Inspecting the role of different mechanisms in community assembly

中国科学院植物研究所
INSTITUTE OF BOTANY, THE CHINESE ACADEMY OF SCIENCES

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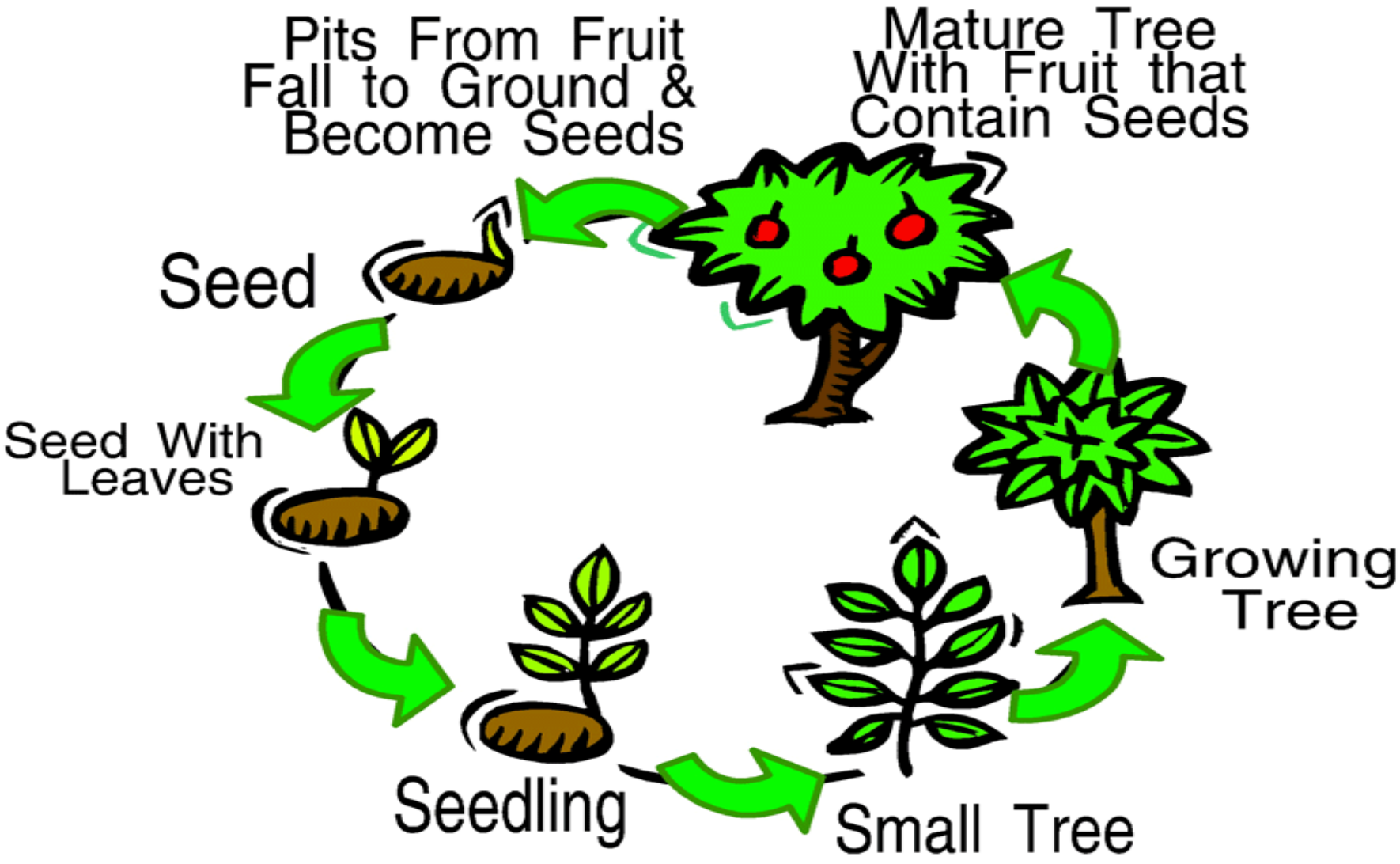
Backgrounds



