

The Sethu Samudram Canal originating at Tuticorin Port and running through the Gulf of Mannar, Palk Bay and Palk Strait will destroy the ecotone (transitional zone) of the narrow hybrid zone that could harbour many more unidentified, stable, hybrid populations<sup>3</sup>. The effect of tsunami and gaining bio-invasions of the eastern peninsular tip make the Gulf of Mannar and Palk Bay vital repositories of undocumented species diversity. Inventory data provide the basis for bio-monitoring programmes, identifying bioindicator species during environmental and anthropogenic climate shifts.

Call for additional or updated inventories supports the conservation and sustainable use of biodiversity, as newer species are discovered and described. Medicinal, agricultural and other economic uses command the need for marine sponge culture. But marine agro-

nomy of sponges is an evolving infant science, just emerging in India. Although the survival rates of cultured species are generally high across the globe, the growth rates are slow and unpredictable, with the reared sponges producing less of the biologically active substances than their natural counterparts<sup>4</sup>.

India has a long coastline (6100 km) which may house new deep-water species assemblages not previously known to science. Our knowledge of the sponge fauna has marginally increased in this decade as a result of enhanced collection efforts driven by pharmaceutical interests. Very few taxonomic papers have been published from Indian waters. Establishment of a sponge research foundation in India could contribute significantly towards the enumeration of the unpublished species and also highlighting the non-indigenous species. Biological accuracy of the Indian sponge database

should be made a reality. It shall help the marine natural product industry of India in the near future.

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## *Aquilaria malaccensis* Lam., a Red-listed and highly exploited tree species in the Assamese home garden

Natural populations of *Aquilaria malaccensis* Lam. are widely distributed in South and South East Asia. Actual accounts of the countries where it occurs vary. Oldfield *et al.*<sup>1</sup> have listed Bangladesh, Bhutan, India, Indonesia, Iran, Malaysia, Myanmar, Philippines, Singapore and Thailand as range states for this species. India is home to the following three *Aquilaria* spp., viz. *A. khasiana*, *A. macrophylla* and *A. malaccensis*. While *A. macrophylla* is restricted to the Nicobar Islands<sup>2</sup>, *A. khasiana* is limited to the Khasi Hills of Meghalaya<sup>3</sup>. *A. malaccensis* occurs mostly in the foothills of the northeastern region (Assam, Arunachal Pradesh, Nagaland, Meghalaya, Mizoram, Manipur, Tripura and Sikkim) and West Bengal<sup>4</sup>.

Large-scale harvesting of *A. malaccensis* has resulted in rapid depletion of the species in its natural habitats. It has been listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora<sup>5</sup>, to bring international trade within sustainable levels. *A. malaccensis* has also been included in The World List of Threatened Trees<sup>1</sup>, and is highly threatened in India due to exploitation of the species for commercial purposes<sup>6</sup>. The

species is 'vulnerable' globally, considered 'critically endangered' in India<sup>7</sup>, and almost 'extinct in wild' in Assam<sup>2</sup>.

During a floristic exploration in the home gardens of upper Assam, *A. malaccensis* Lam. (also called *A. agallocha* and *A. secundaria*) was observed to be a dominant tree species (Figure 1). It is a fast-growing, tropical tree belonging to the family Thymelaeaceae and is locally known as Agar, Agar, Hanchi or Sanchi in Assamese. In the studied home gardens, it contributed highest (34%) to the total tree density with 1443 trees per ha and a frequency of 98%. Besides, it

exhibited a good population and regeneration status (seedling > sapling > tree).

The Agar tree produces a resin as a defence mechanism against infection or injury – this is valued in many cultures for its distinctive fragrance, and is used as a principal component in incense and perfumes as well as in traditional medicine. The economic potential of Agar is unusual compared to other home-garden products, and acts as a compulsion factor to cultivate the species. The low input for management and growth, lack of site specificity and intercropping adaptation make Agar a preferred cash crop. It has



**Figure 1.** a, Pure patch of Agar in the home garden. b, Agar with other home-garden plants.

been extensively cultivated in home gardens as well as tea plantations along with other plant species in upper Assam for the last several years. Generally, two distinct morphs of Agar are cultivated in the home gardens. According to information from the respondents, one variant known as 'Bhola sanchi' is fast-growing and yields less agarwood compared to the other variant 'Jati sanchi', which is slow-growing but high-yielding and therefore preferred for commercial cultivation.

