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Review on Importance of Freshwater Invertebrates on Birds Feeding

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ABSTRACT

Macroinvertebrates are a significant class of creatures that are located in the sediment that lies below the water column and are essential to the health of any aquatic environment. Their research is crucial because, as a result of their sedentary habitat, macrobenthic organisms are well-known markers of anthropogenic stress. Freshwater invertebrates are not only a source of protein but also a link in the aquatic food chain and an indication of the health of the aquatic ecosystem. Freshwater invertebrates are food for a variety of fish, birds, and other aquatic organisms, they play a crucial role in the circulation and recirculation of nutrients in aquatic ecosystems by accelerating the breakdown of decaying organic matter into simpler inorganic forms. Benthic fauna also contributes significantly to the food chain for higher animal taxa by transmitting energy and matter from phytoplankton, zooplankton, and macrophytes to fish, amphibians, reptiles, birds, and mammals as they serve as key food sources for them.

Keywords : Freshwater Invertebrates, Birds, Food Chain, Wetland Ecosystem

I. INTRODUCTION

Macroinvertebrates are a significant class of creatures that are located in the sediment that lies below the water column and are essential to the health of any aquatic environment. Their research is crucial because, as a result of their sedentary habitat, macrobenthic organisms are well-known markers of anthropogenic stress. Freshwater invertebrates are not only a source of protein but also a link in the aquatic food chain and an indication of the health of the aquatic ecosystem. Freshwater invertebrates are food for a variety of fish, birds, and other aquatic organisms; they play a crucial role in the circulation and recirculation of nutrients in aquatic ecosystems by accelerating the breakdown of decaying organic matter into simpler inorganic forms. Benthic fauna also contributes significantly to the food chain for higher animal taxa

by transmitting energy and matter from phytoplankton, zooplankton, and macrophytes to fish, amphibians, reptiles, birds, and mammals as they serve as key food sources for them.

II. Role of freshwater invertebrates as bird food

Macroinvertebrates are a significant class of creatures that are located in the sediment that lies below the water column and are essential to the health of any aquatic environment. Their research is crucial because, as a result of their sedentary habitat, macrobenthic organisms are well-known markers of anthropogenic stress (Dauer and Corner, 1980). They also maintain varied degrees of community and environmental interaction. The benthic macroinvertebrate communities organisation gives accurate and local information on current status of ecosystem (Marques et al., 2003). In wetland ecosystems, distinct taxonomic groups of macroinvertebrates can serve as important indicators of disturbance brought on by stressor gradients (such as nutrient gradients) due to their sensitivity to various contaminants. The samples' abundance of macroinvertebrates and plant density were positively correlated (Ahmadi et al., 2011). Benthic resources contributes to the higher level consumer like fishes, Oligocheta and chironomidae dominated the soft sediment and main food for the higher level organisms. (Umek J et. al., 2010). Freshwater invertebrates are not only a source of protein but also a link in the aquatic food chain and an indication of the health of the aquatic ecosystem. (Nath, 2021; Tapp et al., 2015).

Freshwater invertebrates are main food source of waterbirds (Horváth et al., 2012). The physical and chemical properties of water primarily affects invertebrate macrofauna and zooplankton, which can be thought of as a major source of food for nekton and aquatic birds (Gere et al., 2006.). Anderson, et al., (2000) research suggests that managing damp soil can lead to an increase in wetland invertebrates. The main purpose of managing marsh soil is to maximize the production of seeds that migratory birds can use. The food items of molluscs, annelids, and arthropods, which are part of waders' diets, are abundant in all wetlands. These microfauna are also essential to the preservation of these wetlands. (Kumar et al., 2016).

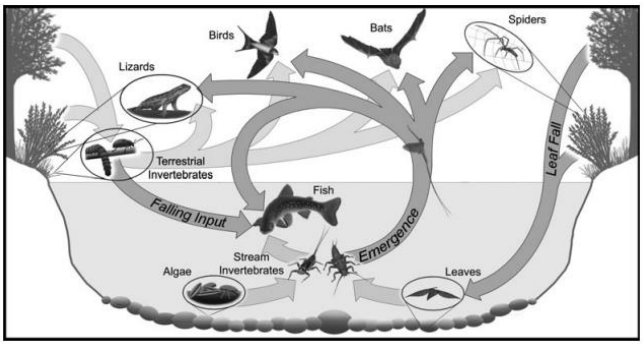
Freshwater invertebrates are food for a variety of fish, birds, and other aquatic organisms; they play a crucial role in the circulation and recirculation of nutrients in aquatic ecosystems by accelerating the breakdown of decaying organic matter into simpler inorganic forms (Idowu and Ugwumba, 2005). This can further accelerate the occurrence of other biotic components (Wiley et al., 1984; Euliss and Grodhaus, 1987; Euliss et al., 1991; Basu et al., 2013). Benthic fauna also contributes significantly to the food chain for higher animal taxa by transmitting energy and matter from phytoplankton, zooplankton, and macrophytes to fish, amphibians, reptiles, birds, and mammals as they serve as key food sources for them (Prabhakar and Roy, 2008).

