

# Understanding interactions between *Leptosphaeria maculans* and *L. biglobosa* for improving control of phoma stem canker on oilseed rape in the UK

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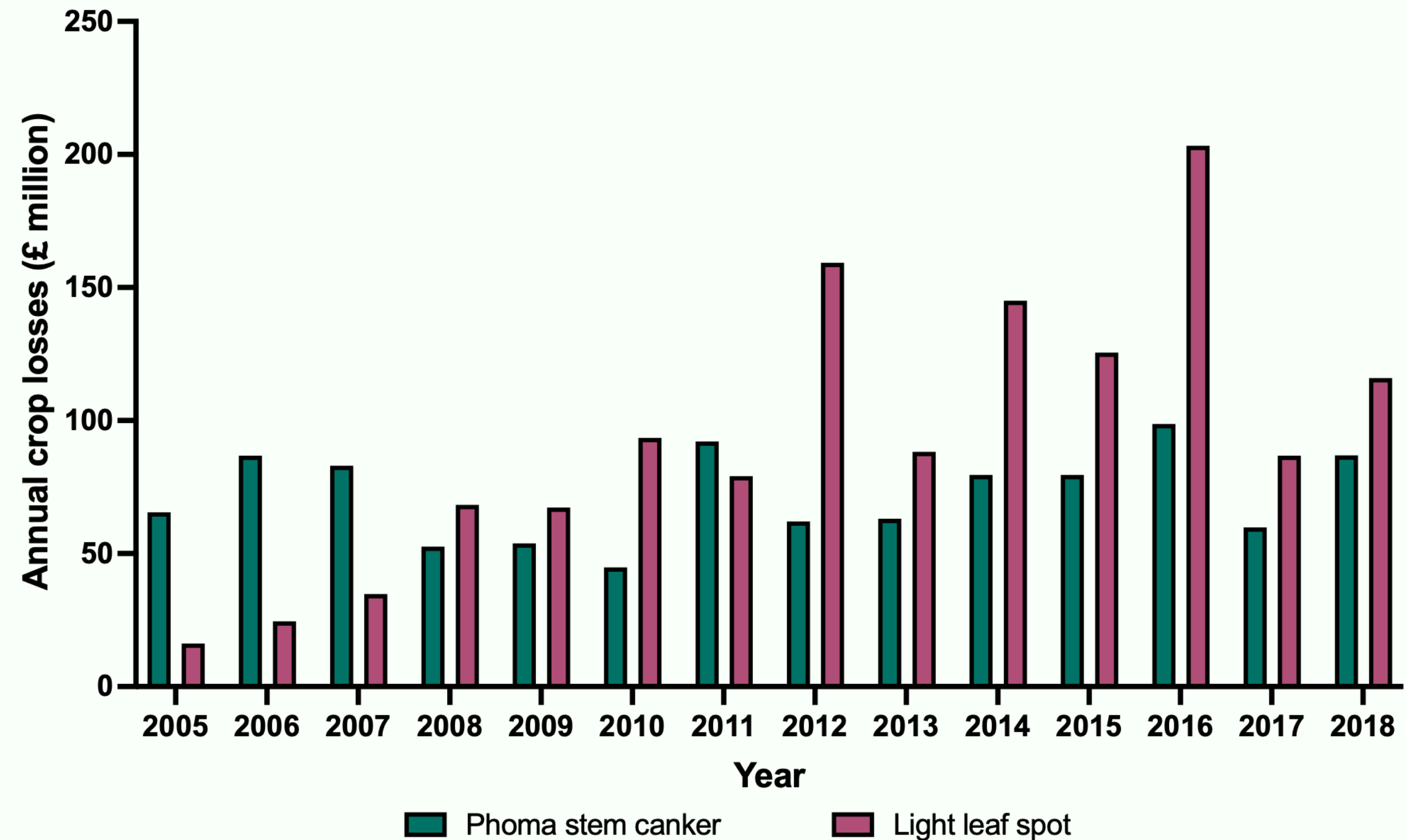
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# Background

