Summary Table

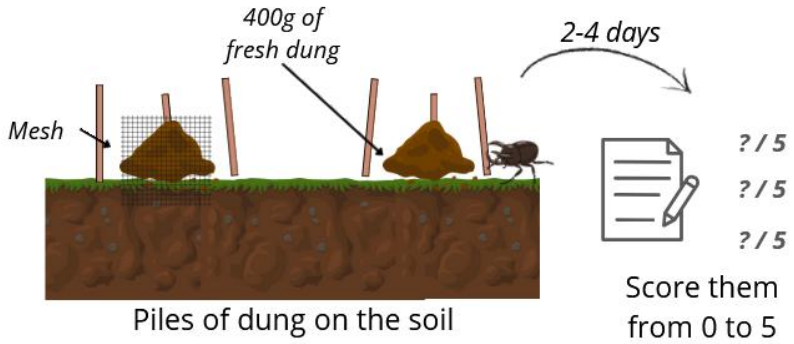
Sources

Test	*Sources*
Dung removal test	*(Chiew et al. 2024; Manning et al. 2017; Woodham et al. 2019; Correa et al. 2024; Schon et al. 2025)*
Toilet paper decomposition test	*(Chiew et al. 2024; Davies, Parr, and Eggleton 2021)*
Earthworm cast count	*(Chiew et al. 2024; Tuma et al. 2019)*
Bait lamina feeding test	*(Chiew et al. 2024; Woodham et al. 2019; Tao et al. 2016; Simpson et al. 2012; Riutta et al. 2016)*
Leaf damage comparison	*(Getman-Pickering et al. 2020; Johnson et al. 2016)*
Plasticine caterpillar predation test	*(Chiew et al. 2024; Howe, Lövei, and Nachman 2009; Low et al. 2014; Schwab et al. 2021)*
Flower-to-fruit ratio test	*('Estimating Your Fruit Set - Cooperative Extension: Maine Wild Blueberries - University of Maine Cooperative Extension', n.d.; Dölek Gencer et al. 2023)*
Seed removal test	*(Chiew et al. 2024; Ewers et al. 2015; Lamperty et al. 2020)*

Dung removal test – Protocol

Measures the role of dung beetles in decomposing and recycling cattle dung into the soil.

VISUAL

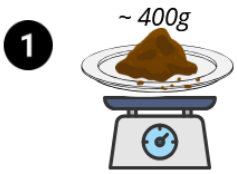


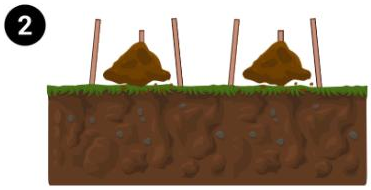
EQUIPMENT

- Cattle dung (2 or more x ~400g)
- Weighing scales
- Paper plates
- Fine mesh
- Notepad, pen or pencil

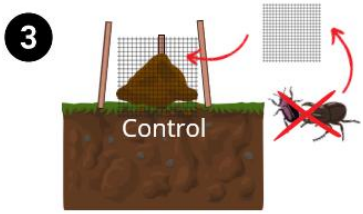
STEPS

1. Collect fresh dung portions (less than 1h old), of similar size and weight. Place each on a paper plate, weigh them and record.

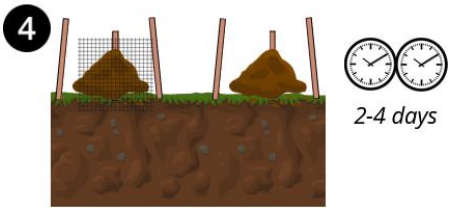




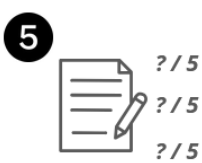
2. Set them on the soil, 1m apart..



3. Cover one portion of dung with a mesh grid, which prevents dung beetles from accessing the dung: this is your "*control*".



4.. Wait a few days, depending on weather conditions.



5. Estimate dung removal due to beetle activity by scoring each dung portion from 1 (no removal) to 5 (complete removal).

