



Challenges for sustainable litchi production systems in northern Thailand: an ecological perspective

Euler¹, D.; Martin¹, K.; Sauerborn¹, J. and Hengsawad², V.

¹Institute for Plant Production and Agroecology in the Tropics and Subtropics, University of Hohenheim, Germany

²Post Harvest Technology Center, Faculty of Agriculture, Chiang Mai University, Thailand



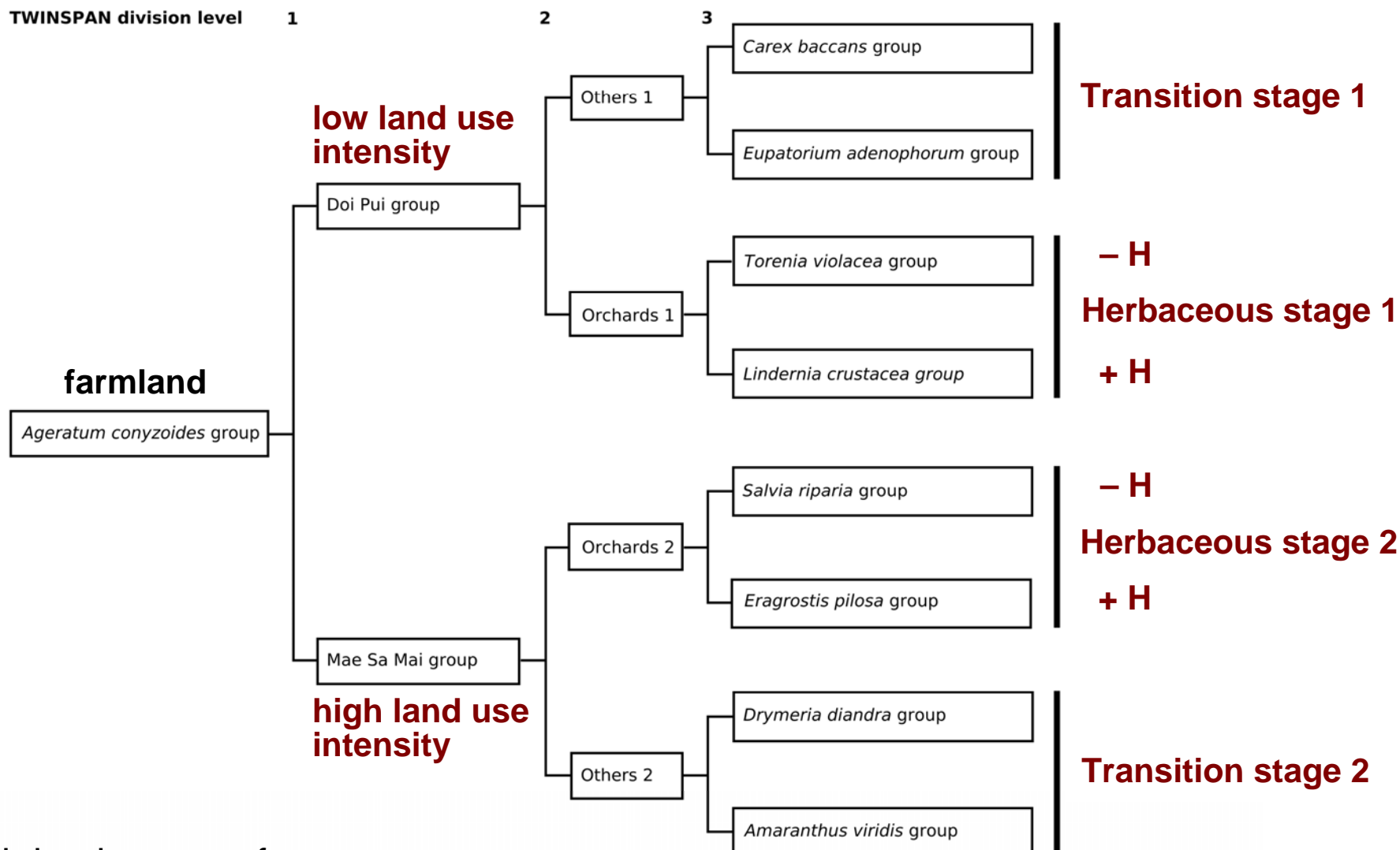


Introduction





Analysis of ground cover vegetation on landscape scale

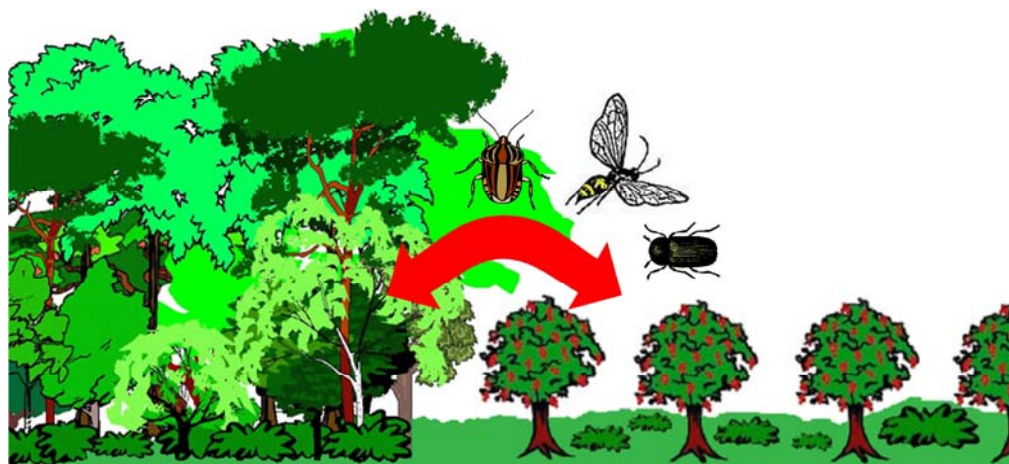
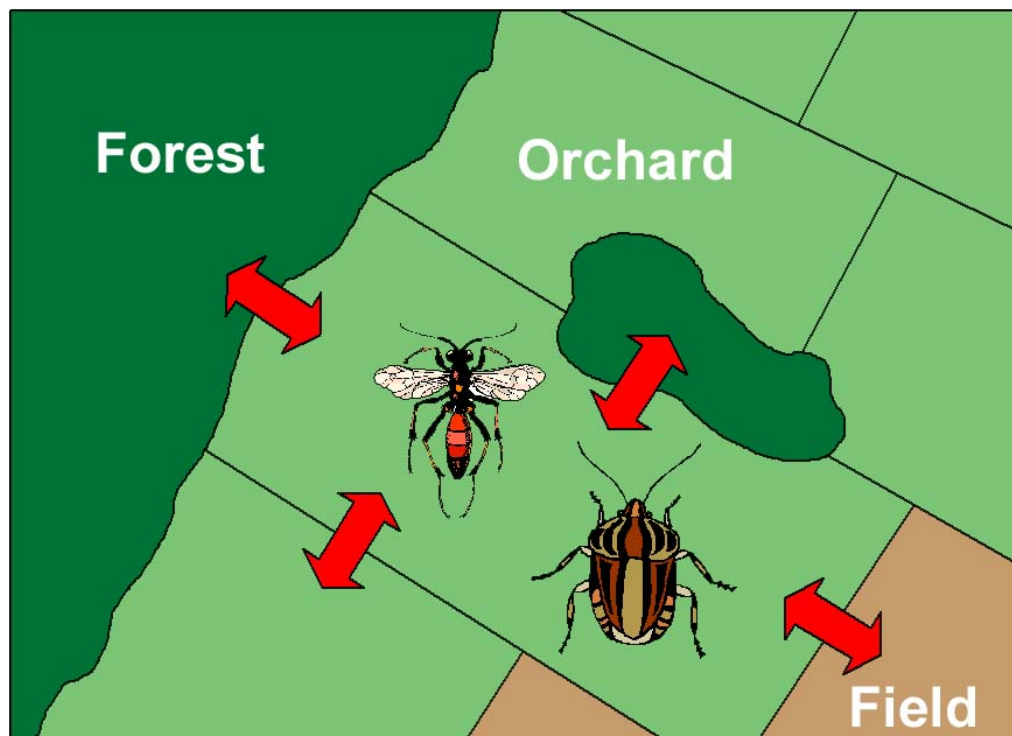


Simplified dendrogram of
TWINSPAN (modified after Euler et al. 2006)

+ H = high proportion of orchards with herbicide application,
- H = low proportion of orchards with herbicide application