## Oilseed rape and phoma stem canker

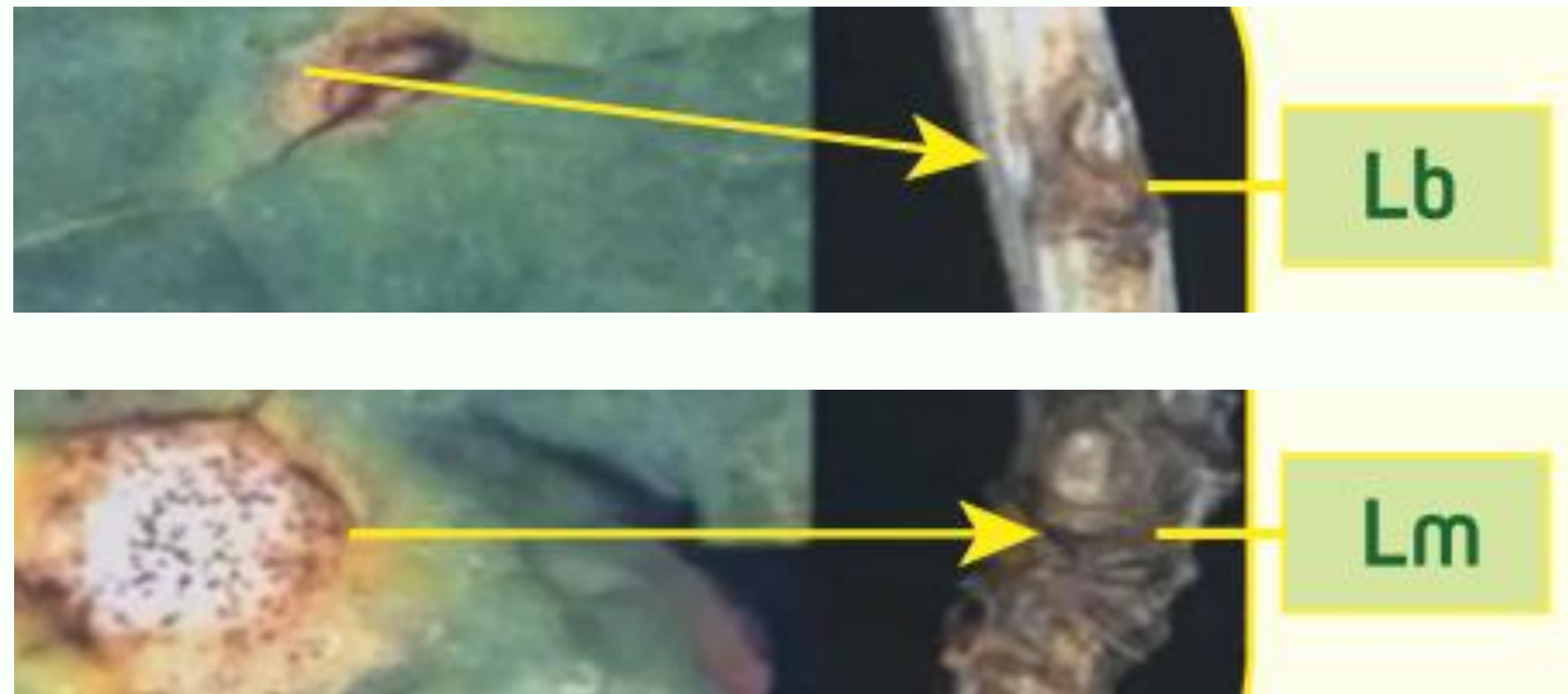


- Oilseed rape (*Brassica napus*) is the second most cultivated oilseed in the world, and the third most important arable crop in the UK
- Phoma stem canker is the second most damaging disease of oilseed rape in the UK, causing annual yield losses of up to £98.7 M
- In the UK, phoma stem canker is caused by *Leptosphaeria maculans* (Lm) and *L. biglobosa* (Lb)

