



# Investigating the Infestation: Understanding and communicating Deathwatch beetle activity on HMS *Victory*

Cathryn Harvey, PhD student

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## Context and background

- Despite knowledge of existence from 17<sup>th</sup> century, very little known about habits and behaviours of Deathwatch beetles beyond tapping
- HMS *Victory* dry docked in 1922 and has been dealing with an infestation first noted in 1932
- Project contributes to early stages of a 15 year conservation programme to preserve HMS *Victory* with only routine maintenance for the next 50 years
- Heritage conservation is a field not widely known to the public, yet is essential to the long-term survival of heritage collections



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# Deathwatch beetles

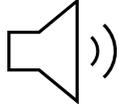
## What we know so far...

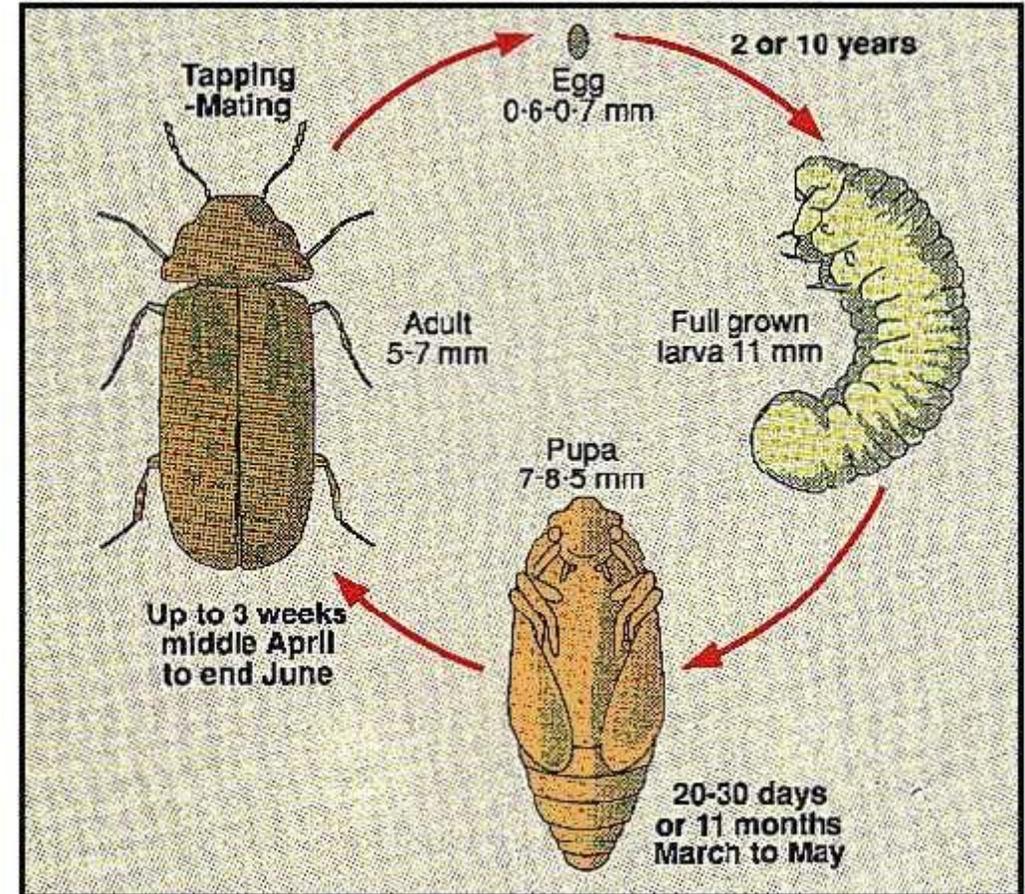
- *Xestobium rufovillosum* de Geer
- Earliest verifiable written record dates to 1668
- Scientific investigations began in the 1920s
- <100 papers about them



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# Deathwatch beetles

- Lifecycle: 1-13 years
- Mating: Tapping behaviour to find mates 
- Eggs: females lay clutch of about 40-60 eggs, prefer decayed wood
- Larvae: eating of the wood creates tunnels. Produce distinctive “bun-shaped” frass
- Pupa: larvae create a pupation chamber before pupation, from which the adult emerges



Birch, M. C., and Julian Keenlyside. 1991. 'Knocking on Wood for a Mate'.  
New Scientist. 1991. <https://www.newscientist.com/article/mg13117765-600-knocking-on-wood-for-a-mate/>.



