

Monitoring Coral Spawning 2023

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Coralium - UNAM

SCTLD Caribbean Cooperation
Team Partners meeting

May 8, 2023

Photo by Paul Selvaggio





Coral
Restoration
Consortium

Spawning of the grooved brain coral *Diploria labyrinthiformis*: Guidelines for monitoring, gamete collection and larval rearing



Available on the Coral Restoration Consortium's website at:
<http://crc.reefresilience.org/working-groups/larval-propagation/>



Ellen Muller

Presented by co-chairs of the
CRC's Larval Propagation WG

Dr. Valérie Chamberland



Paul Selvaggio



Dr. Anastazia Banaszak



Vincent Lavigne



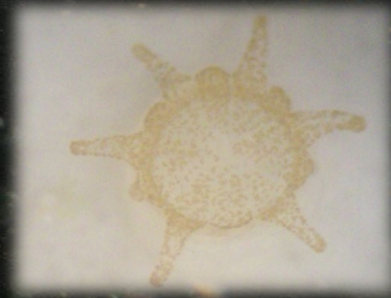
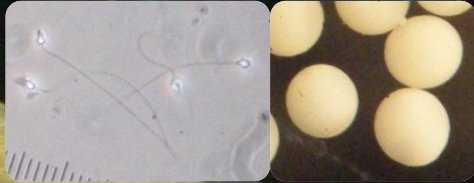
Topics covered today



1. **Coral breeding is possible**
 - Life cycle
 - Ex situ breeding
2. **What data you should have ahead of time**
 - Species
 - Abundance (AGRRA Online Data Tool)
3. **What to look for**
 - Setting
 - Spawning
4. **When to monitor**
 - Month
 - Day
 - Time
5. **How to record your observations**
 - Slate template
 - Excel datasheet
6. **How to report your data**
 - Spawning database (in progress)

Orbicella faveolata

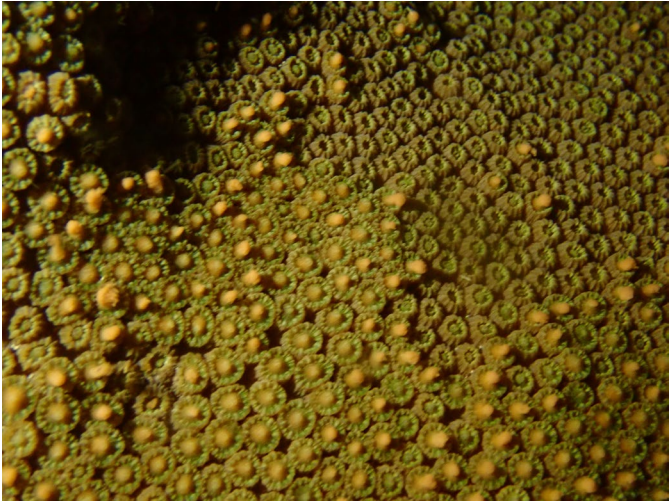
Photo credits: Sandra Mendoza Quiroz



Coral breeding:

- 5 reef building species
- Colonies outplanted in 10 damaged or degraded reefs

Orbicella faveolata



Pseudodiploria strigosa



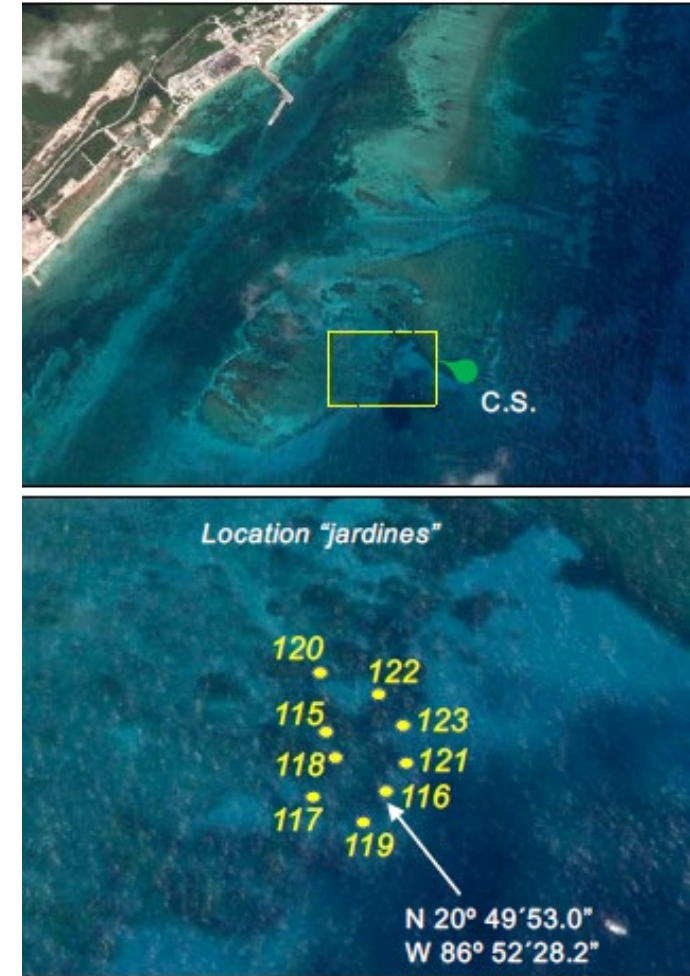
2. What data you should have ahead of time:

- **Species**

- Correct identification
 - Photos, tags, GPS points, maps ahead of time
- Colony abundance and distance between them
 - Colonies relatively close together to safely move between them
 - Create “hubs” if necessary and allowed
- Size of colonies
 - Reproductive size can vary
- Health
 - Preferably healthy colonies
- Depth
 - Take into account for maximum allowable dive times

- **Sites**

- Safe and easy access
- Ensure reconnaissance dive prior to spawning
- Mark the site with buoy



