A COMPARISON of TUNNELING by TWO COLONIES of the FORMOSAN SUBTERRANEAN TERMITE in the FIELD and LABORATORY

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INTRODUCTION

Tunneling of the Formosan subterranean termite, *Coptotermes formosanus* Shiraki (Isoptera: Rhinotermitidae), has been observed in the laboratory with groups of foragers extracted from field colonies or from colonies maintained in the laboratory, but there is little information on tunneling by foragers that are a functional part of a field colony. The objective of this experiment was to observe tunneling by Formosan subterranean termites in the field and to compare the results to tunneling behavior of the same species observed in laboratory arenas.

MATERIALS and METHODS

Three two-dimensional foraging arenas constructed of clear acrylic were installed in the field over active foraging sites for a period of seven days in each of two areas occupied by colonies of Formosan subterranean termites. Three separate arenas were established in the laboratory for each colony, and 1,500 termites were added in each arena. Search pattern, daily tunneling rate, and total volume tunneled were compared. Tunneling was also monitored at three-hour intervals for a period of 72 hours in two field arenas of one colony to examine possible temporal fluctuations in tunneling rate.

RESULTS

We found that tunnel search patterns of repeated radial bursts at foraging sites as described by Campora and Grace (2001) were similar in both laboratory and field arenas. However, tunneling rate and total tunnel volume in field and laboratory arenas were significantly different. One colony tunneled much more in the field compared to the laboratory, and the other tunneled much less in the field compared to the laboratory. No differences were observed in total tunnel volume between colonies in the laboratory. Tunneling rate in the field fluctuated over time and was possibly related to temperature.

A variety of explanations for the disparity in tunneling activity between the two colonies in the field are possible. Intrinsic colony factors, such as population size and colony vigor, and extrinsic factors, such as location of the arenas within the colony's foraging territory, are discussed.

REFERENCES

Campora, C. E., and Grace, J.K. 2001. Tunnel orientation and search pattern sequence of the Formosan subterranean termite (Isoptera: Rhinotermitidae). J. Econ. Entomol. 94: 1193-1199.

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