The fading glow of the fireflies

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FOR several years now, reports on dwindling firefly colonies in areas like Kuala Selangor have been making headlines, fuelled mostly by local anecdotal accounts.

But are the numbers really declining? How do we tell?

Up until four years ago, there was no way to know - not in a scientific, orderly manner at least. But now, Malaysia appears to have figured it out.

In 2006, when the Forest Research Institute of Malaysia (Frim) was commissioned by the Department of Irrigation and Drainage (DID) to monitor the population of the Pteropteryx tenera firefly along the Selangor River, the researchers did away with routine conventional methods such as sweep netting or counting through a window.

Instead, entomologist Dr Laurence G. Kirton and his team positioned themselves across the river and set up a highly-sensitive digital camera on a special tripod.

Every month, on a moonless night, they took shots of fireflies on berembang trees on the opposite riverside.

A figure was tabulated based on counts of flashes visible in the photographs.

This night digital photography subsequently became the world’s first firefly monitoring method. Quite an impressive feat, considering that the twinkling of the light, visible as it is to the naked eye, almost always does not appear on any camera screen.

While the idea of using photography wasn’t new, the detailed and systematic technique in which it was done was.

The method has since been refined and was recently shared for the first time with the international research community at the Second International Firefly Symposium this year in Subang, Selangor.

"Photography could be a way of getting an index of the population size over a large area in a relatively short period of time.

"It took us just three days to cover seven sites stretched across 1.6km along the Selangor River, from Bukit Belimbing to beyond Kg Kuantan," said Kirton, who headed the study.

Researchers recorded a population peak between May and August, followed by a decline until October, and then picking up again in December.

This fluctuation was seen throughout the three-year observation period, said Veronica Khoo, who presented the team’s findings at the symposium.

She said rainfall might be a factor.

"The drop between the months of September and November could be related to low rainfall between May and August. The larval population of the firefly and the host snail need moist habitats.

"Similarly, the increase in the abundance of adult fireflies towards the middle of the year may also be associated to high rainfall periods from November to December, and March to May each year on the central west coast of Peninsular Malaysia.

"The study also recorded the peak of 2008 to be lower than 2007 and 2006 by about 40 per cent."

Why is this happening? Could this be due to habitat destruction or weather patterns?

"This is where long-term monitoring comes into the picture. It’s still too early to conclude a specific trend," said Khoo.

Kirton said a clearer trend would be visible over a longer period of between five and 10 years.

"We’ll be able to see whether there’s an increase or decline in the firefly population. From the perspective of conservation, monitoring is very important if we want to understand the population dynamics of the species and health of the population.

"In the case of the fireflies in the Selangor River, there’s concern that loss of habitat, river pollution and the building of a dam upstream could threaten the firefly population, and this would have an impact on ecotourism and the livelihoods of the community," said Kirton.

Other organised monitoring methods such as observation and sampling are also important. It’s through these methods that it was discovered recently that fireflies along the Rembau and Linggi rivers were disappearing.

This is due to river modification works at the Rembau-Linggi estuary, allegedly carried out by DID to alleviate floods, stated a Universiti Putra Malaysia research.

Within 1½ years, half the firefly colonies that used to be found in that area in Negri Sembilan had disappeared.

"When I surveyed the estuary in November 2008, there were about 122 colonies of fireflies. By June this year, there were only 64."

"Forty-four display trees have been destroyed, and some were missing. Over half the colonies had disappeared within two years," said UP’s Wan Faridah Akmal Wan Jusoh who observed and sampled the colonies.

Wan Faridah said the mangroves in the area were not gazetted as reserves, leaving them vulnerable to development.

River modification activities are not showing signs of slowing down, she added.

"If no drastic and immediate steps are taken to protect the fireflies, we fear their populations in the area will continue to drop and eventually die off."
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Fireflies seen here on a berembang tree. — Pictures courtesy of FRIM

A new method to monitor the firefly population through a highly-sensitive digital camera.
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Fireflies are fast disappearing along the Rembau and Linggi rivers (top and bottom pictures, respectively).

It is difficult to capture the flash of a firefly.