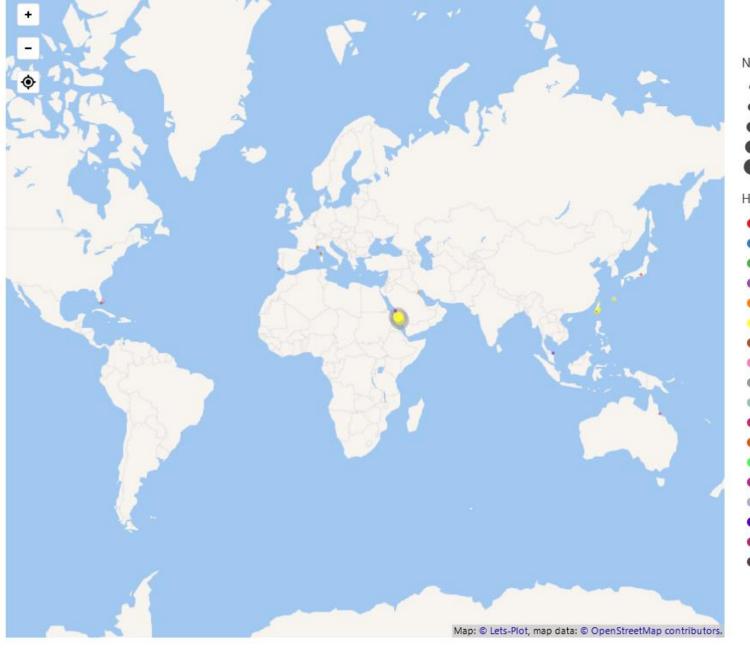


Endozoicomonas bacteria phylogeny inferred in a likelihood analysis of 15 16S rRNA sequences using TIM3+I+G4 model. Bootstrap values are labeled on the branches, orange being above 90%, and red being 100% support values. Taxon label includes the location of sampling, as well as the species from which it was sampled from (the host). The list was based off of Picking sequences was influenced by Pike et al. (2013).



Number of sequences

- 100
- 200
- 300
- **4**0
- 500

Host coral/sponge species

- Haplosclerida gen. et sp.
- Montipora aequituberculata
- Porites compressa
- Irciniidae sponges
- Acropora clathrata
- Stylophora pistillata
- Eunicella cavolini
- Eunicea fusca
- Acropora humilis
- Plexaura homomalla
- Lobophytum compactum
- Corallium rubrum
- Endozoicomonas sp. Acr-14
- Endozoicomonas sp. Acr-12
- P. verrucosa
- Clavelina coerulea
- Acropora cytherea
- Eunicea flexuosa

Mapping of location of included a mix of 140 Endozoicomonas and bacterial clone (not explicitly uploaded as Endozoicomonas sp.) 16S sequences with latitude and longitudinal on a map using pandas, geopandas, lat_long_parser and Lets-Plot (with OpenStreetMap). Size of dot correlates to number of sequences, while color indicate the sample's host species. Samples come from Australia, France, Portugal, US (Florida and Hawai'i), Bahamas, Malaysia, Saudi Arabia, Kuwait, Taiwan (Kenting, Yeh Liu, Green Island) and Japan (Shizuoka and Okinawa).

Uncultured bacterial clones from Stylophora pistillata in Southern Red Sea, Saudi Arabia Uncultured bacterial clones from Stylophora pistillata in Southern Red Sea, Saudi Arabia Uncultured bacterial clones from P. verrucosa in Al-Fahal reef, Saudi Arabia Uncultured bacterial clones from P. verrucosa in Al-Fahal reef, Saudi Arabia Uncultured bacterial clones from Stylophora pistillata in Southern Red Sea, Saudi Arabia Uncultured bacterial clones from Acropora humilis in Red Sea, Brown reef, Saudi Arabia Jncultured Endozoicomonas from Corallium rubrum in Porticcio, Corsica Island, France Endozoicimonas from Irciniidae sponges in Algarve, Gale Alta, Armacao de Pera, Portugal Uncultured bacterial clones from Eunicella cavolini in Bay of Villefranche-sur-Mer. France Uncultured bacterial clones from Clavelina coerulea, Terengganu Malaysia Uncultured bacterial clones from Acropora humilis in Red Sea, Brown reef, Saudi Arabia Uncultured bacterial clones from Stylophora pistillata in Southern Red Sea, Saudi Arabia Uncultured bacterial clones from P. verrucosa in Al-Fahal reef. Saudi Arabia clones from Pocillopora damicornis in Red Sea, Brown reef, Saudi Arabia Uncultured Enzozoicomonas from Stylophora pistillata in Kenting, Taiwan Endozoicomonas sp. from Acropora hemprichii in Red Sea, Saudi Arabia Endozoicimonas from Acropora clathrata in Qit'at Bnaider, Kuwait Uncultured Endozoicomonas from Stylophora pistillata in Kenting, Taiwan Endozoicomonas sp. Acr-14 from Acropora sp. in Kenting, Taiwan Endozoicomonas sp. Acr-12 from Acropora sp. in Kenting, Taiwan Uncultured Enzozoicomonas from Stylophora pistillata in Okinawa, Japan Endozoicomonas sp. from Acropora cytherea in Red Sea, Saudi Arabia Uncultured Enzozoicomonas from Stylophora pistillata in Okinawa, Japan Endozoicomonas from Lobophytum compactum in Orpheus Island Great Barrier Reef, Australia Endozoicomonas euniceicola from Eunicea flexuosa in Florida, USA Uncultured Endozoicomonas from Plexaura homomalla in Summerland Key, Florida, USA Endozoicomonas gorgoniicola from Plexaura sp. in Bimini, Tuna Alley, Bahamas Endozoicomonas montiporae CL-33 from Montipora aequituberculata in Kenting, Taiwan Uncultured Enzozoicomonas from Stylophora pistillata in Kenting, Taiwan Uncultured Endozoicomonas from Plexaura homomalla in Summerland Key, Florida, USA

