Bertholletia excelsa Bonpl. 2384 Lecythidaceae

Nomenclatural reference 1217 Govaerts, R. (2022): The World Checklist of Vascular Plants (WCVP). – Royal Botanic Gardens, Kew. Checklist dataset of 2022-12-08. Retrieved from https://sftp.kew.org/pub/data-repositories/WCVP/, viewed 4.3.2023.

Summary

Intrinsic Traits

Distribution	Bertholletia excelsa is distributed from northern South America to western Brazil. It has been introduced in other regions, e.g. Malaysia, Sri Lanka, Java, Hawaii or the Caribbean.
Abundance	Brazil nut occurs as scattered trees or in clumps. A typical density in natural stands are populations of 50-100 trees at 5-20 trees per ha, each stand separated from one another by up to 1 km.
Habitat	Brazil nut is distributed in rainforests of the Amazonian basin on non-flooded ground.
Regeneration	Seedling establishment and survival are limited by light-gap availability, while individual trees survive longer in closed-canopy forest. Life-spans can reach 1000 years. Trees start fruiting when 12-16 years old. They reach their maximum fruit production at the age of 25-30 years, but continue producing fruit throughout their life span. Fruit production is highly variable from year to year and from tree to tree.
Reproduction	The species is exclusively dependent on generative reproduction. Flowers are self-sterile and cross-pollination is needed for fruit set. Pollination is dependent on extremely specialised pollinators, largebodied bees and to a lesser extent bats. The seeds are distributed by large rodents as specialised dispersers.
Plant Parts	The major plant part used is the seeds; timber is also used locally.
Lifeform	Brazil nut is one of the longest-lived and largest trees in the Amazon forest, up to 50m tall.
Systematics	Bertholletia excelsa is the only species in the monotypic genus Bertholletia.

Extrinsic Traits

Threat Status	Assessed globally by IUCN as Vulnerable in 1998. It has been assessed on a regional level as Endangered in Bolivia in 1998 but as Near Threatened later in 2005. It is regarded as Vulnerable in Colombia (2013) and in Brazil (2012).
Threats	The Brazil nut trees have experienced major declines in its population because of deforestation. In Brazil, timber extraction contributes to ist decline which is projected to be 30% in the next 100 years. Little is known about the impact of seed gathering on regeneration, but it clearly can be detrimental under some harvesting regimes.
Purpose	Brazil nut is mainly used for its edible nuts. To a lesser extent the nut oil also used medicinally and for cosmetic products.
Use Fields	Animal food; food; material (timber); medicine; social use (cosmetics).
Trade Trend	Brazil nuts are harvested almost entirely from wild trees. Efforts to cultivate the tree have largely failed because it depends on specific bee pollinators.The major collection areas are the tri-border regions of Acre in Brazil, Pando in Bolivia ,and Madre de Dios in Peru. The main producer is Bolivia, followed by Peru and then Brazil. As an effect of deforestation in the Amazonian rainforest, the harvest of Brazil nuts decreased from about 104,000 mt in 1970 to only about 50 000 mt in 1980. Between 2012 and 2016, the global average annual production was 27,000 mt (metric tons). In 2017/2018, the global production dropped to 10,000 mt due to unfavorable weather conditions.
Legislation	The species is not protected by CITES. It is nationally protected in Brazil.

Taxonomy and Identification

Taxonomy	*Reference*
"1 trop. S Am.: B. excelsa Bonpl. (Braz. nut, Pard nut)"	3753 Mabberley, D.J. (2017): The plant-book. 4th e

Synonyms

Taxon Present in Pharmacopoeias and other References

Name as used in Source	Status	Reference	
Bertholletia excelsa		3145	Brinckmann, J.A., Kathe, W., Berkhoudt, K, Harter, D.E.V. & Schippmann, U. (2022): A new global estimation of medicinal and aromatic plant species in commercial cultivation and their conservation status. Economic Botany 22(10): 1-15.
Bertholletia excelsa		8394	Therapeutic Goods Administration (ed.) (2007): Substances that may be used in listed medicines in Australia. Therapeutic Goods Administration, Symonston. Retrieved from http://www.tga.gov.au/cm/listsubs.pdf, viewed: 25.01.2009.
Bertholletia excelsa Bonpl.		3561	Quattrocchi, U. (2012): World dictionary of medicinal and poisonous plants. Common names, scientific names, eponyms, synonyms, and etymology. CRC Press, Boca Raton.
Bertholletia excelsa Bonpl.		6596	Ribeiro Silva, S., Buitron, X., de Oliveira, L.H. & Martins, M.V.M. (2001): Plantas medicinales de Brasil. Aspectos generales sobre legislacion y comercio. TRAFFIC America del Sur, Quito. Retrieved from http://www.traffic.org/species-reports/traffic_speci
Bertholletia excelsa Bonpl.		8747	Duke, J.A. (ed.) (2009): Duke's handbook of medicinal plants of Latin America. CRC Press, Boca Raton.
Bertholletia excelsa Bonpl. in F.W.H.A.von Humboldt & A.J.A.Bonpland		3145	Brinckmann, J.A., Kathe, W., Berkhoudt, K, Harter, D.E.V. & Schippmann, U. (2022): A new global estimation of medicinal and aromatic plant species in commercial cultivation and their conservation status. Economic Botany 22(10): 1-15.
Bertholletia excelsa Humb. & Bonpl.		1180	GRIN (17.3.2015): Download World Economic Plants report from GRIN Taxonomy for the query. Medizin = 'Alle Nutzungen'. Retrieved from http://www.ars-grin.gov/cgi-bin/npgs/html/taxecon.pl?language=de
Bertholletia excelsa Humb. & Bonpl.		6358	Mors, W.B., Toledo Rizzini, C. & Alvares Pereira, N. (2000): Medicinal plants of Brazil. Reference Publications, Algonac (Medicinal Plants of the World 6).
Bertholletia excelsa Humb. & Bonpl.		6369	McGuffin, M., Kartesz, J.T., Leung, A.Y. & Tucker, A.O. (2000): Herbs of commerce. 2nd edition. AHPA, Silver Spring, USA.

