Foodweb Impacts of Macondo Oil in the Marsh: Indications of Recovery

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Ants are indicators of food web effects of Macondo oil and hurricanes in the marsh.

As arthropod numbers decreased in the marsh in late 2010 & early 2011, ant populations followed in late 2011.

Ants (and other arthropods) are 68% recovered from the oil spill in late 2016.
Acrobat ants that live inside the cord grass exhibited a delayed impact in oiled areas. New colonies inhabit the area in spring and early summer but have not survived until 2014. Possible recovery in 2016?
4/2010 DWH Explodes

9/2010
Insect pop reduced

6/2011
Insect pop crash

9/2010
Insect pop reduced

9/2011
Insect pop rise & fall

H Isaac 8/2012
Insect Pop crash

TS Lee 9/2011

Ants survive

Ants crash

Ants gone

Ants resurge & die 2013

Insect pop resurge 2014

Insect pop resurge and die 2013

Ants Survive (~30%)
Reference sites

Acrobat Ants
Sept 2011

Before TS Lee
After TS Lee

P = 0.28

Oiled Sites

Acrobat Ants
Sept 2011

Before TS Lee
After TS Lee

P = 0.64

Acrobat Ants
Sept 2011

P < 0.0001

No. Ants/45m sweep

Reference
Oiled
• Delineating Colonies
• Line Transects
Summer 2012

Ants

- Reference
- Lt Oil
- Oiled

No. Colonies/3 transects

- p = 0.04
- p = 0.004
- p < 0.0001

90 transects
2012 Ants by Season

No. Colonies/3 transects

April/May Ref
A/M Oiled
June/July Ref
J/J Oiled
Oct Ref
Oct Oiled

Mating Flights

p<0.0001

H Isaac

p=0.19

p=0.19
## A look back... 2012

<table>
<thead>
<tr>
<th>Site</th>
<th>Colony</th>
<th>Colony/ha (10,000m²)</th>
<th>NI Distance Avg (m)</th>
<th>NN Distance Avg (m)</th>
<th>Index of Aggregation</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>/400m²site</td>
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<tr>
<td>A</td>
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<td>1.24</td>
<td>0.96</td>
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<tr>
<td>C</td>
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<td>1.55</td>
<td>1.22</td>
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<tr>
<td>D</td>
<td>92</td>
<td>2300</td>
<td>1.49</td>
<td>2.14</td>
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<tr>
<td>E</td>
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<td>1500</td>
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<tr>
<td>Avg</td>
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<td><strong>1425</strong></td>
<td><strong>1.80</strong></td>
<td><strong>2.18</strong></td>
<td><strong>1.42</strong></td>
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</table>

One oiled site A: Conducted summer before H Isaac
The bar chart shows the number of colonies per site (3 transects) in different months and years:

- **2013 June**
  - Oiled: 8
  - Unoiled: 2

- **2013 Oct**
  - Oiled: 8
  - Unoiled: 2

- **2014**
  - Oiled: 4
  - Reference: 8

The p-value for the comparison between Oiled and Reference in 2014 is **P=0.02**.
Now a look forward... 2015

<table>
<thead>
<tr>
<th>Site</th>
<th>Colony</th>
<th>Colony/ha (10,000m²)</th>
<th>NI Distance Avg (m)</th>
<th>NN Distance Avg (m)</th>
<th>Index of Aggregation</th>
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<td></td>
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<td>1062.5</td>
<td>1.91</td>
<td>2.78</td>
<td>1.47</td>
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Oil and hurricanes are impacting marsh food web

Ants are a good indicator of disturbance to the coastal food web

Ants were decimated after both the BP oil disaster and H Isaac

2015 showed 73% recovery from pre-Isaac, un-oiled ant populations and 68% in 2016
Thank you!

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