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Adult neurogenesis

Overwhelming evidence of neuronal stem cells that have the properties to differentiate, migrate and get integrated into functional neuronal circuits has now made adult neurogenesis an established fact. However, long before the recent mammalian and human evidence impacted a crushing of the dogma that no new neurons are produced in adult higher vertebrates, the phenomenon was demonstrated in birds. M. Sadananda (**page 297**) traces evidence that led to this paradigm shift in neuroscience. Further, based on data that exists, he examines factors that induce or deter adult neurogenesis, discusses the implications that neuronal stem cells have for learning and memory, and touches upon the possibilities stem cell research extends to treat neurodegenerative disorders in humans. A review of the functional significance of adult neurogenesis, and the effect that diverse environments have on it by either enhancing or attenuating it, are reminiscent of the post-natal, activity-dependent development of neuronal networks.

Sugarcane and the white peril

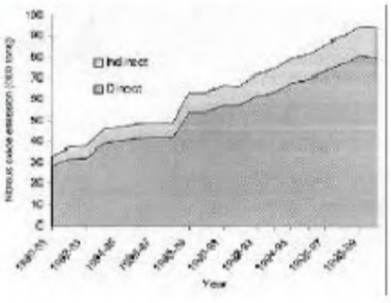
Sixty years after it was first described from Java in Indonesia, the sugarcane woolly

aphid, *Ceratovacuna lanigera* Zehntner was reported to occur in Coochbehar in West Bengal. Over the years it spread to other states of northeast India and remained confined there at uneconomic levels till in July 2002, it appeared in epidemic proportions in Maharashtra. Within the next few months it rapidly spread across the sugarcane-growing regions of Maharashtra and the neighbouring states of Karnataka. In the areas of its occurrence this aphid is known to cause significant losses in tonnage, juice quality and sugar recovery. The unchecked spread of the pest could affect the sugar industry, which is the second largest agro-based industry in our country contributing over Rs 1000 crores annually to the central exchequer.

While the aphid has been spreading relentlessly into the sugarcane-growing tracts of Andhra Pradesh, Tamil Nadu and Kerala, the search is on to find safe, effective and sustainable methods to contain this pest. Though a number of pesticides kill the aphid, the pest however makes a comeback after a few weeks, thus proving the futility of chemicals as a means of control. Sugarcane being a perennial crop, biological control-based integrated pest management could prove to be the ideal approach to contain this pest that is emerging as a threat to sugarcane in our country. Joshi and Viraktamath (**page 307**) review the status of the aphid as a pest and the possibilities of using its natural enemies for control.

Greenhouse gas emissions

Methane (CH_4) and nitrous oxide (N_2O) are the important greenhouse gases con-



tributing 15% and 5% respectively, of the enhanced greenhouse effect. Agricultural and associated sectors produce about 50% and 70% respectively, of the total anthropogenic emissions of these gases. Indian agricultural soils are often blamed to be major contributors of atmospheric methane as paddy cultivation occupies around 42 Mha in the Indian subcontinent, the largest area in Asia. Agricultural soils receiving natural and chemical fertilizer nitrogen also contribute to nitrous oxide emission. Due to the diverse soil, land-use types and climatic conditions, there are uncertainties in quantification of greenhouse gas emission from agricultural soils in India. What is Indian agriculture's real contribution to greenhouse gas emissions and subsequent climate change can only be answered by preparing a national inventory. An inventory of the emission of methane and nitrous oxide from different states in India was prepared using the methodology given by the Inter-Governmental Panel on Climate Change (IPCC) (see **page 317**). For the base year 1994–95, methane and nitrous oxide emissions from Indian agricultural fields were estimated to be 2.9 Tg (61 CO_2 equivalent) and 0.08 Tg (39 Tg CO_2 equivalent) respectively.

Monsoon behaviour

The summer monsoon rainfall over India during 2002 and 2003 was 81 (102)% of its long period average. While the monsoon 2002 was a severe drought, monsoon 2003 was normal. This inter-annual monsoon behaviour is partly due to the external surface boundary forcing and partly due to its internal dynamics. While the external forcing provides the handle for seasonal prediction, the internal dynamics within the monsoon system is difficult to predict. The inter-seasonal variability (3–7 day, 10–20 day, 30–60 day associated with the oscillation of the monsoon through, westward and northward-moving waves respectively) during the monsoon season constitutes this internal dynamics. A comparison of the intra-seasonal features during the drought of 2002 and the normal monsoon of 2003 reveals that while the faster modes (3–7, 10–20 day) dominated monsoon 2003, monsoon 2002 was dominated by the slower 30–60 day mode, in particular during the unprecedented long dry spell of July 2002 (see **page 325**).