

Myrsine melanophloeos (L.) R.Br.

Protologue Prodr.: 533 (1810).

Family Myrsinaceae

Synonyms *Rapanea melanophloeos* (L.) Mez (1902), *Rapanea rhododendroides* (Gilg) Mez (1902).

Vernacular names Cape beech (En). (Fr). (Po). (Sw).

Origin and geographic distribution *Myrsine melanophloeos* is widespread, occurring from West, East to South of Africa in Nigeria, Ethiopia and Kenya, and Angola, Zimbabwe, Mozambique, South Africa and Swaziland.

[Countries 16, 17, 18, 24, 25, 26, 27, 29, 32, 33, 34, 35, 36, 37, 40, 41, wild]

Uses The wood is used for joinery, decorative panelling, poles, furniture, cabinet work, vehicle bodies, musical instruments such as violins, carved sticks, implements and tool handles. It is suitable for construction, flooring, interior trim, railway sleepers, toys, novelties, pattern making, carvings, turnery, veneer and plywood. It is used as firewood and for charcoal production.

Bark decoctions are taken as expectorant and emetic, and to treat pains, fever, diarrhoea palpitation, and wounds. Roots are used roots as purgative. Dried fruits are used as anthelmintic and purgative, and commonly as anthelmintic in livestock. *Myrsine melanophloeos* is planted as an ornamental tree.

[PU: 7; SU: 4, 10, 11]

Production and international trade The wood is only used locally and not traded on the international timber market. The bark is commonly traded on markets in South Africa.

Properties The heartwood is whitish to pale brown or pinkish brown, darkening upon exposure, and indistinctly demarcated from the wider sapwood. The grain is straight, sometimes with a tendency to become wavy, texture is medium to fine and even. Quarter-sawn surfaces show a nice silver-grain figure, and backsawn surfaces show a reticulated-mottled pattern.

The wood is medium-weight to heavy, with a density of 680–845 kg/m³ at 12% moisture content. It should be dried slowly and with care because it is susceptible to splitting, warping and cupping, particularly in backsawn boards. It is recommended to quarter-saw logs before drying. The proportion of shrinkage is rather high, from green to oven dry about 3.2% radial and 11.4% tangential respectively.

At 12% moisture content, the modulus of rupture is 112 N/mm², modulus of elasticity is 15,780 N/mm², compression parallel to grain is 58 N/mm², shear is 13 N/mm², Janka side hardness is 6625 N and Janka end hardness is 8135 N.

The wood is easy to saw and work with both hand and machine tools, and finishes to a smooth surface without the use of filler. The nailing properties are moderate. The wood glues and turns well. It is not durable, being liable to fungal, termite, dry-wood borer and marine borer attacks. It is moderately resistant to impregnation with preservatives.

The bark contains up to 15% tannin. Triterpenoid saponins such as sakurasosaponin have been isolated from the leaves. Sakurasosaponin showed molluscicidal and antifungal activities against *Biomphalaria glabrata* and *Cladosporium cucumerinum*, respectively. In tests, methanolic extracts of leaves and twigs showed weak in-vitro antiplasmodial activity. Benzoquinone embelin has been isolated from the seeds. This compound caused a decline in testosterone levels in male rats. Tests in sheep infected with the nematode parasite *Haemonchus*

contortus showed *Myrsine melanophloeos* fruit extracts to have no anthelmintic effect. *Myrsine melanophloeos* fruit extracts showed little effect in mice infected with *Heligmosomoides polygyrus*.

Adulterations and substitutes The wood resembles that of *Faurea* spp., which is used for similar purposes.

