

reproduced foals in early reproduction invested more time and effort in guarding their foals than equivalent mares whose first reproduction was in late reproduction. Our results suggest that mares in early reproduction will enhance their lifetime reproductive success although costs of early reproduction would be substantial.

A104

Morphological Differences between Males and Females of Korean Wood-eating Cockroaches, *Cryptocercus* sp.

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We describe morphological characters that would allow rapid and non-destructive determination of gender in Korean woodroaches. Examination of female woodroaches revealed apicolateral emargination of the subgenital plate and subtruncate apical median prominence in adults, and a narrowly rounded apical median prominence in nymphs. On the contrary, males show no such emargination, and instead have rounded broad apical median on this area. The presence or absence of an apicolateral emargination of the subgenital plate provides a particularly excellent diagnostic character for gender determination in Korean woodroaches.

A105

Colony Composition in Relation to Parental Care in Korean Wood-eating Cockroaches, *Cryptocercus* sp.

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Populations of wood-eating cockroaches were discovered in rotting logs from various mountainous regions in Korea. They live in monogamous associations in which parents care for their young for an extended period. Mean brood size was 21.5 (N=163 broods, SD=9.2). The number of nymphs dropped significantly between one and two year of age, whereas there was no significant decrease in brood size between two and three year of age. In family groups with young nymphs of one to three years old, the brood size was significantly greater in broods with parent than in broods without parents. However, the presence of one or both of parents did not correlate with brood size in family groups with four year-old nymphs. These results suggest that parental presence is more important for survival in younger nymphs than in older nymphs.

A106

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

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We have investigated the general breeding ecology of black-billed magpies (*Pica pica sericea*) on the campus of Seoul National University since 1998. Three aspects were considered here: (i) breeding success, (ii) territoriality, and (iii) offspring sex ratio. Breeding successes of 1998, 1999 and 2000 were 2.8, 3.2, and 2.5 fledglings/successful nest respectively. Breeding success appeared to be influenced by the temperature during incubation and/or the number of rainy days during fledging. Causes of breeding failure differed among the three years; hatching failure was the main cause in 1999 and 2000 while nest desertion was the one in 1998. Territory size and distribution did not differ

significantly among the three years. Average territory size was close to 1ha, and distance to the nearest active nest was approximately 93m. Breeding pairs actively defended their territories all year round, although they also formed foraging flocks in the winter. Molecular sexing revealed that offspring sex ratio was slightly male-biased in early nests and female-biased in late nests. Considering that early-fledged birds generally have higher dominance ranks than late-fledged ones, this result suggests that getting high dominance by fledging early may be more advantageous in males.

A107

Cognition of Shapes in the Female White Mouse (ICR, *Mus musculus*)

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We studied changes in visual cognition in female white mice (ICR, *Mus musculus*) as a result of situational change, with a focus on the capability of discrimination among geometrical shapes such as circle, triangle, and quadrangle. Mice performed a series of passive avoidance tasks accompanied by mild electrical shock (aversion) and a series of water-finding Y-mazing tasks (affection). They discriminated all geometrical shapes on passive avoidance tasks. However on water-finding Y-mazing tasks, they could not discriminate between triangle and quadrangle. These results suggest that female white mice have the capability of discriminating among certain geometrical shapes and that discriminating degrees differ in aversion and affection situation.

A108

Is Courtship Behavior of Male Fiddler Crab, *Uca Lactea*, Affected by Food

Supply?

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For the fiddler crab, *Uca lactea*, living on the upper-tidal mud flat in Kanghwa island, food is available mainly during the spring tides. Food-carrying water does not reach the habitat during the neap tides. Thus we hypothesized males, even in their mating season, would invest more time in feeding than courtship display during the early spring tidal periods and the amount of food supplied in these periods would influence male courtship intensity. Through the observation on male behavior from July to early August in 2000, we found that feeding behavior followed semi-monthly tidal cycle with peaks near the time of spring tides, whereas waving and low semidome (LSD) building did with peaks 5-6 days later. Food-supplemented males built significantly more LSDs than food-removed and control males. Our results suggest that feeding during the spring tides affects condition-dependant courtship display of *U. lactea* males.

A109

The genus *Burmoniscus* (Crustacea, Isopoda, Philosciidae) from Philippines.

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The Oriental genus *Burmoniscus* is a terrestrial isopods and shows high species abundance in the tropical area. Previously only a single species, *Pseudotyphloscia alba* (Dollfus, 1898), has been recorded from Philippines. We examined the terrestrial isopod specimens which were collected from