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The woods used in Recorder making (June 2022)

Although this article is aimed at Recorder players (because Recorders are made in a greater variety of woods than other Woodwind instruments) it may be of interest to players of other Woodwind instruments.

The design of the bore; the design of the wind-way; and the location, size, and shape of the tone-holes, are the most important factors with regard to the tone of an instrument but the wood the instrument is made of does also influence the tone. This can be demonstrated by playing two instruments of the same design by the same manufacturer, but made of different woods e.g. comparing a Mollenhauer Denner descant in Boxwood (5122) with a Mollenhauer Denner descant in Rosewood (5120).

The most important characteristic of the wood is how well it can be cut and shaped, and this is closely, but not entirely, related to its density – denser woods can be shaped with more accuracy and are generally more stable, and most importantly they have a smoother finish – this is of particular relevance to the bore of the instrument. Generally, woods that are softer and less dense have a rougher bore surface, which produces a warmer, more covered and diffuse tone, whereas harder and denser woods have a smoother, more highly polished bore surface and produce a brighter, clearer, and more centered tone quality with greater projection. Softer woods tend to be cheaper because they grow more quickly, but other factors, such as scarcity of the wood, also affect the price so it is not always the case that the harder the wood the more expensive it is (it is also not necessarily the case that the more expensive the instrument the better the instrument – whether a recorder makes a pleasant sound is a subjective decision).

A note of caution regarding density - if a manufacturer has indicated the particular species of tree (wood) used e.g. Grenadilla (Dalbergia melanoxylon) then it is possible to look up its' specific gravity (its' density) which is measured in grams per cubic centimeter (g/cm3) however there is no standard of dryness of the wood when calculating the specific gravity – freshly cut wood (green wood) contains more water than seasoned wood which contains more water than kiln dried wood – so the same piece of wood can have different specific gravities depending on how dry it is – therefore different sources can give different figures for the specific gravity of any particular wood. The figures for specific gravity used in this document are generally from wood-database.com – this website gives two figures for each wood – the first one is derived using a common Botanical method of calculating density and the second one is derived using a common woodworking method of calculating density; when figures for a species of wood have not been obtainable from this source I have used figures from other sources (indicated by).

Accurately identifying the wood an instrument is made out of is very difficult – it is necessary to establish the Botanical species of tree the wood came from but timber yards (and manufacturers) use the local or regional name for the tree/wood and the same name can be used in different parts of the world to describe entirely different woods. Often the local name indicates a genus of tree rather than a particular species of tree (in botany a genus is a grouping of different species of plant) e.g. Maple is the colloquial name for the genus 'Acer' and within that genus there are several species of tree and therefore there are several types of wood called Maple each with different properties including different densities – so two recorders can be made from Maple but they could be different species of Maple. It is worth visiting the manufacturer's website to see if they have identified the species of wood being used – for instance Moeck give exact Botanical names for the woods they use.

The wood used for recorders can be divided into three groups according to hardness/density.

The commonly used '**soft**' woods (in this context meaning lower density) have a specific gravity up to approx 0.65 g/cm3. Generally, softer woods are less expensive (because they grow more quickly) and they are used for student instruments or very large instruments. These lower density woods include Maple, Sycamore, Pear, and Cherry, but none of these names refer to a particular species of wood and so it is impossible to ascertain the properties of the wood used to make a particular instrument. For each of these 4 generic wood types some of the possible species of tree/wood that might be used (and some of their common regional names) are indicated below.

Maple is the common name for the genus Acer (A.) containing many species including the following which are used to make musical instruments: the Big leaf Maple - A. macrophyllum spg 0.44/0.55; the Black Maple (aka Black sugar Maple) – A. nigrum spg 0.52/0.64; the European Sycamore (aka Sycamore Maple) – A. pseudoplatanus spg 0.48/0.62; the Field Maple (aka Hedge Maple) – A. campestre spg 0.53/0.69; the Norway Maple – A. platanoides spg 0.50/0.65; the Red Maple - Acer rubrum spg 0.49/0.61; the Striped Maple - Acer pensylvanicum spg 0.44/0.51; the Silver Maple – A. saccharinum spg 0.44/0.53; the Sugar Maple (aka Hard Maple / Rock Maple) – A. saccharum spg 0.56/0.71.