Grosso et al., 2021 Coral Reefs
40:937-950

Example -Lighthouse Atoll
Pop up table

DLAB – Brain coral locations and cover



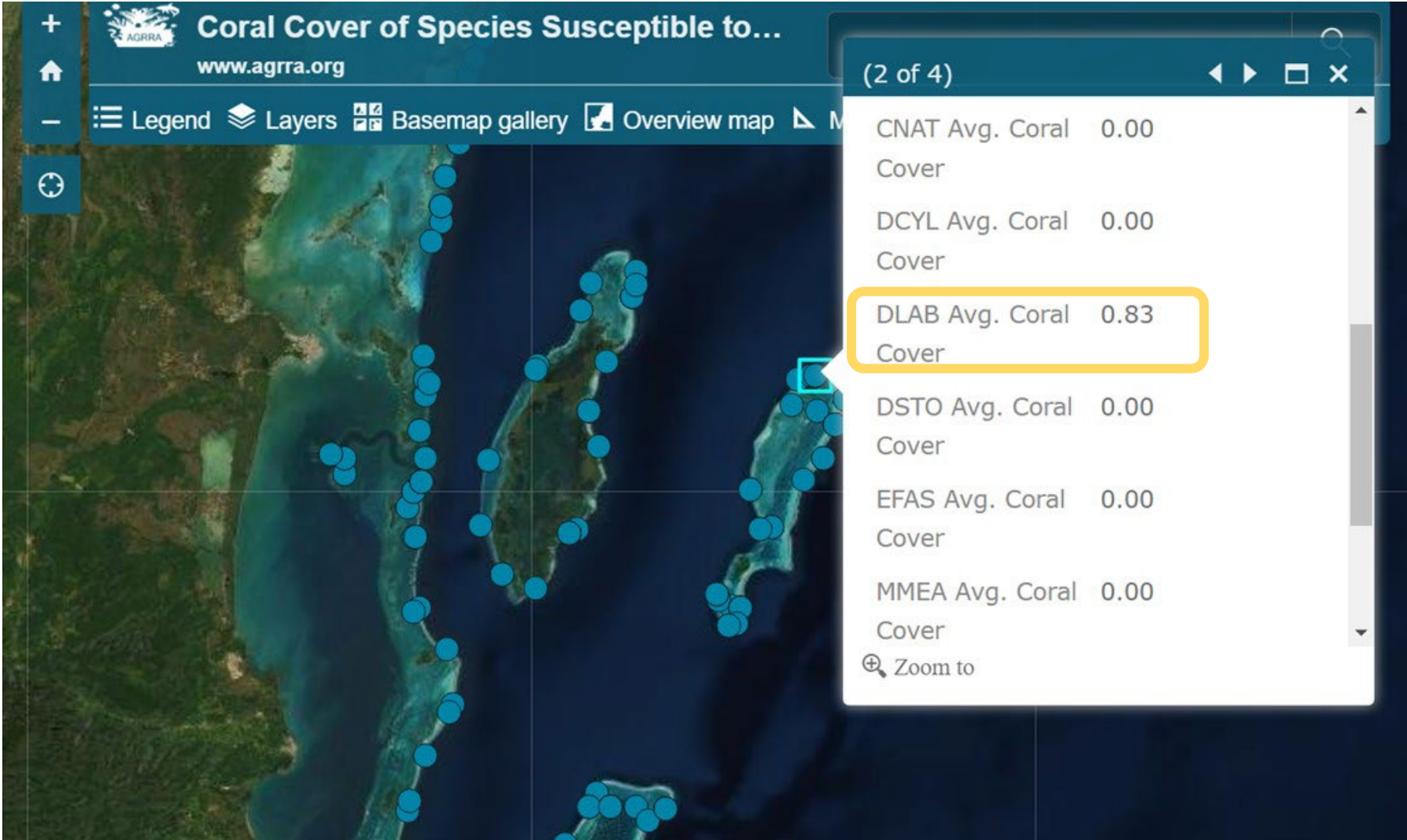
Diploria labyrinthiformis (DLAB or grooved brain coral)

Hermaphroditic broadcast spawner

When: July to August, MX*

DAFM:~9–11 days

MAS: ~ -2–50 min



Map Tool by AGRR. AGRR Data collected by Healthy Reefs Initiative and partners. <https://www.agrra.org/coral-disease-outbreak/>



3. What to look for: Setting and Spawning

- Familiarize yourself with photos and videos



Questions?

SCTLD Caribbean Cooperation
Team Partners meeting

May 8, 2023

Photo by Paul Selvaggio



4. When to monitor

- What you need:
 - Local observations and/or prediction calendars
 - Full moon dates and times of moon maximum brilliance for your region
 - Sunset times for your precise location

Coral Spawning Prediction calendar 2023 Northern/Mexican Caribbean



Month	JULY												
Nights after full moon (NAFM)	0	1	2	3	4	5	6	7	8	9	10	11	12
Calendar Date	3	4	5	6	7	8	9	10	11	12	13	14	15
Sunset time (north of Quintana Roo)	19:32	19:32	19:32	19:32	19:32	19:32	19:32	19:32	19:32	19:32	19:32	19:31	19:31
Species	Spawning time	Spawning window MAS or MBS	*Spawning of A. palmata is possible this month. ** Diploia labyrinthiformis spawning starts in this region.										
Acropora palmata	21:43-22:37	131-185 MAS	Mexican Caribbean*										
Acropora cyathophylla	22:02-22:49	150-190 MAS	Caribbean										
Diploria labyrinthiformis	18:11-19:15	17-81 MBS	Mexican Caribbean**										
Dendrogya cylindrus	19:25	7 MBS	Mexican Caribbean										
Montastrea cavernosa	19:48-23:17	15-225 MAS	Caribbean										
Colobanthus rotatus	19:57-21:27	25-115 MAS	Caribbean										
Orbicella annularis	22:37-23:42	185-250 MAS	Caribbean										
Orbicella faveolata	22:37-23:47	185-255 MAS	Caribbean										

