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# Can different IML RESI tools and operators impact wood density predictions in Southern pines?

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# Drilling resistance technique

- Routine method among Australian forest growers for standing tree wood quality assessment
- Fast, cheap, and sufficiently precise for commercial use
- Facilitated by the web-based trace processing platforms
- Its low cost in field applications and the relatively high-resolution data produced







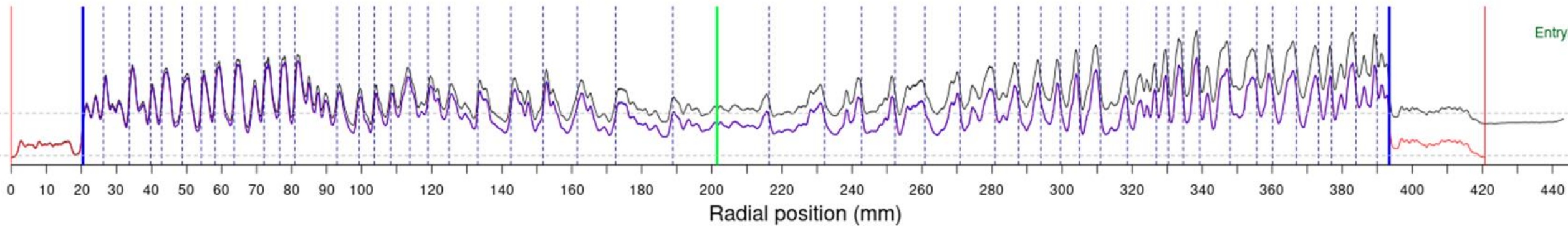
# How does it work?



Fixed rotational and forward speed

~3 mm diameter needle

Measure amplitude (0 to 100%) at 0.1 mm intervals





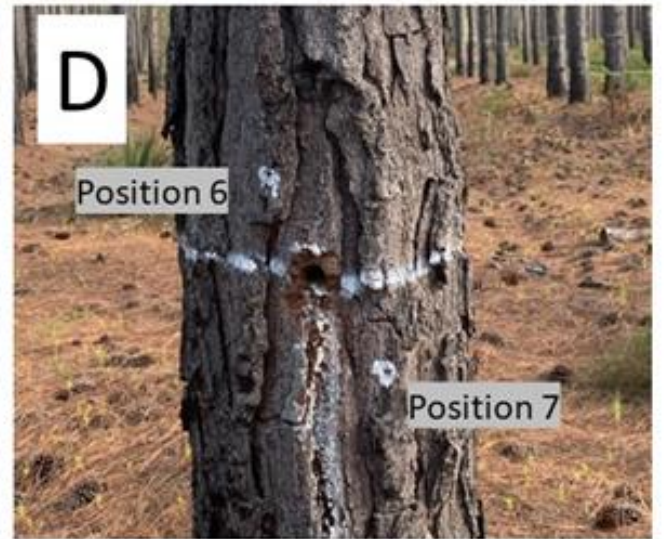
- Do different IML Resi tools gives different basic density predictions?
- Is there an operator and Resi type (size) effect on predicted basic density?





- Southern Pine (*Pinus elliottii* var. *elliottii* x *Pinus caribaea* var. *hondurensis*)
- 6 Sites x 30 trees
- 2 Operators
- 7 Resi Instruments + 1 serviced and retested
- Two types of instruments IML Resi PD-400 and IML Resi PD-500
- Sampling conditions: feed speed 200 cm/min and 3500 RPM
- Resi needle diameter 3.14 mm