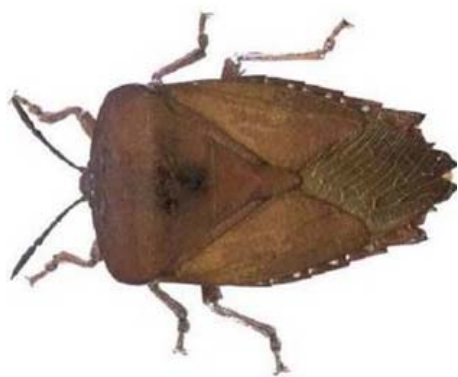
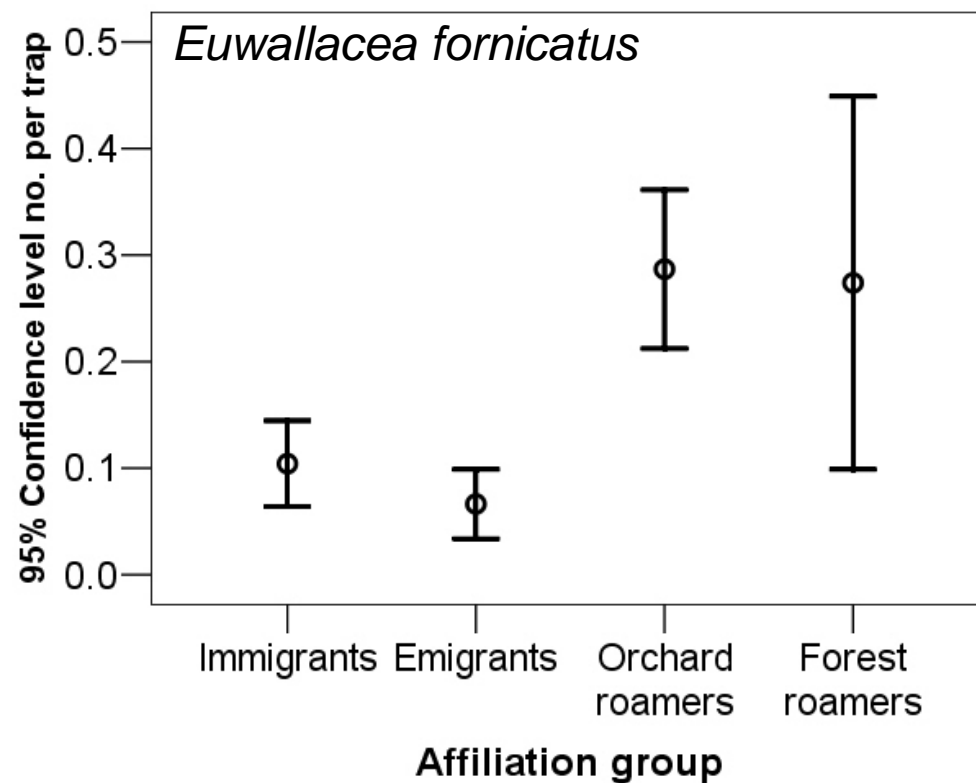
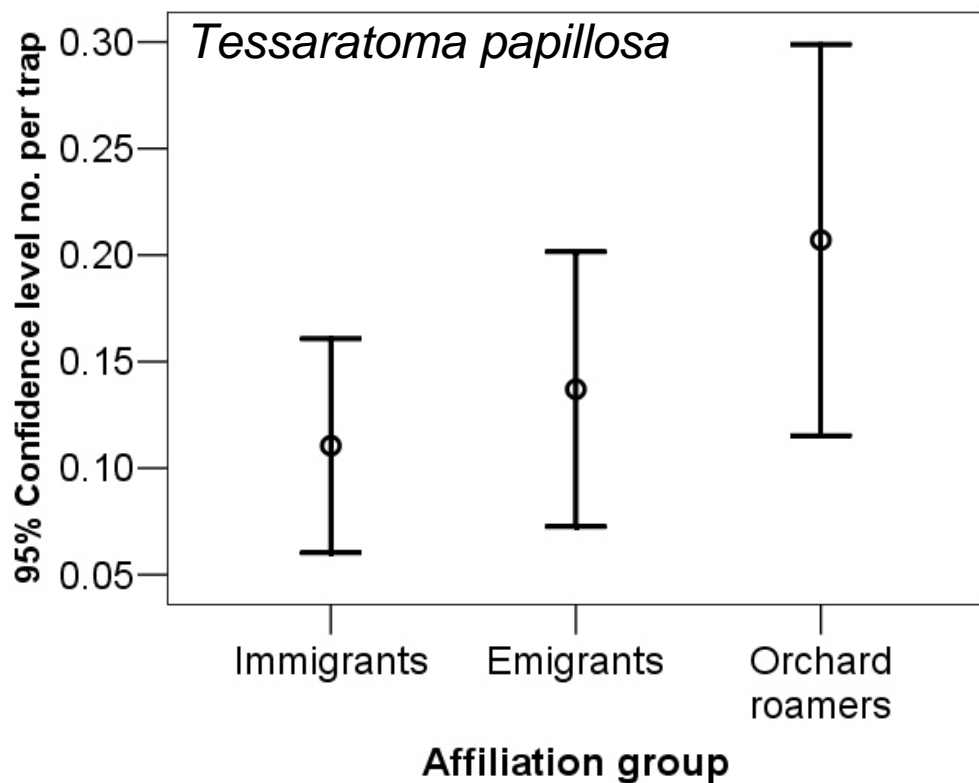


