Jurnal Riset Biologi dan Aplikasinya
https://journal.unesa.ac.id/index.php/risetbiologi

An Additional Information of Tarenna (Rubiaceae) in Madura Island

Novita Kartika Indah[1]* & Ashari Bagus Setiawan
[1] Departement of Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya Jl. Ketintang, Gayungan, Surabaya 60231, East Java, Indonesia
[2] SMA Al-Wildan 4 Islamic School Jakarta, Jl Haji Nudin, Lebak Bulus, Cilandak, South Jakarta, Indonesia
*Corresponding Author
e-mail: novitaindah@unesa.ac.id

Article History

Received : 2 May 2022
Revised : 16 August 2022
Approved : 14 September 2022
Published : 30 September 2022

Keywords
Tarena, identification, Ixora,

ABSTRACT

Tarenna is a genus of relatives of Ixora which is found in forests. Tarenna is different from Ixora which is known as an ornamental plant. The purpose of this study was to find the genus Tarenna in Madura natural habitat to preserved or conserved before this genus became extinct. Observations were made on morphological characters. The morphological characteristics observed included: stature, stems, leaves, inflorescences, flowers, fruits, and seeds. Ixora has a corolla of various flowers while Tarenna only has a white corolla but smells good. Recent exploration and collection of Tarenna in Madura Island indicated that two species are a new record for Java and Madura Island, namely *T. costata* and *T. fragrans*. Existence of *T. costata* in this area not only as a new record for Madura Island, but also as a new record for Java. *Tarenna fragrans* was firstly reported in Madura Island as a new distributional record for this area. An updated of identification key, several descriptions, and documentations, as well as a distributional map are provided.

How to cite: Indah, N.K & Setiawan, A, B. (2022). An Additional Information of Tarenna (Rubiaceae) in Madura Island. *Jurnal Riset Biologi dan Aplikasinya*, 4(2): 90-95. DOI: 10.26740/jrba. v4n2.p.90-95.

INTRODUCTION

The genus of Tarenna is less known to the public. *Tarenna* is unknown or almost never heard of in contrast to its relatives in the Rubiaceae family. The genus of Tarenna is a member of subfamily lxoroideae, along with lxora, Pavetta, and Rutidea. They were classified in tribe Pavettae based on the following characters namely shrubs, rarely climbers or trees; stipules interpetiolar, margin entire (fimbrate in Rutidae); on the lower leaf surface raphides absent; inflorescence terminal; corolla lobes contorted to the left; ovary 2 (--7) locular, each axillary placenta with 1 to 28 ovules; fleshy fruits; one to many seeds per locule; exotesta cells sometimes parenchyma-like; stylar pollen present, 3 or 4 (rarely 5) of colporate pollen grains .

Tarenna was first published by Gaertner in 1788 with the speciment type of *Tarenna zeylanica*. *T. zeylanica* is from Africa. Because the boundaries of the original genera were rather narrow, other genera were born which were considered more suitable to accommodate the new species collected from the field, such as Webera and Stylocoryna. In the writing of Sumatran flora by Miquel in 1862 and the list of Sumatran plant species written by Boerlage in 1891, two genera names were listed, namely Stylocoryna and Webera, which turned out to be the same taxon as Tarenna.

In addition, because the morphological characteristics of this genus are like *Pavetta* and *Ixora*. If the specimen does not have generative organs, the taxonomist will have identification errors. As a result, several species of Pavetta and Ixora were transferred to Tarenna, as was done by Bremekamp (1934) for *P. macroptera*, *P. meyeri*, and *P. astericus*. Other researchers who carried out the transfer of several species of the Webera genus (*W salicina* and *W. longifolia* and so on) to Tarenna included Ridley (1923). Merril (1921) transferred several species from Pavetta (*P. eucrantha* and *P. palawanensis*) and *Stylocoryna* (*S. angustifolia* and *S.*

adpressa). Wong in 1989 moved *Randia mussaendoides* to *Tarenna*.

