Are Stripe-backed Wren Groups Super organisms?

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According to previous authors . . .

**Superorganisms** are assemblages of previously independent* units characterized by . . .

- increased "complexity"\(^1\)
- division of labor\(^1\) (epigenetic specialization\(^2\))
- especially reproductive and nonreproductive specialization\(^2\)
- new mechanisms\(^1\) for (more complex\(^2\)) communication
- central control\(^1\) (frequent cooperation / infrequent conflict\(^3,4,5\))
- rejection of foreign units\(^2\)
- new mechanism for transmission of genes\(^1\)
- shared genes (relatedness) or shared reproductive prospects\(^5\)
- irreversibility (with exceptions)\(^1\)

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\(^1\) Maynard Smith & Szathmáry. 1995. *The Major Transitions in Evolution*

\(^2\) Hölldobler and Wilson. 2009. *Superorganism*

\(^3\) Queller and Strassmann. 2009. *Beyond society: the evolution of organismality*

\(^4\) Reeve and Hölldobler. 2007. *The emergence of a superorganism through intergroup competition*

\(^5\) Bourke 2011. *Principles of Social Evolution*

*evolved from independent units*
Superorganisms are assemblages of previously independent* units characterized by . . .

- adherence and recognition
- internal diversification
- proliferation of cooperation
- reduction of conflict
- interdependence for reproduction or survival

which together can lead to . . .

- escalation
- irreversibility
- superordinate natural selection

*evolved from independent units
Stripe-backed Wrens *Campylorhynchus nuchalis*


savanna woodlands of northern Venezuela and Colombia forage for insects independently in foliage

groups average 5 individuals (2-14) roost in communal nests jointly defend year-round territories nest during prolonged wet season (May-November)

all members behave aggressively toward intruders' vocalizations share group-specific vocalizations defend the nest and feed offspring

usually only one pair reproduces parentage: principal female 100%, principal male 90%
Large groups produce more young per season

because large groups often produce 2 broods and have lower nest predation
(totale nest success is higher, young per successful nest is the same)
Unassisted pairs produce 0.3 juveniles/year
Groups of 4 or 5 produce 1.8 juveniles/year

Unassisted pairs cannot replace themselves!!
Males and females differ in reaching reproduction

Males tend to inherit a breeding position

53% of reproducing males remain in natal territory
29% in adjacent territory
always the oldest male in a group
first breeding on average at age 2.8

Females always emigrate to a breeding position

82% of reproducing females are in adjacent territory
18% in next adjacent territory, 4% in natal territory
first breeding on average at age 2.1
Ontogenetic trajectories of males

- Principal male
- Helping male
- Helping male
- Juvenile male
- Nestling

- Short-range disperser (usually adjacent territory)
- Long-range disperser (sometimes > 2 km) (infrequent)

natal territory  nearby territory  distant territory
Ontogenetic trajectories of females

Principal female

Helping female

Helping female

Juvenile female

Nestling

natal territory

nearby territory

distant territory

dispersal

Short-range disperser (usually adjacent territory)
All adults help regardless of sex or age  
(principal males feed less but are more vigilant)

Groups are nuclear families (sometimes with a stepmother)

Auxiliaries wait in a queue for opportunities to breed  
(no exceptions to precedence ever observed)

Many adults die before reproducing
Groups of stripe-backed wrens have features of super organisms

adherence and recognition (like gangs)

internal diversification

proliferation of cooperation

reduction of conflict

interdependence for reproduction
Evolutionary origin of cooperative groups in this species explained by . . . extended parental care and kin selection

Evolutionary maintenance of cooperative groups in this species explained by . . .

indirect benefits from kin selection +
delayed direct benefits of succession to a favorable reproductive position (in a large nearby group)

Evolutionary specialization for cooperation in groups has resulted in . . .

complexity of interaction and communication

interdependence of individuals for reproduction

irreversibility ???

superordinate level of natural selection ???

In all of these features they resemble . . .

superorganisms . . . and some human societies
References for the behavioral ecology of Stripe-backed Wrens


References for the behavioral ecology of Stripe-backed Wrens (continued)


