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Six years of demography data for 11 reef coral species

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Class I. Data Set Descriptors

A. Data set identity:

Six years of demography data for 11 reef coral species

B. Data set identification code:

- *competition.csv*
- *egg_energy.csv*
- *fecundity.csv*
- *growth.csv*
- *polyp_density.csv*
- *size_structure.csv*
- *survival.csv*
- *trimodal.csv*

C. Data set description:

1. **Principal investigators:** Andrew H. Baird, Sean R. Connolly, Maria A. Dornelas, Joshua S. Madin.
2. **Abstract:** Scleractinian corals are colonial animals with a range of life history strategies, making up diverse species assemblages that define coral reefs. We tagged and tracked approximately 30 colonies from each of 11 species during seven trips spanning six years (2009-2015) in order to measure their vital rates and competitive interactions on the reef crest at Trimodal Reef, Lizard Island, Australia. Pairs of species were chosen from five growth forms where one species of the pair was locally rare (R) and the other common (C). The sampled growth forms were massive [*Goniastrea pectinata* (R) and *G. retiformis* (C)], digitate

[*Acropora humilis* (R) and *A. cf. digitifera* (C)], corymbose [*A. millepora* (R) and *A. nasuta* (C)], tabular [*A. cytherea* (R) and *A. hyacinthus* (C)] and arborescent [*A. robusta* (R) and *A. intermedia* (C)]. An extra corymbose species with intermediate abundance, *A. spathulata* was included when it became apparent that *A. millepora* was too rare on the reef crest, making the 11 species in total. The tagged colonies were visited each year in the weeks prior to spawning. During visits, two or more observers each took 2-3 photographs of each tagged colony from directly above and on the horizontal plane with a scale plate to track planar area. Dead or missing colonies were recorded and new colonies tagged in order to maintain approximately 30 colonies per species throughout the six years of the study. In addition to tracking tagged corals, 30 fragments were collected from neighboring untagged colonies of each species for counting numbers of eggs per polyp (fecundity); and fragments of untagged colonies were brought into the laboratory where spawned eggs were collected for biomass and energy measurements. We also conducted surveys at the study site to generate size structure data for each species in several of the years. Each tagged colony photograph was digitized by at least two people. Therefore, we could examine sources of error in planar area for both photographers and outliners. Competitive interactions were recorded for a subset of species by measuring the margins of tagged colony outlines interacting with neighboring corals. The study was abruptly ended by Tropical Cyclone Nathan (Category 4) that killed all but nine of the over 300 tagged colonies in early 2015. Nonetheless, these data will be of use to other researchers interested in coral demography and coexistence, functional ecology, and parametrizing population, community and ecosystem models. The data set is not copyright restricted, and users should cite this paper when using the data.

3. **Key words/phrases:** Reef, coral, Scleractinia, growth, survivorship, mortality, fecundity, spawning, competition, demography, growth form

Class II. Research origin descriptors

A. Overall project description:

1. **Identity:** Six years of demography data for 11 reef coral species
2. **Originators:** The project was conceived by the principal investigators (See Class I. C. 1. Principal Investigators). All authors contributed to data collection in the field and laboratory and/or processing of colony images and data files.
3. **Period of study:** 2009 – 2015.
4. **Objectives:** Our overall aim was to measure variation in demographic rates (growth, survival, and reproduction) across coral species with diverse life history strategies. We subsequently aimed to use this information to parameterize demographic models (e.g., integral projection models) to address questions related to community assembly and coexistence theory on coral reefs. Several of these objectives have already been published (see Class V.F.1). The objective of this data paper is to make the data set available to other researchers to address other questions and for parameterizing ecological models.
5. **Abstract:** See Class I. C. 2. Abstract.
6. **Sources of funding:** The compilation of this data set was supported by Australian Research Council (ARC) Discovery-Projects (DP0987892 to JSM; DP0880544 to SRC), ARC Future Fellowships (FT110100609 to JSM; FT0990652 to AHB), the

ARC Centre of Excellence for Coral Reef Studies (CE0561432; CE140100020) and the John Templeton Foundation (60501 to MD and JSM). Further funding support was received by a National Science Foundation that supported MJM and the compilation of this data set (1948946 to JSM).

