

## Dominance hierarchies and associated signalling in a cooperative passerine

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### Abstract

In animal societies, individuals face the dilemma of whether to cooperate or to compete over a shared resource. Two intertwined mechanisms may help to resolve this enduring evolutionary dilemma by preventing conflicts and thereby mediating the costs of living in groups: the establishment of dominance hierarchies and the use of ‘badge-of-status’ for signalling dominance. We investigated these two mechanisms in the sociable weaver (*Philetairus socius*), a colonial and social passerine which cooperates over multiple tasks. We examined the sociable weavers’ dominance structure in 2 years by recording 2563 agonistic interactions between 152 individuals observed at a feeder at eight colonies. We tested which individual traits, including sex, age, relatedness and two melanin-based plumage traits, predicted variation in social status. First, using social network analysis, we found that colonies were structured by strongly ordered hierarchies which were stable between years. Second, medium-ranked birds engaged more in aggressive interactions than highly ranking individuals, suggesting that competition over food is most pronounced among birds of intermediate social status. Third, we found that colony size and kinship influenced agonistic interactions, so aggression was less pronounced in smaller colonies and among relatives. Finally, within- and between-individual variation in social status and the presence of an individual at the feeder were associated with variation in bib size, as predicted by the badge-of-status hypothesis. These results suggest that dominance hierarchies and bib size mediate conflicts in sociable weaver societies.