Dung removal test – Data sheet

Sample ID	Date	Location	Data collector	Treatment code
CBG_A1_T1				

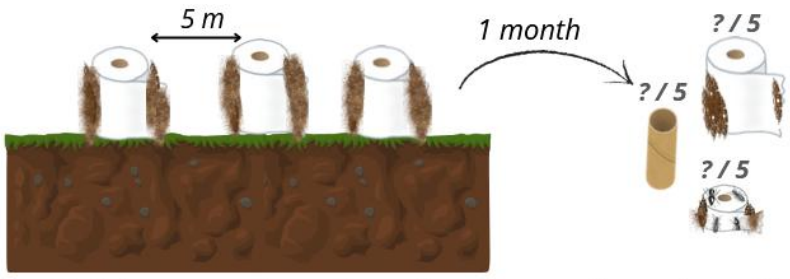
FIRST STEP	
Dung portion	**Initial weight**
Control	
Test	

SECOND STEP					
Dung portion	**Score 1**	**Score 2**	**Score 3**	**Score 4**	**Score 5**
Description	*(Dung intact with odour and moisture)*	*(Dung intact with no odour and moisture)*	*(> 50% remaining and beginning to fragment)*	*(< 50% remaining and fragmented)*	*(Dung decomposing with only flat mass remaining)*
Control n°					
Control n°					
Test n°					
Test n°					

Toilet paper decomposition test – Protocol

Assesses soil biological activity by measuring the rate of cellulose decomposition.

VISUAL



Toilet paper rolls on the soil Score from 0 to 5

EQUIPMENT

- Unscented white toilet paper rolls
- Measuring tape (5 metres or longer)
- Notepad, pen or pencil
- Optional: stakes (for marking positions)

STEPS

1. Take unscented, plain white toilet paper rolls and place them directly on the soil, marking them at least 5 metres apart.

2. Brush aside surface litter to ensure direct contact between the soil and the paper.

3. Leave the rolls in place for 1 month.

4. After 1 month, score each roll from 0 (intact) to 5 (paper completely gone

5. Record all scores to evaluate soil decomposition activity in your field and calculate the proportion of toilet rolls eaten.

Toilet paper decomposition test – Data sheet

Sample ID	Date	Location	Data collector	Treatment code
CBG_A1_T2				

FIRST STEP						
Toilet paper roll n°	**Score 0 (no attack)**	**Score 1 (1-25% removed)**	**Score 2 (26-50% removed)**	**Score 3 (51-75% removed)**	**Score 4 (76-99% removed)**	**Score 5 (all removed)**
1						
2						
3						
4						
5						
6						

SECOND STEP	
Score	**Total**
Score 0	
Score 1	
Score 2	
Score 3	
Score 4	
Score 5	
Total number of rolls	

Proportion of toilet rolls eaten:

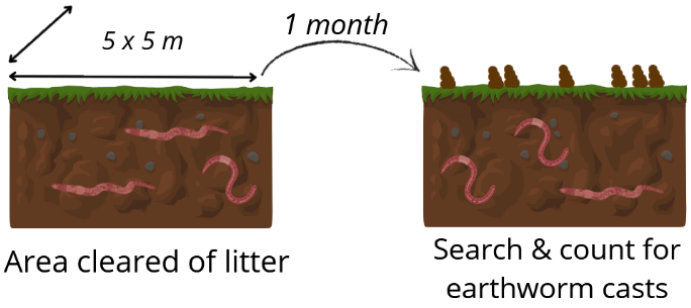
$$\frac{1 \times Nb\ of\ rolls\ for\ score\ 1 + \cdots + 5\ \times Nb\ of\ rolls\ for\ score\ 5}{Total\ number\ of\ rolls\ \times\ 5} \times 100$$

THIRD STEP	
Proportion of toilet rolls eaten	

Earthworm cast count – Protocol

Estimates earthworm activity through the presence of casts, indicating soil mixing and aeration.

