（学位第３号様式）

学　位　論　文　要　旨

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題　目	Studies on Lower-Volume Pesticide Spray in Tea Cultivation （チャ栽培における農薬散布量削減に関する研究）

I have developed a novel method for pesticide reduction using a lower-volume sprayer that specifically target the plucking surface of tea plant. The aim of this study is to develop the method of lower-volume spraying for farmers. I changed the volume of pesticide spray per 10 ares according to the treatment, and I have studied about practical possibility of lower-volume partial spraying.

The prevention effect of feeding damage to new shoots caused by *Empoasca onukii* Matsuda was more stable when spraying at high volumes. However, there were many cases that damage index of *E. onukii* were no significant difference between the lower-volume partial (40 L/10 ares, 70L /10 ares) spraying and the conventional spraying (200 L/10 ares). On the other hand, the prevention effect and the annual number of *Scirtothrips dorsalis* Hood in lower-volume spraying (40 L/10 ares) was similar to conventional spraying. The prevention effect of the rolled leaves of *Caloptilia theivora* (Walsingham) tended to be superior in the case of larger volume of spraying. However, we also confirmed the case of a no statistically significant difference at the number of rolled leaves of *C. theivora* between the 200-L treatment and the control. Therefore, I thought a possibility that does not require pesticide spraying against *C. theivora* by the degree of their occurrence. There were also other cases that the prevention effect of conventional spraying (200 L/10 ares) and lower-volume partial spraying were similar (*Acaphylla theavagrans* Kadono: 40 L/10 ares; *Homona magnanima* Diakonoff and *Adoxophyes honmai* Yasuda: 70 L/10 ares, 90 L/10 ares). Besides, although much amount of volume of spraying (1000 L/10 ares) is usually needed to control *Pseudaulacaspis pentagona* (Targioni-Tozetti), the male adult population of *P. pentagona* in the control and the lower-volume partial spraying (40 L/10 ares) treatments tended to be lower than that in the conventional spraying. Spraying pesticides (e.g., target for *E. onukii*, *S. dorsalis*, and *C. theivora*) harmful to *P. pentagona*'s natural enemies in tea fields can be relieved by lower-volume spraying.

The number of natural enemies (Spiders, *Megaphragma* sp., *Encarsia* spp., and other wasps) tended to be higher in lower-volume partial (40 L/10 ares) treatment than in the conventional treatment. Moreover, I found that continuing the method of pesticide spraying, which leaves refugia in the leaf layer with sub-lethal dosages of pesticide, helps phytoseiid mites to evade pesticides, resulting in maintenance of the composition of the phytoseiid mite populations in terms of diversity and abundance. Maintaining the diversity and abundance of Phytoseiidae may have contributed to the stabilization of the *T. kanzawai* population at low densities in tea fields. Consequently, I found that the tea leaf layer acts as a useful shelter for natural enemies at the time of pesticide application, and that the lower-volume partial spraying method that targets around the plucking surface can help improve this sheltering function. To gain the balance of direct effect of pesticide vs. natural enemies in tea fields, we should try to spray at the lowest possible volume of pesticide with partial spraying.