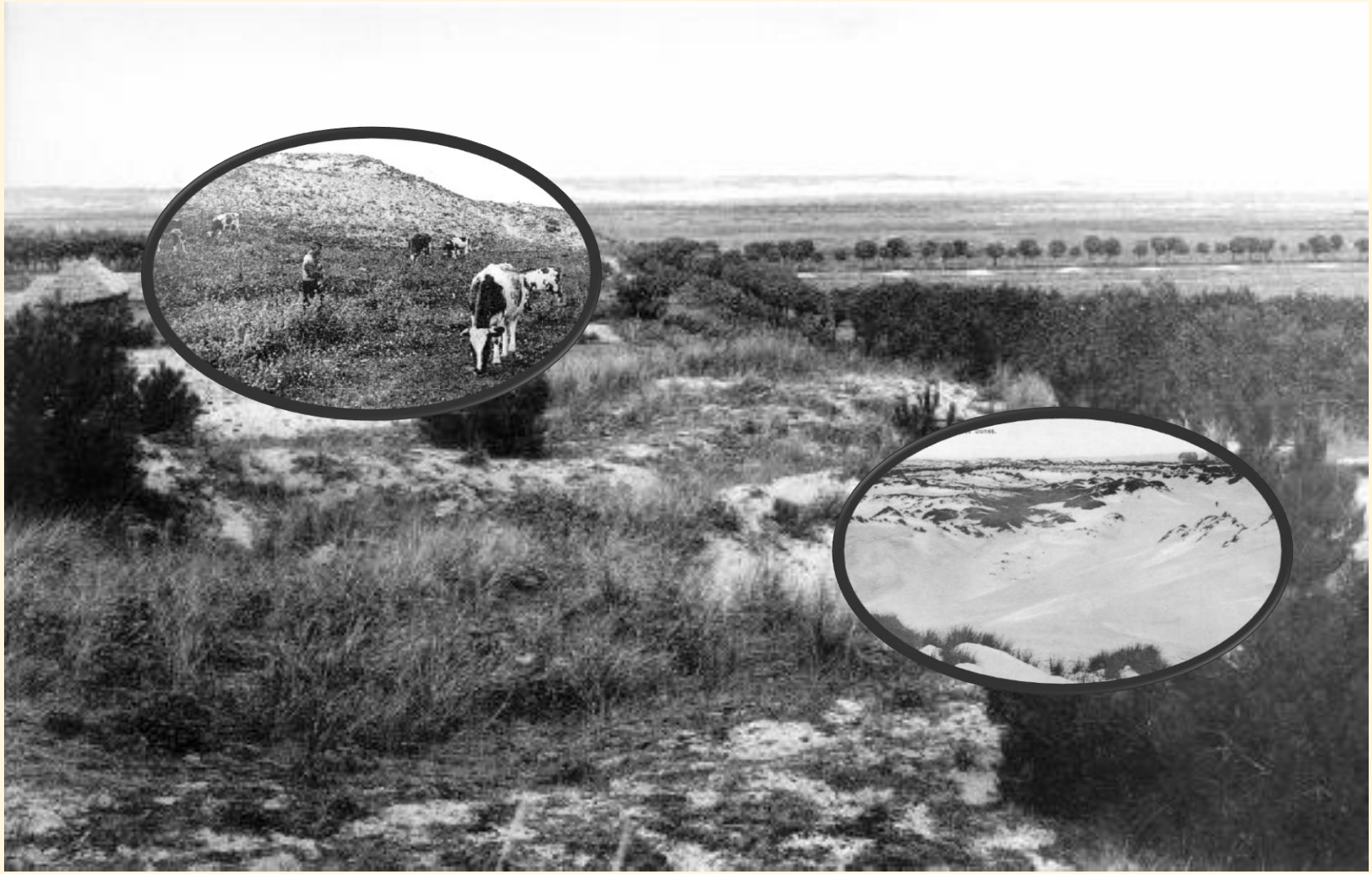
Femke Batsleer
Supervisors: Dries Bonte & Dirk Maes