Bremekamp (1939) said that Pavetta and Tarenna were very similar, the difference was only in the number of crown lobes. This similarity causes frequent errors in identification, especially if it is only based on the vegetative parts. Diagnostic character of *Tarenna* is **leaves** usually ± acuminate and aristate; **stipules** triangular-lanceolate or ovate, always erect, sometimes aristate**. Inflorescences** terminal on main and leafy lateral branches or subterminal is on very short leafless branches, lax or compact; **flowers** pedicellate or sometimes shortly so, sometimes pedicels accrescent in fruit; fragrant, hermaphrodite, (4–)5-merous, pedicellate or less often sessile in mostly corymbose; bracts sometimes present but inconspicuous; bracteoles present, often on the (Oliver 1877; Ridley, 1923; Backer and Brink Jr., 1965; Fosberg et al., 1993; Indah, 199; WFO, 2017).

The forest is habitat of the genus *Tarenna*, this genus is rarely used as an ornamental plant or medicinal plant. Members of this genus are very numerous, about 368 species, while *Tarenna* in Java based on Flora of Java there are only three species (Backer & van Bakhuizen, 1963) namely *T. dasyphylla*, *T. fragrans*, and *T. laxiflora*. According to the publication records, all above come from forests in Java. However, only *T. fragrans* can still be found and is still stored in the form of living plants in the Purwodadi Botanical Gardens. *Tarenna* was never reported growing on Madura Island.

The morphological character of *Tarenna* is similar to *Ixora*. The most important diagnostic character between *Ixora* and the *Tarenna* is the color of the flowers. The Ixora flower color is more attractive than *Tarenna*. *Tarenna* has a white flower color and/or yellowish-white while the color of *Tarenna* flowers varies.

The purpose of this study was to find the genus *Tarenna* in its natural habitat to preserved or conserved before this genus became extinct.

MATERIALS AND METHODS

This research was conducted in October-November 2021 in Bangkalan, Sampang, Pamekasan, and Sumenep Regencies using the cruising method (Rugayah et al.,2004). The parts of plant collected include parts of branches with leaves, inflorescences and flowers, and fruit. Each specimen was collected in two branches as duplicates. The recorded data includes collection numbers, name of collectors, habitat and elevation, coordinate positions, local names, utilization, and morphological characteristics.

The procedure for making herbarium follows Djarwaningsih (2002). The specimens were dried and made into an herbarium. Then the herbarium specimens were observed and described. Observations were made on morphological characters. The morphological characteristics observed included: stature, stems, leaves, inflorescences, flowers, fruits, and seeds. All specimens were documented using the SM-A725F/DS mobile device. Indumentum, flower, and seed shape characteristics were observed using a Nikon SMZ-745 stereo microscope. This activity was carried out at the Biology Laboratory of Building C1 (IsDB), Surabaya State University. Then matching activity with several related herbarium specimens was carried out at Herbarium Bogoriense (BO) and virtually via Herbarium Leiden (https://bioportal.naturalis.nl/).

The collected specimens were identified using Flora of Java 2 (Backer & Bakhuizen van den Brink 1963), *Tarenna* species (Rubiaceae) in Sumatra (Indah, 1999), a taxonomic revision of *Tarenna* Gaertn. and *Triflorensia* S.T. Reynolds (Rubiaceae: Ixoroideae: Pavetteae) in Australia (Reynold & Foster 2005), and A Checklist of the genus *Tarenna* Gaertn. (Rubiaceae) in Thailand (Kesonbua & Chantaranothai, 2008). The terminology used follows Harris & Harris (1994) and Rifai & Puryadi (2008). All specimens were stored in Herbarium Bogoriense (BO). Characters observed included stature, leaves (shape, size, upper and lower surfaces, trichomes, and petioles), stipules shape, inflorescences (inflorescence type, petal and crown shape, petal and crown estivation, length of crown tube, crown color, and flower odor), fruit shape and fruit color, and seeds (shape and number of seeds). Morphological characters were used for identification process and creating key identifications.

