Current chelonian diversity in the East Asian Islands

various other native animals, such as the rails and thrushes (birds), colubroid snakes and scincid and agamid lizards (reptiles), ranid frogs (amphibians), and even crickets and freshwater shrimps (arthropods). It is interesting to note that the cat actually eats various non-mammalian animals: frequent predation on frogs by the Iriomote cat is particularly noteworthy, because this group of animals is very rarely preyed by other wild cat populations including those belonging to other leopard cat subspecies. Therefore, we can state that the dietary habit of the Iriomote cat is characterized by utilization of various animals available in its habitat largely irrespective of their taxonomic allocations.

The interesting food habit of the Iriomote cat was also indicated by the patterns of its activity and habitat use as revealed by our radio-tracking survey. The results indicated that each individual cat intensively uses the coastal lowland, apparently largely depending on streams and swamps there. Distribution of the scats also indicated that the individual density of the cat is much higher in the coastal lowland than in the inland mountainous area. The coastal lowland, encompassing various types of habitats, such as mangrove forests, swamps, and broad-leafed forests, may offer diverse prey to the cat throughout the year. The cat's ability to utilize diverse animals from various habitats, including water-depending animals from riverin systems, seems to be the primary reason why it has survived on such a small, rodent-less island as Iriomotejima.

The home range size of the Iriomote cat, varying from 3—6 km^2 in male and 2—5 km^2 in female, was smaller than those of other leopard cats in Southeast Asia. Higher food availability and absence of other carnivores that would act as competitors on Iriomotejima Island seem to be the main causes for such difference. In addition, our survey by radio-tracking and other methods indicated that an individual Iriomote cat can alter the home range size and the prey animal species, probably in response to seasonal and annual changes of habitat condition and food availability. Long survival of the cat population on Iriomotejima Island also seems to be partially attributable to such ecological flexibility of this subspecies.

Since its initial establishment in about 200,000 years ago (see above), the population size of the wild cat on Iriomotejima Island seems to have thoroughly been a few hundred at most. Moreover, the current genetic diversity of the Iriomote cat is remarkably low, most likely reflecting extensive bottlenecks in the recent past. Nevertheless, the cat has been surviving to the present, obviously by taking advantage of the bountiful and relatively stable environment of this island.

It has recently been well documented that insular biota is often highly vulnerable to anthropogenic environmental changes, including a large scale of land development, and introductions of exotic organisms and diseases. Future survival of the Iriomote cat as an indicator of diverse, rich fauna of Iriomotejima Island obviously depends on how we can effectively keep on excluding these and other unfavorable factors from this island.

Oral -13

Current chelonian diversity in the East Asian Islands

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The East Asian Islands, consisting of Japan and Taiwan, extends from subtropical zone in the southwest to subarctic zone in the northeast and represents two biogeographical realms, namely the Oriental region and the Palearctic region. Such a situation, along with the presence of several long standing straits crossing this island chain, makes taxonomic diversity of terrestrial animals in this region so high. Seven species of freshwater turtles are distributed in the East Asian Islands. In Japan mainland, two geoemydid turtles, *Chinemys reevesii* and *Mauremys japonica*, and one trionychid turtle, *Pelodiscus sinensis*, occur. From the Ryukyu Archipelago, three geoemydid turtles, *Cuora flavomarginata*, *Geoemyda japonica* and *M. mutica*, have been known. In Taiwan, four geoemydid turtles, *C. reevesii*, *C. flavomarginata*, *M. mutica* and *Ocadia sinensis*, and one trionychid turtle, *P. sinensis*, occur. All these Taiwanese species also occur in the eastern and southeastern parts of the Eurasian continent. Of these, *C. reevesii* exhibit prominent variation within a population in qualitative characters, whereas it shows little between-population variation. In quantitative characters, there were also no significant differences between any combinations of populations, although the Japanese population tended to be larger than the Taiwanese and the continental Chinese populations. In *M. mutica*, analyses of morphometric characters and coloration revealed that the Ryukyu populations are much diverged from the other populations, deserving

recognition as a distinct subspecies, *M. m. kami.* However, my genetic analysis have yielded contradicting results, placing the Taiwanese populations much closer to the Ryukyu populations than to the continental populations. *Geoemyda japonica* is endemic to the central Ryukyus, with its closest relative, *G. spengleri*, being confined to the distant southeastern continental China and northern Indochina. These two species had long been considered as conspecific subspecies, but a recent comparative study demonstrated remarkable differences between these species in a number of qualitative characters. With respect to *C. flavomarginata*, morphometric analyses suggested the Ryukyu populations to be most divergent among conspecific populations, deserving taxonomic recognition at the subspecific level (*C. f. evelynae*). Recent studies proved that *P. sinensis* shows considerable genetic variation among the Japanese, Taiwanese and continental Chinese populations. Geographic variation has not yet been studied at all for *M. japonica* or *O. sinensis*. Characteristics of the turtle fauna of the East Asian Islands may be summerized as follows: 1) endemic species are recognized in Japan mainland and the central Ryukyus; 2) all taxa occurring in Taiwan also occurs in the continental China; 3) certain extent of variations exist between conspecific populations of Taiwan and the southern Ryukyus; and 4) in widespread species, Taiwanese populations may be closer to the continental population than the Japanese population (but see the case of *M. mutoca* mentioned above). The geographic faunal pattern of the East Asian turtles is in good agreement with the currently prevailing scenario for the history of dispersals and vicariances of several other terrestrial organisms in this region.

Oral -14

Biogeography and evolutionary patterns of landsnails on the island of Borneo

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The northern part of Borneo (Sabah) has experienced the island's most active and recent tectonic processes, which include the expansion of land area (from the Middle Eocene to the Middle Pliocene) and climate fluctuations (during the Pleistocene). The interplay between geology and climate generates extraordinary diversity and genetic distinctiveness among species. However, the effects of historical processes on contemporary distributions of landsnails in Borneo are not known. The mitochondrial DNA sequences from 16S rRNA and COI genes, and nuclear ribosomal DNA sequences from ITS-1 were used to investigate phylogeographic patterns among two landsnail genera: *Everettia* (Gastropoda: Ariophatidae) and *Meghimatium* (Gastropoda: Philomycidae) in Northern Borneo. Maximum parsimony and maximum likelihood analyses on these genetic datasets produced trees in general agreement with phylogeographical patterns in both genera. Their taxonomy (based on the morphology) was also well-supported by genetic data. The resulting diversity and phylogeography for both groups of landsnails can be linked to major vicariance events in the Miocene and Pliocene. The phylogenetic trees also showed that a number of endemic species on Mount Kinabalu are possible remnants from the Pleistocene climate fluctuations.