

**A105** Molecular systematics of the European and the Korean cobitids based on mitochondrial cytochrome *b* complete sequence

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Traditional phylogenetic inference regarding the biogeography and evolution of the family Cobitidae was mainly based on the correct interpretation of transitions between the morphological states of secondary sexual characters (e.g., lamina circularis). We compared complete mitochondrial cytochrome *b* sequence to provide an independent assessment systematics and biogeographic relationships of species in the genus *Cobitis*. The mtDNA-based phylogeny for species of the genus *Cobitis* from the Korea and Europe permits a phylogenetic assessment of the morphological transitions of lamina circularis. Our data confirm the monophyly of genus *Cobitis* and the phylogenetic relationships between the Korean and the European cobitids indicate that the Korean lineage is in the group of one lamina circularis, primitive condition. Sequence divergences of cytochrome *b* gene among genus *Cobitis* were 0.3-19.0%.

**A106** Agonistic behavior and the size of major claw in the fiddler crab *Uca lactea*

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We investigated agonistic behavior in male fiddler crabs *Uca lactea*. The male with a larger major claw threatened smaller males to prevent them from being active on

sediment. Males of similar sizes fought each other with major claws in order to take over opponents' burrows or to take control of territories. The sequence of fighting included claw waving, matching, and interlocking. The larger males were more likely to win over smaller males. Resident males, however, had little advantage in their fights when they were smaller than intruders. Fighting duration was longer when claw size ratio (loser claw size/winner claw size) was greater. Furthermore, they fought longer when the mean size of fighters was larger. Our results suggest that major claw size is more important than residency in male-male competition of *U. lactea*.

**A107** Food availability influences courtship intensity and timing of the fiddler crab *Uca lactea*

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On Kanghwa Island, the fiddler crab *Uca lactea* lives on upper intertidal mud flats that are covered by the spring but not neap tides. From July to early August in 2000, *U. lactea* males exhibited semi-monthly cycles in courtship peaking at about 2-3 days after the spring tides when food-rich water covered the habitat. This suggests that male investment in courtship behavior may be limited by food intake. We manipulated food availability for 4 weeks in enclosed plots in 2001 (food-supplemented, food-deprived and control). There were significant differences in the numbers of wavers and semidomes on each day between food treatments. Food-supplemented males built more semidomes and wavered for more days than the males in food-deprived and control plots during the test. Furthermore, wave rate of males in food-supplemented plot was highest. However, neither courting days nor wave

rates were related to male size. Courtship was initiated earlier and courtship cycle was shortened when food was supplemented. Our results support that short-term food availability influences courtship intensity and timing in *U. lactea*.

**A108** Breeding Ecology of Black-billed Magpies in Korea (*Pica pica sericea*)

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Breeding success of magpie population on the campus of Seoul National University was assessed from 1998 to 2001. Breeding successes were 2.8, 3.2, 2.5 and 2.8 fledglings/successful nest in those four years. Although the differences among the years were not statistically significant, breeding successes seem to be mostly influenced by climate condition during winter and early spring. It was suggested that winter precipitation affects egg production and temperature during incubation directly influences hatching success. We measured the quality of the chicks using 'Body Condition Index (mass/tarsus length)' in addition to the number of chicks. BCI values were not related to sex or clutch size but to fledging date; better-conditioned chicks fledged earlier. Clutch size and hatching success were measured in 2000 and 2001. The mean hatching success did not differ between the two years, although the mean clutch size was smaller in 2001. In both years, hatching success was not related to clutch size. It seems that magpie breeding success is largely dependent on hatching success rather than fledging success.

**A109** Structure and Context of Chatter Call in Korean Black-billed Magpies (*Pica pica sericea*)

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Chatter call is a species-specific signal used in inter- or intra-specific interaction. Korean black-billed magpies were observed to emit this type of call under a variety of circumstances such as territory defence, alarming or mobbing to predator. We studied the acoustical features and behavioral contexts of magpie chatter call. In this study we present (i) acoustic description of chatter call, (ii) trends of call transition and (iii) function of different cadences in communication. Our analysis on the spectro-temporal structure showed that magpies use varied versions of chatter call under different contexts. As antagonistic situation became more serious, number of calls within a bout and call frequency increased but call duration and inter-call interval decreased. In addition, magpies seem to match call cadences when responding to neighbor's chatter call. Our results suggest that black-billed magpies vary chatter call structure to exchange contextual information with the conspecific. In order to reveal precise relationship between structural variation and contextual information, a series of playback experiments will be conducted.

**A110** Cooperation of Prey Capturing in the Young of the Subsocial Spider *Amaurobius ferox*

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Cooperative hunting is one of the most widely distributed form of cooperation in animals and may be an important