Common Names

Common Name	Typ	Language	Country	Ref	
Brazil nut	scn			6369	McGuffin, M., Kartesz, J.T., Leung, A.Y. &
Braziliaansche noot	ver	Dutch		1100	GRIN Database (Germplasm Resources In
Brazilnut	ver	English		1100	
Brazilnut-tree	ver	English		1100	
castaña	ver	Spanish		1100	
castaña del Brasil	ver	Portuguese		1100	
castanha-do-Brasil	ver	Portuguese		1100	
castanha-do-Pará	ver	Portuguese		1100	
castanheira	ver	Portuguese		1100	
castaño de Pará	ver	Spanish		1100	
creamnut	ver	English		1100	
noyer de Para	ver	French		1100	
noyer du Brésil	ver	French		1100	
nuez del Brasil	ver	Spanish		1100	
paranöt	ver	Swedish		1100	
Paranußbaum	ver	German		1100	
Paranut	ver	English		1100	
tapa	ver	Spanish		1100	

Distribution Range

Distribution Range	Ref	
"82 FRG GUY SUR VEN 84 BZC BZN "	1126	World Checklist of Selected Plant Families,
"It has been introduced to Malaysia, Sri Lanka, Java, Hawaii and the Caribbean."	2389	Wickens, G.E. (1995): Edible nuts. FAO, Ro
"Large natural stands still exist in northern Bolivia and the species is locally abundant in Suriname"	5520	Oldfield, S., Lusty, C. & MacKinven, A. (199
"Large natural stands still exist in northern Bolivia and the species is locally abundant in Suriname."	3538	Americas Regional Workshop (1998): Bertho
"N. South America to W. Brazil"	1126	World Checklist of Selected Plant Families,
"native to the Guianas, Venezuela, Brazil, eastern Colombia, eastern Peru, and eastern Bolivia"	1135	Wikipedia. www.wikipedia.org
"Native to: Bolivia, Brazil North, Brazil West-Central, Colombia, French Guiana, Guyana, Suriname, Venezuela"	1192	Plants of the World Online (POWO). Royal B
"Native: Southern America: Brazil: Brazil - Amapa, - Amazonas, - Mato Grosso, - Para; Northern South America: Guyana; Venezuela – Amazonas; Western South America: Bolivia - Beni; Colombia - Amazonas; Peru - Madre de Dios"	1100	GRIN Database (Germplasm Resources Info

"Native: Bolivia, Plurinational States of; Brazil (Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia); Colombia; French Guiana; Guyana; Peru; Suriname; Venezuela, Bolivarian Republic of"	3538	Americas Regional Workshop (1998): Bertho
"Probably originated in southeastern Amazonia. Present in natural stands (castanhais) of 50-100 trees at densities of 5-20 trees per ha, each stand separated from one another by up to 1 kilometre as emergent trees in rainforest on non-flooded ground in the Guianas, Amazonian Brazil, southeastern Colombia, southern Venezuela, eastern Peru and northern Bolivia."	2389	Wickens, G.E. (1995): Edible nuts. FAO, Ro
"several researchers believe that the current geographical distribution of the Brazil nut tree is a direct result of indigenous practices"	3848	Ortiz, E.G. (2002): Chapter 5. Brazil nut (Ber
"This species naturally occurs mainly in Brazil, Bolivia and Peru; however, some smaller populations are found in the Guyanas, Colombia and Venezuela."	1135	Wikipedia. www.wikipedia.org
BR: "amplamente distribuída e bastante frequente na Amazônia brasileira. Ocorre nos Estados do Acre, Amazonas, Amapá, Mato Grosso, Pará e Rondônia e dados de especialistas indicam sua distribuição também em Roraima"	3682	Martinelli, G. & Avila Moraes, M. (ed.) (2013)
Native: "Bolivia; Brazil (Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia); Colombia; French Guiana; Guyana; Peru; Suriname; Venezuela"	5520	Oldfield, S., Lusty, C. & MacKinven, A. (199

Distribution

Continent	Region	ICC	Status	Free Text	Ref
8 Southern America	82 Northern South Americ	GF			1109
		GF			8445
		GF	native		1126
		GF	native		1127
		GY			1109
		GY			8445
		GY	native		1126
		GY	native		1127
		SR		Surinam	1109
		SR			8445
		SR	native		1126
		SR	native		1127
		VE			1109
		VE	native		1126
		VE	native		1127
	83 Western South Americ	BO			1109
		BO	native		1127
		CO			1109
		CO	native		1127
		PE			1109
		PE			8447
		PE	native		1120
		PE	native		3538
	84 Brazil	BR			1106
		BR		"BZN-RN"	1109
		BR		Maranhao	1109
		BR		Acre	1109
		BR		"BZC-MG"	1109
		BR		"BZN-PR"	1109
		BR		"BZN-MP"	1109
		BR		"BZN-MZ"	1109
		BR	native		1126
		BR	native	"Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia"	1127

Abundance / Local Population Size

ICC	Abundance	Reference	
	"Trees are usually found in stands called manchales or manchais of 50 to 100 trees, each clump separated by distances that may extend up to several kilometres. There are some records of 10 to 25 Brazil nut trees in a hectare; however, these are exceptions."	3848	Ortiz, E.G. (2002): Chapter 5.
	"occurs as scattered trees in large forests on the banks of the Amazon River, Rio Negro, Tapajós, and the Orinoco"	1135	Wikipedia. www.wikipedia.org
	"widely occurring emergent of the Amazonian forest"	3538	Americas Regional Workshop (
	"Present in natural stands (castanhais) of 50-100 trees at densities of 5-20 trees per ha, each stand separated from one another by up to 1 kilometre"	2389	Wickens, G.E. (1995): Edible n
BO	"Large natural stands still exist in northern Bolivia"	3538	Americas Regional Workshop (

BR	"Density of Brazil nut trees per hectare varies considerably throughout the Amazon. [...] a study of Brazil nut production in eastern [...] found from 9 to 26 reproductive trees per hectare, while Becker and Mori (unpublished data) found only one tree over 10 centimeters dbh in a 100-hectare plot in central Amazonian Brazil."	3684	Mori, S.A. (1992): The Brazil n
SR	"locally abundant in Suriname."	3538	Americas Regional Workshop (

