

## **Interaction between sexual and parthenogenetic incipient colonies of *Reticulitermes speratus***

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### **Abstract**

*Reticulitermes speratus* can found a colony by two female dealates in the laboratory and reproduce by parthenogenesis. On the other hand, we could not find female-only colonies that reproduced exclusively by parthenogenesis during a survey of 149 field colonies in Japan. The reproductive success of the parthenogenetic field colonies, even if it is present, should be much smaller than ordinary sexual colonies. It is likely that the aggregated distribution of incipient colonies results in strong competition between sexual and parthenogenetic colonies, which the latter lose.

In this study, we produced 400 sexual (male-female) colonies and 242 parthenogenetic (female-female) colonies using *R. speratus* alates, and examined colony compositions after 300 days. We then transplanted 20 pairs of the sexual and parthenogenetic colonies adjacent to each other, and observed interactions for 90 days. Survival rate and size of the parthenogenetic colonies (18.1% and  $18.9 \pm 6.9$ ) on day 300 were significantly lower than the sexual colonies (42.8% and  $42.2 \pm 18.4$ ). Nymphs and nymphoids differentiated only in the parthenogenetic colonies as the X-linked caste determination model predicted. During the colony interaction experiment, eight colony pairs fused. Both reproductives from the parthenogenetic colonies were killed in six of the fused colonies. Among 12 colony pairs without colony fusion, parthenogenetic colonies died in seven pairs and partial offspring incorporation occurred in nine colony pairs. During the interaction, the survival rate of reproductives from sexual colonies was 95.0%, while that from parthenogenetic colonies was 27.5%. Our results indicate that the parthenogenetic colonies are much less competitive during intercolonial interactions. On the other hand, frequent colony fusion and offspring incorporation should allow invasion by individuals with a "nymph-oriented genotype" into sexual colonies, which would have had a tendency to become secondary queens even in the presence of the original queen.

**Keywords:** parthenogenesis, intraspecific competition, incipient colony, *Reticulitermes*