

Food-web structure of willow-galling sawflies and their natural enemies across Europe

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Abstract. Communities consist of species and their interactions. They can thus be described as networks, with species as nodes and interactions as links. Within such networks, the diversity of nodes and the distribution of links may affect patterns of energy transfer between trophic levels, the dynamics of the system, and the outcome in terms of ecosystem functioning. To date, most descriptions of networks have focused on single or relatively few sites, and have oftentimes been built on poorly resolved nodes and links. Yet, comparisons of local interaction networks reveal variation in space and in time, thus spurring interest in methods and theory for understanding patterns, drivers, and consequences of this variation. Progress in this field relies on access to replicate samples of comparable food webs across large spatiotemporal scales, resolved to species rather than to compound nodes. Due to the massive efforts required, high-quality data sets are still scarce. We created a data set on a single community type sampled across Europe: willow species (*Salix*), willow-galling sawflies (Hymenoptera: Tenthredinidae: Nematinae: Euurina), and their natural enemies (hymenopteran parasitoids and coleopteran, lepidopteran, dipteran, and hymenopteran inquilines). Each sample was referenced in space and time, and each node resolved with the highest possible resolution, including taxonomic affinity, gall type (for herbivores), and mode of parasitism (for natural enemies). Galler survival and link structure were resolved by dissection and rearing of gall inhabitants. In total, the data set is based on 641 site visits over 29 years, and on 165,424 galls representing 96 herbivore nodes and 52 plant nodes. The dissections and rearings yielded 42,129 natural enemies belonging to 126 species, and revealed 1,173 different links. The spatiotemporal and taxonomic resolution of these data make them amenable to analyses of both ecological and evolutionary processes of network assembly. Thus, this data set will facilitate testing of important hypotheses in recent community theory, concerning, e.g., the sampling effort needed to adequately describe interaction structure within ecological communities, the impact of environmental conditions and biotic filters on the distribution of species and their interactions, and the relationship between the global “metaweb” and its local realizations.

Key words: *decadal census; ecological interaction networks; Europe; food webs; galler; inquiline; parasitoid; Salix; spatiotemporal community structure; trans-continental survey; trophic interactions.*

The complete data sets corresponding to abstracts published in the Data Papers section in the journal are published electronically as Supporting Information in the online version of this article at <http://onlinelibrary.wiley.com/doi/10.1002/ecy.1832/supinfo>.

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