An overview of threadfins fishes (Family: Polynemidae) in coastal district of Eastcoast of Tamil Nadu

Sivabalan P, Anrose A and Chezhian Y

Abstract
In the case of the marine biodiversity of India, the number of species known could be of the order of 13,000 or higher (Ramakrishna and Venkataraman 2001). The family Polynemidae usually known as thread-fins; name resulting from the occurrence of numerous slim or slender filaments on the lower part of the pectoral fin, number and the nature of these free filamentous rays assist the systematic arrangement of species. Present studies deal with the overview, diversity and population density of the thread-fins (Family: Polynemidae) fishes of the south east coast of Tamil Nadu. The coastal district of Tamil Nadu in the present study showed five fish species spread over 3 genera, 1 family and 1 order.

Keywords: Polynemidae, coastal district, East Coast and Tamil Nadu

Introduction
In marine ecosystem fishes are the complete living vertebrate which are half in diversity. Taxonomically diversified and wealth ecosystems is represented of coastal plains and seas of the earth. In the case of the marine biodiversity of India, the number of species known could be of the order of 13,000 or higher. The coastline of Tamil Nadu has a length of about 1076kms, constitutes about a 15% of the total coastal length of India and stretches along Bay of Bengal, Arabian Sea and Indian Ocean. The family Polynemidae usually known as thread-fins; name resulting from the occurrence of numerous slim or slender filaments on the lower part of the pectoral fin, number and the nature of these free filamentous rays assist the systematic arrangement of species, polynemids are hermaphroditism. They occur primarily in shallow muddy bottom in the coastal waters, Juveniles are found in estuaries. They are contributing to the regional significant; Polynemids are most highly esteemed table fishes. Especially Eleutheronema tetradactylum and Ploynemus indicus they occur all along the east and the west of India some of the species Being migratory fishes, as a minimum they occur not only in the ocean but also in the river mouth and estuaries. Polynemids plays an imperative role in the nationwide economy, due to they are being favored as enormously good eating fishes with broad cyclic and spatial distribution range, so this kind of group comprises a reserve. Present studies deal with the overview, diversity and population density of the thread-fins (Family: Polynemidae) fishes of the south east coast of Tamil Nadu.

Material and Methods
Fish samples were collected during the period from Oct-2012 to Sep-2013 of 13 Coastal district of Tamil Nadu; viz. Chennai, Cuddalore, Kanchipuram, Kanyakumari, Nagapattinam, Pudukottai, Ramanthapuram, Thanjavur, Thiruvalur, Thiruvallur, Tirunelveli, Tuticorin and Villupuram, samples and data were collated and observed from fishing landing centers; few samples was collected for identification purpose; samples were preserved into 37% formalin. Fish diversity was calculated using PAST software.

Result
The costal district of Tamil Nadu in the present study showed five fish species spread over 3 genera, 1 family and 1 order (Table 1). However, the systematic and diagnostic characters were provided for all five species. Highest number of fish species represented in the genus Polydactylus followed by genus Eleutheronema and Filimanus shows each one species. Species richness and population density were calculated and discussed in detail in present study area (Table 2 & 3).
## Table 1: List of species available in the study area.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Order</th>
<th>Family</th>
<th>Genus</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perciformes</td>
<td>Polynemidae</td>
<td>Eleutheronema</td>
<td>Eleutheronema tetradactylum</td>
</tr>
<tr>
<td>2</td>
<td>Polydactylus</td>
<td>Polynemidae</td>
<td>Polydactylus</td>
<td>Polydactylus plebeius</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>Polydactylus sexfisilis</td>
<td>Polydactylus sexfisilis</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>Polydactylus sextarius</td>
<td>Polydactylus sextarius</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>Filimanus</td>
<td>Filimanus heptadactyla</td>
</tr>
</tbody>
</table>

### Systematic Accounts

**Genus** Eleutheronema Bleeker, 1862

1. *Eleutheronema tetradactylum* (Shaw, 1804)
   *Eleutheronema tetradactylum* (Shaw, 1804)
   *Polynemus rhadinus* Jordan & Evermann, 1902

### Distinctive Characters:
The largest of the threadfins. Body more or less elongate and compressed. Snout projecting, mouth very large, with small teeth; lips absent, except for lower lip near corner of mouth; eyes large (eye diameter 4.5 to 5 times in head length). Pectoral fins in 2 parts, upper part with all rays unbranched, lower with 4 free filamentous rays of which the upper filament is the longest, reaching to pelvic fin base; caudal fin forked with lobes equal. Scales small, ctenoid (rough to touch).

### Colour:
Body silvery green above, cream below; dorsal and caudal fins grey, dusky at edges, pelvic and anal fins orange, pectoral filamentous rays white.

