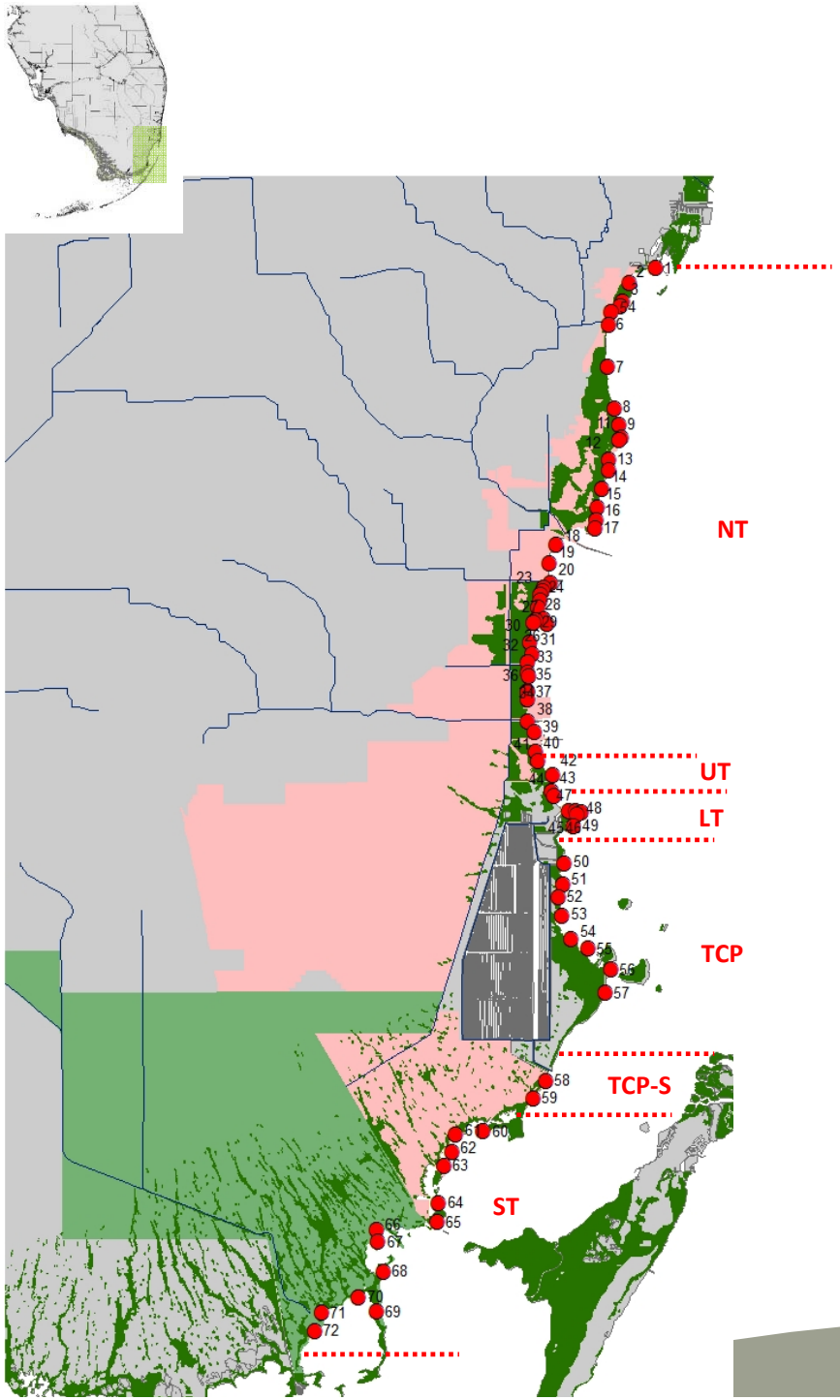
Spatial Differences in Community Composition: a Potential Indicator for CERP

A Demonstration Analysis Using 2007-2012 Epifauna data At 72 shoreline sites from Shoal Point to Manatee Bay

Joan A. Browder, Gladys L. Liehr, Michelle Harangody, and Thomas L. Jackson



Presently great concern and controversy about FP&L's appropriation of additional regional fresh water to resolve cooling canal issues.

More water for Turkey Point seems likely to reduce freshwater inflow to Biscayne Bay.

Q 1: Will future reduction in freshwater flow be reflected in ecosystem changes in Biscayne Bay in the cooling canal vicinity?

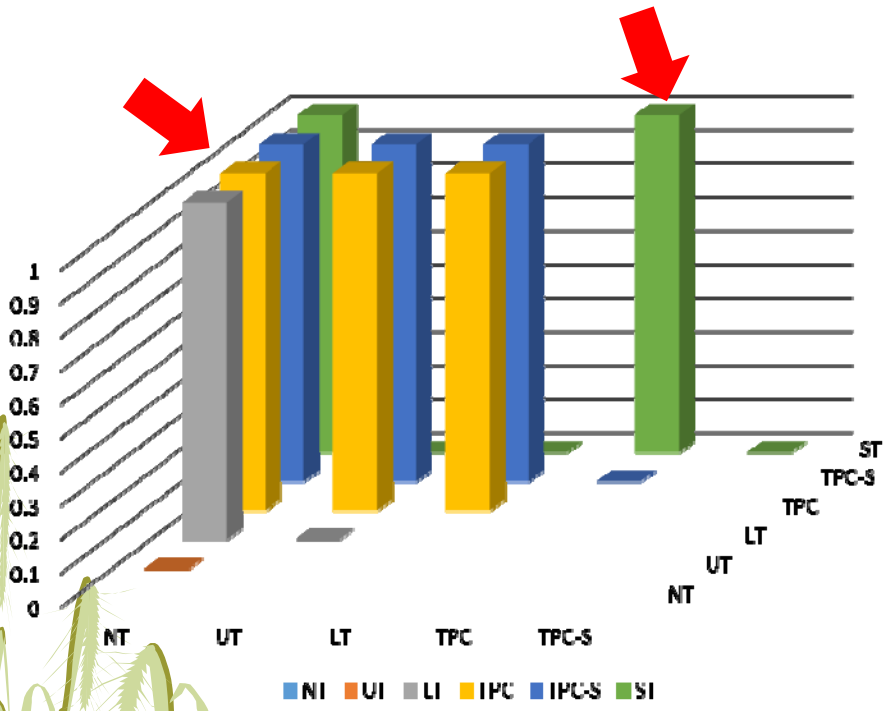
Q 2: Given their location and structure, have the cooling canals already reduced freshwater flow to the Bay and altered the adjacent Bay ecosystem -- and can an effect be seen in the faunal community?

