**[The buzz](https://www.dawn.com/news/1693400/the-buzz)**

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The writer is a journalist.

AS fascinating as serial killers are (who can resist a glimpse into a twisted mind, I ask you?), equally fascinating are the tools and techniques used by investigators to catch these elusive murderers. The killers, quite naturally, take great pains to avoid detection and capture by covering their tracks, learning more about investigative techniques used to catch them, and ‘hunting’ further and further away from their home grounds.

Given that these aren’t your typical criminals, you can’t only rely on standard investigative techniques to catch them; you have to use forensic behavioral psychology to get into the heads of these monsters to learn how they think and thus, how to stop them before they claim more victims.

In this quest, authorities have found an unlikely ally: the bumblebee. No, they aren’t using bumblebees like some insectile bloodhounds to track down suspects, but are instead using models of bees’ foraging behaviour and applying them to how serial killers hunt.

This is how it works: when bees set out from their hives to find food they choose an area close to the hive, but not so close that predators and parasites can track them back to their hive. In essence, they create a ‘buffer zone’ for their own safety. Serial killers, and criminals in general, do the same; they commit crimes close to their homes, but far enough that neighbours don’t get suspicious and police don’t find their trail. And so, scientists began to study bee behaviour and the buffer zone technique, even going so far as to devise algorthims to understand and predict their movements. Those algorithms, once streamlined, were then used to improve the geographical profiling techniques authorities use to track down serial offenders.

There’s a lot to learn from bees.

The thing about breakthroughs like this one is that once they are discovered they seem painfully obvious in retrospect. How many of us have entertained a random, possibly off-beat thought and then abandoned it as being too ‘out there’ or just some thought exercise? For example, as a child I always wondered why insects don’t drown in the rain, or at the very least get badly bludgeoned by raindrops which, relative to their size, must feel like giant watery bowling balls pounding down on them at high velocities. How exactly does a fly, mosquito or butterfly survive that with their wings intact?

Granted, most such insects avoid flying in heavy rain, preferring to shelter under leaves or overhanging structures but just in case they do get caught out nature has built-in protection for these tiny, fragile creatures. Take butterflies: when scientists examined their wings under the impact of raindrops they found that the tiny, sharp bumps on those gossamer wings shattered the impacting raindrops into smaller pieces, thus minimising the impact. Think of them as tiny needles on which balloons are falling and then breaking up into smaller pieces; this doesn’t just reduce impact but also reduces heat loss from the cold droplet of rain falling on the butterfly. Without this, the insect would be unable to fly as efficiently and would become easy prey.

If water repellent wings are cool, then wait till you read about antibacterial wings. Cicadas and dragonflies, among other insects possess wings that can actually kill bacteria by impaling them on tiny nanopillar structures that act much like the spikes on the butterfly wings do. Inspired by this, scientists applied this principle to food packaging materials, coming up with a wrapping that kills 70 per cent of bacteria on impact thus greatly reducing bacterial contamination and food spoilage. Research is also being conducted on using similar materials to coat the surfaces of medical devices.

There’s a lot you can learn from locusts too. Feared by farmers for generations, locusts are as hardy as they are voracious — capable of travelling some 130 kilometres in a day and staying in the air continuously for long periods. Some swarms even cross oceans, with one particularly determined swarm flying all the way from West Africa to the Caribbean — a distance of over 8,000km. All the while their wings are beating furiously with surprisingly little wear and tear in a display of resilient design that we, for all our technological marvels, have been unable to achieve.

How do they manage this? Well, if you take a close look at the wings of locusts you’ll see a network of ‘veins’ that at first glance seem to serve no actual purpose. These veins are the secret to the locusts’ success as when a crack inevitably appears on the wing, it grows until it hits one of these veins, which then act as ‘crack barriers’ to halt the fissure in its tracks and prevent further damage.

But beyond biomimicry and catching would-be Javed Iqbals, perhaps the greatest lesson we can learn from the insect kingdom is how to maintain complex societies that can exist in harmony with the environment. To achieve big things, we really need to start thinking small.

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