Preface:

This part includes the four section a) Classification: It introduces the systematics of sub kingdom Protozoa. b) Systematics of Gregarines: It introduces the systematic of gregarine parasite are found in different host during study period. c) Systematic of Host: It introduces to systematic of different host are collected in different localities i.e. Aurangabad and Jalna district (During study period). d) Morphology of genus Gregarina: It introduces to the morphology of Gregarines in family Gregarinidae, (Labbe, 1899). Genus Gregarina and their some species.
Systematic of Subkingdom Protozoa:

The parasitic protozoa, like freeliving ones, are comprised of a large and highly heterogenous taxonomic groups. They are of much interest to mankind because they produce disease in man and his livestock. There are others, which seldom produce disease, and still others, which live as commensals or symbionts in the animal body and thus, they all, must be recognized to avoid misdiagnosis as well as to understand their functional relationship in the animal’s economy. (Fauna Of Andhra Pradesh (Part – 6) Protozoa (Zoological Survey Of India)

Classification of Protozoa is still in unsettled stage. In fact, there is no generally accepted classification of this group. In the classical scheme which was mainly based on their locomotory organelles, Protozoa was treated as phylum, but in one of the revised schemes it is considered as a kingdom (Cavelier-Smith, 1993, 1998).

In 1980, the Society of Protozoologist (Levine et al., 1980) published a newly revised classification which recognized seven phyla: Sarcomastiphora, Labyrinthomorpha, Apicomplexa, Microspora, Ascetospora, Myxozoa and Ciliophora. Most of the parasitic protozoa were assigned to the phyla Sarcomastigophora, Apicomplexa, Microspora and Myxozoa. There are also some parasitic and commensalistic protozoa in the phyla Ascetospora and Ciliophora. This 1980 classification, though mostly followed in this document for convenience and wide acceptance, was realized to be unsatisfactory by the Society of Protozoologists (Lee et al., 1985). The another classification proposed by Sleigh in (1989). A starting point of further revision but our convenece we used Levihe’s classification during our wark.
Classification of Apicomplexa or Systematics of Phylum Apicomplexa:

Apical complex (visible with electron microscope), generally consisting of polar ring(s), rhoptries, micronemes, conoidm and subpellicular microtubules present at some stage; micropore(s) generally present at stage; cilia absent; sexuality by syngamy; all species parasitic. **Class Perkinsea**: Conoid forming incomplete cone; soospores (sporozoites) flagellated, with anterior vacuole; no sexual reproduction; homoxenous. **Order Perkinsida**: With characters of the class (Genus mentioned in text: Perkinsus.). **Class Sporozoea**: Conoid, if present, forming complete cone; reproduction generally both sexual and asexual; oocysts generally containing infective sporozoites which result from sporogony; locomotion of mature organisms by body flexion, gliding, or undulation of longitudinal ridges; flagella present only in microgametes of some groups; pseudopods ordinarily absent, but if present, used for feeding, not locomotion; homoxenous or heteroxenous. **Subclass Gregarinia**: Mature gamonts large, extracellular; mucron or epimerite in mature organism; mucron formed from conoid; generally syzygy of gamonts; gametes usually similar (isogamous) or nearly so, with similar numbers of male and female gametes produced by gamonts; zygotes forming oocysts within gametocystes; life cycle characteristically consisting of gametogony and sporogony; in digestive tract or body cavity of invertebrates or lower chordates; generally gomoxenous. **Order Archigeregarinida**: Life cycle apparently primitive, characteristically with merogony, gametogony, sporogony; gamonts (frophozoites) aseptate; in annelids, sipunculids, hemichordates, or ascidians. **Order Eugregarinida**: Merogony absent; gametogony and sporogony present; locomotion progressive, by gliding or undulation of longitudinal ridges, or nonprogressive;
typically parasites of annelids and arthropods, but some species in other invertebrates. **Suborder Blastogregarinina** : Gametogony by gamonts while still attached to intestine, with anisogamous gametes budding off of gamons; no syzygy gametocysts absent; oocysts with 10 to 16 naked sporozoites; gamont composed of single compartment with mucron, without definite protomerite and deutomerite; in marine polychaetes. **Suborder Aseptatina** : Gametocysts present; gamont composed of single compartment, without definite protomerite and deutomerite, but with mucron (epimerite) in some species; syzygy present. (Genera mentioned in text: Monocystis, Enterocystis, Rhabdocystis, Apolocystis, Nematocystis, Rhynchocystis.). **Suborder Septatina** : Gametocysts present; gamont divided into protomerite and deutomerite by septum; with epimerite; in alimentary canal of invertebrates, especially arthropods. (Genera mentioned in text: Gregarina, Stysocephalus, Actinocephalus, Porospora, Nematopsis.). **Order Neogregarinida** : Merogony, presumably acquired secondarily; in Malpighian tubules, intestine, hemocoel, or fat tissues of insects. **Subclass Coccidia** : Gamonts ordinarily present; mature gamonts small, typically intracellular, without mucron or epimerite; syzygy generally absent, but if present involves markedly anisogamous gametes; life cycle characteristically consists of merogony, gametogony, and sporogony; most species in vertebrates. **Order Agamococcidiida** : Merogony and gametogony absent. **Order Protoocciidiida** : Merogony absent; in invertebrates. **Order Eucoccidiida** : Merogony present; in vertebrates and/or invertebrates. **Suborder Adeleina** : Macrogamete and microgamont usually associated in syzygy during development; microgamont producing 1 to 4 microgametes; sporozoites enclosed in envelope; gomoxenous or heteroxenous. (Genera mentioned in text: Adelina, Haemogregarina, Hepatozoom. **Suborder Eimeriina** : Macrogamete
and microgamont developing independently; no syzygy; microgamont typically producing many microgametes; zygote nonmotile; sporozoites typically enclosed in sporocyst within oocyst; homoxenous or heteroxenous (Genera mentioned in text: *Aggregata, Eimeria, Lankesterella, Isospora, Levineia, Toxoplasma, Sarcocystis, Frendelia*).

