THE COSTS AND BENEFITS OF TERRITORIAL NEIGHBOURS IN A TEXAS PUPFISH (CYPRINODON BOVINUS)

by

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Summary
Territorial animals often establish themselves in clusters despite the presence of suitable unoccupied habitat nearby or the costly interactions involved in settling into conjoining territories. One reason for this may be that the presence of adjacent neighbours allows residents to share the costs of defending against intruders while reaping the benefits of maintaining the territories. In the Leon Springs pupfish, Cyprinodon bovinus, we compared the territories of males defending in a cluster to males defending in dispersed localities and asked whether territory residents would be more successful with or without sharing common borders with competing neighbours. Clustered residents were subjected to more intrusions by conspecific competitors and had a substantial portion of their spawning opportunities interrupted by intruding males. In particular, neighbours caused half of the spawning interruptions observed in clustered territories; in comparison, dispersed residents were rarely interrupted during spawning sequences. However, clustered males approached and spawned with more females than dispersed males, with the consequence that the overall reproductive successes of clustered and dispersed males were similar. These results are discussed in relation to the potential habitat differences between the clustered and dispersed localities and the ideal free distribution of competitors.

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Introduction

When territoriality develops to partition limited resources, the territories often appear tightly packed with neighbours sharing common borders (e.g., Barlow, 1974; Stamps & Krishnan, 1994). Studies that have removed territory residents have found that such vacancies were short-lived as new settlers queued for the space (e.g., Kodric-Brown, 1978) or as neighbours quickly expanded their territories (e.g., Krebs, 1971; Adams, 1998). The latter suggests that territorial males may prefer larger areas and will attempt to expand their territories at the expense of their neighbours’ territories (Ferno, 1987). Although the competition between neighbours may place a toll on the net benefits gained from possessing a territory, many studies report a decrease in aggression between neighbouring residents that may minimize the effects of this competition. This diminished aggression between adjacent neighbours has been termed ‘dear enemy’ recognition (Fisher, 1954; Temeles, 1994) and apparently gives territory holders the opportunity to direct their competitiveness against non-territorial individuals (Getty, 1987; Leiser & Itzkowitz, 1999) and/or to harvest the territorial resources.

While the dear enemy phenomenon may reduce the costs of having neighbours in some species (e.g., Krebs, 1982; Fox & Baird, 1992; Heinze et al., 1996), this reduction in aggression has not been seen in other species (e.g., Beletsky, 1983; Temeles, 1990; Speirs & Davis, 1991). Although interactions with territorial neighbours are often less costly than those with non-neighbours (Jaeger, 1981), the effects of having a neighbour are not always clear. For instance, given a particular territory, might the territory resident be more successful without a competing neighbour sharing a common border? Some evidence suggests to the contrary. For example, individual residents within a cluster of territories may benefit by having nearby neighbours help in defending against the common threat of intruders (Getty, 1981; Stamps, 1988) or predators, or in attracting mates (Itzkowitz, 1978). However, there is also considerable evidence that territorial neighbours interfere with each other’s ability to mate, either by intercepting a neighbour’s potential mate (Ferkin, 1988; Howard & Young, 1998), by interfering with mating (Itzkowitz, 1974; Leiser & Itzkowitz, in prep.), or by attracting non-territorial competitors (Kodric-Brown, 1986; Stamps et al., 1987).

Here we examined the consequences of having territorial neighbours in the Leon Springs pupfish, _Cyprinodon bovinus_. Our intent was to compare...