

Transition towards natural livestock farming

Report on natural remedies used worldwide against ectoparasites in ruminants

May 7, 2021



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Table of contents



Introduction

Research question

Current situation NL

Materials and methods

Main findings

Discussion

Conclusion

Future prospects

Introduction – Who are we



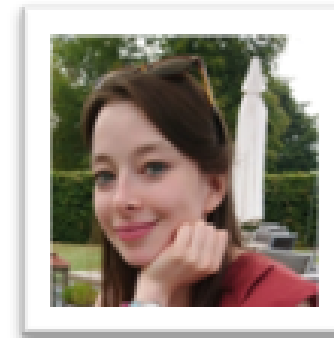
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Research question

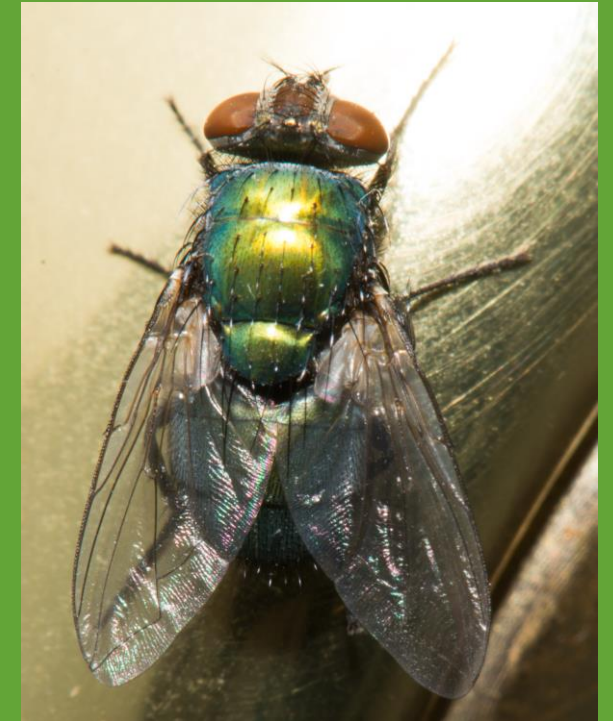
What natural remedies are available worldwide to deter (or reduce) ectoparasite infection on ruminants?



Current situation in the Netherlands

- Nuisance in animal husbandry
- Physical damage (e.g., myiasis)
- Vectors for diseases (e.g., bluetongue)

- Solution = synthetic ectoparasiticides?



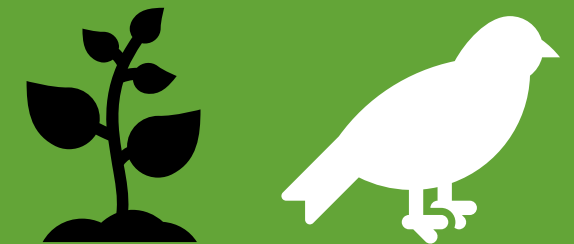
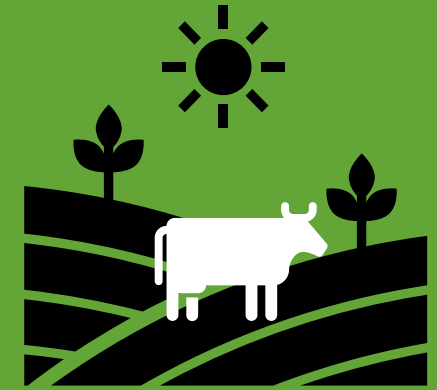
Common green bottle fly (*Lucilia sericata*) can cause myiasis in livestock

Current situation in the Netherlands

Except....