# Project plan

**Aim: to better understand deathwatch beetles on HMS *Victory* and raise awareness of this complex conservation issue**

- Part I: Deathwatch beetle behaviour
  - Identify how the beetle tunnel in timber
  - Determine whether areas of active infestation be detected with non-invasive methods
- Part II: Public Engagement
  - Determine suitable methods to raise public awareness of specific conservation issues
    - Can these models be used and adapted for other conservation issues?



# Plank for analysis





# Part I: Deathwatch beetles

Perspective 30°

Snap: Axis, 3D

## How is the information being gathered?

1. Surface recording
2.  $\mu$ CT (micro-computed tomography)
3. Non-invasive detection
4. Live deathwatch beetle culture

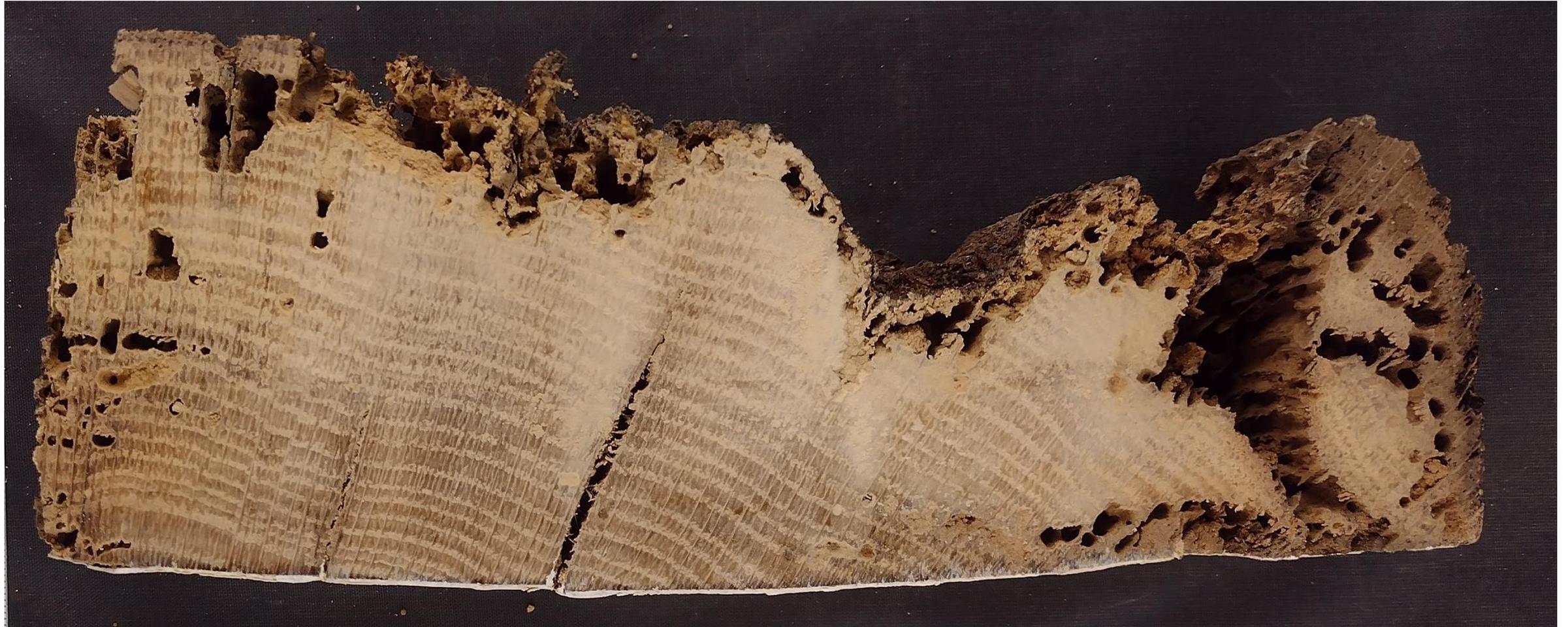


faces: 1,207,147 vertices: 605,106

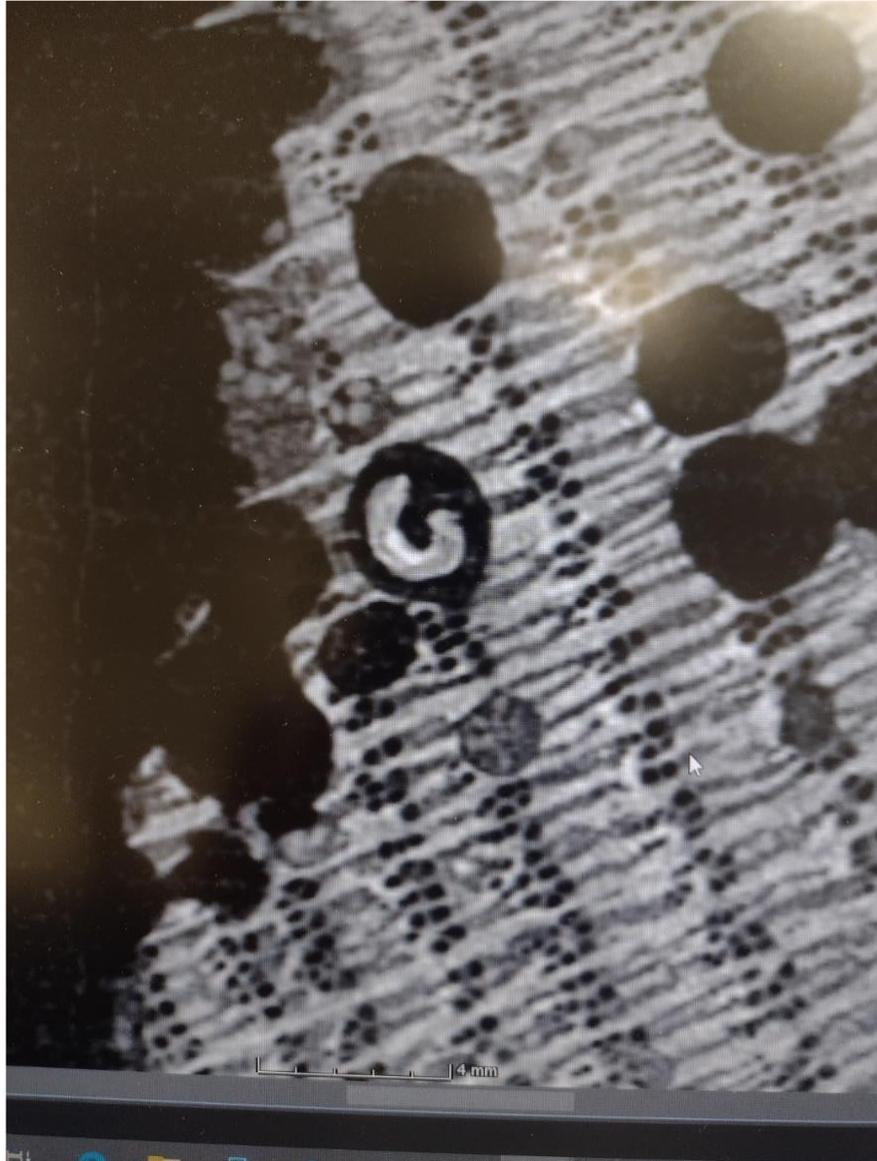




# Findings so far

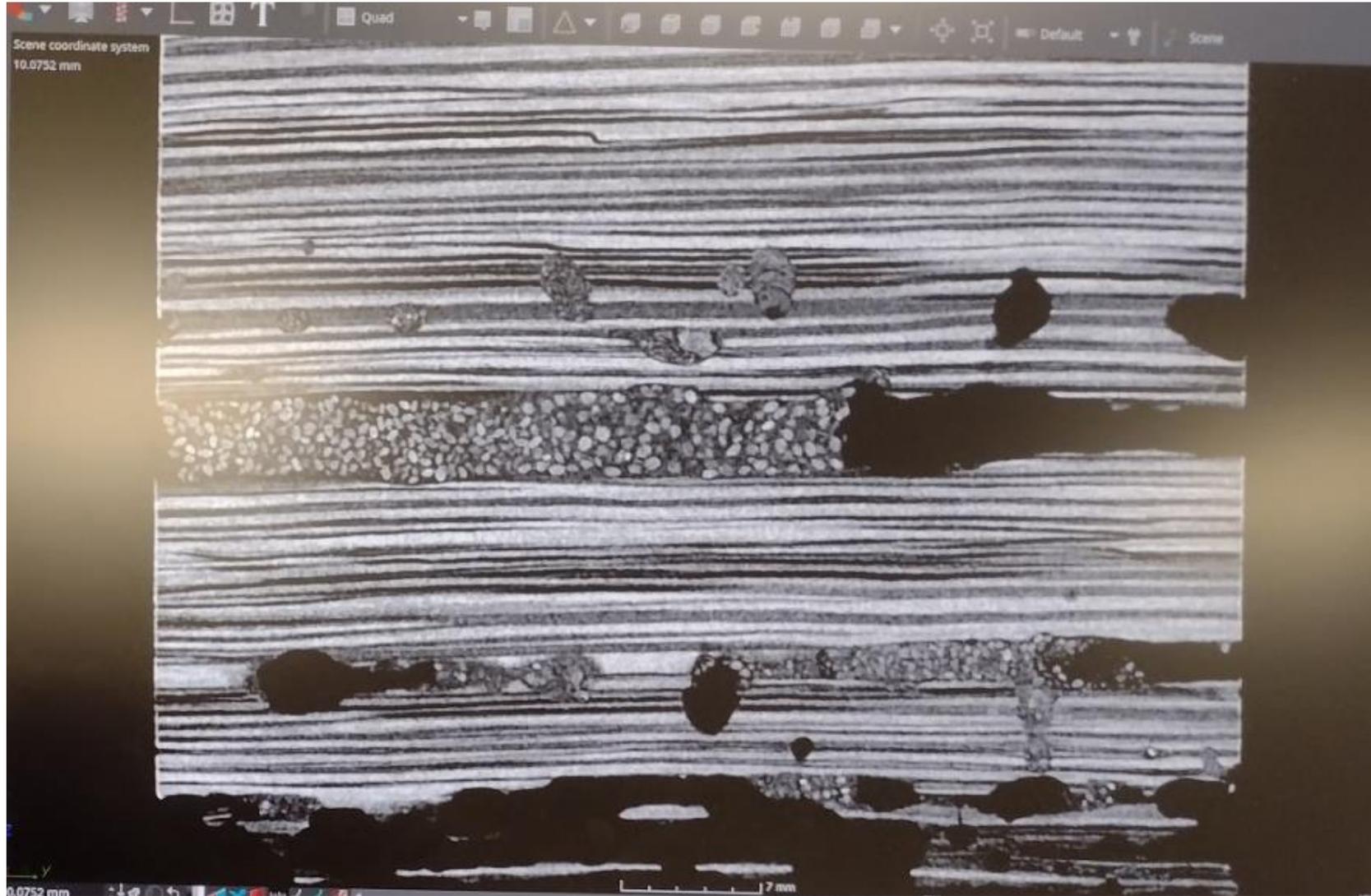


# Deathwatch beetle and larva





# Frass in tunnel





## Part II: Conservation awareness

**How do we take detailed conservation research and information and present it to the public in such a way that is engaging and wide-reaching?**

- Data from Part I will be used to create 2 early prototypes
- Live culture and/or 3D models incorporated
- Assess effectiveness of prototypes with established social science research methods (i.e. surveys)



# Conclusions

- Still early in the project, so no conclusions thus far
- Research has a lot of potential contributions:
  - Knowledge of DWB activity and behaviour
    - Foundation for future research and investigation
    - Help identify areas of risk
    - Applicable to other historic buildings
  - Non-invasive detection
    - Conservation of HMS *Victory* can be more targeted, impacting the amount of historic fabric that can be saved
    - Detection of beetles in wood may be applicable to other species
  - Conservation awareness
    - Engaging with the public is essential for the longevity of heritage
    - Project has improved awareness at technical committee and board level for *Victory*, impacting funding



## References

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<https://www.cranfield.ac.uk/people/cathryn-harvey-32646867>

**T: +44 (0)1234 750111**

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