B. Specific subproject description

1. Site description

a. **Site type:** Tropical shallow-water coral reef

b. **Geography:** Trimodal Reef, Lizard Island (14.6998°S, 145.4486°E), Great Barrier Reef, Australia.

c. **Habitat:** Exposed reef crest in between North and South Palfrey Islands. The site is regularly exposed to strong wave action and currents.

d. **Geology, landform:** Granitic Island, Fringing Reef.

e. **Watersheds, hydrology:** Oceanic. Minor influences of heavy rains and run-off from mainland Australia.

f. **Site history:** The site has been impacted by a range of large-scale disturbances including cyclones, coral bleaching, and outbreaks of predatory crown of thorns starfish (Baird et al. 2018; Madin et al. 2018). Our study encompassed a period of relative ecological stability until a series of severe disturbances impacted the site, with most of the sampled individuals last observed in the 2014 census. In April 2014, Severe Tropical Cyclone Ita (Category 4) crossed the island from the north, yet the site retained much of its coral cover. In March 2015, Severe Tropical

Cyclone Nathan (Category 4) impacted the area through waves generated from the south, generating a severe decline in coral abundance and species richness at the study site (Baird et al. 2018; Madin et al. 2018).

g. **Climate:** Tropical.

2. Experimental or sampling design

a. **Design characteristics:** We conducted demographic surveys of common and rare coral populations for six years (2009-2015) on an exposed reef crest on Lizard Island, Australia. Eleven species of reef-building coral (Scleractinia) were selected to represent at least one locally common and one locally rare species from five morphological groups (Figure 1). Species within each group differ only slightly in morphological structure (e.g., in corallite geometry), and therefore have a range of functional traits in common. Nevertheless, we specifically selected species with different patterns of commonness and rarity within each group (Figure 1), allowing us to test for the influence of demographic rates on abundance patterns.