Ecology

TypeEc	ICC	Ecology	Ref	
alti		"at elevations below 800m"	3848	Ortiz, E.G. (2002): Chapter 5. Br
habit		"A widely occurring emergent of the Amazonian forest."	5520	Oldfield, S., Lusty, C. & MacKinv
habit		"found in non-flooded Amazonian forests at lower elevations"	3848	Ortiz, E.G. (2002): Chapter 5. Br
habit		occur naturally only in lowland rainforests"	3848	
repro		"A handful of mammals eat Brazil nuts, but only after three species of rodents gnaw open the fruits and liberate the seeds: the agouti, the paca and a squirrel. The agouti (Dasyprocta spp.) is responsible for most of this work – more than 80 % of the total […]..Without the agouti, virtually no natural regeneration of Brazil nuts would occur."	3848	
repro		"agoutis []are the natural disperser of the Brazil nut"	3538	Americas Regional Workshop (1
repro		"bees, and to a lesser extent bats, are essential for the pollination and subsequent fruit and seed development"	3684	Mori, S.A. (1992): The Brazil nut
repro		"Brazil nut trees produce fruit almost exclusively in pristine forests, as disturbed forests lack the large-bodied bees of the genera Bombus, Centris, Epicharis, Eulaema, and Xylocopa which are the only ones capable of pollinating the tree's flowers, with different bee genera being the primary pollinators in different areas, and different times of year."	1135	Wikipedia. www.wikipedia.org
repro		"Capuchin monkeys have been reported to open Brazil nuts using a stone as an anvil"	3851	Bauman, H. & Moser, J. (2019):
repro		"flowers can only be entered by largebodied bees with enough strength to pry open the androecial hood to obtain the pollinator reward that is thought to be nectar produced at the apex of the coiled androecial hood. Bees of the genera Bombus, Centris, Epicharis, Eulaema, and Xylocopa have been captured visiting Brazil nut trees"	3684	Mori, S.A. (1992): The Brazil nut
repro		"For the most part, crosspollination is needed for seed set"	3684	
repro		"Forest trees are 12-16 years old before fruiting, with maximum production from 25-30 years"	2389	Wickens, G.E. (1995): Edible nu
repro		"fr. once trees c. 10 yrs old, takes 14 months to mature""	3753	Mabberley, D.J. (2017): The pla
repro		"fruit production […] is extremely variable within populations and years […] The strongest predictor of fruit production [is] crown area […] Trees on [sites] with higher available P and K produced nearly three times more fruits, and appeared more resilient to prolonged drought and drier atmospheric conditions."	3850	Staudhammer, C.L., Wadt, L.H.(
repro		"Fruit production varies between trees, from no fruits at all to over 2000 per tree. When all fruit-bearing trees in a population are considered, productivity per tree averages close to, or slightly above, 20kg of raw or in-shell nuts, or around 100 fruits."	3848	Ortiz, E.G. (2002): Chapter 5. Br
repro		"In any given year, approximately 25% of the trees produced 72% of the total population production. Annual variation of fruit production at the individual level was relatively high, and at the population level was extremely low, with annual production departing from average only in a year of delayed and reduced rainfall. These results coupled with low synchronicity of fruiting, confirm long-term observations of harvesters that Brazil nut populations exhibit relatively constant fruit production."	3835	Kainer, K.A., Wadt, L.H.O & Sta
repro		"In comparison with a previous study in the same area twelve years before, it is evident that the abundance of all forest-dependent orchid bees analysed declined around 50%, and it was statistically significant (P = 0.022) for Euglossa marianae […], the most sensitive to anthropogenic disturbances of all Atlantic Forest orchid bees."	3836	Nemésio, A. (2013): Are orchid
repro		"Ligule (see fam.) pressed down in A & anthers available therefore only to big bees (Xylocopa spp. & female euglossines"	3753	Mabberley, D.J. (2017): The pla
repro		"mainly allogamous (ie they require cross-fertilization or, in other words, need other genetically unrelated conspecific trees nearby and gamete carriers for fertilization)."	3848	Ortiz, E.G. (2002): Chapter 5. Br
repro		"most seed set in this species is the result of cross-pollination"	3684	Mori, S.A. (1992): The Brazil nut
repro		"natural bee pollinators require natural forest for their survival"	2389	Wickens, G.E. (1995): Edible nu
repro		"Seedlings at the earliest stages of development are rarely found, suggesting that a major recruitment bottleneck occurs at the seed dispersal stage or during seed establishment."	3848	Ortiz, E.G. (2002): Chapter 5. Br
repro		"seeds, which have a bony testa, are removed from the capsules and dispersed by rodents, especially agoutis (Dasyprocta spp.)"	3684	Mori, S.A. (1992): The Brazil nut
repro		"the agoutis, larged rodents, are the natural dispersers of fruits and seeds"	5520	Oldfield, S., Lusty, C. & MacKinv
repro		"The Brazil nut tree has co-evolved with the help of the euglossine bee, also called orchid bee or long-tongued bee, which pollinates its heavy-lidded flowers. Once pollinated, the flower can then develop into a full fruit. Each mature tree can produce up to 300 fruit pods in a season, which […] take approximately 14 months to mature. The large fruit pods are roughly the size of a baseball and can weigh up to two kilograms […]. Each fruit pod has a hard, woody shell that contains eight to 24 triangular seeds that are up to two centimeters […] wide and five centimeters […] long."	3851	Bauman, H. & Moser, J. (2019):
repro		"this self-incompatible species requires pollen from another Brazil nut tree to set fruit and it depends on certain taxa of bees to reproduce, which thrive in the forest"	3539	Dimobea, K., Ouédraogoa, A., C
repro		self sterile	3753	Mabberley, D.J. (2017): The pla

Life Form

LF_Standard	Duration	Lifeform	Woodiness	Height	Ref	
				50m	1135	Wikipedia. www.wikipedia.org
tree				50 m tall	2389	Wickens, G.E. (1995): Edible n
tree		phanerophyte			1126	World Checklist of Selected Pl

