

# RETICULITERMES HAGENI (ISOPTERA: RHINOTERMITIDAE) FROM MISSOURI WOODLANDS: PRELIMINARY MORPHOMETRIC AND MOLECULAR COMPARISONS

PINZON, OLGA<sup>1</sup> AND HOUSEMAN, RICHARD<sup>2</sup>.

UNIVERSIDAD DISTRITAL FRANCISCO JOSE DE CALDAS, BOGOTA. [OPATRICIAO@UDISTRITAL.EDU.CO](mailto:OPATRICIAO@UDISTRITAL.EDU.CO)

<sup>2</sup> DIVISION OF PLANT SCIENCES, ENTOMOLOGY PROGRAM AREA. UNIVERSITY OF MISSOURI.

## BACKGROUND

At least seven species of *Reticulitermes* (Isoptera: Rhinotermitidae) subterranean termites are known to occur in the United States and they play an important ecological role as cellulose-degrading organisms in natural forests. *Reticulitermes hageni* Banks predominates in woodland areas of Missouri (Pinzon and Houseman 2009, Figure 1). In this study we examine nine morphometric characters measured from individual *R. hageni* soldiers collected from woodlands in Missouri whose species and haplotype identity was confirmed using molecular sequencing.

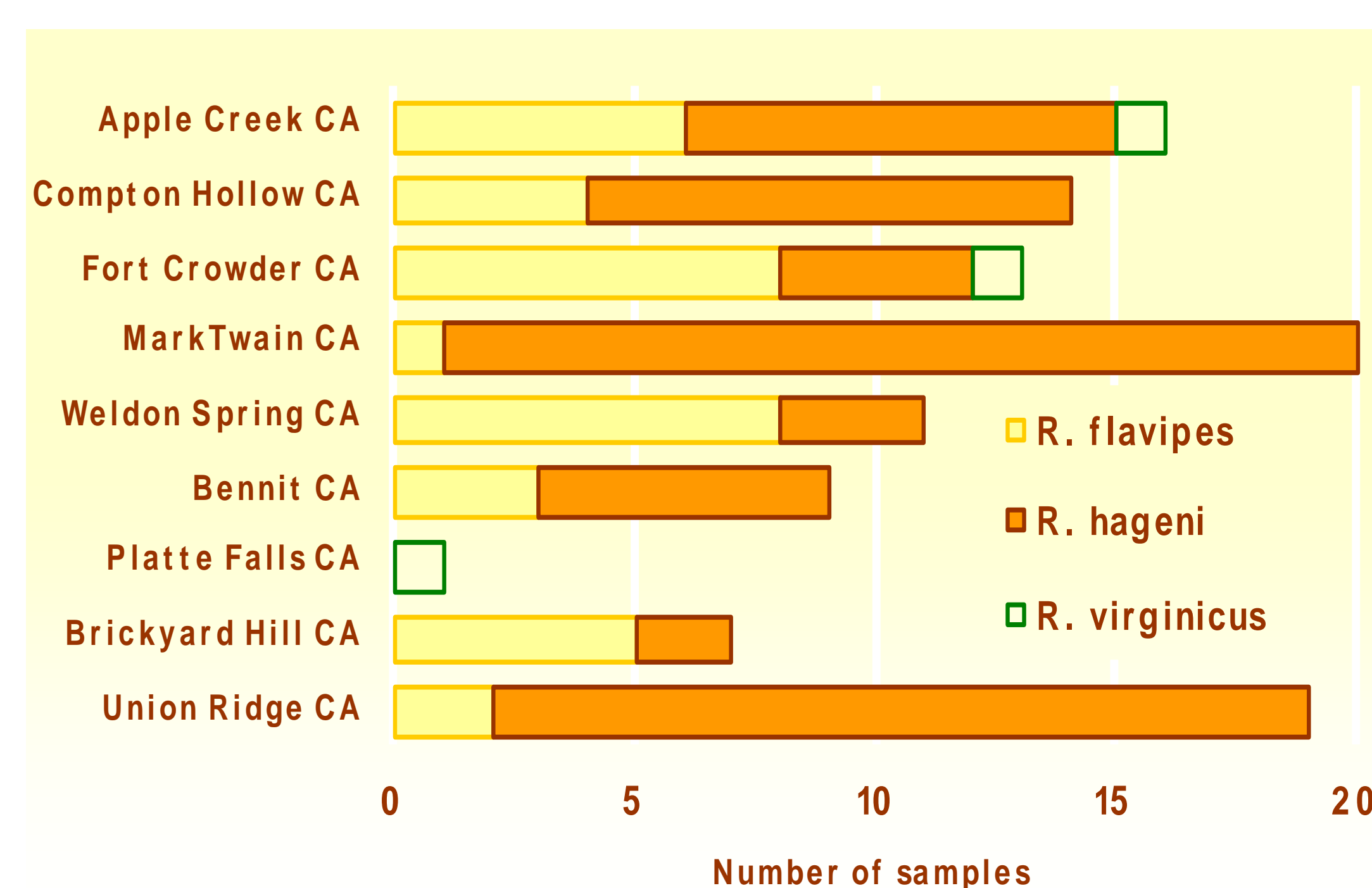


Figure 1. Absolute frequency of *Reticulitermes* sp. found in each conservation area (Source: Pinzon and Houseman 2009).

## MATERIALS AND METHODS

### Sampling

Samples of *R. hageni* colonies were collected from conservation area woodlands located in all geographic regions across the state of Missouri using linear transects. Five samples per transect (4-5 transects in each conservation area) that were at least 15m apart were collected to get approximately 20 colony samples within each conservation area. A total of 248 samples were collected and preserved in vials containing 80-90 % ethyl alcohol.

