New strategies for the construction and management of pond production systems for sustainable fish farming
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Contributing to a necessary \textit{revision} of \textit{production systems} that must be \textit{efficient}, \textit{profitable}, \textit{respectful of the environment} and \textit{integrated into the territories}

**Program objectives**

\textbf{To propose new practices for pond fish farming}

- \textit{A central theme:} Defining the composition of the polyculture
- \textbf{To produce in a more} \textit{sustainable way}
- \textbf{Adapted to the} \textit{diversity of the contexts} (modalities of realization of the polycultures)
- \textbf{Taking into account} all the \textit{biological compartments} of the ecosystem

**Our working method**

\textbf{A work of co-construction with the actors of the sector}

- \textbf{A multidisciplinary approach} to address the complexity of interactions between pond compartments
- The introduction of the notion of \textit{ecosystem services} to discuss the vocation of fishponds
- The explicit consideration of \textit{biodiversity} in the functioning of fishponds
- To help build new solutions, \textit{modeling approaches}

**Program ambition:**

To go as far as \textit{recommendations} and \textit{practical tools} for fish farmers.

**Methodology**

- \textit{What drives the choices}
- \textit{Surveys:} Fish farmers state of play
- \textit{Regional workshops}
- \textit{Criteria for stocking choices?}
- \textit{What new species?}
- \textit{TOFF modeling approach}

**First results**

<table>
<thead>
<tr>
<th>Sites</th>
<th>Surface (ha)</th>
<th>Fish polyculture scenarios</th>
<th>Stocking (kg/ha)</th>
<th>Yield (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S01</td>
<td>2.2</td>
<td>C. Carp - Orfe - Pike</td>
<td>110</td>
<td>30</td>
</tr>
<tr>
<td>L04</td>
<td>2.1</td>
<td>Roach - Rudd - Pikeperch</td>
<td>80</td>
<td>86</td>
</tr>
<tr>
<td>D08*</td>
<td>9.4</td>
<td>Roach - Tench - Pikeperch - \textit{White Sturgeon}</td>
<td>76</td>
<td>145</td>
</tr>
<tr>
<td>L05</td>
<td>1.4</td>
<td>C. Carp - Tench - Roach</td>
<td>100</td>
<td>197</td>
</tr>
<tr>
<td>L03</td>
<td>4.1</td>
<td>Roach - C. Carp - Grass Carp</td>
<td>266</td>
<td>295</td>
</tr>
<tr>
<td>B01</td>
<td>12</td>
<td>Tench - C. Carp - Pikeperch</td>
<td>91</td>
<td>336</td>
</tr>
<tr>
<td>D01*</td>
<td>3.4</td>
<td>White Fish - Tench - Black Bass</td>
<td>76</td>
<td>336</td>
</tr>
<tr>
<td>Bx1</td>
<td>0.1</td>
<td>C. Carp - Roach - Tench - Pikeperch (claustration)</td>
<td>115</td>
<td>404</td>
</tr>
<tr>
<td>Bx2</td>
<td>0.1</td>
<td>C. Carp - Roach - Tench - Pikeperch (open)</td>
<td>115</td>
<td>410</td>
</tr>
<tr>
<td>B02</td>
<td>0.8</td>
<td>Roach - C. Carp - Grass Carp - Black Bass</td>
<td>74</td>
<td>435</td>
</tr>
<tr>
<td>D04*</td>
<td>6</td>
<td>White Fish - C. Carp - Grass Carp - Black Bass</td>
<td>156</td>
<td>542</td>
</tr>
<tr>
<td>D03*</td>
<td>3</td>
<td>White Fish - C. Carp - Grass Carp - \textit{White Sturgeon}</td>
<td>272</td>
<td>625</td>
</tr>
</tbody>
</table>

- \textit{Feeding} 
- \textit{Without feeding} 
- \textit{Fertilization} 
- Limit of 200 kg/ha

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{diagram.png}
\caption{Diagram showing the methodology and first results.}
\end{figure}