CORRESPONDENCE

Documentation of inherited traditional knowledge of 110 ethnic communities of Arunachal Pradesh

Arunachal Pradesh, in the eastern Himalayan region, is a botanical paradise. The state is blessed with incomparable biodiversity consisting of almost one-third of the species found in India and 110 ethnic communities with a huge treasure of the inherited traditional knowledge about different uses of plants in their day-to-day life. It has about 81.9% forest cover, but the ground flora is now disappearing at a fast rate. The advancement of Western civilization from urban to rural areas has created a threat to this hotspot of the global mega-diversity centre (eastern Himalaya). In today’s context, in view of IPR, TRIPS, etc., it becomes mandatory to document the inherited traditional knowledge of people belonging to 26 major tribes and 110 sub-tribes dwelling in different corners of the state. However, a big hurdle in this process of documentation is the script-less languages of the 110 ethnic communities. So far, little work has been done in this direction by a handful of workers covering over 350 species of vascular plants and a few species of fungi. For complete documentation of the inherited ethnic knowledge of these people, a wholehearted, concerted effort by taxonomists, ethno-biologists and naturalists involving people from every ethnic community, is to be taken up on top priority, before it is too late. If not, after a decade or two, there may be none to tell the vernacular names and traditional ethnic usage of different species.

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Reducing water conflict in Cauvery river delta

Water scarcity may become a security threat in the future. Historically, Egypt has threatened to go to war to protect its water supplies. The long-standing tension between Israel and the Arab world is perhaps the most famous of these water disputes. Other Riverside regions where friends may be forced to become foes include the Danube in Europe, the Zambezi and the Nile in Africa; and the Mekong, the Ganges and the Indus in Asia. Lately, an inter-state water conflict in South India is related to the Cauvery.

Despite an estimated annual average freshwater availability of 2464 cubic metres per person, many parts of India’s nearly one billion people suffer occasional water shortages due to uneven availability. Precipitation is concentrated mainly during the monsoon season. Some areas of the Western Ghats region receive heavy rainfall during the summer monsoon; sometimes the daily rainfall even reaches 15 cm and thereby causes extensive damage. Most of the water cannot be harvested for later use owing to inadequate storage facilities. Recent flash floods in the desert regions of Jaisalmer and Barmer have left people perplexed over nature’s strange ways. But, the important question remains, will India avert water shortages leading to future domestic conflicts?

The holy river Cauvery, traditionally known as ‘Daksina Ganga’ (Sanskrit meaning ‘Ganges of the South’), has been revered by the people of south India for centuries. It is referred to as the ‘life-line’ of Karnataka and Tamil Nadu since it irrigates vast areas all along its flow and in the delta. In addition, over 40 lakh farmers are dependent on this river. Sharing of Cauvery water has been a contentious issue between the southern states of Karnataka, Tamil Nadu, Kerala and Puducherry for several years now. The Cauvery Water Disputes Tribunal was specifically set up in June 1990 to deal with this issue. Recently, the tribunal gave its verdict on the sharing of water among the four riparian states. The tribunal has recommended that the central government constitute a Cauvery Management Board to implement the directions in its final award. It is crucial for this body to initiate a new task to harvest the monsoon flow in the delta region. One way to do this is to construct a series of check dams in Cauvery and its tributaries throughout the delta region.

As a Tata Visiting Chair, I had an opportunity to study the check dams constructed by a non-profit agency, NM Sadguru Water and Development Foundation that harvests water to improve irrigation as well as the livelihood of the tribal people in Gujarat and Rajasthan. Headed by Haranath Jagawat, a visionary social worker and supported by his wife, Sharmistha Jagawat, also a fellow social worker, and armed with a team of dedicated dam-building engineers, this humble institution embarked on a simple mission three decades ago to build a series of cost-effective check dams in rivers across tribal areas to hold water. Thus far, 305 such check dams in West India’s tribal drylands have been constructed, which in turn are converting 242,000 acres of wasteland to productive agricultural land through lift irrigation cooperatives. This massive effort by a modest non-profit agency ultimately benefited nearly 180,000 families or 1,085,000 people in tribal villages. These villagers lived in absolute poverty prior to the intervention and they have now been released from the bondage of misery. This unique model can be replicated in the Cauvery delta to boost water supply and thus reduce the on-going water struggle.

