Descriptionof Gregarines parasite from grasshopper(Trilophidia annulata) (Orthoptera, acridoidea,) of Sillod, Aurangabad district. (M. S.)

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Abstract:

In the present study a gregarine parasite is described from grasshopper (*Trilophidia annulata*) collected from Sillod, Aurangabad District (Marathwada, India). Gregarine infection was observed in specific localities investigated during the study. During the study period, several life stages, such as young trophozoite, mature trophozoite, gamonts, gamatocyst, oocyst and association of gregarine parasite were observed in the alimentary canal or gut content of *Trilophidia annulata*.All life stages measurements are given in micrometer (um).

Keywords: **Protozoa, *coronoepimeritus japonicus*, Orthoptera, acridoidea, *Trilophidia annulata*.**

Introduction:

The *Trilophidia annulata*,is species of grasshopper. These insects (grasshopper) have been used in ecological studies because they found everywhere in monsoon. Insects in this group are feeding on plants, with a few species at times becoming serious pests of cereals, vegetables and pasture, especially when they swarm in their millions as locusts and destroy crops over wide areas. They protect themselves from predators by camouflage; when detected, many species attempt to startle the predator with a brilliantly-colored wing-flash while jumping and (if adult) launching themselves into the air, usually flying for only a short distance (en.wikipedia). Grasshoppers have a broad province of predators at different stages of their life; eggs are eaten by bee-flies, ground beetles and blister beetles; hoppers and adults are taken by other insects such as ants, robber flies and sphecid wasps, by spiders, and by many birds and small mammals(Capinera, 2008). Grasshoppers demonstrate a range of anti-predator adaptations, prevent them to avoid detection, to escape if detected, and in some cases to avoid being eaten if captured. Grasshoppers are often camouflaged to avoid detection by predators that hunt by sight; some species can change their coloration to suit their surroundings (Cott,1940). The *Trilophidia annulata* (Thunberg) had been widely distributed throughout Pakistan. This species commonly occurs at mixed agricultural crops, pasture lands; where they damage upper part of the plants. Hence it's considered a pest of agricultural fields the species causes heavy damage when their numbers increased in favorable climatically conditions. At the present detail observation has been made on the phallic complex. Earlier, Hubbell (1932) Otte, (2002) stated that the Phallic complex characters are considered authentic and

useful in diagnosing and separating species from one another. (Hubbell 1932, Otte, 2002). Gregarines arise as parasites in the body cavities and the digestive systems of invertebrates (britannica.com). The gregarines were identifying as a taxon by Grasse in 1953 currently, about 250 genera and 1650 species are known in this taxon. They are divided into three orders based on habitat, host range, and trophozoite morphology (Perkins, 2000).

M**aterial and Methods:** (SUSANTA RAY, 2003)

Host insect (grasshopper) were collected from Sillod, Aurangabad district of Marathwada region. The insect was maintained in plastic jars with whole grass. The host is dissected and removed their gut content carefully. The gut was gently teased with needle for the parasites to come out of lumen, this fresh material placed on the clean glass slide with a drop of 0.5% $NaCl_2$ solution. A thin film or smear was taken on a slide and examination of living gregarine parasite under the light microscope. After the initial study of the smear is dried & fixed in Schaudin's fluid for 20 min. The smears were stored in 70% alcohol for removing of mercuric chloride. Then slide passed through a descending series of alcohol for 5 min. & placed in Distilled water then kept in Hematoxylin stain for overnight. Then slide washed thoroughly, dehydrated in an ascending series of alcohol, cleared in xylene and mounted in D.P.X. All measurements were made with a calibrated ocular micrometer (40x, 10x µm).

Results and Discussion

Description of species:

Young trophozoite (sporadin): The young trophozoites are found in alimentary canal or gut content of the host. It is long and oval .It is transparent and dark brown in colour, it measures about 65.0 to 70.0 um. Cytoplasm is granular thin and white in colour. The shape of epimerite is crown like; this crown is formed by short digitiform projection. It measures about 11.0µm to 12.0µm in length and 10.0µm to 11.0 µm in width. The shape of protomerite is broad with the blunt apex on which crown like epimerite is present. It measures about 10.0 to 12.0 µm in length and 15 to 16.0 µm in width. Deutomerite is elongate ovoidal; both ends are broad and rounded. The posterior end is bluntly pointed. It measures about 60.0 to 62.0 µm in length and 40.0 to 42.0 µm in width. A shape of the nucleus is spherical. It is centrally placed. It measures about 20.0 to 21.0 µm in length and 20.0 to 21.0 µm in width.

