

S1 Table. Experimental design of the manuscript “Accuracy in bird predation assessment: Camera traps testing the efficacy of plasticine caterpillars as prey models” as described in the registered report prior to implementation of the experiment.

It should be noted that when drafting the protocol for the registered report, we initially thought we would be able to detect predation evidence with camera traps at the caterpillar level. Later, we realized that this evidence was only detectable at the branch level, which led to slight adjustments in the statistical models in the final manuscript. See the Materials and Methods section for further details.

Question	Hypothesis	Sampling plan	Analysis Plan	Rationale for deciding the sensitivity of the test for confirming or disconfirming the hypothesis	Interpretation given different outcomes	Theory that could be shown wrong by the outcomes
1. Could the lack of consistency between observers be detrimental to the plasticine model's method for assessing bird predation?	H1. The experienced observers who underwent the same training show a high degree of consistency in assessing attacks on models.	The 3 observers will carefully read the plasticine models bite image guide by Low et al. 2014 beforehand. Each of the 3 observers will then evaluate each of the 420 models and define whether or not it has been attacked by a bird.	The consistency of the 3 observers' assessments will be calculated using the intra-class correlation coefficient (ICC) with a two-way random effect model because each model will be evaluated by the same set of 3 observers.	We will use the <i>icc</i> function of the “irr” package (Gamer et al., 2019) to calculate the ICC among observers. We will consider an ICC greater than 0.75 to be representative of good consistency between the 3 observers (Koo & Li, 2016). In this case, we argue that we can randomly choose one observer among the 3. Its evaluation will be called "predation clues" for the following hypothesis.	If the ICC between the 3 observers is less than 0.75, their consistency will be considered insufficient (Koo & Li, 2016). In such a case, for each model where there was doubt as to its attacked or non-attacked status, the 3 observers will discuss and agree on its status. We believe that scientists using plasticine models probably proceed in this way, seeking the advice of colleagues when in doubt.	Theoretically, the plasticine model method is based on very good consistency between observers, without which human judgment would be too unreliable and subjective to characterize predation interactions using this method. Should this be the case, we would discuss the need for a standardized training system for recognizing bird bill marks on models.
2. Is there a bias between observer and camera detection of bird marks on models?	H2. Posterior detection of marks on models is inaccurate, increasing the number of attacks, because observers unconsciously account for marks not related to predation.	We will select 12 pedunculate oaks. We will attach 5 plasticine models to one of the branches of each of them. We will attach 5 corpses (dead caterpillars) on another branch of each of them, as far	$logit(P(Y_{ijk} = 1)) = \beta_0 + \beta_1 \times Detection_{clues,ijk} + \gamma_j + \zeta_k$ where Y_{ijk} is the binary response variable (one data point per detection method, branch, and model), with $Y_{ijk}=1$ indicating at least one predation clue or one bird presence evidence, and $Y_{ijk}=0$	In the experimental area, a previous study using plasticine caterpillar models coupled with observer detection of predation clues found bird attack rates ranging from 5 to 10% (see data from site “ <i>ele.val_1</i> ”, Schille et al., 2024).	If $\beta_1 \approx 0$, predation clues reflect predation evidence assessed by the camera because the difference between predation clues and evidence would then be minimal,	If predation clues overestimate or underestimate real predation on plasticine models, observers should (1) go through a process of training and/or assessment of their ability to

<p>as possible from the first branch. A camera trap will face each branch bearing a set of 5 caterpillars, whether corpses or models. Every two days, the caterpillars will be collected and a new set of caterpillars will be installed on 12 new oaks (this process will be referred to hereafter as "permutation").</p>	<p>indicating no detection. β_0 is the model intercept, representing the logit-transformed probability of detection for the camera-assessed bird presence evidence (i.e., $Detection_{Evidence,ijk}$), β_1 the coefficient of the fixed effect predation clues detected by the observer (i.e., $Detection_{Clues,ijk}$). γ_j is the random effect for tree identity nested in temporal permutation and follows a normal law $\gamma_j \sim N(0, \sigma_\gamma^2)$, ζ_k is the random effect for model identity and follows a normal law $\zeta_k \sim N(0, \sigma_\zeta^2)$.</p>	<p>We used these references in conjunction with our hypothesis and sample size to simulate 3 different datasets with different effect sizes:</p> <p>(1) Predation evidence of 5% detected with the camera versus 10% predation clues detected by human; (2) 8% evidence vs. 9% clues; (3) 9% evidence vs. 9% clues.</p>	<p>and β_1 would not be significant.</p> <p>If $\beta_1 < 0$, predation clues are underestimated in relation to predation evidence assessed by the cameras.</p>	<p>detect predation marks and/or (2) consider the more systematized use of cameras to observe what is actually happening in the field.</p>
<p>(H2) Bird predation evidence will be recorded on each of the 420 models using camera traps. In parallel, one or more observers (depending on the consistency of their assessments, see previous hypothesis) will also have assessed bird predation clues on each caterpillar. Each model will therefore be considered attacked or not attacked by 2 types of detection (clues or evidence).</p>	<p>We predict $\beta_1 > 0$ indicating an increased detection rate of predation clues compared to bird presence evidence.</p>	<p>Note that the simulation of this dataset is not fully randomized. We simulated the attacked/non-attacked status of the vast majority of models identical between the two types of detection. Only 1% of models have a different status in the e.g., dataset (2) in comparison to dataset (1). This means that 8% of attacked models are of the same status, regardless of the detection type.</p>	<p>We used package <i>simr</i> (Green et al. 2023) to perform power analyses on each of these 3 datasets.</p>	<p>Power analyses indicate a result of over 99% for the first two data sets (see Fig.S2). This suggests a very high probability of detecting significant differences in our sample size, if any. On the other hand, if the predation clues assessed by human observers accurately reflect real predation (predation evidence), the power analysis drops drastically to 0%. This remains logical, since in this case there is absolutely no</p>