Questions

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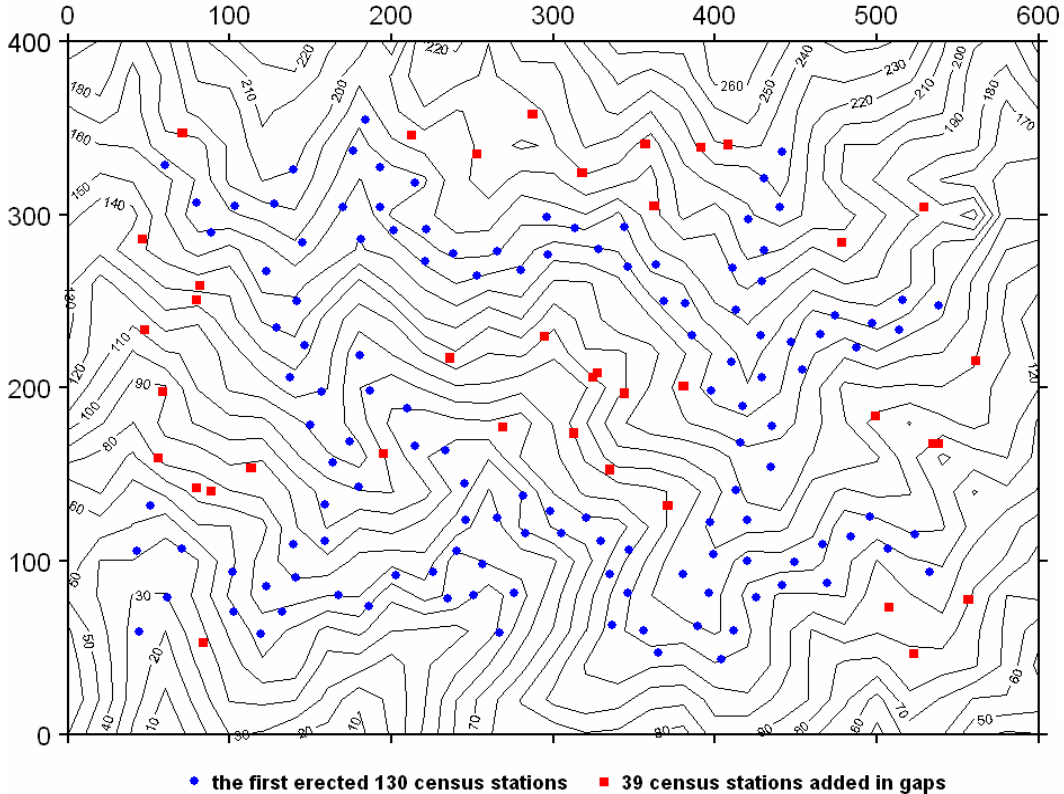
- How does the composition of established seedlings varied across the whole plot ?
- How and when different mechanisms, biotic interaction, dispersal limitation , recruitment limitation, niche differentiation and ecological drift ,play in the whole tree life cycle?

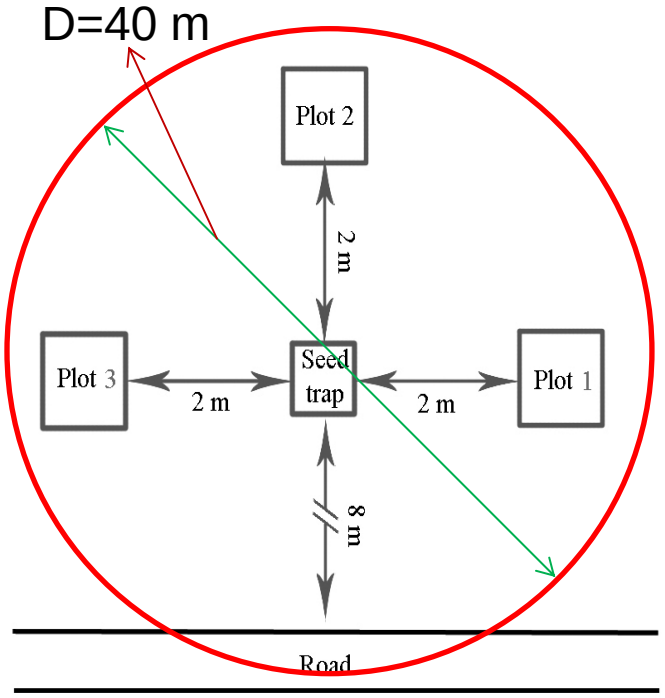
Location

- GuTian shan 24 ha forest dynamic plot

Methods

- **We inventoried woody seedlings <1 cm DBH in 169 (130) census stations within the GTS 24-ha Forest Dynamics Plot, where all trees and shrubs ⩾ 1 cm DBH have been identified.**





Methods

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- **We compare diversity and composition of seedlings to that of larger size classes(saplings and adults) and use the new spatial analysis method of principal coordinates of neighbor matrices (PCNM) to disentangle the contributions of different processes.**