# Background

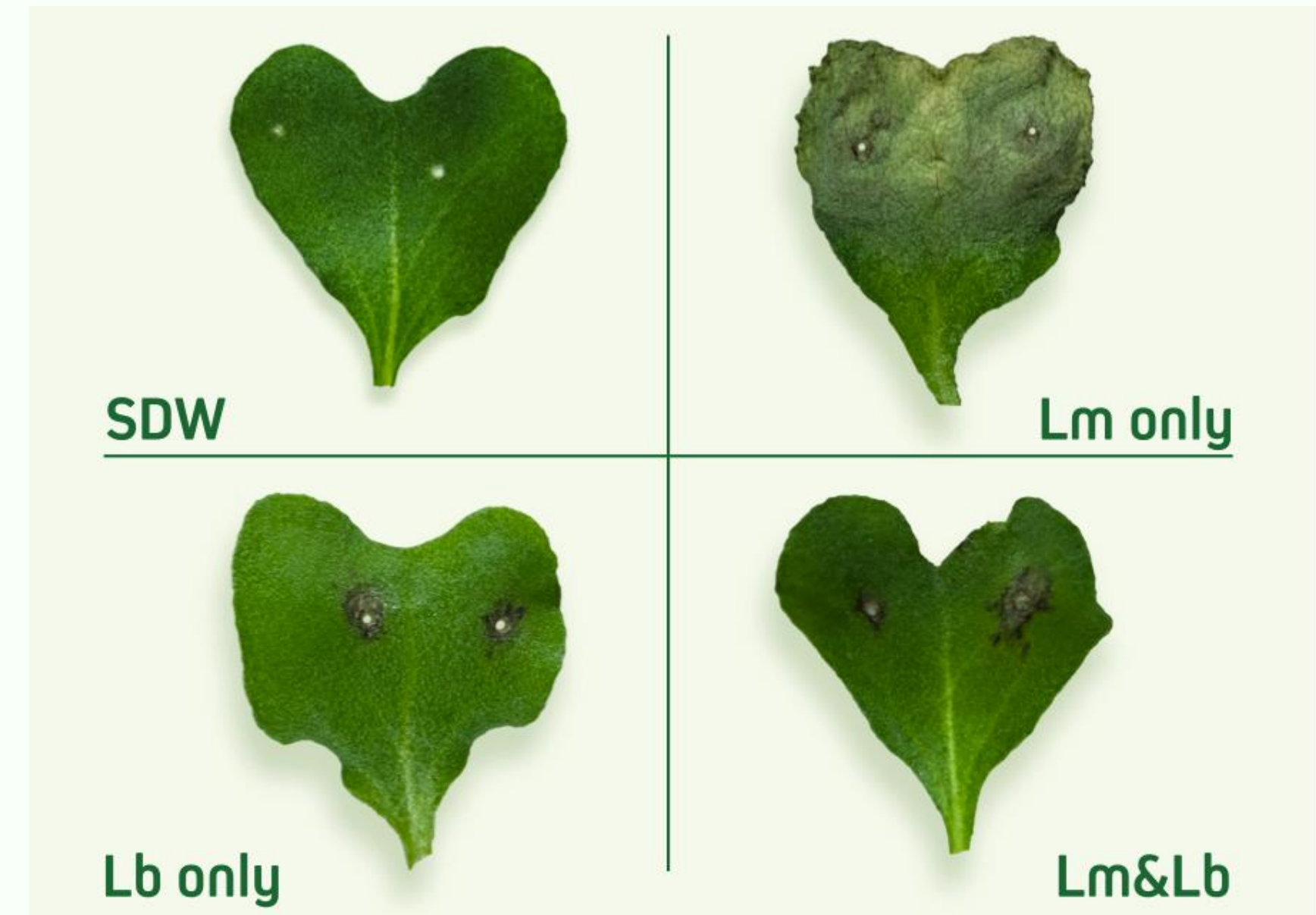
## Interspecific interactions

### Co-existence



- Their co-existence is facilitated by the differences in optimal temperatures for pseudothecial maturation, which creates temporal and spatial separation
- However, recent studies report that ascospores of both species are being released at similar times, leading to interspecific competition