Analysis of the functional landscape interrelations



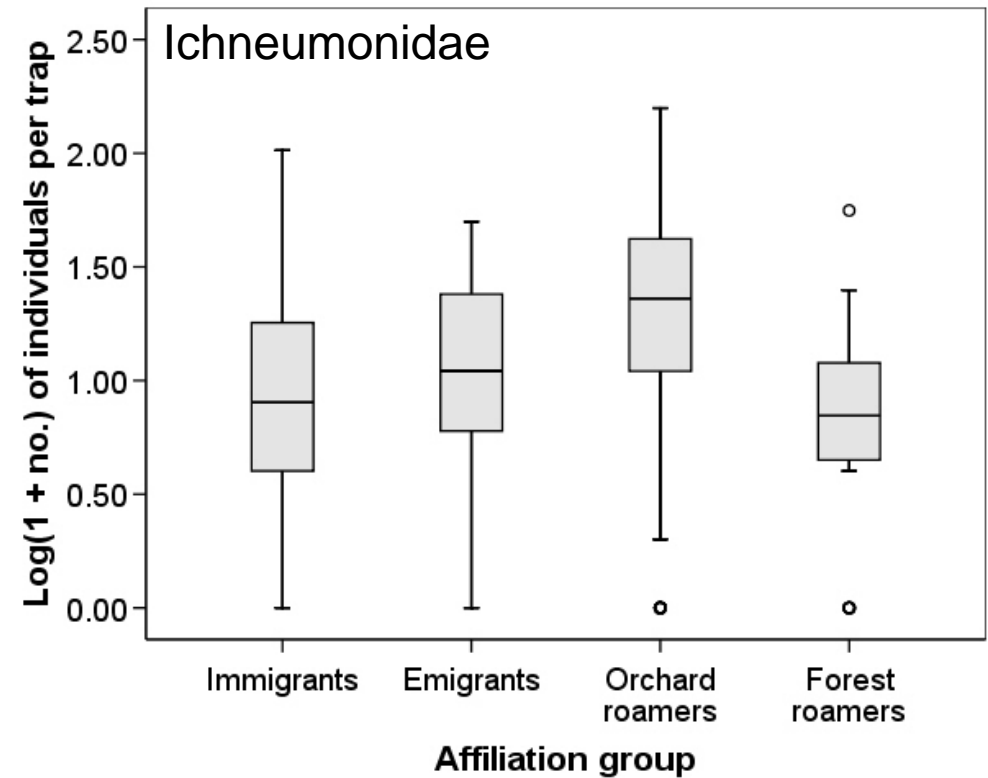
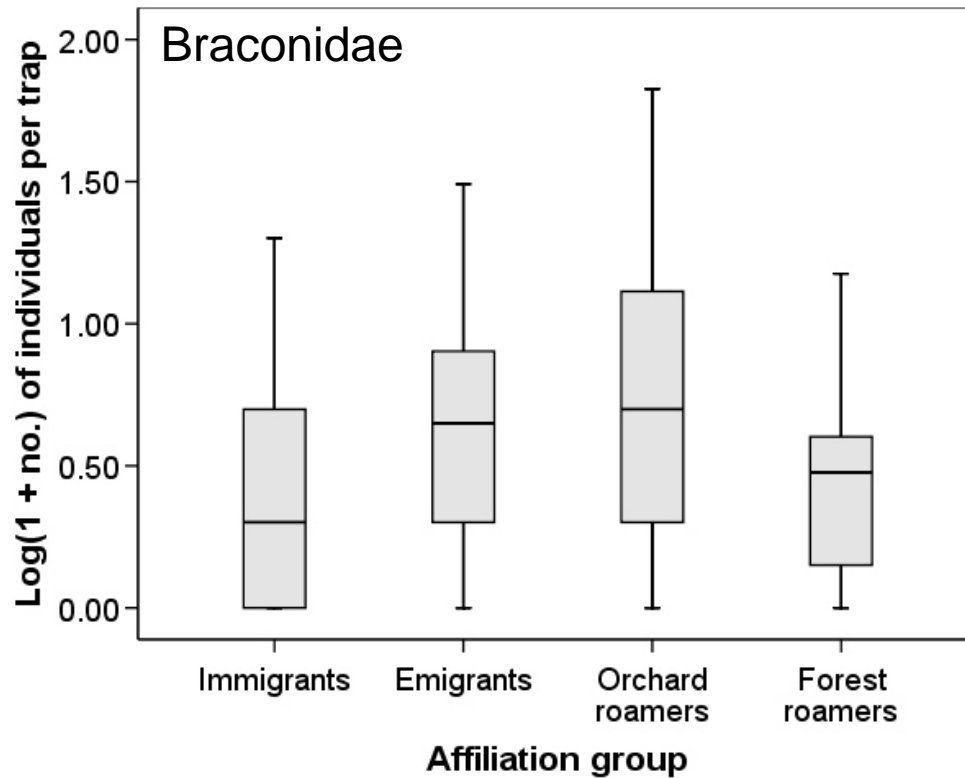