Month	AUGUST												
Nights after full moon (NAFM)	0	1	2	3	4	5	6	7	8	9	10	11	12
Calendar Date	1	2	3	4	5	6	7	8	9	10	11	12	13
Sunset time	19:25	19:25	19:24	19:24	19:23	19:23	19:22	19:21	19:21	19:20	19:19	19:19	19:18
Species	Spawning time	Spawning window MAS or MBS	*Spawning of A. palmata is most likely to occur this month. ** Spawning of Orbicella and Pseudodiploria species begins.										
Acropora palmata	21:06-23:50	102-226 MAS	Mexican Caribbean*										
Acropora palmata	20:39-20:53	139-153 MAS	Bahia (C. Caye)										
Acropora palmata	21:39-22:29	140-190 MAS	Caribbean										
Acropora cyathophylla	21:53-22:33	150-190 MAS	Caribbean										
Dendrogya cylindrus	20:53-22:03	90-160 MAS	Caribbean										
Orbicella faveolata	21:03-0:33	100-310 MAS	Mexican Caribbean**										
Orbicella faveolata	22:26-23:36	185-255 MAS	Caribbean										

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Current Time

sábado
26 de mar de 2022
Chetumal, Quintana Roo, Mexico

Set home location >

World Clock

Search for city or place...

Calculators & Timers

- Date-to-Date Calculator
- What Date is it in X Days?
- Countdown to Any Date
- Countdown to New Year
- Stopwatch
- Timer / Alarm

Time Zone

- Time Zone
- Time Anno
- Time Zone
- Meeting Pl
- Find the Be
- Time Zone

In the News

Sky full of e

The night sky

you can see it from your location. Full Story >

Sun Calculator

- Moon Calculator
- Moon Phases
- Night Sky
- Meteor Showers
- Day and Night Map
- Moon Light World Map
- Eclipses
- Live Streams
- Seasons

Possible spawning months

General information:

- Spawning generally occurs during warmer months (due to seasonal changes in Sea Surface Temperature, SST)
- Most, but not all, Caribbean species spawn between August and October
- Spawning generally differs slightly among locations
- Month of spawning of same species may differ among regions
 - *Diploria labyrinthiformis* in Mexico spawns in July and August, rarely in September
 - In Curaçao Dlab spawns from May to September: peak in Spring (May/June) and smaller one in Autumn (August/September)

When to monitor spawning in your area:

- Select spawning months from previous years in or near your area
 - If none available search literature, ask park managers etc
- If no records are available in your area, go out one month early and one month late (when possible) using other prediction calendars as a reference

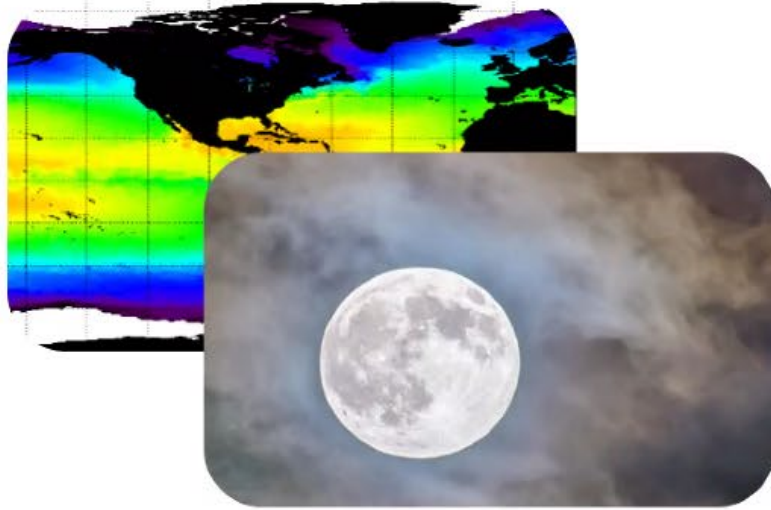
Possible spawning months

- Find the date of the full moon for the months when you expect spawning: Dlab in Puerto Morelos in July and August, possibly September
- 3rd July, 1st and 30th August

2023: Possible split spawning

When the full moon occurs very early or late in the month, spawning activity may split between two successive months

“Split spawning”



Split spawning can happen if the full moon occurs:

- Very early in the month
- Very late in the month
- Twice on the same month



In 2023

Early August

and/or

Early September

2023 AUGUST

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1 FM	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31 FM		

© BlankCalendarPages.com

Possible spawning days

General information:

- Spawning is in phase with the lunar cycle
- Corals typically spawn 2 or 3 days in a row, between 2-9 nights after the full moon (NAFM)
- Look for full moon dates and times (of maximum brilliance) for your location
 - try several websites as they do vary
 - Date and time of maximum brilliance of Full Moon differs every month

Moon Phases for Puerto Morelos, Quintana Roo, Mexico in 2023

Showing moon phases for:

Lunation	New Moon		First Quarter		Full Moon		Third Quarter		Duration
1237					6 de ene	18:07	14 de ene	21:10	29d 10h 36m
1238	21 de ene	15:53	28 de ene	10:18	5 de feb	13:28	13 de feb	11:00	29d 10h 13m
1239	20 de feb	2:05	27 de feb	3:05	7 de mar	7:40	14 de mar	21:08	29d 10h 17m
1240	21 de mar	12:23	28 de mar	21:32	5 de abr	23:34	13 de abr	4:11	29d 10h 49m
1241	19 de abr	23:12	27 de abr	16:19	5 de may	12:34	12 de may	9:28	29d 11h 41m
1242	19 de may	10:53	27 de may	10:22	3 de jun	22:41	10 de jun	14:31	29d 12h 44m
1243	17 de jun	23:37	26 de jun	2:49	3 de jul	6:38	9 de jul	20:47	29d 13h 55m
1244	17 de jul	13:31	25 de jul	17:06	1 de ago	13:31	8 de ago	5:28	29d 15h 06m
1245	16 de ago	4:38	24 de ago	4:57	30 de ago	20:35	6 de sep	17:21	29d 16h 02m
1246	14 de sep	20:39	22 de sep	14:31	29 de sep	4:57	6 de oct	8:47	29d 16h 15m
1247	14 de oct	12:55	21 de oct	22:29	28 de oct	15:24	5 de nov	3:36	29d 15h 32m
1248	13 de nov	4:27	20 de nov	5:49	27 de nov	4:16	5 de dic	0:49	29d 14h 05m
1249	12 de dic	18:32	19 de dic	13:39	26 de dic	19:33			29d 12h 25m

* All times are local time for Puerto Morelos. They take into account refraction. Dates are based on the Gregorian calendar. Current lunation cycle is highlighted yellow. Special events are highlighted blue. Hover over events for more details.