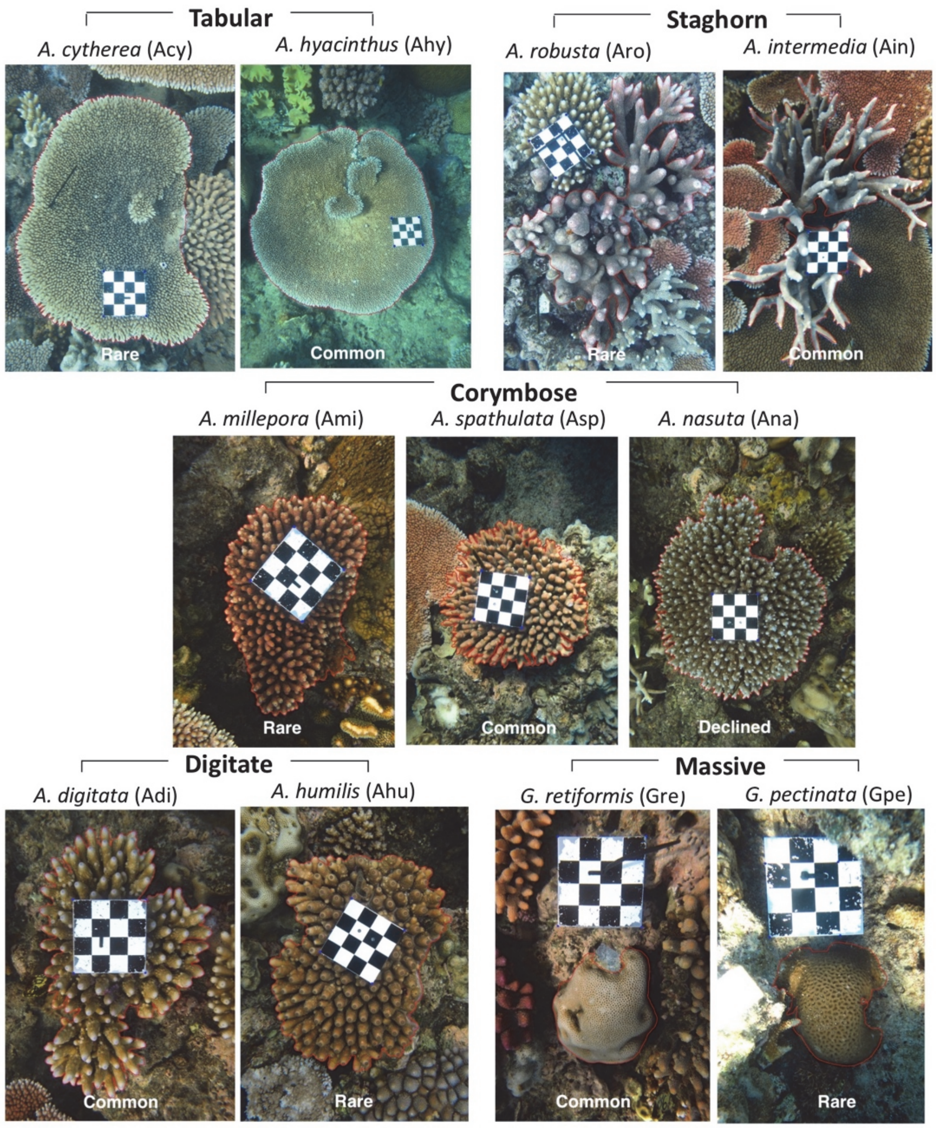

Figure 1. Eleven species from five morphological groups used in the analysis. Images show example colonies of each species with outline and 10 cm by 10 cm scale-bar (2.5 cm checkerboard) used to quantify size- dependent demographic rates, and are labelled by their abundance patterns throughout the study period (common or rare). *Acropora nasuta* was originally classified as common but declined in abundance throughout the study period. All photos taken by the authors of this paper.

b. **Permanent plots:** The study was conducted within a 500m x 10m patch of reef on Lizard Island (14.699839°S, 145.448674°E). This stretch of reef is known locally as 'Trimodal Reef' because of its species abundance distribution (Dornelas and Connolly 2008).

c. **Data collection period and frequency:** Annual demographic surveys were conducted in November from 2009 – 2015.

3. Research methods

a. **Field/laboratory methods:** Rates of coral growth, survival and fecundity were quantified by monitoring thirty colonies of each species over six years (Figure 2). We tagged 30 colonies of each of the branched species with numbered cattle tags using cable ties, and, for the massive *Goniastrea,* with metal tags hammered into the substrate in the vicinity of the colonies. Each year, two or more observers each took 2-3 photographs of each tagged colony from above with a two-dimensional scale plate placed level with the surface of the colony. The scale plate was 10 x 10 cm (100 cm^2) with a 2.5 x 2.5 cm checkerboard design made of stainless steel with an adhesive laminate. The angle of the camera was horizontal, and the distance from the colony was such that the entire colony was visible in the photograph. The images were corrected for barrel distortion using the software PTLens. The scale and outline of each colony were digitized in ImageJ by re-scaling the image using the scale-bar, and manually drawing around the colony boundaries for estimations of planar area. Outlines were traced multiple times for each image to account for tracing errors, such that, in each year, each tagged colony had 2-3 replicate images from each of at least 2 photographers, and at least 2-3 outlines per image, with mean values typically used for analyses of growth, survival, and size-specific fecundity. Every year, dead or missing colonies were replaced in order to maintain approximately 30 colonies per species. Growth was calculated as changes in planar area each year (Dornelas et al. 2017, Madin et al. 2020). Colonies were considered dead when the skeleton of the tagged colony was found, or if the exact position formerly occupied by the colony could be ascertained (implying that the colony was dislodged). This allowed us to track and quantify colony mortality rates (Madin et al. 2014). Yearly fecundity was measured by collecting fragments (one nubbin of *Goniastrea*, four branches of *Acropora*) from thirty colonies one week before spawning and counting eggs in six polyps per fragment using a dissecting microscope. Egg carbon content in 3–6 isolated colonies was measured directly to estimate egg biomass (Baird et al. 2018). Size-specific fecundity (eggs per cm^2) was found by multiplying average eggs per polyp in each colony by the average polyp density of its species. Polyp densities were measured by counting all polyps (in three dimensions) across a 16 cm^2 planar area of replicate colony skeletons using specimens from an extensive coral collection at James Cook University, Australia (Álvarez-Noriega et al. 2016). Colony fecundity was calculated by multiplying size-specific fecundity by colony area (Álvarez-Noriega et al. 2016). Competition was quantified by marking the starting and ending points of contact in a competitive interaction on top of the digital image of the colony's perimeter, to measure the amount of the colony's periphery involved in competitive interactions (Álvarez-Noriega et al. 2018). Interactions were classified as competitive when one of the colonies partially covered the other colony on the planar view (overtopping), when at least one of the neighboring colonies had an injury in the area of contact (digestion), or when one of the competitors was growing directly over the colony surface of the other (overgrowing). Overgrowth and digestion were considered "direct-contact" competition (Álvarez-Noriega et al. 2018). In addition to tracking tagged corals, we also conducted surveys at the study site to generate size structure data for each species over several years. Size structure was measured by photographing approximately 50 colonies of each study species, which took longer for rare species, and estimating planar areas using the same outlining methods detailed above. Figure 3 highlights some of the size specific demographic rates that can be generated with this data set that have appeared so far in research papers.