Threat Situation

ICC	PopulationStatus	Ref	
	"Although Brazil nut tree logging is illegal in all producing countries, potentially productive Brazil nut forest areas are increasingly being reduced, mainly through forest degradation caused by opening areas for cattle ranching, agriculture and intensive logging."	3848	Ortiz, E.G. (2002): Chapter 5.
	"At current harvest intensities, the longstanding collection of B. excelsa seeds does not seem to compromise future generations, as suggested by most research"	3850	Staudhammer, C.L., Wadt, L.H
	"Despite Brazil nut trees being protected by conservation regulation, forest degradation threatens sufficient gene-flow among Brazil nut tree populations. This has impacts on the reproductive success, genetic diversity, and consequently on the resilience of this species to environmental change."	3853	Chiriboga-Arroyo, F., Jansen,
	"forecasted declines in pollinator diversity may reduce ecosystem functional redundancy and threaten the long-term resilience of the services provided by Brazil nut trees"	3852	Sales, L.P., Rodrigues, L. & M
	"hunting pressures that accompany Brazil nut harvest may be intensive enough to wipe out mammals and birds that are important to ecological processes, and logging and thinning may affect forest characteristics necessary for Brazil nut seedling regeneration"	3848	Ortiz, E.G. (2002): Chapter 5.
	"Little is known about the impact of seed gathering on regeneration, but it clearly can be detrimental under some regimes where agoutis, the natural disperser of the Brazil nut, are hunted or chased away."	3538	Americas Regional Workshop (
	"Little is known about the impact of seed gathering on regeneration, but it clearly can be detrimental under some regimes where agoutis, the natural disperser of the Brazil nut, are hunted or chased away."	5520	Oldfield, S., Lusty, C. & MacKi
	"Logging is a significant threat to the sustainability of the Brazil nut-harvesting industry."	1135	Wikipedia. www.wikipedia.org
	"The Brazil nut tree has experienced major declines in its population because of deforestation. One of the greatest concentrations of trees exists in Tocantins valley where various activities, from the construction of the trans-amazon railway to the building of a reservoir, have brought about a shrinking in the gene pool. An area of 200,000 ha in south Pará has been purchased by the government with the aim of settling landless farmers. Trees remaining in the vast cattle ranches of Pará and Acre are neglected and dying.“	5520	Oldfield, S., Lusty, C. & MacKi
BR	"B. excelsa esta sob forte pressao extrativista devido a coleta de suas sementes para fins industriais e de alimentacao, o que ja vem restringindo o recrutamento de novos individuos em algumas subpopulacoes. Alem disso, vem enfrentando um expressivo declinio continuo na extensao e qualidade do habitat em boa parte da sua distribuicao, devido a expansao de atividades agropecuarias. Suspeita-se que, a despeito da protecao legal, B. excelsa sofra com a exploracao madeireira devido ao seu grande porte e tronco colunar, tipicos das Lecythidaceae. Assim, considerando as ameacas atuais e potenciais as quais se encontra submetida, e estimando o tempo de geracao da especie em pelo menos 50 anos, e possivel suspeitar que B. excelsa venha a sofrer um declinio populacional de pelo menos 30% nos proximos 100 anos."	3682	Martinelli, G. & Avila Moraes,

Threat Status: Global and Supranational

Glo	Threat Category		Criteria	Ass.	Publ.	Ref	
glo	VU	Vulnerable		1998	2023	1223	2023 IUCN Red List of Threatened Species. Version 2023-1. www.iucnredlist.org. Download of plant data received from IUCN website 16.12.2023.
		Name used in redlist:	Bertholletia excelsa Bonpl.	Accepted		Name used in redlist:	Bertholletia excelsa Bonpl.
glo	VU	Vulnerable	A1acd+2cd	1998-01-01	1998	1206	2020 IUCN Red List of Threatened Species. Version 2020-3. www.iucnredlist.org. Download of plant data received from IUCN 14.1.2021.
		Name used in redlist:	Bertholletia excelsa H.& B.	Accepted		Name used in redlist:	Bertholletia excelsa H.& B.
glo	VU	Vulnerable	A1 acd+2cd	1998	1998	5520	Oldfield, S., Lusty, C. & MacKinven, A. (1998): The world list of threatened trees. World Conservation Press, Cambridge.
		Name used in redlist:	Bertholletia excelsa	Accepted		Name used in redlist:	Bertholletia excelsa
glo	VU	Vulnerable	A1acd+2cd	1998	1998	3538	Americas Regional Workshop (1998): Bertholletia excelsa. The IUCN Red List of Threatened Species 1998. e.T32986A9741363 (Conservation & Sustainable Management of Trees, Costa Rica, November 1996). Retrieved from https://www.iucnredlist.org/species/32986/9741363, viewed: 22.02.2021.
		Name used in redlist:	Bertholletia excelsa	Accepted		Name used in redlist:	Bertholletia excelsa

Threat Status: Countries

ICC	Region	Threat Category		Assd.	Publ.	Ref	
BO		VU	Vulnerable		2020	3007	Navarro Sánchez, G., Arrázola Rivero, S., de la Barr
		Name used in redlist:	Bertholletia excelsa Bonpl.	Accepted		Accepted Name:	Bertholletia excelsa Bonpl.
BO		NT	Casi Amenazada		2005	9717	Meneses, R.I. & Beck, S. (2005): Especies amenaza
		Name used in redlist:	Bertholletia excelsa Kunth	Accepted		Accepted Name:	Bertholletia excelsa Bonpl.

BO	E	Endangered	1997	1109	UNEP-WCMC Threatened Species Database. Downl
		Name used in redlist: Bertholletia excelsa H.& B.	Accepted	Accepted Name: Bertholletia excelsa Bonpl.	
BR	VU	Vulnerável	2013	3682	Martinelli, G. & Avila Moraes, M. (ed.) (2013): Livro v
		Name used in redlist: Bertholletia excelsa Bonpl.	Accepted	Accepted Name: Bertholletia excelsa Bonpl.	
BR	V	Vulnerable	2001	6596	Ribeiro Silva, S., Buitron, X., de Oliveira, L.H. & Marti
		Name used in redlist:		Accepted Name:	
CO	VU	Vulnerable	2002	3683	Calderón, E., Galeano, G. & García, N. (ed.) (2002):
		Name used in redlist: Bertholletia excelsa H. & B.	Accepted	Accepted Name: Bertholletia excelsa Bonpl.	
PE	E	Endangered	1997	1109	UNEP-WCMC Threatened Species Database. Downl
		Name used in redlist: Bertholletia excelsa H.& B.	Accepted	Accepted Name: Bertholletia excelsa Bonpl.	
VE	NT	Casi Amenazado	2020	3996	Huérfano, A., Fedón, I. & Mostacero; J. (ed.) (2020):
		Name used in redlist: Bertholletia excelsa	Accepted	Accepted Name: Bertholletia excelsa Bonpl.	
VE	MR/ca	Menor Riesgo / casi amenazadas	2003	8577	Llamozas S., S., Duno de Stefano, R., Meier, W., Rii
		Name used in redlist: Bertholletia excelsa	Accepted	Accepted Name: Bertholletia excelsa Bonpl.	