Possible spawning days

When to monitor spawning in your area:

- The calendar date of spawning will change every year but the dates relative to full moon will be the same or very similar
- If no records are available in your area, go out a couple of days earlier and later when possible, using other prediction calendars as a reference
 - Dlab in Mexico spawns in 9 to 12 Days After Full Moon (peak 10-11 DAFM)
 - In the Dominican Republic Dlab spawns 9 to 12 DAFM (peak 10-11 DAFM)
 - In Curaçao Dlab spawns 9 to 13 DAFM (peak 11-12 DAFM)

Possible spawning days

When to monitor spawning in your area:

Normally the full moon will occur after sunrise

Sometimes it will occur before sunrise

Full moon: timing of maximum brilliance

When the time of maximum brilliance of the full moon occurs before sunrise count day 0 from the day before:

(i.e., 29th September 2023 at 4:57 am is actually the **night of the 28th**)

28th September | 29th September

29th September | 30th September



Possible spawning time

General information:

- Spawning time is relative to time of sunset in your area (minutes after sunset, MAS). Sunset times differ per location and time of year.
- Varies greatly between species
- Sunset times change depending on date
- Spawning may be continuous or in pulses with pauses between them



When to monitor spawning in your area:

- All but one Caribbean species (Dlab) initiate spawning after sunset for at least 10 minutes and up to 120 minutes
- If no records are available in your area, go out earlier when possible as long as dive times permit
 - Dlab in Mexico spawns 45 to 50 Minutes Before Sunset (Grosso-Becerra et al. 2021)
 - In Curaçao Dlab spawns 2 to 50 MBS (peak 15-45 MBS)

May
(Florida Keys)

18:50

~19:50

May
(Curaçao)

17:50

~18:50

Oct
(Curaçao)

17:15

~18:15

Steps to calculate when to monitor spawning in your area:

1. Find sunset time in your area
e.g., Puerto Morelos, July 2023: **12th, 13th (19:32), 14th to 16th (19:31)**
2. Determine how many minutes before or after sunset the species spawns in your area
e.g., *Dlab* in Puerto Morelos 17-81 Minutes Before Sunset (**-17 to -81 MBS**)

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Colobastrella rotunda	19:57-21:27	25-115 MAS	Caribbean													
Oribicella annularis	22:37-23:43	185-250 MAS	Caribbean													
Oribicella faveolata	22:37-23:47	185-255 MAS	Caribbean													

Steps to calculate when to monitor spawning in your area:

1. Find sunset time in your area
e.g., Puerto Morelos, July 2023: **13th (19:32), 14th to 16th (19:31)**
2. Determine how many minutes before or after sunset the species spawns in your area
e.g., *Dlab* in Puerto Morelos 17-81 Minutes Before Sunset (**-17 to -81 MBS**)
3. Also useful to know setting times to plan dive time begin
e.g., Setting for *Dlab*: **Up to 40 minutes prior to spawning**, but usually no setting.
4. Calculate time of spawning and setting relative to sunset
e.g., *Dlab* spawning in Puerto Morelos: **18:11 to 19:14 h; setting possibly from 17:31 h**
5. Plan dive time
e.g., to be in the water by **17:30 h to 19:15 h (1 h 45 min) @ 8 m depth**

Questions?

SCTLD Caribbean Cooperation
Team Partners meeting

May 8, 2023

Photo by Paul Selvaggio



Hermaphroditic broadcast spawners

Source: Marhaver et al. 2017 Webinar available on CRC website at Reef Resilience Network



Photo credit: E. Hickerson

Orbicella franksi

DAFM: 5-10; peak 6-8

MAS: 100-250; peak 110-200

August-September-October



Photo credit: K. Marhaver

Orbicella annularis

DAFM: 5-8; peak 6-7

MAS: 150-275; peak 190-250

August-September-October



Photo credit: FGBNMS

Orbicella faveolata

DAFM: 5-9; peak 6-8

MAS: 100-275; peak 175-250

August-September-October

DAFM: Days After Full Moon
MAS: Minutes After Sunset

2023: Early September, early October and possibly early November

Hermaphroditic broadcast spawners

Source: Marhaver et al. 2017 Webinar available on CRC website at Reef Resilience Network

Different species may spawn on the same night at different times



Photo credit: Hickerson/FGBNMS

Pseudodiploria strigosa
DAFM: 5-8 ; peak 6-8
MAS: -100-320; peak 100-200
August-September-October



Photo credit: FGBNMS

Colpophyllia natans
DAFM: 6-10; peak 8-9
MAS: 38-170; peak 30-123
August-September-October

