

Supporting Information

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Table S1. Summary of sample information, outer and inner radiocarbon ages, calibrated median probabilities ages from the Calib 5.0 program, calculated life-spans, and radial growth rates for *Gerardia* sp. and *Leioipoathes* sp.

Sample ID	Location	Outer >>>				>>> Inner				Radial Growth rate mm/yr		
		Dist (mm)	¹⁴ C Age	±	Median Prob Age	Dist (mm)	¹⁴ C Age	±	Median Prob Age		Life Span	Radial Dist (mm)
<i>Gerardia</i> sp.												
KP04 Ger 22	Keahole Point, Big Is HI	0.0	4,070	35	4,147	30.0	4,780	35	5,101	954	30.0	0.031
KP04 Ger 24	Keahole Point, Big Is HI	0.0	2,520	35	2,223	30.0	3,220	40	3,076	853	30.0	0.035
KP04 Ger 23 BD	Keahole Point, Big Is HI	0.0	2,315	35	1,961	10.0	2,565	35	2,272	311	10.0	0.032
KP04 Ger 25	Keahole Point, Big Is HI	0.0	2,205	35	1,836	28.0	2,860	35	2,674	838	28.0	0.033
KP04 Ger 21 D3	Keahole Point, Big Is HI	0.0	2,460	35	2,151	24.0	3,115	40	2,927	776	24.0	0.031
KP04 Ger 20 D3	Keahole Point, Big Is HI	2.0	3,970	35	4,006	23.0	4,555	35	4,806	800	21.0	0.026
GER-HI-RG-01†	Hawaii Big Is HI	0.0	2,390	30	2,055	23.2	3,200	35	3,040	985	23.2	0.024
Lan04 Ger 4 D2	Lanikai, Oahu HI	0.0	3,395	35	3,302	42.0	4,775	30	5,092	1,790	42.0	0.023
Lan04 Ger 5 D23	Lanikai, Oahu HI	0.0	3,435	30	3,346	27.0	4,970	35	5,357	2,011	27.0	0.013
Lan04-GER2-#1 [‡]	Lanikai, Oahu HI	0.0	Modern		2004AD [§]	11.0	585	30	263	317	11.0	0.035
GER-RD97-01 Radial*†	Makapuu, Oahu	0.0	Modern		1997AD [§]	12.0	1,200	25	760	807	12.0	0.015
Mak04 GER-#1†	Makapuu, Oahu	0.0	570	25	260	20.0	1,150	35	710	450	20.0	0.044
Mak04 GER-#2†	Makapuu, Oahu	0.0	Modern		1962AD [¶]	38.1	3,020	30	2,730	2,742	38.1	0.014
Mak04 GER-#4†	Makapuu, Oahu	0.0	980	25	585	35.9	2,120	30	1,740	1,155	35.9	0.031
CS04 Ger 6 D8	Cross Seamount	2.0	9,790	45	10,677	61.0	10,350	40	11,383	706	59.0	0.084
CS04 Ger 101 D1	Cross Seamount	0.0	Modern		2004AD [§]	10.0	1,270	30	843	897	10.0	0.011
CS04 Ger 2 D1	Cross Seamount	0.0	730	35	400	45.0	1,370	35	945	545	45.0	0.083
<i>Leioipoathes glaberina</i>												
BC-RD97-05 (BC#5)-Radial*†	Makapuu, Oahu	0.0	530	40	1997 AD	11.6	2,600	35	2,320	2,367	11.6	0.005
outer 7.7 mm of growth			530	40	1997 AD	7.7			1,912	1,959	7.7	0.004
1 st 5.1 mm of growth					1,912	5.1			2,314	402	5.1	0.013
Lan04 Leio 1 D1 Stalk [‡]	Lanikai, Oahu HI	0.0	Modern	2,004	0	1.9	4,105	40	4,197	4,251	19.0	0.004
Lan04 Leio 1 D1 Hoof	Lanikai, Oahu HI	0.0	2,035	35	1,634	5.9	4,150	35	4,265	2,631	5.9	0.002
Lan04 Leio-2	Lanikai, Oahu HI	0.0	Modern	2,004	0	0.7	620	35	295	349	0.7	0.002

The Median Probability Age reported is derived from the radiocarbon calibrations which were done using a ΔR of -28 ± 4 ¹⁴C years [(Druffel ERM, et al. (2001) Changes of subtropical North Pacific radiocarbon and correlation with climate variability. *Radiocarbon* 43:15–25]Druffel et al. 2001), the CALIB 5.0 (Stuiver & Reimer 1993)[Stuiver M, Reimer PJ (1993) Extended ¹⁴C database and revised CALIB V5.0 radiocarbon calibration program. *Radiocarbon* 35:215–230] computer calibration program and the marine04 calibration dataset (Hughen et al. 2004[Hughen KA, et al. (2004) Marine04 Marine radiocarbon age calibration, 26–0 ka BP. *Radiocarbon* 46:1059–1086]).

[∞]Microtomed (100- μ m intervals) specimens; see Figs. 2A and 3.

*Radial transects from outer edge to center in \sim 0.5-mm increments; see Fig. 5.

[‡]Results published in Roark et al., 2006, MEPS Vol 327: p1–14.

[§]Sample was collected alive, thus the outer most age assigned is the collection year.

[¶]Post-bomb data are reflected by positive Δ^{14} C values. AD years were determined by comparison with a Hawaiian surface water Δ^{14} C time-series. See Fig. 2.