Insects at the Putrajaya Lake and Wetland Ecosystem: a post decade ecological succession

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Do not the Unbelievers see that the heavens and the earth were joined together (as one unit of Creation), before We clove them asunder? We made from WATER every living thing. Will they not then believe?

(Al Anbiya’ 21:30)
we began monitoring the insects in March 2011…

to set an ecological community assessment of terrestrial insects and related arthropods recolonization and successional response to Putrajaya Lake and Wetland ecosystem development and management

*There is not an animal (that lives) on the earth, nor a being that flies on its wings, but (forms part of) Communities like you*

*Al An’am 6:38*
We assess for...

- Recolonization of insects to the “man-made” ecosystem
- Successional responses to anthropogenic disturbances (urban development and management)
- Spatio-temporal dynamics of insect communities

To synthesize the health of PLW ecosystem from the perspective of terrestrial insects as indicators

To prospects ecosystem services by the insect communities
<table>
<thead>
<tr>
<th>THE SAMPLING PROGRAM</th>
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<tbody>
<tr>
<td>March 2011 through to September 2015</td>
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</tbody>
</table>

**Sweep netting**
For grass and shrub inhabiting communities
- 6 stations x 3 rounds x 56 months

**Malaise trapping**
For low flying diurnal and nocturnal communities
- 6 stations x 1 unit x 56 months
THE SAMPLING PROGRAM
March 2011 through to September 2015

Pitfall trapping
for ground dwelling communities
• 6 stations x 20 units x 56 months

Black light trapping
for high flying nocturnal communities
• 6 stations x 1 unit x 56 months
Where Did We Set Our Gradient?
Our Synthesis Last Time was...
Distinct communities corresponding to the east and west tributaries

Overlapping sets of communities merging towards the lake
This Time Around…
## SPECIES COMPOSITION
indicating Hymenoptera (ants, bees & wasps) dominated community

15 insects Order inhabit the ecosystem

<table>
<thead>
<tr>
<th>Taxa</th>
<th>No. of morphospecies identified</th>
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<tbody>
<tr>
<td></td>
<td>2013</td>
</tr>
<tr>
<td>Hymenoptera</td>
<td>244</td>
</tr>
<tr>
<td>Coleoptera</td>
<td>194</td>
</tr>
<tr>
<td>Diptera</td>
<td>208</td>
</tr>
<tr>
<td>Lepidoptera</td>
<td>104</td>
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<tr>
<td>Hemiptera</td>
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<tr>
<td>Orthoptera</td>
<td>53</td>
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<td>Blattodea</td>
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<td>Odonata</td>
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<td>Neuroptera</td>
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<td>Dermaptera</td>
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<td>Ephemeroptera</td>
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<tr>
<td>Thysanoptera</td>
<td>1</td>
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<tr>
<td>Psocoptera</td>
<td>0</td>
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<tr>
<td>TOTAL</td>
<td>972</td>
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</table>

### Aquatic Bioindicators

<table>
<thead>
<tr>
<th>Location</th>
<th>Coleoptera</th>
<th>Hymenoptera</th>
<th>Diptera</th>
<th>Lepidoptera</th>
<th>Hemiptera</th>
<th>Orthoptera</th>
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<tbody>
<tr>
<td>UN</td>
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<tr>
<td>LAKE</td>
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</tbody>
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*Legend: UN, UW, UE, LE, UB, LAKE*
VARIATIONS

across gradient (stations)

Ants, bees & wasps

Moths & Butterflies

Flies, gnats & mosquitoes

Beetles

No. of Spp.

No. of Spp.

No. of Spp.

No. of Spp.

UN  UW  UE  LE  UB  LAKE

UN  UW  UE  LE  UB  LAKE
### Variations across gradient (stations)

#### Ants, bees & wasps
- UN: 100 Spp.
- UE: 200 Spp.
- UB: 100 Spp.

#### Bugs & planthoppers
- UN: 75 Spp.
- UW: 100 Spp.
- LE: 100 Spp.
- UB: 75 Spp.

#### Katydid, grasshoppers & crickets
- UN: 50 Spp.
- UW: 75 Spp.
- UE: 100 Spp.
- LE: 75 Spp.
- UB: 50 Spp.

#### Aquatic Bioindicators
- UW: 50 Spp.
- UE: 75 Spp.
- LE: 50 Spp.
- LAKE: 75 Spp.
Our Latest Discovery…
Trend for cumulative insect captures were analyzed by 4 period moving averages.
Our Conclusion
Say: “See ye? – If your stream be some morning lost (in the underground earth), who then can supply you with clear-flowing water?”

(Al Mulk 67:30)

Thank You