Description *Myrsine melanophloeos* stands as an evergreen shrub or small to medium-sized tree up to 20(–25) m tall; bole branchless for up to 6 m, usually straight and cylindrical, sometimes twisted, up to 70(–100) cm in diameter, often fluted at base or with very small buttresses; bark surface fissured, rough, white-grey to reddish brown, inner bark pale brown to reddish; twigs glabrous to slightly hairy. Leaves alternate, often clustered at ends of branches, simple and entire; stipules absent; petiole up to 1(–3.5) cm long, often slightly winged; blade elliptical to lanceolate or obovate, 2.5–20 cm × 1–7 cm, cuneate at base, obtuse to short-acuminate at apex, leathery, glabrous, sometimes with resinous streaks, pinnately veined with 8–22 pairs of lateral veins. Inflorescence an axillary fascicle of 3–12 flowers, often also on older leafless branches, with many scale-like bracts at base. Flowers bisexual or functionally unisexual, regular, (4–)5(–6)-merous, often with dark markings; pedicel up to 7 mm long, stout; calyx cup-shaped, up to 3 mm long with lobes c. 1.5 mm long, minutely hairy at margins; corolla up to 5 mm long, whitish to greenish yellow or pinkish, with c. 1 mm long tube and ovate to oblong lobes, minutely hairy at margins; stamens opposite petals, attached at throat of corolla, without filaments; ovary superior, ovoid to nearly globose, globose, 1-celled, style short or absent, stigma conical. Fruit a fleshy globose drupe up to 8 mm in diameter, with irregular longitudinal lines, pinkish to bluish or purplish, with persistent calyx at base and style base at apex, 1-seeded. Seed flattened globose, up to 4 mm in diameter, with cavity at base, slightly pitted, brownish.

Other botanical information *Myrsine* comprises about 300 species and occurs in all tropical regions. In mainland tropical Africa 2 species occur, 2 additional ones in South Africa, and another 2 in Madagascar. In most African floras, *Rapanea* has been kept separate from *Myrsine*, based on the presence (*Myrsine*) or absence (*Rapanea*) of a collar uniting the stamens. However, in several tropical American species transitions between the two conditions exist, and therefore it has been proposed to include *Rapanea* into *Myrsine*.

Anatomy See Wood Anatomy Workshop 2 (as *Rapanea melanophloeos*).

Growth and development Trees grow fairly rapidly. In southern Africa they usually flower in June–August, sometimes until December. The flowers have a faint scent and are visited by insects such as bees and flies. Fruits take at least 3 months to ripen. They are eaten by birds, which probably disperse the seeds, but wild pigs and monkeys also feed on the fruits.

The roots develop suckers and the tree is consequently not suited for planting as ornamental in smaller gardens.

Ecology *Myrsine melanophloeos* occurs in mountain forest, grassland and thickets up to 3750 m altitude, but in southern Africa also in evergreen coastal forest near sea-level. It usually grows in open forest or forest edges, or along streams because it prefers fair amounts of light. In the mountains of Ethiopia, it is associated with *Hagenia*, *Juniperus*, *Podocarpus*, *Schefflera* and *Erica* spp., in regions with a mean annual rainfall of 1000–1500(–2000) mm. *Myrsine melanophloeos* is fairly tolerant to drought, frost, salt and wind.

Propagation and planting Natural regeneration is often abundant, sometimes resulting in nearly pure stands. Seeds should be stored in sealed containers in a cool and dry locality; it is recommended to add ash because they are susceptible to insect attack. Sowing can be done directly in the field. Seeds can also be sown in

pots with a well-drained general potting mixture and placed in a warm and slightly shaded locality. It is recommended to treat the seeds with a fungicide before sowing to avoid damping off in seedlings. Propagation by wildlings is sometimes also practised.

Management The tree can be managed by coppicing and pollarding.

Diseases and pests In South Africa, it has been observed that fungal species such as *Ceratocystis* spp. may cause significant lesions on *Myrsine melanophloeos* trees.

Harvesting Care should be taken during harvesting because logs are liable to splitting. Debarked trees do not recover easily and it has been recommended to limit harvesting of the bark for medicinal purposes to narrow vertical strips.

Genetic resources Locally the bark of *Myrsine melanophloeos* is heavily exploited, e.g. in northern South Africa, and the average height, bole diameter and number of trees in different size classes in harvested populations is lower than in unharvested populations, although the harvested populations appear to withstand current levels of harvesting. In other regions where *Myrsine melanophloeos* is an important timber and/or medicinal plant, e.g. in Uganda and southern Ethiopia, it is still abundant and not threatened.

Prospects *Myrsine melanophloeos* has been suggested as useful for firewood plantations in highland regions, but undoubtedly the wood from such plantations is also useful as general-use timber for local applications. As a multipurpose tree, it could be considered for promotion for planting in agroforestry programmes/systems, but more research is still needed on propagation, planting and proper management practices.

