My Sustainable Forest

- **Forest managers, public administrations, nature conservation and research institutions** can directly benefit from MySustainableForest products. The *Biotic Damage* product is co-designed with the end-user to help monitor the damage caused by pests and diseases to forests.

- **Remotely sensed data** provide low cost and regular forest information for timely silvicultural activities.

- **Early pest detection and monitoring** is vital for sustainable management.

- The *Biotic Damage* product detects pest outbreaks in forest masses and provides regular updates of the forest health condition.

The challenge

Insects are a natural component of the complex forest ecosystems. However, climatic changes (e.g. extreme drought and summer temperature records) favour increasing seasonal insect breading cycles, which in turn drastically increase tree mortality rates. Accurate data on pest outbreaks and their damage can help forest managers to assess economic losses and to plan effective mitigation activities.

To date, obtaining regular information on outbreak statistics is expensive and therefore challenging for large forest areas. Nonetheless, public administrations and research institutions would benefit in having regular estimation of biotic damage in their reporting activities, as to improve the efficiency of forest health monitoring.

MySustainableForest solution

MySustainableForest (MSF) is a geo-information portfolio of products aiming to support silvicultural activities and sustainable forest management. The products are based on satellite data, LiDAR and sonic non-invasive measurements.

The *Biotic Damage* product detects early pest outbreaks in forest masses. The spectral capabilities of remote sensors detect biomass responses to the breading cycle of insects such as: tree vitality loss, selective defoliation, mild foliar senescence, site deterioration, degeneration of species composition or plantations failure. The product ranks the biotic damage into minor, moderate or severe, depending on the change of forest vitality as a function of leaf area index, photosynthetic activity and vegetation moisture data.

This product leverages upon High Resolution satellite imagery and field measurements for ground truth validation.

The product in a nutshell

With the *Biotic Damage* product you can:

- Assess economic and ecological losses caused by plagues on a given tree species.

- Regularly update forest health assessment maps of the extent and severity of the damage.

- Perform an early diagnosis of the biotic damage and lay out a recovery and mitigation plan.

- Improve environmental impact assessments and forest management plans.

- Complete the Forest Condition assessment of your forest with the MySustainableForest product *Drought Damage*.

What do I need to provide?

The end-user needs to provide two data sets:

The geo-location of the **Area of Interest (AOI)**, through coordinates or a GIS vector layer.

Field data of factors related to biotic damage: such as **1)** host species, **2)** distribution and disturbance period, **3)** pest triggering factors: biotic (e.g. symbiotic relationship) or abiotic (e.g. drought), **4)** visual description of damage on the trees (browning, defoliation, tree fall, etc.).

What will I obtain?

The *Biotic Damage* product will provide you two outputs: **1)** a biotic damage classification of your forest (no damage, minor, moderate, and severe damage), **2)** a vegetation anomaly map, which detects statistical anomalies of forest vitality (photosynthetic activity, leaf area index, and vegetation moisture). This can be used to highlight areas of pest damage in the trees, such as decay, browning, and tree mortality.

The data are accessible through the **MySustainableForest platform**. The information can be downloaded to any OGC standard GIS viewer with a Web Map Service. Product files are metadated.

Full technical specifications are available at MySustainableForest **website**.

Image 1. (left). Impact of biotic disturbances on forests that reduce tree vitality levels.

Image 2 (below). Biotic Damage product overview. Sample mapping of Moravský Kras, Czeck Republic.

S4P1 - Biotic damage
Bark beetle damage in Picea abies
- No damage
- Minor damage
- Moderate damage
- Severe damage

5 km

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