（学位第３号様式）

学　位　論　文　要　旨

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題　目	Maternal care induces synchronous hatching in the subsocial burrower bugs （亜社会性ツチカメムシ類にみられる親に依存した斉一孵化システム）

In some species whose parents provide care for their eggs, the parents also engage in various behaviors that promote the hatching of their eggs. Generally, embryos and newly hatched young have undeveloped locomotive and sensory organs. Consequently, they are vulnerable to dangerous and changeable environments. Particularly during hatching, when embryos emerge from their egg capsules, immediate changes in the physical and biotic environment, thereby the developing status, can present the highest risk for feeble embryos. Therefore, parents of several species have used special care during the hatching, i.e. ‘hatching care’, to increase their offspring’s survival. In this study, I first reported that the mothers of the subsocial burrower bugs show the complex and elaborated hatching care.

1) The egg mass of *Adomerus rotundus* showed a highly synchronous hatching within about 15 min. I found that in *A. rotundus*, mothers displayed a physical vibration (shaking the body rhythmically), while maintaining the egg-guarding posture, i.e., holding the egg mass under the thorax, between the forelegs and midlegs. I experimentally revealed that *A. rotundus* mothers actively regulate synchronous hatching by physical vibration.

2) *A. rotundus* mothers oviposit as a spherical egg-mass on the ground surface. Therefore, the lower and upper eggs in an egg-mass are exposed to different thermal levels. I found that the mothers showed distinctive egg-rolling behaviour similar to avian species while maintaining the egg-guarding posture. As a result of investigation, it turned out that *A. rotundus* mothers actively regulate the thermal microenvironment of the eggs with egg-rolling behaviour.

3) Asynchronous hatching in *A. rotundus* caused the sibling cannibalism likely occurring at ecdysis. In this case, earlier hatched nymphs eating eggs that have not yet hatched or even young nymphs that hatch later, and the earlier hatched nymphs may also have the risk of being fed upon by later hatched nymphs at ecdysis. Synchronous hatching is thought to decrease the occurrence of such sibling cannibalism.

4) *Parastrachia japonensis* mothers also vibrated the egg mass intermittently, and regulated hatching not only synchronously but also successful. Probably, the hatching system of *P. japonensis* strongly depends on maternal vibrational signals, with slightly different effect from *A. rotundus* having the effect of only synchronization in egg hatching.

5) In Japan, I showed that 3 closely related species of subsocial burrowerbugs indicate the maternal vibration at hatching like to that in *A. rotundus* and *P. japonensis*. We are planning to clarify the mechanism and functions of the hatching regulation in these species, and try to reveal the evolutionary process of such a unique care in the future.