

***Stenochironomus nelumbus* infesting leaves of *Nelumbo nucifera* and use of the term ‘gall’**

While reporting the invasive nature of *Stenochironomus nelumbus* (Diptera: Chironomidae), Mathew and Habeeburrahman¹ have indicated that this chironomid induces ‘galls’ on the leaves of *Nelumbo nucifera*. While leaf-mining habit is common among several plant-feeding aquatic Chironomidae², I was surprised to read about the capability of *S. nelumbus* to induce galls. As the current knowledge stands, the gall-inducing capability in Diptera occurs only in the Cecidomyiidae, Chloropidae and Tephritidae³, and to a modest extent in the Agromyzidae⁴. A true gall is a modified tissue of the host plant, which expresses a suite of adaptations to provide food and shelter to the inducing arthropod^{5,6}. In plant-morphogenetic terms, the gall-inducing arthropod initiates a perturbation in the growth activities of the plant and alters its differentiation processes modifying the plant tissue to its advantage⁷. According to Mani⁸, ‘... galls involve complex developmental inhibition, differentiation, growth, and suppression of tissues and parts’. I am curious to know whether Mathew and Habeeburrahman¹ observed such striking changes in the leaves of *N. nucifera* consequent to feeding by the larvae of *S. nelumbus*. The images included in the paper do not indicate any striking change – either hypertrophy or hyperplasia, except for lifted translucent epidermises at sites where the larvae occur. Leaf-mining habit was presupposed for gall-inducing habit, especially in Diptera; but this presupposition is being currently challenged³. Moreover,

Mathew and Habeeburrahman¹ report about leaf rotting, which, again, is an extremely rare feature among true galls of arthropod origin. Only in the stem and root galls induced by weevils (Coleoptera) and moths (Lepidoptera) does tissue-rotting occur, mostly because of accumulation of frass at one end of the tunnel; in other instances, tissue rotting occurs because of the association of a fungus with the gall-inducing insect, where the fungus will induce cell necrosis after the exit of the gall inducer.

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Response:

The invasion, outbreak, nature and extent of damage, and quarantine and management strategies for *Stenochironomus nelumbus* in *Nelumbo nucifera* under Indian freshwaters has been the scope of our paper. As we have discussed, initial reports on this pest are available only in Chinese language. We are sorry about the use of the term ‘gall’ that inadvertently crept in while translating the literature from Chinese websites using available tools. The symptoms observed under Indian freshwaters are leaf tunnelling, piling of faecal matter in rail on both sides of the larva and subsequent rotting of the leaves.

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Present status of critically endangered species of *Gyps* in Andhra Pradesh, India

Population decline of three resident species of vultures belonging to genus *Gyps*, namely Oriental White-backed vulture *Gyps bengalensis*, Long-billed vulture *Gyps indicus* and Slender-billed vulture *Gyps tenuirostris*, in the Indian subcontinent has become a conservation concern¹ and is among the most rapid ever reported in any bird species². Decline in vulture populations was first detected in the

early nineties³, and between 1991–93 and 2000, more than 92% decline in the populations of Oriental White-backed vulture and Long-billed vulture has been reported from north, northwest and central India^{4,5}. Between 2000 and 2003, the annual rates of decline of these two species was 48% and 22% respectively⁶. Largely, the population of vultures in the Indian subcontinent has declined^{1,7} by

more than 95% between 1990 and 2000. The Oriental White-backed vulture population was the worst affected¹, with a decline of 99.9%.