**Suborder Haemosporina**: Macrogamete and microgamont developing independently; no syzygy; conoid usually absent; microgamont producing eight flagellated microgametes; zygote motile (ookinete); sporozoites naked, with threemembraned wall; heterozenous, with merogony in vertebrates and sporogony in invertebrates; transmitted by blood-sucking insects. (Genera mentioned in text: *Plasmodium, Haemoproteus, Leucocytozoon*).

**Subclass Piroplasmia**: Piriform, round, rod-shaped, or amoeboid; conoid absent; no oocysts, spores, and pseudocysts; flagella absent; usually without subpellicular microtubules, with polar ring and rhoptries; locomotion by body flexion, gliding or, in sexual stages (in Babesiidae and Theilleriidae, at least), by large axopodiumlike organelle; asexual and probably sexual reproduction; parasitic in erythrocytes and sometime also in other circulating and fixed cells; heteroxenous, with merogony in vertebrates and sporogony in invertebrates; sporozoites with single-membraned wall; vectors are ticks, but vectors of dactylosomatids unknown. **Order Piroplasmida**: With characters of the subclass. (Genera mentioned in text: *Babesia, Theileria*.)
Classification
Systematic
of
Gregarines
Systematic
of
Host

Part - II
Systematic of Gregarines

Subkingdom – Protozoa, Goldfuss, 1818, Rown, 1858
Phylum – Apicomplexa, Levine (1970)
Class – Sporozoea, Leuckort, 1879
Subclass – Gregarina, Dafour, 1828
Order – Eugregarinida, Legor, 1900
Sub order – Septatina, Lankester, 1885
Family – Gregarinidae, 1899
Genus – Gregarina Dufour, 1828
Species – Gregarina minuta, Lshii, 1914

Genus – Gregarina Dufour, 1828
Species – Gregarina havanuri, Amoji, 1976

Genus – Gregarina Dufour, 1828
Species – Gregarina bidari, Amoji, 1976

Genus – Gregarina, Dufour, 1828
Species – Gregarina cloptoni, J. Joanovy, 2007

Genus – Gregarina, Dafour 1828
Species – Gregarina confuse, J. Joanovy, 2007

Genus – Gregarina Dufour, 1828
Subkingdom : Protozoa Goldfuss, 1818, Rown, 1858
Phylum : Apicomplexa Levine (1970)
Class : Sporozoea Leuckort, 1879
Subclass : Gregarina Dafour, 1828
Order: Eugregarinida Legor, 1900
Suborder : Septatina, Lankester, 1885
Family : Stylocephalidae Ellis, 1912 (Schneider,1875)
Genus : Lophocephalus, Labbe 1899 (Lophorhynchus Schneidre)
Species : Lophocephalus Insignis, Schneidre, 1882