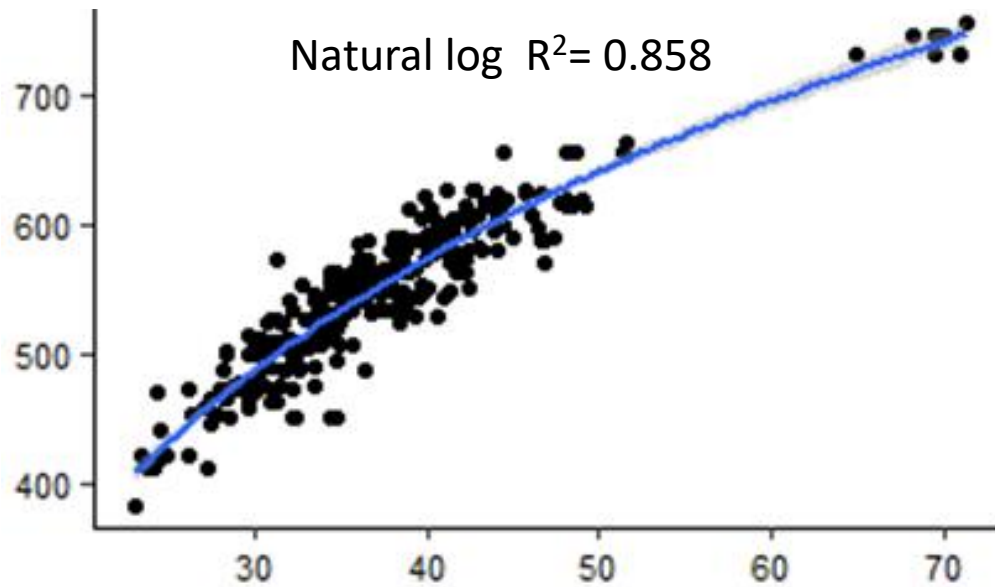
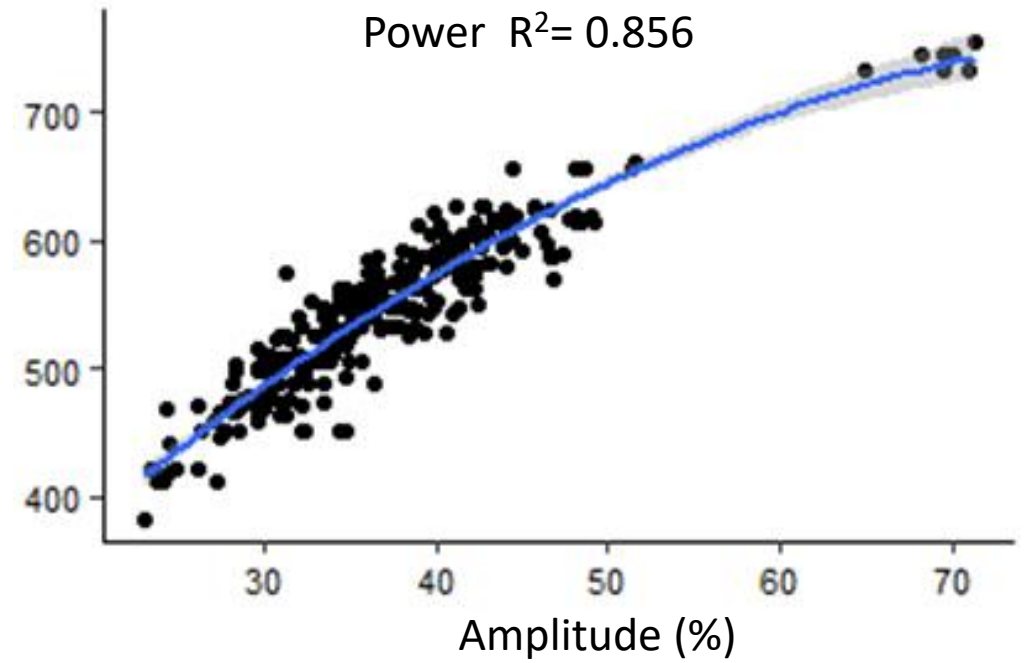
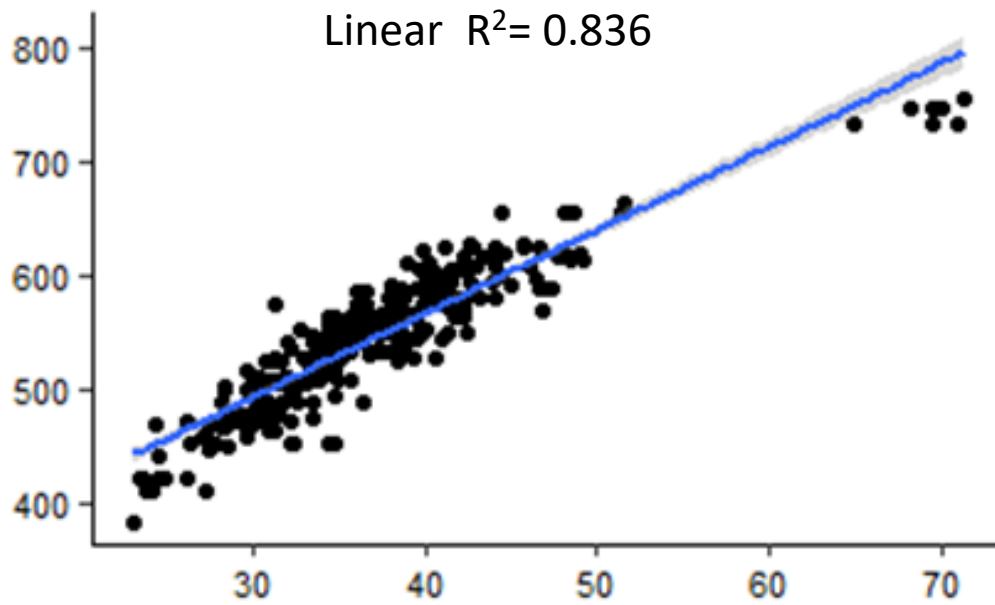