### Species identification

Samples were identified in the laboratory using 16S rRNA sequencing (Pinzon and Houseman 2009), morphology (Hostettler et al 1995; Nutting 1990; Scheffrahn & Su 1994), and morphometric characters of soldiers (Roonwal 1969). To describe morphometric characters of wild populations of *R. hageni* we used measurements from 47 soldiers belonging to different colonies whose species and haplotype was confirmed using molecular sequencing and Analysis of Variance Kruskal Wallis non-parametric analysis ( $\alpha=0.05$ ). The number of samples identified and measured from each woodland were: Apple Creek (4), Bennitt (5), Fort Crowder (6), Hollow Creek (3), Mark Twain (16), Union Ridge (13).

## RESULTS AND DISCUSSION

*Reticulitermes hageni* colonies collected from Missouri woodlands belonged to three haplotypes (RHM1, RHM2, RHM3, GeneBank accessions FJ226419 - FJ226421 respectively). Haplotype RHM2 was more abundant (89%) than RHM1 or RHM3 and was used to describe and compare *R. hageni* morphometric characters from different woodlands. Individual morphometric characters of *R. hageni* soldiers did not substantially differ among the seven woodlands compared (df=5, P>0.05). While environment may play a key role in species size and development, size differences between woodland populations in Missouri were not evident. Comparisons with urban populations would be useful, but *R. hageni* is not abundant in urban environments so few studies have included this species (Vargo and Carlson 2006, Vargo et al. 2006).

