

**Studies on the Productivity of Echinochloa  
Stagnina (Retz) P. Beauv. in the Kanji  
Lake Basin of Northern Nigeria.**

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1985.

## **Abstract:**

Echinochloa stagnina growing in Lake Kainji is identified, described, and separated from Echinochloa pyramidalis and Echinochloa colonaa.

The grass has been recognized by cattle farmers as an important source of dry-season fodder for their stock, while the power generation authorities view it as a problem to the Lake's hydrology and optimal power generation due to its contributions to water loss from the lake through evapotranspiration. Echinochloa stagnina which requires the annual 10 m draw-down of the lake for successful establishment and survival, shows a marked zonation and can potentially cover up to 46% of the lake's surface area. The contribution of the grass to evapotranspirational water loss from the lake accounts for the reduction of the effective lake volume by up to 17%, for example in 1979.

A management strategy which demands the harvest and removal, for livestock fodder, of 5% of the total yearly standing crop (up to 120,965.4 tonnes) in order to maintain the grass as a renewable source of dry season fodder without significantly affecting power generation is presented. With such removal an estimated  $3 \times 10^6$  kg of nitrogen and  $4 \times 10^5$  kg phosphorus are removable from the lake ecosystem. Sources of nutrients to balance these removals are discussed.

Decomposition of Echinochloa stagnina litter in Lake Kainji is rapid and does not fit the general exponential model  $W_t = W_0 e^{-kt}$  where  $W_t$  is the weight of litter left after time  $t$ ,  $W_0$  is the original weight of litter,  $k$  is the decay coefficient and  $e$  is the base of the natural logarithm.

A mathematical model, the Kainji Lake Echinochloa Model, to calculate the area colonizable by emergent vegetation any given year once the upper and lower water levels of the previous year is known, is presented and tested. A current vegetation map of the Lake is presented; the model has been used to reconstruct the vegetation cover history of the lake.

**Keywords:** Lake Kainji/ Echinochloa stagnina/ vegetation/ cattle/ evapo-transpiration/ zonation/ decomposition/ hydrology

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