

## Quicklook Report:

### Coral spawning in the upper Florida Keys, Aug-Sept 2014

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#### **Contributing Partners:**

Keys Marine Lab (with coordination from FWRI): Cindy Lewis & Karen Neely  
Florida Aquarium (FIAq): John Than and Rick Klobuchar coordinating a cast of dozens  
Coral Restoration Foundation (CRF): Ken Nedimyer and Jessica Levy  
Lauri MacLaughlin (LMac): coordinating with several commercial and volunteer resources  
Penn State Univ (PSU): Chan and Parkinson (Baums Lab)  
Florida Keys National Marine Sanctuary (FKNMS)

#### **Abstract:**

SEFSC and partners have been undertaking genet-specific spawning observations of *Acropora palmata* populations in the upper Keys since 2003 during the 'expected' spawning window (nights 2-6 after the full moon in Aug, 22:00-23:00). Given the excellent Ap spawning in the prior year and the anomalously warm temperatures in late July/early Aug, expectations for 2014 were uncertain. Despite these uncertainties, SEFSC and partners documented an excellent Acropora spawn in 2014. Ap was observed to spawn at all four sites observed (Horseshoe, Elbow, Sand Island, Molasses) between the nights of 13-15 Aug, many on two consecutive nights.

Meanwhile, this was the first year that we began genet-specific spawning observations for *Orbicella faveolata* at two sites. The genotyped population at Horseshoe is only slightly clonal, with a total of 35 genets under some degree of observation over five nights (16-18 Aug plus 14-15 Sept). Several Horseshoe Ofav genets (~5 or 6, two collected) were observed spawning on the 16<sup>th</sup> (McLaughlin and Chan); several on the 17<sup>th</sup>, and no spawning was observed on the 18<sup>th</sup> Aug. The other site, Grecian Rocks, has a highly clonal Ofav population with only 8 genets detected (out of ~ 50 colonies genotyped) which were observed over two nights (17-18<sup>th</sup> Aug). Five of these 8 genets spawned on the 17<sup>th</sup>, but no O.fav spawning occurred on the 18<sup>th</sup>. Similarly, O.fav spawning was lackluster at Horseshoe in September with no spawning observed on the 14<sup>th</sup> and one genet spawning fully and four with small dribbles on the 15<sup>th</sup>.

Partner institutions and boats were also able to document spawning and collect gametes from *Acropora cervicornis* (at Horseshoe reef [by L.MacLaughlin], within the CRF nursery and some genets temporarily brought to land tanks for more continuous observation) and *Dendrogyra cylindrus*. We tested new culture apparatus for *Dendrogyra cylindrus* larvae which was successful in fostering survival of swimming larvae over a couple of weeks, though no settlement was observed.

#### **Background:**

The SEFSC Benthic Ecosystem Assessment and Research team has been observing coral spawning and collecting and rearing spawned coral larvae in the upper Florida Keys since the 1990's. Spawning observations on *A.palmata* were somewhat spotty during the period from 1994 to 2002 when observations were focused at only two sites (KL Dry Rocks and Horseshoe reef). Starting in 2003, we had tools to genotype colonies and so observations from this point have increasing genotypic resolution. Another complication with the observed record is that some *A.palmata* genets with observed spawning records have died back and are no longer relevant in the population (e.g., the original area at KL Dry Rocks observed from 1994-98, two patches observed at Little Grecian, several original genets at Sand Is, two of the original eight genets at Elbow). This observational record, though not perfect, may represent one of the longest observational records for *A.palmata* spawning in existence. Prior to 2014, 'good' spawning years for Ap had been documented in 2009 and 2013 (with very poor years in between).

*A.cervicornis* has had a much patchier distribution during this historical period and had not been the focus of spawning observations in the upper Keys until 2009, when contributing partners (CRF and the Aquanauts group) observed spawning by outplanted *A.cervicornis* (cultured at the CRF field nursery) at Molasses reef. Since that time, growing effort by CRF and the Florida Aquarium (with partners) has focused on *A.cervicornis*, especially at the CRF nursery and Molasses reef. Similar to *A.palmata*, virtually no *A.cervicornis* spawning had been observed between 2009 and 2013 (another 'good year').

Initial observation of a single male *Dendrogyra cylindrus* spawning were made by Lauri MacLaughlin at Looe Key back in 2006 and 07. This preliminary report enabled a team from FWRI to document mass spawning by both males and females at Pillar Coral Forest (north Key Largo) for the first time in 2012 during nights 3 and 4 after the full moon, and collection of gametes from this patch in 2013 resulting in the culture of a very few larvae for ~ 48 hr.

