An unlikely ally: The Greater Waxmoth to the rescue…again?

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Dusk is falling over the African savanna. As the sun bids its long goodbye in the horizon, the tentacles of darkness creep over the landscape and the creatures of the night stir languidly from their day-long slumber. Perched in a nearby acacia tree, a male Greater Waxmoth (*Galleria mellonella*) let's out an acoustic sound; a mating call unmistakable to its female, who acknowledges it by a shy flap of its wings. But just to be sure his message went through, the male Greater Waxmoth unleashes its arsenal of pheromones; an irresistible aphrodisiac to its female, who then joins him in his lofty perch to mate.

Guests from hell

Shortly thereafter, the female sets off to find a suitable nesting site for her upcoming offspring. Never one to wait for an invitation anywhere, she spots a honeybee colony a stone's throw away from the acacia tree and promptly makes herself comfortable in it, laying its eggs with reckless abandon. A month later, the eggs hatch into ravenous larvae that will for the next several weeks eat anything in their path: honey, pollen and beeswax! The hapless honeybees in the colony, having watched their food reserves and waxy abode get literally eaten away, are left no choice than to abandon the hive and try to

rebuild their lives elsewhere, far from these self invited “guests from hell”.

Forgotten Glory?

At this point, it might be hard to think of the Greater Waxmoth as anything but a rampaging pest, spreading destruction in its wake. But not long ago, the study of this lepidopteran heralded great scientific breakthroughs. For in-vivo experiments involving animal infection studies, invertebrate models like the *Galleria mellonella* infection model provide a cheaper, less time consuming and more ethically sound alternative to the conventional mammalian models previously used. Since the immune system of the Greater Waxmoth mirrors that of mammals, pathogens infectious to humans elicit a simillar immune response in the larvae of this insect. This knowledge has been put to good use in studying the pathogenicity of bacterial infections (listeria and staphylococcus) and fungal infections (*Candida albicans*). This infection model has also been applied to study the efficacy and toxicity of drugs against these infections before clinical trials, saving thousands of human lives in the process.

Hello, old friend?

Against the backdrop of environmental pollution, one of today's greatest challenges; the Greater Waxmoth has again unwittingly found itself at the tip of scientific tongues around the world. By pure coincidence, a researcher in Spain left a cluster of Greater Waxmoth larvae in a plastic bag overnight

only to find they had eaten their way out. Upon further study, she reported that the larvae degraded the plastic to produce ethylene glycol through an enzymatic reaction. Although this finding has been met with generally piqued interest, it has drawn critism from some quarters. One critic stated that the data might not be sufficient to suggest the presence of an enzyme and suggested that perhaps the degradation was more attributable to mechanical breakdown by the insects' mouth parts. Nevertheless, this opened debate and stimulated further biotechnological research into the mechanism used by *Galleria mellonella* larvae to break down plastic. So far, recent research findings indicate that secretions of gut microbes in the larvae may be responsible but a separate group is studying the effect of the larvae's own digestive juices on the plastic.

Either way, a ground breaking discovery is in the offing and plastic pollution in the world may soon be a thing of the past, all thanks to the Greater Waxmoth. Not a shabby way for an old, wayward friend to make up for the destruction it has caused to beekeeping in the world!

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