

# 3

## Quantify reef coral ecological patterns using

**NMITA** Neogene Marine Biota of Tropical America

### Lesson 3: Gather data to test hypotheses about ecological changes in reef corals over millions of years

This lesson is designed to help you learn how to use a biodiversity bioinformatics database known as NMITA to test hypotheses about Caribbean coral reef ecological changes over the past several million years. *Lesson 1* reviewed the overall structure and data contained in NMITA. *Lesson 2* had you collect coral reef biodiversity data from six different time periods in order to determine if coral reef biodiversity has changed over the past several million years in the Dominican Republic. Lesson 3 builds upon lessons 1 and 2 and explores *ecological* and *morphological* patterns of biodiversity change in the same coral reef samples that you studied previously. In this lesson you will use NMITA to gather data on the *morphology*, or shape, of the living and fossil coral species and plot these changes through time.

#### Key Terms:

*Hypothesis*  
*Biodiversity*  
*Coral reef*  
*Morphology*  
*Ecology*

*Database*  
*Miocene*  
*Pliocene*  
*Pleistocene*  
*Holocene*

#### Key Concepts:

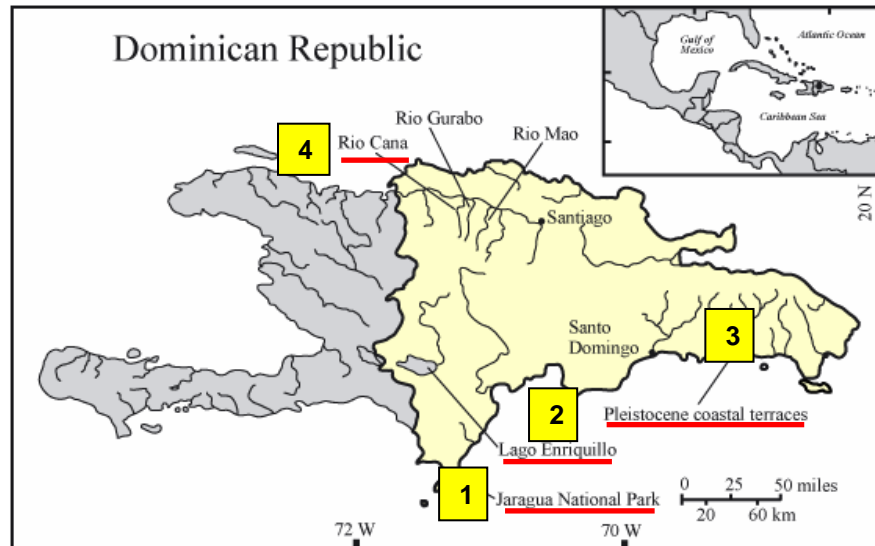
*Evolution*  
*Extinction*  
*Speciation*  
*Coral morphotype*  
*Coral nutrition*



#### Directions:

1. Go to NMITA <http://nmita.geology.uiowa.edu/>
2. Click Maps & Faunal Lists
3. Click Dominican Republic

- Note the map of the Dominican Republic. You will be collecting reef coral data from **four** major regions: (a) **Jaragua National Park** (Living); (b) **Lago Enriquillo** (Holocene); (c) Santo Domingo (**Pleistocene coastal terraces**); and (d) **Rio Cana** (Middle Pliocene, Early Pliocene, and Late Miocene). Be sure that you can find all four localities on the map (shown below).



- Take out the **lesson 3 data worksheets**.
- On the data worksheets you will notice that we are studying **3** samples from **each** time period (e.g., Holocene, Pleistocene, Pliocene, etc).
- For each sample you need to determine the morphotype, or shape, of each coral species. We will then use these data to determine if the reef coral morphotypes in the four regions of the Dominican Republic have *changed* over the past several million years.
- Each coral species in the database has been identified as one of four morphotypes: **branching, massive, platy, or free-living**.
- The morphotypes for some species have already been filled in for you on the data worksheets and the percentages of the morphotypes in the sample have been calculated for you.
- To finish this activity you will need to determine the percentages of branching, massive, platy, or free-living morphotypes in all 18 samples.
- In order to gather coral morphotype data for each sample, you will need to click on the name of each region (e.g., Jaragua National Park) and then click on the sample number **listed on the data worksheets** (e.g., region Jaragua National Park, locality "Cabo Falso.") **Detailed visual instructions are shown on the next page.**

