# Annual record of illipe nut export as a biological memory chip of dry weather in Sarawak

Takuo YAMAKURA[1*], Akira ITOH[1], Satoshi NANAMI[1], Mamoru KANZAKI[2], Tatsuhiro OHKUBO[3], LEE Hua Seng[4], Sylvester TAN[5], Lucy CHOMG[5], Joseph Jawa KENDAWANG[6]

[1]Department of Biology and Geoscience, Graduate School of Science, Osaka City University, Japan
[2]Department of Forest and Biomaterial Science, Graduate School of Agriculture, Kyoto University, Japan
[3]Department of Forest Science, Faculty of Agriculture, Utsunomiya University, Japan
[4]Sarawak Timber Association, Sarawak, Malaysia
[5]Forest Research Center, Sarawak Forestry Corporation, Sarawak, Malaysia
[6]Reforestation and Rehabilitation Branch, Forestry Department, Sarawak, Malaysia

Fruiting is directly influential in seedling regeneration and is an important component process of the forest maintenance mechanisms. The mast fruiting subsequent to general flowering is one of striking features of dryland forest in Malesia and is combined with severe climatic desiccation (Ashton et al. 1988, Roubik et al. 2005). It occurs at irregular intervals of two to ten years and its intensity in allover Sarawak appears to be reflected in a long historic record of illipe nut production that is exported from Sarawak. The nut quantities listed in the record were analysed to substantiate possible major cycles of mast fruiting, in addition to the numerical test for the correlation between illipe nut export and dry weather. Denoting a given export year by $t$, the exported nut quantity at $t$ was expressed by $X(t)$. The two dimensional graphic representation of $X(t\text{-}1)$ vs. $X(t)$ relationship demonstrated that large $X(t) > 1500$ ton/year seldom occurs in consecutive years because the most of data of $X(t)$ aligned on the horizontal axis ($X(t)$) and vertical axis ($X(t\text{-}1)$)of the graph, respectively. This suggests the possible smallest cardinal number of two in the mast fruiting cycles. A spectral analysis of $X(t)$ clarified the two prominent cycles of 16-year and 24-year intervals, respectively, and apparent but weak four-year and eight-year cycles. The monthly rainfall less than 100 mm or 3.93 inches (hereafter, $P$) was a focal variables in the investigation of the correlation between illipe nut exports and dry weather. To a given export year of $t$, the rainfall records of six months from July to December in the year of $t$-1 and further six months from January to June in the year of $t$ were tentatively assigned because it takes several months for fruit maturation after flowering. Thus the six-month lag is assumed in handling rainfall records compiled by the Department of Irrigation and Drainage, Sarawak (1962-1999). The variable P in the assigned year was collected from respective months and respective hydological stations. Then, the ratio of total number of P's records to the total number of all available rainfall records (hereafter, desiccation probability), L'loyd's mean crowding index with respect to the monthly pattern of the occurrence of $P$, and average of $P$ in the assigned year were calculated. These three variables, respectively, express the frequency, concentration, and degree of $P$, and represented positive, positive, and negative correlation with illipe nut exports. The spectral analyses of these three variables supported the aforementioned cycles in illipe nut exports. Thus the illipe nut export record appeares to be a biological memory chip of dry weather in Sarawak and offers an epidemiological basis for the investigation of general flowering and mast fruiting.

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