

QuickNotes

Science summaries from fRI Research

Endemic vs Epidemic Dispersal of Mountain Pine Beetle

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Mountain pine beetle (MPB) has two stable population phases, the high-density epidemic phase, and the low-density endemic phase. Much of what we know about MPB behaviour is from studies of beetles in the epidemic population phase because that is when they are easy to locate in the field and cause the most damage. Dispersal and flight behaviour of MPB is also difficult to study. In this project, we compared the dispersal capacity and flight behaviour of MPB from the epidemic and endemic population phases.

Key Findings

- Endemic MPBs fly further (Fig. 2a) and end their flight with similar amounts of fat as epidemic beetles
- Endemic-reared MPBs are the same size but likely have more fat than epidemic beetles (Fig. 2b)
- As MPB are or will be in an endemic phase in much of Alberta, dispersal models should be updated

Methods

We lab-reared simulated endemic beetles (one female introduced to a small tree bolt) and simulated epidemic beetles (five females introduced to a large tree bolt) (Fig. 1). When MPBs emerged from the bolts, we weighed them, and then attached them to flight mills to record flight duration and distance for 23 hours. After flight, we re-measured the beetles' body condition and determined their fat content.

Conclusions

MPB colonizes smaller, weaker trees when their populations are small. These trees are relatively rare on the landscape. MPB in their endemic phase would likely need to fly further on average to find a new host. Our data confirm this behaviour. It may be that having less competition with siblings allows endemic beetles to greater relative fat content at emergence than epidemic beetles which allows them to fly further.



Figure 1. Introduction of female MPB into a tree bolt

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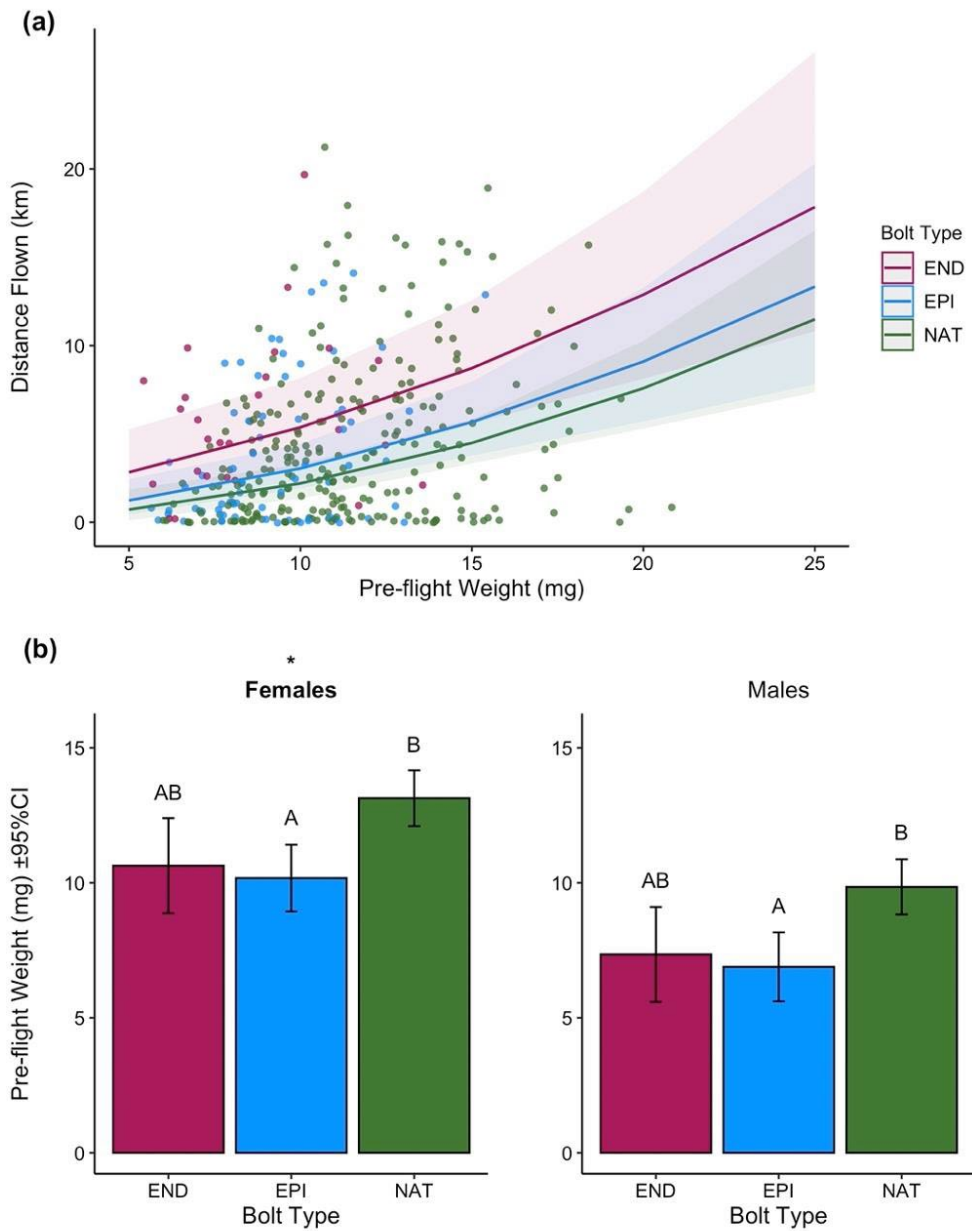


Figure 2. *END = endemic simulation, EPI = epidemic simulation, NAT = naturally mass-attacked trees. (a) modeled curves and 95% confidence bands showing larger beetles fly further, and beetles reared in endemic conditions fly further than epidemic beetles of a similar weight. (b) The weight of endemic and epidemic simulated beetles was not significantly different. Beetles from a naturally mass-attacked tree were larger.*