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## 学 位 論 文 要 旨

氏名: 岡田 純

題目: Natural History of the Japanese giant salamander, *Andrias japonicus* in the Chugoku Mountains with Conservation Implications  
中国山地におけるオオサンショウウオ (*Andrias japonicus*) の自然史および保全に対する提言

Although the Japanese Giant Salamander, *Andrias japonicus*, is threatened with extinction as a consequence of habitat degradation, baseline data on population structure, size, and density are limited.

In Chapter 2, I conducted a mark-recapture study of *A. japonicus* in two tributary streams within very different catchments in Hiroshima Prefecture between 2000 and 2003. In the Ikuridani River, a relatively undisturbed stream running through a wooded catchment, I captured a total of 87 individual salamanders, 54 juvenile and adult salamanders and 33 larvae. In the Ouchi River, which is more heavily disturbed and runs through an agriculturally-dominated catchment. I recorded 118 captures of 75 adults, but caught no larvae. The results revealed that adult *A. japonicus* occur abundantly in both a relatively natural and a relatively disturbed small stream. Salamanders in the Ouchi River were larger and heavier than those in the Ikuridani River, and consumed mainly frogs and other food items originating from rice paddy fields along the stream. However, it appears that larval recruitment is low in the Ouchi River, possibly a result of stream alterations, which may eliminate spawning nests and larval habitat. This is the first report describing relationships between population demography and habitat characteristics for *A. japonicus*. These data provides essential baseline information on *A. japonicus* populations including density, biomass, and size distribution in small streams.

Radio telemetry is a useful research technique for revealing movements and refuge use of secretive animals like *A. japonicus*. However, methods for attaching radio transmitters to amphibians are problematic because of these animals' delicate skin, shape, and use of fossorial habitats and burrows. In Chapter 3, I developed a transmitter attachment method for *A. japonicus*. I used small transmitters (approximately 1.8 and 3.5 g) and attached them with sutures to the tail using nylon line and a pair of plastic washers, in a process that is analogous to ear-piercing. I tested this suturing method with a total of 18 adult salamanders to examine transmitter retention period, damage to salamanders, and cause of transmitter removal. I found that the suturing method is reliably effective for 2–4 months in relatively short-term radio telemetric studies of multiple-sized adult *A. japonicus*. This method was originally designed to minimize transmitter loss and salamander injury, and is a viable option for researchers involved with *A. japonicus* telemetry because of its low cost, and ease of application.

In Chapter 4, I conducted mark-recapture and radio-telemetric studies of *A. japonicus* to evaluate population demography, reproductive ecology including breeding migrations, diet composition and dam impact within relatively natural and disturbed habitats in the Hino River, Tottori Prefecture between 2001 and 2008. One section, the upper section, is relatively undisturbed and runs through a wooded area, and the other section, the lower section, is more heavily disturbed and runs through an agriculturally-dominated area. My results revealed that adult *A. japonicus* are abundant in both the relatively natural and disturbed sections. Salamanders in the lower section were larger and heavier than those in the upper section, and I recorded fewer salamanders in small

size classes (younger individuals) in the lower section than the upper section.

I succeeded in recording pre- and post-spawning migrations of *A. japonicus* using radio-telemetry. These are the first continuously-recorded spawning migrations of the Japanese giant salamander. In the upper section, females moved between stream sections to reach a nesting site and spawn, and in the lower section many salamanders used branch streams as nesting sites and migrated various directions within both main and branch streams. Availability of spawning nests is relatively limited and nests are frequently destroyed by disturbances such as floods. Because of the ephemeral nature and limited availability of nests, *Andrias japonicus* must be able to migrate between sections to reach newly create nests.

In lower section, the movements of many salamanders were interrupted by dams during the breeding season. Also in this section, edible human garbage was the second-most important salamander food item. Otherinedible items such as plastic bags and aluminum foil were ingested. This feeding behavior is a potential cause of death for Giant Salamanders. These data provide essential baseline information on *A. japonicus* populations including population demography, movements, diet composition and human impact across gradients from relatively natural streams to disturbed streams flowing through human-dominated areas.

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