

commun.). Similar subtle disturbances can affect species of aquatic vertebrates, especially amphibians<sup>20</sup>.

Westman<sup>1</sup> suggests the identification of 'critical-link' species in monitoring biodiversity. These species are often insignificant in terms of biomass and place in the food web. Such species are also frequently microorganisms, soil and litter invertebrates and the lower vertebrates. Very little is known about these organisms even in such well-studied landscapes as the NBR. Except probably the exploratory studies done in Silent Valley by the Zoological Survey of India<sup>21</sup> and the studies of butterflies such as that of Larsen<sup>8</sup>, nothing is virtually known about the invertebrate fauna of this species-rich reserve. Emphasis has been on larger mammals and birds<sup>22</sup>. The only study that points out the need to study insects as indicators in environmental monitoring is that of Daniels<sup>23</sup>. More intensive studies including the whole range of organisms in the species-rich NBR would make it a model biosphere reserve for the entire tropical world.

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NEWS

Report on the discussion meeting on Icosahedral Symmetry in Materials

The meeting was held during 1-3 February 1993 at the Jawaharlal Nehru Centre for Advanced Scientific Research, Indian Institute of Science, Bangalore and was attended by nearly 60 scientists from India and abroad. The discussions covered a wide range of topics and materials ranging from fullerenes to viruses including quasicrystals and had authoritative presentations on the formation, structure, stability and properties of fullerenes and quasicrystals.

The meeting began with a discussion of viruses with icosahedral symmetry (M. R. N. Murthy and M. V. Hosur,

India) and proceeded to deal with structure (H. Terrones, Mexico and C. S. Sundar, India), properties (O. N. Srivastava and K. C. Rustagi, India) and coordination chemistry of fullerenes (V. Krishnan, India). A majority of papers were devoted to quasicrystalline phases in ternary alloys and dealt with their occurrence, mechanisms of formation and stability (A. P. Tsai, Japan, R. S. Tiwari, K. Chattopadhyay, A. K. Srivastava, Alok Singh and C. M. Chittaranjan (all from India)), microstructure (V. S. Rangunathan, India), defects and grain boundaries (S. Ranga-

nathan, G. V. S. Sastry, R. Ramasamy, T. Roy *et al.* (all from India)), and transport properties of quasicrystals (T. V. Ramakrishnan, D. Bahadur, Sangam Banerji, N. P. Lalla *et al.*). The study of the structure of quasicrystals both from the point of view of experiments and theoretical modelling received attention (Alok Singh, R. K. Mandal, M. K. Sanyal and R. Chidambaram). The generation of quasiperiodic 2D lattices and their description were dealt by S. Banerjee, S. Baranidharan and P. Ramachandra Rao. Mathematical modelling of fullerenes and mobility edges in

1D quasicrystals with the aid of curved spaces (H. Terrones, Mexico) and multifractals (G. Ananthakrishna) attracted attention. The recent advances in clusters and their description were summarized by Kumar, Italy. The last session at the end of the third day comprised nine short presentations, including an impromptu presentation by R. Prasad on the occurrence of amorphous lead in tubular fullerenes. All the participants

were impressed by the depth and breadth of presentations made in the area of quasicrystals and brought to focus the many significant contributions to the field from India. The diversity in the topics as well as the specializations of the participants was noted by many and aptly summarized by H. Terrones in the quotation from *Rig-Veda*: Let noble thoughts come to us from all sides.

The discussion meeting started with a brief address by V. Krishnan, Head Academic Programme of the Jawaharlal Nehru Centre and S. Ranganathan on behalf of the convenors (R. Chidambaram, S. Ranganathan, K. Chattopadhyay and P. Ramachandra Rao).

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## SCIENTIFIC CORRESPONDENCE

### An epidemic outbreak of *Panonychus ulmi* (Koch) (Acari: Tetranychidae) in apple orchards of Himachal Pradesh, India

In July 1991 apple orchards in the wet temperate high hills of Shimla and Kulu regions of Himachal Pradesh presented a scorched look due to an epidemic outbreak of the European red mite, *Panonychus ulmi* (Koch) (Acari: Tetranychidae).

*P. ulmi* has been variously referred to in the literature as *Paratetranychus pilosus* (Canestrini and Fanzago) and *Metatetranychus ulmi* (Koch)<sup>1</sup>. Commonly known as the European red mite, *P. ulmi* is found in many parts of the world. It is a major pest of apple, pear and plum in Europe, USA and Japan<sup>2</sup>. In India, *P. ulmi* has however been recorded from peach, plum, apple, wheat, fig, hibiscus, tomato-seedlings and ivy from Jammu and Kashmir and from apricot in Himachal Pradesh, but has not been reported to cause any serious damage<sup>3</sup>.

The dry spell of June–August 1991 provided favourable conditions for the proliferation of *P. ulmi*. When mean daily temperatures ranged from 23 to 27°C, the European red mite completed

its life cycle in 5–7 days. First larvae from overwintering eggs, made their appearance in early April on warming up of weather which also coincided with the pink bud stage of the host apple trees. High mite counts (465 mites per apple leaf) were observed from orchards presenting a yellow and bronzed look. These were the orchards with higher insecticide score and conspicuous absence of the natural enemies of *P. ulmi*. Similar observations have been made in the apple orchards of Nova Scotia<sup>4</sup>. The mite-infested trees, during 1992, were observed to form fewer flower buds than normal trees, the fruits were smaller and there was unprecedented fruit drop.

The European red mite overwintered in the egg stage. Numerous overwintering eggs were laid by the females on roughened bark or crevices near the growing points. The number of overwintering eggs per 10 cm length of the twig ranged from 8 to 260. The deposition of the overwintering eggs was observed till the middle of October on the apple trees located between 2000 and 2300 m msl.

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