We used data from the 72 original (pre-IBBEAM) sites of the Epifauna component of IBBEAM to explore Q 2.

Salinity differs between TPC and TPC-S site groups and most other site groups

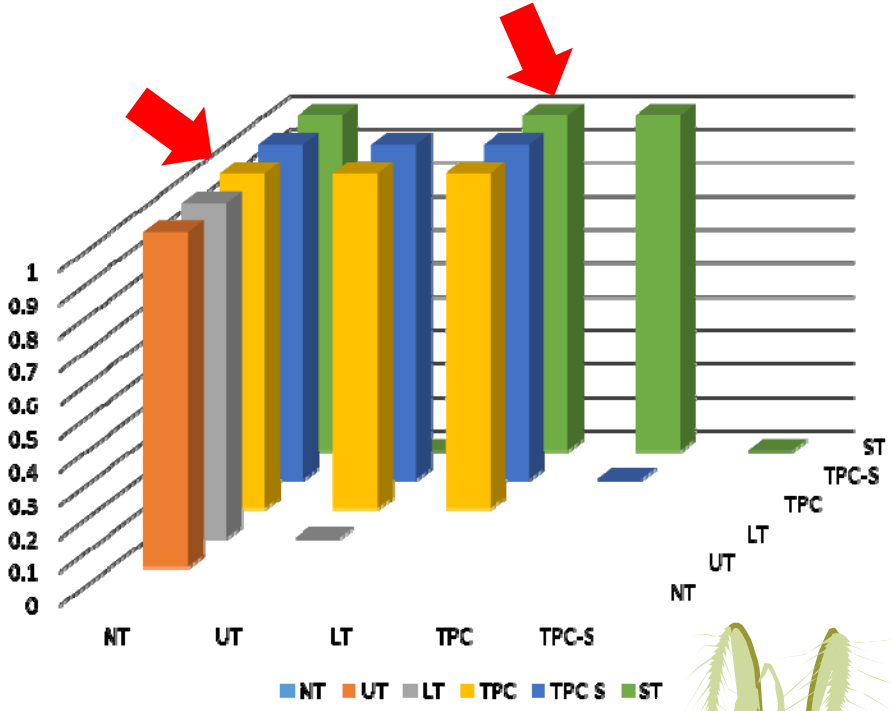
Pairwise test for salinity differences (1 = p < 0.05)

- dry season -



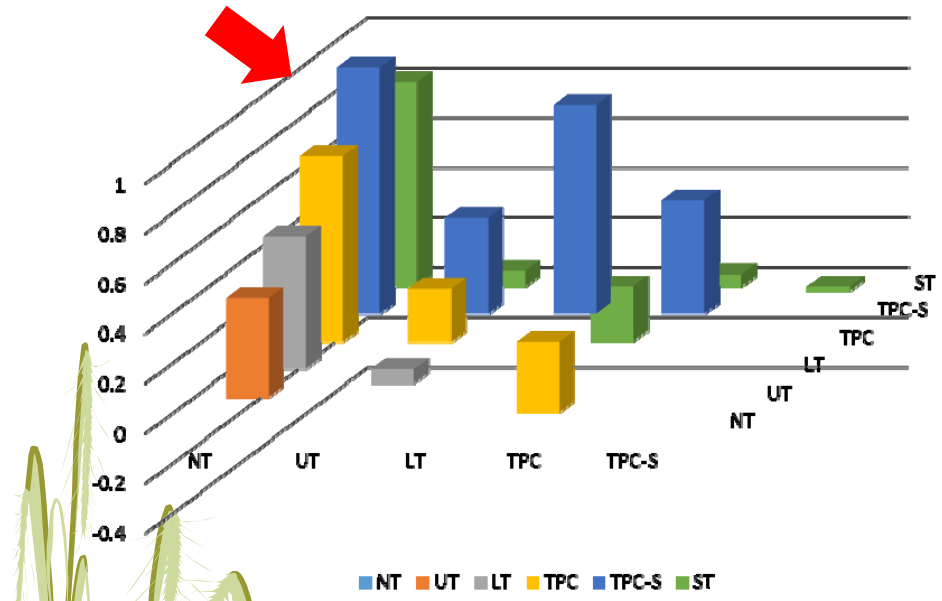
Pairwise test for salinity differences (1 = p < 0.05)

- wet season -

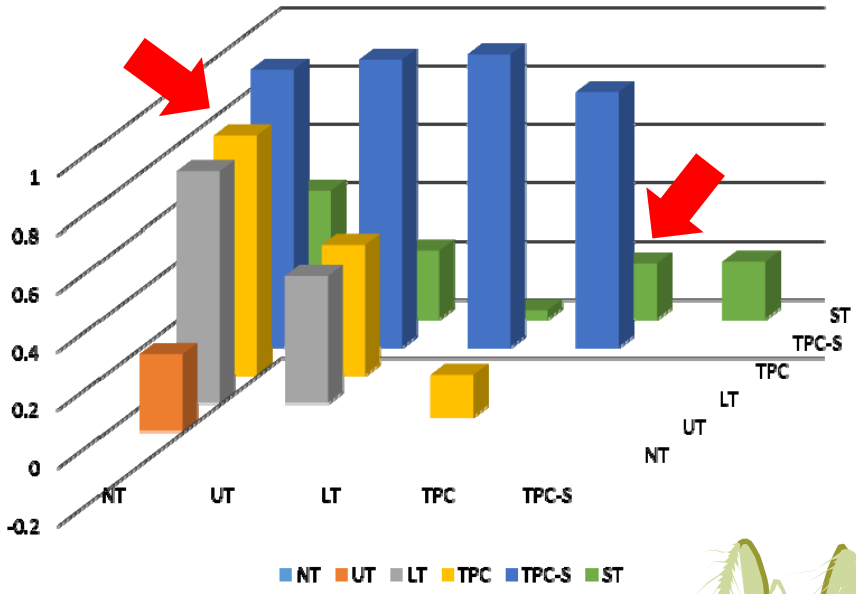


Epifaunal community differs for TPC and TPC-S with NT in dry season and most other site groups in wet season