Preliminary Results

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1.Seedling composition

Life form	No of species	No of individuals
Tree	31	4780
Understory	33	800
shrubs	15	264
Total	79	5844
Seedling recruitment from 2006.5-2007.11(all 169 census station)		

Life form	No of species	No of individuals
Tree	27	3585(1195)
Understory	30	643(157)
shrubs	13	215(49)
Total	70	4443
Seedling recruitment from 2006.5-2007.11(130 census station)		

Preliminary Results

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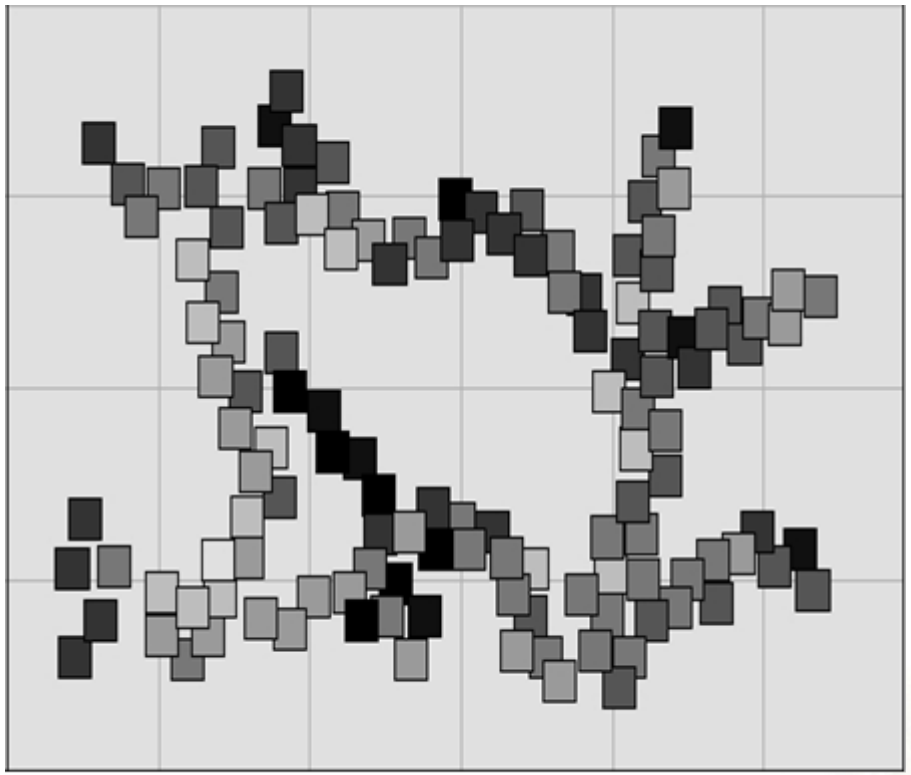
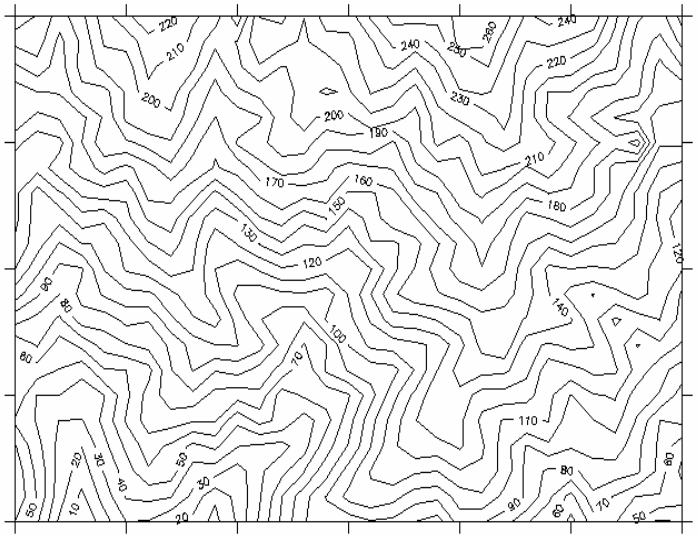
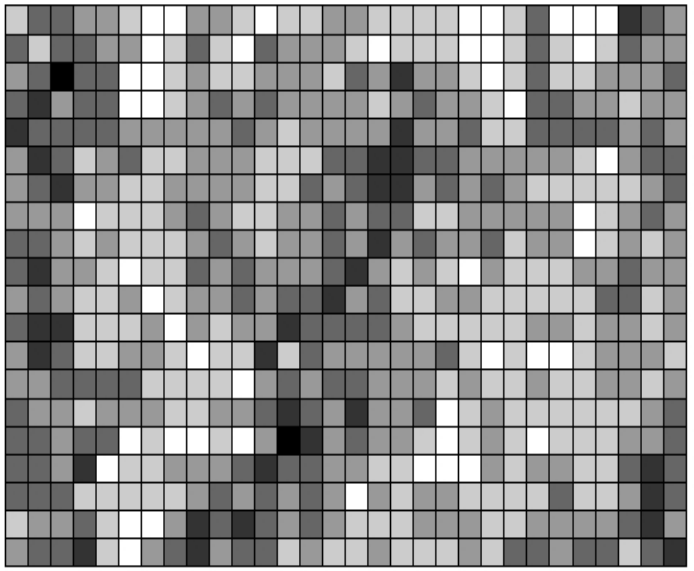
2. spatial variation of seedling