Genus : Stylocephalus, Ellis,1912
Species : Stylocephalus oblongatus, Hammerschmidt, 1838

Genus : Stylocephalus, Ellis,1912
Species : Stylocephalus occidentalis, Clopton,2000

Genus : Bulbocephalus, watson, 1916
Species : Bulbocephalus wardi, watson, 1916

Genus : Bulbocephalus, watson, 1916
Species : Bulbocephalus mosoodae n.sp.

Genus : Xiphocephalus Theodorides, 1964 Emend lopton,1988
Species : Xiphocephalus africanauscorbel, 1965

Genus : Xiphocephalus Theodorides, 1964, Emend lopton,1988
Species : Xiphocephalus serpentula, Devdhar and Amoji,1977
Genus: *Xiphocephalus* Theodorides, 1964, Emend Clopton, 1988
Species: *Xiphocephalus karnatakaenis*, Devdhar and Amoji, 1977


Genus: *Xiphocephalus* Theodorides, 1964, Emend Clopton, 1988
Species: *Xiphocephalus ellisi* clopton, 1998

Species: *Xiphoecephalus quadatogemmatus* (Clopton, 2006)

Species: *Xiphoecephalus triplogemmatus* (Clopton, 2006)

Species: *Xiphoecephalus nikame* n.sp.

Genus: *Murthicephalus* n.gen.
Species: *Murthicephalus gray beetle* n.sp.
Family: Actinocephalidae Leger, 1892
Sub family: Acanthosporinae Leger, 1892
Genus: *Coronoepimeritus*, H. Hoshide, 1959
Species: *Coronoepimeritus japonicas*, H. Hoshide 1959
PLATE - B

Host

*Triobium castanum*  
*Tenbrion molitor*

*Gonocephalum granulatum*  
*Gonocephalum simplex*

*Zygogramma bicolorata*  
*Triophidia annulata*

*Phlaeoba infumata*
Systematic of Host (Beetles)

a. Host: *Tenebrio molitor*

Phylum: Arthropoda
Class: Insecta
Order: Coleoptera
Suborder: Polyphaga
Family: Tenebrionidae
Genus: Tenebrio
Species: *Tenebrio molitor*

b. Host: *Gonocephalum granulatum*

Phylum: Arthropoda
Subphylum: Hexapoda
Class: Insecta
Order: Coleoptera
Family: Tenebrionidae
Genus: Gonocephalum
Species: *Gonocephalum granulatum*

c. Host: *Gonocephalum simplex*

Phylum: Arthropoda
Subphylum: Hexapoda
Class: Insecta
Order: Coleoptera
Family: Tenebrionidae
Genus: Gonocephalum
Species: *Gonocephalum simplex*
d. Host: *Tribolium castanum*
Phylum: Arthropoda
Subphylum: Hexapoda
Class: Insecta
Order: Coleoptera
Family: Tenebrionidae
Genus: *Tribolium*
Species: *Tribolium castaneum*

e. Host: *Zygogramma bicolorata*
Phylum: Arthropoda
Class: Insecta
Order: Coleoptera
Family: Chrysomelidae
Genus: *Zygogramma*
Species: *Zygogramma bicolorata*

❖ Systematic of Host (Grasshopper)

a. Host: *Phlaeoba infumata*
Phylum: Arthropoda
Class: Insecta
Order: Orthoptera
Family: Aridoidea
Subfamily: Acrididae
Genus: *Phlaeoba*
Species: *Phlaeoba infumata*
b. **Host**: *Trilophidia annulat*

Phylum: Arthropoda

Class: Insecta

Order: Orthoptera

Family: Aridoidea

Subfamily: Acrididae

Genus: *Trilophidia*

Species: *Trilophidia annulat*