

# A novel method to measure hairiness in bees and other insect pollinators

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## Abstract

1. Hairiness is a salient trait of insect pollinators that has been linked to thermoregulation, pollen uptake and transportation, and pollination success. Despite its potential importance in pollination ecology, hairiness is rarely included in pollinator trait analyses. This is likely due to the lack of standardized and efficient methods to measure hairiness. 2. We describe a novel methodology that uses a stereomicroscope equipped with a live measurement module software to quantitatively measure two components of hairiness: hair density and hair length. We took measures of the two hairiness components in 109 insect pollinator species (including 52 bee species). We analysed the relationship between hair density and length and between

these two components and body size. We combined hair density and length measures to calculate a hairiness index and tested whether hairiness differed between major pollinator groups and bee genera. 3. Body size was strongly and positively correlated to hair length and weakly and negatively correlated to hair density. The correlation between the two hairiness components was weak and negative. According to our hairiness index butterflies and moths were the hairiest pollinator group, followed by bees, hoverflies, beetles, and other flies. Among bees, bumblebees (*Bombus*) and mason bees (*Osmia*) were the hairiest taxa, followed by digger bees (Anthophorinae), sand bees (*Andrena*) and sweat bees (Halictini). 4. Our methodology provides an effective and standardized measure of the two components of hairiness (hair density and length) thus allowing for a meaningful interpretation of hairiness. We provide a detailed protocol of our methodology, which we hope will contribute to improve our understanding of pollination effectiveness, thermal biology and responses to climate change in insects.

## Keywords

Hairiness, pollen uptake and transportation, bees , *Bombus*, *Osmia*

## Files

No files are present for this dataset.

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