Mature trophozoite (cephalin): Shape of mature trophozoite is elongated and ovoidal which is dark brown in colour. It measures about 60.0 to 65.0 µm in length. In mature form, epimerite is crownlike globular. It measures about 15.0 to 16.0 µm in length and 15.0 to 16.0 µm in width. A shape of protomerite is broad and triangular, slightly tapering at the anterior end. Protomerite – deutomerite septum is clearly marked and straight. Deutomerite is long, broad and cylindrical. Cytoplasm is thin uniform brown in colour. It measures about 40.0 to 42.0 µm in length and 22.0 to 23.0 µm in width. A shape of the nucleus is spherical and centrally placed. It measures about 10.0 to 11.0 µm in length and 10.0 to 11.0 µm in width.

Gamont: The Shape of Gamonts is cylindrical and slightly tapering at the posterior end. Granular cytoplasm is present with brown colour. It measures about 45.0 to 50.0 µm. In Gamonts digitiform structure of epimerite is

destroyed. The shape of protomerite is hemispherical. It measures about 10 to 11.0 µm in length and 10.0 to 11.0 µm in width. Deutomerite is long and cylindrical, anterior end slightly broad as compared to the posterior end. It measures about 30.0 to 32.0 µm in length and 12.0 to 13.0 µm in width. The shape of a nucleus is spherical. It measures about 6.0 to 7.0 µm in length and 6.0 to 7.0 µm in width.

Association: Lateral syzygy is observed.

Gamatocyst: gamatocyst is not seen

Oocyst (spore): Shape of oocyst is stone-like. They are seen in bunches and brown in colour. It measures about 5 to 15.0 µm in length.

TableNo.1-Showing all measurements are in microns of different forms of Coronoepimeritus japonicus (H. Hoshide, 1959).

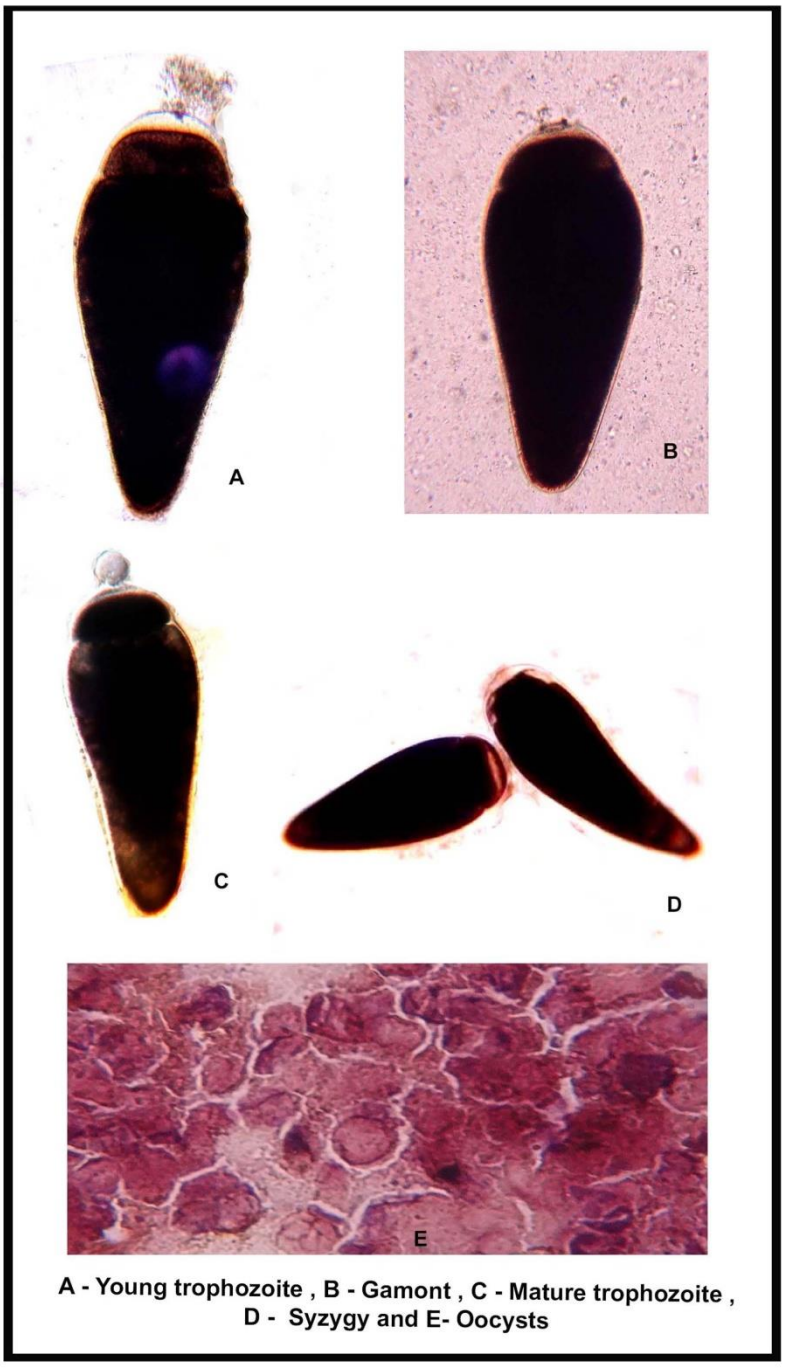
SR. NO	Particulars	Young trophozoite(sporadin)	Mature Trophozoite(cephalin)	Gamonts
1	LE	10.0-11.0	15-16	--
2	WE	10.0-11.0	15-16	--
3	WE/LE	1-1	1-1	--
4	LP	11.0-12.0	10-11	10-11
5	WP	15.0-16	14-15	10-11
6	WP/LP	1.36-1.33	1.4-1.36	1-1
7	LD	60-62	40-42	30-32
8	WD	40-42	22-23	12-13
9	WD/LD	0.66-0.67	0.55-0.54	0.52-0.40
10	LN	20-21	10-11	6.0-7.0
11	WN	20-21	10-11	6.0-7.0
12	TL	65-70	60-65	45-50
13	LE/TL	0.15-0.15	0.25-0.24	--
14	LP/TL	0.15-0.15	0.16-0.16	0.22-0.22
15	LD/TL	0.92-0.88	0.66-0.64	0.66-0.64
16	LP/LD	0.18-0.19	0.25-0.26	0.33-0.34
17	WP/WD	0.25-0.25	0.63-0.65	0.36-0.34