Spatial movement patterns of pest insects



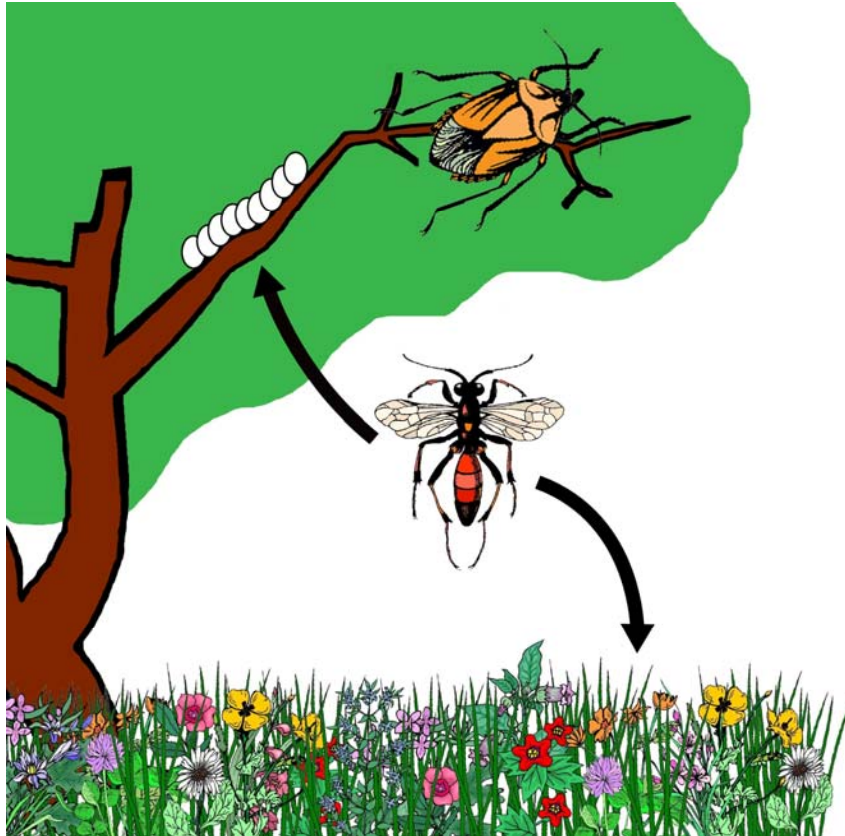


Spatial movement patterns of beneficial insects

