

Phylogenetic taxonomy of the ciliate protozoa inhabiting intestine of herbivorous mammals

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SUMMARY

Many and various ciliates inhabit the alimentary tracts of large herbivorous mammals. Most of these ciliates belong to two orders, Entodiniomorpha and Vestibuliferida, which are considered to be restricted to this unique habitat. These two orders include about 400 species, separated into 18 families. Of these families, some are detected from a relatively wide range of hosts, while some are closely associated with the respective host species. For example, the members of the families Buetschliidae and Cycloposthiidae are distributed in many host species, including horses, rhinoceroses, elephants, tapirs, hippopotamuses and capybaras, but in contrast, species belonging to the family Ophryoscolecidae are detected only in ruminants, Ditoxidae is found only in horses, and Polydiniellidae occurs only in elephants. As these families are considered to have evolved in parallel with their host species, the comparison of the ciliate fauna in the respective hosts would supply a model for co-evolution. A phylogenetic tree based on the distribution of these ciliates generally agrees with that based on comparative morphology. Although molecular phylogenetic trees of this group also support this hypothesis, there are conflicts in some families or genera. Accumulation of additional data is necessary to elucidate the phylogenetic relation of these ciliate groups.