				difference according to the type of detection.		
3. Does the predation on corpse vs. plasticine model differ?	H3. Given birds' ability to recognize fake and real prey, the number of attacks on corpses is higher compared to the models, both assessed by camera traps.	(H3) Camera traps will be used to assign the status "attacked" or "not attacked" by a bird to each of the 420 corpses and 420 models.	$\text{logit}(P(Y_{ij} = 1)) = \beta_0 + \beta_1 \times \text{PreyType}_{\text{Models},ij} + \gamma_j$ <p>where Y_{ij} is the binary variable, indicating the presence or absence of bird predation at each branch (one data point per prey type and branch). Specifically, $Y_{ij}=1$ indicates at least one instance of bird predation evidence, and $Y_{ij}=0$ indicates no evidence of bird predation. β_0 is the model intercept, representing the logit-transformed probability of predation on the corpses (i.e., $\text{PreyType}_{\text{Corpse},ij}$), β_1 the coefficient of the fixed effect of plasticine models (i.e., $\text{PreyType}_{\text{Model},ij}$). γ_j is the random effect for tree identity nested in temporal permutation and follows a normal law $\gamma_j \sim N(0, \sigma_\gamma^2)$. We predict $\beta_1 < 0$ because the average level of caterpillars attacked would be lower with the "model" treatment than with the "corpse" treatment. The mathematical transformation</p> $p = \frac{\exp(\beta_0 + \beta_1 \times \text{PreyType}_{ij})}{1 + \exp(\beta_0 + \beta_1 \times \text{PreyType}_{ij})}$ <p>must be applied to estimate the proportion of caterpillars attacked or not attacked using the model's estimated parameters.</p>	<p>In the same way as for the previous hypothesis, we have created 3 different datasets with different effect sizes:</p> <p>(1) Attack rate of 5% for models versus 10% for corpses; (2) 5% models vs. 20% corpses; (3) 10% models vs. 20% corpses.</p> <p>We performed power analyses on each of these 3 datasets.</p> <p>The 3 power analyses with 1000 simulations indicate a statistical power of over 75% for the 3 different scenarios (see Fig. S3). This suggests that our sample size has a high probability of detecting significant differences if they really exist.</p>	<p>If $\beta_1 \approx 0$, there is approximately the same level of attack on corpses and on models, i.e., birds do not distinguish between the two types of caterpillars.</p> <p>If $\beta_1 > 0$, the average level of caterpillars attacked would be higher on models than on corpses, i.e., the predation attempts done on models do not reflect the predation.</p>	<p>If predation attempts on models do not reflect predation as observed on corpses, this would argue for the use of corpses in studies of predation interactions between insectivorous birds and herbivorous caterpillars. However, we would need to be cautious about the species used, and carefully discuss their condition (live or corpse) at the time of experimentation.</p>

<p>4. Is there a bias between observer and camera detection of bird marks on corpses?</p> <p><i>If no, and according to the results for H3, we might be able to answer :</i></p> <p>Are real caterpillars a more accurate method than plasticine caterpillars for quantifying predation of herbivorous insects by birds if not complemented with the detection of predation evidence assessed by camera traps?</p>	<p>H4. The observer detection of predation clues leads to an overestimation of the predation on corpses accounting for missing individuals as a predation event.</p>	<p>(H4) Bird predation evidence will be recorded on each of the 420 corpses using camera traps. In the field, we will assess bird predation clues on each corpses. A missing corpse or with a missing part will be considered attacked. Each corpse will therefore be considered attacked or not attacked by 2 types of detection (clues or evidence).</p>	<p>Exactly the same model as for hypothesis H2 on real dead caterpillars.</p> $\text{logit}(P(Y_{ijk} = 1)) = \beta_0 + \beta_1 \times \text{Detection}_{\text{clues},ijk} + \gamma_j + \zeta_k$ <p>where Y_{ijk} is the binary response variable (one data point per detection method, branch, and model), with $Y_{ijk}=1$ indicating at least one predation clue or one bird presence evidence, and $Y_{ijk}=0$ indicating no detection. β_0 is the model intercept, representing the logit-transformed probability of detection for the camera-assessed bird presence evidence (i.e., $\text{Detection}_{\text{Evidence},ijk}$), β_1 the coefficient of the fixed effect predation clues detected by the observer (i.e., $\text{Detection}_{\text{Clues},ijk}$). γ_j is the random effect for tree identity nested in temporal permutation and follows a normal law $\gamma_j \sim N(0, \sigma_\gamma^2)$, ζ_k is the random effect for corpse identity and follows a normal law $\zeta_k \sim N(0, \sigma_\zeta^2)$. We predict $\beta_1 > 0$ because it would reflect additional predation clues compared to predation evidence.</p>	<p>The power analyses of hypothesis H2 are completely transposable to this hypothesis (see Fig. S2).</p>	<p>If $\beta_1 \approx 0$, predation clues exactly reflect predation evidence assessed by the camera.</p> <p>If $\beta_1 < 0$, predation clues are underestimated in relation to predation evidence assessed by the cameras.</p>	<p>In the case where $\beta_1 \approx 0$, and only in this case, there is no need for camera trap detection to assess predation on corpses; detection by human observers is sufficient. We can then refer to hypothesis H3 to determine whether corpses are indeed a better method for assessing bird predation on herbivorous insects than plasticine models.</p>
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