The digger wasp *Bembix rostrata* and nature management in the Belgian dunes

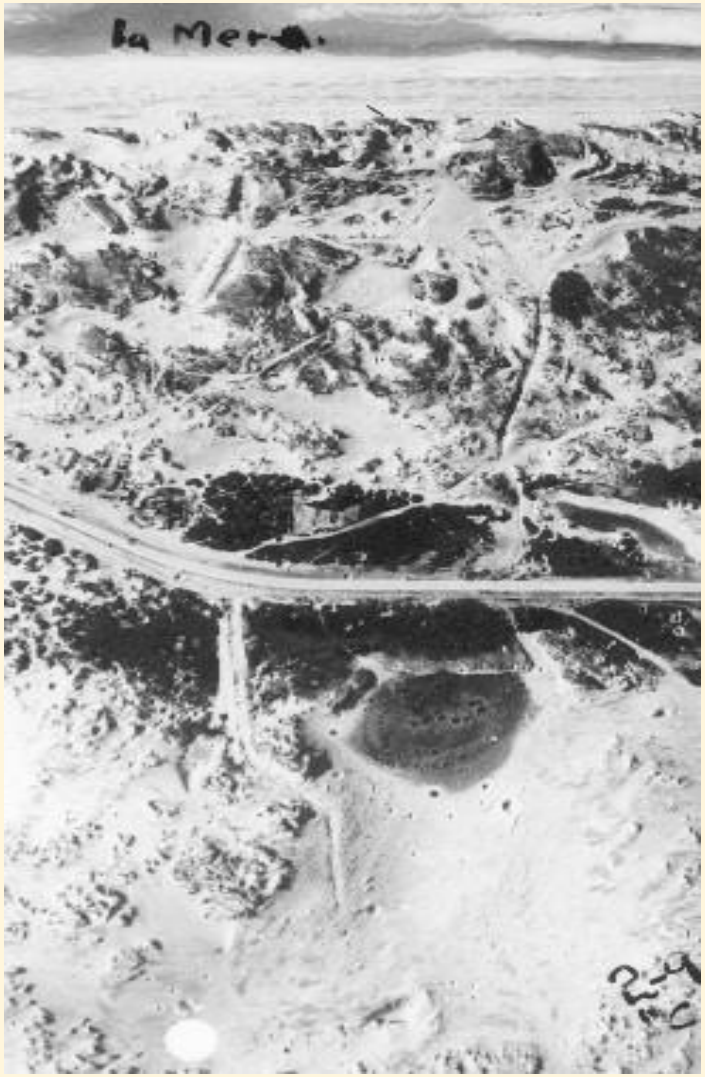
Historical framework

Dune landscape in the early 20th century

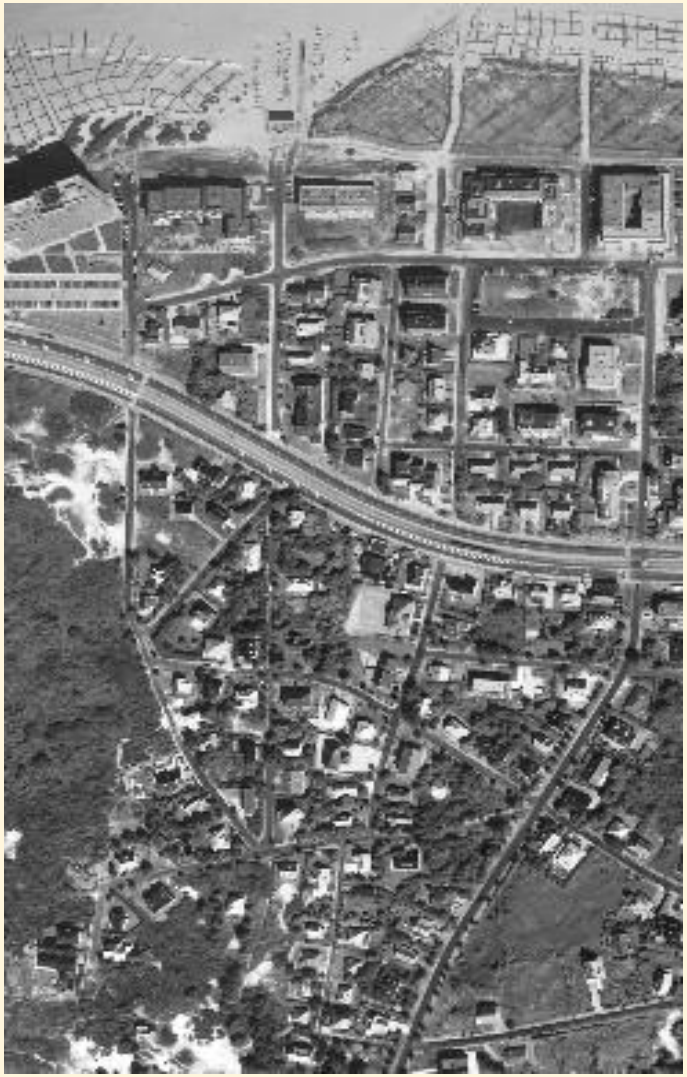


Landuse change

- Urbanisation and fragmentation
- Recreation
- Water extraction



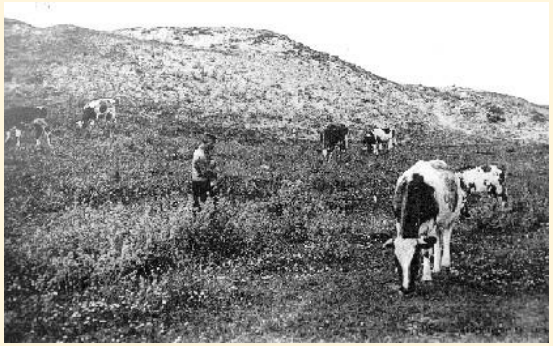
1917

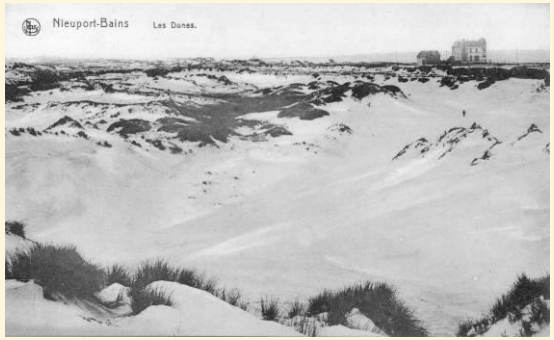


1999

Landscape change

‘Stressed’ & Dynamic landscape

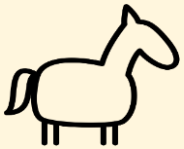




Unconstrained landscape