*Montastraea* (now *Orbicella*) *faveolata* has historically been much more reliable in spawning during nights 6-8 after the Aug full moon. Our historic observations are not comprehensive, but we have always observed at least some spawning on at least one of two nights of observation at just one or two Key Largo sites. Based on prior observations of highly variable fertilization success over this period, in June 2014, we invested in mapping and genotyping *Orbicella faveolata* at two sites (Horseshoe and Grecian Rocks) with prior O.fav spawning observations. This effort revealed a much higher degree of clonality than anticipated for a coral of massive morphology, but the two sites were very different. Grecian Rocks is highly clonal (only 8 distinct genets detected in ~ 50 sampled colonies) whereas Horeshoe is much less so (~40 genets among ~50 colonies sampled). This investment enabled us to begin the construction of genet-specific observational record for O.fav at these two sites.

## **2014 Observations**

Spawning observations by site and species are given in the table. Overall, *A.palmata* spawned well with multiple genets spawning synchronously, many spawning two consecutive nights. *O.faveolata*, on the other hand, showed lackluster spawning this year. In 5 nights of observation (3 in Aug, 2 in Sept), substantial spawning was observed on only one night (17<sup>th</sup> Aug). At least 12 *O.fav* genets under observation for 4 or 5 nights at Horseshoe failed to spawn. Many of the Horseshoe *O.fav* colonies were

at least partially bleached during the Sept spawning observations. One fully bleached colony was observed to spawn fully on 15 Sept.

Table 1. Spawning observations on upper Florida Keys reefs by species and site. (NOTE: This compilation does not include complete spawning observations from CRF nursery.)

<b>Date (AFM*)</b>	<b>Site</b>	<b>Observing Team</b>	<b>Species</b>	<b>Action</b>
11 Aug (night 1)	Pillar Forest	KML/PSU	<i>D.cylindrus</i>	No spawning signs
12 Aug (night 2)	Horseshoe	SEFSC	<i>A.palmata</i>	Small dribble
	Elbow	SEFSC	<i>A.palmata</i>	No spawning signs
	Pillar Forest	KML/PSU	<i>D.cylindrus</i>	No spawning signs
13 Aug (night 3)	Sand Island	SEFSC/FKNMS	<i>A.palmata</i>	No spawning signs
	Elbow	SEFSC	<i>A.palmata</i>	Few dribbles
	Horseshoe	LMac/PSU	<i>A.palmata</i>	Small spawn
	Horseshoe	LMac/PSU	<i>A.cervicornis</i>	No spawning signs
	Pillar Forest	KML/PSU	<i>D.cylindrus</i>	Main spawn
14 Aug (night 4)	Sand Island	SEFSC/FKNMS	<i>A.palmata</i>	1 of 4 genets
	Elbow	SEFSC	<i>A.palmata</i>	3 of 6 genets spawn
	Horseshoe	LMac	<i>A.palmata</i>	Main thicket spawn
	Horseshoe	LMac	<i>A.cervicornis</i>	A couple colonies spawned; one collected
	CFR nursery	CRF/FIAq	<i>A.cervicornis</i>	Many genets spawned
15 Aug (night 5 AFM)	Sand Island	SEFSC/FKNMS	<i>A.palmata</i>	2 of 3 genets spawn (1 again)
	Elbow	SEFSC	<i>A.palmata</i>	6 of 6 genets spawn
	Molasses	CRF/FIAq	<i>A.palmata</i>	1 of 1 genet spawned
	Molasses	CRF/FIAq	<i>A.cervicornis</i>	Many colonies spawned
	CRF Nursery	CRF/FIAq	<i>A.cervicornis</i>	Many (at least 6) genets spawned
16 Aug (night 6 AFM)	Sand Island	SEFSC	<i>A.palmata</i>	No spawning signs
	Elbow	SEFSC	<i>A.palmata</i>	No spawning signs
	Elbow	SEFSC	<i>O.faveolata</i>	No spawning signs
	Horseshoe	LMac/PSU	<i>O.faveolata</i>	Few genets spawned (~20% of genets)
17 Aug (night 7)	Grecian Rocks	SEFSC	<i>O.faveolata</i>	5 of 8 genets spawned
	Horeseshoe	SEFSC	<i>O.faveolata</i>	Many colonies spawned (~40% of genets)
18 Aug (night 8)	Grecian Rocks	SEFSC	<i>O.faveolata</i>	No spawning signs
	Horseshoe	SEFSC	<i>O.faveolata</i>	No spawning signs
14 Sept (night 6)	Horseshoe	SEFSC	<i>O.faveolata</i>	No spawning signs
15 Sept (night 7)	Horseshoe	SEFSC	<i>O.faveolata</i>	Two genets spawned fully with dribbles from 4 more

				(less than 40 % of genets, only 20% substantially)

\*After Full Moon

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