VISUAL

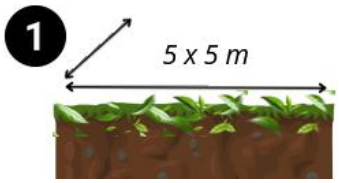


EQUIPMENT

- Measuring tape
- Garden rake or hands (to remove surface litter)
- Notepad, pen or pencil

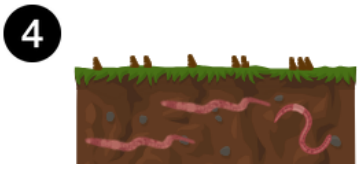
STEPS

1. Select a 5 x 5 metre area of soil.



2. Clear all litter and debris from the surface.

3. Wait for 1 month to allow earthworm activity.



4. Visually inspect the area for cylindrical soil piles (earthworm casts).

5. Count and record the total number of casts.

Earthworm cast count – Data sheet

Sample ID	Date	Location	Data collector	Treatment code
CBG_ A1_T3				

FIRST STEP	
Surface area	

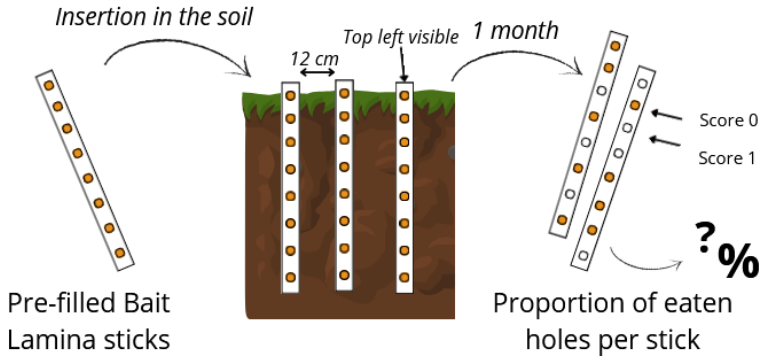
SECOND STEP		
Tick for an earthworm cast	Where	Comment
☐		
☐		
☐		
☐		
☐		

THIRD STEP	
Total number of earthworm casts	

Bait lamina feeding test – Protocol

Evaluates soil invertebrate feeding activity as an indicator of soil biological function.

VISUAL

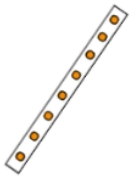


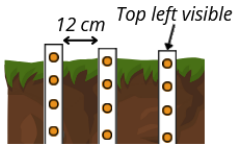
EQUIPMENT

- Pre-filled Bait Lamina sticks (plastic strips with holes)
- Ruler
- Notepad, pen or pencil

STEPS

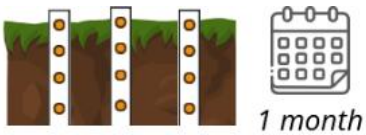
1. Use pre-filled Bait Lamina sticks (ready-to-use with bait already inside).

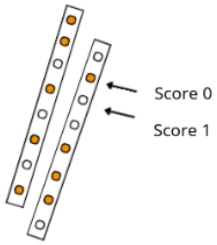




2. Insert ten sticks per plot vertically in the soil, spaced about 12 cm apart, with the top end left visible.

3. Leave them in place for a month.





4. Retrieve the sticks and inspect each hole: score 0 if not eaten, 1 if more than 75% eaten.

5. For each stick, calculate the proportion of eaten holes to estimate soil invertebrate feeding activity.

Bait lamina feeding test – Data sheet

Sample ID	Date	Location	Data collector	Treatment code
CBG_A1_T4				

FIRST STEP				
	Description	Area	Nb of sticks	Total nb of holes
Zone n°1				
Zone n°2				
Zone n°3				

SECOND STEP			
Zone X		Zone X	
Stick n°	Number of holes eaten	Stick n°	Number of holes eaten
1		1	
2		2	
3		3	
4		4	
5		5	
Total	**0**	**Total**	**0**

Proportion of eaten holes:

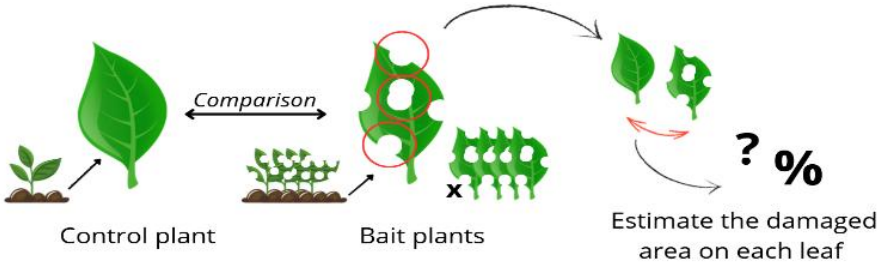
$$\frac{Number\ of\ eaten\ holes}{Total\ number\ of\ holes} \times 100$$

THIRD STEP	
Zone n°	Proportion of eaten holes (%)
1	
2	
3	

Leaf damage comparison – Protocol

Quantifies herbivory pressure by comparing leaf damage between protected and exposed plants.

