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Fish Parasites: A Biotags

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Introduction

Fish stock identification is a process in which the commercially important aquatic organisms advice to exploitation of fisheries resource on maximum sustainable yield to maintain fisheries resource for future. "Fish stock Stock is a subset of one species having the same growth and mortality parameter, and inhibiting in a particular geographical area". By tagging we can get data/ knowledge about fish route of migration, by the same way we can obtain the trends of exploitation of aquatic organism. Now there are numerus pathways for biogeographical isolation/ recognition of stock such as marking, tagging (natural and artificial), meristic and morphometric characterization, hard part (scales, bones, and otolith), molecular tools etc. [1], many authors had used several parasites based on their availability for studying population, species differentiation, species relationship within species and between species, feeding habitats seasonal pattern and growth pattern [2], Here, we are studying about two components (parasite and host) of sniezko's diagram which reveals several unknown fact about host and pathogen relationship [3].

Host and pathogen relationship can measure by parasitic richness (the number of parasitic species on host) and RSD (the ratio of number of parasitic species by number of host species) A very important measure for a potent parasitic marker is its residence time on/in a host organism [4], the load of helminth parasite will be high in male fishes when compared with females [2]. So they are chances to differentiate sexes based on infection range. Generally for stock recognition and enlistment studies, select parasite of more than one year life span, on other hand for seasonal migration study select parasite type of less than one year life span [5]. These studies are being applied to know the cephalopods distribution in abroad [6].

Benchmark Standard for Choosing Parasitic Tags

A. Comparatively there must be geographical difference in Prevalence in parasite (abundant in one location and rare/none in another location,
B. Prevalence of a parasite must be comparatively constant every year.
C. Identification and observation of parasite should be easy,
D. Parasite should have minimum or no adverse effects on host,
E. Parasite should have single host life cycle and
F. Qualification of parasite based on maximum availability of information about its biology [1,5,8-9].

Parasites used Commonly

Several researcher had identified that larvae or juveniles of Anisakid (most commonly used is *Anisakia simplex)* and trypanorhynches or the effective biotags because, they are widely seen in many teleost and their presence is diagnosed easily by "candling" the fillets as the spread all over the musculature of fishes (or) by pepsin digestion [10, but greatest limitation for considering these parasites is they need minimum three host species to accomplish its life cycle [4]. Most commonly cephalopods are encountered by metazoans. For demersal cephalopods, dicyemid mesozones are highly specific [2], nematodes are favorable parasites, because they show multy host lifecycle so they cause less damage to fishes [11], for blue fin tuna, *Hepatoxylon trichuri* and *Grillotia dollfusi* members of trypanorhynchies their larval forms are best markers as they are easly noticed. *Clestrobothrium crassiceps* is a cestode which is evaluated as an efficient tag for hakes [12].

Myxozoans are ubiquitous in a nature, multi cellular spore

formers. *Myzobolus cerebralis* and *Tetracapsula bryosalmonae* are aboded only in salmonid family. For P*leuronectus platessa* stock identification studies, most used biotag is *M. aeglefini*. Myxidium species are used in Northern Norway for studying gadid fishes stock structure which is mainly found in gall bladder [13]. *M. neurobius* and *M. arcticus* are two species which prefer to live in CNS of salmonids fish already they are being used as tags [11]. In Indian context, *Philometra rajani* a nematodes esteemed an gonadal parasites of sciaenids such as *Polynemus polydactylus* and *Pciaena coiter* [14], *Philometra lateolabracis*, found only in subcutaneous tissue of sciaenids caudal fin, especially in *otolithes ruber* they are prevalent.

Merit and Demerits of Parasitic Tagging

They are exclusively befitted for studying of young tender species of fishes like crustaceans, small clupeids etc.. As they are extremely sensitive to adverse environment [4]. Cost effective i.e. cheap method, as we get samples by general sampling program. Utilization of natural indicator will eradicate question related to aberrant behavior of fishes, which is common in artificial tagging. Unlike artificial tags, here (parasites) no need of capturing the fish for marking which allow only few portion of the stock to be consider in this phenomena [1], Mechanical tagging is a laborious, time consuming, expensive process. Presently due to poor knowledge the efficiency of parasites on tagging is a big question mark, but as research proceeds forward the parasites will provide effective service in stock recognition [15]. The main draw back in parasites in these studies is, we cannot represent the results of several parasites due to low knowledge parasitic classification and its lifecycle [10], they accomplish data on movement and facilitate us to characterize the fishes from various stock, until-unless if sampling effort is good, if it is poor then it won't be useful for stock boundary recognition if particular parasite is not infecting a specific fish stock uniformly for a broad period (or) any alteration in availability parasites can interrupt the future planning for long term observation [1].

Note- Crustacean parasites, monogenean trematodes and many protozoans are single host life cycled, they will be simple and best for handling bio- tagging as in the case of multi-host life cycled parasites, needs lo of data and factors affecting its transfer [5]. The host will be infected with a specific parasite only if they reach endemic place of parasite, these places are the regions where transmission will occurs. We can recognize if infected host reach beyond its geographical boundaries by the presence of particular parasites [15], to examine the voyage of singe fish, this parasitic tagging is not worthy phenomenon [9], diminishing effect will be on population and diversity due to improper finding of stock structure [8].

Conclusion

Our failure towards these approach on large scales is because of our vision of parasites as severe disease causing agents, we are not able to notice the second phase of parasite such as biological tags and ecosystem indicator these are the imagination which arise from poor knowledge of the complicated biology of parasites and dull perception of their key function in ecosystem.

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