**Genus** Filimanus Myers, 1936

2. *Filimanus heptadactyla* (Cuvier, 1829)
   *Polydactylus heptadactylus* (Cuvier, 1829)
   *Polydactylus multiradiatus* (Günther, 1860)
   *Polydactylus sextriatus* Bloch, 1801
   *Polynemus heptadactylus* Cuvier, 1829
   *Trichidion heptadactylum* (Cuvier, 1829)
   *Filimanus similis* (Feltes, 1991)

### Distinctive Characters:
Body oblong and somewhat compressed. Snout projecting, mouth large, with small teeth; upper lip absent, lower lip well developed; eyes large (eye diameter 3.8 to 4.0 times in head length), with adipose tissue. Pectoral fins in two parts, upper part with all rays unbranched; lower with 5 free filamentous rays, of which the upper 2 are the longest reaching to end of pelvic fin; caudal fin with lobes equal. Scales small, ctenoid (rough to touch).

### Colour:
Body golden olive, with narrow dusky stripes; pectoral fins black, inner side of pelvic fins white, outer side grey, dorsal and caudal fins grey-edged.

3. *Polydactylus plebeius* (Broussonet, 1782)
   *Polydactylus plebeius* (Broussonet, 1782)
   *Polydactylus agonasi* Jordan & McGregor, 1906
   *Polydactylus microstoma* (Bleeker, 1851)
   *Polydactylus plebejus* (Broussonet, 1804)
   *Polydactylus commersonii* Shaw, 1804
   *Polynemus emoii* Lacepède, 1803
   *Polynemus lineatus* Günther, 1860
   *Polynemus lineatus* Lacepède, 1803
   *Polynemus lydiæ* Curtiss, 1938
   *Polynemus niloticus* Shaw, 1804
   *Polynemus plebeius* Broussonet, 1782
   *Polynemus plebejus* Broussonet, 1782
   *Polynemus plebeius* Broussonet, 1782
   *Trichidion plebejum* (Broussonet, 1782)

4. *Polydactylus sexfisilis* (Valenciennes, 1831)
   *Polynemus xanthonema* Valenciennes, 1831
   *Filimanus xanthonema* (Valenciennes, 1831)
   *Polydactylus multiradiatus* (Günther, 1860)
   *Polydactylus sexfisilis* (Valenciennes, 1831)
   *Polydactylus sextarius* (Bloch & Schneider, 1801)
   *Polydactylus xanthonemus* (Valenciennes, 1831)
   *Polynemus diagrammicus* Bleeker, 1849
   *Polynemus pfeifferi* Bleeker, 1853
   *Filimanus similis* (Feltes, 1991)
   *Polydactylus konadaensis* Mishra & Krishnan, 1993
Distinctive Characters: Body oblong and somewhat compressed. Snout projecting, mouth moderately large, with small teeth; upper lip absent, lower lip well developed; eyes moderate in size (eye diameter 4.5 times in head length), with adipose tissue. Pectoral fins in two parts, upper part with unbranched rays; lower part with 6 free filamentous rays, of which the upper 2 are the longest reaching to tip of pelvic fin; caudal fin forked with lobes equal. Scales small, ctenoid rough to touch.

Colour: golden, pectoral fins deep black, anal fin with a black margin, pelvic fins dark in the middle.

5. *Polydactylus sextarius* (Bloch and Schneider, 1801)

*Polynemus sextarius* Bloch & Schneider, 1801
*Polydactylus sextarius* (Bloch & Schneider, 1801)
*Trichidion sextarius* (Bloch & Schneider, 1801)
*Filimanus heptadactyla* (Cuvier, 1829)
*Polydactylus sexfilis* (Valenciennes, 1831)

Distinctive Characters: Body oblong and somewhat compressed. Snout projecting, mouth moderately large, with small teeth; upper lip absent, lower lip well developed; eyes large (eye diameter 3.0 to 3.8 times in head length), with adipose tissue. Pectoral fins in two parts, upper part with almost all rays branched, lower part with 6 free filamentous rays, of which the upper 2 are the longest reaching to tip of pelvic fin; caudal fin forked with lobes equal. Scales small, ctenoid (rough to touch).

Colour: golden olive above, silvery below; fins yellowish with black spots; inner side of gill cover pigmented with black; a large black blotch at beginning of lateral line. During the study period the fish populations in costal districts of Tamil Nadu ranged from 9 to 210 cumulative individuals, highest population was recorded in Nagapattinam district followed by Thanjavur, Pudukottai, Thiruvallur, Thiruvarur and least population were recorded in Tirunelveli district (Table 2). Total individual population of fishes in study area is 5237 in which *Polydactylus plebeius* (2055) contributed high volume, followed by *Eleutheronema tetradactylum* (1144), *Polydactylus sextarius* (996), *Polydactylus sexfilis* (868) and the least volume of contribution is *Filimanus heptadactyla* (174) (Figure 1).