Major references

- [1] Bolza, E. & Keating, W.G., 1972. African timbers: the properties, uses and characteristics of 700 species. Division of Building Research, CSIRO, Melbourne, Australia. 710 pp. #9967#
- [2] Chikamai, B.N., Githiomi, J.K., Gachathi, F.N. & Njenga, M.G., undated. Commercial timber resources of Kenya. Kenya Forestry Research Institute (KEFRI), Nairobi, Kenya. 164 pp. #14461#
- [3] Coates Palgrave, K., 1983. Trees of southern Africa. 2nd Edition. Struik Publishers, Cape Town, South Africa. 959 pp. #3814#
- [4] Grace, O.M., Prendergast, H.D.V., Jäger, A.K. & van Staden, J., 2002. Bark medicines in traditional healthcare in KwaZulu-Natal, South Africa: an inventory. South African Journal of Botany 69(3): 301–363. #8448#
- [5] Halliday, P., 1984. Myrsinaceae. In: Polhill, R.M. (Editor). Flora of Tropical East Africa. A.A. Balkema, Rotterdam, Netherlands. 23 pp. #3963#
- [6] Katende, A.B., Birnie, A. & Tengnäs, B., 1995. Useful trees and shrubs for Uganda: identification, propagation and management for agricultural and pastoral communities. Technical Handbook 10. Regional Soil Conservation Unit, Nairobi, Kenya. 710 pp. #5755#
- [7] Palmer, E. & Pitman, N., 1972–1974. Trees of southern Africa, covering all known indigenous species in the Republic of South Africa, South-West Africa, Botswana, Lesotho and Swaziland. 3 volumes. Balkema, Cape Town, South Africa. 2235 pp. #5744#
- [8] Porter, H., 2005. *Rapanea melanophloeos* (L.) Mez. [Internet] South African National Biodiversity Institute, Kirstenbosch, South Africa. http://www.plantzafrica.com/plantqrs/rapanmelan.htm. Accessed August 2011.

[9] Sebsebe Demissew, 2003. Myrsinaceae. In: Hedberg, I., Edwards, S. & Sileshi Nemomissa (Editors). Flora of Ethiopia and Eritrea. Volume 4, part 1. Apiaceae to Dipsacaceae. The National Herbarium, Addis Ababa University, Addis Ababa, Ethiopia and Department of Systematic Botany, Uppsala University, Uppsala, Sweden. pp. 64–69. #7274#

[10] van Wyk, B.E., van Oudtshoorn, B. & Gericke, N., 1997. Medicinal plants of South Africa. Briza Publications, Pretoria, South Africa. 304 pp. #5503#

Other references

[1] Botha, J., Witkowski, E.T.F. & Shackleton, C.M., 2004. Harvesting impacts on commonly used medicinal tree species (*Catha edulis* and *Rapanea melanophloeos*) under different land management regimes in the Mpumalanga lowveld, South Africa. *Koedoe* 47(2): 1–18.

[2] Bryce, J.M., 1967. The commercial timbers of Tanzania. Tanzania Forest Division, Utilisation Section, Moshi, Tanzania. 139 pp. #11130#

[3] Burkill, H.M., 1997. The useful plants of West Tropical Africa. 2nd Edition. Volume 4, Families M–R. Royal Botanic Gardens, Kew, Richmond, United Kingdom. 969 pp. #5885#

[4] Clarkson, C., Maharaj, V.J., Crouch, N.R., Grace, O.M., Pillay, P., Matsabisa, M.G., Bhagwandin, N., Smith, P.J. & Folb, P.I., 2004. In vitro antiplasmodial activity of medicinal plants native to or naturalised in South Africa. *Journal of Ethnopharmacology* 92: 177–191. #8459#

[5] Friis, I., 1992. Forests and forest trees of northeast tropical Africa: their natural habitats and distribution patterns in Ethiopia, Djibouti and Somalia. *Kew Bulletin, Additional Series* 15, H.M.S.O., London, United Kingdom. 396 pp. #5753#

[6] Githiori, J.B., Høglund, J., Waller, P.J. & Leyden Baker, R., 2002. Anthelmintic activity of preparations derived from *Myrsine africana* and *Rapanea melanophloeos* against the nematode parasite, *Haemonchus contortus*, of sheep. *Journal of Ethnopharmacology* 80: 187–191.

