

# DIFFERENCES IN STRATEGIES OF AGGRESSIVE FIGHTING IN THREE SPECIES OF GERBILS: A REFLECTION OF SOCIAL OR SOLITARY WAY OF LIVING



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## INTRODUCTION

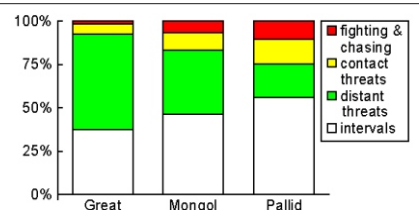
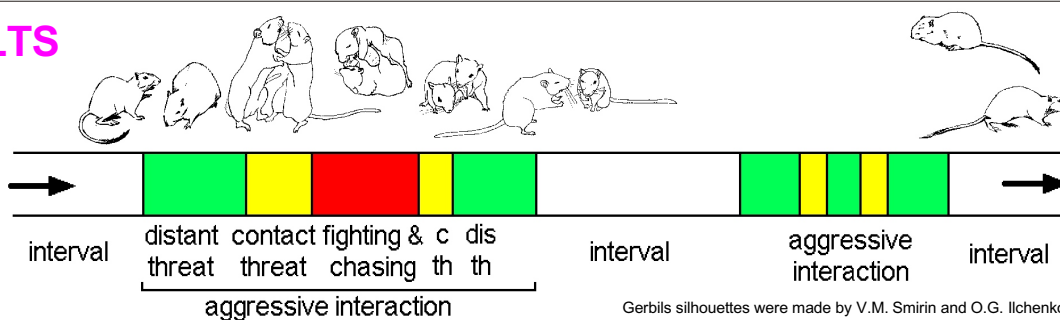
It appearing to be reasonable that animals living in communities should develop the not-injuring ways of conflict resolution. A comparative study of aggressive interactions in close relative species provides a good approach to clear this question. In present study we designed aggressive conflicts in three species of gerbils, differed in sociality, from the social Great Gerbil *Rhombomys opimus* and Mongol gerbil *Meriones unguiculatus* to the solitary Pallid gerbil *Gerbillus perpallidus*.

## METHODS

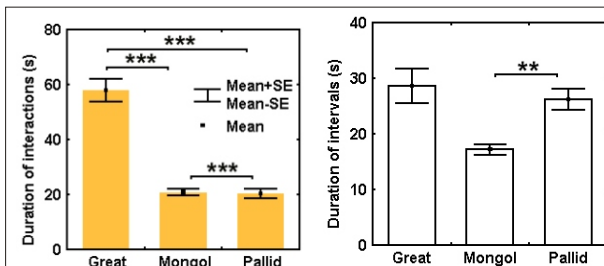
We videotaped intraspecies male-male conflicts on neutral arena been taken from 21 tests for the Great, 26 tests for the Mongol and 20 tests for the Pallid gerbils. Short time after test beginning, one of a males has become a winner, whereas the second one - a loser, and this asymmetry is retaining till the end of a test. We measured winner-loser distances, durations of aggressive interactions and intervals between them using 1 s scan sampling method. In total we analysed 355, 781 and 331 aggressive interactions and 340, 760 and 301 intervals for the Great, Mongol and Pallid gerbils correspondingly.

## RESULTS

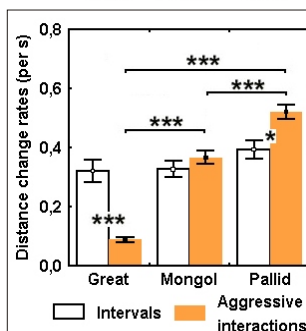
In all the three species, male-male conflicts represented aggressive interactions interspersed by intervals. In their turn, aggressive interactions consisted of distant threats, contact threats and fighting & chasing.



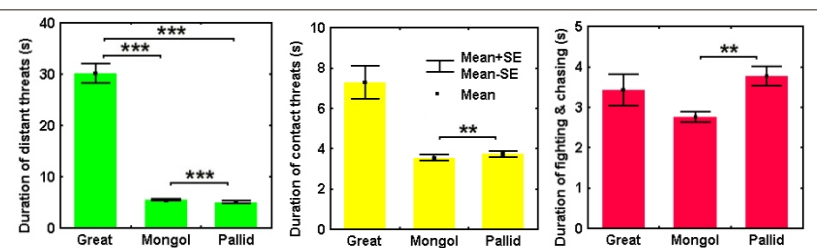
Time percentage spent in aggressive interactions decreases progressively in the row Great - Mongol - Pallid gerbils. However, severity of the aggressive interactions showed a reversed pattern: fighting & chasing and contact threats took more time in the Pallid gerbil in comparison with the Mongol gerbil, and more time in the Mongol gerbil, in comparison with the Great gerbil, who had maximum percentage of distant threats (all the differences were significant,  $p < 0.001$ , White t-test).



Aggressive interactions were significantly longer in the Great gerbil than both in the Mongol and in the Pallid gerbils ( $p < 0.001$ , Mann-Whitney U-test), whose durations of aggressive interactions did not differ. Intervals were shortest in the Mongol gerbil.



Distance change rates during intervals were similar in all the three species. In contrast, the distance change rates during aggressive interactions did differ significant between the species and graded from the most in the Pallid gerbil through intermediate in the Mongol gerbil, to the least rate in the Great gerbil ( $p < 0.001$ , Mann-Whitney U-test). It is interesting, that in the Great gerbil distance change rate was: much lower during aggressive interactions, then during intervals ( $p < 0.001$ , Wilcoxon T-test); in the Pallid gerbil the relations were reversed ( $p < 0.05$ , Wilcoxon T-test), and in the Mongol gerbil the rates were similar in both the cases.



Distant threats demonstrations were the longest in the Great gerbil intermediate - in the Mongol gerbil, and the shortest - in the Pallid gerbil (all differences were significant,  $p < 0.001$ , Mann-Whitney U-test). Durations of contact threats and fighting & chasing were similar rather than different between the species, and significant, but small differences were found only between the Mongol and Pallid gerbils ( $p < 0.01$ , Mann-Whitney U-test).

## CONCLUSION

The found differences in conducting of male-male conflicts represent distinctive species-specific strategies of aggressive fighting, graded in severity in accordance with degree of sociality in the studied species. The most social Great gerbil used a strategy of a conflict delaying, applying by the most part prolonged distant threats, with rare short periods of contact threats or fighting & chasing. The Mongol gerbils used a strategy of quick short aggressive interactions. Rivals supported threat postures or moved simultaneously, keeping distance unchanging. The solitary Pallid gerbils showed severe strategy of fighting, with a lot of fighting & chasing, and fast changing of both distances and demonstrations.