THE CHANGE OF THE DISTRIBUTION PATTERN OF THE LARGE WEEVIL, HYPOSIPALUS GIGAS FABRICIUS (COLEOPTERA, RHYNCHOPHORIDAE) WITHIN A SINGLE GENERATION. A PRELIMINARY NOTE

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INTRODUCTION

Since majority of the wood- and bark-boring insects spend their immature period in a limited space under the bark, they are protected against attacks by natural enemies and unfavourable weather conditions to some extent. On the other hand, they are unable to move out of the bark even if the resource is exhausted, and hence the intraspecific competition for space and food may play an important role in the regulation of local population density. The analysis of spatial distribution patterns of this group of insects is interesting because of such a characteristic mode of their life: The distribution of larvae is primarily determined by egg-laying behaviour of adult females and its subsequent changes during development take place only through mortality, so that the change of distribution pattern within a single generation can easily be interpreted in terms of density-dependent and independent mortality processes that are operating locally upon the population.

In this short report the author describes the distribution pattern and larval mortality of the large weevil, Hyposipalus gigas Fabricius. Although the result presented here is not sufficient to draw any conclusion as to the regulation of population density, there is some indication of the occurrence of density-related process in the larval stage.

CENSUS METHODS

The eggs of the large weevil are deposited singly from spring to summer, in small holes that were dug into inner bark by adult females. The hatching larvae immediately bore into the wood in which they grow, so that the number of bores is equivalent to the number of young larvae. According to the author's observation in 1969, most of the newly emerged adults that were originated from eggs laid in spring flew away from the bores by autumn in the same year.

The study were conducted in Asakawa experiment forest of Gov. For. Exp. Sta., the suburb of Tokyo.

In 1970, the distribution of adults on logs of the Japanese black pine (Pinus thunbergii Parlato) was examined. In late July, 20 trees of 15 years old were felled and the part of the trunk below 280 cm in height was used for the study.
Ten out of the twenty cuttings were laid in Hakusan plot 1 and the other ten were laid in Hakusan plot 2. Each tree provided 4 logs of 70cm long and between 6cm and 10cm in diameter. These logs were laid horizontally in a row and covered with twigs of the pine. The distance between the two plots is about 210 m and a small dingle between them is covered with broad-leaved trees. The Hakusan plot 1 is surrounded by the pine wood with some blighted trees (about 40 years old) and broad-leaved trees, and Hakusan plot 2 is surrounded by young pine wood (about 15 years old) and broad-leaved trees. Censuses were made on 3, 4, 5, 6, 7, 10, 11 and 12 August. At each census time one half of the logs in each plot were examined and the insects that were observed on or under the logs were removed from the plots.

The distribution of larvae was examined in a field of the experiment forest (Plot 3). In the plot, about 200 Japanese black pines of 15 years old had been planted at equal intervals of 1 m × 1 m in 20 lines and 10 rows. In the middle of April in 1969, 40 trees in two rows in the south and 80 trees in every two rows in the remainder were felled at the height of 3-26 cm. Shortly after being cut down, it was observed that the large weevils bored in stumps of these felled trees. The census on the bores was carried out on 16-19 October. In this plot the stumps were attacked also by Shirahoshizo spp. and Myelophilus piniperda, but only the large weevil is the wood borer.

RESULTS AND DISCUSSION

1. Adults

The distribution pattern of adults on the logs was described by using the m-m regression method (IWAO, 1968), where m and m were calculated as the mean number

![Graph showing the m-m relation for adults on pine logs in Hakusan plot 1.](image)