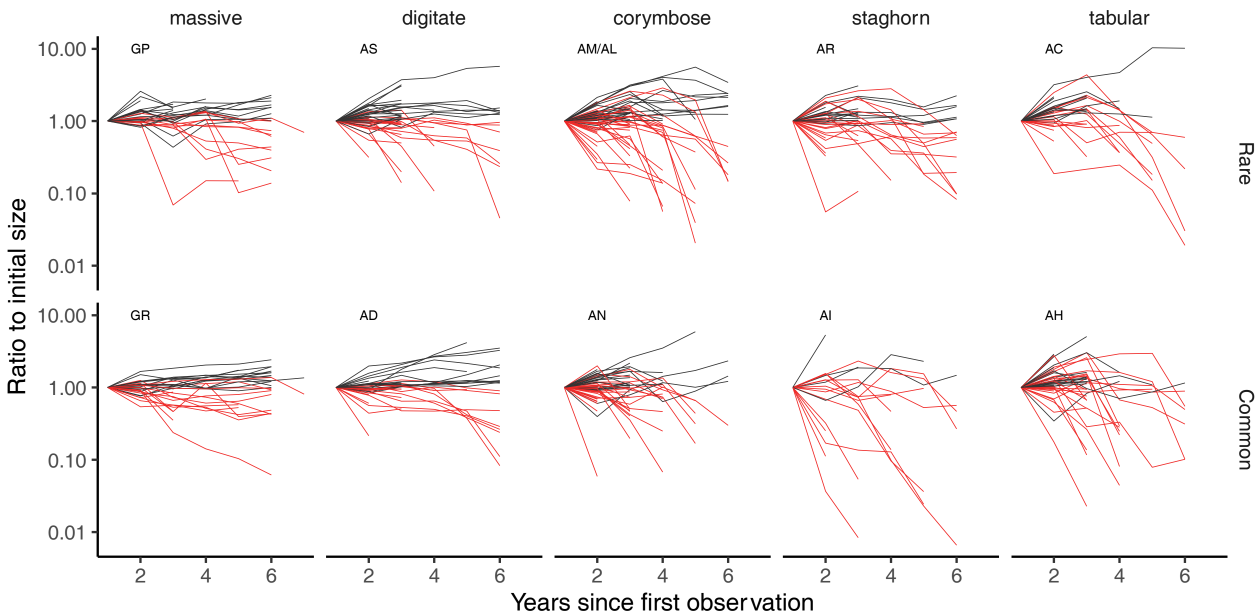

Figure 2: Tracking the fates of coral colonies through time. Each line shows how the size of an individual colony (as a ratio of its initial size) changed over six years. The end of a line indicates colony mortality and the color of the line indicates whether the colony experienced net growth (black) or net shrinkage (red) over the entire study period. Species are separated into panels and arranged into columns according to their morphology, with rare species on the top row and common species on the bottom row. The species names are *Goniastrea pectinata* (GP), *G. retiformis* (GR), *Acropora humilis* (AS), *A. cf. digitifera* (AD), *A. millepora* (AM), *A spathulata* (AL), *A. nasuta* (AN), *A. robusta* (AR), *A. intermedia* (AI), *A. cytherea* (AC) and *A. hyacinthus* (AH).