### Competition

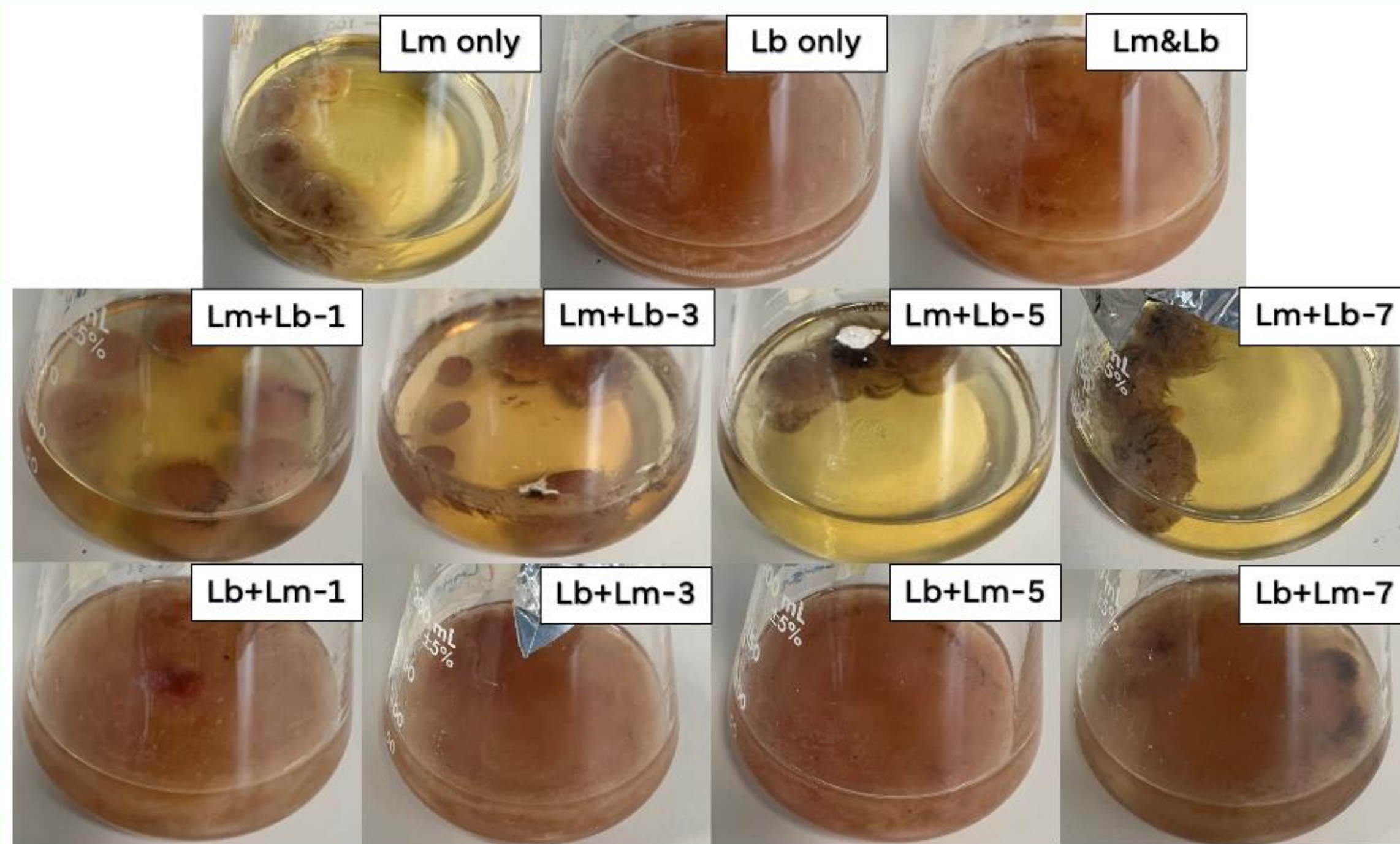


- Lm produces a phytotoxin called sirodesmin PL, which can inhibit the growth of Lb
- But Lb can inhibit the production of sirodesmin PL by Lm if they are simultaneously co-inoculated

