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Spatial patterns generated by simultaneous cooperation and exploitation favour the evolution of altruism

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Highlights

- In kin selection theory in the evolution of social behaviors, the relatedness between players is influenced by the spatial structure of the population.
- Generally, it has been pointed out that 'viscosity' of population is unlikely to promote altruism evolution. We consider that more complex interactions produce specific spatial patterns, which could alter a process of kin selection on the space.
- Thus, we theoretically studied the joint evolution of altruism and resource exploitation in a spatially structured population.
- The analysis indicates that the joint evolution can form regularly-arranged cluster structures, which creates a new 'level of selection', and significantly promotes the altruism evolution.
- Our analysis also suggests an important relationship between niche theory and multilevel selection, two important concepts in ecology and evolutionary biology.

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