Ciliate Phylogeny Inferred from Ontogeny, WILHELM FOISSNER, Universität Salzburg, Institut für Zoologie, Hellbrunnerstraße 34, A-5020 Salzburg, Austria.

The phenomenology of ontogenesis in ciliated protozoa has been reviewed, with emphasis on stomaticogenic data published between 1870 and 1993. Three basic types of fission (homothetic, emantitropic, parallel), two basic modes of division (active, cystic), and five main modes of stomaticogenesis (apokinet, parakinet, buccokinet, telokinet, mikokinet) were distinguished. Within the main stomaticogenic patterns several subtypes occur, some of which, however, possibly evolved convergently in different ciliate groups. There is an urgent need for refined studies, especially in most heterotrichs, thigmotrichs, apotomates and prostomatids and in all karyorelictids, chomatrichs and rhynchodids. Hennig's cladistic method was applied to the ontogenetic data and several morphological features as well as molecular markers. Although it was not possible to determine all character states unequivocally and to harmonize all data, the cladogram suggests main pathways in ciliate evolution and three major conclusions: (i) A subphytic division of the Ciliophora based on a cytos or rhabdos type of oral apparatus is not supported; (ii) Some stomaticogenic modes evolved either conversely or are only superficially similar, viz. by light microscopy; (iii) The "ecciliate" possibly possessed the following character constellation: a dividing, homomeric macronucleus without a subnuclear band; a cytos-type oral apparatus with adoral membranelles and a paroral membrane; somatic dikinetids with postciliolohemata; homothetic-genic fission, and buccokinet stomaticogenesis.

Fine Structural Specializations in a Jumping Peritrichous Ciliate, Hystastella radians Erlanger, 1980 (Ciliophora, Peritrichia), ILSE FOISSNER and WILHELM FOISSNER, Universität Salzburg, Institute für Plasmaphysiology und Zoologie, Hellbrunnerstrasse 34, A-5020 Salzburg, Austria.

Hystastella radians is a rare planktonic ciliate living in temporary pools and in the pelagic of lakes and slowly running, large rivers. It lacks a stalk but possesses an anterior and equatorial girdle of mobile spines continuous with the somatic cortex. The length and number of the spines decreases drastically, i.e. by 50% and more in laboratory cultures, obviously due to the lack of environmental stress. Previous light microscopic studies have suggested that the spines are passively moved by contractions of the cell and/or of individual myonemes, thereby producing the conspicuous jumps driving the cell through the medium. However, our electron microscopic investigations suggest that the spines can move independently of the myonemes, because they contain specialized structures lacking in other peritrichs, viz. sub cortical fibres and microtubules. The closely packed fibres extend underneath the epiphragm and have a complicated periodic structure reminiscent of that known from flagellar rootlets. Underneath the striated fibres is a layer of loosely arranged microtubules extending to the top of the spines. The general ultrastructure of H. radians is very similar to that of other peritrichs. There is, for instance, a scopula organelle composed of short cilia lacking the central microtubule pair and the axosome. The oral infraciliature consists of ciliated adoralis and a paroral having only the distal basal bodies of the dikinetids ciliated.

Tropical Soil Protozoan Diversity: The Ciliates (Protozoa, Ciliophora) of a Giant Pancake, Etosha in Namibia (Southwest Africa), WILHELM FOISSNER, Universität Salzburg, Institut für Zoologie, Hellbrunnerstrasse 34, A-5020 Salzburg, Austria.

12 soil samples were investigated for ciliates from the centre and periphery of the Etosha Pan. The pan soil is a very special mixture of salt, clay, and line having a pH range of about 8.0-9.7; the air-dried mixture is like a stone, but quickly doubles its volume and becomes a fluffy pancake when it is rewetted. Most of the soil is covered with a more or less distinct layer of filamentous cyanobacteria. 153 ciliate species were found, 53(1) of them were new to science. Most belong to one of the following groups: hypotrichs (43 species), colpodids (35), gymnostomids (33), nassuliids (15). The high number and frequency of nassulid ciliates, usually sparsely occurring in soil, is obviously related to the commoness of cyanobacteria, which are their preferred food. A transect from the pan to the surrounding savanna showed that the salt shrub (Suacea) region has the highest species richness and the number of species sharply decreases above pH 8.4: pan centre (saline desert, pH 9.7-8.7, 9-21 species), Suacea zone (pH 8.6-8.4, 43-57 species), thorn bush savanna (about 1km distant from pan margin, pH 7.7, 28 species), Mopane (Colophsoperum) savanna (about 15km distant from pan margin, pH 7.7, 37 species).

Refined ecological research about these special ciliate communities is pressingly needed but difficult to realize because of the high number of new, not-yet described species. The help of Dr. Lindeque, director of the Ecological Research Station of the Etosha National Park, is greatly acknowledged.)