

BEFTA Protocol: Dung Beetles

Researchers:

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Timing

Twice a year – end of dry season (Sept/Oct) & end of wet season (Feb/March).

Dung removal

Equipment

18 x plastic 'tapau' boxes with lids– 800 ml
Kitchen scales
Spoons
Trowel
Bucket to collect dung
Marker pen
18 x large plates -30cm diameter
54 x satay skewers (3 per plate)
Spreadsheet: "Removal.xls"

Methods

Preparing the dung

- Collect 2 buckets of fresh (i.e. not more than 1 hour old, preferably where no dung beetles have yet dug into the dung) dung from the cows in Ribo or Roka estates.
- Mix the dung thoroughly between the buckets so it is homogenised.
- Use the kitchen scales to weigh out 700g of dung into the tapau boxes. Remember to 'zero' the scales after the box has been placed on the scales, so the weight of the box is not included.
- Weigh 5 extra boxes of 700g of dung as the control pats that are dried to calculate the moisture content. Put these in straight into the freezer, or oven at 80°C.
- Weigh 5 empty boxes and take a mean. Enter this mean in the spreadsheet "Removal.xls". (i.e. the boxes we used this time weighed a mean of 21g).
- Keep the dung in a cool room or fridge if storing overnight.

Putting the dung in the field

- Dung removal piles are placed in the centre 50 m plots at the 45° angle pole (i.e. where the data loggers are).
- Clear the ground of vegetation and debris, so the dung is placed on bare soil.
- Spoon out the dung from the boxes so that it is completely empty.
- Place the plate above the dung using 3 skewers.

Collecting in the dung

- After 48 hours collect in the dung into the 'tapau' boxes.

- Use the spoons and trowel to separate the dung from the soil. Scrape as much dung as possible off the dung, so that only dung and no soil is placed in the box.
- If dung is mixed with soil on the surface then this counted as removed, and should not be collected.
- Label the box on the lid and side with the plot number in permanent marker.
- Once the dung is collected scrape away the soil on the surface and count the number of large *Catharsius* holes and the number of small *Onthophagus* holes. Record this data in the spreadsheet "Removal data entry sheet.xls".
- Take the lids of the boxes and take a wet weight of dung remaining using the kitchen scales (NB this will be the weight of the dung and the 'tapau' box). Enter this into the spreadsheet "Removal.xls".
- Take the lids off the boxes and place the dung in the oven at 80°C.
- Take the 5 control pats out of the freezer if they are not already in the oven and dry them in the oven as well.
- Check the dung every few days and weigh a few of the boxes. When the dung reaches a constant weight (i.e. doesn't lose weight any more), weigh all the boxes, and enter the data in the spreadsheet "Removal data entry sheet.xls".

Pitfall trapping

Equipment

19 x Plastic 500ml glasses

5 x 1.5l bottles

Salt

Washing up liquid

Tea strainer

18 x whirlpak bags

70% alcohol

Labels

Pencil

Ziplock bag

Trowel

18 x large plates -30cm diameter

54 x satay skewers (3 per plate)

18 x wooden chopsticks

Muslin

String

2 x 'tapau' boxes

Spoons

450g Human dung!

Methods

Preparing the traps

- Cut the muslin into squares 10x10 cm. Cut the string into 15cm lengths.
- Thoroughly mix the human dung so it is homogenised.
- Place 25g of dung in the centre of the square, fold in the sides so there are no gaps (otherwise beetles will burrow into the dung), twist the top and fold it down.

- Make a loop with the string and slide it over the top of the dung ball, and tie it tight.
- Place the balls into the 'tapau' boxes (9 balls should fit in one box). Hang the ends of the string over the side of the box and then fasten the lid on tightly. This keeps the end of the string clean!
- Fill the 1.5l bottles with water and add 4 teaspoons of salt and 1/4 teaspoon of washing liquid and mix thoroughly.

Setting the traps

- Traps are placed in the centre 50 m plots at the 45° angle pole (i.e. where the data loggers are).
- Clear the ground of vegetation and dig in the plastic glass until the rim is flush with the soil. Make sure there are no gaps around the edges. Use two glasses – one inside the other – to dig in the trap. Once the glasses are flush with the surface pull out the inner cup. This prevents soil from falling into the glass, and keeps the sample clean.
- Fill the cup 2/3 full of the water solution.
- Tie the dung ball onto the chopstick and place over the centre of the glass at a 45° angle. Make sure there is at least a 5cm gap between the dung ball and the top of the glass so beetles can fall into the trap.
- Place the plate above the dung using 3 skewers.

Collecting in the traps

- Cut up small labels of thick paper 1.5x1.5cm. Each label should contain the following information: Date set and collected: e.g. 3-4.ix.13; Site: BEFTA; Plot no.: G09; Type of trap: HF PF (i.e. Human Faeces PitFall).
e.g.
3-4.ix.13
BEFTA
G09
HFPP
Put each label into a whirlpak bag ready for the field.
- After 48 hours drain the water out of the trap using the tea strainer. Swirl the water around the bottom of the glass to remove beetles tuck in the bottom. Use some extra water to make sure everything is emptied from the glass.
- Any comments should be written on the back of the label in pencil (e.g. bait removed, trap destroyed, trap flooded etc.).
- Put the tea strainer inside the whirlpak bag and flick it hard several times to dislodge the insects from the tea strainer.
- Fill the bag with alcohol until the beetles are just covered.
- Place the bag over a flat surface (e.g. your leg) and remove the air from inside the bag by running your hand over it.
- Place the label at the top of the bag and roll the bag down tightly, and fold the metal tabs in place.
- Put all the bags from one collecting date in a ziplock bag together and label with the date.
- Store in the freezer.

- Before posting to the UK, excess alcohol should be drained from the bag by carefully draining it from one corner of the bag, being careful not to let any beetles out. The bag should be rerolled.