Ecography

E6046
Bell, J. R., King, R. A., Bohan, D. A. and Symondson, O. C. 2010. Spatial co-occurrence networks predicts the feeding histories of polyphagous arthropod predators at field scales. – Ecography 33: 64–72.

Supplementary material

Field methods

Three stages of sampling in winter wheat in 2006
1) Flowering of winter wheat (week beginning 12 June 2006: Zadoks scale 69–70); 2) milky or mealy ripe ears (week beginning 10 July 2006: Zadoks scale 73–85) 3) harvest (week beginning 31 July 2006: Zadoks scale 90–92).

Vortis suction sampler
Vortis suction sampler was manufactured by Burkhard Ltd, Rickmansworth. The 10 samples were then bulked and transferred to a plastic bag and placed inside a cool box on ice. In the laboratory, each sample was live-sorted from the detritus and stored in ethanol.

Mustard powder extraction
The active ingredient in mustard, alyll isothiocyanate, is a skin irritant which drives soft-bodied invertebrates out of the soil and has been shown to be more representative of worm abundance than all other commonly used extraction techniques (Paulson and Bowers 2002). 50 g of mustard powder was added to 100 ml of water and stirred to make a paste. After standing for 15 min, the paste was added to a watering can containing 6 L of water to create a mustard suspension which was then poured onto the soil surface within an enclosed high-sided quadrat (0.5 × 0.5 m). Slugs and earthworms were collected over a 15 min period and stored in ethanol.

Molecular methods

Using field caught beetles, genomic DNA was extracted from beetle foreguts using DNeasy Tissue Kits (Qiagen) following the manufacturer's instructions. The forward primers were labelled with a 6-FAM fluorescent tag and amplification products were detected using a 3130xl Genetic Analyzer (Applied Biosystems, Foster City, CA).

Statistical analysis

SADIE as a measure of pairwise co-occurrence
All analyses were conducted within the SADIEShell v1.22 graphical user interface (<www.rothamsted.bbsrc.ac.uk/pie/sadie/SADIE_home_page_1.htm>).

Producing co-occurrence maps using PROXSCAL
Given that the input data (SADIE X) is a measure that naturally lies along the interval scale, we used an unweighted model (identity scaling model) with interval proximity transformations. In this regard, PROXSCAL is novel in allowing these interval type models which facilitate the accurate, non-trivial positioning of species relative to one another (Borg and Groenen 2005). The identity scaling model was used to produced a discrete map for each month ($\mathbf{S}_{June}$, $\mathbf{S}_{July}$ and $\mathbf{S}_{August}$). Model parameters were: Torgerson starts allowing 1000 iterations per model and a minimum stress criteria of 0.00001 with a required dimension reduction to m=3. For more information see Borg and Groenen (2005).

Borg, I. and Groenen, P. 2005. Modern multidimensional scaling: theory and applications. – Springer.

Procrustean methods of comparison between co-occurrence networks
GPA is compatible with orthogonal Procrustes methods (OPM) with which it shares some similarities but only provides analysis of two matrices at any one time. One of these matrices is fixed (Gower and Dijksterhuis 2004) and this allows OPM to more easily provide digestible statistics, such as global percentage differences. More information can be found in Gower and Dijksterhuis (2004).

Gower, J. C. and Dijksterhuis, G. B. 2004. Procrustes problems. – OUP.

Regression between prey and proximity
The program RT (v.1.02c, CASM) was developed by B.F.J Manly and the implications of the adopted procedure are discussed at length in Manly (1994).

Manly, B. F. J. 1994. Randomization, bootstrap and Monte Carlo methods in biology. – Chapman and Hall.