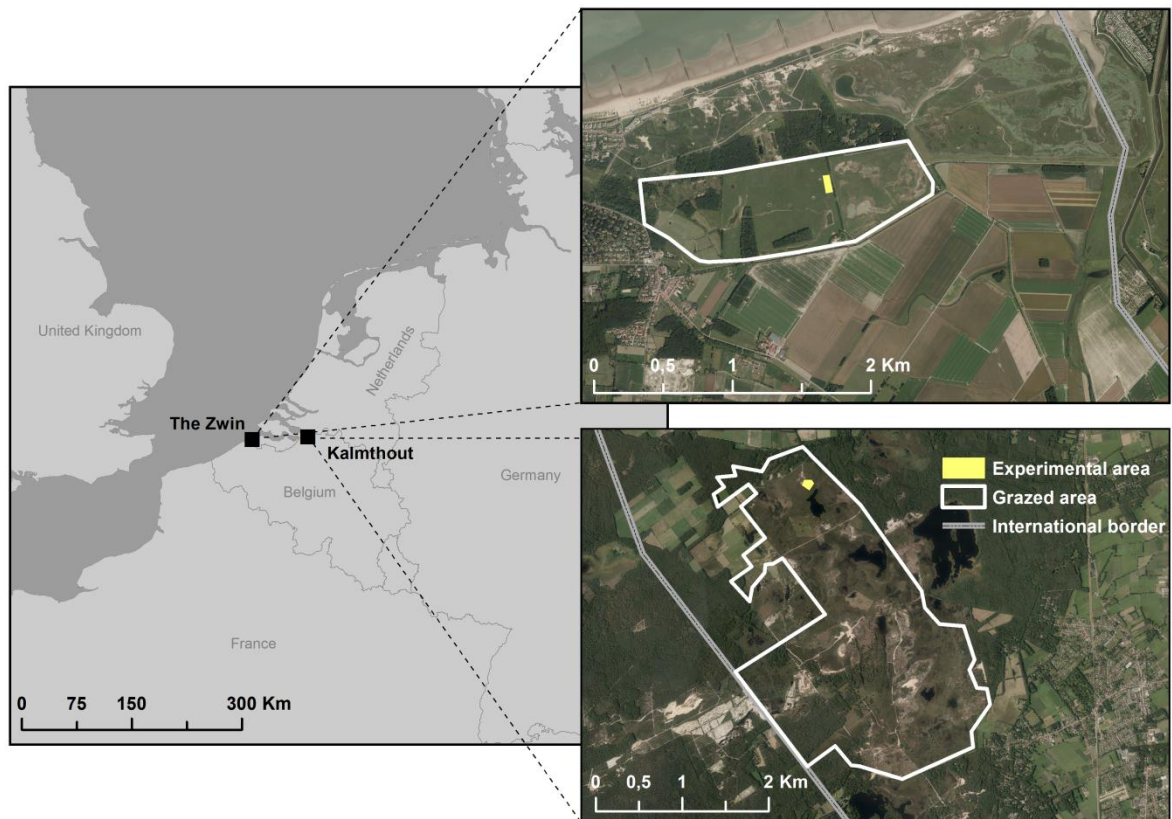


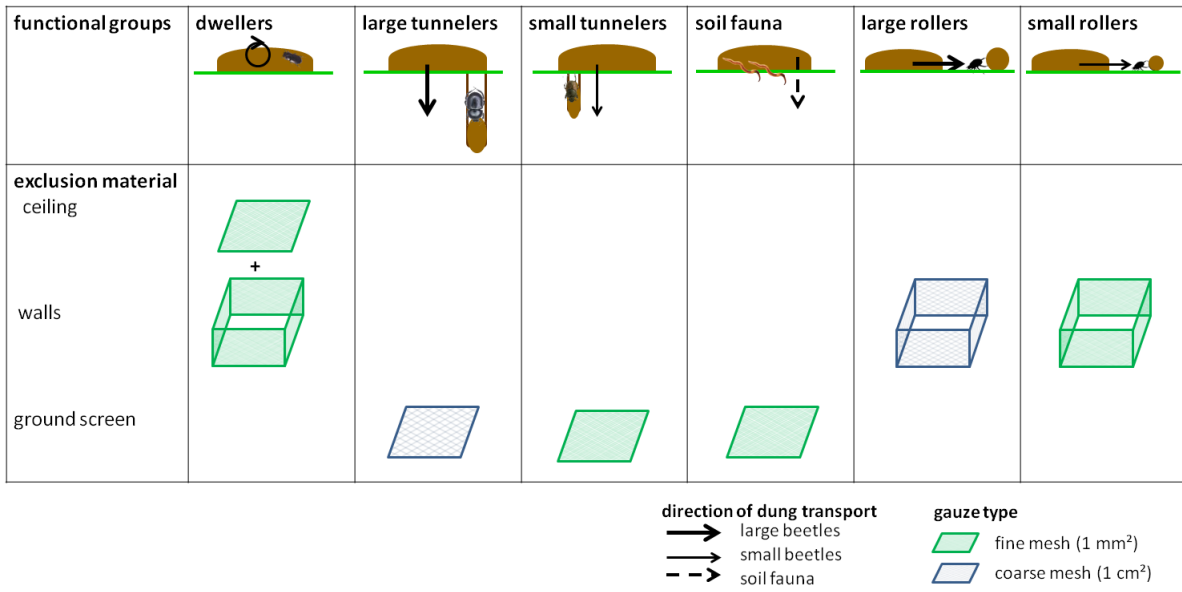
Electronic supplementary material (ESM)

Linking functional group richness and ecosystem functions of dung beetles - an experimental quantification

