

Density, Distribution, and Attributes of Tree Cavities in an Old-Growth Tropical Rain Forest¹

Table S1

TABLE 1—Studies reporting cavity density estimates per unit area from forests of different latitudes and ages. References marked with an asterisk (*) provided minimum cavity size criteria and are included in Fig. 1.

Study	Location	Latitude	Cavity definition	Forest type	Cavs/ha
Pulliainen & Saari 2002	Värriö Nature Reserve, Lapland, Finland	67°44'N	Not provided	Spruce forest	1.1
				Mixed forest	0.8
				Pine forest	0.3
				Subalpine birch forest	0.1
*Carlson <i>et al.</i> 1998	Andersby Forest, S Sweden	60°09'N	Bottom area ≥ 22 cm ² ; interior diam ≥ 40 mm; entrance diam ≥ 25 mm (circular) or ≥ 18 mm (oblong)	Managed mixed deciduous forest	60.4
*Lõhmus <i>et al.</i> 2005	Alam-Pedja Nature Reserve, Estonia	58°N	Entrance diam ≥ 10 mm	Managed mixed deciduous/coniferous forest	0.7
				Unmanaged mixed deciduous/coniferous forest	0.8
*Remm <i>et al.</i> 2006	Alam-Pedja Nature Reserve, Estonia	58°32'N	Entrance diam 21–135 mm, internal cavity width 3.5–33 cm, cavity depth 1–120 cm	Old-growth (50-110-year-old) deciduous/coniferous riverine forest	1.6 – 4.1
*Sandström	Uppland and Skane,	~58°N	Bottom area ≥ 22 cm ² , smallest internal diam	Managed mixed/ coniferous forest	8.0–40.0

1992	S Sweden	≥ 40 mm, entrance diam ≥ 25 mm	Old-growth coniferous/ mixed/ deciduous forest	2.0–72.0
*Edington & Edington 1972	S Wales	$\sim 52^\circ\text{N}$ Entrance diam ≥ 20 mm	Mixed deciduous forest	15.5
Schiermann 1934	Kiefernwald, Germany	$\sim 52^\circ\text{N}$ Suitable for Black and Spotted Woodpeckers	Old-growth pine	5.6
*van Balen <i>et al.</i> 1982	Arnhem, Netherlands	$\sim 52^\circ\text{N}$ Bottom area ≥ 25 cm ² ; diam ≥ 4 cm; bottom-top distance ≥ 10 cm; entrance diam ≥ 23 mm (circular) or 18 mm (slit-like); not exposed, closed at bottom, little or no water	Old deciduous trees/young plantations Old-growth mixed forest	9.4–30.0 6.2–6.8
Walankiewicz 1991	Bialowieza National Park, Poland	$52^\circ 41' \text{N}$ Visited by ♂ Collared Flycatcher	Old-growth oak-hornbeam forest	4.5
Peterson & Gauthier 1985	British Columbia, Canada	51°N Not provided	Aspen groves/boreal forest/parkland	1.2
Kneitz 1961	Würzburg, Germany	$\sim 50^\circ\text{N}$ Woodpecker holes	Conifers > 60 years old Oak trees >60 years old	0.7–1.5 17.0
Zahner & Loy 2000	Spessart Mountains, Germany	$\sim 50^\circ\text{N}$ Potential breeding cavities for swifts	Old-growth oak forest	11.0

Bai <i>et al.</i> 2003	Khentii Mountains, NE Mongolia	49°04'N	Not provided	Old-growth deciduous/coniferous forest	30.0
Rendell & Robertson 1989	Ontario, Canada	44°N	Not provided (only snags searched)	Beaver-flooded deciduous woodlands	11.9
*Soulliere 1988	Mead Wildlife Area, WI, U.S.A.	44°N	Entrance diam > 90 mm; bases \geq 13x8 cm; inside height \geq 23 cm; stable floors < 2 m deep	Second-growth hardwood forest	0.7
Boyer 1976	Shiawassee NWR, MI, U.S.A.	~43°N	Not provided	Deciduous forest	0.1
Kenefic & Nyland 2000	Cuyler Hill State Forest, NY, U.S.A.	~42°30'N	\geq 2 m above ground in tree or snag \geq 10 cm dbh, potentially suitable for hole-nesting species	Selectively logged hardwood forest	28.6
Dobkin <i>et al.</i> 1995	Hart Mountain Nat'l Antelope Refuge, OR, U.S.A.	42°N	Not provided	Aspen forest	7.7
*Bellrose <i>et al.</i> 1964	Mason County, IL, U.S.A.	~40°N	Entrance diam \geq 87.5 mm; free of water and debris	Black oak woodlots	0.2