RESULTS AND DISCUSSION

Two species of *Tarenna* which are new records for Java and Madura Island, namely *T. costata* (Miq.) Merr. and *T. fragrans* (Blume) Koord. & Valeton is found in Sampang Regency, East Java. The key to the latest identification of *Tarenna* species in Java, descriptions and morphological characteristics of *T. costata* and *T. fragrans* are shown in Figure 1 and Figure 2, respectively, and a distribution map of each species is shown in Figure 3. The description of each species is described. below this

Key to *Tarenna* Species in Java

1a. Leaf base cuneate to attenuate, bark smooth with rounded scars, flower pedicels absent ….. *T. costata*
b.Leaf base attenuate, flower pedicels 1-3 mm, bark smooth without rounded scars ……2
2a. Primary veins of upper leaf surface glabrescent to glabrous ……..…… *T. laxiflora*
b. Primary veins of upper leaf surface pubescent to velutinous …… … 3
3a. Inflorescence subterminal, unscented flowers……... *T. dasyphyla*
b. Inflorescence terminal, fragrant flower ……... *T. fragrans*

areas with few human inhabitants. In this study, the maximum number for each species per catch was limited to 3 individuals only with a carapace width >15 centimeters, and the rest were released to their habitat again, based on the Decree of Ministry.

Tarenna costata (Miq.) Merr., Philipp. J. Sci. 17: 472 (1920); Indah, The Species of *Tarenna* (Rubiaceae) in Sumatra, thesis (1999) 45 – Stylocoryna costata Miq., Fl. Ned. Ind. 2: 203 (1857). Webera costata (Miq.) Hook.f., Fl. Brit. India 3: 103 (1880). Tipe: Sumatra, Sumatra Barat, Pasaman, Bonjol, Teisjmann 1051, st., sd., (holo: BO!).

Tree, up to 30 m tall. **Bark** smooth with rounded scars, dippled reddish to orange brown. **Inner bark** pale brown. **Twig** quadrangular, orange brown-brown, velutinous to glabrescent. **Leaves** coriaceous, obovate, 2-30 by 0.7-14.5 cm, base cuneate to attenuate, apex obtuse to acute and cuspidate, upper surface sparsely to densely pubescent, smooth to the touch, primary vein pubescent, secondary veins 6-14 pairs, flat, tertiary veins obscure; lower surface pubescent, primary vein densely pubescent, secondary veins prominent, tertiary veins slightly visible to distinct, secondary and tertiary veins as ladder like connections; petioles pubescent, 1-2 cm; stipules persistent, lobes triangular with mucronate apex, 3-6 mm long, lower surface pubescent, costa subprominent. **Inflorescence** terminalis, corymbose, peduncle 1.5-4 cm longer than petiole, rachis 0.7-2 cm long, peduncles and rachis pubescent; bract linear, apex acuminate, 0.2-0.7 by 0.05 cm, with velutinous indumentum.

