

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

Give Nature What Nature Wants

Club Root



ERGOFITO

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Introduction

Clubroot is a common disease of cabbages, broccoli, cauliflower, brussels sprouts, radishes, turnips, stocks, wallflowers and other plants belonging to the family Brassicaceae (Cruciferae).

It is caused by *Plasmodiophora brassicae*, which was once considered a slime mold but is now put in the group Phytomyxea.

It is the first Phytomyxea for which the genome has been sequenced. It has as many as thirteen races. Gall formation or distortion takes place on latent roots and gives the shape of a club or spindle.

In the cabbage such attacks on the roots cause undeveloped heads or a failure to head at all, followed often by decline in vigor or by death. It is an important disease, affecting an estimated 10% of the total cultured area worldwide.

Historical reports of clubroot date back to the 13th century in Europe. In the late 19th century, a severe epidemic of clubroot destroyed large proportions of the cabbage crop in St. Petersburg. The Russian scientist Mikhail Woronin eventually identified the cause of clubroot as a "plasmodiophorous organism" in 1875, and gave it the name *Plasmodiophora brassicae*.

In 18th, 19th and early 20th century Britain clubroot was sometimes called finger and toe, fingers and toes, anbury, or ambury, these last two also meaning a soft tumor on a horse.

The potential of cultural practices to reduce crop losses due to clubroot is limited, and chemical treatments to control the fungus are either banned due to environmental regulations or are not cost effective.

Breeding of resistant cultivars therefore is a promising alternative. Disease resistance in *Arabidopsis* through flagellin perception.

Eliminating Club Root

Ergofito Application

Prepare the ground, prior planting or immediately afterwards with:

75 Kg Ergostart Bio Plus per Hectare (this is a radical application)

FIRST APPLICATION:

Prior transplanting, wet the plants with the following:

Dilute the mix with 100 liters of water:

Mix the following in sufficient water to wet each plant. This application is **foliar** only:

Product	Quantity
Ergofito Cu/Zn	400 grams
Ergofito Algae	200 grams
Ergofito Nemacontrol	200 grams

SECOND APPLICATION:

This application is made 20 days after the first application, again with sufficient water to wet all the leaves:

Product	Quantity
Ergofito Cu/Zn	1,5 Kg per Hectare
Ergofito Algae	1 Kg per Hectare
Ergofito Nemacontrol	1,5 Kg per Hectare
Ergofito Activator	4 Kg per Hectare

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THIRD APPLICATION:

This application is made 20 days after the above application, again with sufficient water to wet all the leaves:

Product	Quantity
Ergofito Cu/Zn	1,5 Kg per Hectare
Ergofito Stim	0.5 Kg per Hectare
Ergofito Nemacontrol	1,5 Kg per Hectare
Ergofito Activator	4 Kg per Hectare

FOURTH AND FINAL APPLICATION:

This application is made 20 days after the above application, again with sufficient water to wet all the leaves:

Product	Quantity
Ergofito Cu/Zn	1,5 Kg per Hectare
Ergofito Stim	0.5 Kg per Hectare
Ergofito Nemacontrol	1,5 Kg per Hectare
Ergofito Activator	4 Kg per Hectare



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