Chemical ectoparasiticides have negative impacts on environment and contribute to resistance

Concerns from consumers



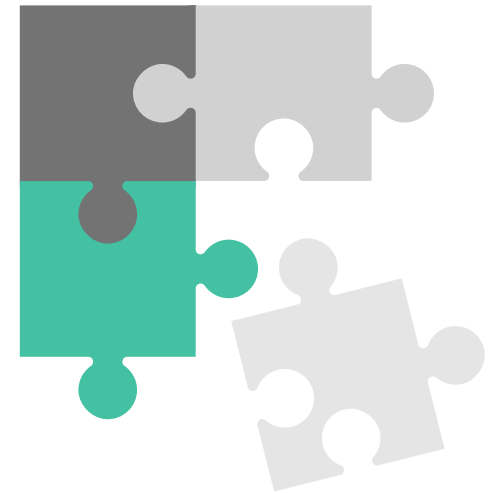
Current situation in the Netherlands

Increasing interest for alternatives (natural remedies)

Lack of available information

No official guidelines on usage natural remedies

- Academic resources
- Non-academic resources
- Manufactured products
- *Knowledge gap and scepticism*



Materials and methods

Interviews

- *11 respondents*

Questionnaire

- *With five different languages*
- *10 respondents*

Literature review

- *A database was made*



Main findings

Main ectoparasites



Flies



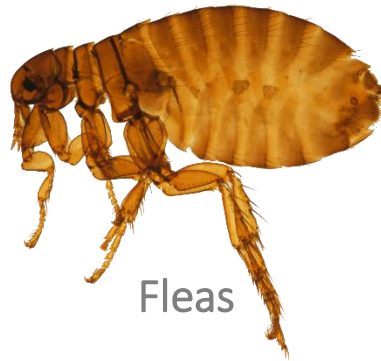
Ticks



Mites



Mosquitoes



Fleas



Lice

Main findings - questionnaire and interviews

Questionnaire

- Tick infestation is the main problem
- The respondents believe in natural remedies, but none reported using them
- Effectiveness has the highest priority, environmental impacts is put in a minor role

Interviews

- Positive inclination in general from different stakeholders
- The research and products are lacking
- Farmers are willing to use natural remedies if the effectiveness is identified



