

学 位 論 文 要 旨	
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題 目	The mechanism of reproductive division of labor and the life-history in <i>Neotermes koshunensis</i> [Isoptera: Kalotermitidae] (コウシュンシロアリにおける生殖分業システムと生活史の解明)
<p>In this thesis I studied the secondary-reproductive system (mainly the neotenic system), the sexual dimorphism, the antennal cropping behavior and the sex ratio in the Asian dry-wood termite, <i>Neotermes koshunensis</i> (Shiraki).</p> <p>In most lower termites, colonies are headed by neotenic reproductives of both sexes after the primary reproductives (i.e., the queen and king) are lost. The production of a neotenic sexual is inhibited by the presence of a primary reproductive of the same sex. However the neotenic caste of <i>N. koshunensis</i> is exclusively male. Moreover, production of male neotenic is completely inhibited not only by the presence of a king but also by the presence of a queen. Meanwhile, male and female adultoids were found. The results of histological observation and the caste differentiation pattern of a male pseudergate to a neotenic may show the male neotenic in <i>N. koshunensis</i> is not functional as a reproductive caste. Production of female adultoids may be inhibited by the presence of the morphological male neotenic. The social role of the male neotenic in <i>N. koshunensis</i> is quite puzzling. In this study, I propose a new non-reproductive caste “Eunuch”.</p> <p>The female-specific sexual character of the elongated seventh sternite, known in other termites, is useful for distinguishing the sex of individuals of <i>N. koshunensis</i> from the fifth instar onward. The method here described is highly efficient at sexing instars, nymphs, soldiers and alates.</p> <p>Antennal cropping, a behavior inferred to exist because queens and kings have shorter antennae than fresh alates, is widespread in termites. I studied the occurrence of antennal cropping in queens, kings, female adultoids and male adultoids in <i>N. koshunensis</i>. Observation of the antennal tip structure with scanning electron microscopy and the occurrence of antennal cropping in new kings and queens reared in isolation indicated that self-cropping is an important proximate mechanism.</p> <p>In this termite the numerical sex ratio of pseudergates, nymphs, alates, and soldiers was significantly skewed toward males. This bias was not related to the colony size. Male alates were 0.9 % larger than female alates in head-width although no significantly difference was detected in dry-weight, thus confirming the presence of male-biased sex allocation in this species. The biased sex allocation was not explained by Local Resource Competition model and may be not explained by Local Resource Enhancement model and by Local Mate Enhancement model. The results of this study together with the previous studies suggest that the sex ratio bias in the genus <i>Neotermes</i> is correlated with the sex specificity in colony succession by secondary reproductives (neotenic): male-biased sex ratio is typically observed in the species that have neotenic only in males.</p>	