TABLE S1. Described species of ammonia-oxidizing archaea (AOA) and ammonia monooxygenase-encoding archaea (AEA) as of July 2012. Note that additional strains of "*Ca.* N. koreensis", "*Ca.* N. limnia", "*Ca.* N. maritimus" and "*Ca.* Nitrososphaera sp." have been reported in the literature (36, 61, 89, 99, 144; see also Fig. S1), but they fall below the species cut-off of 99% identity on the 16S rRNA level that was used to establish this table. Ammonia-oxidizing activities of "*Ca.* C. symbiosum" and "*Ca.* N. salaria" have yet not been demonstrated in the literature and should be referred to as AEA until shown otherwise. All AEA/AOA except *N. maritimus* SMC1 and *N. viennensis* EN76 are still in *Candidatus*-status. Labeling as such in the list is omitted for sake of brevity.

Organism	***Cenarchaeum symbiosum* A**	***Nitrosoarchaeum koreensis* MY1**	***Nitrosoarchaeum limnia* SFB1**	***Nitrosocaldus yellowstonii***	***Nitrosopumilus maritimus* SCM1**	***Nitrosopumilus salaria* BD31**	***Nitrososphaera gargensis***	***Nitrososphaera viennensis* EN76**	***Nitrosotalea devanaterra***	***'AOA-AC5'***	***'AOA-DW'***
Affiliation	group I.1a	group I.1a	group I.1a	ThAOA group	group I.1a	group I.1a	group I.1b	group I.1b	group I.1a-associated	group I.1a	group I.1a
Availability		enrichment	enrichment	enrichment	pure culture	enrichment	enrichment	pure culture	enrichment	enrichment	enrichment
Original habitat	marine sponge *Axinella* sp.	rhizosphere of *Caragana sinica*	low-salinity sediment	hot spring sediment	tropical marine aquarium water	estuary sediment	thermal spring microbial mat	garden soil	acidic soil	freshwater sediment	freshwater sediment
T_{opt} [°C]	10	25	22 [b]	72	28		46	35	25	27	27
pH_{opt}		6.0 - 8.0	7.0 - 7.2 [b]	~8.0	7.0 - 7.2		7.0 - 7.4	7.5	4.5	7.0 - 7.5	7.0 - 7.5
Inhibitory $[NH_4^+]$ / $[NH_3]$		20 mM / 145 µM (pH 7.0)			2-3 mM / 18-27 µM (pH 7.0)		<3.08 mM / <88 µM (pH 7.0)	10-15 mM / 0.51-0.75 mM	<50 mM / <9 µM	>5 mM / >130 µM (pH 7.5)	1 mM / >26 µM (pH 7.5)
Growth rate [day^{-1}]			0.2 (low) / 0.12 (high) [c]	0.8	0.65 (30 °C)			0.043 (auto) / 0.53 (mixo) [e]	0.37	0.55	0.55
Yield [cells μM^{-1} NH_3]		$1.1 * 10^5$			$4 * 10^5$				$4.5 * 10^5$		
Cell shape	rod	rod	rod	spherical	rod		spherical	spherical	rod		
Diameter / length [µm]	0.5 / 0.8	0.3 - 0.5 / 0.6 - 1.0	0.19 - 0.27 / 0.55 - 1.00	~0.5 [d]	0.17 - 0.22 / 0.5 - 0.9		0.9 ± 0.3	0.5 - 0.8	0.33 ± 0.01 / 0.89 ± 0.05		
Genome size [Mb]	2.05	>1.61 [a]	>1.77 [a]	1.43 [d]	1.65	>1.57 [a]	2.83				
References	44, 45, 107	58, 60	15, 90	29	65, 79	88	46	131	71	36	36

[a] unclosed draft genome; [b] *in situ* measurements at the sampling site; [c] growth rates for low (25% of seawater) and high (75% of seawater) salinity media; [d] de la Torre, pers. comm.; [e] growth rate under autotrophic (auto) and mixotroph (mixo) conditions (*i.e.* pyruvate)