Ecography

ECOG-00192
Fayle, T. M., Turner, E. C. and Foster, W. A. 2013. Ant mosaics occur in SE Asian oil palm plantation but not rain forest and are influenced by the presence of nest-sites and non-native species. – Ecography 36: xxx–xxx.

Supplementary material

Appendix 1. Power to detect patterns of species segregation between pairs of species in relation to abundance (prior to correction for multiple comparisons).

Given 20 sites, occupied by two equally abundant (N) focal species, assume that these two species completely exclude each other from any given site. Using chi-square tests for independence with Yate's correction for small sample sizes, it is only possible to detect a significant negative interaction between two equally abundant species when each occupies at least eight out of twenty sites (significant P-values in bold). Since the majority of species in the dataset occur at seven or fewer sites, considerations of statistical power preclude a pairwise analysis of species interactions. Instead, metrics measuring overall levels of co-occurrence between species in a dataset are appropriate here.

N=3, X2=0.001, P=0.930

N=4, X2=0.176, P=0.675

N=5, X2=0.800, P=0.371

N=6, X2=1.916, P=0.166

N=7, X2=3.673, P=0.055

N=8, X2=6.328, P=**0.012**

N=9, X2=10.287, P=**0.001**

N=10, X2=16.200, P<**0.001**

Appendix 2. Code used to analyse patterns of ant species co-occurrence.

```
### Create function for pairwise variance in species co-occurrence (modified from original nestedchecker  function)

nestedchecker.var<-function (comm){

var(designdist(comm, "(A-J)*(B-J)", "binary"))

}

### Standard C-score analysis

oecosimu(data.matrix,nestedchecker,method="swap",nsimul=30000,burnin=30000,thin=1)

### Cvar analysis

oecosimu(data.matrix,nestedchecker.var,method="swap",nsimul=30000,burnin=30000,thin=1)
```

Appendix 3. Removal of non-native species from the dataset resulted in increases in the degree of segregation between ant species in oil palm ferns and oil palm canopy communities (see Table 1). The removal of species *per se* is not expected to have this effect, rather it is expected that reduction in the size of the dataset will result in decreased statistical power, and therefore smaller standardised effect sizes. This is demonstrated here, where the analyses in which non-native species are removed is repeated, but in which the species to remove are chosen at random. *indicates datasets in which the non-natives have been removed. ‡indicates datasets in which a randomly selected subset of the species have been removed. Note that as before, C_{var}-score tests were only conducted for datasets in which the C-score was not found to be significantly different from that expected at random. No previously non-significant dataset became significant as a result of removing a random subset of species, including those that became significant on removal of non-natives (oil palm canopy, $1m^2$ scale and whole tree scale). The dataset that showed a significant degree of species segregation prior to removal of any species (oil palm ferns), had a lower standardised effect size and a higher (although still significant) P-value after removal of a random subset of species. These results demonstrate that the removal of subsets of species is not expected to result in increased strengths of patterns of segregation between species.

Habitat	Microhabitat	C-score				C_{var}-score			
		Obs.	Mean null	SES	P	Obs.	Mean null	SES	P
1m^2 scale:									
Oil palm	Epiphytic ferns	2.36	2.23	2.77	**0.006**	NA	NA	NA	NA
Oil palm*	Epiphytic ferns	2.26	2.10	3.59	**0.001**	NA	NA	NA	NA
Oil palm‡	Epiphytic ferns	2.23	2.11	2.32	**0.016**	NA	NA	NA	NA
Oil palm	Leaf litter	1.41	1.46	-1.85	0.983	0.13	0.17	-1.67	0.967
Oil palm*	Leaf litter	1.31	1.35	-1.49	0.947	0.14	0.17	-1.11	0.882
Oil palm‡	Leaf litter								
Oil palm	Canopy	2.17	2.14	1.30	0.107	0.10	0.10	0.29	0.381
Oil palm*	Canopy	2.00	1.97	1.98	**0.026**	NA	NA	NA	NA
Oil palm‡	Canopy	2.23	2.21	0.69	0.243	0.09	0.09	-0.38	0.638
Whole tree scale:									
Oil palm	Leaf litter	2.36	2.41	-1.42	0.932	0.28	0.34	-1.46	0.926
Oil palm*	Leaf litter	2.04	2.09	-1.57	0.945	0.22	0.28	-1.61	0.958
Oil palm‡	Leaf litter	2.31	2.37	-1.54	0.945	0.25	0.29	-1.21	0.885
Oil palm	Canopy	3.04	2.99	1.41	*0.090*	0.24	0.23	0.43	0.328
Oil palm*	Canopy	2.61	2.54	2.32	**0.012**	NA	NA	NA	NA
Oil palm‡	Canopy	3.09	3.05	1.14	0.130	0.21	0.21	-0.12	0.540