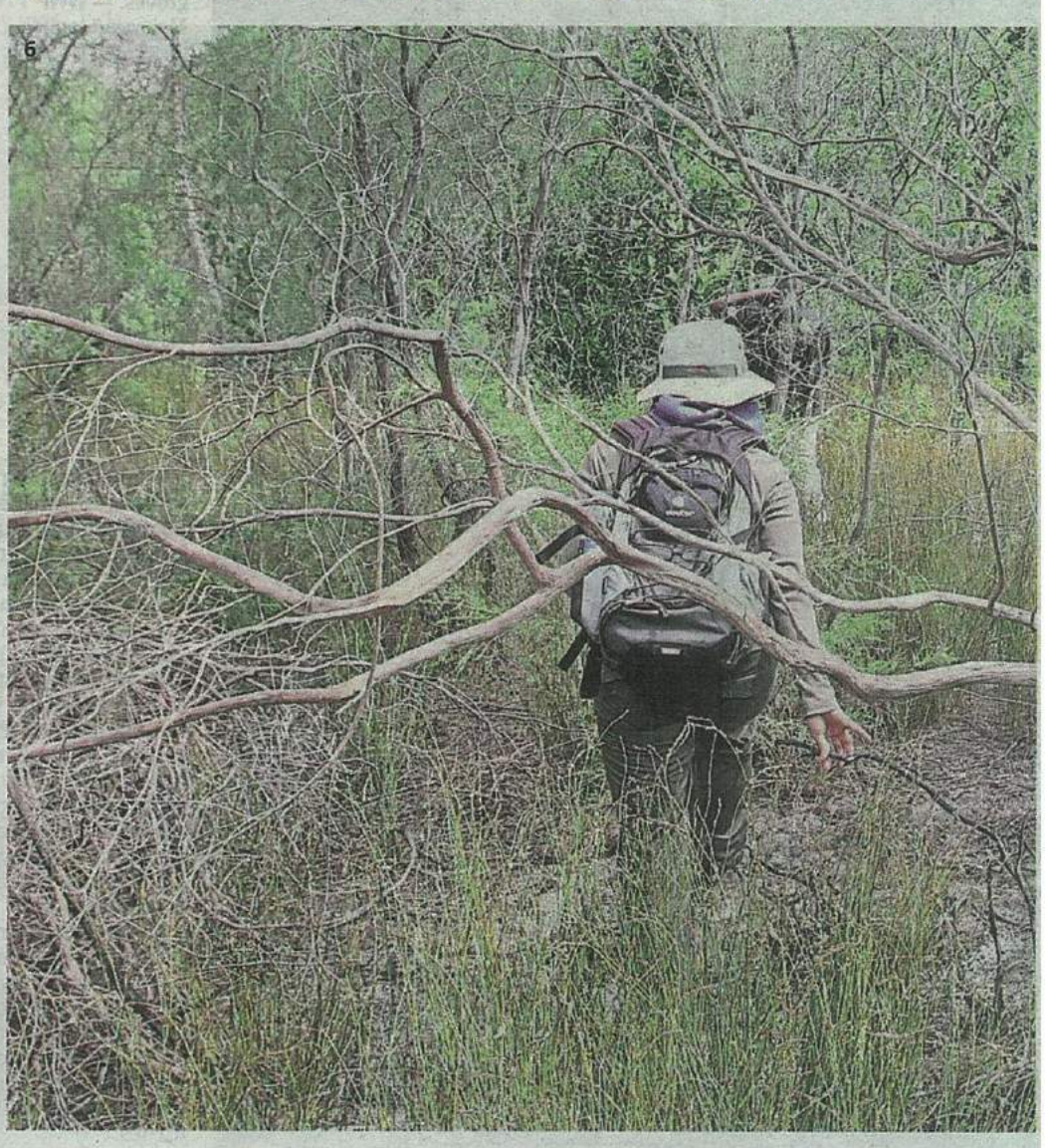

Unique plants in a scanty forest

The little-known gelam forest has largely been cleared for development although it hosts remarkable flora.