# How to use NMITA to gather morphotype data

1

NMITA Neogene Marine Biota of Tropical America

FAUNAL LISTS AND COLLECTING LOCALITIES

Select area of interest from the map or the links below:

Costa Rica  
Cruzales Bay  
Western Map

Jamaica  
Cruzales Bay  
Orcunas  
Kingston Harbour  
Manchester Harbour  
Montego Bay

Dominican Republic  
maps:  
Rio Cana  
Rio Ozamalo  
Rio Mayo  
stratigraphic columns:  
Rio Cana  
Rio Ozamalo

Detailed map HERE

Go to: <http://nmita.geology.uiowa.edu>  
Click on: Maps & Faunal Lists  
Click on: *Dominican Republic*  
A map of the Dominican Republic will appear.

2

Dominican Republic

Note the rivers west of the city of Santiago. These rivers have exposed sedimentary rock rich in coral and mollusk fossils.  
Click on the river *Rio Cana*

3

Cana Gorge

A detailed map of the Rio Cana will appear along with small tributaries.  
Note the three main regions of the river.  
Click on *Cana Gorge*.

4

Cana Gorge

AB03-3

A detailed map of the Cana Gorge locality will appear along with sample localities. We will be studying three localities from Cana Gorge  
Click on locality *AB03-3*

5

NMITA Neogene Marine Biota of Tropical America

Rio Cana  
Cana Gorge  
Locality AB03-3: Mao Formation, Middle Pliocene, ~3.6 - 3.8 Ma

Faunal List (reef corals only)

*Caulastrea portoricensis* [branching]

*Diploria zambensis* [massive/mound]

*Favia massiliensis* [mostly free-living]

*Montastraea-I canalis* [massive/mound]

*Montastraea-II cavernosa* [massive/mound]

*Placopora variabilis* [free-living]

*Porites-I portoricensis* [branching]

*Porites-II waylandi* [massive/mound]

*Porites-III baracoensis* [branching]

*Stephanocoenia thumasi* [massive/mound]

*Siphonaria armandi* [branching]

*Siphonaria massi* [branching]

*Udotea apertius* [plates]

A data screen will appear with information on the sample and the coral reef species that occur in the sample.  
Next to each genus and species is the morphotype, or shape, of the coral species.

6

Faunal List (reef corals only)

[Caulastrea portoricensis](#) [branching]

[Diploria zambensis](#) [massive/mound]

[Isophyllia sp.A](#) [massive/mound]

[Madracis decactis](#) [mostly branching]

[Montastraea-I limbata](#) [massive/mound]

[Montastraea-II cavernosa](#) [massive/mound]

[Mussismilia sp.A](#) [mostly branching]

[Mussismilia sp.B](#) [mostly branching]

[Porites-I portoricensis](#) [branching]

[Porites-I waylandi](#) [massive/mound]

[Porites-II baracoensis](#) [branching]

The morphotype is listed after the name of each species in parentheses, e.g. [branching]. Transfer the morphotype data to the data worksheet. You may look at pictures of each species by clicking on the species name.

12. For each sample, determine the morphotype of each coral species. This information is shown **after the scientific name** of each species. Follow the instructions shown on the previous page.
  13. Transfer the morphotype data to the data worksheets. Be sure that you are placing the morphotype data in the correct sample box for the correct species.
  14. When you are finished transferring all of the coral morphotype data to the data worksheet, calculate the **percentage** of each morphotype in each sample. To perform this calculation, divide the number of species of a given morphotype by the total number of species in the sample (e.g, 8 branching species/16 total species = 50% branching species in the sample).
- 15. Repeat steps 13 and 14 until you are finished with all 18 samples.**
16. When you are finished, you should know the percentage of branching, massive, platy, and free-living coral species in all 18 samples.
  17. Now plot the percentage data on the graphs on the analysis worksheet. You will be completing **2 graphs**, one for platy morphotypes and one for branching morphotypes. When you are finished you will have documented patterns of coral morphotype change over the past 6 million years in the Dominican Republic.

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#### **Data interpretation:**

Has the percentage of platy or branching coral morphotypes changed over the past 6 million years in the Dominican Republic?

If one were to travel back in time to the Pliocene, would coral reefs in the Dominican Republic have similar percentages of branching species as there are today?