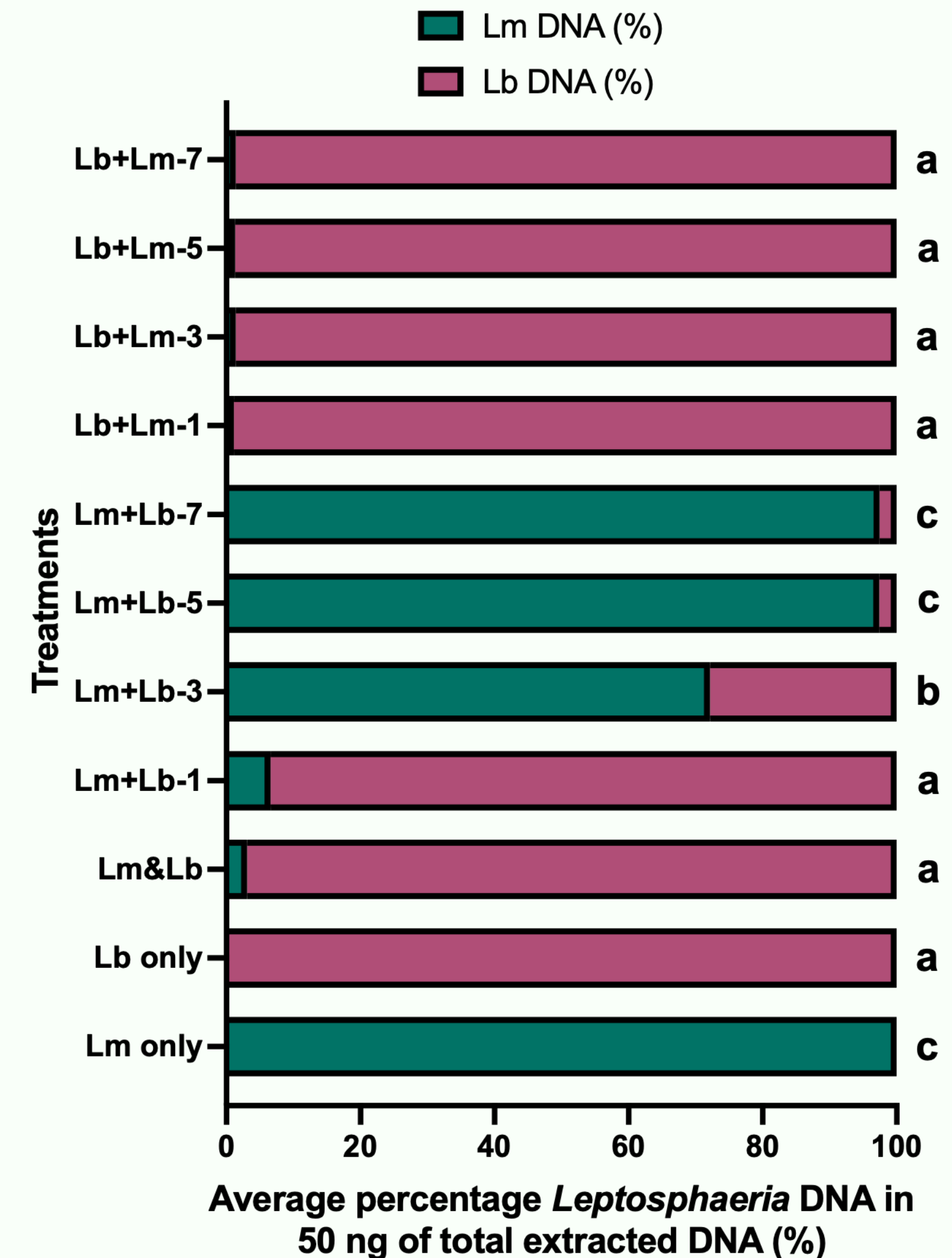


# Lm & Lb interactions - *in vitro*

How does sequential co-inoculation effect interspecific interactions *in vitro*?

