

The Study for Assessment and Control of Ecological Risks Caused by Cryptic Invisible Alien Species

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[Abstract]

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In the present study, we aim to investigate the invasion route and the process of expansion of distribution of Cryptic Invisible Alien Species (CIAS) such as ants, mites, mussels, and fungi. We are also assessing impacts caused by the CIAS on natural ecosystems, native species and human lives.

The investigation of mtDNA variation in invading populations of the Argentine ant, *Linepithema humile*, which is one of the worst damaging invasive alien ants in the world, revealed that one haplotype was shared among different populations across the continent. We also examined hypotheses of supercolony formation by behavioral and genetic analysis and suggested that gene flow and colony fusion could occur among supercolonies.

We examined wood and living materials for which regulation was not required by law to import, and concluded that they were important pathways of exotic organisms such as insects, mites, nematodes, and fungi, which might have collapsed forest ecosystem in Japan.

We investigated the invasion route of the Golden mussel, *Limnoperna fortunei*, by population genetical analysis with DNA data. We developed artificial traps for monitoring the expansion of their distribution.

We advocated a new hypothesis for the origin of chytridiomycosis which is a serious emerging disease of amphibians, called as “Asia origin hypothesis”, as a result of investigation of pandemic state of the disease both in Japan and in the world, and the genetic variation of the chytrid fungus *Batrachochytrium dendrobatidis* which is a microbe of the disease. Furthermore, we found two new emerging diseases in amphibians in the Japanese field; Rana virus and trematodiasis. Especially, it has been suggested that the naturalized alien animals such as the raccoon are driving vector of the pandemic of amphibian trematodiasis.

We detected a lot of ticks attaching to the wild alien reptiles introduced from various countries. Moreover we could extract new types of *Borrelia*, which have a potential to infect animals including human.