Main findings – literature review



Total of 325 remedies found

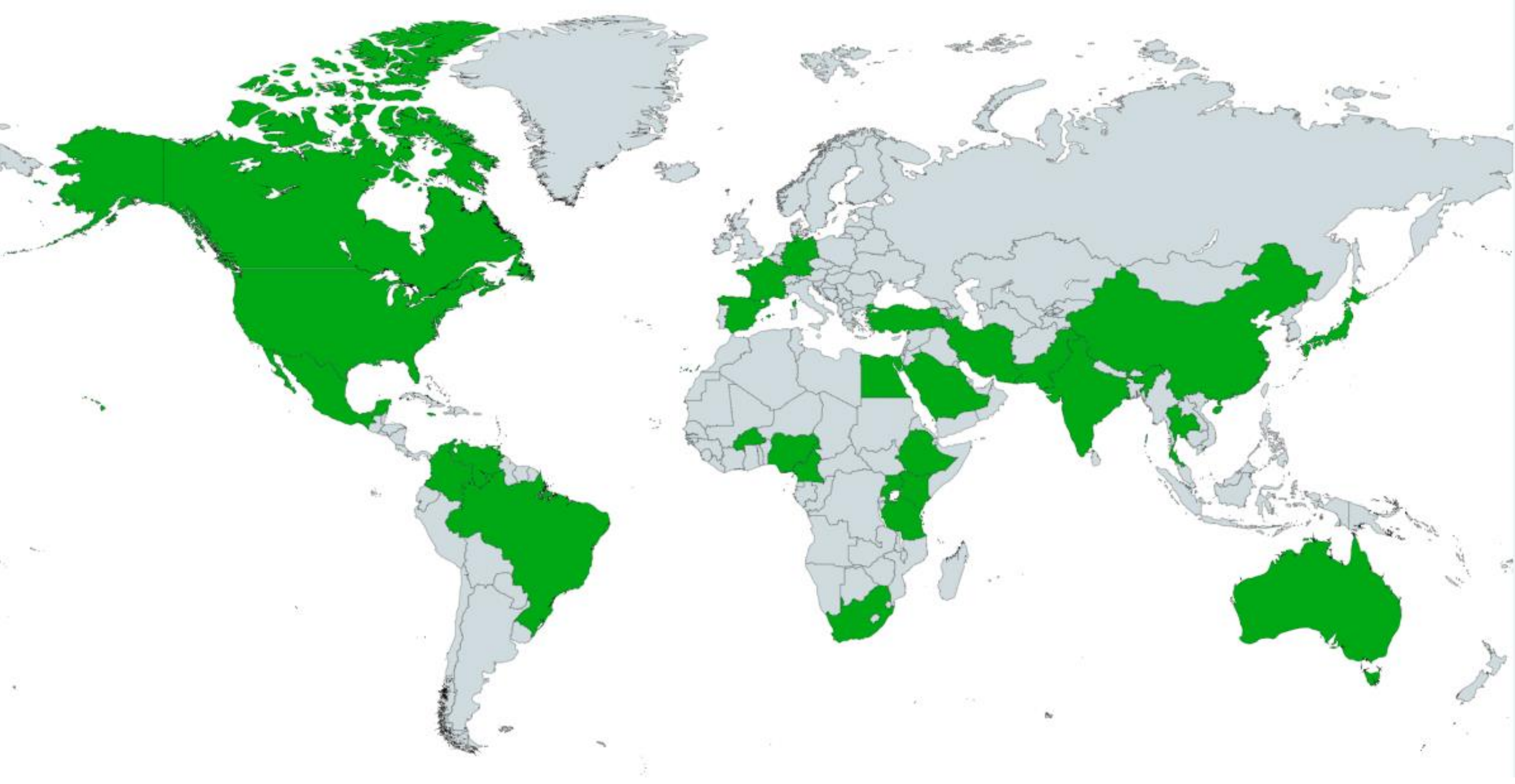


Reference type

168 scientific articles

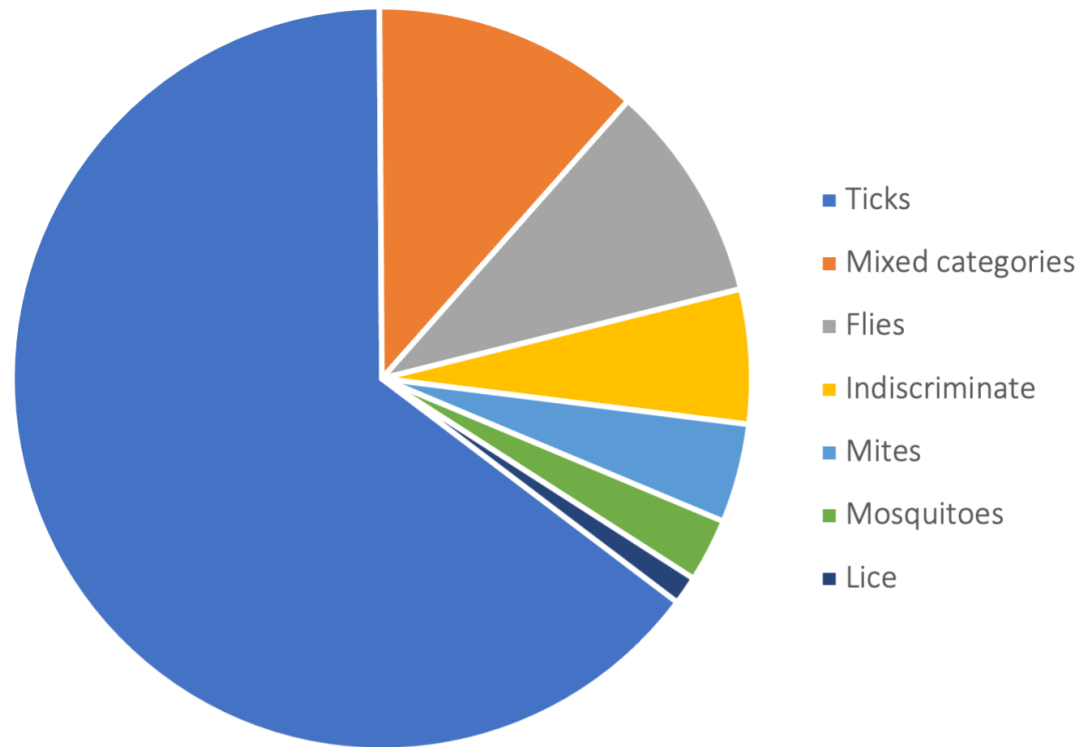
125 journal articles on traditional veterinary practices