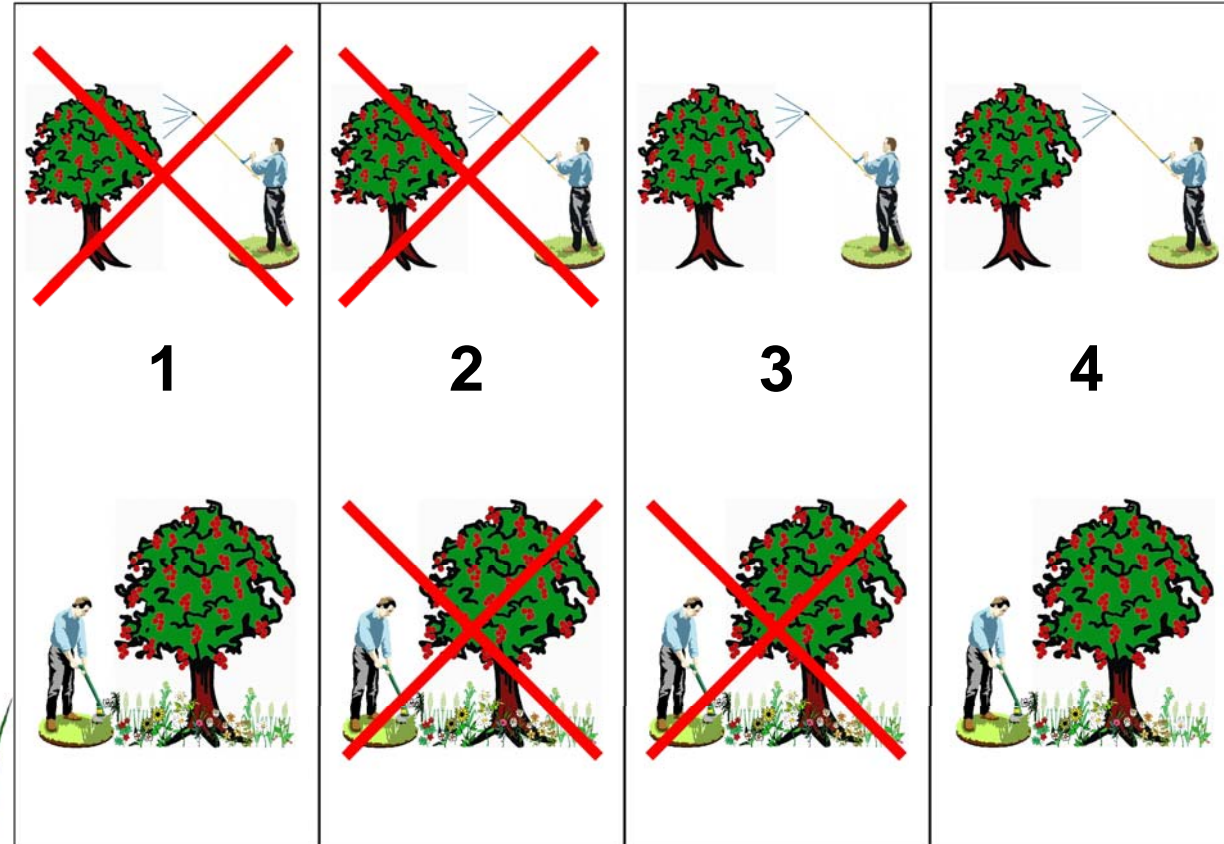




Management influence on beneficials and vegetation on field scale



