Food habits of the urban Japanese weasels *Mustela itatsi* revealed by faecal DNA analysis

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Urban ecosystems all share the overwhelming characteristic that humans “drive the system” (Gehrt et al. 2010). In some cities, regional endemic species including medium to large carnivores occur within highly anthropogenic environments, e.g., Northern raccoon (*Procyon lotor*) and coyote (*Canis latrans*) in California (Gehrt et al. 2010) and stone marten (*Martes foina*) in Luxemburg (Herr et al. 2010). Studies of these species have shown that the carnivores used remnant or newly created green areas, parks, gardens, riverbanks, and agricultural fields in which to rest and forage. Studies monitoring their presence and ecology, and management programs to maintain those habitats have been established and are on-going. Although some mammal species are known to occur in urban areas in Japan, little is known of their ecology there.

The Japanese weasel (*Mustela itatsi*) is reported to have declined throughout Japan (Imaizumi 1986), but is known to survive in both rural and urban areas. In a rural area where they have been studied, Japanese weasels utilize more than two habitat types allowing them to switch between available food items (Kaneko et al. 2009). In contrast, for Japanese weasels in urban areas, riverbanks are among the few remaining important habitats available to them (Fujii et al. 1998), yet no conservation measures have been taken in that habitat.

Past surveys of sympatric carnivores by means of faecal analysis have revealed difficulties in species identification (Birks et al. 2004). For weasels in Japan, experienced researchers have been able to identify droppings based on faecal appearance and diameter (Japanese weasels and Japanese martens *M. melampus melampus*, reviewed by Tsuji et al. 2011), or on species-specific faecal odours (Siberian weasels *M. sibirica* and Japanese martens *M. m. tsuensis*, Tatara and Doi 1994). More recently, DNA analysis has made it possible to accurately identify the faeces of sympatric carnivore species in Japan (Shimatani et al. 2008; Sekiguchi et al. 2010).

In this study, we used DNA analysis to confirm the identification of Japanese weasels from faecal samples collected from weasel habitat along the Tama River in an urban area. We investigated the distribution of Japanese weasels in the riparian environment, and whether male and female Japanese weasels consume different food items. Based on this information, we discuss the management of the Tama River as Japanese weasel habitat.

**Material and methods**

**Study area**

The study area was confined to the southwest bank of the middle reaches of the Tama River, between Hamura

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