- Loss of (aeolic) dynamics
- Fixated dunes
- Encroachment

‘Dune decree’ (Duinendecreet) 1993
Grazers introduced as nature management tool in ‘90



Landscape use by grazers

Grazers will use the landscape and (vulnerable) ecotypes differently

→ Higher pressure on open grey dunes

Impact on arthropods

Maes & Bonte (2006) Biol. Cons.

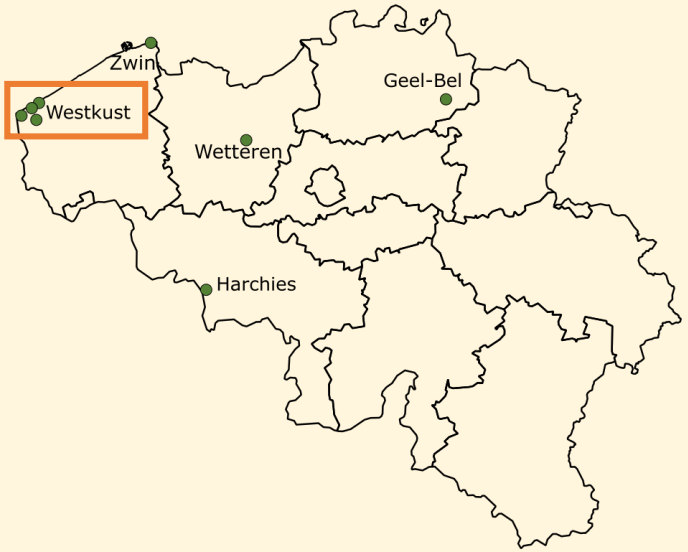
Trampling Fragmentation

Table 3a – Parameter estimates obtained by a logistic regression analysis on species incidence (mixed model with year as random variable)

