

琉球大学学術リポジトリ

Significance of diversity of small animals as viewed from a wild cat surviving on a small subtropical island

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exemplified by the Iriomote cat (see Oral-12). Consequent vacancy of some niches in the Ryukyu islands seems to have enabled other animals to make their niches unusually broad.

2) Distinct patterning in geographic distributions of non-volant mammals in this region. Most of their ranges are delimited by the Watase's Line and the Hachisuka's Line (see above), as has been already noted. This suggests the substantial influence of paleogeography on the formation of current distributions of species and subspecies in mammals as in the case of other animal groups.

3) Unexpectedly limited distributions of chiropteran species and subspecies in this region. Many previous authors implicitly or explicitly assumed that bat taxa generally show distributions whose pattern does not necessarily correspond to island configuration due to their highly effective migration ability. However, many of the Ryukyu bats actually show strongly limited distributions that more or less correspond to island shapes. This probably reflects the influence of geographic arrangements of important resources, such as resting sites and foraging areas.

O-11

Taxonomic importance of a tiny island: type locality - Singapore. New species from inland to off-shore. Will we discover more?

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The island of Singapore has been the designated type locality for practically hundreds of newly described taxa for more than a hundred years. New genera, subgenera, species and subspecies of a wide variety of vertebrates and invertebrates have been described by various scientists from around the world, even till today. In total, how many published taxa have been described. Of these, how many are actually valid still? In the future, how many more discoveries remain to be unearthed? Where are some of the local 'hotspots' for biodiversity, where potentially new species lie waiting to be found? This is a preliminary attempt to answer these, and other questions, pertaining to Singapore's past, present and future significance from a taxonomic perspective.

Oral -12

Significance of diversity of small animals as viewed from a wild cat surviving on a small subtropical island

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The Iriomote cat *Prionailurus bengalensis iriomotensis*, a wild cat endemic to Iriomotejima Island, is the only indigenous medium-sized carnivore in the Ryukyu Archipelago. Recent molecular studies indicated that this cat is closely related to the leopard cat distributed from India and Southeast Asia to Russia and that the former was derived from the latter through migration to Iriomotejima island and subsequent isolation for about 200,000 years. Carnivores, occupying the top of the food chain, usually need wide ranges of habitats that guarantee constant provision of prey animals. The Iriomotejima Island (284 km²) is apparently too small for such medium-sized carnivores as the Iriomote cat. Moreover, except for some chiropteran species, no small indigenous terrestrial mammals that are almost always the staple of feline diet occur on this island. The survival of the Iriomote cat on Iriomotejima Island has therefore been regarded as a kind of enigma by mammalogists and ecologists.

We have studied food habits, home ranges, and activities of the Iriomote cat to solve this enigma. The scat analyses showed that the diet of this cat consists of an extraordinarily wide range of animal taxa, including not only such small mammals as the native fruit bats and the introduced black rats, but also

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-dependent 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 km² in male and 2–5 km² 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