What would be the advantages or disadvantages of plotting the average morphotype percentage value for each time period? Would this change the patterns that we observe? Why would this be significant?

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#### **Discussion questions:**

Corals have different morphotypes because of genetic differences and environmental differences. What environmental factors might contribute to different coral morphotypes?

Could changes in coral morphotypes through time be a product of changes in the environmental conditions in the Caribbean? Explain.

Name:

Living today	Los Carraplanes (2)		Morphology			
	Jaragua National Park		Branching	Massive	Platy	Free-living
	1					
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						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
<b>TOTAL SPECIES:</b>	<b>17</b>					
<b>Percent of total species:</b>						

Cabo Falso (5)		Morphology			
Jaragua National Park		Branching	Massive	Platy	Free-living
Acropora palmata		X			
Acropora cervicornis		X			
Undaria agaricites				X	
Undaria pusilla				X	
Helioseris cucullata				X	
Agaricia lamarcki				X	
Agaricia grahamae				X	
Agaricia fragilis				X	
Helioseris cucullata				X	
Porites porites		X			
Porites astreoides			X		
Madracis decactis		X			
Madracis pharensis			X		
Madracis formosa		X			
Diploria strigosa			X		
Diploria clivosa			X		
Diplora labyrinthiformis			X		
Colpophyllia natans			X		
Colpophyllia breviserialis			X		
Colpophyllia amaranthus			X		
Meandrina meandrites			X		
Montastraea "annularis"			X		
Montastraea faveolata			X		
Montastraea franksi			X		
Montastraea cavernosa			X		
Siderastrea siderea			X		
Siderastrea radians			X		
Dichocoenia stokesi			X		
Dichocoenia stellaris				X	
Eusmilia fastigiata		X			
Mycetophyllia aliciae				X	
Mycetophyllia lamarckiana				X	
Mycetophyllia danaana				X	
Mycetophyllia ferox				X	
Scolymia cubensis					X
Scolymia lacera					X
Scolymia wellsii					X
Isophyllastrea rigida			X		
Mussa angulosa		X			
Stephanocoenia intersepta			X		
<b>TOTAL SPECIES:</b>	<b>40</b>	<b>7</b>	<b>18</b>	<b>12</b>	<b>3</b>
<b>Percent of total species:</b>		<b>18</b>	<b>45</b>	<b>30</b>	<b>8</b>

Bahia Honda en Cabo Rojo (8)		Morphology			
Jaragua National Park		Branching	Massive	Platy	Free-living
Acropora cervicornis		X			
Undaria agaricites				X	
Undaria pusilla				X	
Agaricia lamarcki				X	
Agaricia grahamae				X	
Agaricia fragilis				X	
Helioseris cucullata				X	
Porites porites		X			
Porites astreoides			X		
Madracis decactis		X			
Madracis mirabilis		X			
Madracis pharensis			X		
Diploria strigosa			X		
Diplora labyrinthiformis			X		
Colpophyllia natans			X		
Colpophyllia breviserialis			X		
Colpophyllia amaranthus			X		
Meandrina meandrites			X		
Montastraea "annularis"			X		
Montastraea faveolata			X		
Montastraea franksi			X		
Montastraea cavernosa			X		
Solenastrea bourmoni			X		
Siderastrea siderea			X		
Dichocoenia stokesi			X		
Dichocoenia stellaris				X	
Eusmilia fastigiata		X			
Manicina aerolata			X		X
Manicina mayori			X		
Mycetophyllia aliciae				X	
Mycetophyllia lamarckiana				X	
Mycetophyllia danaana				X	
Mycetophyllia ferox				X	
Mycetophyllia reesi				X	
Scolymia cubensis			X		
Scolymia lacera			X		
Scolymia wellsii			X		
Isophyllastrea rigida			X		
Isophyllia sinuosa			X		
Mussa angulosa		X			
Stephanocoenia intersepta			X		
<b>TOTAL SPECIES:</b>	<b>41</b>	<b>6</b>	<b>22</b>	<b>12</b>	<b>1</b>
<b>Percent of total species:</b>		<b>15</b>	<b>54</b>	<b>29</b>	<b>2</b>

Name:

Holocene	Sample 1	Morphology			
	Lago Enriqueillo	Branching	Massive	Platy	Free-living
	1. <i>Acropora cervicornis</i>	X			
2. <i>Undaria agaricites</i>				X	
3. <i>Colpophyllia natans</i>		X			
4. <i>Eusmilia fastigata</i>	X				
5. <i>Favia fragum</i>		X			
6. <i>Helioseris cucullata</i>				X	
7. <i>Manicina areolata</i>					X
8. <i>Oculina diffusa</i>	X				
9. <i>Porites astreoides</i>		X			
10. <i>Porites divaricata</i>	X				
11. <i>Porites furcata</i>	X				
12. <i>Porites porites</i>	X				
13. <i>Scolymia lacera</i>		X			
14. <i>Siderastrea siderea</i>		X			
15. <i>Stephancoenia intersepta</i>		X			
16					
17					
18					
19					
20					
<b>TOTAL SPECIES:</b>	<b>15</b>	<b>6</b>	<b>6</b>	<b>2</b>	<b>1</b>
<b>Percent of total species:</b>		<b>40</b>	<b>40</b>	<b>13</b>	<b>7</b>

Sample 3	Morphology				
Lago Enriqueillo	Branching	Massive	Platy	Free-living	
<i>Undaria agaricites</i>				X	
<i>Agaricia lamarcki</i>				X	
<i>Colpophyllia breviserialis</i>		X			
<i>Colpophyllia natans</i>		X			
<i>Dichocoenia stokesi</i>		X			
<i>Helioseris cucullata</i>				X	
<i>Montastraea "annularis"</i>		X			
<i>Madracis mirabilis</i>	X				
<i>Mussa angulosa</i>	X				
<i>Montastraea cavernosa</i>		X			
<i>Mycetophyllia lamarckiana</i>				X	
<i>Oculina diffusa</i>	X				
<i>Porites astreoides</i>		X			
<i>Porites divaricata</i>	X				
<i>Scolymia lacera</i>		X			
<i>Siderastrea siderea</i>		X			
<i>Stephancoenia intersepta</i>		X			
<b>TOTAL SPECIES:</b>	<b>17</b>	<b>4</b>	<b>9</b>	<b>4</b>	<b>0</b>
<b>Percent of total species:</b>		<b>24</b>	<b>53</b>	<b>24</b>	<b>0</b>

Sample 4	Morphology				
Lago Enriqueillo	Branching	Massive	Platy	Free-living	
<i>Acropora cervicornis</i>					
<i>Agaricia lamarcki</i>					
<i>Undaria agaricites</i>					
<i>Colpophyllia natans</i>					
<i>Dichocoenia stokesi</i>					
<i>Eusmilia fastigata</i>					
<i>Helioseris cucullata</i>					
<i>Montastraea "annularis"</i>					
<i>Madracis mirabilis</i>					
<i>Manicina areolata</i>					
<i>Mussa angulosa</i>					
<i>Montastraea cavernosa</i>					
<i>Oculina diffusa</i>					
<i>Porites astreoides</i>					
<i>Porites divaricata</i>					
<i>Porites furcata</i>					
<i>Porites porites</i>					
<i>Siderastrea siderea</i>					
<i>Stephancoenia intersepta</i>					
<b>TOTAL SPECIES:</b>	<b>19</b>				
<b>Percent of total species:</b>					

Name:

Pleistocene	Santo Domingo (JK 5)		Morphology			
	Pleistocene Coastal Terraces		Branching	Massive	Platy	Free-living
1. <i>Acropora cervicornis</i>		X				
2. <i>Acropora palmata</i>		X				
3. <i>Colpophyllia natans</i>			X			
4. <i>Dendrogyra cylindricus</i>			X			
5. <i>Diploria labyrinthiformis</i>			X			
6. <i>Diploria strigosa</i>			X			
7. <i>Montastraea "annularis"</i>			X			
8. <i>Montastraea faveolata</i>			X			
9. <i>Montastraea franksi</i>			X			
10. <i>Montastraea "organ pipe"</i>			X			
11. <i>Montastraea cavernosa</i>			X			
12. <i>Siderastrea siderea</i>			X			
13. <i>Stephanocoenia intersepta</i>			X			
14						
15						
16						
17						
18						
19						
20						
<b>TOTAL SPECIES:</b>	13		2	11	0	0
<b>Percent of total species:</b>			15	85	0	0

