

HOW SIMILAR ARE COLONIES OF THE FORMOSAN SUBTERRANEAN TERMITE? EVIDENCE FROM HYDROCARBON AND ENZYME STUDIES FROM HAWAII AND THE MAINLAND UNITED STATES

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The Formosan subterranean termite, *Coptotermes formosanus* Shiraki, is broadly distributed on the island of Oahu, Hawaii. This exotic pest is also well established on most of the other Hawaiian Islands, as well as in numerous locations on the mainland of the United States. Recently, a large infestation of *C. formosanus* has been discovered in southern California; *C. formosanus* may now be established on the West Coast as well. For two years, we made monthly collections from seven colonies of *C. formosanus* located in different areas of Oahu. From these colonies we characterized forty-five individual and isomeric mixtures of cuticular hydrocarbons from all castes. Using gas chromatography/mass spectrometry we identified several unusual dimethylalkanes with a methylene group separating the methyl groups, such as 13,15-dimeC29 and 15,17-dimeC31. Many of these components occur in very small amounts (<0.5% of the total hydrocarbon) and were not recognized in earlier studies with this species. The average hydrocarbon profiles of workers and soldiers were not drastically different, and the variability in relative proportions of the more abundant hydrocarbons was quite low among the seven colonies from Oahu. Variability in relative proportions was also low from month to month, with the exception of C39 & C41 components. Over the two years, these late-eluting components were present in significant proportions in the fall and winter, but decreased drastically in the spring. Similarly, analysis of isozymes of numerous colonies of *C. formosanus* from Oahu indicate no genetic variation among colonies. This lack of cuticular hydrocarbon and genetic variation is consistent with a single founder event in Hawaii. In other words, it is quite possible that the entire *C. formosanus* population on Oahu resulted from a single introduction, probably before 1900. Comparisons of hydrocarbon mixtures from *C. formosanus* populations from Oahu and locations on the mainland suggest that this species has been introduced on several, separate occasions. None of the mainland populations (except perhaps San Diego, California) have hydrocarbon patterns that are quantitatively similar to those from Oahu. Most likely, the sources of the mainland populations were from localities other than Oahu. Confirmation of these founder events will be the subject of future research. Results will help us estimate how rapidly we can expect established infestations of *C. formosanus* in North America to spread and become the dominant subterranean termite species.