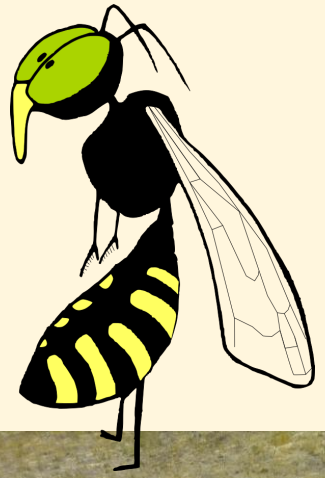
Variables	*A. fabrilis*	*X. sabulosus*	*O. caerulescens*	*H. semele*	*I. lathonia*
Intercept	−7.812	−6.819	−7.761	−9.731	−5.746
Area^{Log}	0.842$^{(1)}$	0.718$^{(2)}$	0.888$^{(1)}$	0.698$^{(3)}$	0.662$^{(1)}$
Trampling^{Class}	−1.619$^{(2)}$	−1.156$^{(3)}$	0.512$^{(2)}$	–	−0.018$^{(2)}$
Sand dynamics^{Class}	–	–	0.020$^{(3)}$	0.027$^{(1)}$	–
Connectivity^{Log}	1.843$^{(3)}$	3.082$^{(1)}$	–	1.926$^{(2)}$	–
Year	0.309 ± 0.567	0.311 ± 0.538	0.012 ± 0.111	0	0.023 ± 0.087

Bembix rostrata

Harkwesp/Bembex à rostre



- Sandy regions → grey dunes
- Rare
- Gregariously nesting, solitary
- Burrow in sand & provision larva
- Only make 5-6 nests/season
- Overwinter as pupae



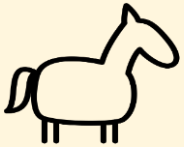
Our goal

formulate **practical recommendations** for future management in the dunes to **reconcile** the conservation of **sand digging arthropods** and the **need for grazers** for ecosystem dynamics

Focusing on *Bembix rostrata*

Impact of grazing & fragmentation

1) Grazing by cattle and horses



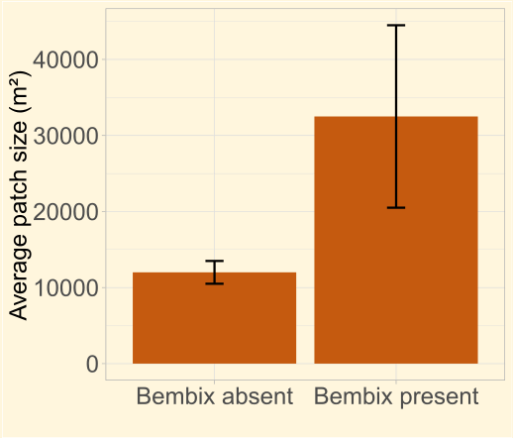
Planned research: impact by sheep

- Less impact on soil
- Do they fulfill other management goals?

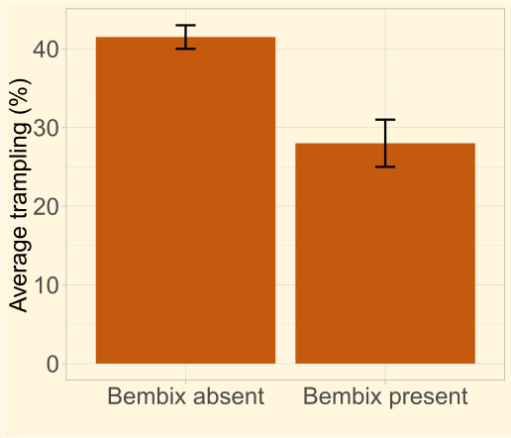
Impact of grazing & fragmentation

2) Fragmentation: metapopulation context

Patch area



Extinction rate/suitable patches



Bruijlants (2015)
Master thesis

Planned research: more detailed

- More detailed metapopulation study, landscape explicit + detailed grazing maps: spill-over effect?
- Population genetics study

Take home message

- Landscape context & grazers → negative impact on arthropod dune specialists
- Reconcile different management goals (keeping dunes open vs. insect biodiversity)
- For *Bembix*, provisional practical recommendations: (temporal) sheep grazing in grey dunes that get encroached, considering metapopulation context
- But more detailed assessments are on their way!

Thank you for your attention!

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