

**E R G O F I T O I N A C T I O N**

Give Nature What Nature Wants

## Sick Trees



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[www.ergofito.co.za](http://www.ergofito.co.za)

Tel: + 27 21 447 7114 / Email: [ergofito@telkomsa.net](mailto:ergofito@telkomsa.net)

***Hymenoscyphus pseudoalbidus*** is an Ascomycete fungus that causes ash dieback, a chronic fungal disease of ash trees in Europe characterized by leaf loss and crown dieback in infected trees. The fungus was first scientifically described in 2006 under the name *Chalara fraxinea*. Four years later it was discovered that *Chalara fraxinea* was only the asexual (anamorphic) stage of a fungus that was subsequently named *Hymenoscyphus pseudoalbidus*.

Trees now believed to have been infected with this pathogen were reported dying in Poland in 1992. Poland is the country in which ash dieback is believed to have originated. It is now entrenched in Europe. It is closely related to a native fungus *Hymenoscyphus albidus*, which is saprotrophic and grows on the dead leaves of ash trees.

### **FUNGAL ATTACKS:**

Fungi are unable to produce nutrients on their own and in order to survive must derive their food from other organisms. Fungi attack all parts of a plant and under hospitable conditions, fungi can damage plant translocation tissues; killing a plant in a relatively short period of time. Some of the most common fungal diseases include damping off, leaf spot, anthracnose and rust.

### **PATHOGENIC ATTACKS:**

There are three types of pathogenic attacks:

1. Biotrophs: Keeps the host plant alive
2. Necrotrophs: Kills the host plant
3. Hemibiotrophs: Mutates from Biotrophs to Necrotrophs

All of the above pathogens damage the host plant. The methods used by the pathogens to attack the plant are well described and are not addressed specifically in this paper.

### **ALL PLANTS INHERENT DEFENSE MECHANISM AND METHODS.**

Generally the plant is subject to disease due to both biotic and abiotic agents and factors. The natural defenses available to plants are:

#### **Constitutive:**

- Cell walls
- Waxy Epidermal Cuticles
- Bark

#### **Inducible:**

- Production of Toxic Chemicals
- Pathogen Degrading Enzymes
- Deliberate Cell Suicide

### **Surveillance & Detection:**

- Hypersensitive Response
- Effector
- Systemic Acquired Resistance
- RNA Silencing

### **Insect herbivores:**

- Volatile Organic Compounds

### **Plant Cell:**

- Oxidative Burst
- Callose
- Papillae
- Idioblasts
- Pigmented Cells
- Sclereids
- Stone Cells
- Stinging Cells
- Prostaglandins
- Crystalliferous Cells
- Silica Cells

### **Plant Tissues:**

- Epidermis
- Guard Cells
- Trichomes
- Glandular Trichomes
- Phellem
- Thorns
- Spikes
- Prickles

### **Chemical Defenses:**

- Secondary Metabolites
- Terpenoids
- Essential Oils
- Pyrethrins
- Turpentine
- Diterpenoids
- Gossypol
- Phytoectysones
- Azadirachtin
- Cardic Glycosides
- Digitoxin
- Latex
- Saponins
- Gaeumannomyces graminis
- Phenolics
- Flavonoids
- Anthocyanins
- Phtoalexins
- Tannins
- Lignin
- Furanocoumarins
- Alkaloids
- Cyanogenic glycosides
- Glucosinolates

### **Proteins and Enzymes:**

- Defensins
- Digestive enzyme inhibitors
- Protease inhibitors
- Hydrolytic Enzymes

*The above is a broad overview of plant defenses. Other aspects of plant defense include symbiotic relationships, the importance of beneficial microbes on plant health, and the environmental conditions on plant disease. Humans influence disease resistance by implementing integrated pest management strategies, biological control, cultural practices and genetic engineering.*

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## **Ergofito SOLUTION:**

In a natural environment like a forest, where human intervention is minimal or non-existent, a fungal attack has to be controlled or eliminated by boosting the tree's inherent defense mechanism rather than applying chemical products that may generate secondary problems and weaken the plant's immune system.

For such an event as the ash trees die back, it is recommended to apply a ground microbial solution as well as a foliar solution as follows:

## **YEARLY FOLIAR APPLICATION:**

PRODUCT	HOW MUCH	WHEN
Ergofito Cu/Zn	5 Kg Per Hectare	During Autumn
Ergofito Cu/Zn	5 Kg Per Hectare	As Soon As The Buds Open In Spring
Ergofito Cu/Zn Ergofito Algae Ergofito Defense	3 Kg Per Hectare 1 Kg Per Hectare 2 Kg Per Hectare	When The Tree Has Leaves Once a Month For Four Months
Ergofito Cu/Zn	5 Kg Per Hectare	Prior to the Leaves Falling

Ergofito is a concentrate which is diluted with water at a ratio of 1:200, 1 Kg of product per 200 liters of water. When the products are mixed (as per above) 200 liters is sufficient for all three products mixed together. Ergofito contains its own fungi which are strongly antagonistic towards *Chalara Fraxinea*. It has substances that stimulate the natural immune system of the trees.

Please refer to "Ergofito Benefits" documentation for full product explanation.



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