Table 2: Total species collected in study area district wise

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Coastal district</th>
<th>Eleutheronema tetratactylum</th>
<th>Polydactylus plebeius</th>
<th>Polydactylus sexfilis</th>
<th>Polydactylus sextarius</th>
<th>Filimanus heptadactyla</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chennai</td>
<td>72</td>
<td>145</td>
<td>90</td>
<td>73</td>
<td>12</td>
<td>392</td>
</tr>
<tr>
<td>2</td>
<td>Cuddalore</td>
<td>81</td>
<td>163</td>
<td>69</td>
<td>51</td>
<td>09</td>
<td>373</td>
</tr>
<tr>
<td>3</td>
<td>Kanchipuram</td>
<td>91</td>
<td>151</td>
<td>57</td>
<td>76</td>
<td>19</td>
<td>394</td>
</tr>
<tr>
<td>4</td>
<td>Kanyakumari</td>
<td>92</td>
<td>162</td>
<td>61</td>
<td>63</td>
<td>14</td>
<td>392</td>
</tr>
<tr>
<td>5</td>
<td>Nagapattinam</td>
<td>89</td>
<td>210</td>
<td>98</td>
<td>81</td>
<td>21</td>
<td>499</td>
</tr>
<tr>
<td>6</td>
<td>Pudukottai</td>
<td>98</td>
<td>184</td>
<td>74</td>
<td>58</td>
<td>15</td>
<td>429</td>
</tr>
<tr>
<td>7</td>
<td>Ramanthapuram</td>
<td>89</td>
<td>156</td>
<td>75</td>
<td>60</td>
<td>10</td>
<td>390</td>
</tr>
<tr>
<td>8</td>
<td>Thanjavur</td>
<td>91</td>
<td>198</td>
<td>65</td>
<td>75</td>
<td>12</td>
<td>441</td>
</tr>
<tr>
<td>9</td>
<td>Thiruvallur</td>
<td>89</td>
<td>138</td>
<td>92</td>
<td>67</td>
<td>17</td>
<td>403</td>
</tr>
<tr>
<td>10</td>
<td>Thiruvarur</td>
<td>95</td>
<td>147</td>
<td>83</td>
<td>66</td>
<td>15</td>
<td>406</td>
</tr>
<tr>
<td>11</td>
<td>Tirunelveli</td>
<td>80</td>
<td>121</td>
<td>76</td>
<td>59</td>
<td>10</td>
<td>346</td>
</tr>
<tr>
<td>12</td>
<td>Tuticorin</td>
<td>91</td>
<td>136</td>
<td>80</td>
<td>68</td>
<td>11</td>
<td>386</td>
</tr>
<tr>
<td>13</td>
<td>Vllupuram</td>
<td>86</td>
<td>144</td>
<td>76</td>
<td>71</td>
<td>09</td>
<td>386</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1144</td>
<td>2055</td>
<td>996</td>
<td>868</td>
<td>174</td>
<td>5237</td>
</tr>
</tbody>
</table>
Fig 1: Total population of individual of study area

Table 3: Diversity Index of Identified fish species in the study area

<table>
<thead>
<tr>
<th>Diversity Index</th>
<th>Eleutheronema tetrataclaym</th>
<th>Polydactylus plebeius</th>
<th>Polydactylus sexfilis</th>
<th>Polydactylus sextarius</th>
<th>Filimanus heptadactyla</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simpson (1-D)</td>
<td>0.9226</td>
<td>0.9212</td>
<td>0.9213</td>
<td>0.9219</td>
<td>0.9172</td>
</tr>
<tr>
<td>Shannon (H)</td>
<td>2.562</td>
<td>2.553</td>
<td>2.553</td>
<td>2.557</td>
<td>2.528</td>
</tr>
<tr>
<td>Evenness (e^H/S)</td>
<td>0.9971</td>
<td>0.9884</td>
<td>0.9885</td>
<td>0.9925</td>
<td>0.9635</td>
</tr>
</tbody>
</table>

Diversity index is estimated through Shannon, Simpson and Evenness, Shannon index ranged from 0.9172 to 0.9226, Simpson index ranged from 2.528 to 2.562 and Evenness ranged from 0.9635 to 0.9971 (Table 3). However Shannon index and Shannon index shows less in Filimanus heptadactyla and high in Eleutheronema tetrataclaym.

Conclusion
The purpose of this study to review and conclude that the decline of family Polynemidae in southeast cost of Tamil Nadu. The water quality is one of major factor to increase the decline ratio of thread-fins fishes or marine diversity; by oil, chemical and biological wastage and in some circumstance climatic changes also decisive decline ratio. This astounding loss of biodiversity, defined as the variety of life forms and processes, can be directly linked to the activities of an overgrown and over-consumptive human population (Groom et al. 2006) [7]. Extinction is a natural process, and natural processes can be characterized by average rates. Historically, extinction rates for animals average 9% of existing species every million years, or one to two species per year (Helfman S., 2009) [6]. Human alteration of aquatic habitats is the most commonly cited cause of declines in fin-fishes populations. Marine diversity and sustainability will be protect to abide by following criteria such as do not harvest the fish during the
spawning period, cut out harvest juveniles, to educate locals fisherman’s of impacts of pollution with chemicals wastes and anthropogenic activities led to the degradation of southeast coast of Tamil Nadu. Hence, conservation and management strategy is needed to conserve this important ecosystem and thread-fins fish population.

**Acknowledgements**

The authors are grateful to the Zonal Director, Fishery Survey of India, Chennai for constant encouragement and providing the necessary facilities.

**Reference:**

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