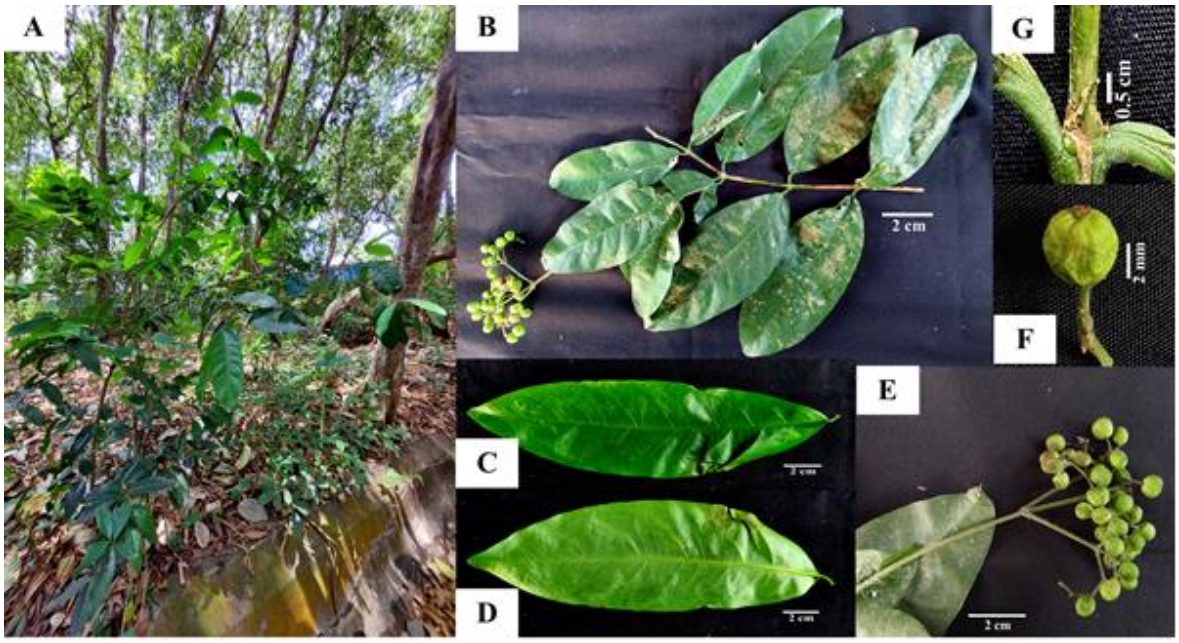

Figure 1. *Tarenna costata* (Miq.) Merr. A. Stature; B. Complete branch; C. Adaxial surface of the leaf; D. The abaxial surface of the leaf; E. Fruiting; F. Fruit; G. Stipula. Photo documentation by Ashari Bagus Setiawan

Flowers whitish yellow, sessits; calyx 1-2 mm long, with pubescent indumentum, lobe triangular, imbricate, 0.5-1 mm, pubescent; corolla tube 0.3-0.6 cm long, outside densely pubescent, petal imbricate, apex obtuse, 0.3-0.4 cm long, outside pubescent; anthers 3-4.5 mm long; many ovules, stigma clavata, 0.7-0.8 cm long. **Fruit** globular, 0.2-0.6 cm diam., dull greyish green to green. **Seed** 36-48, trapezoid, irregular, suberect, surface reticulate, 0.1-0.2 cm long by 0.1-0.3 cm wide.

Local name: unknown.

Distribution: Peninsular Malaysia, Sumatra, Borneo, and the Philippines. In this study, it was found in the Sumber Omben area, Omben District, Sampang Regency, Madura Island (East Java).

Habitat: This plant was found in secondary forest at an altitude of 4-250 m above sea level. (Indah, 1999). Where in this study, the specimen was found in a mixed forest area near the Omben source area which was dominated by *Syzygium* sp. (130 m above sea level.).

Observed Specimens: Ashari B. Setiawan & Thobib Hasan Al Yamini 011, 012.

Note: the inflorescence has a pubescent indumentum.

Utilization: this species is not utilized by the local community.

Tarenna fragrans (Blume) Koord. & Valeton, Meded. Lands Plantentuin 59: 77 (1902); Backer & Bakh. f., Fl. Java. 2: 308 (1965); Indah, The Species of Tarenna (Rubiaceae) in Sumatra, thesis (1999) 50 – Wahlenbergia fragrans Blume, Catalogus 15 (1823). Tipe: Indonesia, Jawa, Blume 1333 (holo: L!). *Ceriscus fragrans* (Blume) Nees, Flora 8: 116 (1825); *Stylocoryna fragrans* (Blume) Blume, Bijdr. 982 (1826); *Stylocoryna fragilis* D.Dietr., Syn. Pl. 1: 794 (1839); *Stylocoryna albituba* Miq., Fl. Ned. Ind., Eerste Bijv. 541 (1861); Webera fragrans (Blume) Hook.f., Fl. Brit. India 3: 103 (1880); Chomelia fragrans (Blume) K.Schum, Nat. Pflanzenfam. 4(4): 74 (1891); Webera albituba (Miq.) Boerl., Handl. Fl. Ned. Ind. 2(1): 129 (1891).

Treelet to tree, up to 10 m tall. Bark smooth, greyish brown. **Inner bark** brown. **Twig** quadrangular, brown, pubescent to glabrescent. **Leaves** chartaceous to thinly coriaceous, elliptical to obovate, 5-18.5 by 1.2-7.8 cm, base attenuate, apex acuminate, upper surface glabrescent to glabrous, primary vein glabrescent to glabrous, secondary veins 6-13 pairs, flat, tertiary veins obscure; lower surface glabrescent, primary vein glabrescent, secondary veins visible, tertiary veins obscure; petioles pubescent to glabrescent, 0.5-1.5 cm; stipules persistent, lobes triangular with cuspidate apex 5-6 mm long, lower surface pubescent, costa prominent. **Inflorescence** terminal, thyrsa, peduncle 1.5-3.5 cm longer than petiole, rachis 0.5-1.5 cm long, peduncles and rachis pubescent; bract lanceolate become foliar, apex acute, 0.4-0.6 by 0.05-0.1 cm, with pubescent indumentum.