Among other reasons (including habitat destruction, decline in food availability, hunting, poor breeding success) for the population decline among *Gyps* species, diclofenac toxicity is considered a primary threat^{6,8,9}. Diclofenac was till recently a

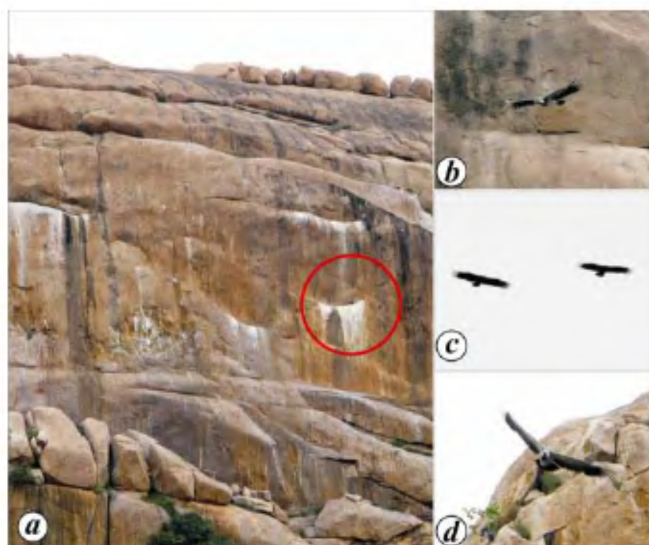


Figure 1. *Gyps indicus* at Adoni, Andhra Pradesh; **a**, Roosting areas showing white-washed ledges and a pair (marked with red circle); **b–d**, Individuals in flight above the roosting area.

widely used pain-killer and anti-inflammatory drug that was also an all-purpose veterinary medicine for domestic livestock in the Indian subcontinent⁹. The toxicity of diclofenac to vultures and the strong evidence of its effect on their population¹ led to the withdrawal of the license to manufacture this drug in India since mid-2006.

Most work on the status of vultures in India was carried out across northern, central, western and northeastern India. This was both due to good number of natural populations present in these regions and decades of observations. Vulture surveys in southern India are negligible, except for one report from Andhra Pradesh¹⁰ (12°30'–20°00'N, 76°30'–85°00'E) which states that 'the status of these vultures has become vulnerable throughout the State and most of these species have become locally extinct from their hitherto known distributional range'. The survey spanning seven years, between 1990 and 1997, has yielded in the sighting of 8615 individuals of the vulture species from 39 sites in 15 districts of Andhra Pradesh. Between 2006 and 2007, surveys were conducted in different parts of Andhra Pradesh to locate *Gyps* species. These could not locate any vulture from any of the sites reported earlier¹⁰, indicating total annihilation of vulture populations.

Presently, a few individuals of Oriental White-backed vulture and Long-billed vulture survive in two sites in Kurnool District. In June 2002, eight individuals (four adult and four juvenile) of Oriental White-backed vulture and two adult individuals of Long-billed vulture were sighted at Sundipenta (16°03'N, 78°54'E), Kurnool District. In June 2005, only three individuals of Long-billed vulture were sighted and the same number was observed in June 2008. These birds roost on the ledges of the hills on the south bank of River Krishna in the Nagarjunasagar–Srisailem Tiger Reserve. These birds were often seen feeding on cattle carcasses dumped near the graveyard at Sundipenta and also occasionally observed to feed on carcass of wild animals in the Tiger Reserve. On 11 August 2008 we sighted two adult Oriental White-backed vultures and 17 (six adult and nine juvenile) Long-billed vultures near Adoni (15°39'N, 77°13'E). The birds were seen emerging out of the nearby rocky outcrops (Figure 1 a–d). We surveyed the area and found the roosting ledge on the northwestern side of one of the rocky hillocks. We observed numerous small-to-big, white-washed ledges (Figure 1 a) along the southeastern face of the chain of hillocks that is located opposite the hillock where the vultures roost. Interviews with local shepherds revealed

that the vultures used to be found in large numbers earlier and that their population has declined over the past few years.

The vulture population of Adoni needs to be monitored closely and *in situ* conservation programmes need to be initiated by establishing a vulture restaurant and conducting conservation education workshops for local stakeholders. This population could also contribute to the breeding stock of individuals for the conservation breeding programme to be implemented at the Vulture Conservation Breeding Centre in Hyderabad, Andhra Pradesh.