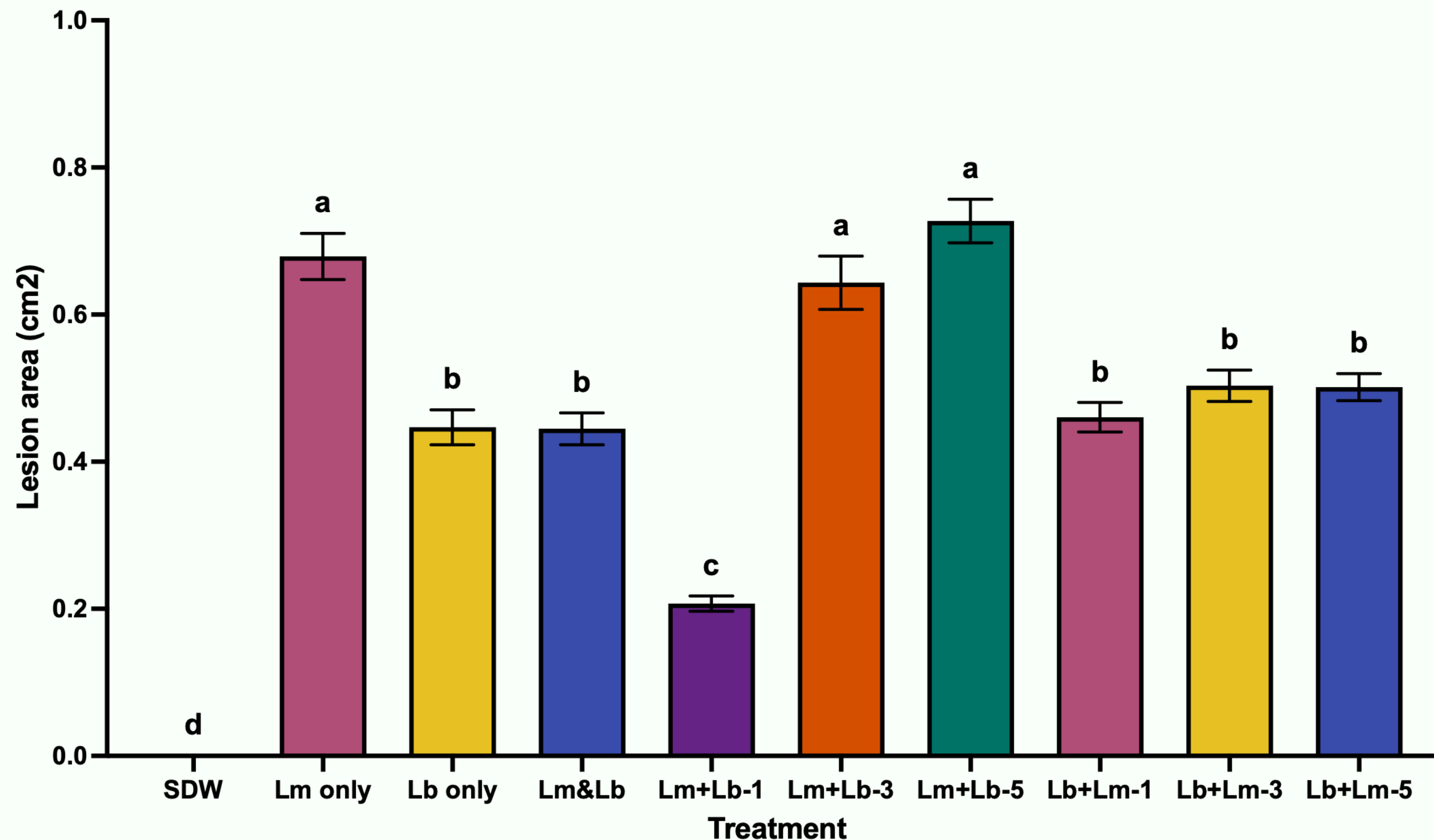


- **No Lm growth** if Lb is inoculated before Lm
- **Partial Lm growth** if Lb is inoculated 3 days after Lm
- **No Lb growth** if Lb is inoculated 5 or 7 days after Lm



# Lm & Lb interactions - *in planta*

Are similar patterns observed *in planta*?