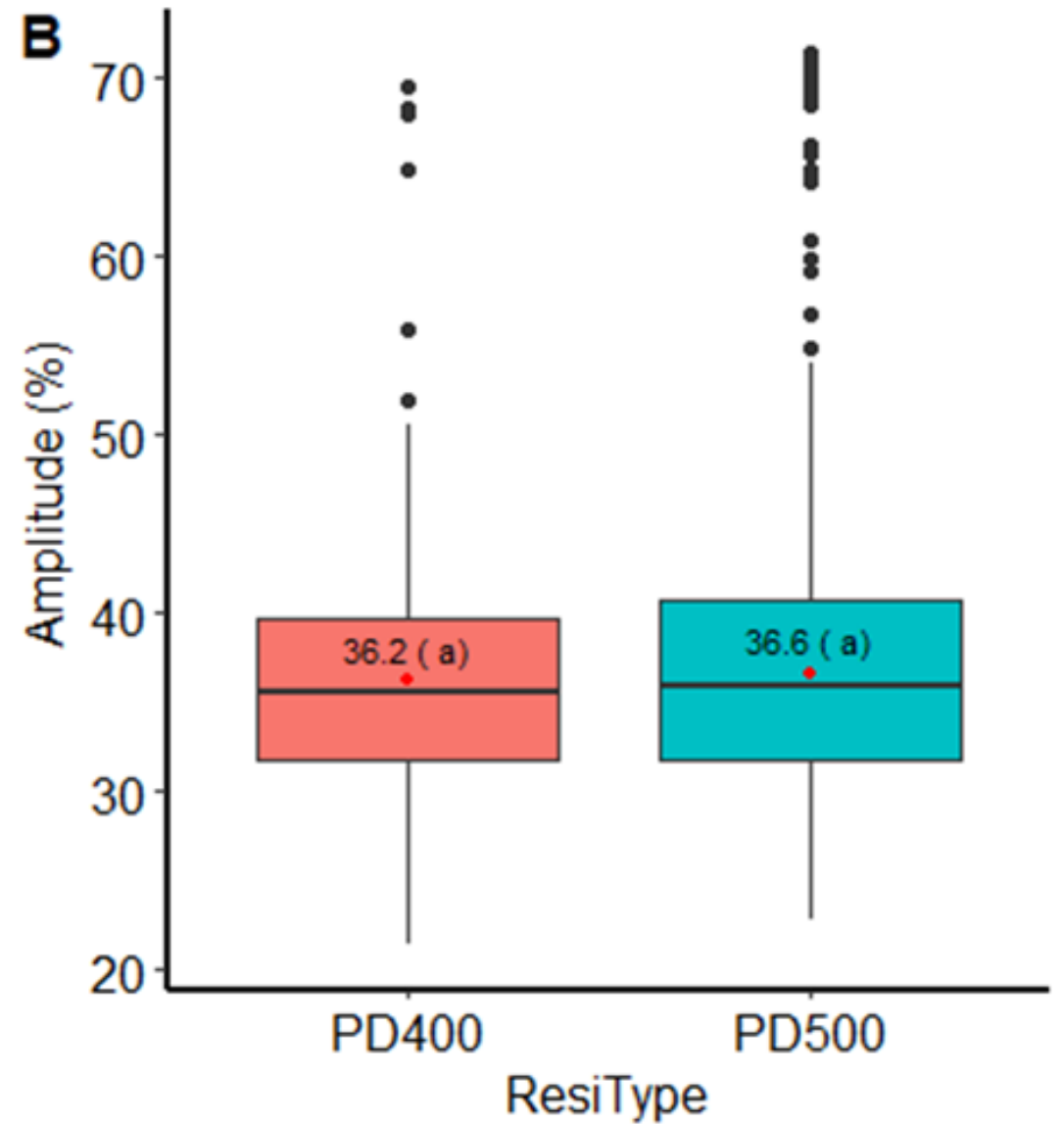