Sycamore can indicate the species Acer pseudoplatanus as above but could also indicate the genus Platanus (P.) which contains several species including the following which can be used to make musical instruments: Arizona Sycamore (aka Sycamore / Arizona Planetree / Alamo) – P. wrightii spg 0.49/0.54; the Californian Sycamore (aka Californian Planetree / Planetree/ Western Sycamore / Aliso / Sycamore / Buttonball / Buttonball tree / Buttonwood) - P. racemosa spg 0.49/0.54; London Plane (aka European Plane / Lacewood / London Planetree / Hybrid Plane) – P. x acerifolia spg 0.46/0.56; Sycamore (aka American Sycamore / American Plane / Buttonball / Buttonball tree / Buttonwood / Californian Button / Californian Sycamore / Cotonier / Lacewood / Oriental Planetree / Oriental Sycamore / Plane / Planetree / Quartered Sycamore/ Sycamore / Water Beech) – P.occidentalis spg 0.46/0.55.

Pearwood indicates wood from the genus Pyrus (P.) which contains over two dozen species including the European pear (aka Swiss Pear / wild Pear / choke Pear) – P. communis spg 0.52/0.69. Most of the species with the Genus Pyrus can be used to make Recorders.

Cherry – this could indicate one of two species from the Genus Prunus (P.): probably European Sweet Cherry (aka Wild Cherry / Sweet Cherry) – P. avium spg 0.48/0.62; but possibly American Cherry (aka Cherry / Black cherry) – P. serotina spg .47/0.56. It does not indicate Brazillian Cherry (aka Jatoba) - Hymenaea courbaril spg 0.77/0.91 which is a much denser wood but has a porous end grain and so is unsuitable for Recorder making.

The next group of woods have a '**medium**' density this includes Boxwood, Plum wood, Olive Wood, Bubinga, and Haldu. These woods have a warm and brighter sound than the softer woods and are used to make better instruments for Consort or Solo performance.

Boxwood – this is one of the most abused names of wood because while it used to indicate wood solely from the Genus Buxus (B.) of which there are 70 species, it can now also indicate many other species of wood with similar properties but from outside this Genus. In the Genus Buxus the most prized Boxwood is European Box (aka Boxwood / aka Common Box) – B. sempervirens spg 0.68/0.98. Three other types of 'Boxwood' from outside this genus are associated with the manufacture of wind instruments – from Central/South America: Castelo Boxwood (aka Ivory wood / Palo Blanco) - Calycophyllum multiflorum spg 0.64/0.82; and Maracaibo Boxwood (aka West Indian Boxwood / Venezuelan Boxwood / Zapatero / Palo Blanco) - Casearia Praecox spg 0.75-0.90*; and from India, Indian Boxwood – Gardenia Latifolia spg approx 0.80*.
European Boxwood is harder than South American Boxwood and Indian boxwood but is more expensive and less consistent, and because it is less consistent it is more difficult to work and is prone to warping, so it less commonly used.

Plum – this indicates the species Prunus domestica spg 0.61/0.79 although there are 7 subspecies and various hybrids which may vary in their density to some degree.

Olive – this indicates the species Olea europaea spg (0.72-0.99*) although there are 6 subspecies and various hybrids which may vary in their density to some degree.

Bubinga – this wood is also known as African Rosewood although it is from the Genus Guiboutia, not from the Genus Dalbergia (see below). According to wood-database.com, the wood Bubinga (0.72-0.89) legitimately refers to only 3 species - G. demeusei (0.72-0.89), G. pellegriniana, and G. tessmannii; however, the species G. arnoldiana, G. carrissoana, and G. coliosperma are also referred to as Bubinga and/or African Rosewood.

