

# PARASITES OF RED-MED IMMIGRANT AND NATIVE MEDITERRANEAN COASTAL FISH SPECIES: NEW OBSERVATIONS FROM THE ISRAELI AND TURKISH COASTS

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## Abstract

The metazoan parasites of 20 species of invasive and native fish species along the Israeli and Turkish Mediterranean coasts were studied. A total of 648 fish were examined for branchial and alimentary tract parasites. The parasite groups found were Nematoda (25.5% of examined fish), Cestoda (18.7%), Monogenea (15.3%), Digenea (11.9%), Copepoda (7.3%), Isopoda (4.5%) and Acanthocephala (0.5%). The combined prevalence of all taxa was very similar amongst native and invasive species. Although information on the invasive parasite species in their native Red Sea are not as well studied as in their new Mediterranean target area, analysis of our data suggested that the success of invading host populations was not unequivocally linked with reduced parasite loads.

*Keywords: Parasitism, Fishes, Eastern Mediterranean, Red Sea, Suez Canal*

## Introduction

One of the most significant factors to impact the eastern Mediterranean over the last few decades is the massive invasion of tropical Red Sea faunal elements via the Suez Canal. Despite numerous research efforts of this extraordinary phenomenon, we still have relatively little knowledge on the role parasites have in this arena. Several authors have attempted to explain the extraordinary success of some invader species that have created large populations and spread over large areas, while others appear to be limited and only marginally successful. The "Enemy Release Hypothesis" has been suggested as a possible explanation.

## Materials and methods

In the present study, we studied the metazoan parasites of 20 species of invasive and native fish species along the Israeli and Turkish Mediterranean coasts. All together, a total of 648 fish were examined for branchial and alimentary tract parasites.

## Results

The most prevalent parasite groups were Nematoda (25.5% of examined fish) and Cestoda (18.7%); Monogenea (15.3%) and Digenea (11.9%) were less common, and least abundant were Copepoda, Isopoda and Acanthocephala (7.3%, 4.5% and 0.5%, respectively). The prevalence of all taxa combined was very similar amongst native and invasive species (65.6% and 61.3%, respectively;  $\chi^2$   $p=0.348$ ). Digenea are a distinctive heteroxenous group of parasites, which possess complex, multiple-host life cycles. Somewhat unexpectedly, no statistically significant difference ( $p=0.093$ ) was found between their prevalence in invasive (13.1%) and native (8.1%) fish host species.

Overall infection prevalence values were higher in samples taken from the Israeli coast as compared to those taken in Turkey (67.4% vs. 52.7% respectively,  $p<0.001$ ). This difference may reflect warmer waters prevailing on the Israeli coast that would accelerate parasite development rates and possibly enhance survival of larval stages.

The most abundant invasive fish species in our samples was *Saurida undosquamis* (Synodontidae), which occurred in >80% of the trawl nets. This long established species was heavily infected with larval cestodes (mostly Tetracanthidae and Trypanorhyncha). It also hosted the digenean *Lecithochirium* cf. *manicaudatus* (Hemiuridae), larval nematodes, Monogenea (Capsalidae) and *Gnathia* sp. (Isopoda). A recent invading species, *Apogon smithi*, which occurred in 35.5% of the trawls, supported a high prevalence (52.1%) of cestodes (mainly Pseudophyllidea and Diphyllidea), as well as an unidentified digenean probably belonging to the Lecithasteridae.

The bluespotted cornetfish, *Fistularia commersonii*, another recent invader species, supported high prevalence infections with larval cestodes and two digeneans, *Allolepidapedon* sp. and *Neoallolepidapedon* sp. (Lepocreadidae). *Allolepidapedon* has recently been reported from bluespotted cornetfish on the Italy coast (Pais et al., 2007). Both lepecreadids are known from cornetfish in the Pacific Ocean and are therefore presumed to be invasive Indo-Pacific species.

The Hemiuroidea were by far the most prominent and speciose digenean sub-order in our samples. These parasites typically have low host specificity and most occupy the stomach, a relatively harsh environment. These group

attributes may have facilitated the relatively wide distribution and abundance amongst the invading fish species.

## Discussion

Although in recent years we are steadily accumulating knowledge on parasitic infections of the Red-Med species in their new environment, we still lack fundamental data on parasite infections of the invasive species in their native Red Sea. The available information suggests that while parasite richness is reduced upon invasion, abundance levels of some host species fluctuate and the success of invading host populations may not be unequivocally linked with reduced parasite loads.

## References

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