ANOSIM test for community differences (1 = p < 0.05)
- dry season -



ANOSIM test for community differences (1 = p < 0.05)
- wet season -



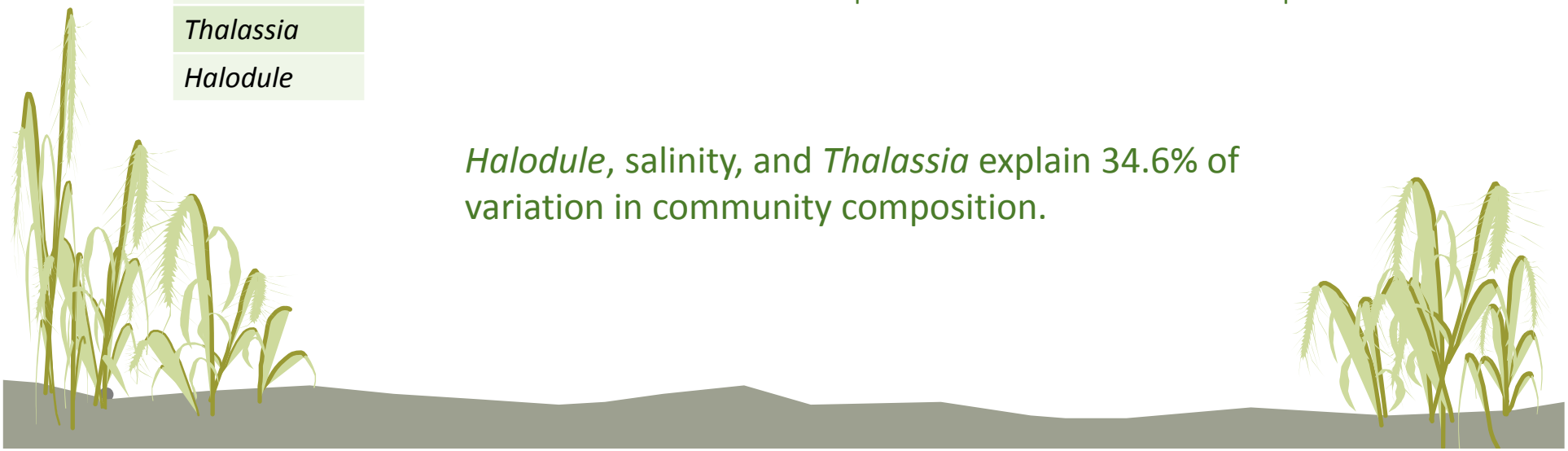
Habitat variables BEST explaining community composition – dry season

Starting variables
Salinity
Temperature
Dissolved O2
Depth
Thalassia
Halodule

BEST variables	Pseudo-F	P-value	Proportion explained	Cumulative proportion
Halodule	19.119	0.001	0.21454	0.21454
Salinity	7.7829	0.001	0.07962	0.29415
Thalassia	5.3848	0.001	.051793	0.34595

* Stepwise DISTLM results include the important variables.

Halodule, salinity, and *Thalassia* explain 34.6% of variation in community composition.



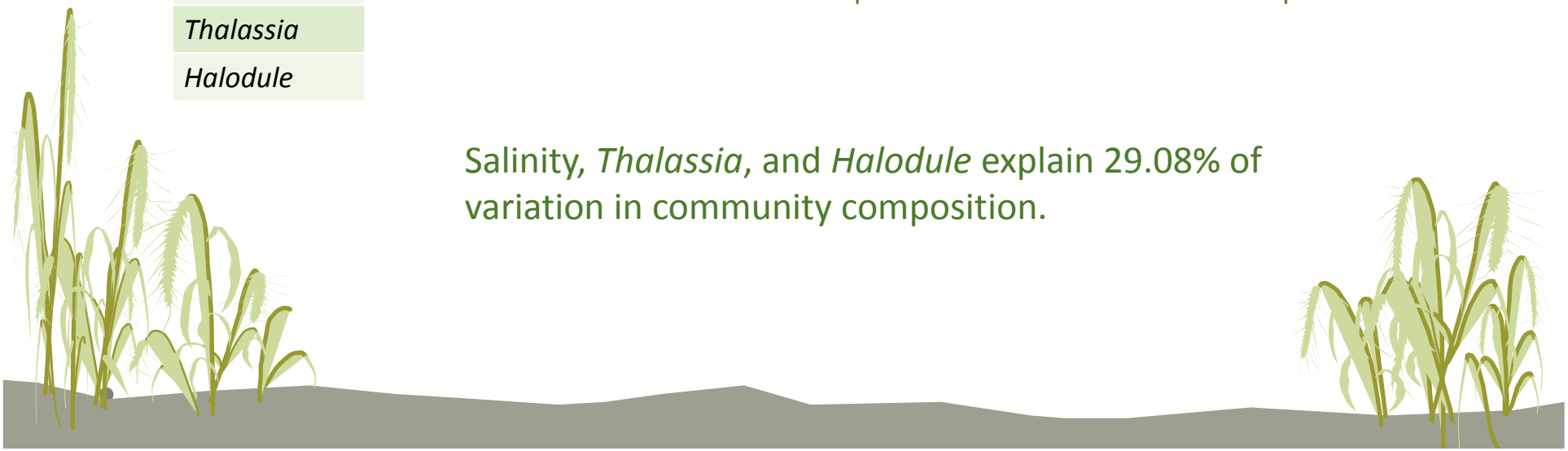
Habitat variables BEST explaining community composition – wet season