Haldu – this is the common name for the species Haldina cordifolia (aka Aldina cordifolia) spg (0.70*) the sole species of the genus Haldina (of the Rubeaceae family).

The last group is the group of commonly used '**hard**' woods, these have the highest density - and are the Rosewoods (genus Dalbergia) and Ebonies (genus Diospyros) and Mopane (genus Colophospermum); they have pronounced personalities and make excellent solo instruments, but they are less suitable for consort use. The most prized wood is Grenadilla (Dalbergia melanoxylon) - it is stronger in tone than the South American Rosewoods but not as edgy or brilliant - it is usually the wood preferred by professional players who need to perform in large halls or compete with modern orchestral instruments such as flute or oboe.

Rosewood / **Palisander** – these two names are effectively interchangeable – they both refer to the very hard tropical woods of the Genus Dalbergia (D.) that are 'brilliant' sounding for graduate /professional solo work, the species of Dalbergia associated with the production of musical instruments (although some species are now endangered and so may no longer be used) include: Amazon Rosewood – D. spruceana spg 0.89/1.08; Bois de Rose (this name is used for two very similar species of Madagascan Rosewood) – D. maritima & D. louvelli spg 0.74/0.93; Brazillian Rosewood (aka Palisander de Rio Grande / Bahia Rosewood / Jacaranda / Rio Rosewood) – D. nigra spg 0.68/0.84; Brazillian Tulipwood - D. decipularis (often mistakenly labelled D. frutescens) spg 0.88/0.97; Burmese Blackwood (aka Khamphi Rosewood / Laos Rosewood) – D. cultrata spg 0.83/1.04; Burmese Rosewood – D. oliveri spg 0.78/0.94; Cocobola - D. retusa 0.89/1.10; Grenadilla (aka African Blackwood / Mpingo) - D. melanoxylon spg 1.08/1.27; Honduran Rosewood (aka Honduras Rosewood) – D. stevensonii spg 0.82/1.03; Indian Rosewood (aka Indian Palisander / East Indian Rosewood) - D. latifolia spg 0.70/0.83; Indian Rosewood (aka Sissoo / Sheesham) – D. sissoo spg 0.63/0.77;Kingwood (aka Violet wood)– D. cearensis spg 0.98/1.20; Madagascar Rosewood - D. baronii spg 0.75/0.93; Siamese Rosewood (aka Thailand Rosewood / Vietnamese rosewood / Cambodian Rosewood) – D. cochinchinensis spg 0.85/1.03.

Ebony – this indicates a member of the Genus Diospyros (D.) containing over 700 species although the most commonly used are: African Ebony (aka Gabon Ebony / Nigerian Ebony / Cameroon ebony) - D. crassiflora spg 0.82/0.96; Black Ebony (aka Gabon Ebony) - D. dendo spg approx 1.08*; Ceylon Ebony (aka East Indian Ebony) - D. ebenum spg 0.70/0.91; Madagascar Ebony – D. perrieri spg approx 1.10*; and Makkasar Ebony (aka Striped Ebony) – D. celebica spg 0.89/1.12.

Mopane – this is the only species of the Genus Colophospermum and is found across Southern Africa (particularly in Namibia, Botswana, Zimbabwe, and Mozambique) spg 0.88/1.08. It is said to have excellent acoustic properties similar to Grenadilla.

The woods used in historical Recorder copies

For a Recorder to be a true copy of an original instrument it needs to be at the same pitch and made of the same material as the original however this can limit the instrument's usefulness. It is often the case that performers have to compromise between the attempt to re-create an authentic sound and the need to be heard in a concert hall (or alongside other instruments of a more modern design e.g. Oboe). Performers may choose a copy of an instrument from a particular historical period but prefer to use a Recorder manufactured from a wood that would not have been available to Recorder makers in that historical period (e.g. Rosewood or Ebony) in order for the instrument to project more.

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