Enhancing ecosystem function assessment through cost-effective Tea Bag decomposition studies in marine habitats

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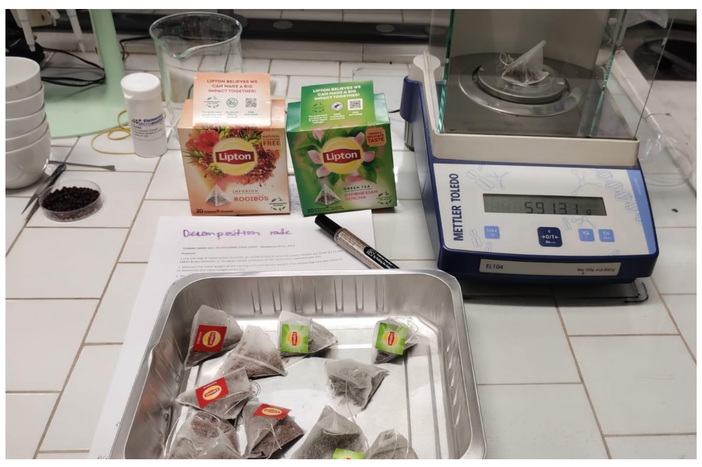
FRAMEWORK

Climate change is increasingly impacting marine ecosystems, generally exerting negative effects on their **functioning**, **stability** and potentially their **resilience to multiple stressors**. In this context, analyzing decomposition rates – an ecosystem function - across different ecosystems is a crucial step in assessing changes in nutrient cycling and carbon dynamics, which may play a pivotal role in ecosystem multifunctionality, i.e. the ability of an ecosystem to sustain multiple functions and services simultaneously. Despite the importance of decomposition rates, global climate predictions remain limited by scarce data due to the high costs and efforts associated with comparative litter decomposition studies. **At this stage, we are focused on developing and refining the TBI methodology. While data collection is underway, this poster presents the methodological framework and its potential applications.**

METHODS



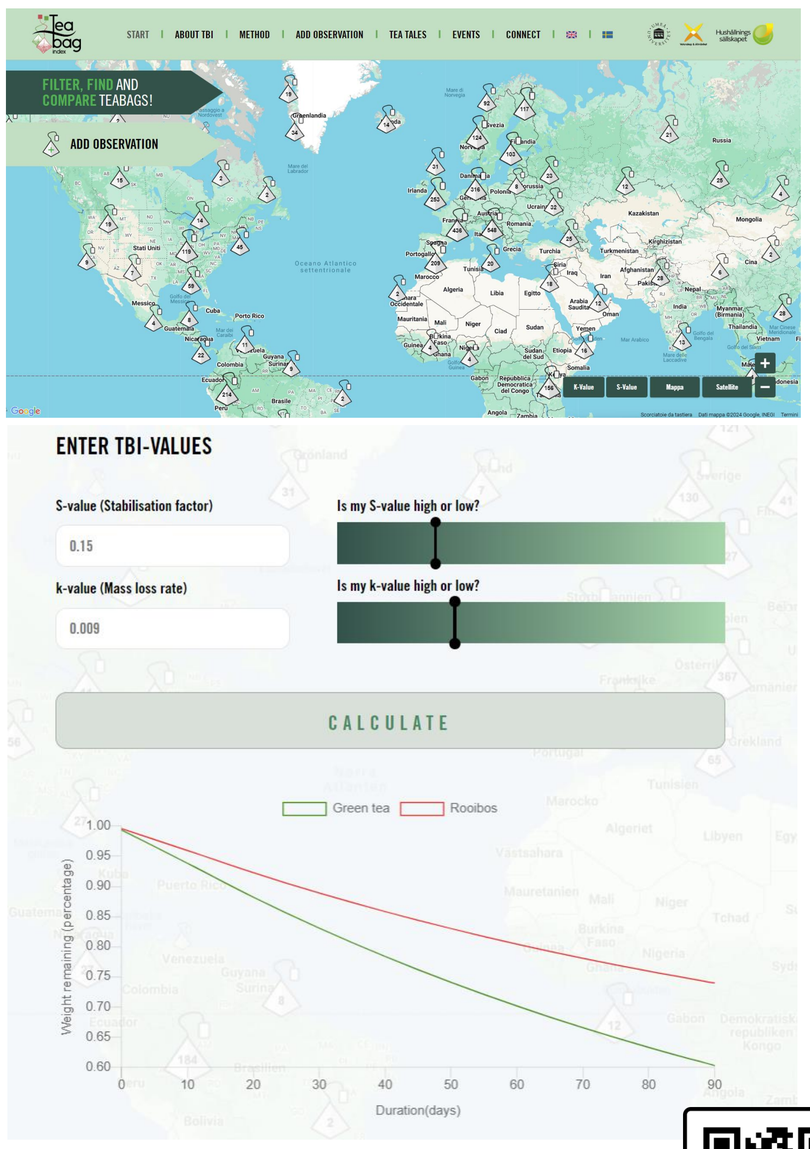
Tea bags decomposition index (**TBI**) is an innovative technique based on standardized decomposition and stabilization curves using two commercially available teas. The method was originally employed in the terrestrial environment. We are currently implementing this cost-effective method **in marine habitats** to enable increased replication in field experiments and to ensure consistent data collection across various treatments and ecosystems. We selected the **lagoon** of the Stagnone di Marsala, Western Sicily, to study pattern of decomposition rate, **following a density gradient of seagrass**.

A **seagrass ecosystem** has been selected as target testing marine ecosystem due to the **pivotal role in service's provision** such habitat forming or carbon sequestration and being one of the ecosystems facing challenges from climate change and anthropogenic pressures.

WHAT ARE THE TBI VALUES?

The TBI values (**k** and **S**) describe the decay of the **easy to break down** material, sometimes called the "labile material". The **initial mass loss rate** "k" describes **how fast** the tea weight is reduced. A **higher k value** suggests that the tea has been **decomposed faster**.

The **stabilization factor**, or S-value, shows roughly how much of the **easily degradable** material that has **not been decomposed**. This "stabilized" material consists of **undigested material**, leftovers from microbial digestion and dead microbes. A **higher S-value** means that **more material is left** which is (not yet) decomposed.



https://teabagindex.org/

INSIGHTS

TBI represents a **cost-effective method** allowing for an **increased replication** in field experiments and, more importantly, the standardized nature of TBI facilitates **comparable** data **collection across different treatments and ecosystems**.

By involving the public in these experiments, we aim to expand data collection across multiple ecosystems, facilitating more meaningful replications, enhancing cross-ecosystem comparisons and ultimately achieving more robust results.

Additionally, due to its **high accessibility**, the methodology is suitable for **sharing with the public** and for **large-scale application** also in citizen science context, representing a promising tool to strengthen the **interface between science and stakeholders** and to advance **translational ecology**.

COST EFFECTIVE

CROSS COMPARISON

PUBLIC INCLUSION

SCAN ME

TBI WILL BE ONE OF THE BIODIVERSITY SAMPLING WEEKS TOOLS PROMOTED BY THE NATIONAL BIODIVERSITY FUTURE CENTER. DO YOU WANT TO ENJOY A TEA BAG (INDEX)? CONTACT US!