Note added in proof: On 10 January 2009, an individual of Eurasian Griffon *Gyps fulvus* was reported sighted by local bird watchers from Kollero Lake (16°34'N, 81°15'E), Krishna District.

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INSA: new initiatives and concerns*

The Indian National Science Academy (INSA), New Delhi which is currently in its Platinum Jubilee year, has maintained its eminence and dignity all these years. The Fellowship of INSA is highly cherished. The Academy enjoys considerable prestige. This prestige needs to be converted into influence. INSA is in the process of setting up a Science Policy Study Cell. The Academy needs to strengthen its role as a think-tank in the service of the nation on science-related issues. INSA is also in the process of establishing an archive. We can understand the present and plan for the future only in the context of the past. Thirdly, we would like to establish an electronic hub of science information at INSA. We do not wish to solely hold large quantities of information. But we need to have links with all major depositories of science-related information in the country. This is in consonance with the general philosophy of an Academy. The Academy is not a major implementer or executor of policies and programmes. It is a catalyst and a beacon that guides.

The Platinum Jubilee is also an occasion to take stock of ourselves and to introspect. Indian science has done the country proud. It has served society in myriad ways. Perhaps one example of such service is the green revolution. In my youth, the Indian condition used to be described as ship-to-mouth existence. The green revolution changed all that. The green revolution was made possible through a magnificent collaboration involving scientists, the political leader-

ship, the bureaucracy and the great Indian farmer. Our success in the pharmaceutical industry is based on our strength in organic chemistry. Our biotechnology effort is in the take-off mode. Then, there are the great strides we have made in the nuclear, space and defence efforts. These technological achievements are based on home-grown science. Yet in the global scenario, I believe that Indian science is in crisis. During the period when the Academy celebrated its Golden Jubilee, India used to be described as a superpower in Third World science. This is no longer true. There are many reasons for this situation. I would like to highlight today two of them. One has to do with the structure of Indian science, which is now unequal to the tasks of modern scientific research. The Prime Minister, in his first address to the Science Congress after taking office, specifically referred to the twin problems of bureaucracy and hierarchy. Autonomy of scientific institutions and agencies is another area which needs close attention. The scientific output of India results from the efforts of tens of thousands scientists across the country and it is important to involve them in consultative processes. In order to unleash the creative potential of Indian science, we need a vibrant, resilient and sensitive system which is less bureaucratic, less hierarchical, more autonomous and more participatory. I am conscious of the heroic efforts of many of our distinguished colleagues in the Government and elsewhere towards the realization of this objective. INSA, and I as its President, look forward to working closely with them and others concerned in this effort, with our own specific inputs.

Another major concern is in relation to higher education and the university sector. We are aware of the keen interest of

the Government and others concerned in this area. The three science academies have together circulated a draft document on the contents of higher education which could form a basis, along with other inputs, for further discussions. We also hope to be able to address the structure of education in due course. Thus, the science academies are bracing themselves to become effective participants in the discourse on higher education in the country.

We are living through exciting times. In the Councils of the World, including those on science, India is taken very seriously. In the country, problems as well as opportunities abound. I am confident that the scientific community would rise to meet the challenges and to make use of the opportunities. Science and technology constitute a pre-eminent tool to enhance the well-being of people. Science is also a way of life, an approach to problems and a celebration of excellence. Promotion of excellence is a hallmark of a healthy civilization. This civilizational aspect of science is of paramount importance. In addition to helping the material welfare of the human kind, science also helps lead us into that heaven of freedom, to quote the poet in part,

‘Where the mind is without fear and the
head is held high;
Where knowledge is free;

Where the clear stream of reason
has not lost its way into the dreary desert
sand of dead habit’.

*Based on the welcome address and introductory remarks on the occasion of the inauguration of the Platinum Jubilee events of the Indian National Science Academy by the Prime Minister at New Delhi on 10 January 2009.

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