Santo Domingo (JK 6)		Morphology			
Pleistocene Coastal Terraces		Branching	Massive	Platy	Free-living
<i>Acropora cervicornis</i>					
<i>Acropora palmata</i>					
<i>Dendrogyra cylindricus</i>					
<i>Dichocoenia stokesi</i>					
<i>Diploria clivosa</i>					
<i>Diploria strigosa</i>					
<i>Favia fragum</i>					
<i>Isophyllia sinuosa</i>					
<i>Montastraea "annularis"</i>					
<i>Montastraea faveolata</i>					
<i>Montastraea "organ pipe"</i>					
<i>Siderastrea siderea</i>					
<i>Stephanocoenia intersepta</i>					
<b>TOTAL SPECIES:</b>	13				
<b>Percent of total species:</b>					

Santo Domingo (JK 8)		Morphology			
Pleistocene Coastal Terraces		Branching	Massive	Platy	Free-living
<i>Acropora cervicornis</i>		X			
<i>Acropora palmata</i>		X			
<i>Colpophyllia natans</i>			X		
<i>Diploria labyrinthiformis</i>			X		
<i>Diploria strigosa</i>			X		
<i>Isophyllia sinuosa</i>			X		
<i>Montastraea "annularis"</i>			X		
<i>Montastraea faveolata</i>			X		
<i>Montastraea "organ pipe"</i>			X		
<i>Montastraea cavernosa</i>			X		
<i>Siderastrea siderea</i>			X		
<i>Stephanocoenia intersepta</i>			X		
<i>Undaria agaricites</i>				X	
<b>TOTAL SPECIES:</b>	13	2	10	1	0
<b>Percent of total species:</b>		15	77	8	0

Name:

Middle Pliocene	Cana Gorge (AB03-3)		Morphology			
	Rio Cana		Branching	Massive	Platy	Free-living
1. <i>Caulastrea portoricensis</i>	X					
2. <i>Diploria zambensis</i>		X				
3. <i>Favia maoadentensis</i>					X	
4. <i>Montastraea-II canalis</i>		X				
5. <i>Montastraea-II cavernosa</i>		X				
6. <i>Placocyathus variabilis</i>					X	
7. <i>Porites-I macdonaldi</i>				X		
8. <i>Porites-I portoricensis</i>	X					
9. <i>Porites-I waylandi</i>		X				
10. <i>Porites-II baracoensis</i>	X					
11. <i>Stephanocoenia duncani</i>		X				
12. <i>Stylophora granulata</i>	X					
13. <i>Stylophora minor</i>	X					
14. <i>Undaria agaricites</i>				X		
15						
16						
17						
18						
19						
20						
<b>TOTAL SPECIES:</b>	<b>14</b>	<b>5</b>	<b>5</b>	<b>2</b>	<b>2</b>	
<b>Percent of total species:</b>		<b>36</b>	<b>36</b>	<b>14</b>	<b>14</b>	

Cana Gorge (AB03-4)		Morphology			
Rio Cana		Branching	Massive	Platy	Free-living
<i>Caulastrea portoricensis</i>	X				
<i>Montastraea-I limbata</i>		X			
<i>Montastraea-II cylindrica</i>		X			
<i>Porites-I portoricensis</i>	X				
<i>Porites-I waylandi</i>		X			
<i>Porites-II baracoensis</i>	X				
<i>Stephanocoenia spongiformis</i>		X			
<i>Stylophora granulata</i>	X				
<i>Undaria agaricites</i>				X	
<b>TOTAL SPECIES:</b>	<b>9</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>0</b>
<b>Percent of total species:</b>		<b>44</b>	<b>44</b>	<b>11</b>	<b>0</b>

Cana Gorge (JK-03-6)		Morphology			
Rio Cana		Branching	Massive	Platy	Free-living
<i>Caulastrea portoricensis</i>					
<i>Diploria zambensis</i>					
<i>Isophyllia sp.A</i>					
<i>Madracis decactis</i>					
<i>Montastraea-I limbata</i>					
<i>Montastraea-II cavernosa</i>					
<i>Mussismilia sp.A</i>					
<i>Mussismilia sp.B</i>					
<i>Porites-I portoricensis</i>					
<i>Porites-I waylandi</i>					
<i>Porites-II baracoensis</i>					
<b>TOTAL SPECIES:</b>	<b>11</b>				
<b>Percent of total species:</b>					



Name:

Early Pliocene	Canada de Zamba (AB03-2)	Morphology			
	Rio Cana	Branching	Massive	Platy	Free-living
1. <i>Agaricia lamarcki</i>					
2. <i>Favia dominicensis</i>					
3. <i>Goniopora hilli</i>					
4. <i>Isophyllia</i> sp.A					
5. <i>Madracis</i> cf. <i>herricki</i>					
6. <i>Madracis decactis</i>					
7. <i>Madracis decaseptata</i>					
8. <i>Madracis mirabilis</i>					
9. <i>Madracis</i> sp.A					
10. <i>Manicina grandis</i>					
11. <i>Montastraea-I limbata</i>					
12. <i>Montastraea-II cavernosa</i>					
13. <i>Placocyathus variabilis</i>					
14. <i>Porites-I macdonaldi</i>					
15. <i>Porites-I waylandi</i>					
16. <i>Porites-I baracoensis</i>					
17. <i>Stylophora granulata</i>					
18. <i>Stylophora minor</i>					
19					
20					
<b>TOTAL SPECIES:</b>	<b>18</b>				
Percent of total species:					

Canada de Zamba (JK03-10)	Morphology			
Rio Cana	Branching	Massive	Platy	Free-living
<i>Caulastrea portoricensis</i>				
<i>Favia maoadentensis</i>				
<i>Leptoseris gardineri</i>				
<i>Montastraea-I limbata</i>				
<i>Porites-I macdonaldi</i>				
<i>Porites-I portoricensis</i>				
<i>Porites-I waylandi</i>				
<i>Porites-II baracoensis</i>				
<i>Siderastrea siderea</i>				
<i>Stephanocoenia duncani</i>				
<i>Stylophora affinis</i>				
<i>Stylophora granulata</i>				
<i>Stylophora minor</i>				
<i>Undaria agaricites</i>				
<b>TOTAL SPECIES:</b>	<b>14</b>			
Percent of total species:				

Canada de Zamba (JK03-5)	Morphology			
Rio Cana	Branching	Massive	Platy	Free-living
<i>Diploria zambensis</i>				
<i>Favia dominicensis</i>				
<i>Isophyllia</i> sp.A				
<i>Madracis mirabilis</i>				
<i>Montastraea-I limbata</i>				
<i>Mussismilia</i> sp.A				
<i>Pocillopora crassoramosa</i>				
<i>Porites-I macdonaldi</i>				
<i>Porites-I waylandi</i>				
<i>Siderastrea siderea</i>				
<i>Stephanocoenia duncani</i>				
<i>Stylophora affinis</i>				
<i>Stylophora minor</i>				
<i>Undaria agaricites</i>				
<b>TOTAL SPECIES:</b>	<b>14</b>			
Percent of total species:				

Name:

Late Miocene	Arroyo Bellaco (BEL-1)		Morphology			
	Rio Cana		Branching	Massive	Platy	Free-living
1. <i>Agaricia lamarcki</i>						
2. <i>Dichocoenia sp.A</i>						
3. <i>Gardinerseris planulata</i>						
4. <i>Goniopora hilli</i>						
5. <i>Goniopora imperatoris</i>						
6. <i>Montastraea-I limbata</i>						
7. <i>Pocillopora crassoramosa</i>						
8. <i>Porites-I waylandi</i>						
9. <i>Siderastrea siderea</i>						
10. <i>Solenastrea bournoni</i>						
11. <i>Stephanocoenia duncani</i>						
12. <i>Stephanocoenia spongiformis</i>						
13. <i>Stylophora affinis</i>						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
<b>TOTAL SPECIES:</b>	<b>13</b>					
<b>Percent of total species:</b>						

