Researchers find urban moths have smaller wings, reduced light response compared to rural moths

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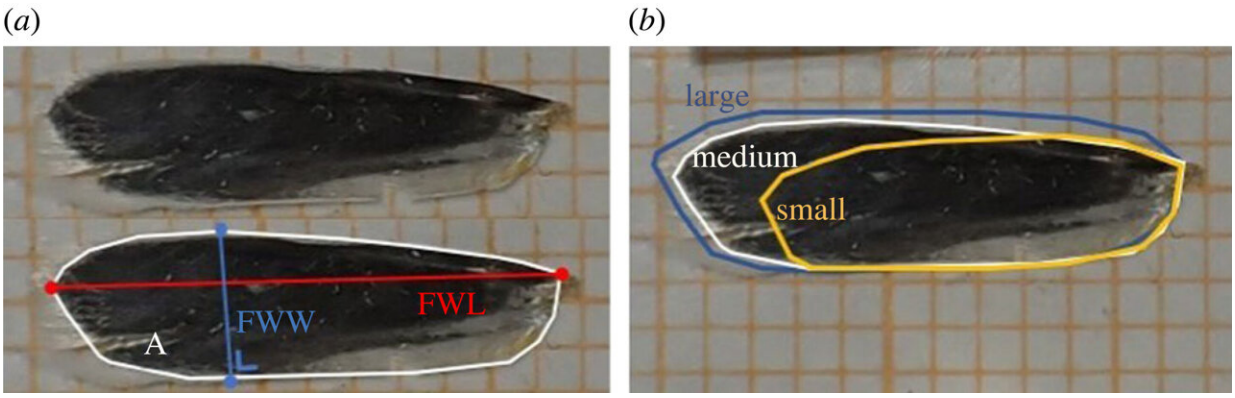

(a) Yponomeuta cagnagella forewing indicating the three morphological measurements taken: area (A), forewing length (FWL) and forewing width (FWW). (b) Contours of medium-sized forewing (white) with contours of relatively large (blue) and small (yellow) wings, respectively. Orange grid lines in the background indicate a millimeter scale. Credit: *Biology Letters* (2024). DOI: 10.1098/rsbl.2023.0486

A small team of environmental scientists affiliated with several institutions in Belgium and Switzerland has found evidence that city-

dwelling moths may be evolving smaller wings, possibly due to light pollution. In their project, reported in the journal *Biology Letters*, the group studied the body and wing sizes of several hundred moths captured in a prior research effort.

In the earlier experiment, researchers captured 680 live ermine moth larvae in brightly lit urban areas and in dark rural settings—both groups were then raised in the same test area. After they grew to adulthood, each was tested to see how it responded to a light source during otherwise dark nights. The researchers found 30% fewer urban moths captured in a light trap.

For this new study, the researchers measured the wing and body size of all the moths that had been tested in the prior experiment and found that the urban moths had slightly smaller wings than those from the country. They noted that the smaller wing size correlated with a weaker response to the light test.

The research team notes that smaller wings on moths would likely impact flight speed and distance, both of which could have an impact on obtaining food. They further suggest that a trade-off to smaller wings in urban settings could allow moths to survive if it meant reduced attraction to artificial light sources, which tend to prevent moths from feeding and make them more vulnerable to predation.

The research team acknowledges that they were not able to find a direct connection between light pollution and smaller wings, noting that other urban factors could have played a role, such as the more fragmented environment found in urban areas or different types of food sources. They also note that it is possible that the urban moths may be experiencing changes to their vision or the way their brains process the

environment due to living in constantly lit areas.

More information: Evert Van de Schoot et al, Evolutionary change in flight-to-light response in urban moths comes with changes in wing morphology, *Biology Letters* (2024). DOI: 10.1098/rsbl.2023.0486