

PREFACE

Simulium commonly known as black flies is cosmopolitan in distribution. Due to the biting habits of the adult female flies that cause considerable effects on humans and wild life including poultry, cattle, as well as in tourist industry, causing a serious deleterious economic impact. Black flies are established vectors of onchocerciasis, mansonellosis certain viral diseases, including protozoan and filarial diseases. However, the vector activity of these flies in this Himalayan region is yet to be established. 2,204 constitute the world population of black flies. So far 524 species of black flies have been reported from the Oriental region. The Himalayan range with innumerable streams and trickles provide the most favourable breeding habitat for the black flies. The female black flies lay eggs over the flowing water.

Darjeeling, West Bengal, India situated at sub-Himalayan region with an altitude of 2354m, with latitude of 27.036007°N and longitude of 88.262672° is one of the favourable locations for the black fly populations. 22 nominal species have been recorded from the Darjeeling Hills. The diversity of *Simulium* population is not sufficiently studied. The information on black flies from Darjeeling region is very scanty. The cytological data of black flies from this region is very limited to eight species already described. The present work adds to the chromosomal information of other four species of

black flies found from Darjeeling area. Despite all these challenges the work of study of population at the chromosomal level from three subgenus, *Nevermannia*, *Montisimulium*, and *Gomphostilbia* has been carried out with atleast one representative species from each of the above subgenus.

Study of *Simulium* population from any aspect from Darjeeling hill is a very challenging task. Although there are numerous species of black flies besides those already described, the work on Himalayan Simuliids could not advance due to some of the few reasons such as, their habitats are temporary that come into existence only during the rainy season that feed the streams; the erratic nature of the seasons and the rainfall directly affect the black fly population; destruction of the habitat where the eggs are laid and development of the larval and pupal stages take place and the adult fly emerge, owing to indiscriminate use of water resources caused due to potable water scarcity in this hilly region; encroachment of the habitats by exploding human population; and other effects of climate change. Availability of any species for a considerable period of time in a season is very erratic. It has been found that different populations of black flies appear during different period of time. Under this circumstance steady study population of any species is very uncertain. Keeping in view the destruction of the breeding sites, the future of black flies in Darjeeling hills seemed to be threatened.

The present work encompasses the mitotic and polytene chromosomal data of four different species, *Simulium* (*Nevermannia*) *praelargum* “IIL-1.2”, *Simulium* (*Nevermannia*) *praelargum* “IL”, *Simulium* (*Montisimulium*) *dattai*, and *Simulium* (*Gomphostilbia*) *williei* from Darjeeling Hill. On the basis of chromosomal data two new species of *Simulium* (*Nevermannia*) *praelargum* has been established as the cytoforms and have been designated *Simulium* (*Nevermannia*) *praelargum* “IIL-1.2” and *Simulium* (*Nevermannia*) *praelargum* “IL”. The intra specific diversification has been studied in this species. The construction of species map of *Simulium* (*Montisimulium*) *dattai* described this species cytologically. The description of cytological polytene map of *Simulium* (*Gomphostilbia*) *williei* has laid the structural frame work of the chromosomal map of the *Gombakense* species group which was lacking till now.

The present chromosomal study is very significant in understanding the diversity of Simuliid population across the world on the cytological basis. The similarities between the Darjeeling Hill species and the Oriental region were more in comparison to the populations of other realms. The present study, however, may mean to be very little but will contribute significantly towards understanding the diversity of *Simulium* on worldwide basis.