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Guild Structure of Gall Midges (Diptera: Cecidomyiidae) Associated with *Fagus crenata* (Fagaceae) in Relation to Snow Gradient

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Fagus crenata (Fagaceae) is ^adistributed discontinuously from Southern Hokkaido, the northernmost main island of Japan, to Southern Kyushu, the southernmost main island. The species is common in regions with heavy snow. At least twenty-six species of gall midge (Diptera: Cecidomyiidae) have been known to induce various midge galls on leaves of *F. crenata*. They must synchronize their life history to host plants to successfully induce gall. Some species overwinter inside winter buds (type 1) but the others in the litter layer on the ground (type 2). Hence, it is hypothesized that snow limits distribution of type 2 species because their adults cannot emerge from the ground at suitable timing. In this study, we compared the number of gall midge species and density of each species between beech forests with intermediate snow and those with heavy snow.

We established nine study plots were in Ishikawa Prefecture and six at Hachimantai, Akita Prefecture. In each study plot, five rectangular litter traps, 1 X 1 m, were set throughout seasons. Samples were collected at 2-4 weeks intervals. Spatial and annual variance of density and of species number for each gall midge species were analyzed in relation to maximum snow depth in the previous winter season. As a result, average numbers of gall midge species per plot were 10.2 (5-17) and 5.2 (2-8) at Ishikawa and Hachimantai, respectively. Among nine plots in Ishikawa, the density and the number of gall midge species tended to decrease with the snow depth. No type 2 species were collected in Hachimantai. These results suggest that snow is an important factor to determine distribution and abundance of gall midge species on *F. crenata*.

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