Purpose of Use

Purpose		Ref
animal food - general	"Seed oil. [...] The seed cake may be used for feeding livestock"	2389
food - general	"Analyses of the nutritional value of Brazil nuts have shown it to be rich in oil (approximately 65 per cent) and protein (approximately 17 per cent), with a high content of methionine, […] as well as all the essential amino acids."	3848
	"Brazil nuts are notable for diverse content of micronutrients, especially a high amount of selenium"	1135
	"In-shell Brazil nuts are traditionally for the Christmas market in UK, Germany and USA as "mixed nut in-shell pack". Kernels are used in USA for roasting and salting for inclusion in mixed salted kernel packs. Approximately 60% of the UK market is in kernels for coating with chocolate (enrobing), the remaining 40% are marketed as raw packed kernels."	2389
	"Nuts edible"	1126
	"Seed oil is bright yellow, nearly odourless and with a pleasant nutty flavour. The first extraction yields an excellent cooking oil"	2389
	Food (nut)	1180
material - general	"Brazil nut oil is used as a lubricant in clocks, in the manufacturing of paint, and in the cosmetics industry. […] Because of its hardness, the Brazil nutshell is often pulverized and used as an abrasive to polish materials such as metals and ceramics"	1135
material - timber, wood products	"Brazil nut wood is used for the construction of houses and fences as well as for boat-building."	3848
	"The lumber from Brazil nut trees (not to be confused with Brazilwood) is of excellent quality, having diverse uses from flooring to heavy construction."	1135
	Mater. (wood)	1180
medicine - general	"Due to its high content of selenium, it is also used for treating several types of cancer, and has lately been recommended as a treatment for prostate cancer."	3848
	"used medicinally and commercialized in BR"	6596
medicine - traditional herbal medicine	Medic. (folklore)	1180
social use - cosmetics	"Seed oil. […] the second extraction is suitable for soap-making and as an illuminant."	2389
	"soap, hairconditioner & cosmetics"	8359

Purpose: Standardized Use Fields

Purpose: Fields of Use	Frequency
animal food - general	1
food - general	6
material - general	1
material - timber, wood products	3
medicine - general	2
medicine - traditional herbal medicine	1
social use - cosmetics	2

Purpose: Number of Use Fields

Purpose: Number of use fields

Taxon used in 7 different standardized use categories (max. 27 categories possible).

Plant Parts Used

Plant Part (standardized)	Plant Part (free text)	Remark	Ref	
seed			2389	Wickens, G.E. (1995): Edible nuts. FAO, Ror
seed			2389	Wickens, G.E. (1995): Edible nuts. FAO, Ror
seed	"nut"		1126	World Checklist of Selected Plant Families, F
wood			1135	Wikipedia. www.wikipedia.org

Scale and Trend of Trade

ICC	Trade Trend	Ref	
	"Between 2012 and 2016, the global production averaged 27,000 metric tons, a figure that dropped to 10,000 metric tons in the year 2017 / 2018."	3838	Kiprop, V. (2018): Top Brazil Nut consuming countries. Retrieved from https://www.worldatlas.com/articles/top-brazil-nut-consuming-countries.html, viewed: 06.03.2021.
	"Deforestation in the Amazonian rainforest has brought about a reduction in the harvest of Brazil nuts from about 104 000 tonnes in 1970 to only about 50 000 tonnes in 1980."	2389	Wickens, G.E. (1995): Edible nuts. FAO, Rome (Non-wood Forest Products 5).
	"In 1980, annual production was around 40,000 tons per year from Brazil alone, and in 1970, Brazil harvested a reported 104,487 tons of nuts."	1135	Wikipedia. www.wikipedia.org
	"Production of Brazil nuts increased from 3,557 tons in 1944 to approximately 95,000 tons in 2014."	3851	Bauman, H. & Moser, J. (2019): Food as medicine. Brazil nut (Bertholletia excelsa, Lecythidaceae). HerbalEGram 16 (5): s.pag. Retrieved from https://www.herbalgram.org/resources/herbalegram/volumes/volume-16/number-5-may/food-as-medicine-brazil-nut-bertholletia-excelsa-lecythidaceae/food-as-medicine/, viewed: 13.03.2021.
	"The production of Brazil nuts more than halved between 1970 and 1980, apparently because of deforestation."	5520	Oldfield, S., Lusty, C. & MacKinven, A. (1998): The world list of threatened trees. World Conservation Press, Cambridge.