Preliminary Results

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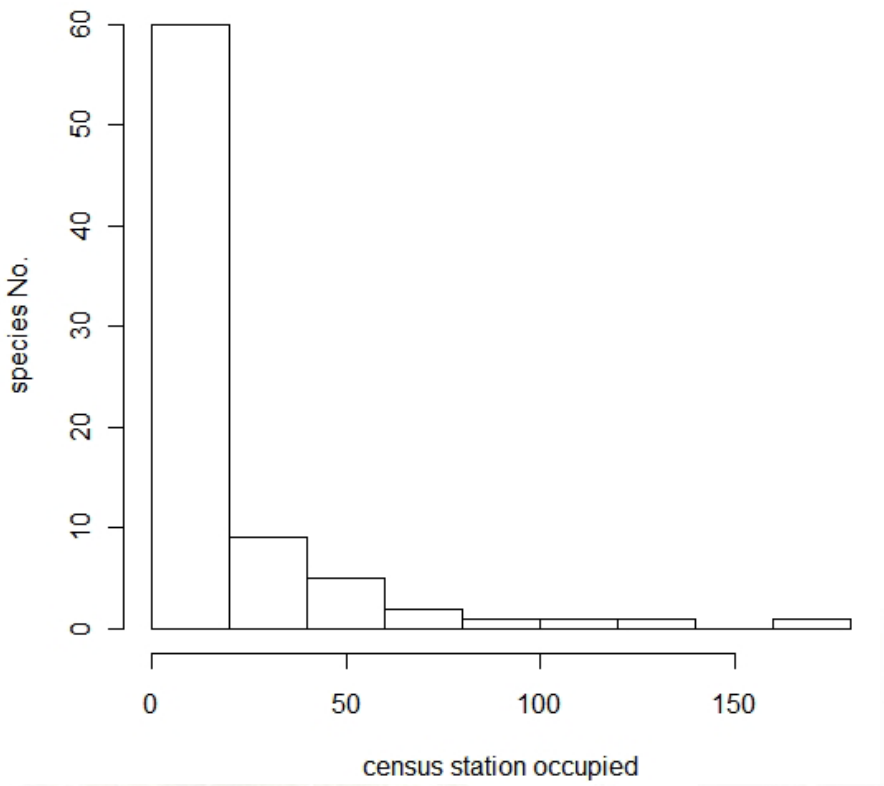
2. spatial variation of seedling

Trap occupied	Species name
43	毛花连蕊茶
43	石斑木
50	红楠
57	柳叶蜡梅
60	赤楠
72	苦枥木
76	浙江新木姜子
81	虎皮楠
110	野漆树
134	甜槠
166	木荷

