The billion dollar game of strategy: The effect of farmers' decisions on pest control

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Researchers say that the actions of individual farmers should be considered when studying and modelling strategies of pest control.

Research published in *PLOS Computational Biology* presents a model to understand the actions of humans and the dynamics of pest populations. The authors demonstrate this by using the example of the European corn borer, a moth whose larval phase is a major pest of maize.

Using game theory the researchers found that the farmers' perceptions of profit and loss, alongside communication networks between individuals, affects pest populations. A farmer's decision on whether to control a pest is usually based on the perceived threat of the pest and the guidance of commercial advisors.

Therefore, farmers in a region are often influenced by similar circumstances, which can create a coordinated response to a pest. This coordinated response, although not intentional, can affect ecological systems at the landscape scale.

Dr Alice Milne, Rothamsted Research scientist who led the study commented: "By understanding the dynamics of farmer decisions we can determine how to manage better the system, through improved communication, subsidy or taxation, to achieve robust and cost effective area-wide control, while minimizing the risk of the evolution of resistance to control strategies".

Dr Milne continued, "In our study we used concepts of game theory to build a model framework for understanding the feedback mechanisms between the actions of humans and the dynamics of pest populations. We demonstrate this framework with an example about the European corn borer".

More information: Milne AE, Bell JR, Hutchison WD, van den Bosch F, Mitchell PD, Crowder D, et al. (2015) The Effect of Farmers' Decisions on Pest Control with Bt Crops: A Billion Dollar Game of Strategy. *PLoS Comput Biol* 11(12): e1004483. DOI: 10.1371/journal.pcbi.1004483

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