Complicates dive operations if spawning at different times and different sites



Photo credit: R. Ritson-Williams

Acropora palmata
DAFM: 0-15; peak 3-6
MAS: 90-210; peak 140-190
August



Photo credit: R. Ritson-Williams

Acropora cervicornis
DAFM: 1-15; peak 2-6
MAS: 125-200; peak 150-190
August

Coral Spawning Prediction calendar 2023

Northern/Mexican Caribbean



Month			JULY													
Nights after full moon (NAFM)			0	1	2	3	4	5	6	7	8	9	10	11	12	13
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Species	Spawning time	Spawning window MAS or MBS	* Spawning of <i>A. palmata</i> is possible this month. ** <i>Diploria labyrinthiformis</i> spawning starts in this region.													
<i>Acropora palmata</i>	21:43-22:37	131-185 MAS			Mexican Caribbean*											
<i>Acropora cervicornis</i>	22:02-22:49	150-190 MAS	Caribbean													
<i>Diploria labyrinthiformis</i>	18:11-19:15	17-81 MBS												Mexican Caribbean**		
<i>Dendrogyra cylindrus</i>	19:25	7 MBS			Mexican Caribbean											
<i>Montastrea cavernosa</i>	19:48-23:17	15-225 MAS					Caribbean									
<i>Colobastrea rotunda</i>	19:57-21:27	25-115 MAS							Caribbean							
<i>Orbicella annularis</i>	22:37-23:42	185-250 MAS							Caribbean							
<i>Orbicella faveolata</i>	22:37-23:47	185-255 MAS							Caribbean							

Month			AUGUST													
Nights after full moon (NAFM)			0	1	2	3	4	5	6	7	8	9	10	11	12	13
Calendar Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sunset time			19:25	19:25	19:24	19:24	19:23	19:23	19:22	19:21	19:21	19:20	19:19	19:19	19:18	19:19
Species	Spawning time	Spawning window MAS or MBS	* Spawning of <i>A. palmata</i> is most likely to occur this month. ** Spawning of <i>Orbicella</i> and <i>Paradiploia</i> species begins.													
<i>Acropora palmata</i>	21:06-23:10	102-226 MAS			Mexican Caribbean*											
<i>Acropora palmata</i>	20:39-20:53	139-153 MAS								Baja IC (Caye)						
<i>Acropora palmata</i>	21:39-22:29	140-190 MAS	Caribbean													
<i>Acropora cervicornis</i>	21:53-22:33	150-190 MAS		Caribbean												
<i>Dendrogyra cylindrus</i>	20:53-22:03	90-160 MAS	Caribbean													
<i>Orbicella faveolata</i>	21:03-0:33	100-310 MAS								Mexican Caribbean**						
<i>Orbicella faveolata</i>	22:26-23:36	185-255 MAS								Caribbean						

Gonochoric broadcast spawners

Source: Marhaver et al. 2017 Webinar available on CRC website at Reef Resilience Network



Photo credit: Neely et al. 2013 Coral Reefs 32: 813

Dendrogyra cylindrus - males

DAFM: 2-5; peak 2-4

MAS: 58-134; peak 93-119

August-September



Photo credit: Neely et al. 2013 Coral Reefs 32: 813

Dendrogyra cylindrus - females

DAFM: 1-4; peak 2-3

MAS: 58-142; peak 102-134

August-September



Photo credit: B. Holland

Montastraea cavernosa - males

DAFM: 4-9; peak 6-7

MAS: -19-259; peak 62-154

August-September-October



Photo credit: FGBNMS/Schmahl

Montastraea cavernosa - females

DAFM: 4-9; peak 6-7

MAS: -9-245; peak 62-147

August-September-October

Gonochoric broadcast spawners (lesser known)

Source: Marhaver et al. 2017 Webinar available on CRC website at Reef Resilience Network



Photo credit: K. Marhaver

Dichocoenia stokesii- males
DAFM: 3-?
MAS: 90-170
September-October-November



Photo credit: K. Marhaver

Dichocoenia stokesii - females
DAFM: 3-?
MAS: 90-170
September-October-November



Photo credit: E. Muller

Meandrina meandrites- males
DAFM: 4-?
MAS: 10-70
September-October-November



Photo credit: E. Muller

Meandrina meandrites - females
DAFM: 4-?
MAS: 10-70
September-October-November



Photo credit: B. Brown

Siderastrea siderea - males
DAFM: 5-7; peak 5-6
MAS: 217-226; peak 217-226
September-October



Photo credit: B. Mueller

Siderastrea siderea - females
DAFM: 5-7; peak 5-6
MAS: 210-231; peak 215-229
September-October



Photo credit: E. Muller

Eusmilia fastigiata
DAFM: 5-10
MAS: 75-140?
August-September-October



Photo credit: E. Muller

5. How to record your observations

Step 1: Record spawning or no spawning observations (just as important) using available **Underwater slate template** while you are diving

Spawning Monitoring - underwater slate template

Date: 20190921

of days AFM: +7

Date:	22/08/2022	Site:	Media Luna Profundo	Diver's name:	Gardhi, Gaby, Pedro, Mojo
Sunset time:	19:12	number of monitored colonies:	15		
Moonrise time:	02:15 am	Gamete bundle setting start :	No se observó		
Monitoring start time:	6:10 pm	spawning start time:	6:50 pm		
Depth:	10 m	spawning end time:	7:10 pm		
Monitoring area:	120 x 70 m	number of colonies that spawned:	4		
Monitored species:	O. lab	end time of monitoring:	7:15 pm		
Date of full moon:	11/08/22	number of colonies with gamete collection	6		
Comments:	Una de las colonias desovó 4 paquetes, no se recolectaron. Los paquetes tenían flotabilidad neutra.				