VISUAL

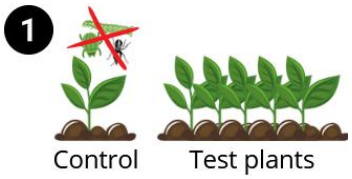


EQUIPMENT

- Test plants and one protected control plant
- Magnifying glass
- Notepad, pen or pencil
- Optional: mobile phone with *LeafByte* app
- Optional: ruler (for consistent leaf measurement)

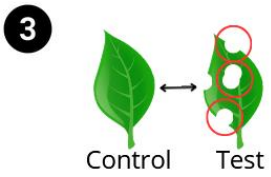
STEPS

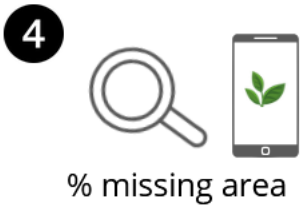
1. Select a plant species with several individuals. Protect one of them from pests as your "*control*".



2. Leave all plants undisturbed for around 7-10 days.

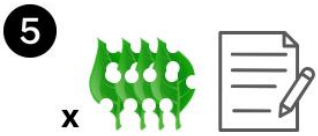
3. After this period, select a leaf from a test plant and compare it to a similar leaf from the control plant.





4. Estimate the percentage (%) of leaf area missing or damaged by visual inspection or using the *LeafByte* app (if available).

5. Repeat this comparison for leaves from each of the test plants and record your results.



Leaf damage comparison – Data sheet

Sample ID	Date	Location	Data collector	Treatment code
CBG_A1_T5				

FIRST STEP					
Leaf/Test plant n°	Leaf (details, measures…)	% of missing area			
		0 – 25 %	26 – 50 %	51 – 75 %	76 – 99 %
1					
2					
3					
4					
5					

SECOND STEP	
Nb of leaves between 0 – 25 %	
Nb of leaves between 26 – 50 %	
Nb of leaves between 51 – 75 %	
Nb of leaves between 76 – 99 %	
Total number of leaves	0

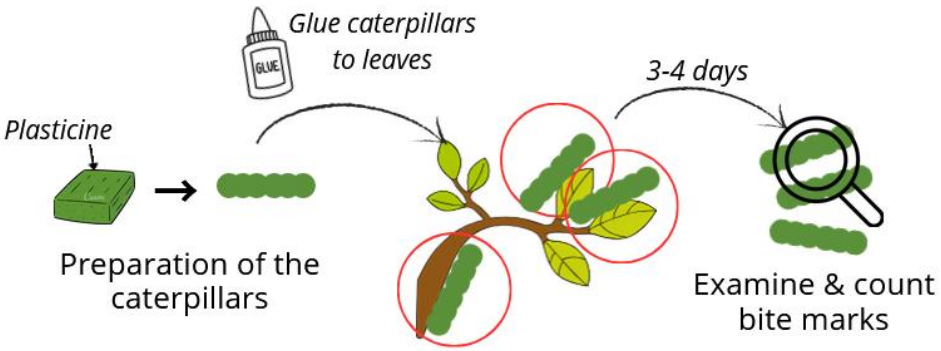
Proportion : $\frac{Number\ of\ leaves\ for\ a\ range}{Total\ number\ of\ leaves} \times 100$

THIRD STEP	
% of missing area	Proportion
0 – 25 %	
26 – 50 %	
51 – 75 %	
76 – 99 %	

Plasticine caterpillar predation test – Protocol

Measures predation pressure on herbivores by recording attacks on artificial caterpillars.

