

Form 3

Population structure of the Japanese orange fly, *Bactrocera tsuneonis* (Diptera: Tephritidae)

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The Japanese orange fly *Bactrocera tsuneonis* (Miyake) (Diptera: Tephritidae) is an important citrus fruit pest, which is distributed only in western Japan and China. To monitor and control them, it is important to determine their dispersal ability. To this aim, I employed population structure analysis using microsatellite markers. I developed 17 loci of microsatellite markers from RNA sequencing data, and 20 loci from genomic data. Then, I traced the expansion history of them using eight markers. A total of 235 larvae of *B. tsuneonis* were collected from abandoned orange orchards in three prefectures, Oita, Ehime and Yamaguchi. Oita had the fewest number of alleles; however, this is incongruent with the observation history in which Oita was the original area the species found first. In all prefectures, high inbreeding coefficients were observed. I concluded that bottlenecks and genetic drift was caused by the lower population size resulted from frequent chemical pesticides and their limited flying ability. Then I conducted population structure analysis at the orchard-by-orchard level. Isolation-by-distance was not observed, and fixation indices were relatively high, even if between the adjacent populations. These results indicated that this species has isolated in each orchard and long-distance dispersal seem very rare. As a consequence, monitor and control of them at the orchard and area level will be effective for quarantine.