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PATCHES of forest with sparse and shrubby vegetation is a feature of the coastal area around Setiu, Terengganu. They lack the thick foliage of mangroves or the rainforest. This is the little-known gelam forest, one of the rarest types of wetland in Malaysia.

Having less plant diversity than the other types of forest has earned it the name *hutan miskin* or poor forest. But a walk through a tract of this woodland in Kampung Bari with Dr Jamilah Mohd Salim@Halim shows otherwise. Not only does it host unique flora, it plays a key hydrological role.

Parts of the Setiu coastal plain consists of beach ridges interspersed with swales, commonly known by its acronym, BRIS. While the ridges remain dry, the swales (depression areas) are seasonally waterlogged and form freshwater swamps. The *gelam putih* tree or *Melaleuca cajuputi* grows well in BRIS areas, forming gelam or Melaleuca forest.

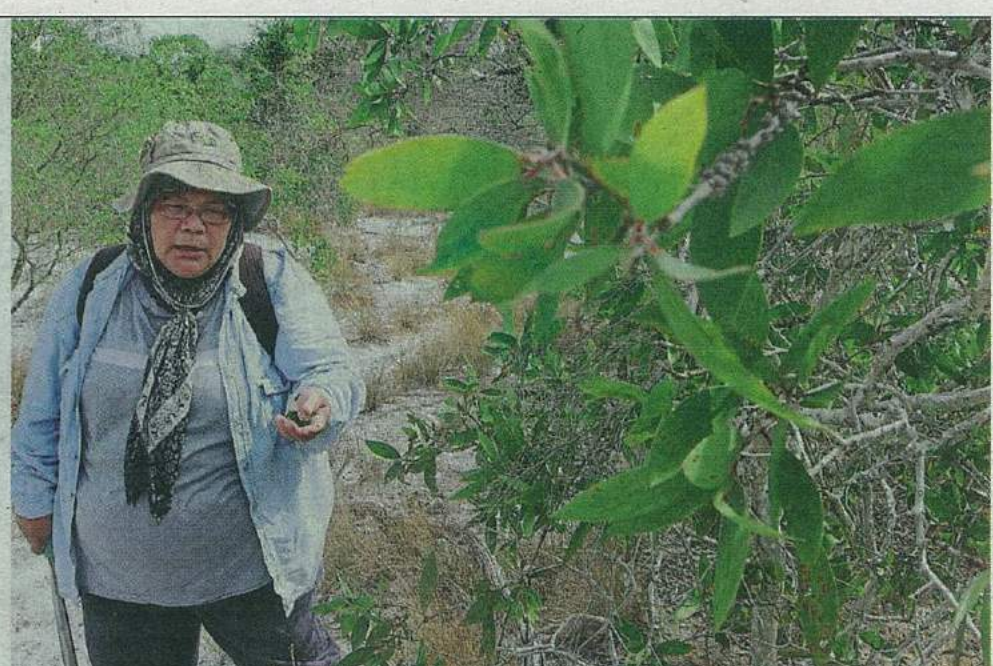
Jamilah, a plant ecologist from Universiti Malaysia Terengganu (UMT), says gelam forest is not widespread. Patches are found in Pahang and Johor but the only sizeable gelam forest in the east coast is in Terengganu, where it extends from Kemaman to Besut.

"The soil is sandy, being the deposit of materials from the ocean. Being poor in nutrients, it supports unique species. The plants are adapted to dry and sandy conditions, so they tend to have thick, waxy leaves."

Jamilah plucks a leathery gelam leaf, crushes and smells it. I follow suit. The scent is refreshingly fruity. "Gelam is in the same family as the Australian tea tree but is not exploited for its oils because the content is not high enough to be commercially viable," she explains.

In such forests which have poor soil, plants tend to clump. When something takes root, other vegetation will grow around it because that spot will be richer in organic matter (such as from decaying leaves of the main plant). So we see orchids growing under the shade of a *gelam merah*, which has reddish, papery bark.

