

Changes in parasitoid community structure by influx of less competitive parasitoid: A case study for multiple parasitoids on *Thecodiplosis japonensis*

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Community structure of parasitoid is consequence of co-evolution between interacting parasitoids, and the structure can be changed by introduction of new species. Parasitoids community on pine needle gall midge (PNGM), *Thecodiplosis japonensis*, which is an invasive species and a severe insect pest in pine forests in Korea, was surveyed using traps in a pine forest located in Yeongcheon, Korea from 1986 to 2010. Parasitoids community was consisted of 3 species: *Inostemma seoulis*, *I. matsutama* and *Platygaster matsutama*. Until 2004, *I. seoulis* and *I. matsutama* were dominant parasitoids and the former is a key parasitoid to suppress its host density although the latter emerged earlier than the former (Jeon et al., 2006). After collapse density of both parasitoids in 2004, the density of *P. matsutama* increased and dominancy of *I. seoulis* decreased by introduction of *P. matsutama* that is less competitive parasitoid to *I. matsutama*. The relationship between the host density and parasitism rate was reverse density-dependent, showing parasitism by parasitoids was low at early stage of invasion phase. The total parasitism by parasitoids was linearly related to parasitism by each parasitoid, and total parasitism contributed to suppression PNGM density because increase rate of host population linearly decreased with increase in total parasitism.

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