If you see setting, make sure to note down the times; helpful data for dive planning in the future

Species	Sex	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
M cavernosa	FEMALE	0											
	MALE												
	FEMALE												
	MALE												
	FEMALE												
	MALE												
	FEMALE												

* # days After Full Moon and Sunset times can be found at www.timeanddate.com/astronomy/

* MALE colonies typically spawn earlier than FEMALE colonies

5. How to record your observations

Step 2: Compile your data and observation in the Coral_Spawning_Data_TEMPLATE

1	Date	Year	Month	Day	Full Moon	Number of days After Full Moon	Country	Location	Site	Site Area	GPS coordinates (latitude)	GPS coordinates (longitude)	Depth (in m)	Approximate area monitored (in m ²)	Observer (s)
430	21-ago-19	2019	August	21	14-ago-19		7 México	Puerto Morelos	Bocana	Iguana	20°52'24.64"N	86°51'5.41"W	4	40	Gandhi Ramírez
431	21-ago-19	2019	August	21	15-ago-19		6 México	Cancún	Bajito Nizuc	Kelly Plot 1	21° 1'.12"N	86°47'13.2"W	2	600	Pedro
432	22-ago-19	2019	August	22	15-ago-19		7 México	Cozumel	La Caletita	La Caletita	20°29'42.5"N	86°57'51.2"W	1.5	200	
433	22-ago-19	2019	August	22	15-ago-19		7 México	Cozumel	Playa Corona	Playa Corona	20°26'10.20"N	87°00'05.96"W	1.5	150	Noely Marconi Rocco
434	22-ago-19	2019	August	22	14-ago-19		8 México	Puerto Morelos	Jardines	Arenal	20°49'53.00"N	86°52'28.20"W	8	60	Daniela
435	22-ago-19	2019	August	22	14-ago-19		8 México	Puerto Morelos	Jardines	Arenal	20°49'53.00"N	86°52'28.20"W	8	60	Daniela
436	22-ago-19	2019	August	22	14-ago-19		8 México	Puerto Morelos	Jardines	Arenal	20°49'53.00"N	86°52'28.20"W	8	60	Daniela
437	22-ago-19	2019	August	22	14-ago-19		8 México	Puerto Morelos	Jardines	Arenal	20°49'53.00"N	86°52'28.20"W	8	60	Daniela
438	22-ago-19	2019	August	22	14-ago-19		8 México	Puerto Morelos	Jardines	Siembra APAL	20°49'50.84"N	86°52'30.18"W	5	100	Sandra Mendoza
439	22-ago-19	2019	August	22	14-ago-19		8 México	Puerto Morelos	Jardines	Siembra APAL	20°49'50.84"N	86°52'30.18"W	5	100	Sandra Mendoza
440	22-ago-19	2019	August	22	15-ago-19		7 México	Akumal	El Vivero	El Vivero	20°23'45.09"N	87°18'23.56"W	15	200	Jenny Mallon
441	22-ago-19	2019	August	22	15-ago-19		7 México	Akumal	El Vivero	El Vivero	20°23'45.09"N	87°18'23.56"W	15	200	Jenny Mallon
442	22-ago-19	2019	August	22	14-ago-19		8 México	Puerto Morelos	Limones	Plot 1	20°59'18.74"N	86°47'49.85"W	3	600	Pedro
443	23-ago-19	2019	August	23	15-ago-19		8 México	Cozumel	La Caletita	La Caletita	20°29'42.5"N	86°57'51.2"W	1.5	200	Noely Marconi Rocco
444	23-ago-19	2019	August	23	15-ago-19		8 México	Cozumel	Playa Corona	Playa Corona	20°26'10.20"N	87°00'05.96"W	1.5	150	
445	23-ago-19	2019	August	23	15-ago-19		8 México	Cozumel	Arrecife Paraíso	Arrecife Paraíso	20°28'31.82"N	86°58'43.91"W	15	80	
446	23-ago-19	2019	August	23	15-ago-19		8 México	Cozumel	Arrecife Paraíso	Arrecife Paraíso	20°28'31.82"N	86°58'43.91"W	15	80	
447	23-ago-19	2019	August	23	15-ago-19		8 México	Cozumel	Arrecife Paraíso	Arrecife Paraíso	20°28'31.82"N	86°58'43.91"W	15	80	
448	23-ago-19	2019	August	23	14-ago-19		9 México	Puerto Morelos	Jardines	Siembra APAL	20°49'50.84"N	86°52'30.18"W	5	100	Marinés
449	23-ago-19	2019	August	23	14-ago-19		9 México	Puerto Morelos	Jardines	Arenal	20°49'53.00"N	86°52'28.20"W	8	100	Gandhi Ramírez
450	23-ago-19	2019	August	23	14-ago-19		9 México	Puerto Morelos	Jardines	Arenal	20°49'53.00"N	86°52'28.20"W	8	100	Gandhi Ramírez
451	23-ago-19	2019	August	23	14-ago-19		9 México	Puerto Morelos	Jardines	Arenal	20°49'53.00"N	86°52'28.20"W	8	100	Gandhi Ramírez
452	23-ago-19	2019	August	23	14-ago-19		9 México	Puerto Morelos	Jardines	Arenal	20°49'53.00"N	86°52'28.20"W	8	100	Gandhi Ramírez
453	23-ago-19	2019	August	23	14-ago-19		9 México	Puerto Morelos	Jardines	Arenal	20°49'53.00"N	86°52'28.20"W	8	100	Gandhi Ramírez
454	24-ago-19	2019	August	24	15-ago-19		9 México	Cozumel	La Caletita	La Caletita	20°29'42.5"N	86°57'51.2"W	1.5	200	
455	24-ago-19	2019	August	24	15-ago-19		9 México	Cozumel	Playa Corona	Playa Corona	20°26'10.20"N	87°00'05.96"W	1.5	150	Noely Marconi Rocco
456	25-ago-19	2019	August	25	15-ago-19		10 México	Cozumel	Playa Tikila	Playa Tikila	20°29'02"N	86°58'21"W	1	22	
457	18-sep-19	2019	September	18	13-sep-19		5 México	Puerto Morelos	Jardines	Canal de arena	20°49'51.99"N	86°52'29.07"W	8	3000	Sandra Mendoza
458	18-sep-19	2019	September	18	13-sep-19		5 México	Puerto Morelos	Jardines	Canal de arena	20°49'51.99"N	86°52'29.07"W	8	3000	Sandra Mendoza
459	18-sep-19	2019	September	18	13-sep-19		5 México	Puerto Morelos	Jardines	Canal de arena	20°49'51.99"N	86°52'29.07"W	8	3000	Sandra Mendoza

Please don't change any columns if you plan to add them to a Caribbean wide database (in progress)

Questions?

