e ISSN–2321–7987 | ●●● Article ●●● |Visit us : *www.researchjournal.co.in*|

Importance of aeration in aquaculture pond

Mohammad Tanveer
Department of Aquacultural Engineering, College of Fisheries Engineering, Tamil Nadu Fisheries University, Nagapattinam (T.N.) India (Email : nobletanveer@gmail.com)

Need : Air is essential for all living beings on this earth. On earth oxygen requirement is fulfilled by photosynthesis of plants and trees. Likewise; in aquaculture ponds water receives oxygen through photosynthesis of aquatic plants and diffusion through surface of water. Dissolved oxygen (DO) is one of the most important water quality parameters affecting the quality of aquaculture pond water. Aeration is the term used to provide oxygen *i.e.* DO to the aquatic animals. Aquatic animals and organisms in water require oxygen for respiration and other biological activities. DO is the most critical water quality parameter in any aquaculture operation because all biological activities require a constant supply of DO in the pond. Therefore, a basic understanding of the mechanism of aeration necessitates to aid aquaculturists in the successful management of pond growing systems.

Principle : Aeration is the addition of oxygen or air containing oxygen to water. Any aquatic species important for commercial purpose requires oxygen. Transfer of oxygen in a water body can be termed as a three step process.

– Transfer of oxygen in the gas to gas liquid interface.

– Transfer across the gas liquid interface.

– Transfer of oxygen away from the interface into the liquid.

Types : Different types of aerators have been developed in an effort to improve the energy efficiency of the oxygen mass transfer process. These aerators work mainly on two principles: (i) aeration by splashing water into the air *i.e.* paddle wheel aerator, vertical pump, pump sprayer, gravity aerators etc. or (ii) aeration by bubbling air into water *i.e.* propeller aspirator, diffused aeration system etc. In aquaculture, propeller-aspirator-pump aerators, vertical-pump aerators, diffused-air aeration systems and paddle wheel aerators are widely used.

Aeration in shrimp ponds : Shrimp ponds with low initial stocks density such as 5 to per m^2 will not require any aerator. Partial water exchange alone will give good result. For ponds with initial stocking density between 10 to 12 per m^2 and targeted production level of 4 to 4.5 t/ha with 2 crops, application of aerators could be avoided by providing sufficient water exchange which may vary from 5 per cent at the beginning to 50 per cent towards harvest. However, in ponds with initial stocking density of 15 per m^2 and above, aerators are essential. In such cases, depending upon stocking density and various other factors ponds are usually provided with 6 to 8 number of aerators for each ha. of water area. Water exchange is normally 20 to 30 per cent. If initial stocking density is very high, say 100/m^2 it may become essential to provide each such ponds of water spread area of say, 500 m^2 with at least two aerators. In such cases, requirement of water exchange too becomes very high. Ponds, where feeding rates are above 40 to 50 kg/ha/d, frequent aeration is needed.

Placement of aerators in ponds: Proper placement of aerators in ponds plays an important role on efficient mixing of water throughout ponds. In a rectangular shaped pond, the best position is to place the aerator at the middle of one of the long sides of the pond directing water parallel to the short side of the pond. The placement of aerator in the corner of the pond to direct water diagonally across the pond is probably the worst position. Depending upon the sizes and shapes of the pond, the placement patterns of the aerators aimed to achieve the best water circulation will vary. Water circulation in the pond is important in breaking of the stratification of water parameters such as O_2, temperature and salinity. Positioning of the aerator on the pond should be decided taking into consideration the prevailing wind direction so as to effectively distribute the oxygen saturated water all over the pond and to promote water circulation in it.

Received : *08.02.2017* ***Revised :*** *21.04.2017* ***Accepted :*** *02.05.2017*