

Physical and chemical factors affecting the upstream migration of amphidromous shrimp in the Luquillo Experimental Forest, Puerto Rico

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Abstract. Amphidromous shrimp play a large role in freshwater stream ecosystems of the Luquillo Experimental Forest (LEF) of northeastern Puerto Rico. The seasonality and proximate causes for the upstream migration of post-larval shrimp have received little study despite its importance in understanding recruitment of juveniles into adult populations. We sampled the upstream migration of 3 species of amphidromous shrimp, *Atya lanipes*, *Xiphocaris elongata* and *Macrobrachium* spp. in the Rio Espiritu Santo for 46 nights over a five-month period. Detailed information on environmental, hydrological and chemical variables was also collected on each sampling date. The magnitude of shrimp migration varied widely for each of the three shrimp species over the 46 nights sampled. *Atya lanipes* showed little response to environmental variables while light levels and flood regime affected the magnitude and timing of both *Xiphocaris elongata* and *Macrobrachium* spp. migrations. *Xiphocaris elongata* and *Macrobrachium* spp. migrations also showed a large degree of seasonality. Controlled experiments in artificial streams indicate that migratory post-larval shrimp modify their migratory behavior based on the presence of physical and chemical stimuli. The rate of shrimp migration increases with increased flow and increased turbidity, however migratory shrimp avoid migration into channels with low water quality or predator presence.

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