SCTLD Caribbean Cooperation
Team Partners meeting

May 8, 2023

Photo by Paul Selvaggio



5. How to report your observations

- Fill out Coral Spawning Report Form
 - <https://survey123.arcgis.com/share/5870056342be449ba82bae2727a314fc?portalUrl=https://OREF.maps.arcgis.com>
 - Basic information to plot on map where spawning observations have been made or attempted

NEW Caribbean Coral Spawning Tracker & Map

Caribbean Coral Spawning Tracker

CORAL SPAWNING REPORT FORM



Have you seen corals spawning?

Join us in tracking coral spawning across the Caribbean. Corals have synchronized breeding once or twice a year where coral polyps release millions of tiny egg and sperm bundles, called gametes, at the same time into the water to distribute their offspring over a broad geographic area. Together, scientists, divers, and underwater photographers can share what they see. Every record of date, time, and coral species spawning is helping scientists better understand and predict future spawning events and guide restoration efforts such as larval propagation.

Name*

First and Last Name

Organization*

What organization are you affiliated with?

Email*

How can we get in touch with you?

Country of Survey*

In what country/territory did this observation occur?

1. Zoom to the area of your observation or
2. Type in the coordinates (decimal degrees: e.g., 29.12345, -80.12345) into the boxes below the map. Different formats are available by clicking the icon before the boxes. Once in the proper place, move on to the next question. Your location will be logged when you submit the entire form.


Find address or place

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Esri, FAO, NOAA

Powered by Esri

Lat: Lon:

Site Name

If known, enter the site or reef name where the monitoring took place.

Start Date/Time of Spawning Monitoring*

When did the spawning monitoring start?

MM/DD/YYYY

hh:mm

End Date/Time of Spawning Monitoring*

When did the spawning monitoring end?

MM/DD/YYYY

hh:mm

Date of Full Moon*

When did the full moon occur?

Species Observed Spawning*

Which coral species did you observe spawning? Check all that apply.

2 selected

Species Observed but Not Spawning*

Which coral species did you observe but were not spawning? Check all that apply.

-Please select-

Acropora cervicornis Percentage of Colonies that Spawning*

10-20%

Acropora palmata Percentage of Colonies that Spawning*

10-20%

Additional Comments

Please include any additional relevant observations or information from your monitoring survey.

Photos of Observation

Upload up to 10 photos from your dive! Please share any photos of spawning corals and a landscape photo of your site. Please include credit name in the photo file label (e.g. spawning_MBrown.jpeg). These photos will be viewable on the spawning webmaps.

Drop image here or select image

Did you collect detailed coral spawning information? If so please [click here](#) to also fill out the detailed form and submit to [Anastazia Banaszak](#).

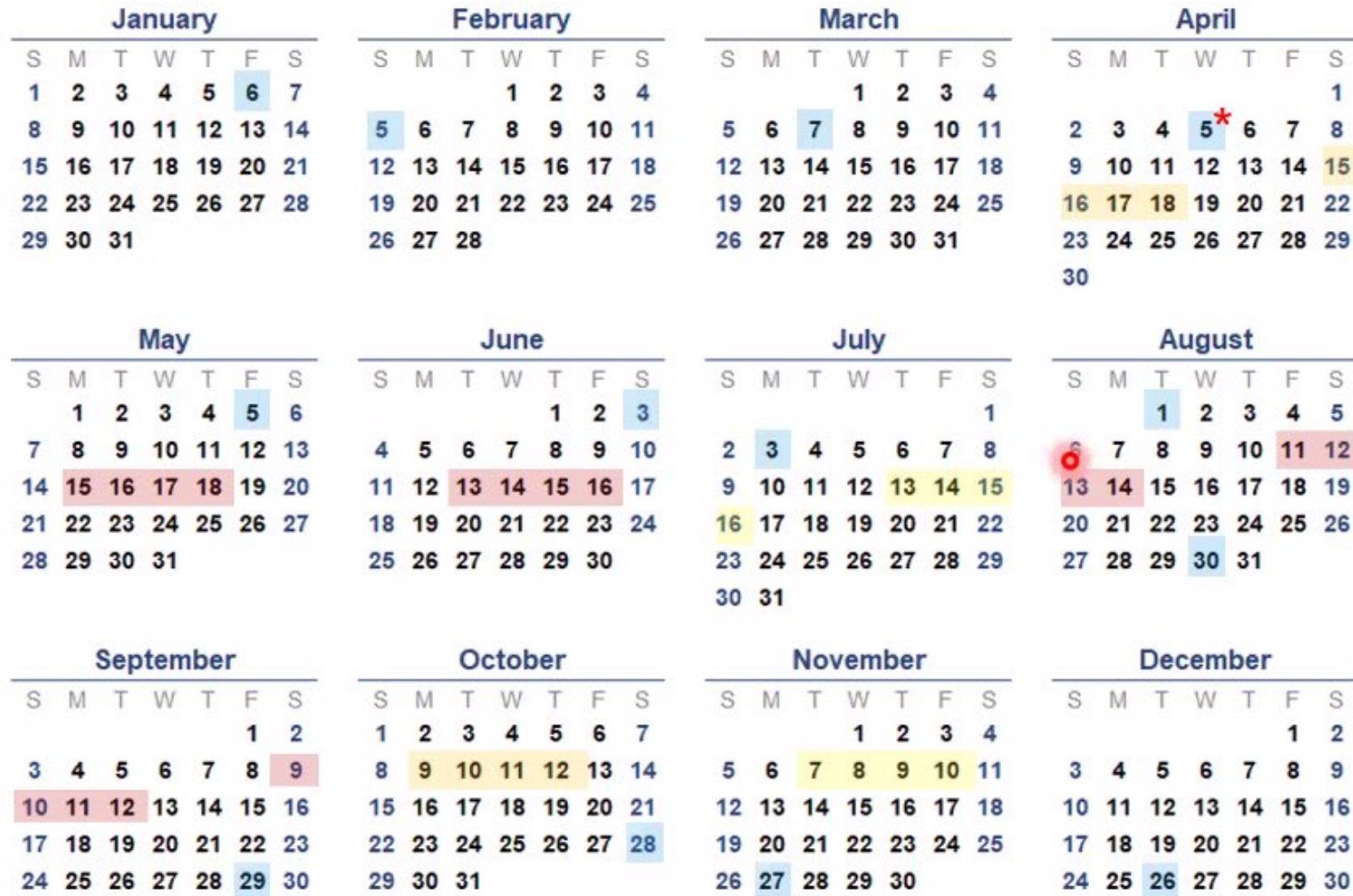
NEW Caribbean Coral Spawning Tracker & Map