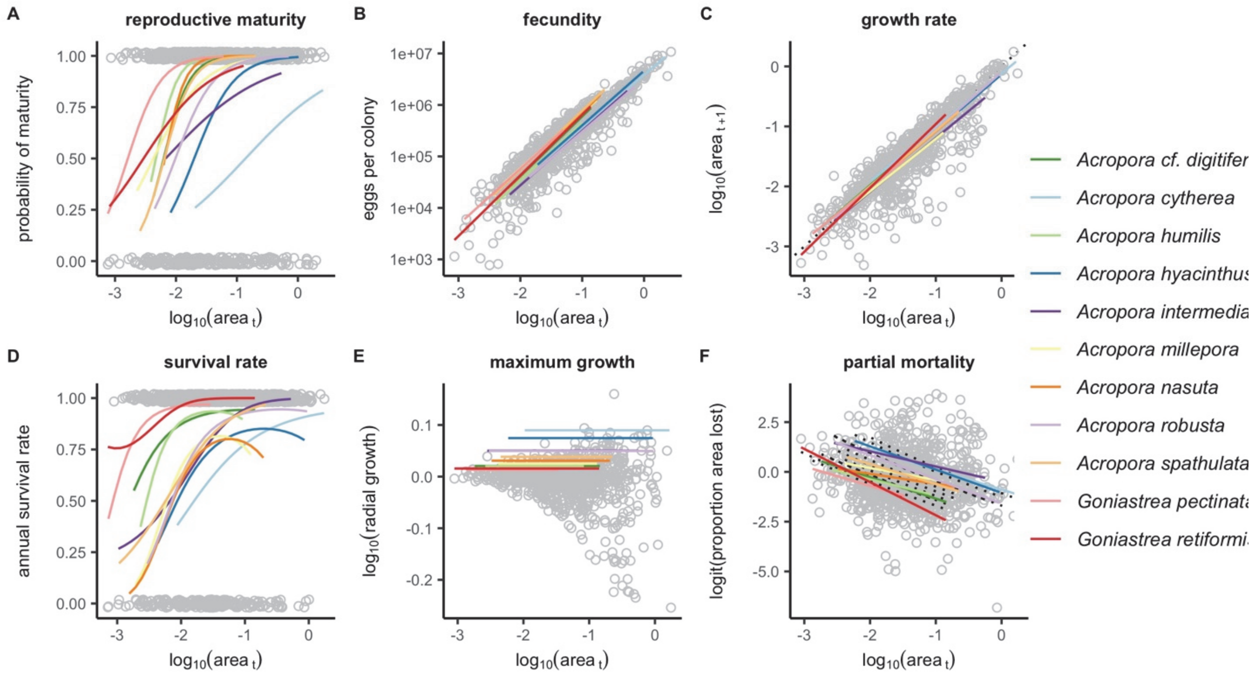

Figure 3. Examples of relationships between coral colony area and vital rates. Relationships in panels A-F were generated using the data set. Research papers about these relationships can be found in the reference list below, culminating in McWilliam et al. (2022) in *Ecology*.

b. **Instrumentation:** The cameras used for capturing colony images were Canon G-series (G6 to G12 over the study). A 10 x 10 cm checker plate was used for scale (see Figure 1).

c. **Taxonomy and systematics:** *Acropora* species were identified according to Wallace (1999) and *Goniastrea* species were identified according to Veron (2000). More recent taxonomic research suggests that some of the tagged species (e.g. *A. hyacinthus, A. humilis, A. nasuta*) are species complexes (Cowman et al. 2020).

d. **Permit history:** Permits for collecting fragments were provided courtesy of the Great Barrier Reef Marine Park Authority to some combination of the Principal investigators depending on the year. Permit numbers are: G08/28194.1 (Connolly, Baird, Dornelas), G11/34584.1 (Connolly, Baird, Dornelas), G14/36684.1 (Dornelas) and G15/38127.1 (Madin, Dornelas, Connolly).

e. **Legal/organizational requirements:** None to report.

4. **Project personnel:** Principal investigators: Joshua S. Madin, Andrew H. Baird, Sean R. Connolly, Maria A. Dornelas. Technical and field support: Mariana Álvarez-Noriega, Miguel Barbosa, Shane A. Blowes, Paulina Cetina-Heredia, Alec P. Christie, Vivian Cumbo, Marcela Diaz, Madeleine A. Emms, Erin Graham, Dominique Hansen, Mizue Hisano, Emily Howells, Chao-Yang Kuo, Michael J. McWilliam, Caroline Palmer, James Tan Chun Hong, Theophilus Zhi En Teo, Rachel Woods

Class III. Data set status and accessibility

A. Status

1. **Latest update:** 28th March 2022
2. **Latest archive date:** 28th March 2022
3. **Metadata status:** Metadata are complete. The most recent update was 26th July 2022.
4. **Data verification:** The data set was subjected to extensive quality assurance and control prior to publication. If any potential errors are detected, please notify Joshua Madin (contact information in Class III.B.2. “Accessibility”).

