

Bow Woods - Raw Data												
Material	Breaking Strain (MOR/Stiffness) (millis) [1]	Crush Strain (Crush strength/stiffness) (millis) [2]	Tension-to-Crush Strength Ratio [3]	Resilience-to-weight ratio (MPa) [4]	Strength-to-weight ratio (MOR/SG@12% moisture) [5]	Specific Gravity @ 12% moisture content [6]	Modulus of Rupture (MPa) [7]	Crushing Strength (MPa) [8]	Volumetric Shrinkage % [9]	T/R Shrinkage Ratio [10]	Stiffness (GPa) [11]	PNW Wild? [12]
Alligator Juniper	10.31	6.34	1.63	0.41	80	0.58	46.2	28.4	7.8	1.3	4.48	
Apple	10.08	4.75	2.12	0.53	106	0.83	88.3	41.6	17.6	1.8	8.76	Yes
Bamboo	4.22 - 8.43	Varied	Varied	Varied	119 - 198	0.50 - 0.85	76 - 168.6	62 - 93	Unknown	Unknown	18 - 20	
Black Cherry	8.23	4.76	1.73	0.62	152	0.56	84.8	49.0	11.5	1.9	10.30	
Black locust	9.46	4.97	1.90	0.82	174	0.77	133.8	70.3	10.2	1.6	14.14	
Black palm	8.82	4.51	1.96	0.63	142	0.97	137.6	70.3	11.0	1.0	15.60	
Black walnut	8.69	4.51	1.93	0.72	165	0.61	100.7	52.3	12.8	1.4	11.59	Yes
Bubinga	9.14	4.12	2.22	0.86	189	0.89	168.3	75.8	13.9	1.4	18.41	
Bulletwood	8.33	3.87	2.15	0.74	178	1.08	192.2	89.2	16.8	1.4	23.06	
Cascara Buckthorn	9.06	6.33	1.43	0.44	98	0.61	60.0	41.9	7.6	1.4	6.62	Yes
Cocobolo	8.45	4.35	1.94	0.61	144	1.10	158.0	81.3	7.0	1.6	18.70	
Dogwood	8.72	4.56	1.91	0.61	141	0.82	115.3	60.3	19.9	1.6	13.22	Yes
Eastern Redcedar	10.00	6.84	1.46	0.57	115	0.53	60.7	41.5	7.8	1.5	6.07	
Greenheart	7.53	3.72	2.02	0.69	184	1.01	185.5	91.7	16.5	1.1	24.64	
Hackberry	9.24	4.57	2.02	0.58	127	0.60	75.9	37.5	13.8	1.9	8.21	
Hard maple	8.64	4.28	2.02	0.67	154	0.71	109.0	54.0	14.7	2.1	12.62	Yes
Holly	9.27	4.99	1.86	0.51	111	0.64	71.0	38.2	16.9	2.1	7.66	Yes
Honey Locust	9.02	4.60	1.96	0.61	135	0.75	101.4	51.7	10.8	1.6	11.24	Yes
Hophornbeam	8.29	4.56	1.82	0.51	123	0.79	97.2	53.5	18.6	1.2	11.72	
Ipe	8.02	4.25	1.89	0.65	161	1.10	177.0	93.8	12.4	1.2	22.07	
Jatoba	8.20	4.29	1.91	0.70	171	0.91	155.2	81.2	12.1	1.9	18.93	
Koa	8.39	4.70	1.79	0.60	143	0.61	87.0	48.7	12.4	1.1	10.37	
Lancewood	8.18	Unknown	Unknown	0.68	167	0.98	163.5	Unknown	15.4	1.5	20.00	
Lemonwood	9.68	4.29	2.26	0.91	188	0.81	152.4	67.5	13.2	1.8	15.74	
Leyland cypress	12.13	5.57	2.18	1.00	165	0.50	82.7	38.0	9.6	2.4	6.82	
Madagascar rosewood	13.80	6.38	2.16	1.23	178	0.93	165.7	76.6			12.01	
Mulberry	8.65	5.17	1.67	0.51	117	0.69	80.6	48.2	10.3	2.0	9.32	
Muninga	11.25	6.34	1.78	0.92	164	0.60	98.2	55.3			8.73	
Oregon ash	9.34	4.45	2.10	0.67	144	0.61	87.6	41.7	13.2	2.0	9.38	Yes
Osage orange	11.05	5.56	1.99	0.83	150	0.86	128.6	64.7	9.2	1.5	11.64	
Pacific yew	11.26	6.01	1.87	0.83	148	0.71	104.8	55.9	9.7	1.4	9.31	Yes
Padauk	9.90	4.44	2.23	0.79	155	0.87	138.8	62.3	8.4	1.7	14.02	
Pear	10.68	5.65	1.89	0.65	121	0.69	83.3	44.1	13.8	2.9	7.80	Yes
Pecan	7.92	4.53	1.75	0.51	128	0.74	94.5	54.1	13.6	1.8	11.93	
Persimmon	8.81	4.56	1.93	0.65	147	0.83	122.1	63.2	19.1	1.4	13.86	
Pignut hickory	8.89	4.07	2.19	0.74	167	0.83	138.6	63.4	17.9	1.6	15.59	
Plum	8.68	Unknown	Unknown	0.49	112	0.79	88.4	Unknown	Unknown	Unknown	10.19	Yes
Poplar	6.39	3.50	1.82	0.49	152	0.46	69.7	38.2	12.7	1.8	10.90	Yes
Port orford cedar	7.47	3.69	2.02	0.67	180	0.47	84.8	41.9	10.1	1.5	11.35	Yes
Purpleheart	7.49	4.13	1.81	0.63	169	0.90	151.7	83.7	10.6	1.7	20.26	
Quaking aspen	7.11	3.60	1.98	0.49	138	0.42	57.9	29.3	11.5	1.9	8.14	Yes
Red (Slippery) elm	8.73	4.27	2.04	0.65	150	0.60	89.7	43.9	13.8	1.8	10.27	
