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Getting to grips with taxonomy first

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AN insect is an insect is an insect, right? Not so. Some insects are carriers of death and disease, while others bring life as agents of pollination.

Among plants, herbs have varying appearances and properties, and grow in different conditions.

We tell the larger mammals apart by their shape, size, fur colour and patterns.

And we know what names to call each of these different species thanks to taxonomy.

However, the science of taxonomy - identifying, classifying and telling apart the different species - is a much taken-for-granted field and considered unpopular.

The lack of experts and taxonomic information on Malaysia's plants, animals and micro-organisms could now become a bane to the country's attempts to start a thriving biotechnology industry.

Local flora and fauna experts have long recognised the problem but only until the Prime Minister Datuk Seri Dr Mahathir Mohamad announced in recent years that biotechnology would be a key industry in our Knowledge-economy, did it come to light that we were in urgent need of our own taxonomists.

"Otherwise, we'll be relying on foreigners to tell us what we have in our forests," says World Wide Fund for Nature Malaysia Species Conservation Unit senior head Dr Dionysius Sharma.

Taxonomic data is important because it is a building block of biotechnology, if not the cornerstone.

"Taxonomy is the basis, the core to understanding biodiversity before we can exploit it for useful purposes," Sharma says.

Universiti Kebangsaan Malaysia director of botany Prof Datuk Abdul Latiff Mohamad agrees. "We must know the different species before we can go into biotechnology."

The value of being able to tell one species from another is shown in the different uses that different organisms offer.

For example, among bacteria within the genus *Streptococcus*, some species or strains are used in the commercial production of dairy products. In the *Streptomycin* family, certain bacteria produce antibiotics.

In the rainforest, the bintangor tree in Sarawak has a compound now undergoing trial for HIV treatment. Poisons in the skins of certain frogs are being researched for possible medicines or cures for diseases.

With many uses for mankind, resources may be fought over unless they are protected as intellectual property rights.

Taxonomy allows "ownership" to be claimed of a nation's flora and fauna, ensuring that country earns the benefits of biotechnology.

Worldwide, taxonomists have identified and classified over 1.7 million different species. They estimate that over 30 million more are as yet undiscovered.

Taxonomy around the world is struggling, but in Malaysia, and in other parts of Asia, it still has a long way to go.

Large collections of plant and animal specimens are mainly kept in developed countries.

Starting and maintaining such collections is expensive for developing countries, yet, some poorer countries have the highest biodiversity.

When colonial explorers left their territories, the science was not passed on to the indigenous population of newly independent countries.

"The British were the ones interested in finding out and documenting what plants and animals Malaya had," says Abdul Latiff.

"When they left, there was a big vacuum in taxonomy."

The first concerted regional attempt to revive taxonomy in Asia was recently launched under the Global Taxonomy Initiative.

GTI is a programme under the Convention of Biological Diversity (CBD), a United Nations treaty to protect biodiversity, ensure its sustainable use and equal sharing of its benefits.

Science, Technology and Environment Minister Datuk Seri Law Hieng Ding who launched the GTI Asia workshop on Sept 10, noted the need to address the shortage of taxonomists.

He said the ministry offered scholarships for post-graduate work in taxonomy.

WWF's Sharma says taxonomists are "a dying breed of specialists".

"Hardly anyone does taxonomy. The science graduates produced by universities now are not taking up this field."

Taxonomists in the country are believed to be a mere handful. UKM's Abdul Latiff knows of six plant taxonomists and 17 entomologists (experts in insects), "and not all of them are practising".

Abdul Latiff feels that our main taxonomic problem is on insects. Of all the animals, insects have the highest diversity, and Malaysia, being one of the 12 mega-biodiversity sites in the world, has long been regarded an entomologist's heaven.

"While plants, mammals, birds, reptiles and amphibians are quite well documented, we have a real problem with insects," Abdul Latiff says.

We also have a problem with "lopsided information", he adds. Taxonomic work has been stronger in the peninsula, but not so in Sabah and Sarawak.

Abdul Latiff, a plant taxonomist himself, says there are 8,750 known plant species in the peninsula, but little documentation exists on the two eastern States.

He estimates that altogether there could be 12,000 plant species or more. This should be about 40 per cent of plant species in the Malay Archipelago (including Indonesia and the Philippines), he adds.

Nationwide, there are 185,000 known fauna, including 150,000 invertebrates, 286 mammals, 736 birds, 400 reptiles and amphibians, and 1,173 ferns.

How much is there left to discover in Malaysia? Who knows, if the estimate of undiscovered species worldwide is 30 million or more.

"The current rate of discovery of new species in Malaysia (both plants and animals) average between 10 to 20 new ones every year," says Abdul Latiff.

As far as plants in the peninsula go, he feels there could be at least 9,000 species, which means there are some 300 more different types as yet unknown.

But the current pool of local taxonomists will not last till the last (or so we think) species is discovered.

It takes several years from the time a specimen is picked up for analysis and given its Latin scientific name.

The process of taxonomy starts with collecting specimens, separating them, and analysing their external characteristics or even dissecting them to study their DNA.

Analysis also includes comparing the specimen with known species; if there is no match, then a new species has been discovered.

The taxonomist must then write a proper description and name the finding so other scientists will be able to identify the new species for

themselves.

All the while, taxonomists race against time as natural habitats are cleared for development or degraded through pollution.

The Asia GTI workshop was thus an important step for countries in the region to pool their resources. Regional, and even international cooperation, is necessary for taxonomy in developing countries, where problems like illegal logging, poaching and forest fires threaten to wipe out habitats before scientists can tell what's in them.

Co-operation also helps countries fulfil their obligations under the Convention on Biological Diversity, which calls for comprehensive taxonomic data as the first step towards forming national policies and implementation of conservation and sustainable use programmes.

Abdul Latiff feels if Malaysia can't train enough of its own taxonomists, it will have to improve its mechanism for drawing foreign experts here.

"A lot of foreign scientists are interested in Malaysia but the incentives for them to do research here are not attractive enough, neither is the environment conducive," he says.

One area to improve is better pay for postgraduate researchers, who currently earn about RM3,500 a month.

"We are unable to draw experts from developed countries because that amount is too little for them."

The UKM botanist welcomes the Government's keenness on biotechnology and is glad that taxonomy is finally getting its due, but says that it took so long.

He also hopes the national clearing house for taxonomic data at the Malaysian Science and Technology Information Centre (Mastic) will improve its accessibility and data retrieval.

Mastic is to be the focal point linking the different taxonomic databases kept by various universities and institutions.

In 2004, Malaysia will host the CBD's seventh meeting of the Conference of Parties (the governing body of the convention) and Abdul Latiff feels the country must, before then, prove it can be a leader for Asia in this field.