Utilization: Commodity, Cultivation, Harvest, Sustainability, Trade

Type	ICC	Utilization	Ref	
com		"Internationally, nuts are commercialized under three modalities: in-shell, unshelled or as a processed part or derivate. In-shell nuts are sold mainly to the US and UK and have become part of the traditional Christmas feast. The main use of unshelled nuts is in nut mixes, but they are also consumed raw, roasted, salted or used as ingredients in ice creams and desserts."	3848	Ortiz, E.G. (2002): Chapter 5.
cul		"Although agronomic techniques have been successfully developed, large-scale attempts at domestication have failed."	3848	
cul		"Cultivated in South America outside its natural range."	2389	Wickens, G.E. (1995): Edible r
cul		"Efforts to domesticate the Brazilian nut tree has failed because it depends on a specific species of bees for pollination."	3838	Kiprop, V. (2018): Top Brazil N
cul		"There have been relatively few successes at establishing plantations."	5520	Oldfield, S., Lusty, C. & MacKi
cul	PE	cultivated: Agroforestry	3145	Brinckmann, J.A., Kathe, W.,
exp		"Total export volumes of Brazil nuts fluctuate according to the year and demand, ranging from 30 to 60 metric tons with exportation values around US$40 to US$70 million"	3848	Ortiz, E.G. (2002): Chapter 5.
exp	BO	"During the last decade, lower production costs and an aggressive marketing strategy have given Bolivia a competitive economic advantage over neighbouring Brazil, making Bolivia the world's leading Brazil nut-producing country."	3848	
har		"Almost all Brazil nuts consumed around the world still come from wild trees."	3538	Americas Regional Workshop
har		"Almost all Brazil nuts consumed around the world still come from wild trees."	5520	Oldfield, S., Lusty, C. & MacKi
har		"An established tree can produce up to 300 fruits, meaning collectors can harvest some 6000 seeds per tree."	3537	Melvin, M. (2019): The Brazil N
har		"Bolivia is the dominant producer of the nuts, in the period 2017/2018, the country accounted for 78% of production. Peru producers 16% while Brazil produces a mere 2%."	3838	Kiprop, V. (2018): Top Brazil N
har		"Brazil nut commercialization has driven producers to seek greater efficiency and better yields (in quality and quantities). […] For example, in Peru and parts of Bolivia, fruits are gathered from the ground by bare hand, while in Brazil harvesters use a basket and a grabbing stick. Practitioners of both techniques claim their collection method is faster and easier. When compared, fruit-picking time proved to be twice as effective and safer with the use of baskets."	3848	Ortiz, E.G. (2002): Chapter 5.
har		"Brazil nuts are harvested almost entirely from wild trees during a five to six month period in the rainy season."	3684	Mori, S.A. (1992): The Brazil n
har		"Current evaluations of double-harvesting regimes (ie early and late in the harvesting season) are showing that more fruits may be gathered overall, due to reductions in losses of fruits taken by agoutis as well as increases in untaken fruits that fall after the regular harvesting dates."	3848	Ortiz, E.G. (2002): Chapter 5.
har		"Nuts mainly harvested from the forest where they are managed under a traditional system of swidden agroforestry."	2389	Wickens, G.E. (1995): Edible r
har		"The output of the Brazil nuts is susceptible to changes in climatic conditions. The highest output of 33,500 metric tons was achieved 2016/2017 while the lowest production of 10,000 metric tons was the 2017/2018 period."	3838	Kiprop, V. (2018): Top Brazil N
har		"The production of Brazil nuts more than halved between 1970 and 1980, apparently because of deforestation."	3539	Dimobea, K., Ouédraogoa, A.,

har	BR	"In Brazil the gatherers are paid in advance in cash or kind and are contracted to deliver the nuts to the shipper's agent (the trading agent is known as the shipper). In Bolivia the major shippers own large estates and largely make use of bonded labour, exchanging Brazil nuts and rubber for over-priced goods from the estate shops. The nuts are then brought by truck or barge to Belém for onward shipment."	2389	Wickens, G.E. (1995): Edible r
har	BR	"Most (76 K t per annum) coll. from wild trees"	3753	Mabberley, D.J. (2017): The pl
har	BR	"The production of Brazil nuts more than halved between 1970 and 1980, apparently because of deforestation. Almost all Brazil nuts consumed around the world still come from wild trees. "	5520	Oldfield, S., Lusty, C. & MacKi
imp		"In 2003, the European Union imposed strict regulations on the import of Brazilian-harvested Brazil nuts in their shells, as the shells are considered to contain unsafe levels of aflatoxins, a potential cause of liver cancer."	1135	Wikipedia. www.wikipedia.org
imp		"The US, UK, Germany, Italy and other European nations are the main importers of Brazil nuts, accounting for close to 90 per cent of the total volumes processed by exporting companies, with probably less than 5 per cent consumed in producing countries"	3848	Ortiz, E.G. (2002): Chapter 5.
imp	DE	"Germany is the second largest consumer and importer of Brazilian nuts. The country consumes an average of four thousand metric tons [...]. In the past decade, imports have increased by 5,000 metric tons, up from 2,000 in 2006 to 7,000 in 2016."	3838	Kiprop, V. (2018): Top Brazil N
imp	GB	"The UK is both the largest consumer and importer or the Brazilian nuts. The country's consumption has been [...] growing from 3,900 metric tons in 2012 to 5,600 metric tons in 2016. The United Kingdom imports an average of 7,000 metric tons of the nut annually from Bolivia."	3838	
imp	US	"The United States is the third largest consumer and importer of the Brazilian nuts. Between 2006 and 2015, the US imported an average of eight thousand metric tons. However, the drop in production in 2016 limited the import to 3,700 metric tonnes."	3838	
socu		"[...] ongoing question of compatibility between timber and Brazil nuts (both valuable products sourced from trees that grow side by side in the forests of Peru, Bolivia and Brazil)"	3839	Moncrieff, V.M. (2015): A little
socu		"[Brazil nut visiting] orcsocuhid bees tend to live in primary forests where these orchids naturally grow – so without the surrounding forest, orchid bees can't reproduce, and without reproduction, the Brazil nut tree would produce significantly less fruit. Some theories suggest this love triangle is the principle reason virtually all our Brazil nuts come from wild trees. Cultivating Brazil nuts has been fruitless – quite literally – with farmed trees producing negligible amounts of nuts compared to their wild cousins."	3499	Melvin, M. (2019): The impact
socu		"Although stranded Brazil Nuts Bertholletia excelsa have occasionally been recorded from Irish, NW European, and western North Atlantic maritime shores, they are generally regarded as local refuse. During the early 1990s, four specimens of stranded Brazil Nuts were discovered on Irish maritime shores, and two more in Cornwall, U.K. during 2014. […]. It is possible that at least some of the NW European specimens may represent true trans-Atlantic peregrine drifters."	3849	Declan, T.G., Quigley, D.M., W
socu		"Brazil nut harvest often represents a highly significant, if not the primary, source of yearly income for close to half of the human population in Brazil nut areas (numbering several hundred thousand individuals). […] Brazil nuts offer an empowering mechanism for women: apart from those who are directly involved in the harvesting (30 per cent of concessions in Peru are owned by women), women are the primary workforce in Brazil nut factories. […]. Such employment often represents the only source of family income."	3848	Ortiz, E.G. (2002): Chapter 5.
socu		"Brazil nut harvesting is a physically demanding and dangerous activity. Fruits are gathered from the ground, usually during the rainy season when the fruits ripen and fall. There have been several cases of reported deaths and serious injuries resulting from fruits or cocos falling on unlucky harvesters: a 1 to 2 kilogram (kg) fruit falling from a height of 50m is a potential	3848	
socu		"Brazil nut stands are not free land. In large part, they are portions of forests assigned by governments to communities or to individual caretakers that may take the form of private corporations, compa- nies or individuals. A smaller portion of the world's castañales is found on private property."	3848	
socu		"Brazil nut, the most economically important non-timber forest product in the Amazon Basin. It supports thousands of rural families and generates tens of millions of dollars in exports"	3839	Moncrieff, V.M. (2015): A little
socu		"Coined 'excelsa' in 1808 by naturalists Alexander von Humboldt and Aime Bonpland for its impressive size, these Amazonian giants tower above the canopy, reaching heights of up to 50 metres and establishing trunks as wide as men."	3537	Melvin, M. (2019): The Brazil N
socu		"collection and marketing are responsible for the protection of millions of hectares of healthy forests in Brazil, Bolivia and Peru and represent a major source of income for hundreds of thousands of Amazonian residents"	3848	Ortiz, E.G. (2002): Chapter 5.
socu		"Collectors harvest brazil nuts during the wet season (January-March) when most of the trees' fruit has fallen to the forest floor. Mature fruits resemble woody cannonballs which are so robust that only the agouti, a rodent with the right dental equipment, can crack them open. Each fruit contains roughly 20 seeds (nuts) which are individually armoured and neatly packed like orange segments."	3537	Melvin, M. (2019): The Brazil N

