

Butterflies and mangrove branches

Who would have expected that a casual walk in a mangrove forest, which has been so well-studied by many national and international mangrove scientists, could still end up with new scientific discoveries.

On 13 July 2012, three scientists from the National Institute for Environmental Studies (NIES) in Tsukuba visited the mangrove forest at Funaura Bay on Iriomote Island in Japan. They were guided by the first author from University of the Ryukyus who has explored the forest many times. When they came to a forest stand dominated by *Bruguiera gymnorhiza* trees, they were intrigued by butterflies of *Idea lueconoe*

(rice paper butterfly) fluttering among the forest canopy. What was most puzzling, the trees were not in flower.

Butterflies are known to pollinate the flowers of *Bruguiera*, beside birds and bees (Tomlinson, 1986; Kondo *et al.*, 1987, 1991). On Iriomote Island, butterflies of *Papilio bianor* have been observed visiting the flowers of *B. gymnorhiza* (Fig. 1).

The discovery came about when one of the butterflies alighted on a small branch of *B. gymnorhiza* and stayed there motionless (Fig. 2). A closer look showed that the butterfly was licking salt from the branch (Fig. 3). Later, when tasted with the tongue, the crystals were salty.



Photo by S. Baba

Fig. 1. A butterfly of *Papilio bianor* visiting flowers of *Bruguiera gymnorhiza*



Photo by T. Kadoya

Fig. 2. A butterfly of *Idea lueconoe* alighted on a branch of *Bruguiera gymnorhiza*



Photo by T. Kadoya

Fig. 3. The butterfly was licking salt (red arrow) from one of the branches with annular cracks (black arrows)

The first discovery was the presence of salt on branches of *B. gymnorhiza*. The species does not secrete salt (Tomlinson, 1986) and the salt could have crystallised from xylem sap exuded from annular cracks in the branches (Fig. 3). This is probably the first field observation of salt exudation from a mangrove branch, with pictorial evidence.

The second discovery was that butterflies of *I. lueconoe* could immediately sense the presence salt crystals on the branches of *B. gymnorhiza*. This implies that salt from the branches can serve as an alternative nutrient source for butterflies.

Many questions arise that require further studies. Beside *B. gymnorhiza*, do other mangrove species exude salt from their branches? Is the salt exudation an active process or due to bark injury? Can other butterfly species detect the presence of branch salt? Is the salt licking activity regular or seasonal?

The purpose of this short note is to document with pictorial evidence that salt is exuded from branches of *B. gymnorhiza* and that butterflies of *I. lueconoe* lick the salt. These exciting scientific discoveries present great opportunities for further studies.

References

- Kondo, K., Nakamura, T., Tsuruda, K., Saito, N. & Yaguchi, Y. (1987). Pollination in *Bruguiera gymnorhiza* and *Rhizophora mucronata* (Rhizophoraceae) on Ishigaki Island, the Ryukyu Islands, Japan. *Biotropica* 19(4): 377-380.
- Kondo, K., Nakamura, T., Piyakarnchana, T. & Mechvichai, W. (1991). Pollination in *Bruguiera gymnorhiza* (Rhizophoraceae) in Miyara River, Ishigaki Island, Japan, and Phangnga, Thailand. *Plant Species Biology* 6: 105-109.
- Tomlinson, P. B. (1986). *The Botany of Mangroves*. Cambridge University Press, 419 pp.

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