

Order – Trichomonadida

- Having 4-6 flagella and one trailing flagella attached to undulating membrane
- One or 2 nuclei, asexual reproduction generally by binary fission
- Non-pathogenic found in alimentary canal, reproductive tract
- Two family present under this order, Family: Monocercomonadidae and Trichomonadidae
- Some pathogenic forms found in genera *Tritrichomonas*, *Trichomonas*, *Giardia* and *Hexamita*

Family- *Trichomonadidae*

- Found in digestive tract and reproductive tract
- Pyriform in shape, rounded anterior end and pointed posterior end
- Single nucleus and anterior to this there is blepharoplast from where arise anterior flagella and posterior flagella which runs along the edge of an undulating membrane and often extend posteriorly of the body
- Presence of axostyle which is rod like and runs through the body, arising from the blepharoplast and emerging from the posterior end
- The genera of importance are *Tritrichomonas*, *Trichomonas*, *Trichomitus*, *Tetratrichomonas* and *Pentatrichomonas*.

Genus- *Tritrichomonas*

- Three anterior flagella and posterior flagella member *Tritrichomonas foetus*
- Parasite of cattle, pig, horse and deer but pathogenic in bovine causes venereal disease, bovine trichomoniosis
- World-wide distribution and once was major economic important but due to widespread use of Artificial- insemination is of less importance but till now important in beef cattle and places where natural insemination is going on

Morphology- pear shaped, 10-25µm long by 3-15 µm wide, show jerky movements under microscope, anterior nucleus, sausage-shaped parabasal body

Multiplication by longitudinal binary fission can be cultured on 'diphasic' glucose-birth-serum medium. Three serological strain Belfast (Europe, Africa and USA) Manley and Brisbane (Australia)

Transmission- by coitus, AI by infected semen and by gynaecological examination of cows

Pathogenesis

In bull principal infection site is preputial cavity, on the surface of penile and preputial membranes. No lesion of diagnostic significance, no effect on sexual behavior or fertility.

But in some cases clinical signs are pain on micturition and disinclination to serve cows, mucopurulent discharge but signs disappear in 1-2 weeks but bull regarded as permanent source of infection.

In cows infection occurs through coitus through vagina. Initial lesion is vaginitis of varying intensity, slight to mucopurulent discharge maximum number of organism found after 14-18 days of service, invade uterus through cervix there may be roughness of vaginal mucosa and catarrh formation. In uterus infection there may be different sequelae it may go un-noticed and animal may conceive normally and give birth to normal calf after full term pregnancy.

Frequently, placentitis, detachment of placental membranes and death of foetus. Early abortion 8-16 weeks after the infected service, later abortion is rare. In some cases very early abortion (1-2 weeks) and foetus and membrane pass un-noticed.

- Following abortion there may be uterine discharge and series of irregular heat periods
- Where foetus and membrane not completely eliminated there is maceration leading to chronic catarrhal and purulent endometritis, some-times permanent sterility, anoestrous persistent uterine discharge noticeable when the animal lies down.
- At times when cervix is closed and corpus luteum presence there is large volume of thin greyish odourless material swarming with trichomonad with anoestrus depicting the animal to be pregnant.

Immunity to trichomoniosis in cattle- bull don't get immuned, organism found through out the life causing them a continuous source of infection

- Cow (non-pregnant) recover but ay remain carrier for more than a year, despite immunity permanent sterility if there is extensive involvement of uterine mucosa

Diagnosis- history of early abortion, cows fail to be pregnant after repeated service, vaginal discharge and pyometra in herd

- organism found in vaginal and uterine discharge, stomach of aborted foetus, amniotic and allantoic fluids the organism show characteristic jerky movements
- Cervical mucus agglutination test- mucus collected from vagina of cow using a sterile glass tube 50 cm length, 9mm diameter and bent at an angle of 150° about 9 cm from one end. Mucus is mixed with glucose saline for diffusion of antibodies, saline is mixed with *in vitro* cultured organism (*T. foetus*) 100000 org/ml in positive sample agglutination will be observed, it is herd test.
- Culture of the organism in different media viz, lactate ringer solution, plastridge medium, ELISA and PCR detection

Treatment and Control

- In bull, pudendal anaesthesia is given to flex the retractor penis muscle, penis is washed with weak detergent, drier and flavine ointment is applied massaged for 15-20 minutes, 100-150 ml 1% Berenil applied to prepuce, Dimetridazole 50mg/kg daily for 5 days orally or 50mg/kg iv or 10mg/kg iv for 5 days.