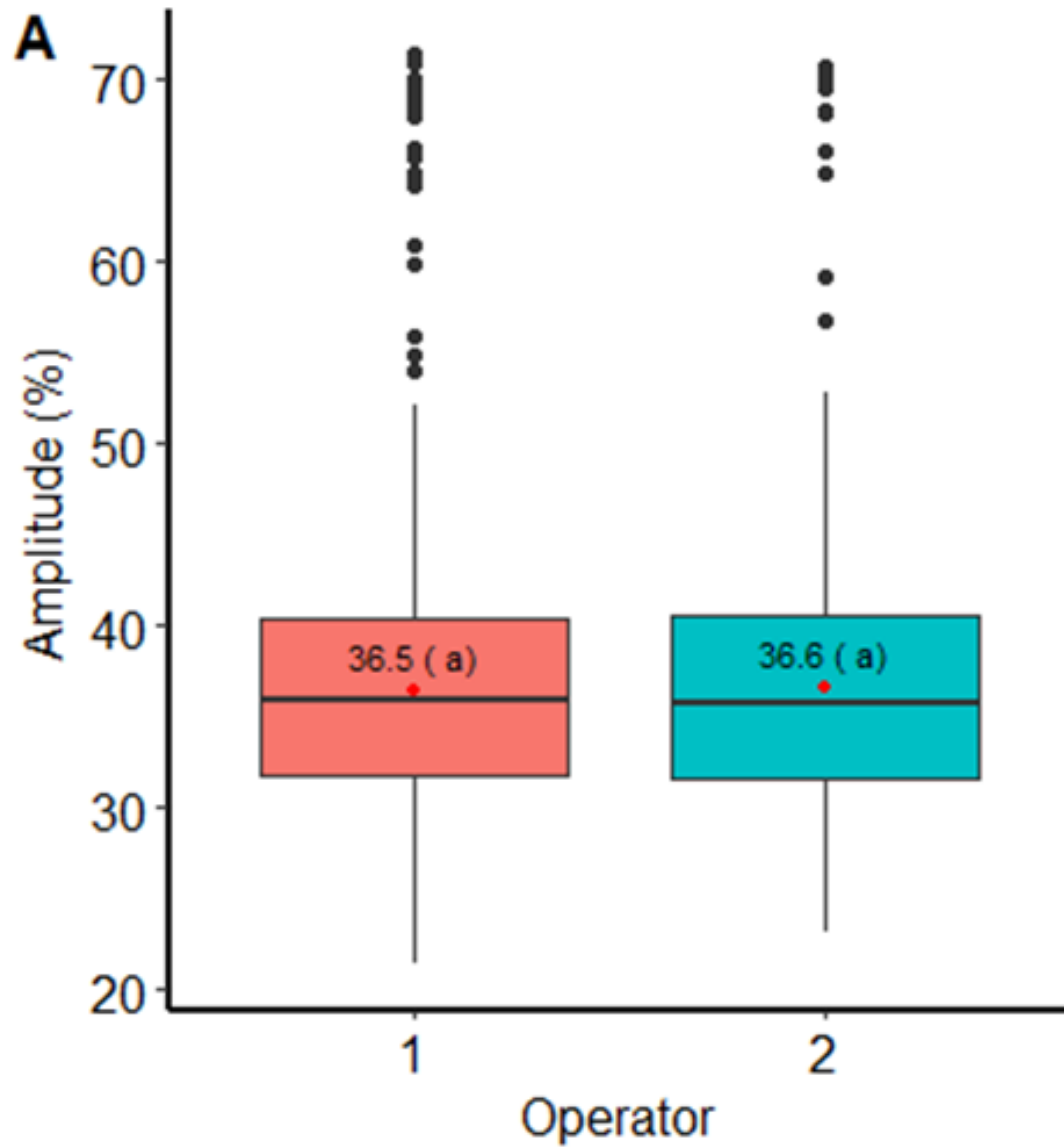