Rest included: MSc. Theses, PhD dissertations, reports, brochures, etc...

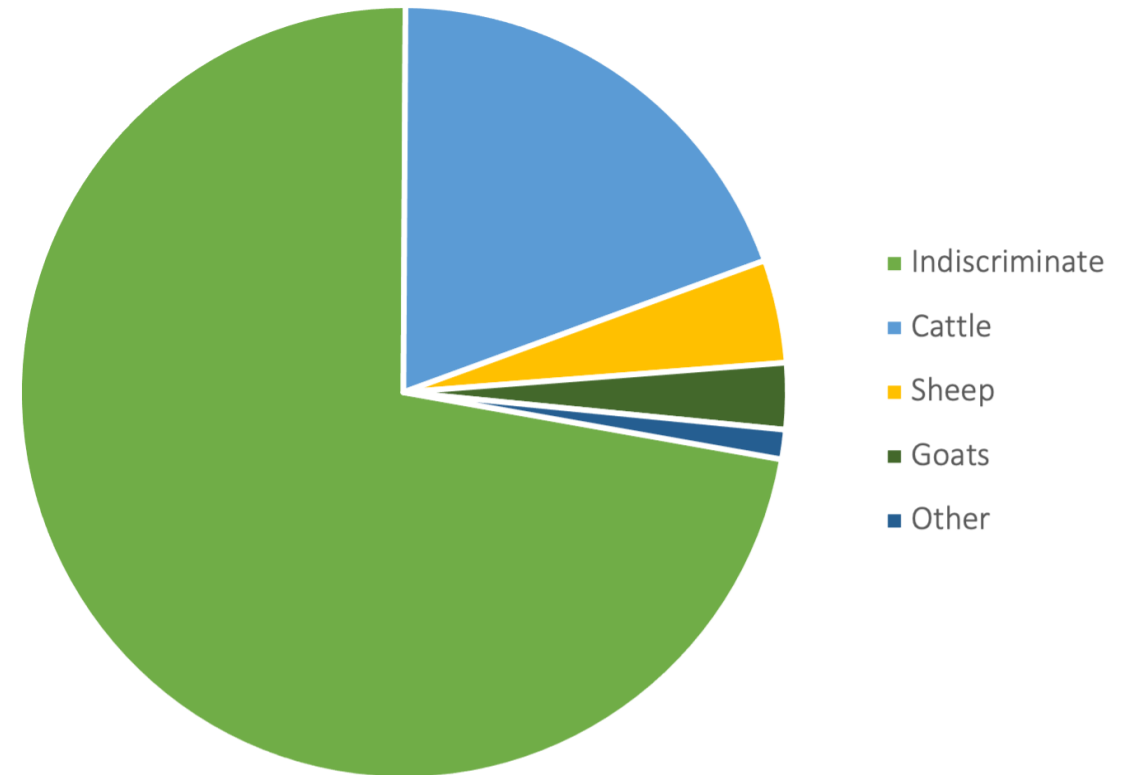


Main findings – effective remedies found

Ectoparasite type



Ruminant animal type



Main findings – effective remedies found



Different application methods

248 active
11 passive
7 active or passive



Different remedy types

177 treatment
57 preventative/repellent
36 preventative/repellent or treatment

Main findings – remedy form

- Essential oils
- Paste
- Decoction
- Concoction
- Infusions
- Sap/latex
- And their dilutions