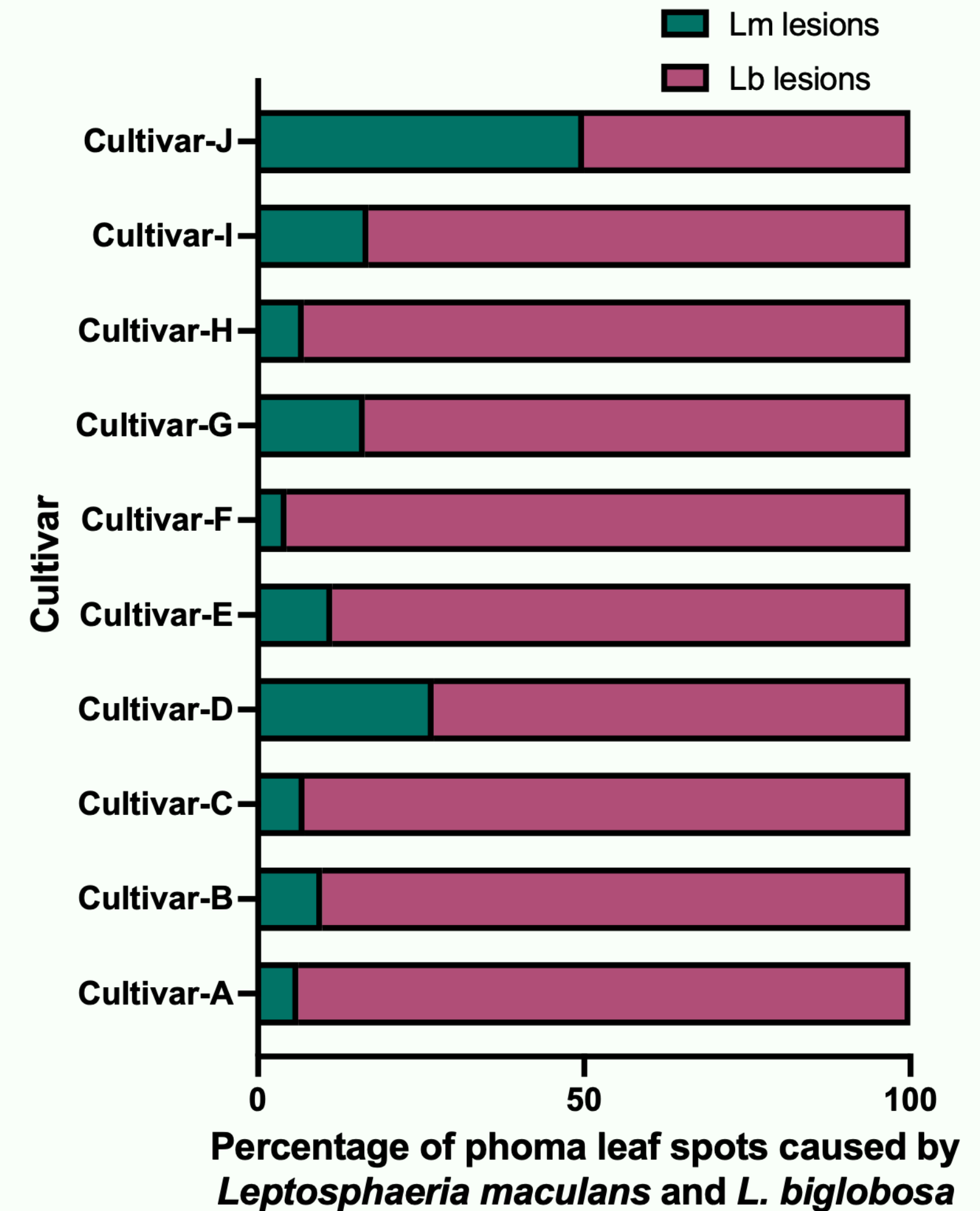
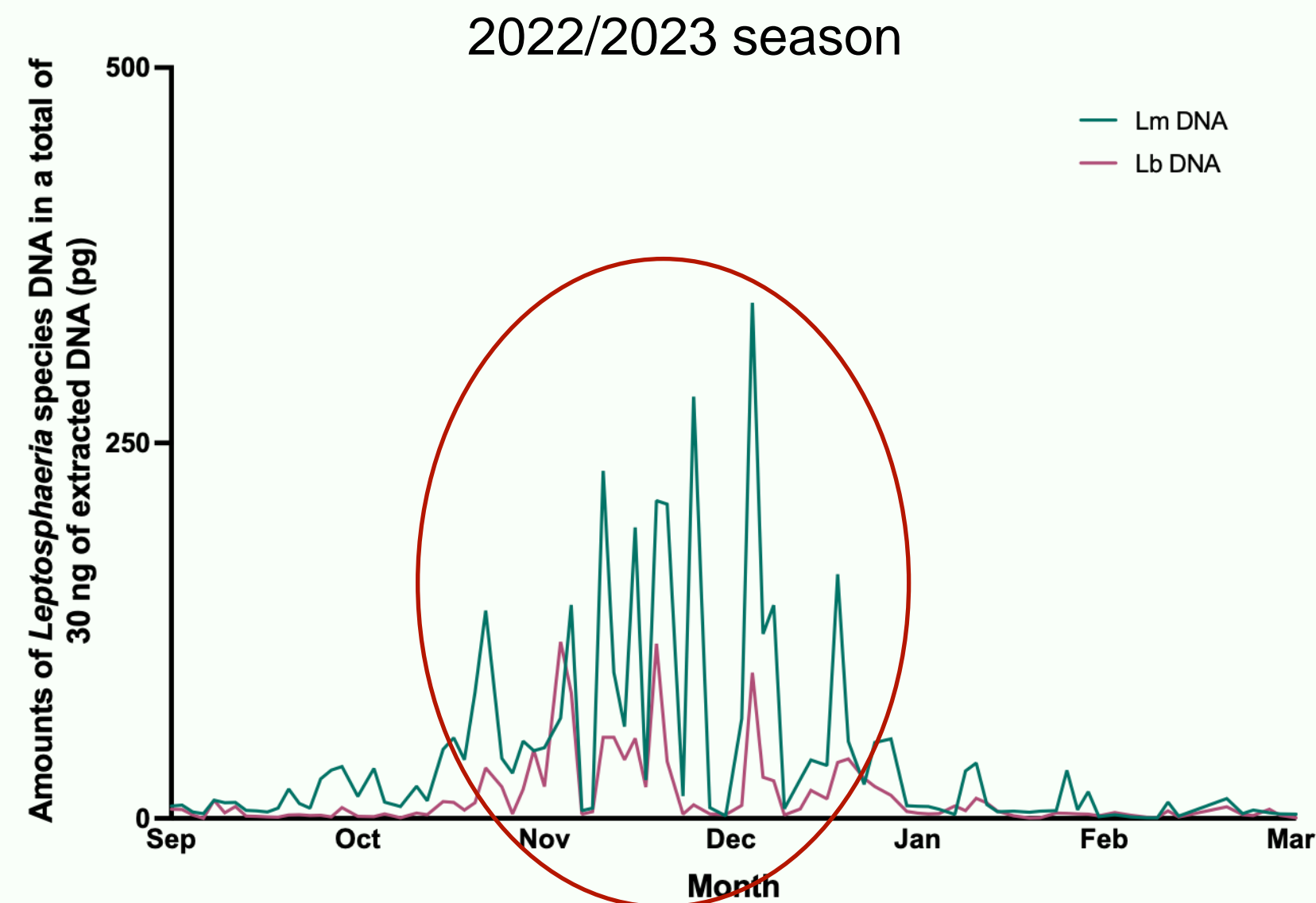
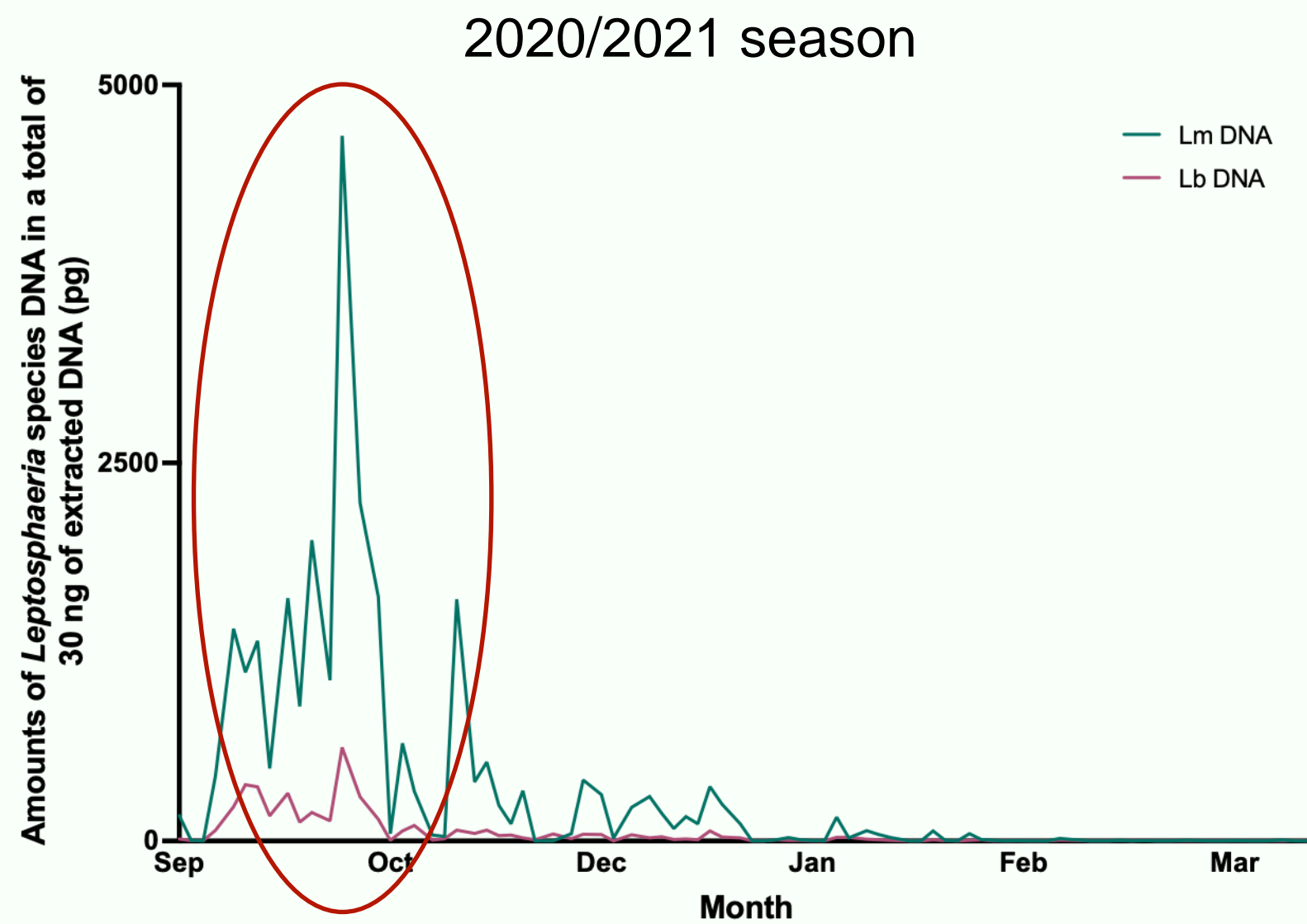


- Lb only, Lm&Lb, Lb+Lm-1, Lb+Lm-3 and Lb+Lm-5 produced similar lesions
- Lm only, Lm+Lb-3 and Lm+Lb-5 produced similar lesions
- Lm+Lb-1 produced significantly smaller lesions



# Lm & Lb interactions - in natural conditions

## What are the current patterns of ascospore release of Lm and Lb?



- Lm & Lb ascospores are still being released at similar times in weather conditions of recent years
- Majority of phoma leaf spots in the autumn of 2023 (Hertfordshire) were caused by Lb
- Since Lb has also been shown to cause stem base cankers in the UK in recent years, the importance of Lb in causing phoma stem canker is likely to increase



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