Ashley et al., (2000) used an avian enclosure experiment along with counts of aquatic bird use to investigate the interaction between benthic invertebrates and aquatic birds at a recently created wetland. Predation, however, had no discernible impact on invertebrate numbers, according to the trial. The fact that the density of benthic macroinvertebrates varies between years suggests that the wetland is highly contaminated, which further influences the presence of benthic macroinvertebrates. In shallow lakes, waterbirds have a significant seasonal impact on the benthic ecology, as demonstrated experimentally by Rodriguez-Perez et al. in 2018. They noted that their study offers some of the strongest evidence to date that flamingos and other water birds, primarily ducks and coots, significantly affect the number and community structure of benthic invertebrates in shallow lakes. The abundance of benthic macroinvertebrates was clearly correlated with shorebird populations in the data, which accounted for 53.63 percent of the variance in shorebird abundance. Environmental

conditions have a significant impact on the prey density Zhang et al., (2016).

Benthic Macroinvertebrates are main food source of birds (Evans et al., 1983). Bird populations significantly and negatively correlated with polychaete densities on mudflats. (Zou et al., 2018). The zooplankton is a crucial component of the aquatic food chain since it serves as both a source of food for larger animals (Akbulut et al., 2004). The considerable predator-prey connections between the birds and benthic macroinvertebrates indicate that the waterbirds used the wetland predominantly as a feeding area. On their wintering sites, migratory ducks are known to consume a high-protein diet (Halse et al., 1996). Waders in particular are known to gather in large numbers at locations with strong invertebrate production (Silvius and Parish, 1987).

By consuming plankton and benthic species, whose availability is controlled by physico-chemical factors, waterbirds obtain crucial nutrients. It has been shown that the main food source for waterbirds is benthic invertebrates (Rundle, 1982). Additionally, it has been discovered that invertebrates significantly affect the distribution and eating habits of waterbirds (Bolduc and Afton, 2008). The densities of waterbirds increased together with those of all benthic invertebrates. The storks were observed eating either shallow bivalve beds or the dispersed gastropods and other invertebrates on the exposed sandflat (Borges and Shanbhag, (2008). The benthic food chain depends on dead and decaying debris, hence the majority of them are scavengers or detrivores (Covich et al., 1999).



(Source: Baxter et al., 2015).

III. CONCLUSION

The loss and degradation of wetlands worldwide has adversely affected waterbirds, which depend on wetland habitats. Aquatic invertebrates play a critical role in assessing the impact of human activity on water bodies, as well as on the freshwater ecosystem as a functional group. Freshwater macroinvertebrates communities are indicators of aquatic ecosystem health as many species are responsive to pollution and abrupt changes in their surroundings.

Freshwater invertebrate are main source of food for birds, they play important role in provide protein source to migratory and waterbirds. Molluscs, annelids, and arthropods, which are part of waders diets. Abundance of birds is correlated with numbers of freshwater invertebrates. Benthic macro-invertebrates have a role in nutrient cycling and nutrient outflow management in ecosystems. Because many benthic macroinvertebrates have limited migration patterns or a sessile mode of life, they are particularly well-suited for assessing site-specific impacts. Pelagic, terrestrial as well as benthic community play important roles in the food web. Flamingos and other water birds, primarily ducks and coots, significantly affect the number and community structure of benthic invertebrates in shallow lakes. The abundance of benthic macroinvertebrates was clearly correlated with shorebird populations. The zooplankton is a crucial component of the aquatic food chain since it serves as both a source of food for

larger animals. The considerable predator-prey connections between the birds and benthic macroinvertebrates indicate that the waterbirds used the wetland predominantly as a feeding area.

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