Main findings - effective remedies found



Neem



Tobacco



Camphor laurel



Wormwood



Whiteweed



Capsicum



Aloe



Castor bean



Basil



Marigold

Findings - Cattle

- 66 reports found
- Mostly ticks
- Remedies found to have an efficacy > 99% against ticks
- **In vitro:** *Azadiracta indica* (Neem), *Bursera simaruba* (Gumbo-limbo), *Cassearia corymbosa* (Argentine senna)
- **In vivo:** AV/EPP/14, *Tagetes minuta* (Marigold)
- **In vitro and in vivo:** *Stemona collinsae* (Stemona)

Andreotti et al., 2013; Jansawan et al., 1993; Kalakumar et al., 2000; Ndumu et al., 1999; Ravindra et al., 2000; Rosado-Aguilar et al., 2010



Findings - Sheep

- 14 reports found
- Mostly on flies
- Remedies are mostly essential oils as repellents and insecticidal treatments
- In vitro:
 - *Lavendula spp.* (Lavender) and *Cinnamomum camphora* (Camphor laurel)
 - *Melaleuca alternifolia* (Tea tree)
 - *Chrysopogon zizanioides* (Vetiver), *Cinnamomum verum* (Cinnamon) and *Lavendula spp.* (Lavender)
 - *Azadiracta indica* (Neem)



Findings - Goats

- 13 reports were found
- 7 out of 13 were on ticks
- Remedies are mostly essential oil-based as acaricidal treatment
- In vivo:
 - *Azadirachta indica* (neem) oil and eucalyptus oil mixture
 - *Ageratum Houstonianum* (bluemink) oil
 - *Azadirachta indica* (neem) seed powder

Findings - specific parasites

235 reports in total, of which the majority are ticks

Plant species	Solvent	Repellence/mortality
<i>Senna italica</i>	Ethyl acetate	100% mortality
<i>Capsicum spp.</i>	Butter fat	100% mortality
<i>Euphorbia obovalifolia</i>	-	100% mortality
<i>Ficus brachypoda</i>	-	100% mortality
<i>Tagetes minuta</i>	-	97% repellence
<i>Artemisia herba-alba</i>	Ethyl acetate	91.03% mortality
<i>Ricinus communis</i>	Dichloromethane	87.5% repellence
<i>Clerodendrum glabrum</i>	Acetone	87.3% repellence
<i>Artemisia monosperma</i>	Hexane	83.96% mortality
<i>Jatropha curcas</i>	Methanol	79.7% repellence
<i>Aloe marlothii</i>	Dichloromethane	73% repellence
<i>Aloe marlothii</i>	Acetone	58.9% repellence

Discussion

Limitations



Interviews

- Limited stakeholders
- Knowledge gap
- Regulations



Questionnaire

- Few answers
- Not focused on one stakeholder
- (Limited) useful supplementary info



Literature research

- Old references
- Largest focus on ticks
- Availability
- Controversial research about same remedies



General

- Lack of scope
- Lack of specific info
- Lack of monitoring
- Potential toxicity
- Limited timeframe

Future research

- Research in the Dutch situation in vivo
- Lack of research on goats and sheep
- Research active compounds and mechanism of action
- Research different parasitic species (lack of research on mosquitoes, lice and mites)
- Perspective of farmers



Conclusion & Final Recommendations

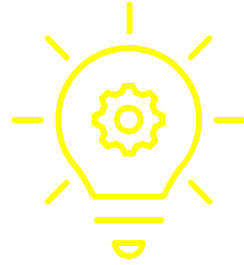
Consequent data is available

For adaptation to Dutch context:

- Future research
- Perspective farmers
- Limitations of ACT



Future prospects



- Combination of multiple remedies
- Innovations for application techniques
- Monitoring and surveillance
- Easy access of scientific knowledge
- Systems-based approach



Many opportunities to be found!

Special thanks to

Gerdien Kleijer

Suzane Tuju

Sanja Selakovic

Questionnaire and interview respondents

And you!



Questions?