B. Accessibility

1. **Storage location and medium:** Data and code for the project are available as supporting information to this data paper in *Ecology* (Data S1) and are also available in Zenodo in Madin et al. (2023) at https://doi.org/10.5281/zenodo.7517462.
2. **Contact persons:** In the case of errors or questions regarding the dataset, please contact Joshua Madin, Email: jmadin@hawaii.edu
3. **Copyright restrictions:** CC BY 4.0
4. **Proprietary restrictions:** We request that users cite this data paper when using the dataset.
5. **Costs:** There are no costs associated with using this data set.

Class IV. Data structural descriptors

A. Data set file

1. **Identity:** competition.csv, egg_energy.csv, fecundity.csv, growth.csv, polyp_density.csv, size_structure.csv, survival.csv, trimodal.csv
2. **Size:** The dataset encompasses eight data files with a total size of 4.2 MB, the raw data file (trimodal.csv) contains 6003 observations of colony sizes (rows).
3. **Format and storage mode:** All data files are in comma-separated-values (.csv) format.
4. **Header information:** See Table 1.
5. **Alphanumeric attributes:** See Table 1.
6. **Special characters/fields:** Species codes are found in every dataset and are as follows: AC: *Acropora cytherea*, AH: *Acropora hyacinthus*, AI: *Acropora intermedia*, AR: *Acropora robusta*, AN: *Acropora nasuta*, AM: *Acropora*

millepora, AS: *Acropora humilis*, AD: *Acropora cf. digitifera*, AL: *Acropora spathulata*, GR: *Goniastrea retiformis*, GP: *Goniastrea pectinata.*

7. **Authentication procedures:** R code is provided for the accurate transmission of the raw data into a format suitable for the analysis of growth, survival and reproduction and their relationship to size.

B. **Variable information:** Please see Table 1 for variable identities, variable definitions, units of measurement, and storage types.

Table 1: Descriptions of datasets and columns,

Dataset: trimodal.csv		**Summary:** Raw (unprocessed) dataset indicating planar areas through time for each colony.	
Column	**Storage Type**	**Definition**	**Notes**
colony_id	Integer	Unique coral colony ID	
species	Character	Coral species name	
spp	Character	Coral species two-digit code.	Three-digit codes were also used in some publications.
year	Numeric	Year of fieldtrip	In each case, during spawning time around October / November.
observation_id	Integer	Unique observation of the colony	
tag	Integer	Number from tag used to identify colony in the field	
image_id:	Character	A concatenation of various identifiers for finding photos.	Fieldtrip ID indicates year (F3 was in 2009, F4 in 2010, and so on). The letter C is redundant and simply means the photo was corrected for barrel distortion before colony outlining.

photographer	Character	Letter A-D designated to a photographer at the start of the fieldtrip.	Letters were assigned arbitrarily each trip.
photograph	Character	The photograph direction and number.	T is top or planar view, T2 means a second photo was taken
area_id	Integer	Unique ID for an outlined area from a particular photo	
area_outliner	Character	The name of the outliner from author list	erin (Graham), paulina (Cetina-Heredia), mizue1 (Hisano), mizue2 (Hisano), mizue3 (Hisano), mariana (Álvarez-Noriega), alec (Christie), mike (McWilliam)
area_cm2	Numeric	The outlined planar area of the colony in centimeters squared	
perimeter_cm	Numeric	The colony perimeter in centimeters	
circularity	Numeric	The ratio between the perimeter of a circle with the area of the colony and the perimeter of the colony.	Always less than 1 (which would be a perfectly circular colony). This measure should be treated carefully, because it is sensitive to the resolution and size of the colony in a picture.
Dataset: growth.csv		**Summary:** Increase in planar area in a one year period for each colony ID and each one year interval. See R code for construction of this dataset. See above for descriptions of colony_id, species, year, and spp.	
Column	**Storage Type**	**Definition**	**Notes**
area_cm2	Numeric	Colony planar area in cm^2 derived from outlines	

