Can biological traits predict the invasion risks of alien plant species in central dry zone of Myanmar?

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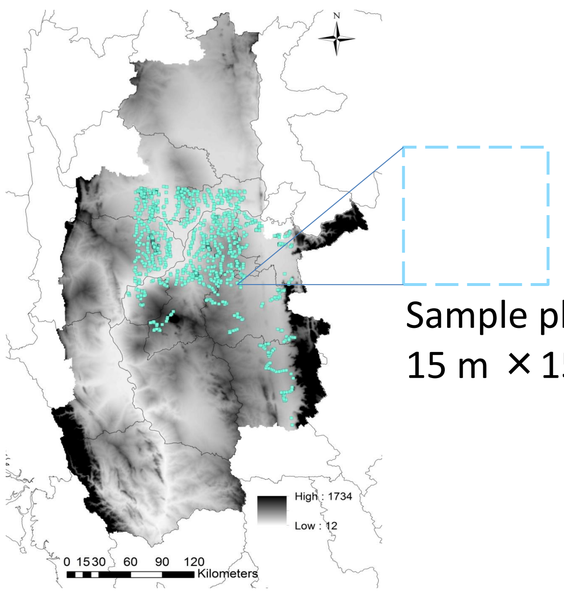
Introduction

◆Central dry zone of Myanmar has been largely degraded by human impacts.
◆Restoration works have been carried out since 1950s through natural forest protection and reforestation activities.
◆Reforestation program occasionally uses alien species.

Objective

◆This study aims to predict potential invasion risk of alien species to remnant forest communities by plant biological traits.

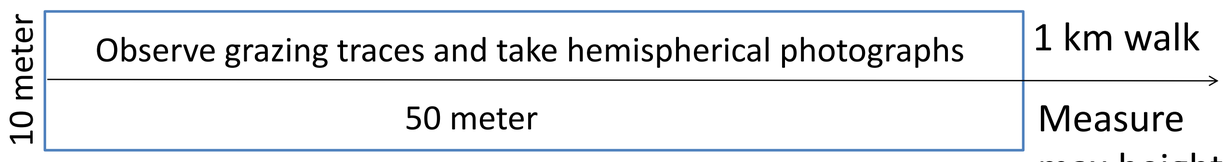
Methods



Sample plot
15 m ×15 m

Classify vegetation community types
◆1399 sample plots
◆Record Presence/Absence of species
◆Classify vegetation community types by TWINSPAN

Measure plant biological triats
◆Animal palatibility
◆Shade tolerance
◆Maximum height