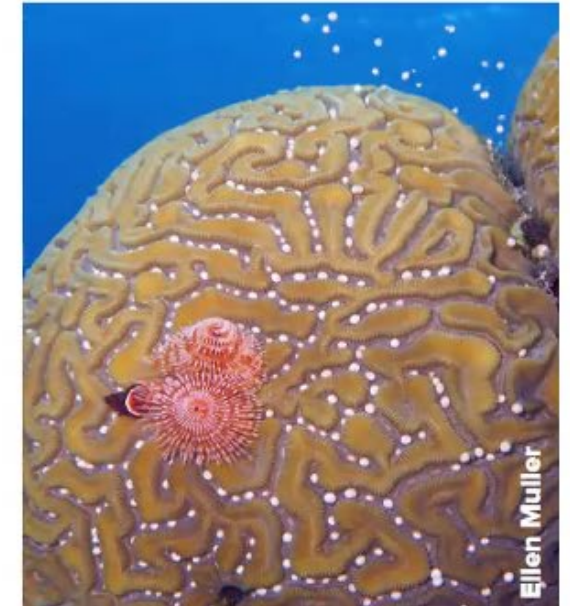
5. How to report your observations

- If you wish, please fill out Coral_Spawning_Data_TEMPLATE
 - Change name of data sheet to Coral_Spawning_Data_YEAR_Location_Your surname
- Send your datasheet, photos and logo to banaszak@cmarl.unam.mx
- Data will be verified and uploaded to Caribbean Spawning Database
 - In progress (needs funding)
 - Ocean Research Foundation (AGRRA)

Diploria labyrinthiformis – 2023



- Full moon
- Spawning is possible
- Spawning is likely
- Spawning is very likely



Available resources:

- Coral Restoration Consortium (https://crc.world)
- Larval propagation working group
- Mentored courses
- Prediction calendars
 - Previous years
 - Curaçao, Dominican Republic, Puerto Morelos
- Excel data sheets
- Patterns in Caribbean Coral Spawning
 - Anna C. Jordan – Master's Thesis

Coral Spawning Prediction calendar 2023

Northern/Mexican Caribbean

JULY														
Month														
Nights after full moon (NAFM)	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Calendar Date	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Sunset time (north of Quintana Roo)	18:52	18:51	18:50	18:49	18:48	18:47	18:46	18:45	18:44	18:43	18:42	18:41	18:40	18:39
Species	Spawning time	Spawning window MAS or MBS	*Spawning of <i>A. palmata</i> is possible this month. ** <i>A. l. l.</i> is likely to form a spawning streak in this region.											
<i>Acropora cervicornis</i>	21:05-22:30	101-180 MAS	Mexican Caribbean*											
<i>Acropora palmata</i>	22:02-22:49	150-180 MAS	Caribbean											
<i>Diploria labyrinthiformis</i>	16:11-18:15	17-81 MBS												
<i>Dendrogya cylindrus</i>	19:05	7 MBS	Mexican Caribbean											
<i>Montastrea cavernosa</i>	19:48-23:17	15-221 MAS												
<i>Colpophyllia natans</i>	19:57-21:27	25-115 MAS												
<i>Orbicella nuxi</i>	22:37-23:42	185-250 MAS												
<i>Orbicella faveolata</i>	22:37-23:42	185-250 MAS												

AUGUST														
Month														
Nights after full moon (NAFM)	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Calendar Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sunset time	18:35	18:35	18:34	18:34	18:33	18:33	18:32	18:31	18:31	18:30	18:29	18:28	18:27	18:26
Species	Spawning time	Spawning window MAS or MBS	* Spawning of <i>A. nuxi</i> most likely to occur this month. ** Spawning of <i>C. l.</i> and <i>P. n.</i> and <i>P. n.</i> species begins.											
<i>Acropora cervicornis</i>	21:05-23:10	102-236 MAS	Mexican Caribbean*											
<i>Acropora palmata</i>	20:58-20:53	138-153 MAS												
<i>Acropora palmata</i>	21:09-22:28	140-180 MAS	Caribbean											
<i>Acropora cervicornis</i>	21:57-22:33	150-180 MAS												
<i>Dendrogya cylindrus</i>	20:57-12:03	90-180 MAS	Caribbean											
<i>Orbicella faveolata</i>	21:03-23:30	130-110 MAS												
<i>Orbicella faveolata</i>	22:35-23:35	185-255 MAS	Mexican Caribbean**											
<i>Orbicella nuxi</i>	22:53-23:16	211-234 MAS												
<i>Acropora palmata</i>	22:24-23:42	182-210 MAS												
<i>Diploria labyrinthiformis</i>	22:46-23:51	205-210	Mexican Caribbean**											
<i>Diploria labyrinthiformis</i>	16:32-19:23	47-185-4 MAS	Caribbean											
<i>Diploria labyrinthiformis</i>	18:07-19:17	70-185-10 MAS												
<i>Montastrea cavernosa</i>	18:36-20:06	15-235 MAS												



Science-based
Coral restoration

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