

Unexpected F2 lethality in interstrain crosses of *Paramecium tetraurelia*

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In ciliates the reproductive concept of species is well applicable. Reproductively isolated groups, which have been called syngens, exist in all ciliates, and they are often considered to be genetic species. At the same time, it is generally assumed that no pronounced reproductive barrier occurs within a species. However, we found that in the cross between *Paramecium tetraurelia* strains 51 and 32, the survival rate of homozygous F2 clones obtained by autogamy of F1 heterozygotes did not exceed 22% in both parental cytoplasmic lineages, while survival of F2 clones was 98-100% in intrastrain control crosses. To figure out if decrease of F2 survivors was an exception or a rule, we crossed four other strains of *P. tetraurelia* with both strains 51 and 32. While all F1 interstrain heterozygotes were perfectly viable, in F2 we documented different lethality rates for different combinations. Two strains produced about 60-70% of viable F2 clones in the cross with strain 32 but only 5-15% in the cross with strain 51, while the other two appeared to be equally compatible with strains 51 and 32, producing about half of viable F2 clones in both cases. In most combinations, F2 lethality was comparable in both parental cytoplasmic lineages, thus indicating genetic nature of the observed effect. Finally, a similar phenomenon of F2 lethality in interstrain crosses was also demonstrated for other species of the *P. aurelia* complex. Possible genetic and epigenetic mechanisms leading to decreased survival rate in F2 progeny of interstrain crosses, and thus potentially driving speciation in the *P. aurelia* complex, will be discussed.

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