The formation of structured cooperative communities

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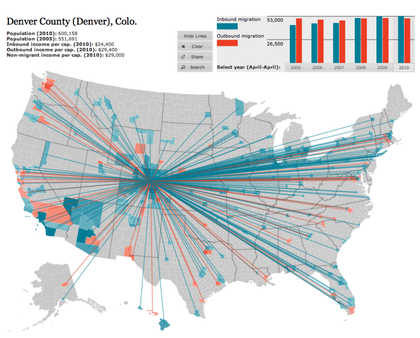
Public goods cooperation

A society relying upon public goods must avoid a tragedy of the commons; it will otherwise wither owing to the collapse of cooperative enterprises. This long recognized phenomenon has repeatedly caught the attention of thinkers across a variety of fields. Game theory has, through stylized quantitative models, served to unfold core processes governing the nature of cooperation on public goods. While caught between oversimplification and intractability, research is pushing to understand cooperation in complex systems.
Large organizational units, such as whole communities, are typically subdivided into a multitude of different localized groups between which individuals may transfer. Although the group structure of such heterogeneous units is known to be important to the success of cooperation, knowledge on how group structures dynamically unfold and develop jointly with cooperative efforts is limited.



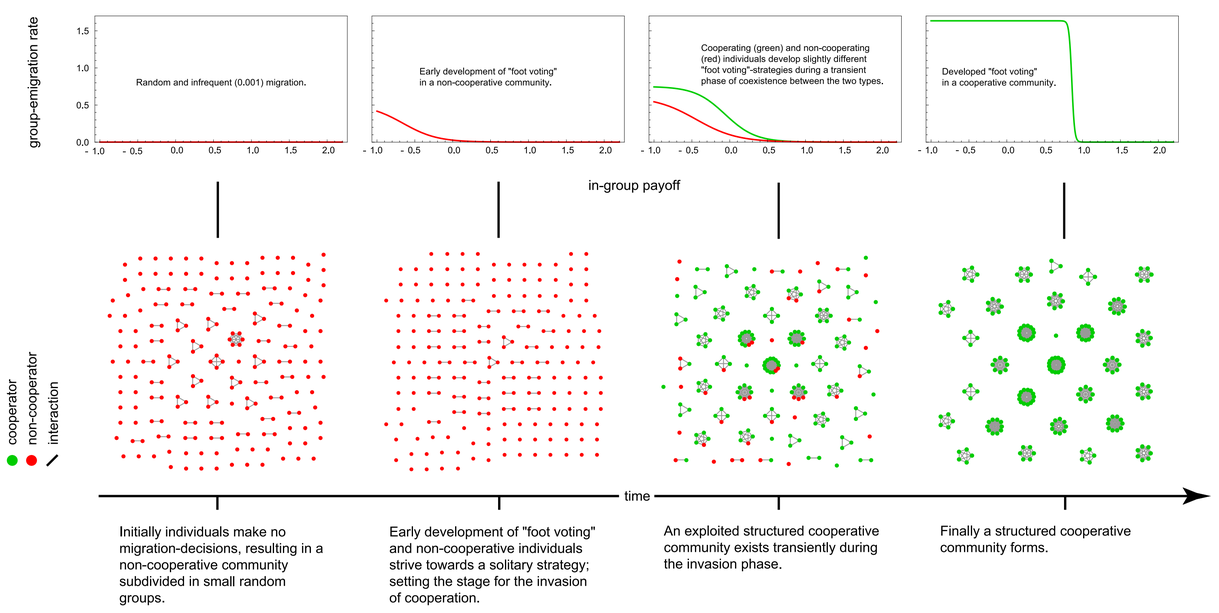
Forbes

Inter-group migration behavior

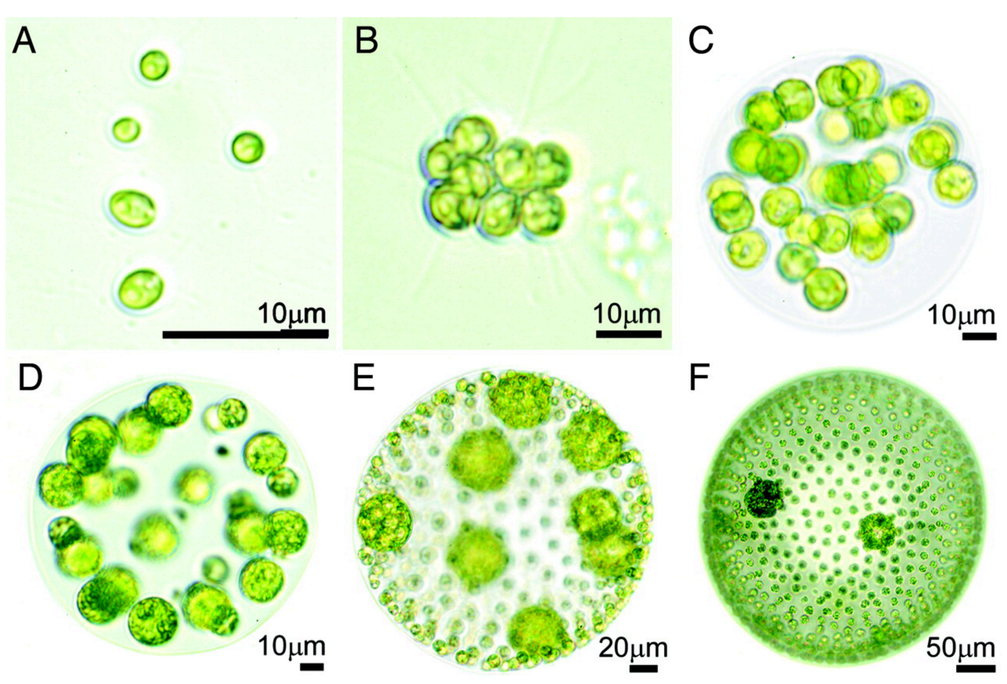
Public economist Charles Tiebout suggested in 1956 that foot voting as an inter-group migration behavior could constitute a powerful bottom-up solution to the free-rider problem in local governance, as he believed that large communities would self-organize into an optimal type of group-structure.

Structured cooperative communities

We apply evolutionary game theory to social group-formation, and find that foot voting spontaneously emerges in large self-organized, public-goods communities. In turn, the emergence of foot voting makes way for cooperation to develop in non-cooperative communities which transform into highly cooperative group-structured societies. As such, the Tiebout hypothesis gets support in evolutionary game theory, and at the same time is revealed as an example of a wider concept, as it builds on a sorting principle that appears inevitable and that may represent a general mechanism for triggering invasion of altruism, potentially at many, and much more basic, levels of social and biological organization.



Formation of a structured cooperative community. Sjödin et al. (unpublished)



Volvocine species (A-F) varying in cell number. Michod (2007)

References

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