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Tests of Rensch's rule in the Japanese fireflies *Luciola cruciata* and *L. lateralis*

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Rensch's rule states that sexual size dimorphism increases with body size in animals where males are the larger sex, but decreases with body size in those where females are the larger sex (Rensch, 1950; Fairbairn, 1997). There have been many studies on this rule, but it is not yet examined in fireflies where females are larger.

Iguchi (2007) examined the validity of this rule in the Japanese fireflies *Luciola cruciata* and *L. lateralis* collected at 14 sites in Nagano Prefecure, Japan (Fig. 1). Part of the data were obtained from Mitsuishi (1990). Male and female body lengths were measured, and then allometry between male and female body lengths was calculated by major axis analysis (Warton et al. 2006).

In the regression of female body length on male body length, the slope of the allometric equation was greater than 1 in both species ($p < 0.02$ for *L. cruciata* and $p = 0.35$ for *L. lateralis*, Fig. 2). This indicates that although females are the larger sex, sexual size dimorphism increases with body size in both species.

Neither firefly species is likely to conform to Rensch's rule, although the allometric slope was not significant in *L. lateralis*.

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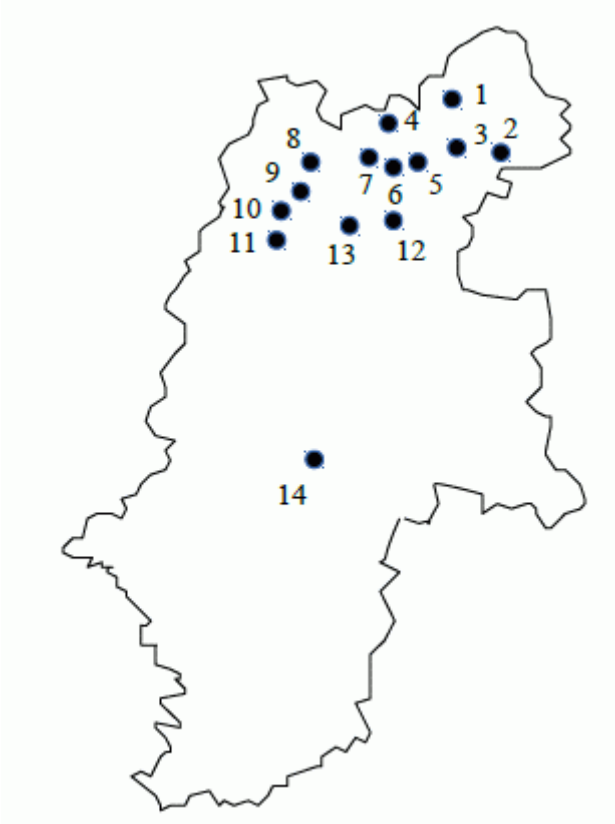

Fig. 1. Map of study sites in Nagano Prefecure. 1: Iiyama, 2: Shigakogen, 3: Nakano, 4: Shinano, 5: Toyono, 6: Sakanaka, Nagano, 7: Sakayachi, Nagano, 8: Kinasa, Nagano, 9: Ogawa, 10: Miasa, Omachi, 11: Iyari, Omachi, 12: Matsushiro, Nagano, 13: Noguchi,

Nagano, 14: Matsuo-kyo, Tatsno.

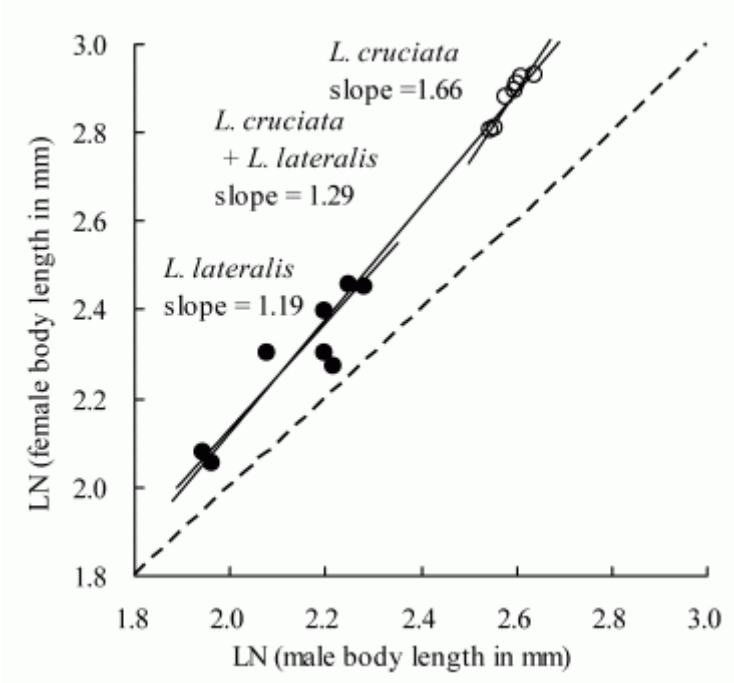

Fig. 2. Variation in male and female body length in *Luciola cruciata* and *L. lateralis*. Dashed line indicates that male body length is equal to female body length. LN denotes natural logarithm.