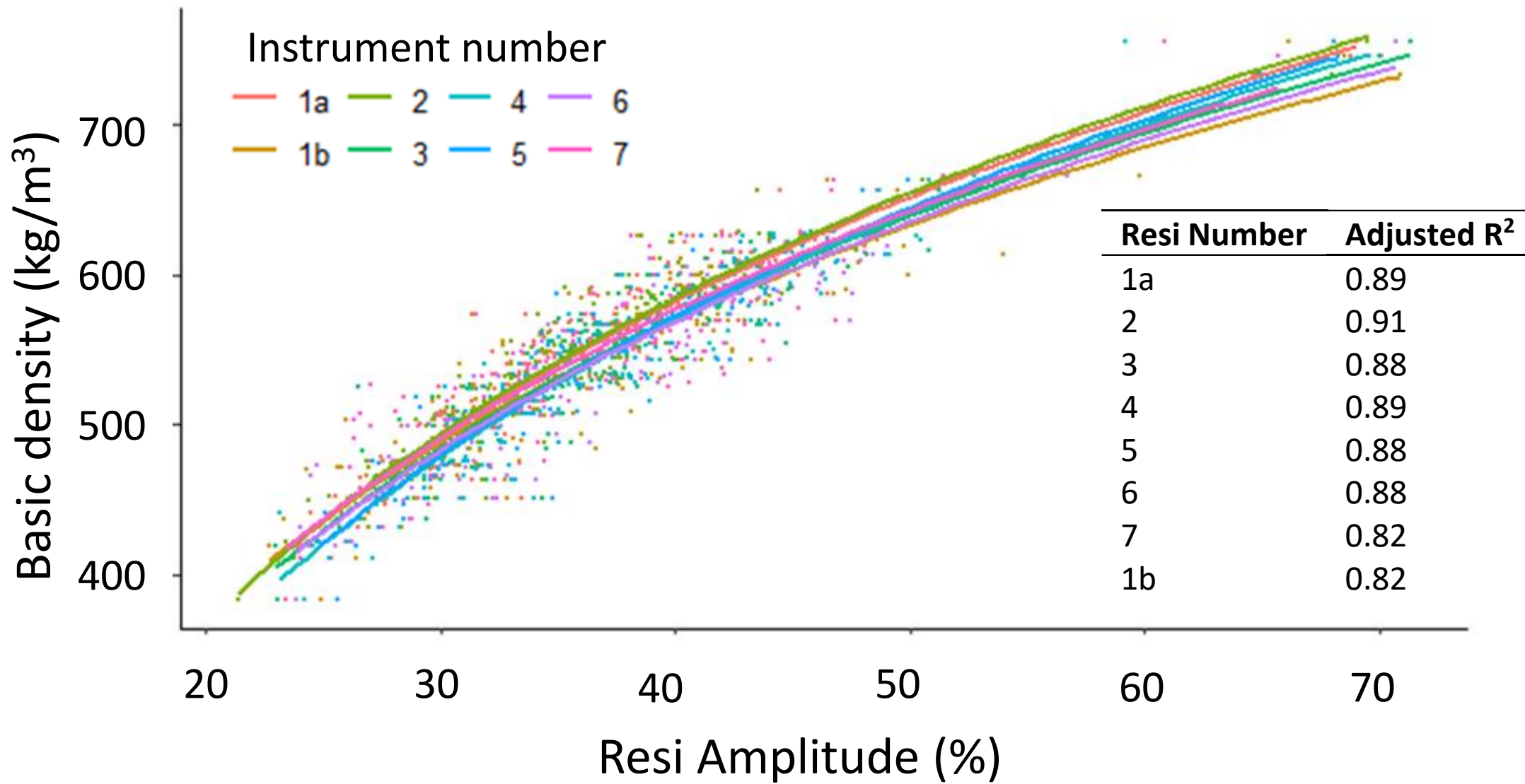


Basic density (kg/m<sup>3</sup>)