Figure 2 *Tarenna fragrans* (Blume) Coord. & Valeton. A. Stature; B. Complete branch; C. Adaxial surface of the leaf; D. The abaxial surface of the leaf; E. Stipules; F. Umbrella inflorescences; G. Bracts in flowers. Photo documentation by Ashari Bagus Setiawan (A-F) and sketch drawing by Novita Kartika Indah (G).

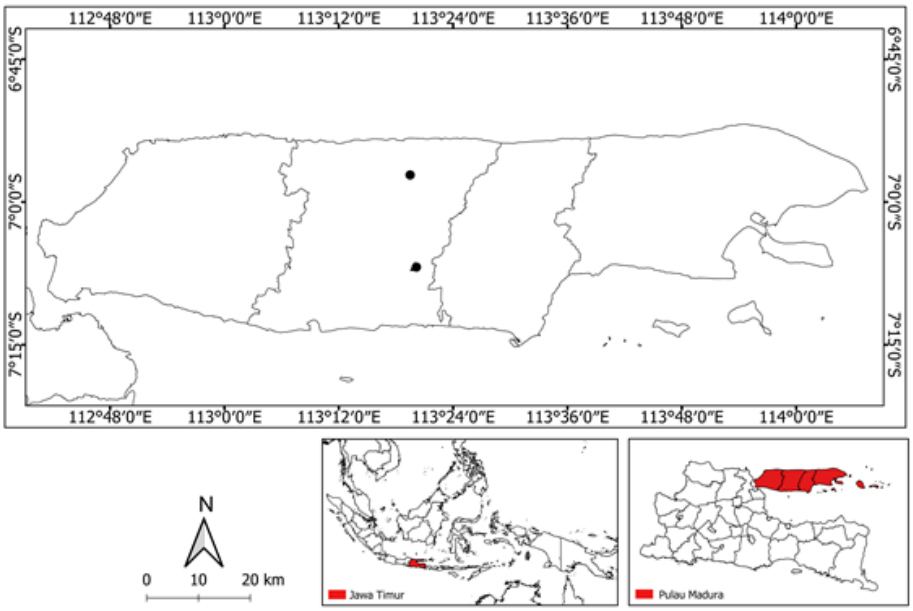

Figure 3. Distribution of Tarenna on Madura Island. ▲ *Tarenna costata*; ● *Tarena fragrans*

Flowers white turning cream to pale yellow, subsessils; calyx 1.5- 2.5 mm long, with pubescent indumentum, lobe ovate, imbricate, 0.5-1 mm, pubescent; corolla tube 015-1.6 cm long, outside densely pubescent, petal imbricate, apex obtuse, 0.45 - 0.6 cm long, outside pubescent; anthers 4.5-5 mm long; many ovules, stigma linear, 1-1.5 cm long. **Fruit** globular, 0.3-0.7 cm diam. **Seed** 40-50 trapezoid, irregular, suberect, surface reticulate, 0.15- 0.3 cm long by 0.15-0.2 cm wide.

Local name: unknown.

Distribution: Peninsular Malaysia, Sumatra, Java, Kalimantan and Sulawesi. In this study, it was found in Pancor Tengah village, Ketapang District, Sampang Regency, Madura Island (East Java).

Habitat: this plant was found in forests at an altitude of 5-700 meters above sea level (Indah, 1999). In this study, the specimen was found in a mixed forest area dominated by teak plants (126 m above sea level.) and people's yards (119 m above sea level.).

Observed Specimens: Ashari B. Setiawan & Thobib Hasan Al Yamini 013, 014.

Note: fragrant flowers

Utilization: *Tarenna fragrans* grows wild in the mixed forest under teak tree stands and is utilized by the local community. One of the residents used the flowers as sowing flowers at funeral activities which were mixed with Rose, Champaca, and Ixora. Sow flowers are sold in the Ketapang market. The owner of the house did not know the location where this plant was first obtained. In Kalimantan, its use has been reported as traditional medicine and dye for woven fabrics (Royyani & Efendi, 2014; Kartini & Sisillia, 2017).

CONCLUSION

The results showed that *Tarenna fragrans* and *Tarenna costata* were found in Madura. Furthermore, it is necessary to conserve these two species, so that they can be developed as an alternative to ornamental plants in the future.