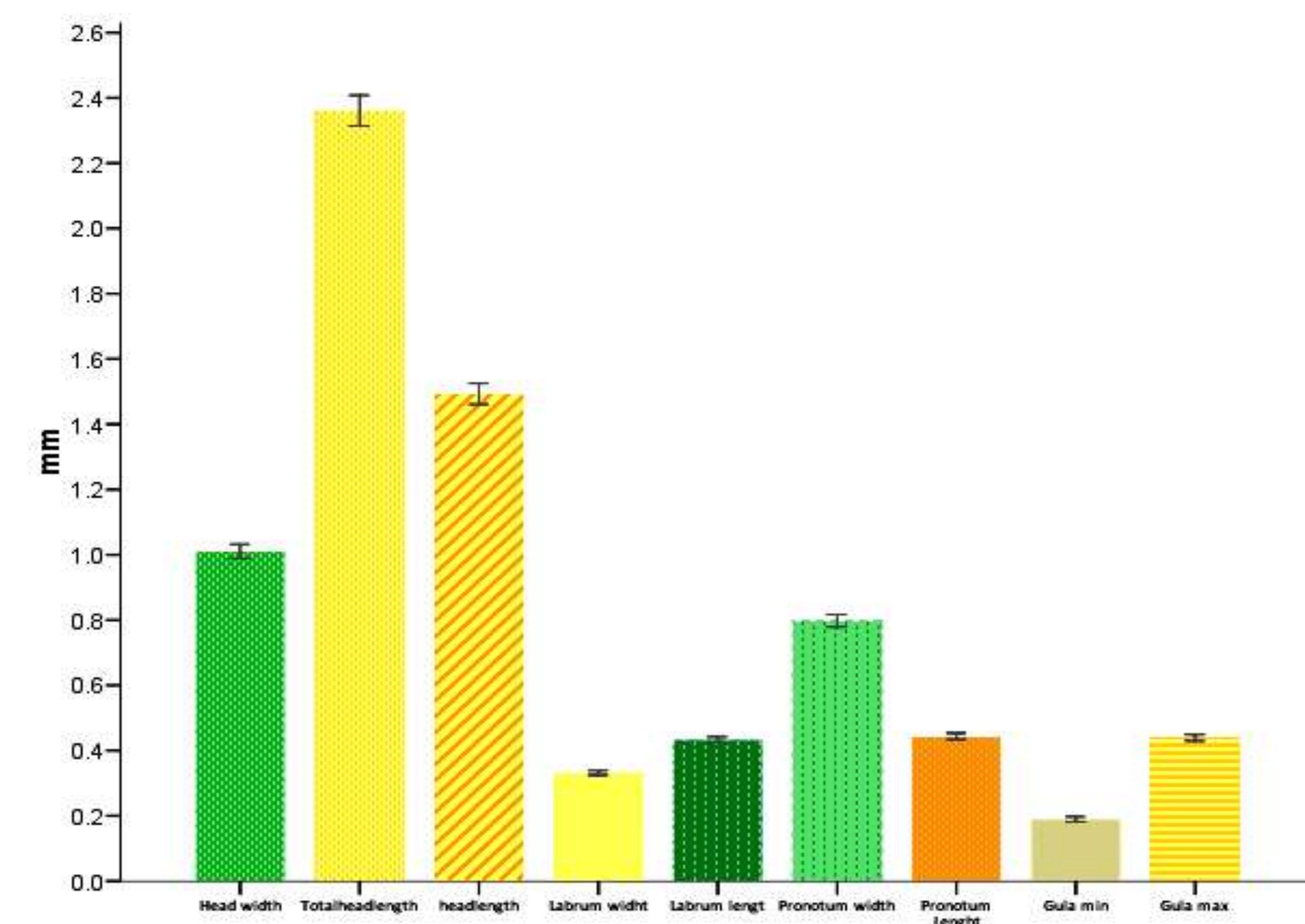


Figure 2. Mean size of the nine morphometric characters measured from soldiers of the 16s rRNA haplotype RHM2 from woodlands of Missouri.

## CONCLUSIONS

Compared with other *Reticulitermes* species occurring in the United States, *R. hageni* from Missouri woodlands shows lower haplotype diversity. Little intraspecific morphometric variability was measured among woodlands located in different geographic of Missouri regions within a single haplotype. Measuring soldier morphological characters from individuals positively identified using molecular methods will ensure the most accurate morphological inter and intraespecific descriptions of *Reticulitermes* species, and may help minimize the intraspecific variation often mentioned as a constraint to effective morphological identification of *Reticulitermes*.

## REFERENCES

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