# In this issue

## Dynamics of the Indian population: Changes in fertility patterns

India has emerged as the largest producer of human beings - more additions per year than any other country in the world (including China). The need to cut down this rate has been felt very strongly for more than half a century, and over Rs 5500 crores have been spent on the family planning programme (as of 1990). Paradoxically (or, to be cynical, expectedly), the annual growth rate of 1.97% seen in 1991 is, if anything, marginally higher than the 1.96% seen during 1951-61! Is the situation really as dismal as it appears to be?

A critical analysis of the numbers behind these numbers, described by K. Srinivasan in his article on **page 577** of this issue, however, reveals some very positive aspects. The net growth rate is the difference between the death rate and the birth rate, and though the difference has remained unchanged, both these rates have substantially decreased. Secondly, the fertility rate - average number of children born per woman - has shown a more pronounced decrease, especially in recent years.

The fertility rate is influenced by a number of social, economic, cultural and demographic factors, and this article examines three of the important ones - infant mortality, female literacy and contraceptive use. Multivariate analysis of statewise data across decades consistently shows the female literacy rate to be the dominant factor. Quantitatively, a 20% increase in female literacy is expected to decrease the fertility rate by one child.

What of the future? The article also attempts to project the fertility rates for the next two decades using several alternative scenarios. The good news is that a (highly desirable) fertility rate of 2.0 is quite likely to be attained. See **page 577** for the rationale behind this optimism.

N. V. Joshi

## Fungus that feeds on petrol

Brick-biting, blade-chewing and automobile-consuming people have made news too frequently; we have also heard of those who develop a strong addiction to the odour of petrol and kerosene. But it is rare to hear of organisms that 'drink' petrol for their energy needs. J. Savitha and C. V. Subramanian from the Centre for the Advanced Study in Botany at the University of Madras, report of a strain of fungus that does exactly this (**page 596 - 600**). About ten years ago, this group isolated from the effluents of the Madras Oil Refineries, a strain of *Aspergillus flavus* that degrades the hydrocarbons in crude oil. This organism obviously, is potentially useful in cleaning up the ecosystems that are polluted with the crude oil from the industrial effluents or from the oil sleaks in the ocean.

Such organisms, both fungi and bacteria that live in the soil and aquatic systems enriched with crude are being reported ever since the late sixties. Perhaps one of the most interesting among them is the isolation of two strains of *Cladosporium resinae* from the aircraft jet fuel systems by Cofone and his colleagues at the University of Dayton, Ohio, USA. But some of the earlier reports did not clearly establish whether the fungi isolated from the oil-rich soils and marine ecosystems could indeed use and degrade the crude oil on their own. It was suggested that the fungal mycelia might only help in penetrating the insoluble substance such as oil and in increasing the surface area for bacterial attack.

In the recent past, however, these doubts are swept aside and substantial evidence exists to indicate that the fungi indeed consume and degrade the crude oil from the polluted systems. Savitha's group, besides adding another fungus to this list of oil-eating organisms, has also compared for the first time its enzyme activities when grown on glucose with that when grown on crude petroleum oil. Their study shows that *A. flavus* growing on crude oil exhibits 3 to 6-fold enhanced lipid levels with a significantly altered fatty acid profile. They also show that such enhanced lipids in the tissue are brought about by the altered activity in a set of enzymes that probably facilitate the oxidation of alkanes in the crude oil. But what is the significance of such enhanced lipid levels? Is it merely a physiological consequence of 'living' in the oil or is it a physiological adaptation of overcoming the problems of overconsuming the oil? Clearly, the work by Savitha and her group opens up more interesting questions besides being potentially useful in applied microbiology.

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