VISUAL

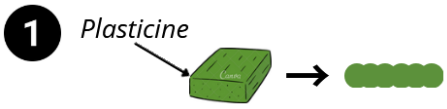


EQUIPMENT

- Plasticine (shades of green or brown)
- Strong glue
- Magnifying glass
- Notepad, pen or pencil

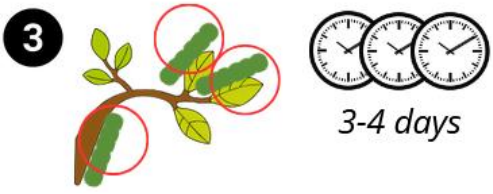
STEPS

1. Shape small caterpillars using plasticine.



2. Glue them to leaves or stems in natural vegetation, spacing them 15-30 cm apart.

3. Leave them exposed for a few days.



4. Collect the caterpillars and inspect them with a magnifying glass for bite marks.

5. Count the number of attacked caterpillars and note the type of marks if possible.

Plasticine caterpillar predation test – Data sheet

Sample ID	Date	Location	Data collector	Treatment code
CBG_A1_T6				

FIRST STEP	
Zone/Tree n°	**Number of caterpillars glued**
1	
2	
3	
4	
5	

SECOND STEP						
Zone/Tree n°	**Retrieved caterpillars**	**Predated caterpillars**	**Type of predator**			
			Arthropod	Bird	Mammal	Reptile
1						
2						
3						
4						
5						

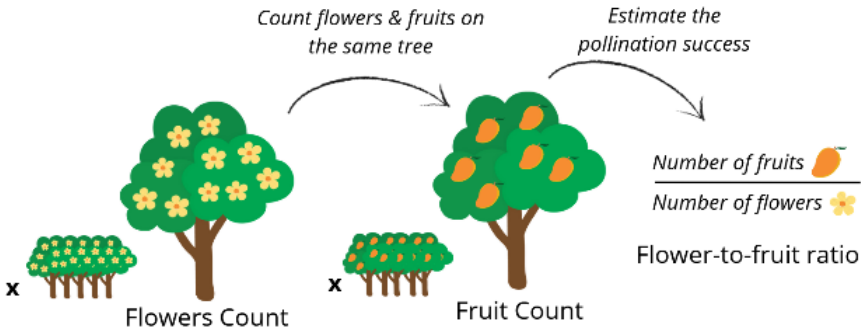
Predation rate (%): $\frac{Predated\ caterpillars}{Retrieved\ caterpillars\ per\ zone} \times 100$

THIRD STEP	
Zone n°	**Predation rate (%)**
1	
2	
3	
4	
5	

Flower-to-fruit ratio test – Protocol

Indicates pollination success by measuring the proportion of flowers developing into fruits.

VISUAL

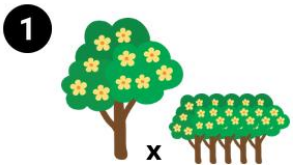


EQUIPMENT

- Several small flowering trees or plants
- Calculator (or phone) to calculate the ratio
- Notepad, pen or pencil
- Optional: small tags or coloured tape to mark trees

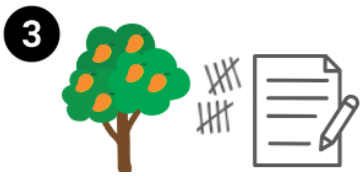
STEPS

1. Choose a small tree or plant with visible flowers, ideally one that you have in multiple copies.



2. At the beginning of the flowering period, count and record the total number of flowers on each individual.

3. After the fruiting period, count and record the number of fruits that have developed.



4 Flower-to-fruit ratio:

$$\frac{\text{Number of fruits}}{\text{Number of flowers}} \times 100$$

4. For each individual, calculate the flower-to-fruit ratio: $\frac{Number\ of\ fruits}{Number\ of\ flowers} \times 100$.