Starting variables
Salinity
Temperature
Dissolved O2
Depth
Thalassia
Halodule

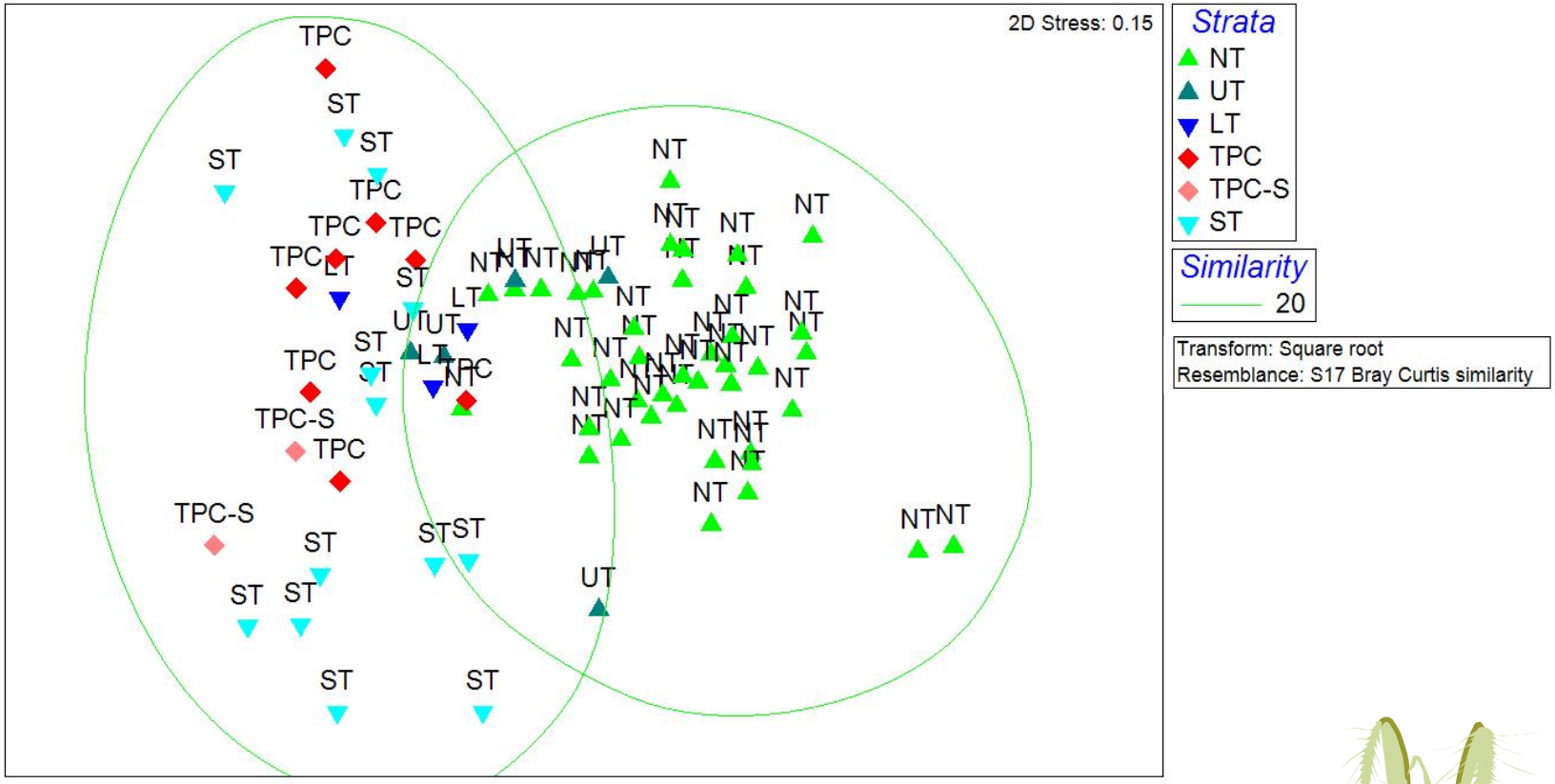
BEST variables	Pseudo-F	P-value	Proportion explained	Cumulative proportion
Salinity	10.419	0.001	.12956	.12958
Thalassia	10.723	0.001	.11708	.24664
Halodule	4.2336	0.001	.04416	.29079

* Stepwise DISTLM results include the important variables.