Total species :159

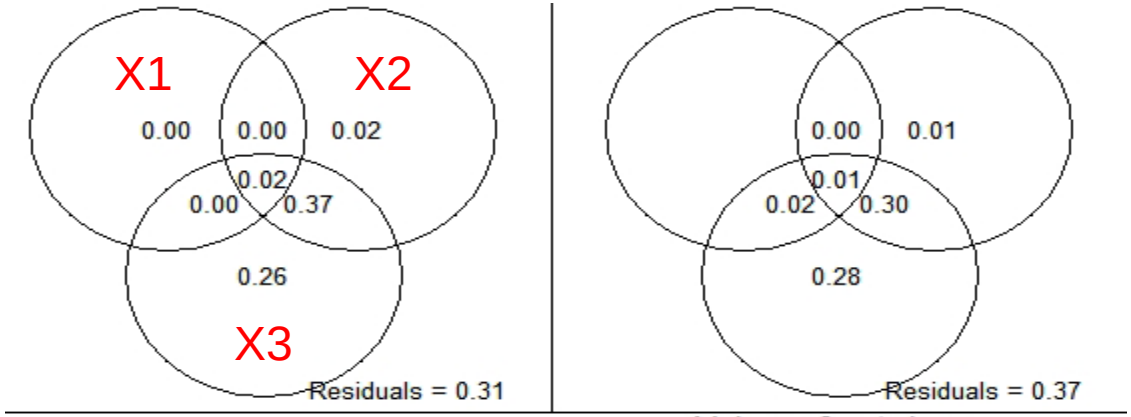
Species with Seedling :80



breaks:	20	40	60	80	100	120	140	160	169
counts:	60	9	5	2	1	1	1	0	1

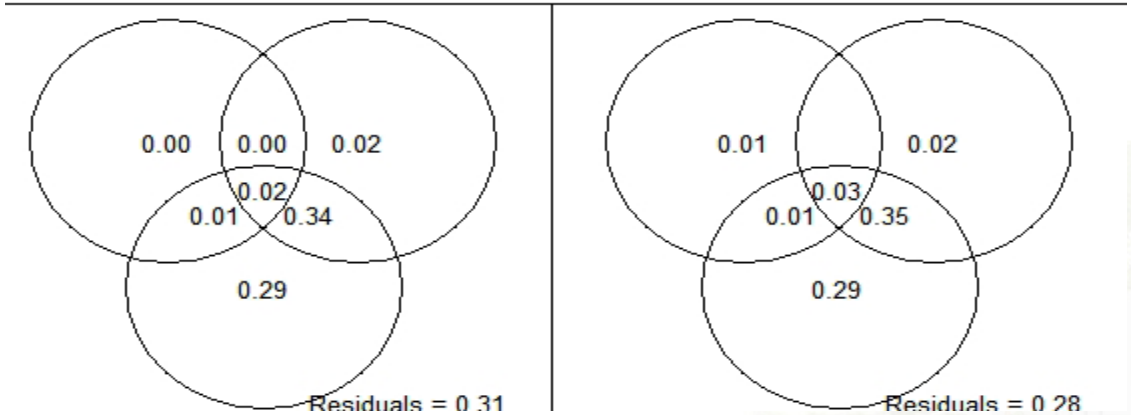
Preliminary Results

3.PCNM: X1=topography , X2 =soil nutrients and X3=PCNMs



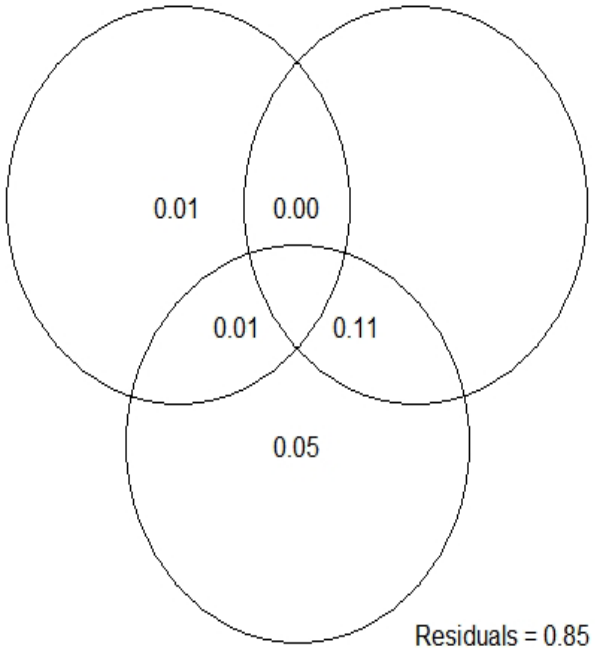
Dbh>=10cm

Dbh<10cm & Dbh>=5cm



Dbh<5cm & Dbh>=2cm

1cm<=Dbh<2cm



seedling

Conclusions

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1. Gap disturbance was critical for tree species regeneration.
2. Dispersal and recruitment limitation is a proper reason for species coexistence.
3. The relation between topography and soil variables was nonlinear(quadratic or higher order).
4. The tree composition can be explained by spatial structured edaphic variables
5. Compared to seedling distribution , habitat might have smaller impact on larger size classes and biotic interaction may be a counterpart as habitat in structuring tree composition .
6. Form the PCNM result of seedling composition, the emergence of seedling was less structured and exhibited a random pattern.
7. Biotic interaction, niche differentiation, neutral process(ecological drift) may be responsible for the observed structure.

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Thanks!