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A peek into hornbill nests

THEY are few bird species that are as conspicuous as the hornbills. Verily, hornbills – with their bright coloured, down curved cow-horned beaks – are one of the more distinct bird species. Today, 55 species of hornbills, most arboreal, some terrestrial, are spread across Asia, Africa, and Melanesia.

Being large bodied, and enjoying a primarily frugivorous diet, these birds are voracious eaters of different kinds of fruits, and, by dispersing seeds, they play a critical ecological role in forest rejuvenation. Unfortunately, the last few decades have witnessed a precipitous drop in hornbill numbers (owing to hunting, poaching, and urbanization) around the world.

Tailoring hornbill conservation strategies, however, is no mean task because the behaviour of different hornbill species vary from one another when it comes to foraging, breeding, and tolerance to ecological changes. But what makes their conservation singularly challenging is that we know pitifully little about their nesting behaviour. To make matters worse, most of the research studies have only characterized the nesting behaviour of hornbills that live in wet tropical forests when it is common knowledge that hornbill species inhabit a wide range of habitats that include not only wet tropical forests, but also dry tropical forests and human modified landscapes.

Considering the above, a Research Communication, **page 1725**, endeavours to shed some light on hornbill nesting behaviour in a dry tropical forest: the Chilla range section of Rajaji National Park, India. By understanding the lay of the land surrounding the nests, and by measuring the physical dimensions of the nests, this study characterizes the nest site of two sympatric hornbills: The Indian grey hornbill, and the Oriental pied hornbill.

Sieving out excessive fluoride

IN 1999, the Centers for Disease Control and Prevention (USA) had listed fluoridation of domestic water as '*one of the ten great public health achievements of the 20th century*'.

Fluoridation of the public water supply is the most cost effective method – costing about $1 per person per year – to significantly reduce tooth decay of those drinking it. Over the years, the reason why fluoridation of drinking water has become such a success story in the dental annals is that it is equitable: Everyone has access to drinking water – the rich, the poor, the young, and the old. Indeed, over the last fifty years the consumption of fluoridated water has reduced tooth decay in adults and children by a whole 30%.

In recent years, however, anthropogenic activities such as the use of phosphate fertilizers and pesticides; the release of sewage and sludge into freshwater sources; and the unsustainable exploitation of groundwater have significantly increased the natural levels of fluoride in freshwater, which is again subjected to further fluoridation in treatment plants. This is bad news. Why? Because, paradoxically, excessive fluoridation is inimical to teeth health, even bone strength.

Studies report that a significant fraction of the population in around 25 countries suffers from endemic fluorosis – a dental and skeletal disease caused by consumption of excessive fluoride. In India the situation is particularly worrisome.

Around 25 million people living in 19 states and all Union Territories have been affected by the copious amounts of fluoride in drinking water, and approximately 66 million people, including 6 million children below the age of 14 years are at risk. Therefore, considering the negatives of excessive fluoridation, a number of research studies in the recent past have reported the synthesis of chemical adsorbents to 'sieve' out excessive fluoride.

One chemical adsorbent that has been proven to be particularly efficacious in reducing fluoride levels is hydrous bismuth oxide. Studies report that this oxide can reduce the levels of fluoride in water by 66%.

But is 66% a good enough reduction? In other words, can this bismuth oxide be engineered to become a more efficient adsorbent, so that it could reduce fluoride by say, about 80%, even 95%? A Research Article, **page 1673**, by chemically adding cationic ligands to the hydrous bismuth oxide, answers this question in the affirmative: 'Yes.'

Carbon footprint of urban India

INDIA being one of the fastest developing countries contributes significantly to the global greenhouse gas (GHG) emissions. Yet, only few empirical studies have numerically assessed the carbon footprint of urban and rural areas. In fact, given the dearth of studies, a general perception floats around that the carbon footprint of rural India is significantly larger than that of urban India. Is there any truth in this perception? The results of a General Article, **page 1616**, allude to the contrary.

This study assesses the GHG emissions from several hundred power plants spread across the country and finds – unequivocally – that cities spew out the greatest volumes of greenhouse gases into the atmosphere.

80-574

METABOLIC syndrome (MetS) has become a global epidemic. About 1.4 billion people are affected by this health disorder that is characterized by a host of medical symptoms including obesity, diabetes, hyperlipidemia, and hyperglycemia.

Of course, the aforesaid medical conditions can be treated medically when dealt with as *individual* health problems, but when they occur *together* (as they do in MetS), laying siege on the body from several 'different directions', one would not be naive to assume that curing, or even treating MetS is a fool's errand. The situation, however, is not as bleak as it seems.

Several drugs – statins, fibrates, *Gugulip* – have been developed to alleviate the hyperlipidemic conditions associated with the metabolic syndrome. Although effective in significantly lowering cholesterol and triglyceride levels, the ingestion of these drugs comes at an unhealthy price. Hepatic toxicity, myopathy, rhabdomyolysis – all are only a few of the adverse side effects a patient suffers when treated with these drugs. Therefore it is imperative new drugs be developed that would rein in MetS but sans the deleterious side effects.

A Research Article, **page 1634**, takes an important step in this direction by discovering that a certain structural analogue of *Guggulsterone* – compound '80-574' – exhibits anti-MetS activity in animal models. But what makes the 80-574 an intriguing discovery is that, unlike traditional drugs, the 80-574 boasts of both hypolipidemic and hypoglycemic characteristics.

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