

**Studies on alcoholic fermentation of different types of fruit pulp from Palmyrah (*Borassus flabellifer* L.)**

A study was carried out to evaluate the intensity of *Tetrahymena* infection in guppies in relation to the external symptoms and to investigate the extent of damage cause by the parasite with a view to suggest the stage of infection for applying preventive/control treatments. Three guppy farms, where the disease was recorded were visited monthly between January and June 1999 and four levels of infection were identified as almost normal, mildly infected, moderately infected and severely infected. Intensity of infection as the number of parasites per microscopic field in the smears made from the scrapings of skin and gills was significantly higher ( $p < 0.05$ ) in severely infected guppies ( $11.9 \pm 4.6$ ,  $2.5 \pm 1.5$  per microscopic field respectively) that exhibited hemorrhagic lesions and white patches on the body surface and exophthalmic eyes with a white rim around. Muscles were invaded by *Tetrahymena* in severely and moderately infected fish while a whitish patch just in front of the dorsal fin was the main external symptom of the latter group. Faded body colour, excess mucus on the gills, lethargic behaviour with reduced appetite were the symptoms of mildly infected fish whose body surface and the gills were harboured by *Tetrahymena* ( $1.5 \pm 2.1$ ,  $0.1 \pm 0.1$  per microscopic field respectively) Fish that behaved almost normal but from infected tanks also harboured *Tetrahymena* on the body surface ( $0.9 \pm 2.9$  per microscopic field).

The parasite was also recorded from smudge of the liver of severely infected fish. Histopathology revealed that *Tetrahymena* could also invade the connective tissues around the eyes, adjacent to the pancreas, near the dorsal blood vessel and the spinal cord and the connective tissue around the brain of severely infected fish. A mixture of ppm methylene blue and 0.03 ppm zinc free malachite green oxalate given as a prolonged bath could control the progress of the disease only in almost normal and mildly infected guppies.