The Assamese people are cultivating *A. malaccensis* in home gardens for their economic upliftment and thereby protecting the species from the danger of extinction. But, there is an urgent need – in addition to protection and conservation

and to create awareness among the local people about this precious species of great economic importance.

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## Medicinal rice varieties of India need urgent attention

Rice is the staple food of over half of the world's population and 90% of Asians. Also, it has extensive curative properties known from the ancient days. In fact, specific rice varieties with medicinal properties were cultivated and used in the treatment of some ailments in different counties of South East Asia. In India, rice was distinguished into three broad kinds according to hardness, colour, flavour and size of the grain<sup>1</sup>. Ancient records speak of the existence of rice varieties of curative value for various ailments, as detailed in Ayurvedic treatise (*Indian Materia Medica*) of the 15th and 16th century AD. For instance, varieties like 'Njavara' and 'Gathuran' were used in the treatment of arthritis, whereas varieties 'Kalama', 'Pundarika', 'Panduka', 'Sugandhalaka', 'Kardamaka', 'Maetunaka' and 'Mahasali' have different medicinal properties.

Surveys made in the 1970s and 1980s in Chhattisgarh have led to the identification of several traditional varieties of rice with medicinal utility. 'Aalcha' for the treatment of pimples, Maharaji, which gives strength and stamina to ladies immediately after delivery, 'Baisoor' for epilepsy, and 'Laicha' for pregnant women to deliver healthy children are a few examples<sup>2</sup>. Moreover, the 'Baisoor' variety is used for the treatment of headache and boils in different regions of Chhattisgarh. It is also used for skin diseases, ringworm infection, itching and conjunctivitis, and as a face pack with neem leaves. Another variety, 'Njavara',

is a unique land race with great antiquity, valued for its medicinal properties. It is traditionally used for the treatment of rheumatism, arthritis, neurological problems and for the relaxation as well as rejuvenation of weak muscles of aged persons by the Ayurvedic physicians of Kerala. 'Njavara' is used as a supplementary diet for underweight persons or consumed as a replenishing drink called 'karkada kanjhi' during monsoon season along with some herbal medicines. The oil prepared from this variety is used for a wide range of ailments like aches, painful inflammations, spondylitis, lower backpain, etc. But the most significant use is the medicinal pouch named 'njavarakizi', made with this rice after cooking it in a milk decoction of medicinal herb, *Sida cordifolia*. It is applied as a massage on the whole body, dipping the pouch repeatedly in the decoction. Some other medicinal rice varieties still available in Kerala are 'Jaathi Suggi', 'Jeeraka Chembavu', 'Karutha Chembavu', 'Kamaal', 'Kolaran', 'Naron', 'Nalla Chennellu', 'Vadakkan' and 'Vatten'. The medicinal and nutritive properties of 'Njavara' have recently received wide recognition and drawn the attention of some corporate sectors for its commercial exploitation.

In Odisha, the tribal inhabitants consume rice beer colloquially called 'Handia' prepared from traditional rice varieties by fermenting watered rice for several days. They add a herbal formulation called 'Bakhara' into it, which they

claim makes it a health drink and which also prevents gastro-intestinal ailments. Similar practice is observed among the tribals of North Bengal, who consume an alcoholic beverage called 'Haria'. It is herbal formulation prepared out of rice flour fermented using yeast culture<sup>3</sup>.

But with the advent of hybrid revolution, farmers are gladly accepting the new varieties for higher yield. Thus millions of years of genetic diversity and germplasm heritage are vanishing forever<sup>4</sup>. Hence urgent attention is warranted to collect and conserve these unique rice varieties for the benefit of posterity.

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