[7] Githiori, J.B., Høglund, J., Waller, P.J. & Leyden Baker, R., 2003. Evaluation of anthelmintic properties of extracts from some plants used as livestock dewormers by pastoralist and smallholder farmers in Kenya against *Heligmosomoides polygyrus* infections in mice. *Veterinary Parasitology* 118: 215–226.

[8] Grace, O.M., Prendergast, H.D.V., van Staden, J. & Jäger, A.K., 2002. The status of bark in South African traditional health care. *South African Journal of Botany* 68: 21–30. #8548#

[9] Kamgan, N.G., Jacobs, K., De Beer, Z.W., Wingfield, M.J. & Roux, J., 2008. *Ceratocystis* and *Ophiostoma* species, including three new taxa, associated with wounds on native South African trees. *Fungal Diversity* 29: 37–59.

[10] Kupicha, F.K., 1983. Myrsinaceae. In: Launert, E. (Editor). *Flora Zambesiaca*. Volume 7, part 1. *Flora Zambesiaca Managing Committee*, London, United Kingdom. pp. 198–210. #5041#

[11] Mungai, N.N., Makawiti, D.W. & Konji, V.N., 1997. Effect of different doses and routes of administration of embelin on plasma testosterone levels. *Phytotherapy Research* 11(7): 532–534.

[12] Neuwinger, H.D., 2000. *African traditional medicine: a dictionary of plant use and applications*. Medpharm Scientific, Stuttgart, Germany. 589 pp. #7828#

- [13] Ohtani, K., Mavi, S. & Hostettmann, K., 1993. Molluscicidal and antifungal triterpenoid saponins from *Rapanea melanophloeos* leaves. *Phytochemistry* 33(1): 83–86.
- [14] Pipoly III, J.J., 1996. Contributions towards a new flora of the Philippines: I. A synopsis of the genus *Myrsine* (Myrsinaceae). *Sida* 17(1): 115–162.
- [15] Sommerlatte, H. & Sommerlatte, M., 1990. A field guide to the trees and shrubs of the Imatong Mountains, southern Sudan. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Nairobi, Kenya. 372 pp. #8211#
- [16] Takahashi, A., 1978. Compilation of data on the mechanical properties of foreign woods (part 3) Africa. Shimane University, Matsue, Japan. 248 pp. #11128#
- [17] Taton, A., 1980. Myrsinaceae. In: Bamps, P. (Editor). *Flore d'Afrique centrale. Spermatophytes*. Jardin botanique national de Belgique, Brussels, Belgium. 62 pp. #5314#
- [18] Tyiso, S. & Bhat, R.B., 1998. Medicinal plants used for child welfare in the Transkei region of the Eastern Cape (South Africa). *Journal of Applied Botany* 72(3–4): 92–98. #7513#
- [19] van Vuuren, N.J.J., Banks, C.H. & Stohr, H.P., 1978. Shrinkage and density of timbers used in the Republic of South Africa. Bulletin No 57. South African Forestry Research Institute, Pretoria, South Africa. 55 pp. #11508#
- [20] van Wyk, B. & van Wyk, P., 1997. Field guide to trees of southern Africa. Struik Publishers, Cape Town, South Africa. 536 pp. #11440#

Sources of illustration

- [1] Dale, I.R. & Greenway, P.J., 1961. Kenya trees and shrubs. Buchanan's Kenya Estates Limited, Nairobi, Kenya. 654 pp. #8584#
- [2] Halliday, P., 1984. Myrsinaceae. In: Polhill, R.M. (Editor). *Flora of Tropical East Africa*. A.A. Balkema, Rotterdam, Netherlands. 23 pp. #3963#

Myrsine melanophloeos – 1, part of branch with flowers; 2, flower; 3, branch with leaves and fruits; 4, part of branch with fruits; 5, fruit.

Authors A. Asamoah, C. Antwi-Bosiako, K. Frimpong-Mensah & A. Atta-Boateng

Kwame Nkrumah University of Science & Technology, Kumasi, Ghana

Date EAO; RL 22/08/2011; AOA 30/08/2011; DL 08/09/2011