The spread of loach in the outpatient system in Saitama

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Background and Purpose

Misgurnus anguillicaudatus is one of the freshwater fish same as *Oryzias*. However, as *Oryzias* was registered as an endangered species in 1999, *M. anguillicaudatus* was registerd as an semi-endangered species in 2018. For the reason of decreasing number in habitats of *M. anguillicaudatus* there are 3 main causes. ①Deterioration of water quality. ②Modification of environmental structure. ③Effects of foreign species. Above all, we have begun the research focusing on ③. Foreign species are *Paramisgurnus dabryanus* and 2 strains of loads of alien species. *P. dabryanus* is genetically different from *M. anguillicaudatus* as shown in Fig-1 and you can tell them apart from others easily by observing angle of the mustache,Peduncle and so on. On the other hand, alien loach is regarded as the same species as conventional species in terms of classification. However ,there is much difference in the number of soft bars, since the origin is extensive, it is difficult to distinct from conventional loach only by the appearance of characteristics. Alien loaches were imported in Japan as edible fish late 1960s. Spread of alien loaches in Japan has not grasped enough yet. On this paper, we investigated on spread of habitats of alien loaches and conventional loaches is Saitama Prefecture.

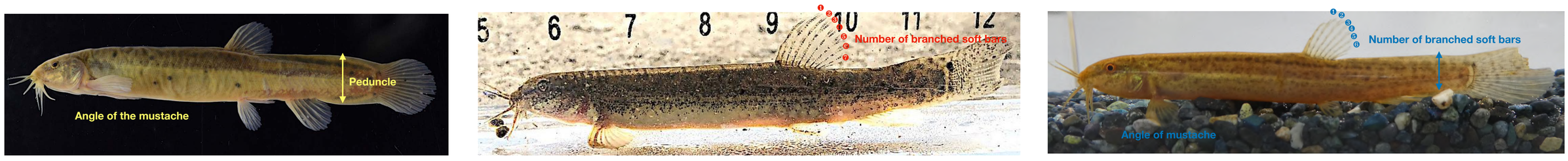

Fig-1　3 species of loaches captured in Saitama Prefecture（L：*P. dabryanus* C：Alien Loach　R：Conventional Loach）

Method of Investigation

We have conducted an investigation since June,19,2023 to October,1,2023 at agriclutural waterways and rivers in Saitama. The collection was carried out by scooping laches hiding in the riverbed and the bushes of aquatic plants with a Tamo net. We set it as an goal to capture 10 loaches in each places and we kept their body as specimen soaking in 70% ethanol. Also, we kept their chest tin saoking in 100% ethanol preparing for genetical analyzing in the near future.

Results and Consideration

We summarized the results by mixing the topography and river map of Saitama Prefecture. Conventional loaches lived widely in hilly areas and plateaus. On the other hand, the loach, which seems to be a *P. dabryanus* and a foreign species lineage, were mainly distributed along the river flowing through the plains. Depending on the region, the habitat of the native species lineage may not be confirmed.The reason why several species of foreign species of loach increased their population may be that there was competition between species and native species by competing for their homes and food. However, all the loaches raised in the aquarium were very gentle, and we could not confirm that they showed competition and aggression. Therefore, we proceeded with the following considerations.The topography of Saitama Prefecture is located in the Chichibu Mountains in the West, and there are 2000-meter-class mountains, including Mt. Sanbo at an altitude of 2,483 meters, which boasts the highest peak in the prefecture. On the other hand, the Kanto Plain spreads to the east, and it has become a flat terrain formed by the flow of rivers such as the Tone River and the Arakawa River since 10,000 years ago. In this area, especially in areas with low sea level, it was greatly influenced by the Jomon Sea from 6500 to 6000 years ago. In addition, at the border between the mountainous area and the Kanto Plain, the hills spread from north to south, making it a clear western high and east low terrain. The loaf of the native species lineage at the time of the Jomon Sea is widely distributed in the current hilly area and plateau, and then spread to the landized plains, expanding its distribution to a wide area except for mountainous areas. In addition, by the formation of paddy fields in reclamation, the number was further increased and it became familiar to the common people, and it was useful as an important source of nutrition due to its high nutritional value. However, after the 1960s, the environment changed due to the urbanization of the Kanto Plain, and the number of mobs such as native species decreased. And to make up for it, we introduced *P. dabryanus* and exotic loach as food, but some of them invaded the natural world. The invading population moved through the Tone River and Arakawa River while leaving offspring, and spread to compensate for the decrease in the loach of native species. The flow speed from the middle to the downstream of the Tone River and the Arakawa River is about 60 cm/s, and it is thought that it is possible to go upstream if it is a large individual. However, the retrograde of the loach, which seems to be a redwood and a foreign species lineage, was blocked by the change in the flow rate when it moved from the plain to the plateau and hills. Therefore, it is very interesting that the native loach has been confirmed alone at many points such as the Omiya Plateau, the Kita-Musashi Plateau, the Hiki Hills, and the Iruma Plateau. In the future, while investigating the distribution of loaches in areas facing outside the prefecture along the Tone River, we will measure the flow speed of the river at the border between the pleas and the plains, investigate whether loaches can go upstream, and explore the diffusion route of loaches in the alien species lineage. I want to explore it.