Red Alder	7.10	4.21	1.69	0.53	150	0.45	67.6	40.1	12.6	1.7	9.52	Yes
Red oak	8.17	3.85	2.12	0.58	142	0.70	99.2	46.8	13.7	2.2	12.14	
Redheart	9.56	4.47	2.14	0.74	154	0.64	98.7	46.2	10.6	2.9	10.32	
Rock Elm	9.61	4.57	2.10	0.65	136	0.75	102.1	48.6	14.9	1.7	10.62	
Rowan	11.61	5.64	2.06	0.90	155	0.77	119.3	58.0	15.0	1.4	10.28	
Shagbark hickory	9.35	4.26	2.19	0.81	174	0.80	139.3	63.5	16.7	1.5	14.90	
Siamese rosewood	10.44	7.14	1.46	0.87	166	1.03	171.0	117.0	Unknown	Unknown	16.38	
Wenge	8.68	4.59	1.88	0.75	174	0.87	151.7	80.7	12.9	1.7	17.59	
White ash	8.63	4.26	2.03	0.66	154	0.67	103.5	51.1	13.3	1.6	11.99	
White oak	8.42	4.18	2.01	0.57	136	0.75	102.3	50.8	16.3	1.9	12.15	
Zapote	9.02	4.20	2.15	0.80	177	1.04	184.2	85.8	16.0	1.5	20.41	
Ziricote	10.35	5.85	1.77	0.72	140	0.81	113.1	63.9	9.8	1.9	10.93	

									Std Dia.:	Hunt Dia.							
									0.31250	0.34375							
Material	S.G. @ 12% moisture [13]	Stiffness (GPa) [14]	Modulus of rupture (MPa) [15]	Resilience (MPa) [16]	EqSD: Equivalent spine diameter (Std Dia. POC) [17]	EqSD, 1/64 inches [18]	Shaft drag ratio [19]	GPI @ EqSD (grains/inch) [20]	GPI @ Std Dia. (grains/inch) [21]	GPI @ Hunt Dia. [22]	Strength-to-weight ratio	Resilience-to-weight ratio [23]	Soft/Hard	Pre-made dowels available?	Ballistic Index - Linear [24]		
Bamboo light	0.64	18.00	76.0	0.16	0.2785	18	0.79	9.9	12.4	15.0	119	0.25	Cane	Yes	1.16		
Sitka spruce	0.42	11.03	70.0	0.22	0.3147	20	1.01	8.3	8.1	9.9	167	0.53	Softwood	Yes	1.09		
Greenheart	1.01	24.64	185.5	0.70	0.2574	16	0.68	13.3	19.6	23.7	184	0.69	Hardwood	No	1.01		
Port Orford cedar	0.47	11.35	84.8	0.32	0.3125	20	1	9.1	9.1	11.0	180	0.67	Softwood	Yes	1.00		
Douglas fir	0.51	12.17	86.2	0.31	0.3071	20	0.97	9.6	9.9	12.0	169	0.60	Softwood	Yes	0.99		
Poplar	0.46	10.90	69.7	0.22	0.3157	20	1.02	9.1	8.9	10.8	152	0.48	Hardwood	Yes	0.98		
Ramin	0.66	15.55	120.9	0.47	0.2888	18	0.85	10.9	12.8	15.5	183	0.71	Hardwood	Yes	0.98		
Bamboo heavy	0.85	20.00	168.6	0.71	0.2712	17	0.75	12.4	16.5	19.9	198	0.84	Cane	Yes	0.97		
Purpleheart	0.90	20.26	151.7	0.57	0.2704	17	0.75	13.1	17.5	21.1	169	0.63	Hardwood	No	0.93		
Western larch	0.58	12.90	89.7	0.31	0.3027	19	0.94	10.6	11.2	13.6	155	0.54	Softwood	No	0.92		
Ipe	1.10	22.07	177.0	0.71	0.2646	17	0.72	15.3	21.3	25.8	161	0.65	Hardwood	No	0.83		
Balau	0.85	16.95	122.3	0.44	0.2827	18	0.82	13.5	16.5	19.9	144	0.52	Hardwood	Yes	0.83		
Hickory (Pignut)	0.83	15.59	138.6	0.62	0.2887	18	0.85	13.7	16.1	19.5	167	0.74	Hardwood	Yes	0.78		
Hickory (Shagbark)	0.80	14.90	139.3	0.65	0.2919	19	0.87	13.5	15.5	18.8	174	0.81	Hardwood	Yes	0.77		
Birch	0.61	10.97	84.8	0.33	0.3152	20	1.02	12.0	11.8	14.3	139	0.54	Hardwood	Yes	0.74		
Hard Maple	0.71	12.62	109.0	0.47	0.3043	19	0.95	13.1	13.8	16.7	154	0.66	Hardwood	Yes	0.74		
Red Oak	0.70	12.14	99.2	0.41	0.3073	20	0.97	13.1	13.6	16.4	142	0.58	Hardwood	Yes	0.72		
Honduran Mahogany	0.59	10.06	80.8	0.32	0.3221	21	1.06	12.2	11.4	13.8	137	0.55	Hardwood	Yes	0.71		
Hophornbeam	0.79	11.72	97.2	0.40	0.3100	20	0.98	15.1	15.3	18.5	123	0.51	Hardwood	No	0.61		

- [1] Breaking strain is the amount of deformation the wood can endure before breaking. A key metric of what makes a good bow wood. Woods with higher breaking strain should be able to handle more extreme designs (longer draw, shorter length, stiffer tips, more extreme recurves).
- [2] Woods with higher crush strain should be more resistant to chrysaling and take less set.
