

## INTISARI

Kayu eboni (*Diospyros celebica* Bakh.) termasuk jenis endemik Sulawesi yang memiliki corak strip yang khas dan menjadi penentu kualitasnya. Eboni saat ini termasuk jenis prioritas untuk dilestarikan dan pemanfaatannya diatur dengan ketat. Eboni memiliki strip yang beragam sehingga industri eboni menggolongkannya dalam dua tipe strip yaitu strip *batang macis* (BM, strip hitam rapat dan halus) dan *sarang laba-laba/bendera* (SL, strip lebih jarang). Sebaran dan potensi terbaru, kualitas strip dari habitat alami dan pengaruhnya terhadap sifat-sifat kayu serta karakteristik tempat tumbuh yang menghasilkan eboni BM dan SL belum diketahui. Penelitian ini dilaksanakan untuk menjawab permasalahan yaitu: (I) bagaimana sebaran, potensi dan karakteristik strip kayu teras eboni di Sulawesi? (II) bagaimana pengaruh asal tempat tumbuh dan posisi kayu dalam batang terhadap struktur anatomi, sifat fisik dan komposisi kimia kayu? dan (III) adakah hubungan antara kondisi tempat tumbuh dengan tipe strip kayu pada eboni? Penelitian ini bertujuan untuk mengetahui: (a) sebaran, potensi dan karakteristik strip kayu eboni di Sulawesi, (b) struktur anatomi, sifat fisik dan komposisi kimia kayu eboni asal tempat tumbuh yang berbeda serta variasinya pada arah radial dan vertikal serta (c) hubungan antara tempat tumbuh dengan karakteristik strip kayu. Penelitian I dilakukan dengan metode survei, inventarisasi potensi, pengumpulan data sekunder dan pengamatan strip kayu. Kualitas strip berdasarkan standar yang dibuat oleh industri eboni. Penelitian II dilakukan dengan mengamati sifat-sifat anatomi, fisik dan kimia pada contoh kayu eboni BM dan SL berdasarkan IAWA List, standar ISO, CIELab, ASTM dan SNI. Penelitian III dilakukan dengan menganalisis lingkungan tempat tumbuh kedua tipe strip. Penelitian dilaksanakan di Provinsi: Sulawesi Selatan, Sulawesi Barat dan Sulawesi Tengah, Fak. Kehutanan dan Fak. Biologi UGM, BPTP Sulawesi Selatan dan BP2LHK Makassar pada bulan April 2013 hingga Agustus 2015. Hasil penelitian aspek I menunjukkan bahwa habitat alami eboni di Sulawesi ditemukan di Kabupaten Gowa, Maros, Pangkajene Kepulauan, Barru, Sidenreng Rappang, Luwu, Luwu Timur, Mamuju, Donggala, Parigi Moutong, Poso dan Morowali. Sebagian besar habitat alami berada dalam hutan lindung, sedang di luar kawasan lindung hanya ditemukan di Luwu Timur, Mamuju dan Poso. Potensi tegakan antara 0,09 m<sup>3</sup>/ha – 75,5 m<sup>3</sup>/ha. Kualitas strip umumnya termasuk mutu C; mutu B dan A hanya ditemukan di Sulawesi Tengah. Penelitian II menunjukkan bahwa tipe strip, arah radial dan vertikal batang berpengaruh pada sifat-sifat kayu. Eboni BM memiliki pori dan ekstrakatif air panas yang lebih besar, frekuensi pori, panjang serat, kadar air basah, holoselulosa dan selulosa lebih kecil dibandingkan eboni SL. Pada arah vertikal dalam batang kedua tipe strip, rerata diameter pori, tebal dinding dan indeks gabungan pori tertinggi pada bagian pangkal, sedangkan frekuensi pori dan jari-jari tertinggi pada bagian ujung. Pada arah radial, dimensi ciri anatomi yang tertinggi pada teras kecuali frekuensi pori dan frekuensi jari-jari. Arah radial berpengaruh pada berat jenis dan kadar air, sedangkan arah vertikal batang berpengaruh tidak nyata. Berat jenis tertinggi pada kayu teras dan kadar air tertinggi pada kayu gubal. Pada sifat kimia, arah radial berpengaruh sangat nyata kecuali kadar holoselulosa, ekstrakatif air panas dan



boron. Kayu teras memiliki kadar selulosa, lignin, ekstrakatif etanol-toluena, pH dan abu lebih tinggi dan berbeda nyata dengan kayu gubal dan intermediat. Ditemukan empat jenis jamur pada kayu eboni segar yaitu *Aspergillus* sp. dan *Fusarium* sp. pada kayu teras dan *A. fumigatus* dan *A. orizae* pada kayu gubal dan intermediat. Temuan jenis jamur pada zona intermediat dan kadar boron menunjukkan bahwa teras eboni tidak terbentuk oleh serangan jamur. Aspek III menunjukkan bahwa pada lokasi tempat tumbuh eboni, sifat-sifat tanah dan kondisi lingkungan seperti suhu, persen debu, pH, kadar N, Ca, KTK, persen pasir dan C berbeda antara lokasi tempat tumbuh eboni BM dengan SL. Variabel-variabel tersebut umumnya lebih tinggi pada eboni SL, kecuali suhu dan persen pasir yang lebih rendah. Komponen utama variabel lingkungan dan tanah yang lebih dominan berpengaruh pada tempat tumbuh eboni BM berbeda dengan eboni SL kecuali kelembaban udara dan magnesium yang menjadi komponen utama kedua lokasi. Variabel lingkungan yang diduga menjadi penentu terbentuknya eboni BM yaitu persen pasir yang lebih tinggi, debu, N, C dan KTK yang lebih rendah dibanding eboni SL. Diperlukan usaha pelestarian berupa perlindungan habitat dan penanaman eboni di luar kawasan lindung khususnya di Sulawesi Tengah sebagai penghasil eboni BM karena keberadaannya yang semakin terancam.