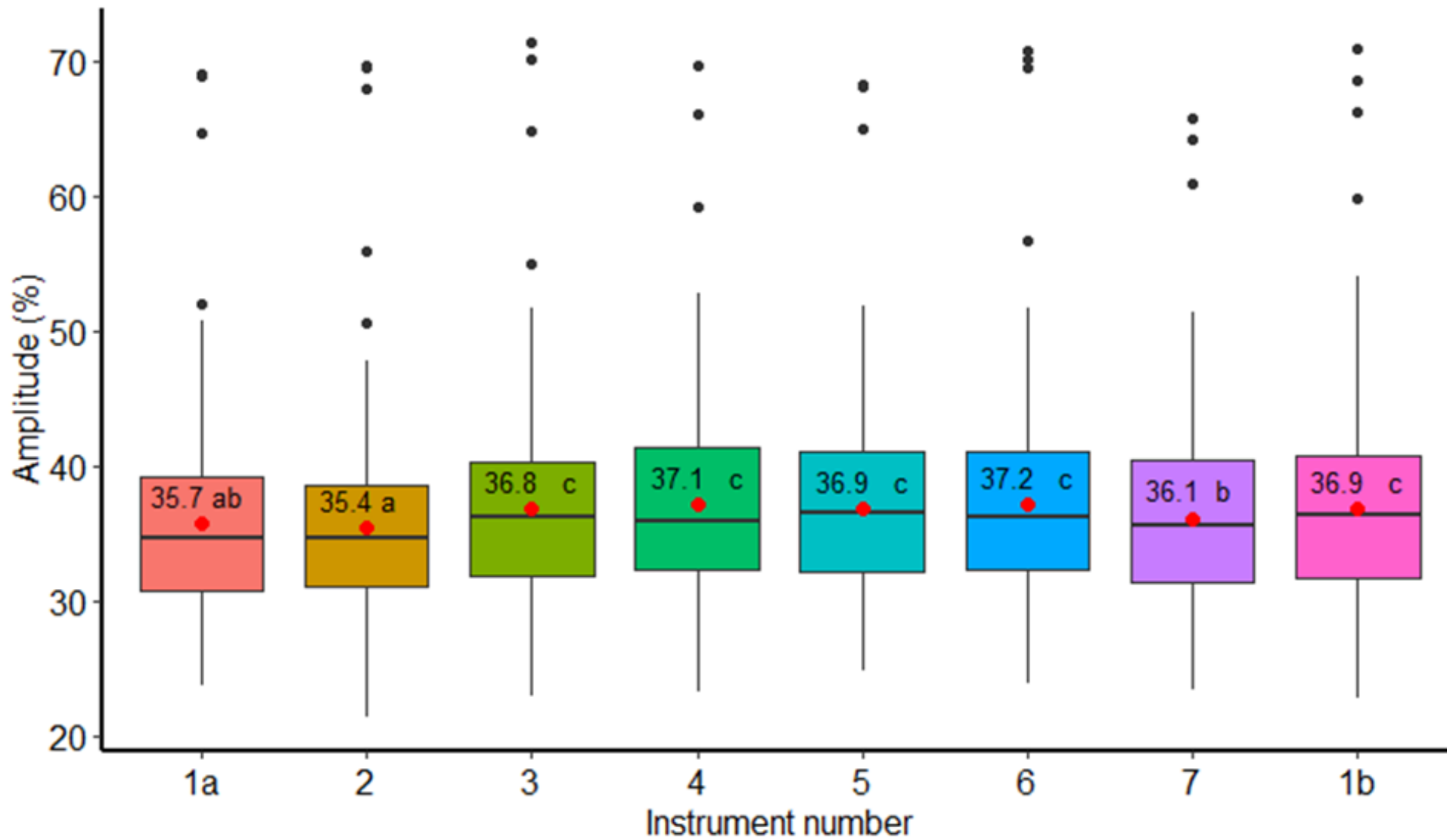


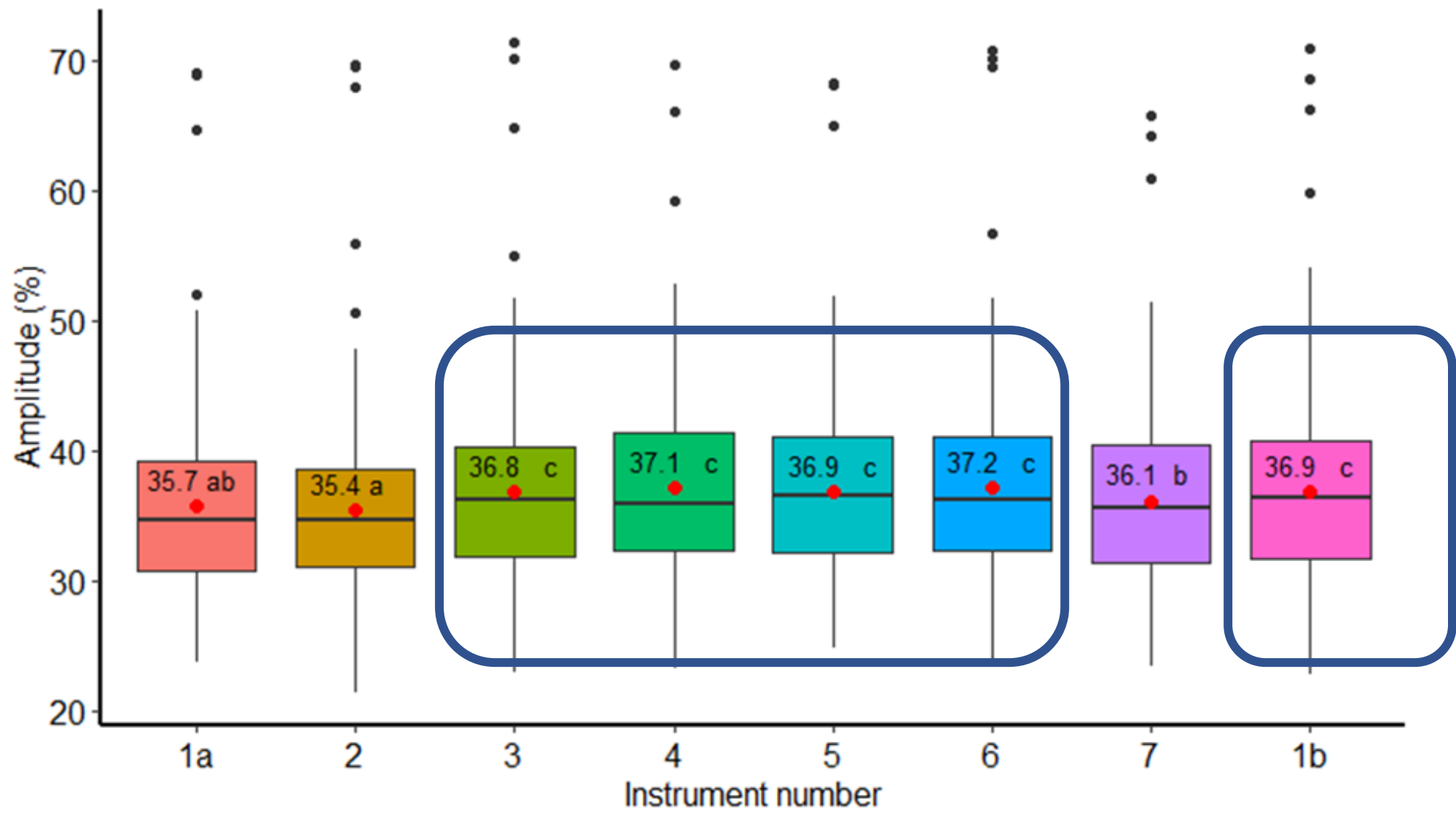




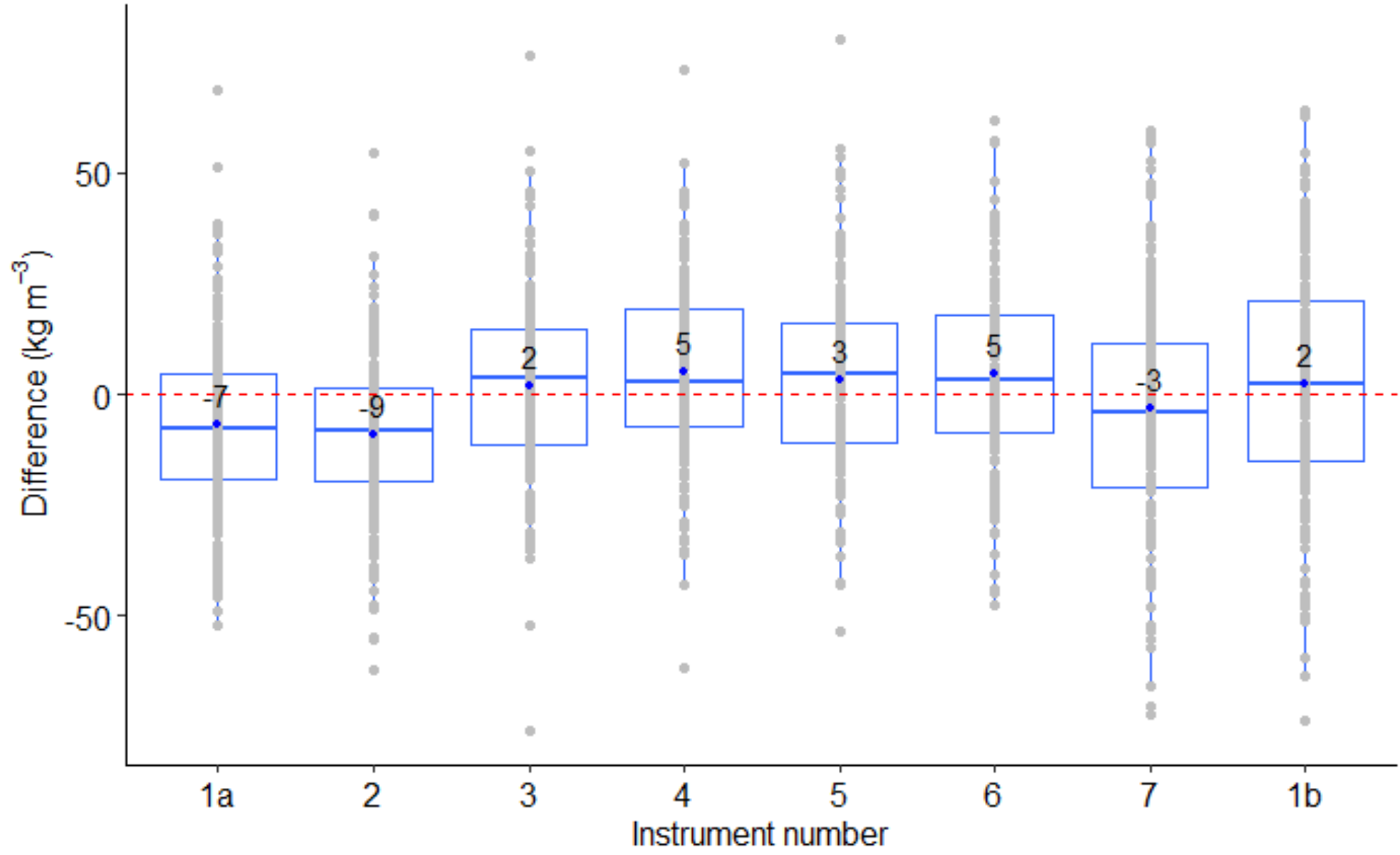












# Conclusions

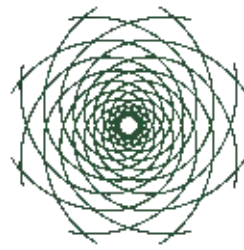
- The variance between instruments was small but significant across the sites.
- One Resi instrument under-predicted basic density by  $9 \text{ kg/m}^3$  and another over-predicted by  $5 \text{ kg/m}^3$ .
- The operator had no effect on basic density prediction.
- Resi PD400 or PD500 instruments gave similar basic density predictions.
- Other instrument variance should be considered (Feed speed & RPM, needle diameter & wear, Resi battery, needle flexing, moisture content and grain angle).
- Commercially appears that can use multiple Resi tools to assess plantations, as tree to tree and plot to plot variation much greater than variation between instruments.







# Project Partners



**RPBC**<sup>®</sup>  
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