

## Re-Bugging the System: Promoting Adoption of Alternative Pest Management Strategies in Field Crop Systems

RELU Project 0093

### Background

Natural pest control is a key ecosystem service delivered by biodiversity estimated to be worth \$417 x 10<sup>9</sup> per annum (Costanza et al., 1997). Enhanced utilisation of crop-associated biodiversity for pest-control will contribute to agricultural sustainability and the integration of biodiversity conservation and agricultural production.

However, experimental studies of natural enemy diversity indicate positive, negative and neutral effects on prey populations, explained by different underlying mechanisms (Fig. 1). Positive effects operate through resource-use differentiation and synergistic interactions whilst negative effects result from intra-guild predation and behavioural interference.

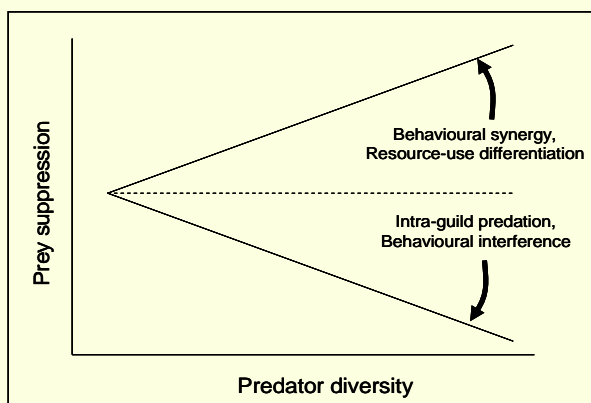


Fig.1 Observed relationships between predator diversity and prey suppression are the net effect of several possible positive and negative mechanisms.



Centre for  
Population Biology

IMPERIAL COLLEGE LONDON AND  
NATURAL ENVIRONMENT RESEARCH COUNCIL

Rural Economy  
and  
Land Use  
Programme

### Experiments



Understanding the local ecological contexts that determine the expression of these mechanisms will enable the development of effective conservation biocontrol strategies. For example, trophic complexity, pest density, alternative prey, spatial heterogeneity and disturbance may influence the relationship between natural enemy diversity and pest population dynamics.

The IC Ecology Group are undertaking a series of controlled environment and semi-field experiments with insect assemblages typical of cereal crop rotations and alfalfa crops (illustrated) to determine the ecological contexts that result in positive effects of natural enemy diversity on pest populations.

#### Research team

Georgianne Griffiths, Charles Godfray, Matt Thomas, Andy Wilby

#### Contact

[g.griffiths@imperial.ac.uk](mailto:g.griffiths@imperial.ac.uk)

#### References

Contanza et al. (1997) The value of the world's ecosystem services and natural capital. *Nature* 387, 253-260.