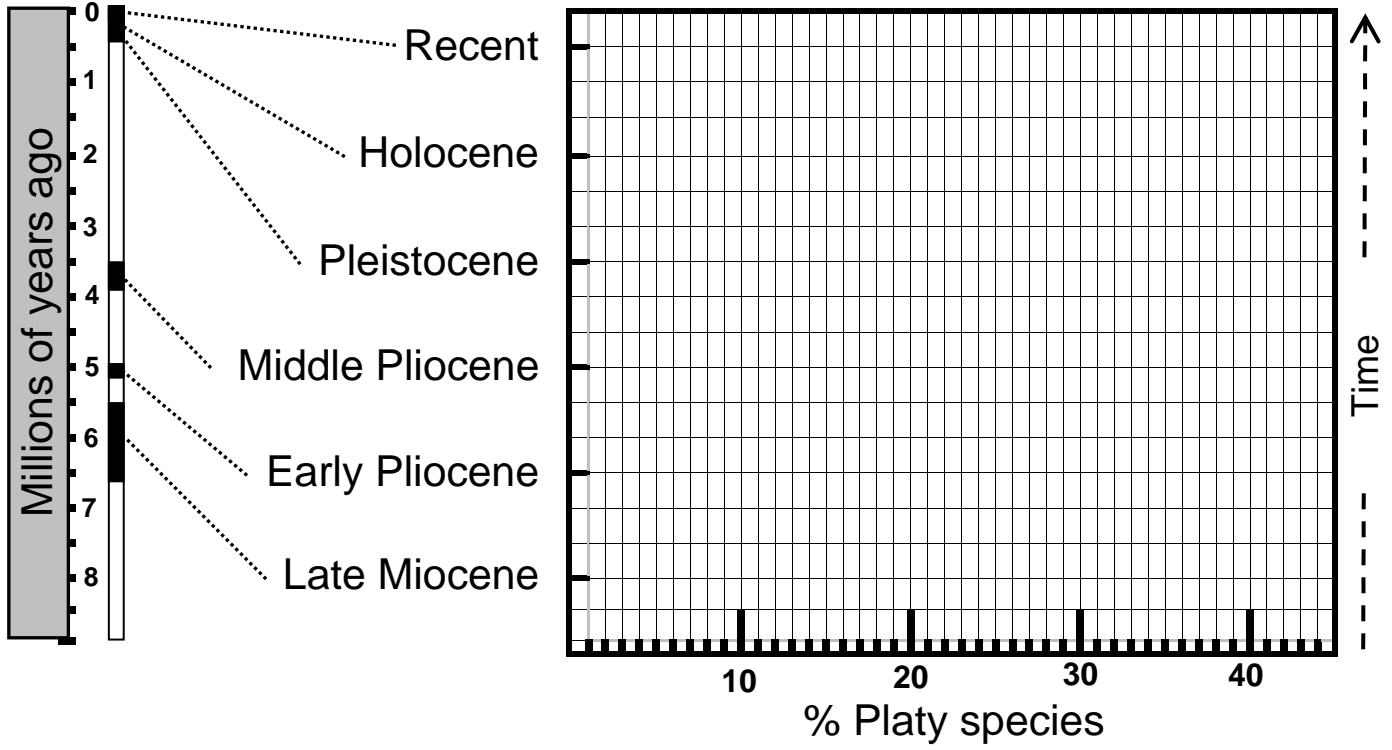
Arroyo Bellaco (BEL-3)		Morphology			
Rio Cana		Branching	Massive	Platy	Free-living
<i>Gardinerseris planulata</i>			X		
<i>Goniopora hilli</i>			X		
<i>Goniopora imperatoris</i>			X		
<i>Montastraea-I limbata</i>			X		
<i>Montastraea-II canalis</i>			X		
<i>Montastraea-II endothecata</i>			X		
<i>Porites-I waylandi</i>			X		
<i>Stephanocoenia duncani</i>			X		
<i>Stephanocoenia spongiformis</i>			X		
<i>Stylophora affinis</i>		X			
<i>Undaria agaricites</i>				X	
<b>TOTAL SPECIES:</b>	<b>11</b>	<b>1</b>	<b>9</b>	<b>1</b>	<b>0</b>
<b>Percent of total species:</b>		9.1	82	9	0

Arroyo Bellaco (BEL-6)		Morphology			
Rio Cana		Branching	Massive	Platy	Free-living
<i>Favia dominicensis</i>			X		
<i>Goniopora imperatoris</i>			X		
<i>Madracis mirabilis</i>		X			
<i>Montastraea-I limbata</i>			X		
<i>Montastraea-II endothecata</i>			X		
<i>Pocillopora crassoramosa</i>		X			
<i>Porites-I portoricensis</i>		X			
<i>Stylophora affinis</i>		X			
<i>Undaria agaricites</i>				X	
<b>TOTAL SPECIES:</b>	<b>9</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>0</b>
<b>Percent of total species:</b>		44	44	11	0

Name:



A.



B.