ACKNOWLEDGEMENT

This research was carried out with the support of all the academic community of the State University of Surabaya, especially Biology Department, Faculty of Mathematics and Natural Sciences, Unesa. Thanks to Dr. Rinie Pratiwi P., M.Sc. as Head of the Department who had given permission to conduct exploration and Dr. Sunu Kuntjoro, M.Si. who gave permission to use the Biology Department Laboratory facilities, especially the Taxonomy Laboratory, and friends from the Botanical KBK and Taxonomy families who continue to inspire enthusiasm so that this article can be completed properly

REFERENCES

Backer, C. A. & Bakhuizen v/d Brink Jr. (1965). Flora of Java II. The Netherland: Noordhoof Groningen.

Corner, E. J. H. 1940. Wayside Trees of Malaya. Singapore: Government Printing Office.

Djarwaningsih, T., Siti Sunarti, & Kartini Kramadibrata. (2002). Panduan Pengelolaan Material Herbarium serta Pengendalian Hama Terpadu di Herbarium Bogoriensi. Herbarium Bogoriense-Bidang Botani. Bogor: Pusat Penelitian Biologi. LIPI.

Fosberg, R., Sachet, & Oliver, R. (1993). Flora Micronesia 5: Bignoniaceae-Rubiaceae. Washington DC: Smithsonian Instituion Press.

Harris, J.G & Melinda W. Harris. (1994). Plant Identification Terminology: An Illustrated Glossary. Spring Lake, Utah: Spring Lake Publishing.

Indah, N.K. (1999). The Species of Tarenna (Rubiaceae) in Sumatra Bogor: IPB (tesis tidak dipublikasikan).

Kartini, D.E. & L. Sisillia. (2017). Jenis Tumbuhan Pewarna Alam yang Dimanfaatkan Oleh Masyarakat Penenun Desa Batu Lintang Kecamatan Embaloh Hulu Kabupaten Kapuas Hulu. *Jurnal Tengkawang*, 7 (2), 84-91. 10.26418/jt.v7i2.23773.

Kesonbua, W. & Pranom Chantaranothai. (2008). A checklist of the genus Tarenna Gaertn. (Rubiaceae) in Thailand. *Thai Forest Bulletin.* 36: 18–45. Plant Identification Terminology: An Illustrated Glosory. Utah: Spring Lake Publishing. https://li01.tci-thaijo.org/index.php/ThaiForestBulletin/article/view/24176/20562.

Merrill, E. D. (1921). Studies on Philippine Rubiaceae IV. *Phillip. Journ. Sc.* 17,461 -474. 10.3860/pjsb.v1i1.908.

Oliver, D. (1877). *Flora Tropical Africa* III London: Reeve & Co.

Reynolds, S.T. & Paul I. Forster. (2005). A taxonomic revision of Tarenna Gaertn. and Triflorensia S.T.Reynolds (Rubiaceae: Ixoroideae: Pavetteae) in Australia. *Austrobaileya.* Vol. 7 (1): 29-55. https://www.jstor.org/stable/41739010.

Ridley, H. N. (1923). *Flora Malay Peninsula.* London: Reeve & Co.

Rifai, M. & Dedi Puryadi. (2008). *Glosarium Biologi.* Jakarta: Pusat Bahasa.

Royyani, M.F. & Efendy, O. (2015). Kajian Etnobotani Masyarakat Dayak di Desa Tau Lumbis, Kabupaten Nunukan Propinsi Kalimantan Utara, Indonesia. *Berita Biologi.*, 14 (2), 177-185. 10.14203/beritabiologi.v14i2.1852.

Rugayah, Atik R., F.I. Windadadri, & Arief Hidayat. (2004). Pengumpulan data taksonomidalam Rugayah, Elizabeth A. W., dan Praptiwi (Ed.) Pedoman pengumpulan data keanekaragaman flora. Bogor: Pusat Penelitian Biologi LIPI.

Wernham, H.F. (1913). The nomenclature of Tarenna. *Journ. Bot.* 51 : 58-59.

WFO (The World Flora Online). *Tarenna* Gaertn. http://worldfloraonline.org/taxon/wfo-4000037591;jsessionid=8CB2B539FE35E1EB8A9D7440F9C1C490.