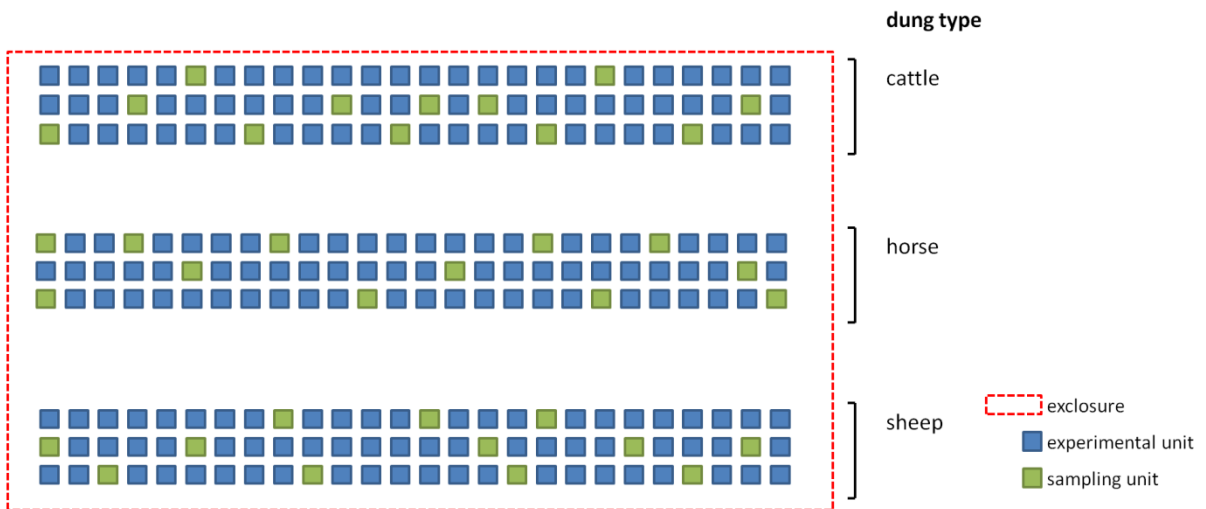
Tanja Milotić, Stijn Quidé, Thomas Van Loo, Maurice Hoffmann



ESM 1 Location of study areas within Belgium (left) and the extent of the grazed areas and the positioning of the experimental locations in the 'Zwindunes and Zwinpolders' (Zwin, top right) and 'De Zoom - Kalmthoutse heide' (Kalmthout, bottom right). The base layers used in the detailed maps are aerial photographs of summer 2012 provided by the Flanders Geographical Information Agency. © AGIV (<http://www.agiv.be/>)

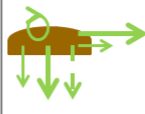

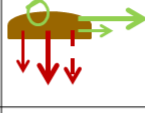

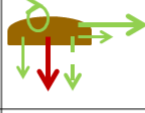

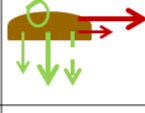







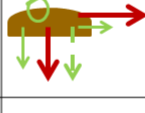


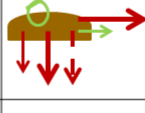


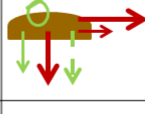


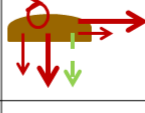



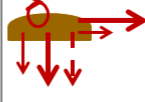


ESM 2 Functional groups distinguished in the experiments, direction of dung transported by each group and type of material used to exclude their dung removing activities.



ESM 3 Experimental design in an enclosure with a randomized distribution of experimental units and sampling units in different sections baited with different dung types.

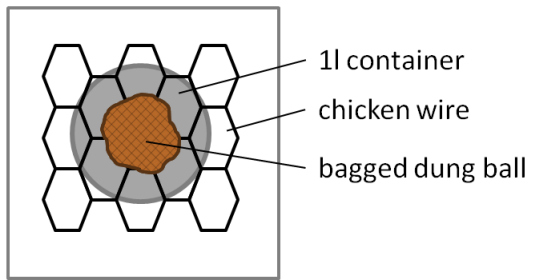
Experimental units

| | functional groups included | ground screen | wall | ceiling | dung transport (→ direction prohibited; → direction allowed) |
|----|---|---|---|---|---|
| 1 | all: dwellers tunnelers (l+s) rollers (l + s) soil fauna | | | |  |
| 2 | dwellers rollers (l + s) |  | | |  |
| 3 | dwellers tunnelers (s) rollers (l + s) soil fauna |  | | |  |
| 4 | dwellers tunnelers (l + s) soil fauna | |  | |  |
| 5 | dwellers tunnelers (l + s) rollers (s) soil fauna | |  | |  |
| 6 | dwellers |  |  | |  |
| 7 | dwellers tunnelers (s) rollers (s) soil fauna |  |  | |  |
| 8 | dwellers rollers (s) |  |  | |  |
| 9 | dwellers tunnelers (s) soil fauna |  |  | |  |
| 10 | soil fauna | |  |  |  |
| 11 | none (control) |  |  |  |  |

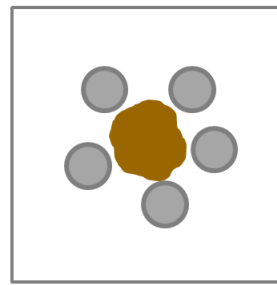
ESM 4 Experimental units with the functional groups able remove dung from the units, used materials and direction of dung transport prohibited and allowed. Tunnelers and rollers were subdivided into size classes: large beetles (l, stopped by 1cm² mesh) and small beetles (s, able to go through 1cm² mesh).

Dung beetle sampling units

large container covered with dung



5 small containers + dung pat



ESM 5 Schematic top view of the sampling units consisting of 1 large container covered with dung of 5 small containers surrounding a central dung pat.