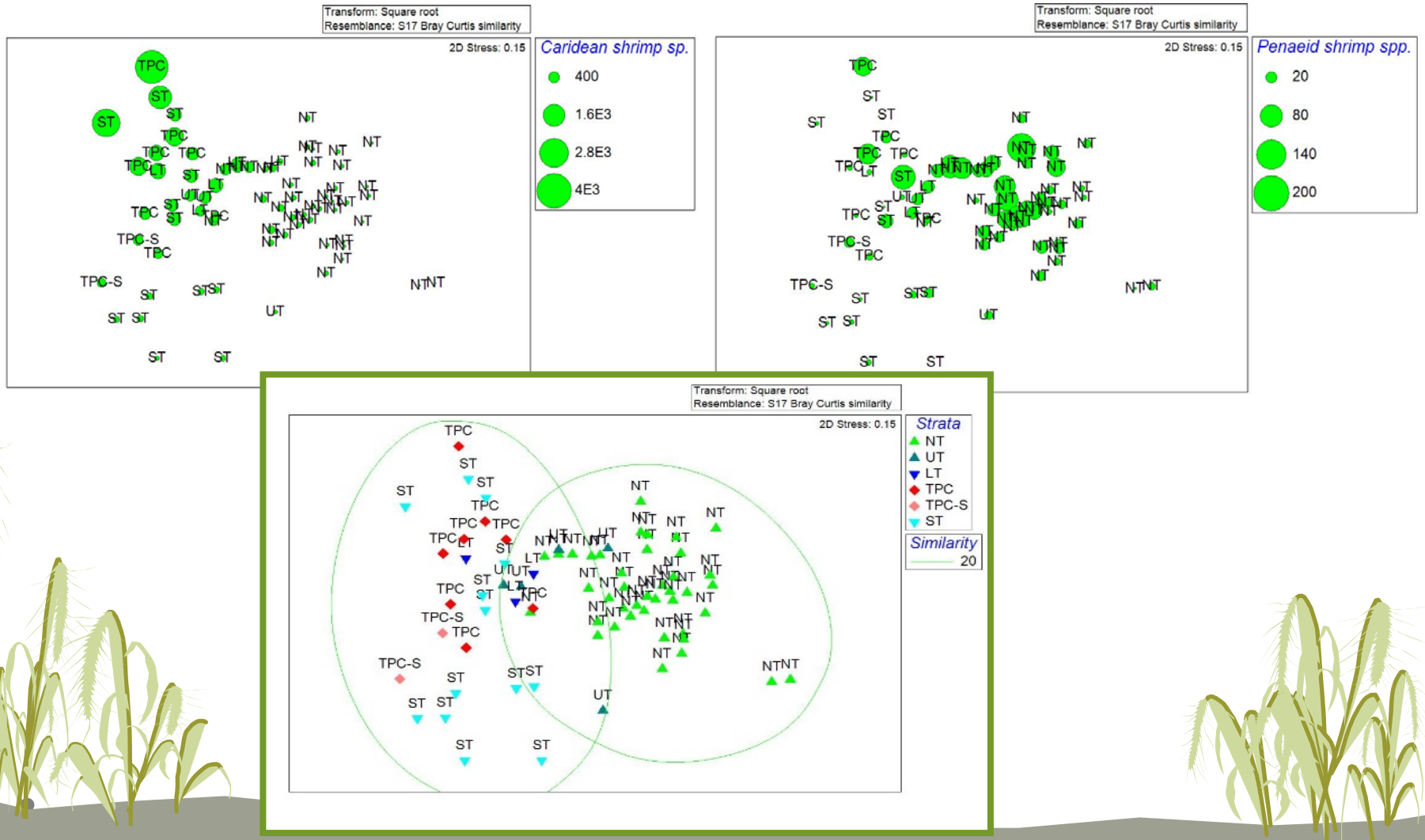
Salinity, *Thalassia*, and *Halodule* explain 29.08% of variation in community composition.