Table No.2Morphometric comparison of the species genus *Coronoepimeritus japonicus* with the present author with H.Hoshide, 1959and Kanse 2015

Sr.no	Species/ characters	Coronoepimeritus japonicas H. Hoshide (1959)	Coronoepimeritus japonicus kanse (2015)	Present species
1	**Epimerite**	Globular,crown, numerous small digitiform, cover the surface of the crown, 100 X 70	Crownlike structure. the whole surface spine is present, 34.6-54.2 X 31.2 to 51.0	globular, crown-like structure. 10.0-11.0 x 10.0 -11.0
2	**Protomerite**	Broadly spherical with slight anterior tapering	Broad,hemispherical, 34.0-57.0 X 31.0-60.0	Broad with the blunt apex l0.0 - 12.0 x15.0 - 16.0
3	**Deutomerite**	Elongate ellipsoidal	Broad, long and cylindrical, 189. 23-387.0 X 36.6-66.2	elongate ovoidal 60.0 - 62.0 x 40.0 - 42.0
4	**Nucleus**	Spherical	Spherical, 28.2-42.0 X 28.6-41.5	Spherica20.0 - 21.0x20.0-21.0
5	**T. L. Young trophozoite (sporadin)**	-- --	Oval, 81.6-144.6	Long and Oval 65.0-70.0
6	**T.L Mature Trophozoite (cephalin)**	-- --	Broad, long, 98.78-281.9	elongated and ovoidal 60.0 - 65.0
7	**Gamont**	300.0 X 500.0	Broad, cylindrical, 268.12-467.0	Cylindrical 45.0 - 50.0
8	**Gametocyst**	-- --	-- --	-- --
9	**Oocyst**	Ellipsoidal, 12.0 X 6.0	Stone, seed shaped, 4.2-12.2	Stone shaped5.0 - 15.0
10	**Association**	-- --	Lateral	Lateral
11	**Infection Site**	-- --	Alimentary canal	Alimentary canal

12	**Host**	Locumigratoriast a	Trilophidia	Trilophidia annulata
13	**Locality**	-- --	At. - Daithana, ta. – Partur, District Jalana (Maharashtra	At-chinchkheda ta-sillod, Dist-aurangabad (Maharashtra)
14	**Ref.**	Haldar& Chakraborty (1975), H. Hoshide (1959)	H. Hoshide (1959)	H. Hoshide (1959), varsha kanse (2015)

Coronoepimeritus japonicus



A - Young trophozoite , B - Gamont , C - Mature trophozoite , D - Syzygy and E- Oocysts

Comments: Table No. 2.

Present species is compared with Coronoepimeritus japonicus (H. Hoshide, 1959 and Kanse, 2015). No other species of this genus is available. When epimerite is compared, it is observed that it matches Coronoepimeritus japonicus i.e. crown-like. Protomerite hemispherical and globular in this species. The

shape of the deutomerite is also same but, size is different. The nucleus is spherical in all three. Their Gamonts are similar but it is smaller in the present species than previous ones. Oocysts are similar in shape but sizes are different. From the above discussion it is observed that all the characters of the present species are very close to Coronoepimeritus japonicus. Only minor morphometric differences are there. So, present species are considered as Coronoepimeritus japonicus and redescribed here.

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