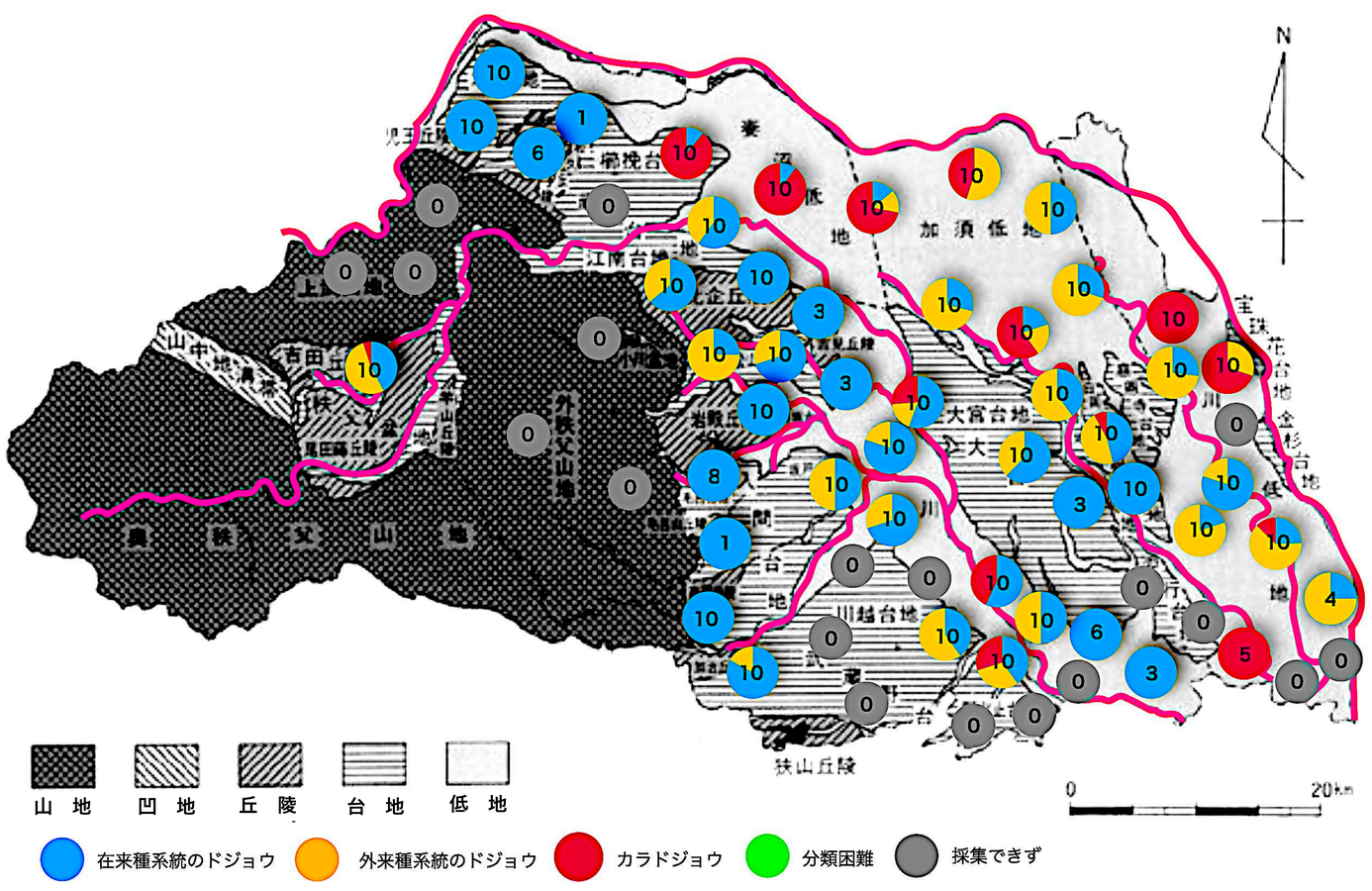

Fig-2　Result of Investigation on