On some genetic consequences of social structure, mating systems, dispersal, and sampling

Many animal species, including humans, live and breed in groups with complex social organizations. The impact of this social structure on the genetic diversity of animals has been a source of disagreement between scientists. This new study shows that social structure can in itself maintain the genetic diversity within species. It provides a new mathematical model that can be used by population geneticists and ecologists to better predict how social groups influence the way species maintain genetic diversity and evolve, and ultimately help in the conservation of species.

Like families, where individuals of different gender, age and dominance rank live together, several groups of insects, birds and mammals form well-defined social structure. Being part of a group can be extremely beneficial to animals as a way to obtain food, defend themselves from predators or cope with environmental changes. But it can also bring disadvantages such as an increased risk of catching diseases or parasites. Geneticists usually consider that due to the small size of social groups, these are at high risk of losing diversity and becoming inbred. However, these predictions are not always consistent with the field observations carried out by ecologists, who often document highly diversified groups. So what is the role of these "families" in terms of genetic diversity?

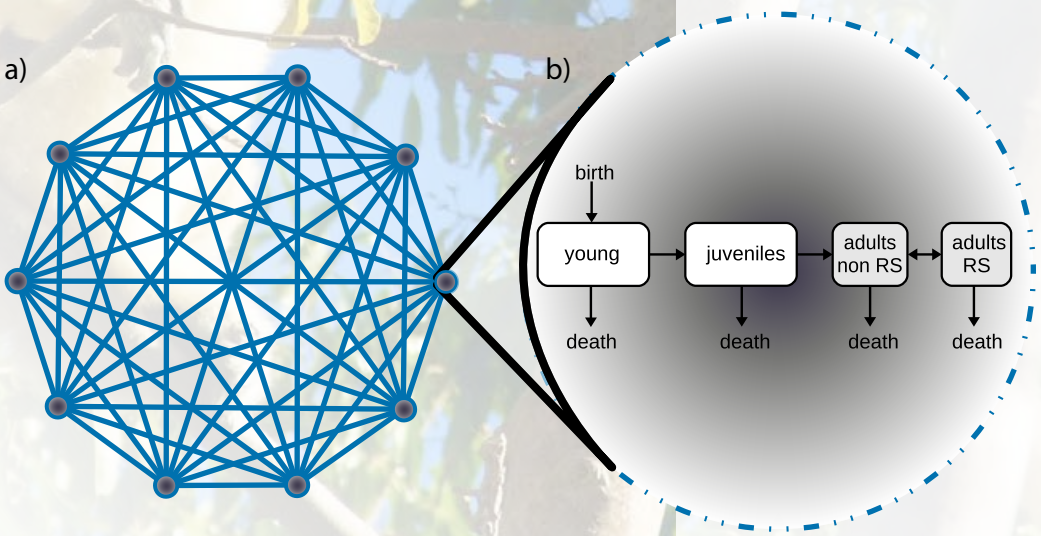

Fig.: *Social structure model with connections between groups (a), and life cycle within each group (b).*

The study conducted by Bárbara Parreira and Lounès Chikhi now reconciles these two fields. They developed a model including informations about social structure. By using genetic and ecological data, they simulated populations, with different mating strategies. Their results show that social structure is highly efficient in maintaining diversity within individuals (*i.e.* heterozygosity) in social groups. The researchers believe this model better reflects the complexities of social species – in comparison to other models that do not consider the social organization of populations – and thus allows field biologist to test specific predictions about the effects of sociality.

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