Global water use has tripled since the 1950s, and for decades, policy makers and politicians have met this rising demand by building larger dams. Dam building is a controversial venture as it involves displacing people and destroying natural
heterogeneous. About 40,000 large dams around the globe exist today. But what has been ignored in this mammoth dam venture is, building a series of check dams upstream and downstream that would have benefited more stakeholders in the chronic conflict for water.

The Chief Minister of Rajasthan recently inaugurated a check dam (367 m long and 7.25 m tall) built by the NM Sadguru Foundation at a cost of 4.5 crore rupees that can store 350 mcf of water and commended the foundation’s unique contribution to rural development (Figure 1). This check dam, India’s largest to be constructed by a non-profit agency with government support, is located on the river Mahi where the government had built a bigger Mahi–Banas Sagar dam on the upstream. River Mahi originates in the Mahi Kanta hills in western Madhya Pradesh, and enters near Chandanganj in Rajasthan’s Banswara district. This example of building check dams even near big dams should be replicated in south India. When I saw the NM Sadguru Foundation’s check dam in Mahi, it reminded me of the Grand Anicut, also known as the ‘Kallanai’ in Tamil, built during the end of second century AD, which is still supplying water to the Cauvery delta in Tamil Nadu.

Unlike big dams, small check dams neither displace people nor destroy natural resources. Even silt is not a problem since opening the gates will wash away accumulated sediment. Only the last flow of water from monsoon is harvested in these remarkable dams which is then pumped upwards via lift irrigation systems. Ever since these environment-friendly dams were built by the NM Sadguru Water and Development Foundation in rivers across Gujarat and Rajasthan, the groundwater levels in many villages were raised – an indication of effective recharging. With a rapidly growing human population pressure, water shortages and desertification in India is likely to worsen. Nonetheless, water problems can be averted by a change in attitude and the check dams implemented by the Sadguru Foundation in the drylands of west India is an outstanding and cost-effective model that should be seriously considered by scientists, bureaucrats and politicians in the Cauvery Management Board.


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Is elephant tail hair osmoticichia?

Oestrous/pro-oestrous female elephants are known to raise their tails up, rather like a flag, after rubbing the brush of their tails against their vaginal region. This ‘scent flagging’, as it has been termed, is likely to disperse putative volatile pheromones in vaginal exudate through air/wind. We have addressed the question: Is the ultrastructure of elephant tail hair adapted to fulfill this function? This question is warranted by the following line of argument.

Over the last three decades or so, specialized hairs with altered ultrastructure, facilitating storage of pheromones, have been discovered in mammals. Hairs of certain body parts (such as at or near some glandular structures exuding pheromone) which collect and store pheromones reveal an ultrastructure that markedly differs from that of the general body hair, such as the honey comb-like structure of the hair of African crested rat (see below). On the basis of this specialized structure and function (pheromone storage) such hair have been termed osmoticichia (smell-hair). After the pioneering work on black-tailed American deer followed by that of the African crested rat, a number of osmoticichia has been recorded. A few more examples are in the Antechinus, a marsupial, the Indian musk shrew and some bat species. The general pattern of body hair ultrastructure of many mammals is a series of scales arranged like those of a fish. SEM images show that tiger, leopard, lion, spotted deer and gorilla have the same general pattern of scaly structure differing only in details. Figure 1a and b shows that head hair and tail hair of the domestic cat have the same general structure (scaly), but that the dimensions of the scales vary. Tail hair is also thinner. The same applies to goat hair (not shown), i.e. both body and tail hair are scaly.

We therefore addressed two questions: (i) Is the ultrastructure of elephant hair which is so stiff and sparsely distributed, basically different from that of the hair of most mammals? (ii) Is the tail hair significantly different from that of head hair so as to merit the term osmoticichia? The first question is of minor interest, while the second one is more important, and is warranted by the behaviour pattern, i.e. ‘scent flagging’ as mentioned above. Figure 2a–c reveals that neither the tail hair nor the forehead hair has the usual scaly structure. Furthermore, there is an unexpected difference between the tail and forehead hair. Although both have a fibrous, non-scaly pattern, the forehead

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