140 Endozoicomonas and bacterial clone phylogeny inferred in a continuous Bayesian phylogeographic analysis using 16S rRNA sequences, their latitude and longitudinal information and sampling dates with BEAST v1.10.4, HKY substitution model and classic priors. Posterior values are labeled on the branches, with purple transitioning to pink being 80-90%, and red being above 90% in support values. Taxon label includes the location of sampling, as well as the species from which it was sampled from (the host). Some clades (filled colors) were collapsed for brevity. Picking sequences was intentionally global in scope.

References

- Ayres DL, Darling A, Zwickl DJ, Beerli P, Holder MT, Lewis PO, Huelsenbeck JP, Ronquist F, Swofford DL, Cummings MP, et al. 2011. BEAGLE: An Application Programming Interface and High-Performance Computing Library for Statistical Phylogenetics. *Systematic Biology* **61**:170–173.
- Barker CH. 2022. NOAA-ORR-ERD/lat lon parser: v1.3.0. Available from: https://github.com/NOAA-ORR-ERD/lat lon parser
- BEAST Developers. 2019. Phylogeographic diffusion in continuous space YFV example. Available from: https://beast.community/workshop_continuous_diffusion_yfv
- Cock PJA, Antao T, Chang JT, Chapman BA, Cox CJ, Dalke A, Friedberg I, Hamelryck T, Kauff F, Wilczynski B, et al. 2009. Biopython: freely available Python tools for computational molecular biology and bioinformatics. *Bioinformatics* **25**:1422–1423.
- Darriba D, Posada D, Kozlov AM, Stamatakis A, Morel B, Flouri T. 2019. ModelTest-NG: A New and Scalable Tool for the Selection of DNA and Protein Evolutionary Models. *Molecular Biology and Evolution* **37**:291–294.
- Edgar RC. 2022. High-accuracy alignment ensembles enable unbiased assessments of sequence homology and phylogeny. bioRxiv.
- Jordahl K, den Bossche JV, Fleischmann M, Wasserman J, McBride J, Gerard J, Tratner J, Perry M, Badaracco AG, Farmer C, et al. 2020. geopandas/geopandas: v0.8.1. Available from: https://doi.org/10.5281/zenodo.3946761
- Kozlov AM, Darriba D, Flouri T, Morel B, Stamatakis A. 2019. RAxML-NG: a fast, scalable and user-friendly tool for maximum likelihood phylogenetic inference. *Bioinformatics* **35**:4453–4455.
- Lets-Plot contributors, Dovdaiytis V. 2023. JetBrains/lets-plot: v4.1.0. Available from: https://github.com/JetBrains/lets-plot
- McKinney W. 2010. Data Structures for Statistical Computing in Python. In: van der Walt S, Millman J, editors. Proceedings of the 9th Python in Science Conference. pp. 56–61.
- Nguyen L-T, Schmidt HA, von Haeseler A, Minh BQ. 2014. IQ-TREE: A Fast and Effective Stochastic Algorithm for Estimating Maximum-Likelihood Phylogenies. *Molecular Biology and Evolution* **32**:268–274.
- OpenStreetMap contributors. 2023. Planet dump retrieved from https://planet.osm.org. Available from: https://www.openstreetmap.org
- pandas development team T. 2023. pandas-dev/pandas: Pandas. Available from: https://doi.org/10.5281/zenodo.10107975
- Pike RE, Haltli B, Kerr RG. 2013. Description of Endozoicomonas euniceicola sp. nov. and Endozoicomonas gorgoniicola sp. nov., bacteria isolated from the octocorals Eunicea fusca and Plexaura sp., and an emended description of the genus Endozoicomonas. *International Journal of Systematic and Evolutionary Microbiology* **63**:4294–4302.
- Rambaut A, Drummond AJ, Xie D, Baele G, Suchard MA. 2018. Posterior Summarization in Bayesian Phylogenetics Using Tracer 1.7. Systematic Biology 67:901–904.
- Tamura K. 1992. Estimation of the number of nucleotide substitutions when there are strong transition-transversion and G+C-content biases. *Molecular biology and evolution* **9**:678–687.