Community Analysis using Multidimensional Scaling (MDS) – dry season



Clues to pattern-setting species – dry season



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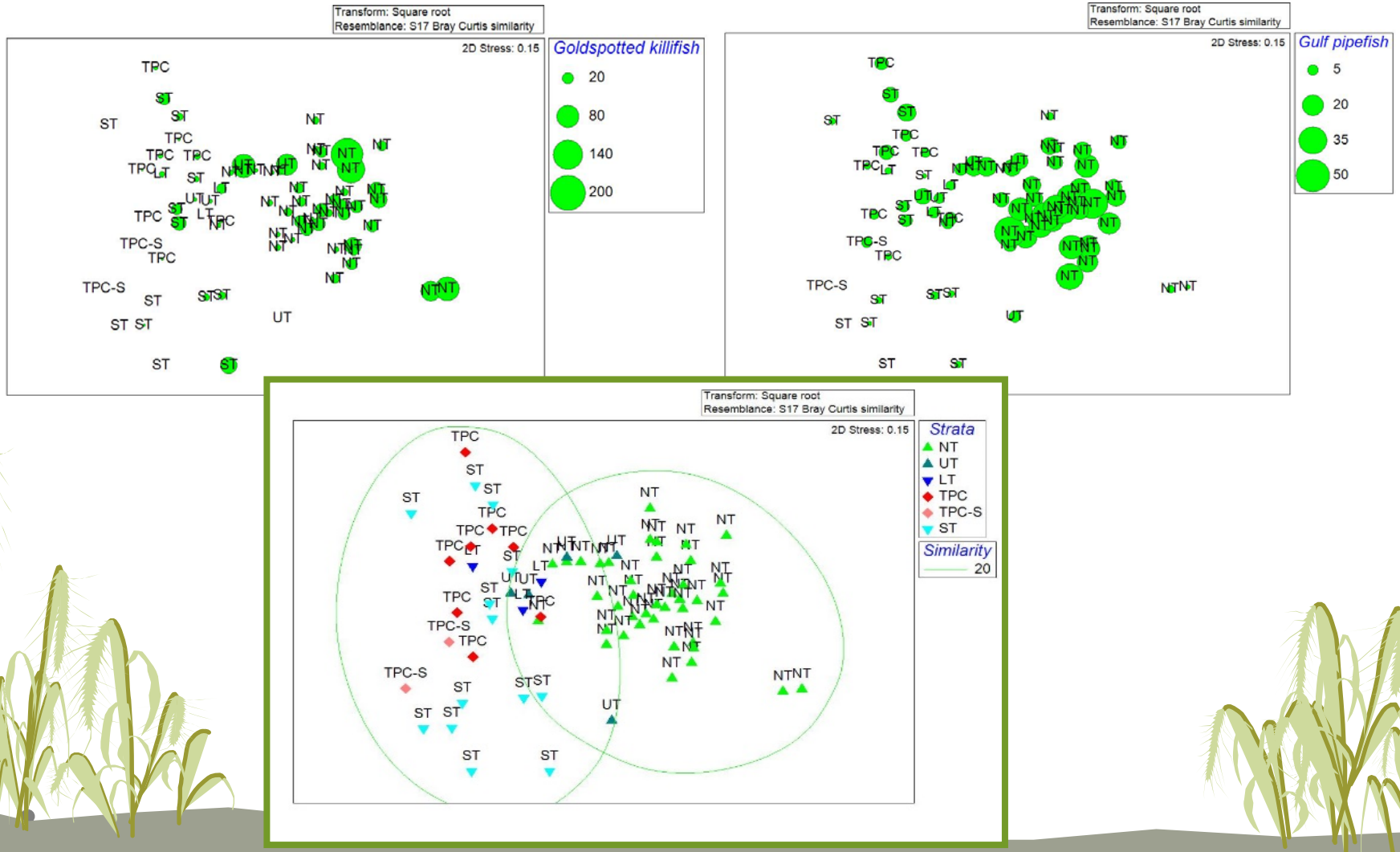
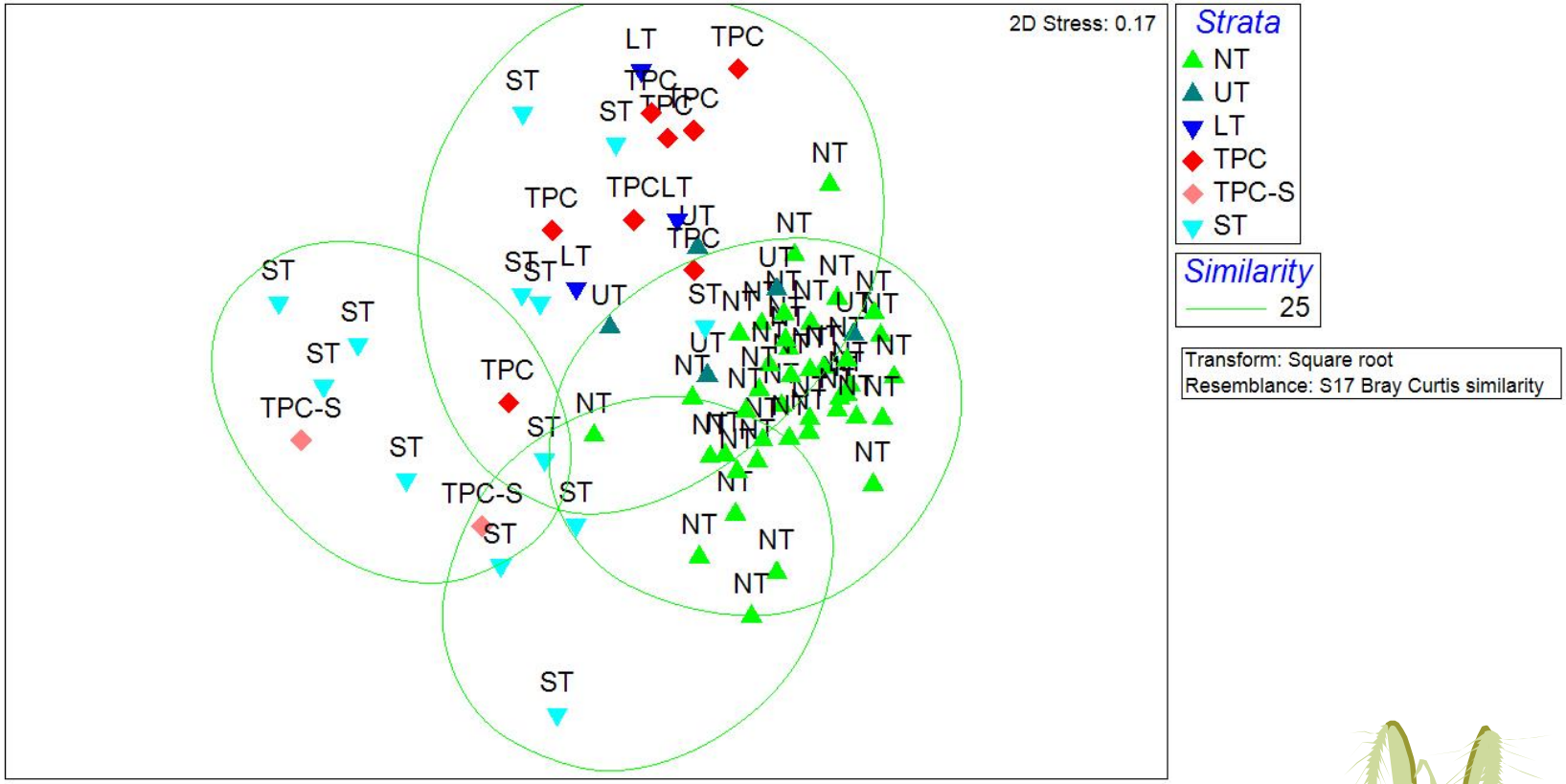


Community Analysis using Multidimensional Scaling (MDS) – wet season



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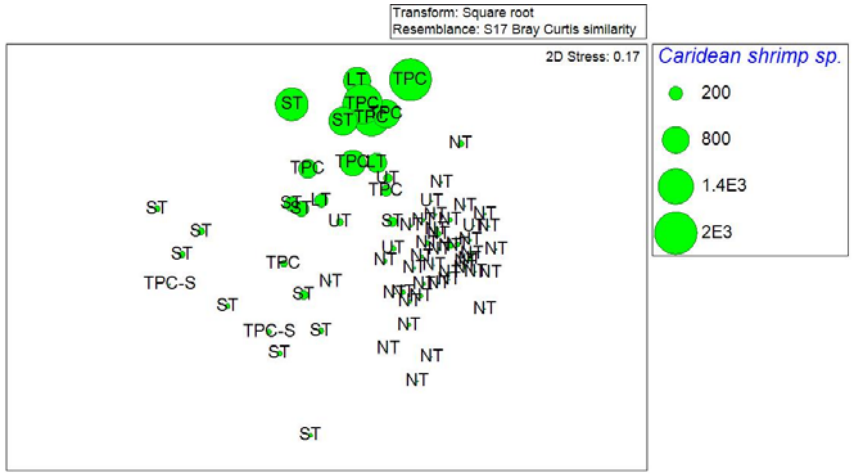

