

matrix and the inversed pooled correlation matrix. Mahalanobis distances between the various groups were calculated for the data sets from which the calibrations were generated. These distances are displayed in Table 3. As a result of DA, a total of 24 hydrocarbon components were chosen as significant discriminators to predict the groups. Regression coefficients and partial F values are shown in Table 3.

Distribution of colonies with four types of CHC's in Japan

We classified CHC patterns of approximately 400 *F. japonica* colonies that were collected in Japan into four groups based on DA. Fig. 4 shows the distribution of the colonies with the four different types of CHC. Type 1 colonies

(white circles) were mainly distributed in southern Honshu, Shikoku, and Kyushu. Type 2 colonies (black circles) were distributed in southern Honshu, whereas Type 3 colonies (blue circles) are found in central and coastal (Pacific) northern Honshu. Type 4 (red circles) distribution is on the Sea of Japan coast of northern Honshu and Hokkaido. In several prefectures, the four types were sympatric.

Comparison of morphological features

We examined workers of the four types to find differences in external morphology by measuring head length (HL), head width (HW), antennal scape length (SL), compound eye length, cephalic index (HW/HL x 100), and scape index (SL/HW x 100). There were no significant differences in these morphological features of the workers among the

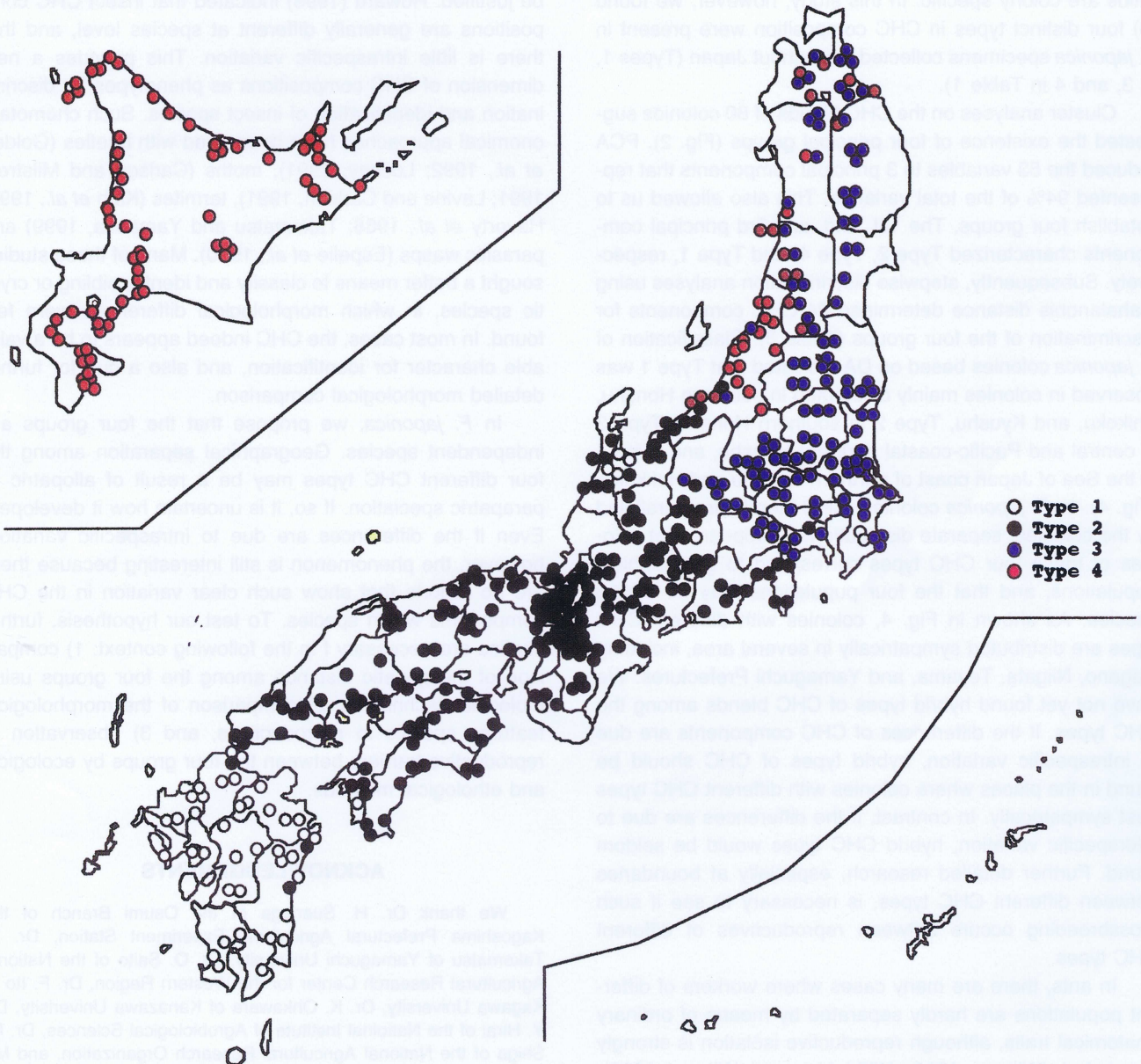


Fig. 4. Distribution of four types of CHC blends in Japan