Control – animal should be given breeding rest, use of AI, using communal bull for service should be discouraged, slaughtering of infected bull, regular monitoring of animal for *T. foetus*, cows permitted service only with non-infected bull.

Other members-

T. suis causes atrophic rhinitis in pigs, *T. equi* found in caecum and colon of horse, world wide distribution causing equine protozoan diarrhea, *T. eberthi* caecum of chicken, turkey and duck

Genus – *Trichomonas*

Pyriiform in shape, have 4 free anterior flagella, there is no trailing flagellum

Trichomonas gallinae is cause of avian trichomoniosis of upper digestive tract and is found particularly in pigeons, but the turkey, chicken, hawk, pyriiform in shape 10 μm by 5 μm , have 4 flagella each up to 13 μm , axostyle narrow and protrudes posteriorly, undulating

membrane does not terminate in a trailing flagellum, cytostome present. In pigeons the organisms is transmitted directly from carrier older birds to newly hatched pigeon squab via the pigeon's milk from the crop. The mode of infection of turkey and chickens is through drinking water. Wild pigeons and other birds are source of infection

Pathogenesis – avian trichomonosis is disease of young birds, adult birds shows no clinical signs. Three strains Jones' Barn (JB) most virulent, TG strain mild pathogenic and YG strain less virulent. Earliest lesion is small yellowish circumscribed area in the moth cavity at soft-palate, 3-14 days after infection, these increase in size and number extend to oesophagus, crop and proventriculus, lesions may be seen in liver, lungs, serous surface of intestine, the pancreas, the heart. In the turkey and chicken the lesions are commonly seen at crop oesophagus and pharynx and are uncommon in mouth.

Clinical signs- pigeon squabs show an initial depression, emaciation, ruffled feather, emaciation, ruffled feather and weakness. Accumulation of greenish fluid or cheesy material in the mouth and crop and come out from beak. In turkey poults and chickens, drowsiness and a pendulous crop and foul odour from the mouth.

Diagnosis- on the basis of clinical signs, characteristic lesion in the oral cavity, oesophagus and crop and presence of organism

Treatment- furazolidone 25-30mg/day for seven days

Control- shielding of drinking places from wild pigeons and other birds

Trichomonas vaginalis- found in vagina, prostrate and urethra of man, largest human trichomonad 7-23µm by 5-12µm, 4 free flagella no trailing flagellum common in females of 30-49 years, infection is venereal in origin and transmission by sexual intercourse. Generally symptoms are mild however there is degeneration and desquamation of vaginal epithelium, inflammation of vagina and vulva with leucocytic discharge.

Genus-Tetratrichomonas

Members have four flagella and one trailing flagellum and a pelta

Tetratrichomonas gallinarum- found in lower digestive tract and sometimes liver of turkey, domestic fowl and guinea-fowl, pear shaped organism, 9-15 µm by 5-9 µm axostyle long and

projects beyond posterior part of body. The liver lesions resembling those due to histomoniasis but the lesion produced by *Histomonas meleagridis* having a more irregular outline and being raised above the liver surface and depressed below in case of *T. gallinarum*

Genus-Pentatrichomonas

Pentatrichomonas hominis- common intestinal flagellate of man and other primate, but can be transmitted to rat, cat, dog and laboratory animals hamster, guinea-pig and chicken, body oval to pear shaped, 5-20µm by 3-14 µm, oval nucleus, 5 free anterior flagella but some forms may have 3 or 4 and rarely six or more flagella, presence of costa and axostyle protrudes outside the body. Generally considered as non-pathogenic.