

## *Drosophila melanogaster*: a tiny fruit fly is invigorating research in India<sup>†</sup>

The fruit fly *Drosophila melanogaster*, a popular research model, has a robust body architecture, highly efficient reproductive system, and a small but complex brain capable of all fundamental behaviour. A 100 years ago, it was first adopted by T. H. Morgan to study the mechanism of inheritance and evolution, and he won the Nobel Prize in Physiology or Medicine in 1933 for his work. The works of E. B. Lewis, C. Nüsslein-Volhard and E. F. Wieschaus, who shared the Nobel Prize in 1995, further established the fly as a useful model for developmental patterning. In addition, the vision and dedication of S. Benzer and others helped adopt the animal for identifying the genetics of neurobiology and behaviour. Because of a plethora of advantages, *Drosophila* has now become one of the most used test beds for research in developmental cell biology, physiology and neuroscience. These include a relatively cheaper cost of maintenance and experimentation, fully annotated genome database, highly developed (and almost completely understood) knowledge of genetics, several specialized molecular-genetics tool kits, and many other utilities (<http://www.flybase.org>). Another great advantage is the community of *Drosophila* researchers, commonly known as 'fly-pushers'. They practice openness with free sharing of knowledge and resources. The fly research in India, first established in Kolkata in 1950s, has now spread all over the country due to the outstanding efforts of leaders like S. P. Ray-Choudhuri, M. R. Rajasekarasetty and O. Siddiqi. At present, more than 90 active research groups in India pursue their studies using *Drosophila*.

The *Drosophila* Meeting 2014 held recently showcased the current state of the fly research in this country. It provided a

new boost and rekindled the platform to exchange knowledge and information amongst the fly workers community in India. Altogether, more than 40 group leaders from different parts of the country participated in this meeting. Their research interests are broadly classified into: (a) disease models, toxicology and stress biology; (b) ecological and evolutionary studies, including research on cytogenetics of laboratory-scale speciation; (c) molecular and cellular analyses of circadian rhythms; (d) molecular basis and cell biology of gene expression, regulation and signalling during development and (e) developmental cell biology of stem cells, tissue morphogenesis and differentiation. Several laboratories are actively maintaining local *Drosophila* varieties in their laboratories, a rich resource for large-scale genetic analysis of quantitative trait propagation in the future. A few groups are documenting local varieties of the *Drosophilid* species in different habitats, useful for ecological impact assessments. The talks highlighted the utility of using *Drosophila* and related species for experimental verifications of evolutionary and ecological theories. It was also evident that indigenous fly research has made significant inroads into the mainstream developmental and cellular biology with some solid contributions<sup>1</sup>. The gen-next of fly research is applying diversified, cutting-edge technology to study molecular cell biology, developmental phenomena and behaviour. There is a good potential in using flies as teaching tools for dissemination of a variety of concepts, with a low cost.

The members also discussed some of the severe constraints plaguing the research. Most common were inadequate awareness and training at the undergraduate and postgraduate levels, and limited access to the knowledge database and reagents. Obtaining fly stocks and reagents from outside is a major roadblock even in some of the elite institu-

tions of the country. Notwithstanding these limitations, fly work is thriving in several centres where the incumbent research has made significant advances in the respective focus areas. Some of them are comparable to the best in the field. Therefore, the community felt an urge to spread such advanced level practices all across the country and achieve leadership positions in technology development using *Drosophila*.

To kick-start this process, the attending members nominated an ad-hoc 'Indian Fly Board' comprising S. C. Lakhotia (BHU, Varanasi), L. S. Shashidhara (IISER, Pune), L. Mandal (IISER, Mohali), V. K. Sharma (JNCASR, Bangalore), M. Mutsuddi (BHU, Varanasi) and U. Nongthomba (IISc, Bangalore) and mandated them to develop and prepare suitable proposals for establishing the 'National *Drosophila* Stock and Research Centre' in India (for details see ref. 2). The Board will promote and facilitate continuous exchange of information about new research findings and reagents generated in different laboratories in the country. The gathering was concluded with a mutually shared optimism to leapfrog the Indian fly community into the forefront of modern research, and make it internationally influential through pioneering research.

1. Abstracts *Drosophila* meeting.pdf; <https://googledrive.com/host/0B21Z1bUQtvisZ0p-XRXZCMS1LSU0>
2. Ray, K., *Proc. Indian Natl. Sci. Acad.*, 2014, **80**(2), (in press).

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