**Delivering ‘Integrated Pest and Pollinator Management’ (IPPM)**

Paul A. Egan, Dept. Plant Protection Biology,

Integrated Plant Protection, SLU Alnarp

paul.egan@slu.se

Worldwide demand for pollinator-dependent crops is steadily increasing, including for many fruits and vegetables that form an essential part of healthy diets. Agriculture is at the same time challenged with increasing restrictions on pesticide use, which will require much deeper adoption of integrated pest management (IPM). Recognising the interlinkages between these challenges, and devising coordinated solutions, is hence a key issue towards ensuring future food security.

Towards this end, my research aims to devise more sustainable and resilient modes of pest and pollinator management in horticultural and field crops. This talk will present a forward-looking focus on recent work to: 1) develop a conceptual framework and empirical support for ‘Integrated Pest and Pollinator Management’ (IPPM) as an emerging paradigm; 2) design practical tools for stakeholder implementation of IPPM; and 3) define climate change threats to IPM and crop pollination, and the possible options for adaptation in low-income countries.

The IPPM framework elaborates approaches for the coordinated delivery of pollination and pest control practices and ecosystem services. Many empirical research gaps remain to be filled however. An important future focus will be the need to breed ‘IPPM-ready’ crops both resistant to pests and attractive to pollinators. This need is justified, in principle, by our findings that domestication has altered floral reward chemistry in highbush blueberry (with likely impacts on bumble bee gustation, nutrition, and disease), and that improving resistance can serve to enhance both pollination and biocontrol services in strawberry.

We recently introduced novel monitoring and decision support tools for IPPM based on a newly developed metric (i.e., the ‘joint economic impact level’). These tools provide a unified basis for IPPM decision making, and should prove of value to a range of stakeholders. Moving forward, greater participatory research will be required to establish empirical pollinator action thresholds for crops, and to catalyse pollinator monitoring as a routine on-farm activity.

Securing more resilient modes of pest and pollinator management will also require understanding the implications of climate change for both. Here I present recent research to quantify the impacts of natural hazards on pollinators (including a global meta-analysis, and experimental work on flooding in Nepal), and to synthesize how IPM and pollinator management can be adapted to protect crop yields – particularly for resource-limited smallholder farmers.