Effect of introduced chital on forest plant communities in the Andaman Islands

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Chital (*Axis axis*) introduced in early 1900s.

Today, occur widely across islands of archipelago. [1, 2]

No native ungulate herbivores in system

Novel herbivore-ecosystem interaction - potential to cause large impacts.[3]

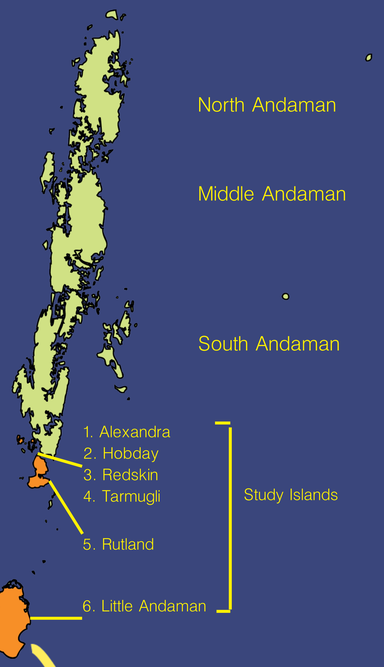
Lower seedling densities, vegetation cover reported from earlier studies. [1, 2]

No systematic studies of impacts of chital herbivory on vegetation structure in the islands.

What are the impacts of chital herbivory on plant communities in evergreen forests in the Andamans in terms of :

- Structure
- Composition
- Functional traits

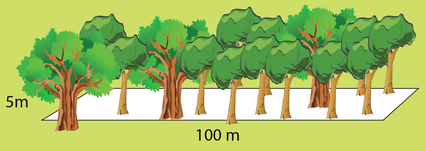
Are the impacts different in islands with different levels of herbivory?



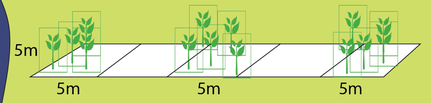
Evergreen forests in six study islands gridded and systematically sampled along transects :

Chital dung pellet groups counted.

All adult trees (girth>10cm) identified and measured for girth at breast height (gbh).

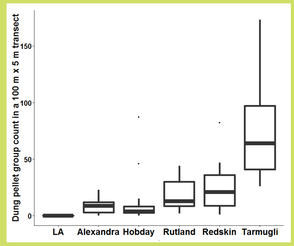


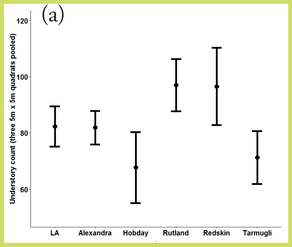
All understorey woody plants (girth<10cm, height>10cm) quantified in three 5 m x 5 m quadrats.

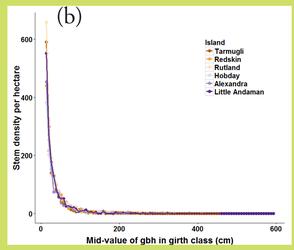


Leaves of 20 most common understory species in each island analysed for leaf thickness.

Chital presence and potential herbivory, as indexed by mean dung pellet counts, ranged from Absent (Little Andaman) to High (Tarmugli).

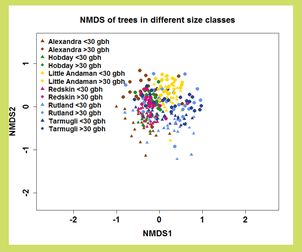




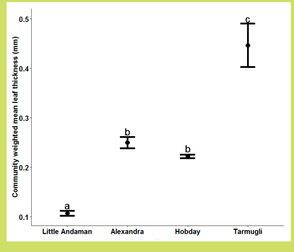


No significant differences in (a) understory plant densities or (b) size structure of adult tree communities across islands.

Adult tree community composition of island with no herbivory (Little Andaman, yellow) distinct from other islands.



Community-weighted values of leaf thickness increased with increasing levels of chital presence.

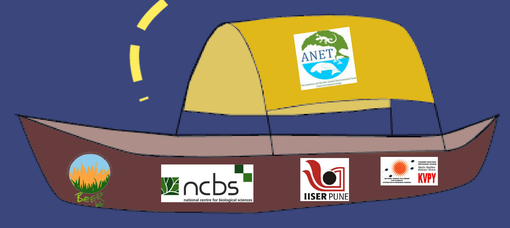


Conclusions

1. No evidence for impacts of chital presence on understorey tree community densities.
2. No signature of past levels of herbivory detected in size structures of adult tree communities.
3. Island with no chital has distinct tree species composition BUT no differences in species composition across islands with chital presence.
4. Community-weighted leaf thickness, a key herbivore-resistance trait[4], increases with higher chital presence. Communities may be responding to herbivory at the level of such traits.

Caveats

1. Only one island with high chital presence studied.
2. Study limited to evergreen forests.
3. No information on habitat use and responses of other forest types.



References : 1. Ali, R. (2004). The effect of introduced herbivores on vegetation in the Andaman Islands. Curr. Sci. 86. 2. Ali, R., and Pelkey, N. (2013). Satellite images indicate vegetation degradation due to invasive herbivores in the andaman islands. Curr. Sci. 105, 209–214. 3. Martin, J.-L., Stockton, S.A., Allombert, S., and Gaston, A.J. (2010). Top-down and bottom-up consequences of unchecked ungulate browsing on plant and animal diversity in temperate forests : lessons from a deer introduction. Biol. Invasions 12. 4. Salgado-Luarte, C., and Gianoli, E. (2012). Herbivores modify selection on plant functional traits in a temperate rainforest understory. Am. Nat. 180, E42–E53.