Also seeking refuge under main trees are pitcher plants, fan ferns (*Schizeae dichotoma)* and *mas cotek* (mistletoe fig, *Ficus deltoidea*), a folk remedy for use after childbirth. Gelam forest is also not devoid of fauna – a whip snake sitting on a gelam tree branch gives us a scare. The swampy spots often harbour ornamental fish



1 A cross-section of an ant plant. It provides food and space for the ants which in return protect it from herbivores.

2 Its tiny leaves and gnarled branches make *cucur atap* (*Baeckea frutescens*) a popular bonsai plant.

3 The flowers of *jambu laut*, a tree that grows in the gelam forest.

4 Dr Jamilah says the gelam tree grows in both dry and waterlogged soil.

5 A seedling of the rare *Bruguiera hainesii*. Only four of this mangrove tree have been found in Setiu.

6 Sparsely vegetated, gelam forests are not treasured but in reality, they host unique flora.

7 *Gelam putih* has a papery bark.

— Photos: SAMUEL ONG/The Star

Jamilah ventured into gelam forest research in 1998. "The tropical forest has been studied by many people but not this ecosystem. There is much that we don't understand about it such as how the nutrients flow, how the plants withstand drought. That attracted me to study this area."

Useful plants

Although BRIS soil has low plant diversity, Jamilah says it is still an important ecosystem as it supports adapted plants which may hold useful genetic materials. "To deal with the extreme conditions, the plants have to adapt. So most species here have high antioxidant compounds.

"Their tissues commonly contain high secondary metabolites used to defend themselves from pests. As soil and water resources are scarce, their tissues are heavily fortified with chemical defences. There is vast potential in the genetic materials of plants adapted to arid conditions. The hardy plants here might help us develop drought-tolerant plants."

The notion of gelam forest being scrubland with little worth has led to it being cleared for other uses. Jamilah says Setiu has lost about half of its gelam forest. "It used to be common but is now uncommon as people do not appreciate it and cleared it."

A silica plant is coming up next to the forest where we stand. The sand, which has high silica content, will be shipped out for processing. A long jetty is being built for this.

"The area to be mined is not large but what if they move to this forest after they've finished mining the first site? And when the access road is built, people will start exploiting this place," says Jamilah.

Suggesting what can happen in future, she points to a stump in the ground – all that's left of a *cucur atap* (*Baeckea frutescens*) plant. It has tiny leaves and gnarled trunk and branches, and so is sought after by bonsai hobbyists.

Jamilah says the invasive acacia tree poses another problem. This hardy tree with Australian origins is sprouting all over the country and can easily dominate the gelam forest.

Gelam forest also plays a hydrological function. "The vegetation stabilises the soil and prevents erosion by wind. It also holds water. Floods in Setiu are getting worse. With the wetlands converted, the water has no place to go," adds Jamilah.

Currently, there is no protection for gelam forest. In fact, it is not even a forest classification. "We're hoping to save a bit of the area to represent the natural ecosystem we have. We're suggesting that the state government protect it for people to appreciate this natural landscape that cannot be found anywhere else," says Jamilah.

Mangrove rarities

The mangroves of Setiu are equally rich. On Pulau Layat, a mangrove-covered island in Setiu lagoon, we plough through mud, wade through streams and duck under tree branches to reach a stand of the rare Bruguiera hainesii – one of three on this island. Another tree is on a sand bar. UMT field botanist Muhamad Razali Salam made the discovery about two years ago.

In the IUCN Red List of Threatened species, this tree is listed as naturally rare, with small and scattered distribution. So far, only 200 trees are known to exist: 80 trees in Malaysia, 120 in Papua and three in Singapore. Locals call the tree *berus mata buaya* because of the large respiratory cells on its trunk.

Razali alerts us to the numerous calyxes, the sepals of the flowers, which have dropped on the ground. With no chance for the flowers to develop into seedlings, it is no wonder the tree is so rare. Nevertheless, we did see one seedling on the tree.

On Pulau Rhu, ant plants hang from almost every tree. Sometimes, as many as four or five adorn a single branch. "I usually don't see ant plants in such abundance in other places," says Razali.

Ant plants live in a mutualistic association with a colony of ants. They provide nectar and space for the ants, which in return protect them against herbivores.

Plant ecologist Dr Wan Juliana Ahmad of Universiti Kebangsaan Malaysia says the presence of rare plants indicates the health of Setiu mangroves. She is mapping the rare trees in order to determine the areas important for conservation.