An ecological approach to zoonotic disease control represented by SFTS

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[Abstract]

Key Words: Wildlife management, Zoonoses, Multi-task approach, Infectious disease risk management, Prediction of spread of infection

Using Severe Fever with Thrombocytopenia Syndrome (SFTS), which is highly related to ecosystem conservation and outdoor activities, as a model, we conducted research aimed at the development of wildlife and vector management and identifying the timing of measures to reduce the risk of zoonoses. We revealed that sika deer and wild boar were primary tick hosts in forests, while major amplifiers of the SFTS virus were mammals of Carnivora including racoon, masked palm civet and racoon dog. Since we confirmed that both vector ticks and those carnivores inhabited the same landscape in the SFTS infection areas, we suggest that increasing ticks by deer and wild boar infected with the virus through the amplifier animals and transmitted the disease to humans. Therefore, the management of amplifier animals has priority around the residential areas, especially in the infected area but in forested areas, either infected or uninfected with the SFTS virus, the management of deer and wild boar is essential. Because wildlife management requires costs and a certain time period, we examined effective pesticides for ticks for emergency situations in high-risk areas. Acute toxicity tests of 12 insecticides and acaricides on a vector tick species showed that etofenprox 100 ppm sprayed areas were effective in tick control for more than one month after spraying. We also found that significantly fewer ticks were questing on forest trails without vegetation cover than in interior forests and forest edges with richer understory vegetation. Therefore, it is possible to manage risk by spraying etofenprox and temporarily removing vegetation in areas of high tick density. On the other hand, although emergency measures may not be necessary in bordering areas where SFTS has not been reported but occurs annually in surrounding areas, the risk assessment of human infection is possible by monitoring the distribution and density of deer and wild boar while conducting SFTS virus antibody tests.

In addition, we suggest the need for immediate countermeasures for the endangered Tsushima leopard cat, which is considered at high risk based on the high susceptibility to SFTS virus in cats by demonstrating the infection of a wild leopard cat. Since the population density of sika deer, which is extremely high in Tsushima Island, is significantly related to tick numbers, deer control must be one of the countermeasures. Furthermore, epidemiological studies in Thailand under an international collaboration revealed the current status of the spread of infection in East to Southeast Asia.

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