

## In this issue

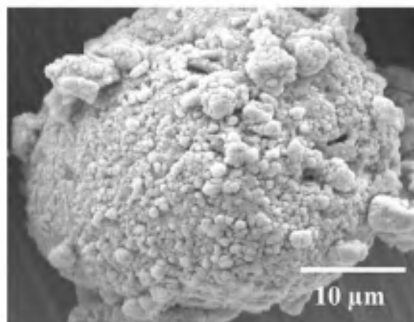
### Elephants in compact evergreen forests

Surendra Varma (page 501) reports the significance of short term, but focused and systematic rapid surveys in understanding the spatial pattern of distribution of the Asian elephant (*Elephas maximus*) in a compact evergreen elephant habitat – the little explored Kalakad–Mundanthurai Tiger Reserve (KMTR) in southern India. The reserve is unique and biologically very rich, as it has the endangered and endemic (to Western Ghats) mountain goat, the Nilgiri tahr and five different primate species (one of which is listed as Endangered and two as Vulnerable under IUCN's Red list). The study by Varma is significant as there is no compact evergreen forest elephant habitat in southern India other than KMTR and its adjoining habitats and, more importantly, not many surveys or studies on elephants and their status have been conducted in this region prior to this survey.

The survey though carried out over a short term, has provided integrated knowledge of the status of Asian elephants, its habitat and the pattern of habitat usage. The other important aspect of the study is that, when visibility within forest is poor, the survey provides the insights of how indirect evidences alone could constructively be used for specific ecological investigations. The study also draws out specific conservation guidance for the species and its habitat. Even with the conservation challenges it faces, the habitat in KMTR is intact and has a long-term conservation value for the species. KMTR cannot be seen in isolation; it is a part of a compact unit covering an area of about 5000 sq. km and conservation plans should also take account of the management of habitats surrounding the reserve.

### Nano CoFe<sub>2</sub> alloy

The use of nanoparticles and nano-materials in magnetic recording application has led to reinvestigation of industrially important ferrites in nano dimension. In an attempt to prepare scalable quantities of industrially important ferrites, Maya Mohan *et al.* (page 473) have incidentally observed that, by a judicious choice of the preparation protocol, one could obtain with ease, either a stable CoFe<sub>2</sub> alloy as precursor for CoFe<sub>2</sub>O<sub>4</sub> or the oxide directly in a single pot reaction. The approach that the authors have employed involves a combination of sono-chemical as well as reduction



route (sono-reduction) under alkaline condition. The novelty of this combi approach lies in the use of two techniques, sequentially and simultaneously as a one-pot reaction. The first step involves reduction of metal salts to corresponding metals in nano size employing N<sub>2</sub>H<sub>4</sub>·H<sub>2</sub>O as a reducing agent. Upon *in situ* formation of nanometals, chemical effects of ultrasound does the alloying effect leading to either a stable alloy precursor, CoFe<sub>2</sub>, if the sonication is carried out in Ar–H<sub>2</sub> atmosphere or it results in finely divided CoFe<sub>2</sub>O<sub>4</sub> nanoparticles if the reaction vessel is flushed with oxygen. The results indicate a convenient route to alloy and to oxidize the metal alloys to desired size and shape by sono-reduction route.

### Chromosome inversions and linkage disequilibrium

Chromosomal polymorphism in *Drosophila* due to paracentric inversions is common and constitutes an adaptive trait. Dobzhansky (1947) suggested that chromosomal polymorphism in *Drosophila* is a device to cope with the diversity of environments. Inversions provide a mechanism for maintaining heterotic systems through the suppression of crossing over in heterozygotes. Levitan (1954) was first to report the occurrence of non-random associations (linkage disequilibrium) of linked inversions in *D. robusta* and subsequently this phenomenon has been reported in many species of the genus *Drosophila*. In his review article on 'Chromosome inversions and linkage disequilibrium in *Drosophila*', B. N. Singh (page 459) documents the cases of linkage disequilibrium between inversions in different *Drosophila* species and highlights their probable causes and their evolutionary significance. Epistatic selection and balanced polymorphism tend to produce supergenes, which are major features of evolution. Although breakdown of heterosis in inter-racial crosses clearly supports the theory of genetic coadaptation, linkage disequilibrium between inversions is relevant to determine the extent of coadaptation as it involves the gene interaction at fitness level. When linkage disequilibrium is present, there has been a tendency to attribute differential selection involving multilocus interactions. Besides selection, there are other factors such as tight linkage, genetic drift, migration, gene flow and genetic hitchhiking, which can generate linkage disequilibrium. Further, factors causing linkage disequilibrium between inversions vary in different species and also in different chromosomes of the same species.