area_cm2_next	Numeric	Colony planar area in cm^2 at the next timepoint, one year later	Values are only shown if a colony survived the time interval
Dataset: survival.csv		**Summary:** Survival (1) versus mortality (0) per colony ID per year. See R code for construction of this dataset. See above for descriptions of colony_id, species, year, and spp.	
Column	**Storage Type**	**Definition**	**Notes**
area_cm2	Numeric	Colony planar area in cm^2 derived from outlines	The area at the start of the time interval.
surv	Binary	Whether a colony survived the next year (1) or died (0).	Survival was determined by whether a colony was observed alive one year later (see R code).
Dataset: fecundity.csv		**Summary:** Egg numbers per branch per colony per year. See above for descriptions of species, year, and spp.	
Column	**Storage Type**	**Definition**	**Notes**
id	Character	Identifier combining fieldtrip, species and colony IDs	
observer	Character	Name of the observer	
colony	Integer	Unique coral colony ID	Fecundity was estimated on different colonies to those in which growth and survival were measured.
branch	Integer	The replicate branch number	Up to six for *Acropora.* Not applicable (NA) to *Goniastrea* that do not have branches.
polyp	Integer	The replicate polyp number	
eggs	Numeric	Number of eggs within each polyp	Linked with polyp_density (below) for colony-level analysis.
area_cm2	Numeric	Colony planar area in cm^2 derived from outlines	

reproductive	Binary	Whether a colony polyp was producing eggs (1) or not (0).	Aggregated at the colony-level for analysis.
Dataset: egg_energy.csv		**Summary:** Carbon and Nitrogen mass found in coral eggs. See above for descriptions of species, year, and spp.	
Column	**Storage Type**	**Definition**	**Notes**
id	Character	Identifier combining fieldtrip, species and colony IDs	
colony	Integer	Unique coral colony ID	
egg	Integer	Replicate egg number	
Carbon_ug	Numeric	Mass of Carbon per egg in micrograms	
Nitrogen_ug	Numeric	Mass of Nitrogen per egg in micrograms	
area_cm2	Numeric	Colony planar area in cm^2 derived from outlines, from which the sample was taken	
Dataset: polyp_density.csv		**Summary:** Number of polyps per area for each species. Note that one species (A. millepora) is missing. See above for descriptions of species and spp. All measurements were done by MA-N.	
Column	**Storage Type**	**Definition**	**Notes**
id	Character	Unique coral colony ID	Not linked to colony IDs measured for fecundity or growth/survival
cm2	Numeric	The planar area in cm^2 within which polyps were counted.	
polyps	Numeric	Total number of polyps counted	Polyps were counted throughout the 3D volume captured by the planar area (cm2 above).
polyps_cm2	Numeric	Number of polyps per cm^2	

Dataset: size_structure.csv		**Summary:** A complete count of colony sizes across the entire study area. See above for descriptions of colony_id, species, year, and spp. Multiple observers took photographs each year.	
Column	**Storage Type**	**Definition**	**Notes**
area_cm2	Numeric	Colony planar area in cm^2	

Dataset: competition.csv		**Summary:** See above for descriptions of colony_id, species, year, and spp.	
Column	**Storage Type**	**Definition**	**Notes**
colony_id			
area_cm2	Numeric	Colony planar area in cm^2 derived from outlines	
competition_id	Integer	Unique competition ID	
competition_number	Integer	Unique interaction number for each colony, each year	
competition_outliner_name	Character	Name of person identifying the competitive encounter	mariana (Álvarez-Noriega), Theo (Theophilus Zhi En Teo)
competition_taxon	Character	Taxonomic details of competing colony, usually at the genus level	Some genera and families may have different names in the latest taxonomy
competition_growthform	Character	Colony morphology of the competitor	Grouped into “branching”, “massive”, “cuneiform”, “corymbose”, “encrusting”, “tabular”, “digitate”, “non-coral”, “uncertain”
competition_length_cm	Numeric	Length of the colony’s perimeter involved in that competitive interaction	
competition	Binary	Whether competition is certain or uncertain	Encounters marked uncertain might still be competitive, as the colonies are in close

			proximity (~5cm), but there is no evidence of injury, overtopping, or overgrowth
competition_type	Character	Type of competitive encounter	Possible entries: “overtop”, “digestion”, “standoff”, “other direct contact”, or “overgrowth”
competition_outcome	Character	Outcome of competitive encounter for the focal colony	Possible entries: “lost”, “won”, “standoff”, “mutual digestion”

C. **Data anomalies:** Some colonies (e.g., colony ID 287 in trimodal.csv) are problematic because they persist as tiny colonies for many years, and therefore skew the size-based demographic models at small colony sizes where there is very limited sampling. We therefore recommend users to explore data before using in analyses. One species (*Acropora millepora*) was not sampled for polyp density and we therefore recommend using the data from closely related and morphologically similar species (e.g., *A. spathulata*) when scaling up polyp fecundity to colony fecundity.

