CHAPTER 2

Literature Review

The study of banding pattern of the polytene chromosomes has significantly contributed in the study of taxonomy and systematics of the family Simuliidae. Debaisieux and Gastaldi (1919) first reported the polytene chromosomes in the black flies. Painter and Griffen (1937a, b) studied the polytene chromosome organization. Griffen (1939) produced the first thesis on the polytene chromosomes of the Simuliids. The basic staining procedures and mapping conventions were established by Rothfels & Dunbar (1953). The first comparison of polytene chromosomes among different Simuliids species was provided by Kunze (1953) and Zimring (1953) independently. The field of cytotaxonomy was ventured by Klaus Rothfels (1956) basing on the polytene chromosomes. Chubareva & Shcherbakov (1963a, 1963b) furthered the study of cytotaxonomy of Simuliids based on polytene chromosomes. Rothfels (1979) comprehensively reviewed the work on black fly cytology. The existence of siblings in black flies provided more fuel to the study of sibling species through polytene chromosomes.

Continuous efforts have been made by Procnier 1982, Gordon 1984, Hunter and Connolly 1986, Post 1986, Brockhouse 1989,
Elsen and Post 1989, Bedo 1989, Conn et al., 1989, Kuvangkadilok et al., 1999, 2008, to study the cytotaxonomy of black flies and ecology by Adler and Kim 1984, Adler 1987. The studies on the strategy for the control of this vector have been made by Post 1986, Adler and Kim 1984. However, the bulk of these cytological investigations have dealt with species from North America and Europe. However, works on the chromosomal characterization is being carried out in different parts of the world and mostly in Southeast Asia, especially the presence of cryptic biodiversity through DNA barcoding (Pramual et al., 2010, 2015), the genetic structure and population history at both cytogenetic and molecular levels (Pramual and Wongpakam 2013). It is therefore of interest to extend such studies to black flies from other areas.

Due to the advancement of molecular technology, the studies from morphology, chromosomes, and molecules have been neglected for the taxonomic and phylogenetic information about the Simuliidae. It is rather convincing that the integrated approach of morphology, cytogenetics, and molecular biology is required for the proper understanding of the hierarchy of a species. Despite having thousands of literature on Simuliids, only a very few literature are available that has dealt the issue in an integrated manner.

The first research arena of the black flies from Darjeeling region begins with the collection of Simulium by Mr. C. Paiva, Dr. J.T. Jenkins, and Mr. Lynch in 1909 followed by Dr. T.N. Annandale in
The specimens were described by Brunetti in 1911 and reviewed in 1912. The studies of black flies from India were made by Dr. I.M. Puri who also described the species of Brunetti (1911). Further morphological and other studies were made by M. Datta during 1968-1972. Dasgupta and Sharma, Dasgupta and Mitra (1969) studied the incidence and blood meal of black flies. Datta & Dasgupta (1972-77), Datta & Das (1975), and Datta, Choudhuri & Dasgupta (1984) studied the relative abundance, sex ratio, nocturnal periodicity, photophilic behaviours, host- preference and internal conditions of females of black flies of Darjeeling. Datta (1973-75, 1988), Datta & Paul (1975), and Datta, Dey & Paul (1975) described several species collected from Darjeeling and Jalpaiguri districts. Datta, Dey, and Pal; Datta, Dey, Paul and Pal (1975, 1976) studied the bio-ecology of some species occurring in the Darjeeling areas. Henry 1988 reported the phenomenon of cannibalism of the black flies. Dey & Fumafartosok (1984a, b) reported the mitotic karyotype of six species and the incidence of supernumerary chromosomes in *Simulium gracile* and *Simulium ghoomense*. The cytological mapping of polytene chromosomes of *Simulium* (*Simulium*) *singtamense*, *Simulium* (*Gomphostilbia*) *ghoomense*, *Simulium* (*Nevermannia*) *praelargum*, *Simulium* (*Nevermannia*) *praelargum “IIIL-1.2”*, *Simulium* (*Nevermannia*) *praelargum “IL”*, and polymorphism of the Nucleolar Organizer Region in black flies (Diptera: Simuliidae) from Darjeeling were made by S. K. Dey, W. Henry, P.H. Adler, W.S. Procu nier, R. Verma, S. Chhetri and S. Thapa in the consecutive years of 1993, 2001, 2014, 2017.