Carey 1983	Monongahela National Forest, WV. U.S.A.	~38°04' N to ground; tree ≥ 10 cm dbh & sound enough to withstand normal winds	Covered hole > 1 m above ground, not open	Second growth oak-hickory forest Second growth maple-beech-birch forests	36 35.3
Sedgwick & Knopf 1992	South Platte Wildlife Management Area, CO, U.S.A.	~38°N	Not provided	Managed mixed deciduous forest	2.3–2.8
Moriarty & McComb 1983	Robinson forest, KY, U.S.A.	37°24'N	Not provided (includes cavities at ground level)	Second growth managed mixed mesophytic forest	30.4
*Waters <i>et al.</i> 1990	San Joaquín Exp. Range, CA, U.S.A.	~37°N	Entrance diam 25–150 mm, depth 15–50 cm	Old-growth oak-pine forest	3.4
Tomasevic & Estades 2006	Pantaniillos Forest, Chile	35°26'S	Considered potentially suitable from ground	Second-growth beech forest Old-growth beech forest	1.9 12.9
Pell & Tidemann 1997	Canberra, ACT, Australia	35°S	Occupied by starlings, mynas, parrots, or bees	Eucalyptus/savannah (actively grazed) Eucalyptus/savannah (no grazing)	3.0 0.4
Chambers &	Kaibab, AZ, U.S.A.	~34°N	Entrance large and deep enough to appear	Burned ponderosa pine forest	3.0

Mast 2005			adequate nesting site for smallest cavity nester in the area	Unburned ponderosa pine forest	2.2
Ganey & Vojta 2004	Kaibab, AZ, U.S.A.	~34°N	Not provided	Mature, managed coniferous forest	3.5–5.0
*Cameron 2006	Goonoo Forest, NSW, Australia	~32°S	> 8 m in height; in branches or stems > 30 cm diam; angle of branch or stem $\leq 45^\circ$; entrance diam ≥ 150 mm	Native forest: ironwood, cypress pine, red gum	0.002
McComb & Noble 1981	Durango, MS, U.S.A.	~32°N	Not provided	Mature riverine hardwood plantation	40.0
	Donohoe, MS, U.S.A.			Mature hardwood-pine upland forest	16.8
	Ben Hur Research Farm, LA, U.S.A.	~31°N	Not provided	Mature mixed hardwood forest	87.5
*Saunders <i>et al.</i> 1982	Nereeno Hills, Australia	~30°S	Entrance diam and cavity depth both ≥ 90 mm	Salmon gum forest (unlogged, disturbed by sheep/rabbits)	16.0
*Pattanavibool & Edge 1996	HKKWS Reserve, W Thailand	15°25'N	Depth ≥ 7.5 cm, entrance diam ≥ 30 mm	Old-growth evergreen deciduous forest Logged evergreen deciduous forest	407.0 189.0

Stoneman <i>et al.</i> 1997	SW Australia	~14°S	Suitable for Brush-tailed Possum	Mature jarrah forest	3.0
			Suitable for Brush-tailed Possum	Logged jarrah forest	2.0
			Suitable for Striated Pardalote	Mature jarrah forest	14.0
			Suitable for Striated Pardalote	Logged jarrah forest	4.0
			Suitable for Australian Ringneck	Mature jarrah forest	4.0
			Suitable for Australian Ringneck	Logged jarrah forest	2.0
			Suitable for Galah nesting	Mature jarrah forest	6.0
			Suitable for Galah nesting	Logged jarrah forest	3.0
Renton 2004	Manu Biosphere Reserve, Peru	12°05'S	Palm snags with cavities large enough to be potential nest sites for Blue-and-yellow Macaws	Old-growth <i>Mauritia</i> palm swamp forest	0.5–0.4
Ross 1998	Queensland, Australia	~12°S	Not provided	Coastal dry sclerophyll	25.9
				Inland dry sclerophyll	25.6
				Coastal wet hardwood	19.4
				Coastal moist hardwood	28.8
				Cypress	19.8

*Boyle <i>et al.</i> (this study)	La Selva biological station, Costa Rica	~10°N	Above ground, extending into the trunk, not open to the ground or sky, entrance \geq 25 mm diam	Old-growth evergreen forest	111.7
Marsden & Pilgrim 2003	Papua New Guinea	5°S	Not occupied by birds other than parrots and hornbills; dbh and entrance diam suitably large	Old-growth forest "Forest gardens"	0.7 0.2

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