally many subsidiary cymules develop around first part, of that female is formed early and those female lateral and male sessile. That male has flower decoration such as 4 cupings, every cuping is short trilateral, 0.25 mm length. The female of cuping achieves 0.5 mm length that fewer short than tube and rather thick.; fruit globose, fine, white.

Usage: Stew all part of plant, if drink it will can cure bronchitis. Besides can use too as a prodisiak and neuralgik and cure skin of tumor and anthritis. In Cambodia a decoction of *V. articulatum* is prescribed for the treatment of bronchitis. It is credited with tonic and sedative properties. In India it is used as an aphrodisiac and febrifuge, and to treat skin tumours. Apoultice of crushed stems is applied to cuts. In Taiwan the whole plant is used as a remedy for neuralgia. In China whole plants are used to treat arthritis.

#### Leaf morphology characteristics

Measure result of leaf morphology characteristics *D. pentandra* (n=62) and *M. tetragonus* (n=37) both include family Loranthaceae, as illustrated at Table 1.

That *V. articulatum* (n=20) include family Viscaceae, has leaf rudimentary and look like small bractea so only some leaf morphology characteristics can measure as illustrated at Table 2.

#### ACKNOWLEDGEMENTS

The authors thank to Development and Research Center Perhutani for permitting on research location and facilitate so this research can well done.

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