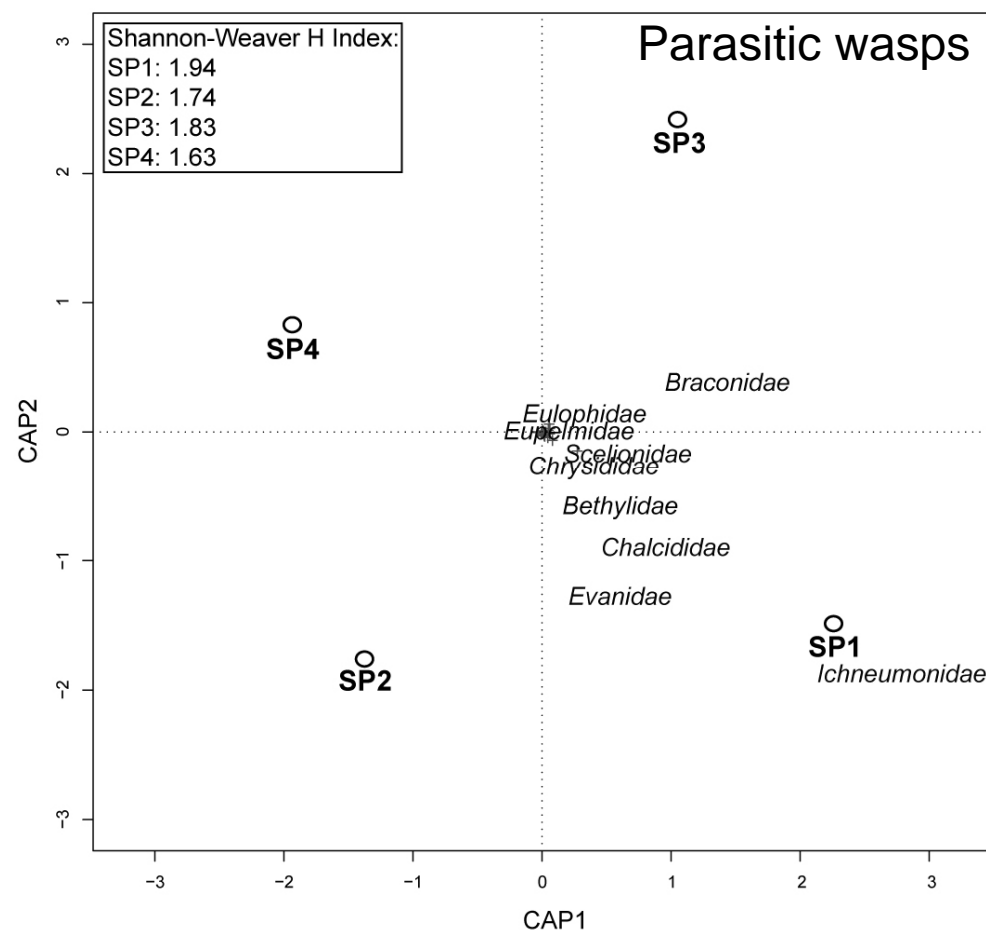
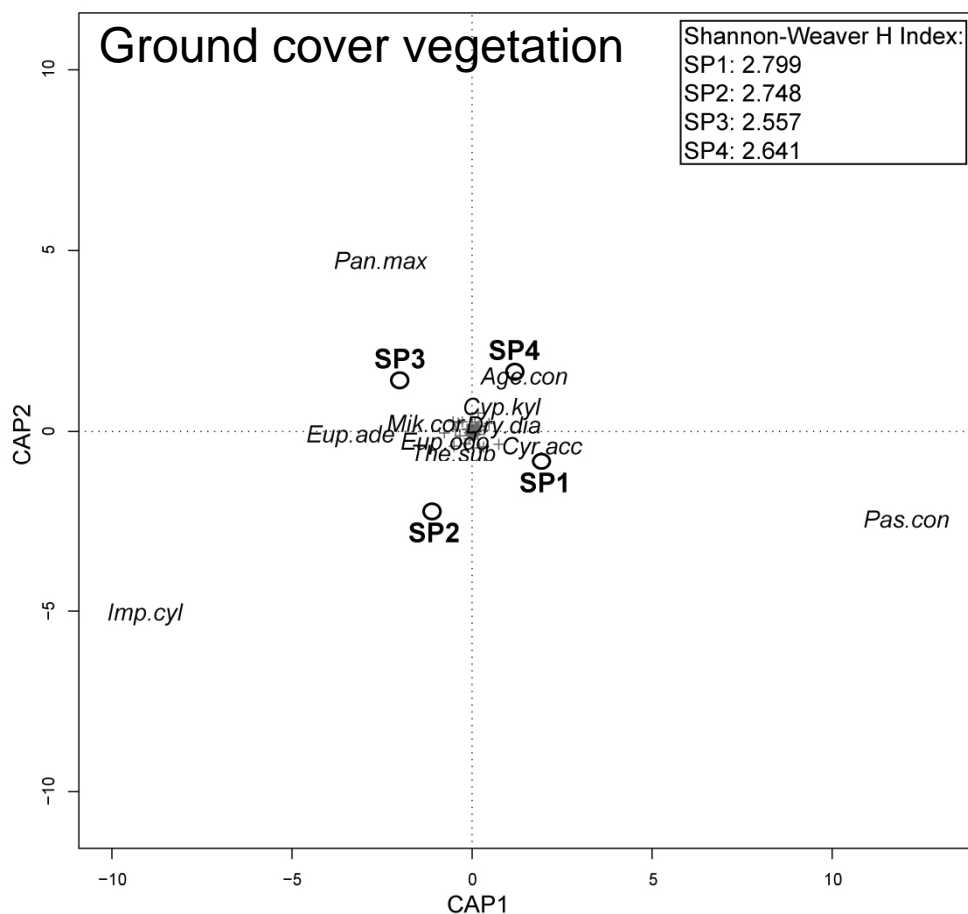
Interrelations of pests, parasitoids
and ground cover vegetation



