Carnoy's solution (methyl alcohol 1 part and glacial acetic acid 1 part) for five minutes and pasted on a graduated transparent tape. Drawings were made by tracing figures reflected on section paper. Analysed characters were selected with those characters; 1) remarkably different among three species, and 2) common to two species but different in one species. The characters were analysed by using all castes, queen, worker, and male.

The great part of the specimens used for ecological distribution were from the collections housed in the Entomological Laboratory of Kyushu University. A few collections by Drs. M. Morishita and Y. Murakami were drawn upon, and further specimens were by Dr. M. Kubota, Dr. M. Kondo, Dr. K. Hayashida, Mr. H. Okamoto, and Dr. J. Hasegawa. Living materials from Sapporo in Hokkaido were donated by Dr. K. Hayashida. The other field collections were made by the present author. The main check points to distinguish each species were based on the rugosity pattern of head and alitrunk of worker and queen. Especially in the workers the rugosity of pronotum (prothorax) and the degree of prominence of mesonotum (mesothorax) were found to be the most reliable characters for the morphological identification of the three species.

For the chromosome studies, males, queens, and workers were collected from field and an artificial colony. Mostly, males developed parthenogenetically from worker eggs were used; these were determined to possess the same chromosome number as normal field males (Imai, 1966). The haploid chromosome numbers were observed in the brain cells and spermatocyte cells of males and the diploid number was determined from the brain cells of queens and workers, and also on the oogonial cells of queens. For the chromosome preparation, the aceto-orcein squash method was applied. Organs of suitable stages ("transparent" stage of prepupae, "slight rouge" eye stage of male pupae, and "scarlet" eye stage of queen pupae) was dissected out in Carlson's solution (Carlson, 1946) and kept for ten minutes in hypotonic solution (0.45% sodium citrate) at room temperature. After the hypotonic solution was removed the tissues were stained by 1% aceto-orcein (dissolved in 50% glacial acetic acid) and then squashed. The details of this method have been described in previous papers (Imai, 1966; part I of this series, 1969).

Observations

1. *Comparison of morphology*

The morphological characters observed in three species are summarized in the drawings in Plates 1-2. The correlations of observed characters in these species can be classified in three categories and are symbolized as follows:

1) Transient change in some character from one species to another is symbolized as $\rightarrow$.
2) Obvious resemblance in some character of one species with another is symbolized as ∞.
3) Apparent difference in some character between two species is symbolized as $//$.

The five observed interspecific relations can be symbolized as 1) o$\rightarrow$f$\rightarrow$s, 2) o∞