Drosophila fauna at three different altitudes of Kudremukh (Western Ghats).

Deepak, D., and M.S. Krishna*. *Drosophila* Stock Centre, Department of Studies in Zoology, University of Mysore – Mysore 570006; fateofacell@gmail.com, drosokrish@gmail.com. *Corresponding Author

Introduction

Drosophila is used as a model organism for over a hundred years. It is a successful model organism because of its low cost of maintenance, short life cycle, large number of progenies available in each generation, 70% sequence homology between humans, availability of complete genome sequence, and versatility of several unique genetic tools which makes it unparalleled in its class. There are 3,500 described species in the family Drosophilidae, the majority of which comprises of Genus *Drosophila*. Distribution pattern of *Drosophila* reveals information about micro and macro environmental changes that are associated with abundances of each species. However, such taxonomical studies are poorly concentrated in India. The present study was undertaken to assess the *Drosophila* fauna at different altitudes of Kudremukh.

Kudremukh is located in Chikkamagaluru district in Karnataka, India, which is a part of Western Ghats mountain ranges and is situated 266 km away from Mysore. It consists of tropical wet evergreen and Shola type of forest receiving an average annual rainfall of 7,000mm. Collection was made in the month of December 2014, at three different altitudes using fermented fruits as bait and net sweeping method was employed.

Table 1. Distribution of *Drosophila* at three different altitudes in Kudremukh Wild Life Scantuary, Chikkamagaluru district, Karnataka, India.

S/N	Species	1,400 m	800 m	400 m	Total number
	Subgenus: Sophophora				
1	*D. malerkotliana*	136	125	129	390
2	*D. parabipectinata*	82	114	84	280
3	*D. bipectinata*	44	87	72	203
4	*D. kikkawai*	35	-	13	48
5	*D. jambulina*	-	8	86	94
6	*D anomelani*	64	56	-	120
7	*D. takahashii*	36	13	-	49
	Total	397	403	384	1184
	Subgenus: Drosophila				
8	*D. nasuta*	-	16	23	39
9	*D. neonasuta*	36	23	88	147
10	*D. immigrans*	66	41	34	141
	Total	102	80	145	327
	Subgenus: Scaptodrosophila				
11	*D. nigra*	-	-	22	22
	Total	0	0	22	22
	Total no. of flies	499	483	551	1533

A total of 1,533 flies were captured belonging to eleven different species (Table 1), of which seven species belonged to Subgenus Sophophora, three species to Subgenus Drosophila and one species to Subgenus Scaptodrosophila. *D. malerkotliana* was found to be most abundant in all three altitudes suggesting it to be dominant species as previously reported in other regions of Western Ghats (Naseerulla, 1993; Hegde, 1979; Prakash, 1979; Muniyappa, 1981; Hegde, S.N. *et al.*, 2000). Variation in species and their number was seen with respect to altitude, with the highest number of flies in Low altitude (400 m) region. *D. jambulina*, *D. nigra*, and *D. nasuta* preferred lower altitudes, whereas *D. anomelani* and *D. takahashii* seemed to prefer high altitudes.

Lower value of Simpson index (Table 2) in lower altitude 400m shows rich biodiversity, whereas a decrease in diversity at 800 m is seen, followed by increase in diversity at 1,400 m. This result shows that *Drosophila* community is affected by the altitudinal variation as previously reported (Guruprasad *et al*., 2011; Wakahama, 1962; Kaushik and M.S. Krishna, 2013).

Higher density of *Drosophila* in lower altitudes can be attributed to the type of forest, where fertile top soil is eroded due to heavy rain and deposited in valleys resulting in dense vegetation, providing a suitable environment with thick vegetation at lower altitudes. Diverse species of flowering and fruit bearing flora provide resources for feeding and ovipositioning (Brncic *et al*., 1985).

Table 2. Diversity index of *Drosophila* population collected at different altitudes in Kudremukh.

Altitude	Simpson index (D)
400 m	0.1512
800 m	0.1784
1,400 m	0.1566

(Simpson Index, D = Σn (n-1) / N (N-1). Where, n = the total number of organisms of a particular species and N = the total number of organisms of all populations).

Acknowledgment: The authors extend their gratitude to the Chairman, Department of Studies in Zoology, University of Mysore, Manasagangothri, Mysore, and *Drosophila* Stock Center, University of Mysore, for providing facilities to carry out the above work.

References: Brncic, D., M. Budrik., and R. Guines 1985, J. Zoolog. Syst. Evol. Res. 23: 90-100;
Guruprasad, B.R., and P. Pankaj 2011, J. Entomol. Nematol, 3(4): 54-57; Hegde, S.N., 1979, Ph.D. Thesis, Univ. of Mysore, Mysore, India; Hegde, S.N., V. Vasudev, V. Shakunthala, and M.S. Krishna 2000, Dros. Inf. Serv. 81: 138; Koushik, P.C.R., and M.S. Krishna 2013, J. Entomol. Nematol. 5(4): 42-44; Muniyappa, N., 1981, Ph. D. Thesis. Univ. of Mysore, Mysore, India; Naseerulla, M.K., 1993, Ph. D. Thesis. Univ. of Mysore, Mysore, India; Prakash, H.S., 1979, Ph.D. Thesis. Univ. of Mysore, Mysore, India; Wakahama, K.L., 1962, Annot. zool. jpn. 35(4): 234-242.

Suppressed double crossovers in *D. pseudoobscura* inversion heterozygotes.

Manzano-Winkler, Brenda[1]. Department of Biology, Duke University, Durham NC 27708; [1]Email: brenda.winkler@duke.edu

Chromosomal inversions play a large role in speciation by limiting gene flow at loci within inversions through inhibiting meiotic recombination in inversion heterozygotes. In this way, inversions are thought to help maintain hybridizing species that would otherwise homogenize. Gene exchange can still occur between heterokaryotypes through a double crossover event. However, double crossovers in inversion heterozygotes occur at rates far lower than expected based on what is observed in homokaryotypes (*e.g*., Roberts,1976; Pergueroles *et al.*, 2010). For example, Stevison *et al.* (2011) observed that double crossovers within the XR inversion occurred at a rate of 1 in 9739 offspring for the interspecies cross between *Drosophila pseudoobscura* and *D. persimilis*. This inhibition of recombination by the inversion may have been greater than normal because it occurred in hybrids of an interspecies cross. A natural extension of this work would be to examine the suppressive power of a comparable inversion within species. Levine (1956) noted strong suppression in *D. pseudoobscura* inversion females heterozygous for the Standard (ST) and Pikes Peak (PP)