- [3] Woods with a high tension-to-crush ratio will benefit from trapping and be suitable for higher-crowned designs such as sapling bows. Woods with a high ratio will be at risk of crysaling and set in rectangular cross-section bows. Woods with lower tension-to-crush ratio will tend to be tension weak and benefit from backing.
- [4] This ratio is a measure of the wood's efficiency in storing energy. Resilience is the amount of energy a material can store without taking permanent deformation. A higher ratio means the wood stores more energy per mass, and therefore should be able to make a lighter mass bow for a given draw weight.
- [5] How strong the wood is for its density
- [6] Specific gravity is the density relative to water. SG of 1.00 means the woods is neutrally buoyant. Greater than 1 will sink in water, less than 1 will float.
- [7] The primary measure of a wood's overall strength.
- [8] Measure of a wood's compression strength.
- [9] The higher this number, the longer the drying process will take, and the more difficult the wood will be to dry without checking.
- [10] Tangential-to-radial shrinkage ratio. In general, the higher this number, the more difficult the wood will be to dry without checking.
- [11] A measure of how much force it takes to bend the wood. Also known as elastic modulus or Young's modulus. The stiffer the wood, the higher draw weight a bow will be for given dimensions. Note that this number does not indicate how far the wood can be bent without breaking. It simply indicates how rigid the material is. Stiffer woods can sometimes be bent farther than less-stiff woods before breaking (see Breaking Strain).
- [12] These woods can be found growing wild in the Pacific Northwest.
- [13] Specific gravity is a measure of density relative to the density of water.
- [14] Stiffer woods will be a smaller diameter for a given spine. Stiffer woods will be available in higher spines for a given diameter.
- [15] A measure of the overall strength of the wood.
- [16] Resilience is the amount of energy the wood can absorb without breaking. Higher resilience woods will make tougher arrows.
- [17] This is the diameter an arrow of this wood, having the same spine as a Port Orford Cedar arrow of the standard diameter. Stiffer woods will have smaller equivalent diameters, meaning you can achieve the same spine as POC using a skinnier shaft.
- [18] Same as equivalent spine diameter, just in 64ths of an inch, for easier reading.
- [19] A measure of how aerodynamic an arrow of this wood is, relative to a POC arrow of equivalent spine. The smaller the ratio, the lower the drag and better the aerodynamics. Stiff woods have smaller equivalent diameters and therefore lower (better) drag ratios.
- [20] Grains per inch of an arrow shaft with spine equal to a POC shaft of standard diameter
- [21] Grains per inch of an arrow shaft of standard diameter
- [22] Grains per inch of a shaft with "hunt" diameter (11/32")
- [23] How tough the wood is for its density.
- [24] A combination of shaft weight and shaft aerodynamic drag, relative to POC. POC has a value of 1. Lighter, stiffer woods have higher values; denser, more flexible woods have lower values. Theoretically, higher number tends to indicate a wood better for flight or long-distance target shooting.