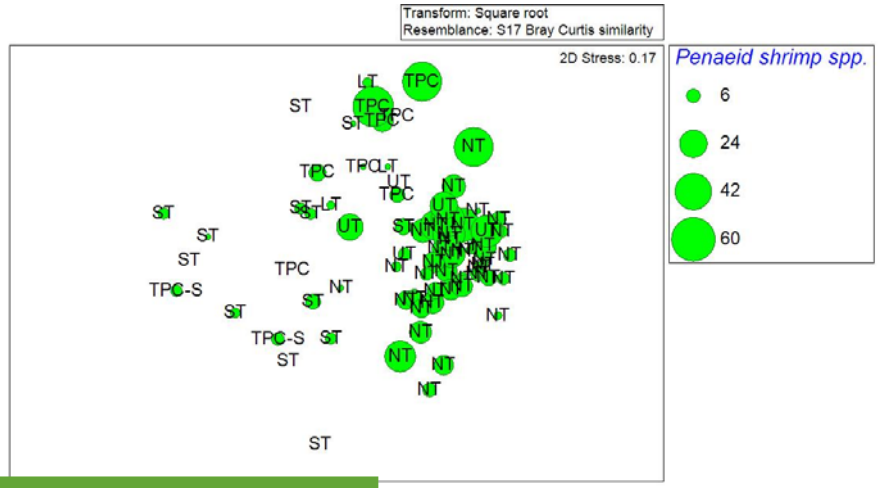

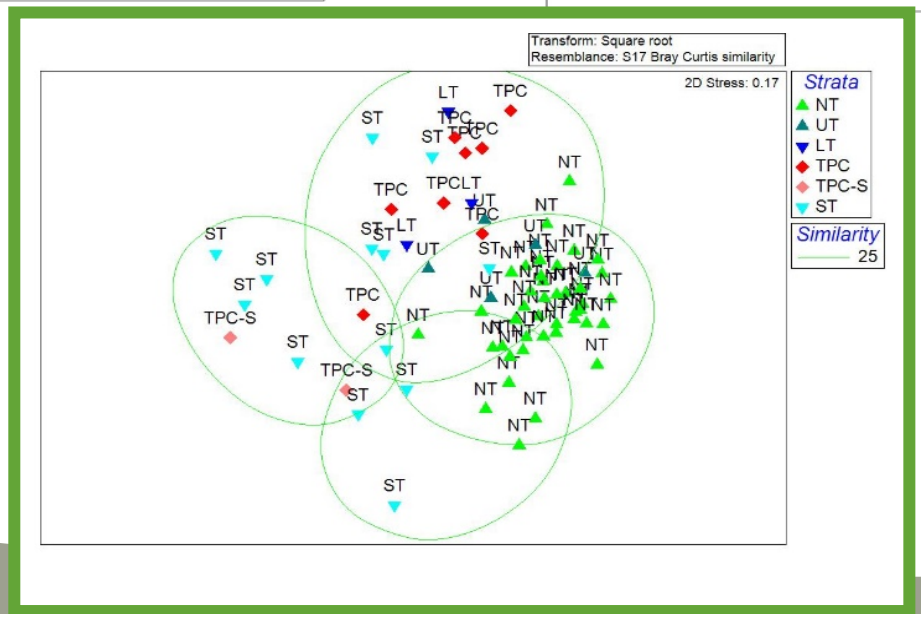

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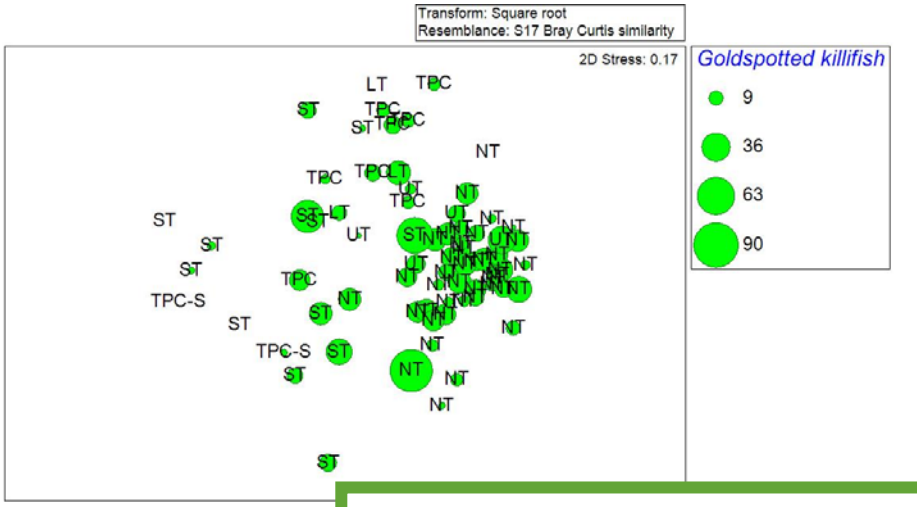