socu		"Despite the numerous potential health benefits provided by Brazil nuts, daily consumption should be limited. Selenium intakes above the Recommended Daily Allowance (RDA) of 55 mcg per day, or approximately one Brazil nut, can result in an accumulation of selenium as selenomethionine in tissues, which can lead to selenosis, with symptoms such as nail brittleness, hair loss, peripheral paresthesia, decreased cognitive function, and skin lesions. Excessive Brazil nut intake can also lead to the accumulation of heavy metals such as barium and strontium and carcinogenic elements such as radium. The presence of barium in Brazil nuts is thought to result from the presence of hollandite ore in soils of the Amazon region. While there is no evidence that strontium is toxic for adults, in children it may impair mineralization of the developing bones."	3851	Bauman, H. & Moser, J. (2019
socu		"For centuries, the indigenous tribes of the Amazon have relied on the nut and other parts of the Brazil nut tree as a staple of their diet and trading commodity. Indigenous tribes commonly used a bark infusion to ease liver ailments and chronic diseases. Traditionally, the nuts were eaten raw, grated with the thorny stilt roots of Socratea palm (Socratea exorrhiza, Arecaceae) into a white mush known as leite de castanha (“Brazil nut milk”), or stirred into cassava (Manihot esculenta, Euphorbiaceae) flour. These calorie-dense, high-protein, high-fat, high-fiber preparations are a valuable source of nutrition for rural communities."	3851	
socu		"Given the majestic size of the Brazil nut tree, it has been said that Humboldt offered an ounce of gold to whomever could climb the tree to procure a flower for its botanical description. The earliest historical reference to Brazil nuts dates back to 1569 and comes from an account of a Spanish explorer, Alvarez Maldonado, who claimed that he survived on these nuts after fleeing from an attack by Indians in south-eastern Peru. […] Dutch merchants were the first to introduce Brazil nuts to Europe early in the 17th century. However, Brazil nuts came to be a regular export product only later in the 19th and 20th centuries, first entering the United States at the beginning of the 19th century."	3848	Ortiz, E.G. (2002): Chapter 5.
socu		"one of the largest and longest-lived trees in the Amazon rainforest"	1135	Wikipedia. www.wikipedia.org
socu		"one of the top 20 most dominant Amazonian species in terms of forest carbon storage and productivity and [with] lifespans > 1000 years […] productive output is estimated to initiate in the first two centuries, and last until individuals near senescence."	3850	Staudhammer, C.L., Wadt, L.H
socu		"several species […] are exclusively found in association with B. excelsa. For example, there is a poison arrow frog (Dendrobates castaneoticus) and a toad (Bufo castaneoticus) that breed almost exclusively in empty, rain-filled Brazil nut shells that have been opened by agoutis."	3848	Ortiz, E.G. (2002): Chapter 5.
socu		"The Brazil nut (the seeds of the rain forest tree Bertholletia excelsa) is the only globally traded seed collected from the wild by forest-based harvesters across the Amazon basin."	3837	Guariguata, M.R., Cronkleton,
socu		"The first Brazil nut exports began in the 19th century. At that time, they were shipped from the port of Sao Luis in the state of Maranhao, where they were called Maranhao nuts […]. Even today, this name is still used in some Latin American countries and in Spain. Later, when shipments began leaving from the port of Belem in Para, they became known as Para nuts. By the middle of the century the Brazil nut had reached appreciable market values and had become an economically important Amazonian product. The collapse of the rubber market changed the extractivist system considerably. Brazil nut gathering became an important source of income […]. Cities in the Amazonian interior such as Guajara-Mirim in Rondonia and Xapuri in Acre even constructed Brazil nut processing plants to prepare nuts for sale and transport to exporters. Nuts were processed and exported either in-shell or shelled. "	0	
socu		"The majority of collection takes place along the tri-border regions of Acre, Brazil, Pando, Bolivia and Madre de Dios, Peru, where it is a crucial source of income for many local communities. Each year, thousands of collectors or castaneros make their journey to the forest, where they will spend the next few months collecting fruit."	3537	Melvin, M. (2019): The Brazil N
socu		"'We found that logging could be compatible with Brazil nut production, so long as no more than two trees are extracted per hectare,' said co-author Cara Rockwell of Florida International University. 'By comparison, in a case where timber was taken at slightly higher intensities – three or four trees extracted per hectare – Brazil nut production tended to decrease'"	3839	Moncrieff, V.M. (2015): A little
socu	BR	"The theory – the ideal, even – is that the forest should be able to support multiple uses, but, as a previous study shows, the practice of 'multiple-use management' in Brazil nut-rich forests is often riddled with technical, knowledge-based and regulatory constraints"	3839	
sus		"Analysis of tree ages in areas that are harvested shows that moderate and intense gathering takes so many seeds that not enough are left to replace older trees as they die. Sites with light gathering activities had many young trees, while sites with intense gathering practices had nearly none."	1135	Wikipedia. www.wikipedia.org
sus		"Effective protection and management of existing Brazil nut stands, combined with innovative approaches such as certification, could help to provide a sustainable future for large forested areas as well as for a large population of people, who depend upon them."	3848	Ortiz, E.G. (2002): Chapter 5.
sus		"In the longer term, stand production can be improved through forest enrichment techniques, where genetically selected seeds are planted after careful identification of sites with the best lighting, soil and other competitive conditions (generally in natural gaps), followed by some level of care provided for the planted seedlings. Studies are showing that it is a better investment of time and money to place efforts on forest enrichment than on the care of naturally regenerating seedlings. Liberation thinning techniques have been shown to be efficient in helping the growth of medium- sized saplings, especially in cases where competition with other plants and vines prevents their development. Overall, however, it is important to note that probably the most effective way to maintain the productivity of a Brazil nut stand is to keep the surrounding forest as healthy as possible and allow the ecological processes of pollination and regeneration to occur without negatively affecting their biological vectors."	3848	

