

Range expansion of *Melanitis phedima* in Southern part of Nagano Prefecture

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The dark evening brown *Melanitis phedima* is a butterfly of Satyridae which inhabits Kyushu and Shikoku districts. In recent years, the distribution area of this butterfly has been expanded by the climate change. So it has been observed even in Tokai or Kanto district. This butterfly was observed in the southern part of Nagano Prefecture in 1970 and it became clear that it inhabited there from the 1990s. However, it is supposed that this butterfly cannot pass the winter in the central part of Nagano Prefecture. In this study, we investigated the distribution of this butterfly in the southern part of Nagano Prefecture and predicted the expansion range in the future based on the data stored from 1981. Moreover, this butterfly was reared in the incubators of the various temperature conditions and the total effective temperature and the developmental zero were calculated by the relation between the rearing temperature and the developmental period.

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