Kata Kunci: *Diospyros celebica*, sebaran, potensi, tipe strip, sifat-sifat kayu, tempat tumbuh.

## ABSTRACT

Ebony (*Diospyros celebica* Bakh.) is an endemic species of Sulawesi with a quality defining unique streak pattern. It is listed as a prioritized species to preserve whose utilization is strictly regulated. It also has various streak pattern in which the industry classified it into two streak types namely *batang macis* (BM, with a dense and smooth black streak) and *sarang laba-laba/bendera* (SL, with spaced streaks). However, the latest information dealing with its distribution, potentials, streak quality of the natural habitat and its influence on the wood characteristics, as well as the site characteristics of both BM and SL ebony is not widely studied. Hence, this research is conducted to answer the problems: (I) how are distribution, potency and streak characteristic of ebony heartwood in Sulawesi? (II) how are the influence of the different site and its variation within trees on the anatomical structure, physical properties and chemical composition? and (III) is there any relation between site characteristics with streak type?. This research is particularly aimed at gathering information on: (a) potentials and streak quality of ebony in its natural habitat, (b) anatomical characteristics, physical, and chemical properties from different site (streak type) and its variation within trees, and (c) the influence of the site on streak type. To get an insight on Aspect I, we conducted survey, potential inventory, secondary data collection, and observation on the wood streaks. The quality is based on the standard quality set by the ebony industry. Meanwhile, on aspect II, we observed the anatomical characteristics, physical, and chemical properties of the sample of BM and SL ebony based on the IAWA List, ISO, CIELab, ASTM and SNI standards. The information regarding Aspect III is collected by analyzing the characteristics of growth site of both streaks. The research is mainly conducted in South Sulawesi, West Sulawesi, and Central Sulawesi, Faculty of Forestry of UGM, Faculty of Biology of UGM, BPTP of South Sulawesi and BP2LHK of Makassar in April 2013 to August 2015. The research on Aspect I reveals that the natural habitat of Ebony in Sulawesi is mainly located in Gowa, Maros, Pangkajene Island, Barru, Sidenreng Rappang, Luwu, Luwu Timur, Mamuju, Donggala, Parigi Moutong, Poso and Morowali Regency. Most of its natural habitat lies in the protected forest, while those located out of the protected forest can only be found in East Luwu, Mamuju, and Poso. The stand potentials of ebony is around 0,09 – 75,5 m<sup>3</sup>/ha. Meanwhile, most of its streak quality which is classified into C quality, B and A quality can be found in Central Sulawesi. Research on Aspect II reveals that the streak type and the radial and vertical direction of the stem highly influence its characteristics. BM ebony generally has bigger vessels and hot water extracts, vessel frequency, fiber length, wet moisture content, holocellulose, and smaller cellulose than SL ebony. In the vertical direction of both streak types, the highest mean of vessel diameter, wall thickness, and the vessel grouping index are in the base, whilst the highest vessel frequency and ray frequency are in the top of the stem. In the radial direction, the highest dimension of anatomical characteristics lies in the heartwood except for vessel frequency and ray frequency. Radial direction affects the density and moisture content, meanwhile the vertical direction of the stem affects it insignificantly. The highest density is



for heartwood while the highest moisture content is for sapwood. In terms of the chemical characteristic, the radial direction is significantly influential except for the level of holocellulose, hot water extractive, and boron. Heartwood possesses substantially higher level of cellulose, lignin, ethanol-toluene, ash, and pH value than the sapwood and intermediate wood. There are four types of fungus in the fresh cut ebony namely the *Aspergillus* sp. and *Fusarium* sp. in the heartwood and *A. fumigatus* and *A. orizae* in the sapwood and the intermediate. The type of fungus found in the intermediate zone and boron level indicate that ebony heartwood is not formed due to fungal attack. The research on Aspect III show differences on the site of ebony, soil characteristics, and environmental condition such as temperature, dust percentage, pH value, level of N, Ca, KTK, percentage of sand, and C for the site of both BM and SL ebony. The SL ebony has higher contents of those variables than the BM ebony, except for the lower temperature and sand percentage. The main component of the environmental variable and soil which is dominantly more influential towards the site of BM ebony is different than SL ebony except for air humidity percentage and magnesium level which set as the main component of both locations. The formation of BM ebony is presumably attributed to some environmental variables such as higher of sand percentage and lower of dust percentage, N, C and KTK than SL ebony. In conclusion, protection of ebony population is necessary for preserving ebony outside of the protected forest especially in Central Sulawesi, the producer of BM ebony, since they are under threat of extinction.

Keywords: *Diospyros celebica*, distribution, potentials, streak type, wood properties, growth site.