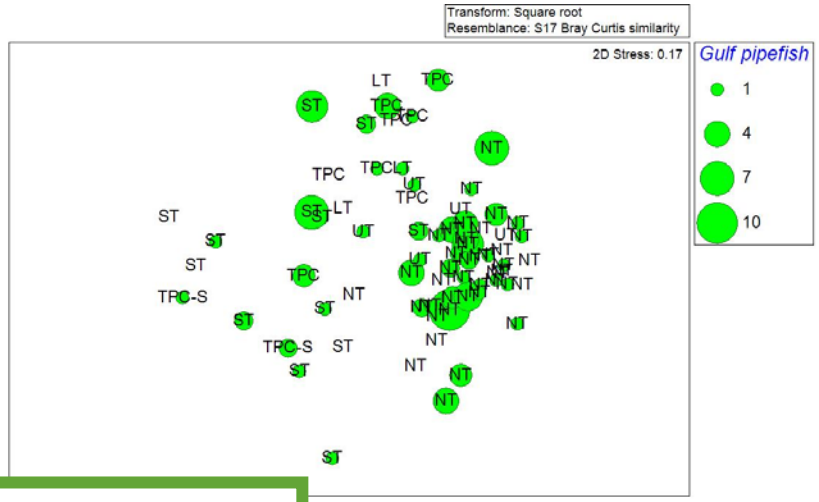

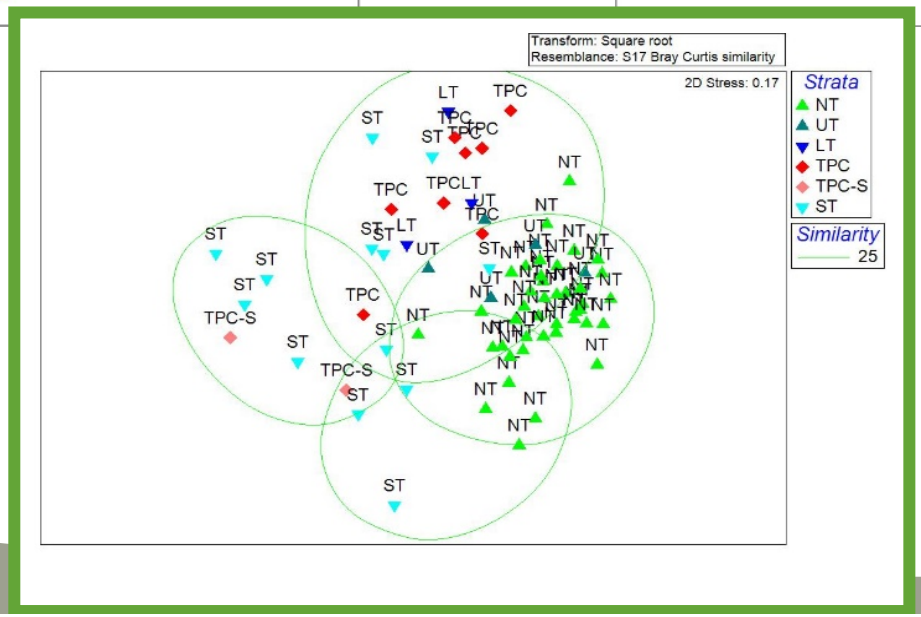

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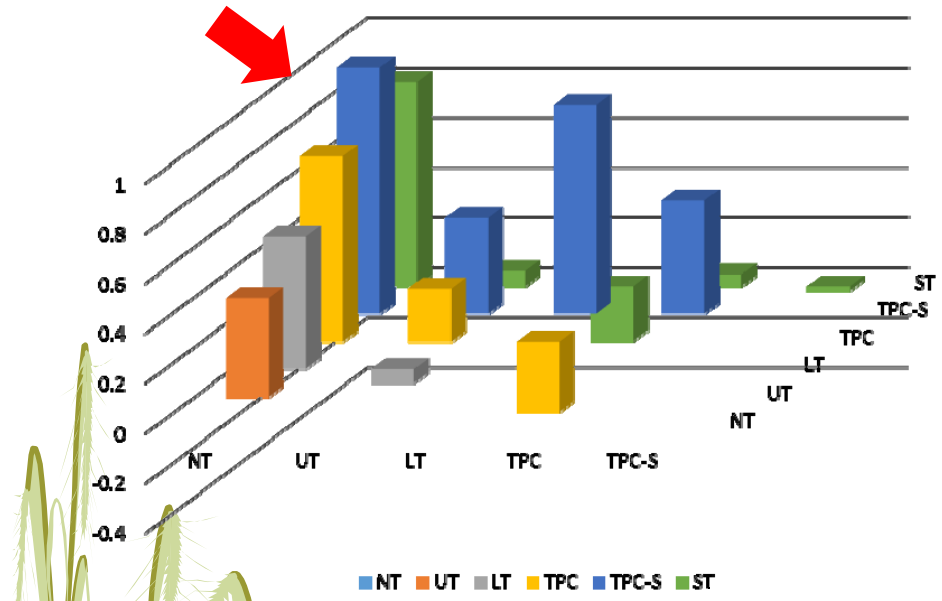

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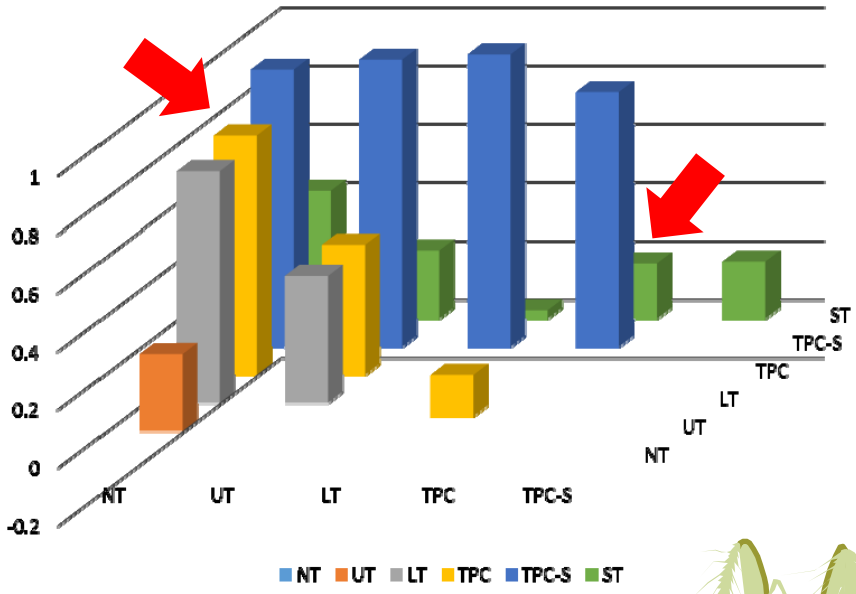

Conclusion

- Salinity in the cooling canal areas (TPC and TPC-S) differ significantly from other defined areas, both north and south.

- The dry season epifaunal community in the area north of Turkey Point differs significantly from that south of Turkey Point, including the cooling canal areas (TPC and TPC-S), which do not significantly differ from the area to the south (ST).

- The wet season epifaunal community in the cooling plant areas (TPC and TPC-S) differ significantly from site groups to both the north and the south (NT and ST).

- Wet season epifaunal data suggest an ecosystem effect of the cooling canal system during the 2007-2012 period.