sus		"Some researchers have proposed that harvesters should leave a minimum of 20 per cent of the seed yield in the forest in order to facilitate the regeneration process […]. This recommendation assumes that intensive harvest adversely impacts B. excelsa recruitment. Research of varying harvest intensities (normal and purposely intensive) in Peru and Brazil showed that close to 40 per cent of the total fruit production in the forest, including all trees in the research population, were left in the ground or were taken by mammalian seed dispersers before fruit gatherers arrived […]. In addition, empirical evidence shows that natural seed regeneration (number of naturally occurring seedlings) is greater in areas where harvesting takes place than in areas not harvested. This fact may be explained by the indirect seed dispersal accomplished by harvesters (seeds dropping from sacks), combined with hunting practices and a subsequently larger agouti population that retrieves a greater number of seeds to cache. In areas that are not harvested, seed mortality may be greater due to less-disturbed agouti populations that have an easier time retrieving their caches, as well as greater levels of seed predation by healthier populations of other seed consumers, such as spiny rats."	3848	
sus		"the Brazil nut model represents a socioecological system that may not require major changes to sustain productivity. Yet since long-term Brazil nut production seems inextricably tied to a continuous forest cover, and because planted Brazil nut trees currently provide a minimal contribution to total nut production basin-wide, we call to preserve, diversify and intensify production in Brazil nut-rich forests"	3837	Guariguata, M.R., Cronkleton,
sus		"The sustainable harvesting of nuts by indigenous people in extractive forest reserves offers the most promising protection for the remaining natural stands."	5520	Oldfield, S., Lusty, C. & MacKi
sus		"The sustainable harvesting of nuts by indigenous people in extractive forest reserves offers the most promising protection for the remaining natural stands."	3538	Americas Regional Workshop
sus		"To avoid negative effects of genetic erosion and inbreeding, [there is a] need to cease large-scale forest conversion and […] promote landscape connectivity. This could support gene flow, maintain genetic diversity across individuals reproducing in clustered patterns and contribute to securing the long-termed reproductive viability and resilience of this high socio-economically and ecologically valuable species."	3853	Chiriboga-Arroyo, F., Jansen,
sus		"We find that the resource unit reacts robustly to the type and level of extraction currently practiced; that resource users have built on a self-organized system that had defined boundaries and access to the resource; that linked production chains, market networks and informal financing work to supply global markets."	3837	Guariguata, M.R., Cronkleton,
tra		"Although the Brazilian nuts are produced in South America, majority are exported to Europe, the United States, Canada, and Oceania. In fact, none of the South American countries makes it to the top twenty consumers of the nuts."	3838	Kiprop, V. (2018): Top Brazil N
tra		"Around 20,000 tons of Brazil nuts are harvested each year, of which Bolivia accounts for about 50%, Brazil 40%, and Peru 10% (2000 estimates)."	1135	Wikipedia. www.wikipedia.org
tra		"Brazilian production has ranged from 3,557 tons in 1944 to 104,487 tons in 1970."	3684	Mori, S.A. (1992): The Brazil n
tra		"In 2017, global production of Brazil nuts was 84,000 tonnes"	3848	Ortiz, E.G. (2002): Chapter 5.
tra	US	"sold in this country"	6369	McGuffin, M., Kartesz, J.T., Le

Legislation

Regulation

ICC	Regulation	Ref	
	"Felling a standing Brazil nut tree is punishable by prison and heavy fines in Brazil, Bolivia and Peru. Although the law, as written, has been respected to some extent, it has been totally ineffective in protecting its target. Large prime Brazil nut areas, on the order of hundreds of thousands of hectares, have been cleared for cattle ranching, leaving only standing Brazil nut trees"	3848	Ortiz, E.G. (2002): Chapter 5.
	[BO, BR, PE]: "felling them is illegal in all three countries"	3839	Moncrieff, V.M. (2015): A little l
BR	"In Brazil, cutting down a Brazil nut tree (typically with the intent of harvesting lumber and Brazil nuts) is illegal"	1135	Wikipedia. www.wikipedia.org
BR	"logging now banned"	3753	Mabberley, D.J. (2017): The pl
BR	"protegida por lei"	3682	Martinelli, G. & Avila Moraes,

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1126 World Checklist of Selected Plant Families, RBG Kew. apps.kew.org/wcsp/home.do

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Abbreviations and Standards

ICC = ISO Country Codes **Ref = literature reference**

Altitude: Low / High = minimum and maximum limits of altitude range [m]

Legislation: Source Taxon = name of taxon as contained in legislation

Utilization: TypeUtil

TypeUtil	*TypeUtilLong*
com	commodity
cul	cultivation
exp	export
har	harvest
imp	import
man	management
price	price
rem	remark
socu	socio-cultural significance
sus	sustainability
tra	trade
trend	trend and scale of trade

Distribution Status: Standard

Status	*Explanation*
chk	check entry
nat	native
int	introd., established
adv	introduced, not established
ocd	occurrence doubtful
unc	status unclear
ext	extinct
cul	cultivated
sou	source doubtful
ica	introduced (casual or naturalized)
don	doubtfully native
pex	(presumably) extinct
ali	casual alien
nzd	naturalized
nna	not native
dpn	status doubtful, possibly native
abs	absent but reported in error

Common names: Type

TypeShort	*Type*
?	<unknown>
ayn	ayurvedic name
hom	homoeopathic name
pha	pharmaceutical name
scn	standardized common name
tra	trade name
ver	vernacular name

Ecology: TypeEcol

TypeEcol	*Explanation*
alti	altitude
grow	growth rate
habit	habitat
morph	morphology
regen	regeneration
repro	reproduction