

The Evolutionary Origin of *Spirotrichonympha* in the Termite Genus *Reticulitermes*. T. L. Merrell,¹ F. De Martini¹, and G. H. Gile¹, School of Life Sciences, Arizona State University.

Introduction: *Reticulitermes tibialis* is in the family Rhinotermitidae and is native to the western United States. In Arizona it is considered the most widely distributed subterranean termite [1]. Like other members of the Rhinotermitidae family, *R. tibialis* is dependent on gut protist symbionts to digest its wood food. The termite genus *Reticulitermes* belongs to a monophyletic group with the termites from the *Coptotermes* and *Heterotermes* genera. Termites from these two genera always contain three genera of protists which are *Pseudotriconympha*, *Holomastigotoides* and *Spirotrichonympha*. However, termites in the genus *Reticulitermes* have a protist community more similar to the distantly related termite *Hodotermopsis*. *Reticulitermes* only has one protist genus in common with its relatives in *Coptotermes* and *Heterotermes*, the parabasalium, *Spirotrichonympha*. One hypothesis for this is that *Reticulitermes* somehow lost all of its hindgut community and replaced it with the hindgut community of *Hodotermopsis* [2]. In order to shed light on this mystery, we sequenced the 18S ribosomal RNA gene (18S rDNA) from *Spirotrichonympha* in *R. tibialis* and performed phylogenetic analyses to determine whether *Spirotrichonympha* sequences from *R. tibialis* are more closely related to those from *Hodotermopsis* or to those from *Coptotermes* and *Heterotermes*.

Results: Observing our phylogenetic analysis we found that our *Spirotrichonympha* sequence from *R. tibialis* did form a monophyletic group with *Spirotrichonympha* sequences from *Hodotermopsis* and therefore are more closely related to sequences from *Hodotermopsis* instead of *Heterotermes* and *Coptotermes*. This is consistent with the earliest ancestor of *Reticulitermes* having replaced its hindgut community with that of *Hodotermopsis*.

References: [1] Baker P. B. and Marchosky R. J. Jr. (2005) *Arizona Termites of Economic Importance*, pg 11. [2] Kitade O. (2004) *Comparison of Symbiotic Flagellate Faunae between Termites and a Wood-Feeding Cockroach of the Genus *Cryptocercus**, *Microbes Environ.* 19, 3: 215-220.