Flower-to-fruit ratio test – Data sheet

Sample ID	Date	Location	Data collector	Treatment code
CBG_A1_T7				

FIRST STEP		
Tree n°	**Number of flowers**	**Number of fruits**
1		
2		
3		
4		
5		

Flower-to-fruit ratio:

$$\frac{Number\ of\ fruits}{Number\ of\ flowers} \times 100$$

SECOND STEP		
Tree n°	**Flower-to-fruit ratio**	**Interpretation**
1		
2		
3		
4		
5		

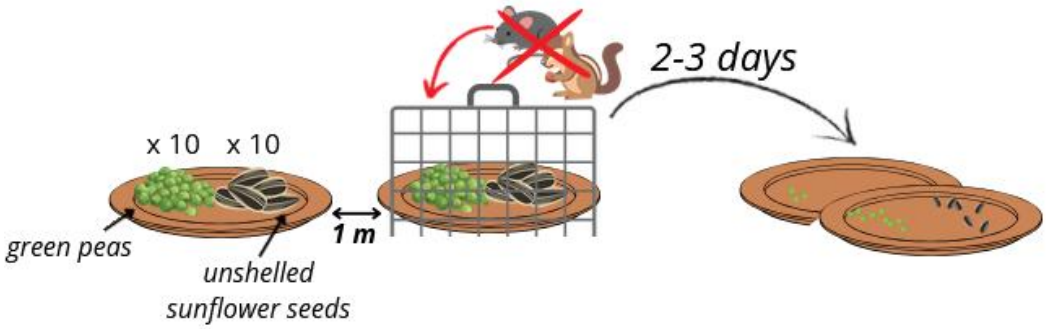
Interpretation:

> 70 %	Excellent fruit set
50 – 70 %	Good fruit set
25 – 50 %	Average fruit set
< 25 %	Poor fruit set

Seed removal test – Protocol

Assesses seed predation and dispersal by comparing removal rates.

VISUAL

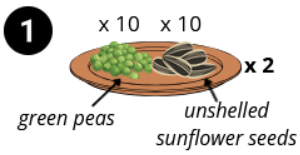


EQUIPMENT

- Green peas (dried, unshelled)
- Unshelled sunflower seeds
- Brown paper or cardboard plates
- Wooden skewers
- Small wire cages
- Measuring tape
- Notepad, pen or pencil

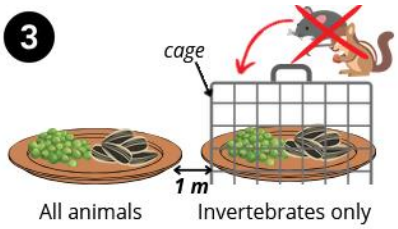
STEPS

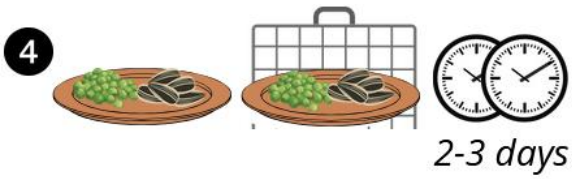
1. Prepare two seed plates per site, each containing 10 green peas and 10 unshelled sunflower seeds.



2. Raise another plate above each seed plate using wooden skewers to protect from the rain : insert a stick through both plates and into the ground to prevent them from being blown away.

3. Apply two exclusion treatments, spaced 1 m apart: in the first, cover the plate with a cage or mesh to exclude vertebrates, and in the second, leave the plate without any barrier.





4. Leave the seed plates in place for a few days, monitoring daily.

5. Count remaining seeds and calculate the proportion removed.

Seed removal test – Data sheet

Sample ID	Date	Location	Data collector	Treatment code
CBG_A1_T8				

FIRST STEP				
	Number of green peas left		Number of unshelled sunflower seeds left	
	All animals	Invertebrates only	All animals	Invertebrates only
Replicate 1				
Replicate 2				
Replicate 3				

SECOND STEP						
	Number of green peas retrieved after 1day		Number of green peas retrieved after 2 days		Number of green peas retrieved after 3 days	
	All animals	Invertebrates only	All animals	Invertebrates only	All animals	Invertebrates only
Replicate 1						
Replicate 2						
Replicate 3						

Proportion of seed removal:

$$\frac{Number\ of\ seeds\ retrieved\ after\ 24h}{Number\ of\ seeds\ left} \times 100$$

THIRD STEP				
	Proportion of green peas removal		Proportion of sunflower seeds removal	
	All animals	Invertebrates only	All animals	Invertebrates only
Replicate 1				
Replicate 2				
Replicate 3				