

## 中文摘要

許多濕地環境受到降雨量及潮汐的影響，而使得水位產生季節性的週期變化，此種波動會直接或間接地影響魚類的生物量，繼而影響到食物鏈的供需平衡。近年來，由於河川上游地區的濫伐，以及中、下游地區的濫墾、濫建，不但使得河口棲地遭到嚴重的破壞，也讓河川水位變化更加急遽，這對魚類和其他高階營養層生物如水鳥的存活形成莫大的衝擊。加上許多大型工程，如排水工程或其他水文替代工程，在施工前並未做好完善的環境評估，使得此等衝擊益發嚴重。本研究嘗試以北台灣關渡溼地的生態環境為應用例，建立濕地中魚產量之季節性變動模式，以期瞭解魚類在不同時期、不同水位中的密度，以及其種間的相互競爭，並探討在環境變遷的情況下，魚類對棲地的選擇。如此，不但能建立魚類群聚的季節性變動模式，也能指出魚類對棲地環境的需求，以作為未來水文工程規劃的參考依據。依據本模式可得知(1)在年平均水位高度為正常水位(0.3m)且呈現季節性水文律動狀態下為有效維持較高魚族群密度之水文週期，(2)溼地生態環境中，大型掠食性魚類之捕食會影響小型魚族群，及(3)經歷嚴重長期乾旱後，小型魚類族群恢復所需時間需1~2年。

**關鍵詞：**魚群動態；水文學；水文週期；濕地；季節循環

## **Abstract**

Many wetlands undergo seasonal cycles in precipitation and water depth. This environmental seasonality is reflected in patterns of production of fish biomass that in turn influence the phenology of other components of the food web including wading birds. Human activities such as drainage or other alterations of the hydrology can exacerbate these natural cycles and results in detrimental stresses on fish production and the higher trophic levels dependent on this production. In this paper we model the seasonal pattern of fish production in a freshwater marsh, with special application to the Kuandu wetland located in the north Taiwan region. The model illustrates the temporal pattern production through the year, which can result in very high density of fish at the end of a hydroperiod (period of flooding, as well as the importance of ponds and other depressions, both are refuges and sinks during dry periods. The model predicts that : ( 1 ) an effective threshold in the length of the hydroperiod that must be exceeded for high fish-population densities to be produced, ( 2 ) the large, piscivorous fish appear to have a major impact on smaller fish in the marsh habitats, and ( 3 ) the recovery of small-fish populations in the marsh following a major drought may require up to 1~2 years .

**Keywords** : Fish dynamics; Hydrology; Seasonal cycles; Hydroperiod; Wetlands