Subplot treatments



Vegetation response and distribution of beneficial insects

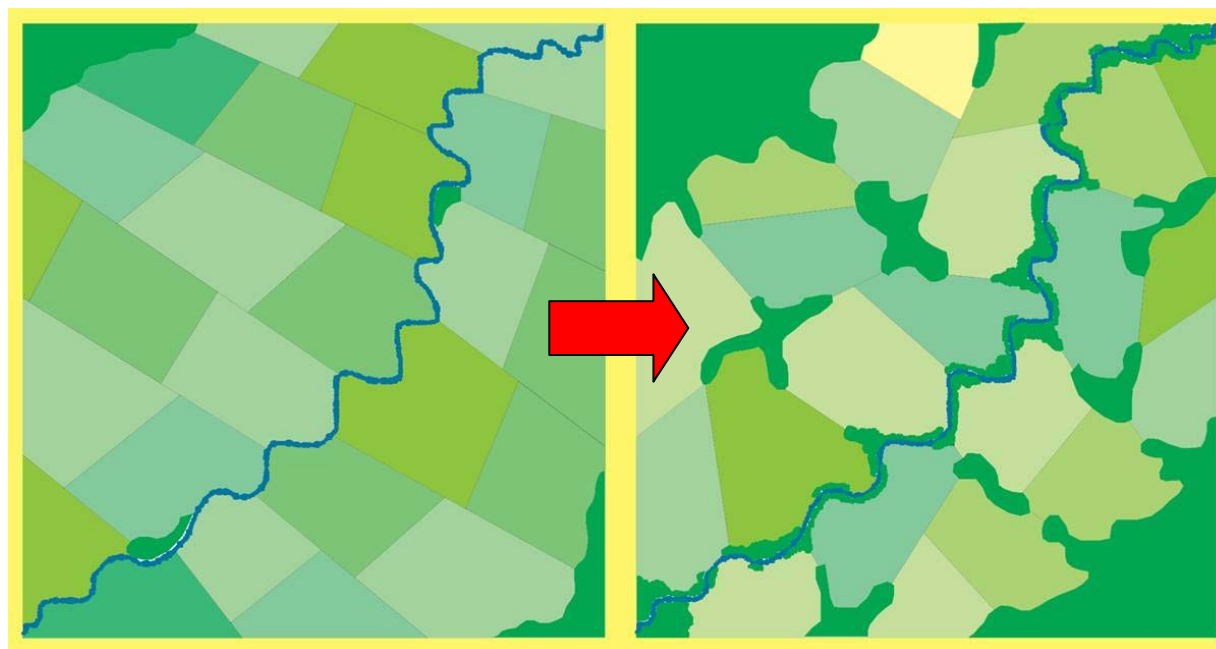
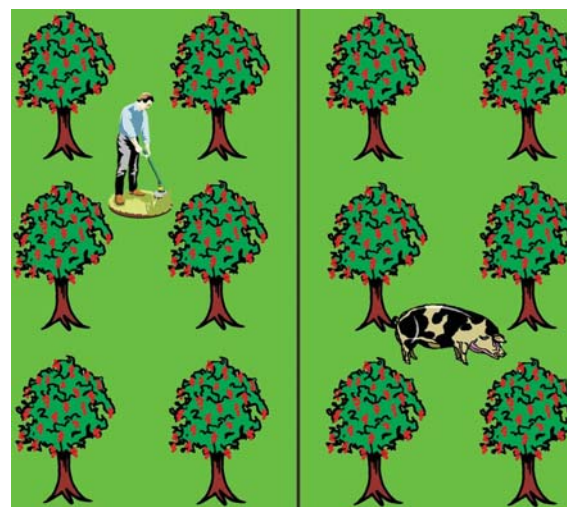
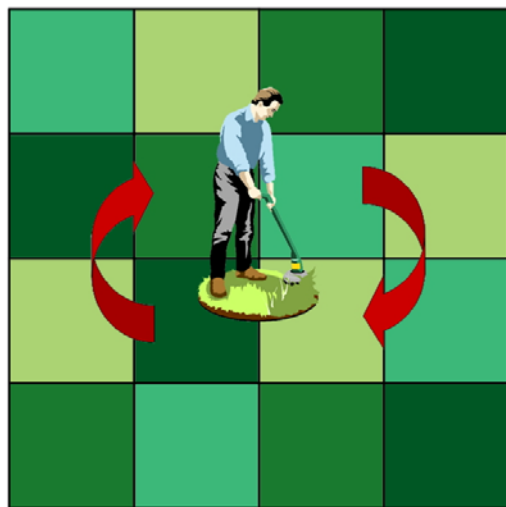


Shannon-Weaver diversity index H and CAP of ground cover vegetation and families of parasitic wasps (Parasitica+Chrysidoidea, Hymenoptera). Centroids of management treatments in subplots 1-4 (**SP1-4**) are displayed by circles ("O").

Most abundant plant species are represented by 3x3 alias names: **Age.con** = *Ageratum conyzoides*, **Cyp.kyl** = *Cyperus kyllingia*, **Cyr.acc** = *Cyrtococcum accrescens*, **Dry.dia** = *Drymaria diandra*, **Eup.ade** = *Eupatorium adenophorum*, **Eup.odo** = *Eupatorium odoratum*, **Imp.cyl** = *Imperata cylindrica*, **Mik.cor** = *Mikania cordata*, **Pan.max** = *Panicum maximum*, **Pas.con** = *Paspalum conjugatum*, **The.sub** = *Thelypteris subelata*. Most abundant families of **parasitic wasps** are named by full family names. All other plant species and families of parasitic wasps are shown as grey crosses ("+").



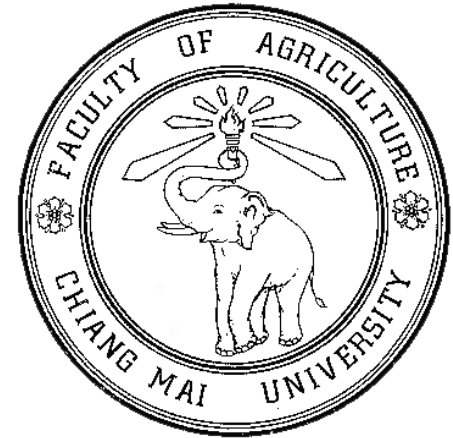
Conclusions and outlook





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The Uplands Program Staff



Deutsche
Forschungsgemeinschaft



Contact:

deuler@uni-hohenheim.de

martin-k@uni-hohenheim.de