



## VENTURING INTO *Drosophila* FLY COLLECTION: A SHARABLE EXPERIENCE THAT MAY HELP TO PLAN AND EXECUTE THE TASK

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### ABSTRACT

The Indian subcontinent, with its diverse ecological habitats, serves as a home to a wide variety of life forms. Insects, the largest group within the animal kingdom, thrive in this region due to the favourable atmospheric conditions conducive to their survival and propagation. In order to study the genetic differentiation of natural populations of *Drosophila ananassae*, it is necessary to collect specimens from various locations across India. During our extensive sampling, we successfully collected *Drosophila* flies from different regions, and in the process, we also encountered several other species. In this brief communication, we share our experiences and insights from this collection effort, which may prove useful to others undertaking similar research on *Drosophila* in India.

**KEYWORDS:** *Drosophila ananassae*, Indian *Drosophila* species, Flies Collection

There are thousands of species of *Drosophila* documented to exist all across the globe; however, *D. melanogaster* is one of the most widely used model systems in biology. Research on *Drosophila* flies are now focused on the laboratory reared flies specialized into particular genetic characteristics. However, to analyze naturally inhabiting flies for their taxonomic, behavioural or genetic features, direct collection from natural habitat is required. India is home to a rich diversity of *Drosophila* species, which can be found in various habitats ranging from forests and agricultural fields to urban environments (Gupta 1974; 1981; 1993; 2005; Gupta and Gupta 1988; Fartyal and Singh 2001; Fartyal *et al* 2012; Singh 2015). The country's varied climate and ecosystems provide a suitable environment for a wide range of *Drosophila* species, making it a valuable region for studies in genetics, ecology, and evolutionary biology. There are 25 genera which comprise the Indian Drosophilid fauna and among them, genus *Drosophila* is the most important and of common occurrence (Singh 2015). Gupta (2005) described four subgenera of the genus *Drosophila* which are found in India: Dorsilopha, Dudaica, Drosophila and Sophophora. Fartyal and his co-workers are exploring the Drosophilid fauna of Uttarakhand and have described a number of new species and new records from this region of the Indian subcontinent (Fartyal and Singh 2001; Fartyal *et al* 2012). The commonly occurring species of *Drosophila* in India are *D. melanogaster*, *D. ananassae*, *D. nasuta*, *D. bipectinata*, *D. malerkotliana*, *D. immigrans*, *D. busckii*, and *D. jambulina* (Gupta 1974; 1981; 1993; 2005; Gupta and Gupta 1988; Fartyal and Singh 2001; Fartyal *et al*

2012; Singh 2015). These species represent just a small fraction of the diversity of *Drosophila* found in India. *Drosophila* flies of different species are highly diverse and exhibit specific ecological preferences, occupying different niches in nature. Some of the species of this genus are ubiquitous in their distribution and are frequently lured if fermenting fruits make its presence in the environment. *D. ananassae*, *D. bipectinata* and *D. melanogaster* flies are commonly found near human habitats, particularly around decaying fruit and fermenting food where these creatures feed and use for their breeding sites. However, due to interspecific competition, the availability of a particular species would have higher chance than the other (Singh and Kumar 2013.). Collecting *Drosophila* flies can be a fascinating experience particularly persons like me (PKB) who for the first time dared to go in the field with a motto to collect flies of a single species whose population analysis was my main task.

In this note, we wish to share our experiences regarding planning and collection of *Drosophila* flies from the nature. Our research is focused on the genetic differentiation of *D. ananassae* flies found in different areas of India. The ecological conditions are not uniform all across the Indian subcontinent, so while planning to collect flies; one has to get aware about the environmental conditions of the places under trip consideration, so that, flies collection at those places could be ensured.

I initiated collecting flies from their natural habitat since August 2023 and by the beginning of March 2024, I could collect flies from eleven geographical

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places aligned at the north-south axis of India, where the populations at the extreme ends lied nearly 2700km apart. Collecting *Drosophila* flies in India presents unique challenges influenced by various factors, particularly, varied climate conditions at its different geographic locations. In the northern regions, the most favourable time for collection of flies is from September to November, when temperatures are moderate. Conversely, in the southern parts of India, one can plan in any month

where, in even hot conditions, dawn and dusk part of the day becomes suitable for collecting flies. For a person like me, who belong to north India, navigate local languages is crucial, as communicating with local people about the purpose of collecting these flies can be particularly challenging. Those who could understand English language and were eager to cooperate me convinced to the local vegetable sellers for the purpose of my fly collection (Table 1).

**Table 1: *Drosophila* flies collected during August 2023 to March 2024 from different locations of India**

S.N.	Population	Date of collection	Total captured flies	<i>D. ananassae</i>		Flies of other species			
				Male	Female	<i>D. bipunctata</i>	<i>D. melanogaster</i>	<i>D. jumbulina</i>	<i>D. malarkottiana</i>
1	Lucknow (Mohanlalganj)	26/08/2023	126	70	36	18	2	0	0
2	Hyderabad (Hanumannagar near bus stand)	26/08/2023	144	64	42	11	21	2	4
3	Prayagraj (from Kachhar)	01/10/2023	156	68	43	26	10	0	9
4	Aligarh (Aligarh Muslim university campus)	14/11/2023	137	52	44	21	14	0	6
5	Madurai (Simmakal)	24/02/2024	133	52	43	25	9	4	0
6	Rameshwaram (Sri Arulmigu Ramanathaswamy temple)	25/02/2024	112	67	45	0	0	0	0
7	Kanya Kumari (Badasery, Nagercoil)	26/02/2024	147	60	42	8	26	3	8
8	Thiruvananthapuram (Chela)	26/02/2024	132	85	47	0	0	0	0
9	Coimbatore (Old Ukkadam bus stand)	27/02/2024	146	61	44	0	29	12	0
10	Mysuru (Devraj)	29/02/2024	144	73	49	0	17	5	0
11	Tirupati (Kotra mangalam)	01/03/2024	149	82	45	0	22	0	0

Five species of *Drosophila* were collected during this attempt. The maximum number of flies in the entire seize belonged to *D. ananassae* on which, we have to work for our research objectives. The possibility of getting this specific species in the majority compared to other species is believed to be, due to its cosmopolitan and domestic occurrence. Therefore, persons planning to

work on population aspects of *D. ananassae* are suggested to confine their collection to the shops engaged in fruits and vegetable sale. Other species, whose possibility with lesser number may be as follows: *D. bipunctata*, *D. melanogaster*, *D. jumbulina*, *D. malerkottiana*. I restricted my collection to the places where permanent residents were doing their fruit and

vegetable business in almost a stable shop. The simplest method to collect flies was to sweep them through small cotton net. In case of sporadic occurrence of flies, a glass aspirator was used. The collected flies were kept in food vials. One noticeable significance of keeping flies in food vials is to give chance to impregnated females to lay eggs in the vials, which then grow into flies. However, the collection may comprise mixture of species, requiring further sorting of flies in the laboratory.

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