

Table S1. Summary of genes investigated, the enzymes they encode, and their function in the nitrogen cycle.

Table S2. PCR primers used for quantitative PCR and reaction conditions.

Table S1

	Enzyme	Process (es)	Details
<i>nifH</i>	Nitrogenase	Nitrogen fixation	Reduction of N ₂ to NH ₄ ⁺
<i>amoA</i>	Ammonia monooxygenase	Aerobic ammonia oxidation	Oxidation of NH ₄ ⁺ to NH ₂ OH
<i>nxrB</i>	Nitrite oxidoreductase enzyme	Nitrification	Oxidation of NO ₂ ⁻ to NO ₃ ⁻
<i>narG</i>	NO ₃ ⁻ reductase	Denitrification	Reduction of NO ₃ ⁻ to NO ₂ ⁻
<i>norB</i>	NO reductase	Denitrification	Reduction of NO to N ₂ O
<i>nosZ</i>	N ₂ O reductase	Denitrification	Reduction of N ₂ O to N ₂

Table S2

Target gene	Primers	Primer Sequence	Reaction	Cycling conditions	Reference
<i>nifH</i>	nifH-F	5'-AAAGGYGGWATCGGYAARTCCACCAC-3'	16.5 µL of 2 X ChamQ SYBR® Color qPCR Master MixTM, 2 µL of DNA template, and 0.8 µL of each primer.	95°C-5 min.; 40x 95°C-5s, 55°C-30s, 72°C-40s	[1]
	nifH-R	5'-TTGTTSGCSGCRTACATSGCCATCAT-3'			
AOA <i>amoA</i>	Arch-amoAF	5'-STAATGGTCTGGCTTAGACG-3'	16.5 µL of 2 X ChamQ SYBR® Color qPCR Master MixTM, 2 µL of DNA template, and 0.8 µL of each primer.	95°C-5 min.; 40x 95°C-5s, 58°C-30s, 72°C-40s	[2]
	Arch-amoAR	5'-GCGGCCATCCATCTGTATGT-3'			
AOB <i>amoA</i>	AmoA-1F	5'-GGGGTTTCTACTGGTGGT-3'	16.5 µL of 2 X ChamQ SYBR® Color qPCR Master MixTM, 2 µL of DNA template, and 0.8 µL of each primer.	95°C-5 min.; 40x 95°C-5s, 58°C-30s, 72°C-40s	[3]
	AmoA-2R	5'-CCCCTCKGSAAAGCCTTCTTC-3'			
<i>norB</i>	norB-F	5'-AAATGGCTTTACGTCATCGTCG-3'	16.5 µL of 2 X ChamQ SYBR® Color qPCR Master MixTM, 2 µL of DNA template, and 0.8 µL of each primer.	95°C-5 min.; 40x 95°C-5s, 60°C-30s, 72°C-40s	[4]
	norB-R	5'-TCTGCGTGCCGTGGGTGT-3'			
<i>nosZ</i>	nosZ-F	5'-CGYTGTTCMTCGACAGCCAG-3'	16.5 µL of 2 X ChamQ SYBR® Color qPCR Master MixTM, 2 µL of DNA template, and 0.8 µL of each primer.	95°C-5 min.; 40x 95°C-5s, 60°C-30s, 72°C-40s	[4]
	nosZ-R	5'-CATGTGCAGNGCRTGGCAGAA-3'			
<i>narG</i>	narG-f	5'- TCGCCSATYCCGGCSATGTC-3'	16.5 µL of 2 X ChamQ SYBR® Color qPCR Master MixTM, 2 µL of DNA template, and 0.8 µL of each primer.	95°C-5 min.; 40x 95°C-5s, 65°C-30s, 72°C-40s	[5]
	narG-r	5'- GAGTTGTACCAGTCRGC SGAYTCSG-3'			
<i>nxB</i>	nxB-F	5'- TACATGTGGTGGAACA-3'	16.5 µL of 2 X ChamQ SYBR® Color qPCR Master MixTM, 2 µL of DNA template, and 0.8 µL of each primer.	95°C-5 min.; 40x 95°C-5s, 50°C-30s, 72°C-40s	[6]
	nxB-R	5'- CGGTTCTGGTTCRATCA-3'			

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