Class V. Supplemental descriptors

A. **Data acquisition**

1. **Data forms or acquisition methods:** Photo metadata and fecundity values were first digitized by technicians by inputting the data into an Excel spreadsheet. The outlining of colony images was done electronically, and an algorithm was used to scale the image and quantify colony planar areas.

2. **Location of completed data forms:** All colony images and digital outlines used to quantify coral demographic rates are stored on two separate hard drives at the Hawai'i Institute of Marine Biology.
3. **Data entry verification procedures:** Outlining was done by 2-3 independent technicians to account for measurement errors that occur while measuring colony areas by hand. A technician then proofed the data to ensure that it was entered correctly. Data curators reviewed and compiled the data into a master database that is presented here. Mean values of replicate planar area estimates were used for the analysis of growth, survival and fecundity.

B. Quality assurance/quality control procedures: A technician carefully proofed each data point by analyzing the growth curves of each individual through time to identify anomalous or unrealistic size changes. They also looked for unusually large variation among replicates caused by different outliners. This led to the identification of a number incorrect colony IDs and scaling algorithms that were subsequently corrected by bringing up the colony photos, and editing the data or the code.

C. Related materials: None.

D. Computer programs and data-processing algorithms: We used R to digitally process the data and to generate cleaned datasets that are ready for demographic analysis. We used ImageJ (https://imagej.nih.gov/ij/) for colony outlining alongside the program PTLens (https://www.epaperpress.com/ptlens/index.html) to correct for barrel distortion in the images.

E. Archiving

1. **Archival procedures:** Data has been archived online at Zenodo https://doi.org/10.5281/zenodo.7517462 (Data S1), as described in this data paper. All original colony images used to quantify coral demographic rates are stored on two separate RAID servers at the Hawaii Institute of Marine Biology.
2. **Redundant archival sites:** Subsets of the data are stored in other locations, attached to publications that have used this database (e.g., https://doi.org/10.1098/rspb.2017.0053 and https://doi.org/10.5281/zenodo.6908911)

F. Publications and results: The following publications have used some or all of this database:

- Álvarez-Noriega, M., A. H. Baird, M. Dornelas, J. S. Madin, and S. R. Connolly. 2018. Negligible effect of competition on coral colony growth. Ecology 99:1347–1356.
- Álvarez-Noriega, M., A. H. Baird, M. Dornelas, J. S. Madin, V. R. Cumbo, and S. R. Connolly. 2016. Fecundity and the demographic strategies of coral morphologies. Ecology 97:3485–3493.
- Álvarez-Noriega, M., J. S. Madin, A. H. Baird, M. Dornelas, and S. R. Connolly. 2020. Disturbance-induced changes in size-structure promote coral biodiversity. Preprint, https://doi.org/10.1101/2020.05.21.094797
- Baird, A., M. Álvarez-Noriega, V. Cumbo, S. Connolly, M. Dornelas, and J. Madin. 2018. Effects of tropical storms on the demography of reef corals. Marine Ecology Progress Series 606:29–38.

- Dornelas, M., J. S. Madin, A. H. Baird, and S. R. Connolly. 2017. Allometric growth in reef-building corals. Proceedings of the Royal Society B: Biological Sciences 284:20170053.
- Madin, J. S., A. H. Baird, M. L. Baskett, S. R. Connolly, and M. A. Dornelas. 2020. Partitioning colony size variation into growth and partial mortality. Biology Letters 16:20190727.
- Madin, J. S., A. H. Baird, M. Dornelas, and S. R. Connolly. 2014. Mechanical vulnerability explains size-dependent mortality of reef corals. Ecology Letters 17:1008–1015.
- McWilliam, M., M. Dornelas, M. Alvarez-Noriega, A. Baird, S. R. Connolly, and J. Madin. 2022. Net effects of life-history traits explain persistent differences in abundance among similar species. Ecology. e3863

G. History of data set usage

1. **Data request history:** None.
2. **Data set update history:** This is the first full version of the dataset.
3. **Review history:** This is the first full version of the dataset.
4. **Questions and comments from secondary users:** See section IV:C – Data anomalies for a description of problems that users have encountered while using the data.

Literature Citations:

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