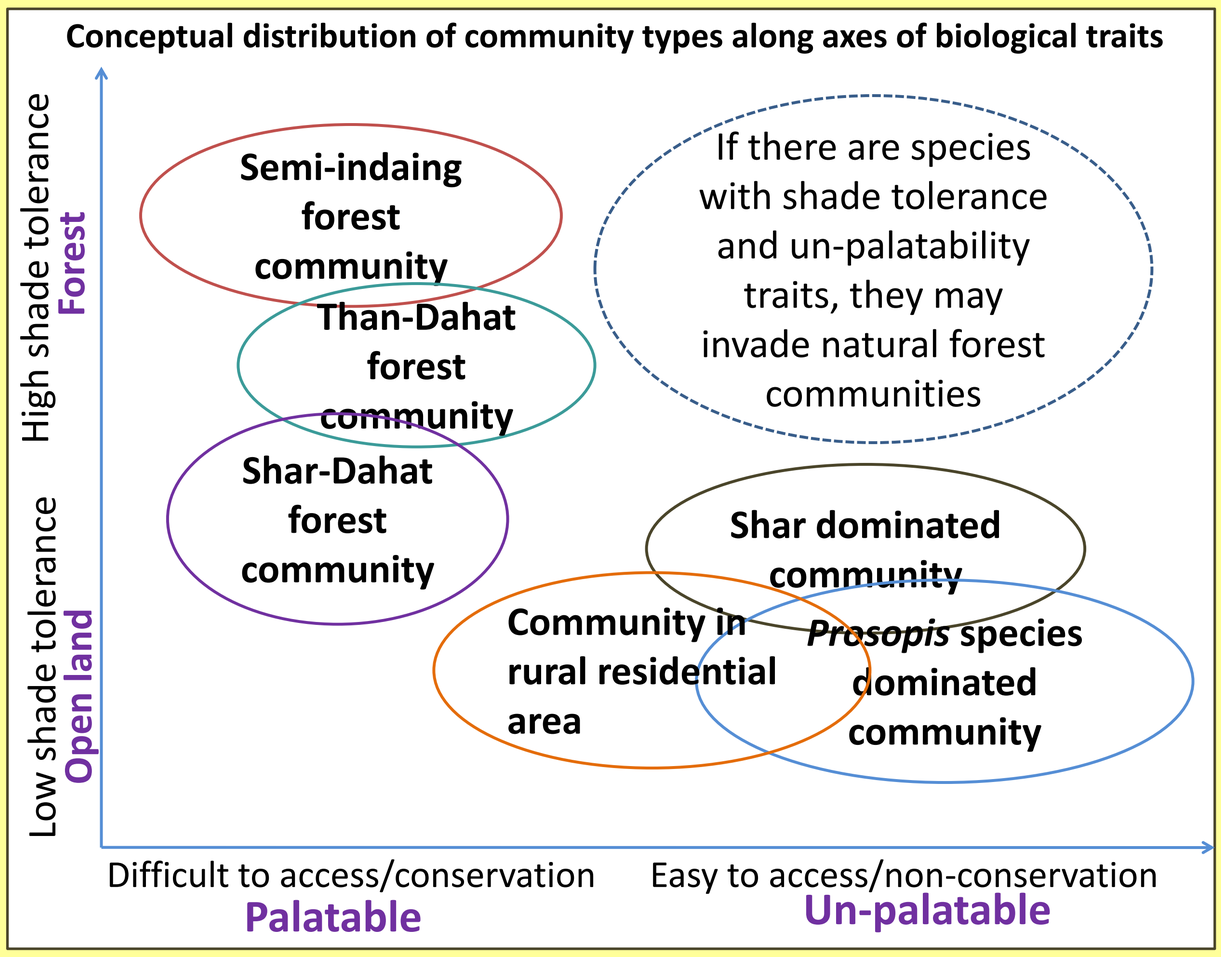
Transect line for measuring biological traits

Seedlings of 2 cm -1 m Taking hemispherical photo of the above crown

Prediction of species composition for each community type

Com. type	Community Description	Significance of model parameters for biological traits		
		Maximum height	Shade tolerance	Animal palatability
1	Semi-indaing forest with Shorea	ns	+ **	+***
2	Than-Dahat forest	+***	+*	+**
3	Shar-Dahat forest	+**	ns	+***
4	Shar dominated community	+***	- ***	- ***
5	*Prosopis species* dominated community	+***	- ***	- ***
6	Vegetation community in rural residential area	+***	Ns	- .

Conceptual distribution of community types along axes of biological traits



Results

Classification of vegetation community types from 360 plant species

Type 1: Semi-Indaing forest community

Type 2: Than-Dahat forest community

Type 3: Shar-Dahat forest community

Type 4: Shar dominated community in agricultural area

Type 5: *Prosopis* species dominated community

Type 6: Plant community in rural residential area

Conclusion

- Although maximum height and shade tolerance were the keys in conserved old-growth forests as in various forests of the world, animal un-palatability was the important key trait in human-dominated landscape of tropical dry forest zone in Myanmar.
- Animals do not prefer to eat *Prosopis* species (leaf and stem), and invasion risk is quite high in agricultural areas, whereas *Prosopis* species may have lower potential to invade forest communities due to its less shade tolerance.
- *Leucaena leucocephala* was preferred by animals, and thus it will not spread in woodlands of agricultural areas in tropical dry forest zone.
- We need to select unpalatable trees for reforestation, however, such species has high risk of biological invasion.
- By plant trait analysis, we could predict the invasion risks of newly added alien plants.