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CONTROL OF BLACKROT IN
CABBAGES USING AN ANTAGONISTIC
STRAIN OF BACILLUS SUBTILLIS
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INTRODUCTION

• **Cabbage** is a leafy green or purple biennial plant
• It is difficult to trace the exact history of cabbage,
• Cabbage seedlings have a thin taproot and cordate (heart-shaped) cotyledons.
Black rot

- **Black rot**, caused by the bacterium *Xanthomonas campestris* pv. campestris (Xcc)
- Host infection by Xcc can occur at any stage of the plant life cycle.
- The pathogen thrives in warm and humid climates and is rapidly disseminated in the field.
- The primary source of inoculum is Xcc infected seed.
Bacillus

- A member of the genus *Bacillus*
- has the ability to form a tough, protective endospore, allowing the organism to tolerate extreme environmental conditions.
- *B. subtilis* is a normal gut commensal in humans.
PROBLEM STATEMENT

• Black rot of crucifers is the most destructive and common disease to attack the cabbage family

• Once a plant becomes infected, the disease spreads quickly to other cabbages when water splashes from one plant to the other
• Biological control of plant pathogens using antagonistic bacteria is a promising strategy for plant protection
• Internal colonisation of plants by non-pathogenic bacteria seems to be a natural widespread phenomenon
OBJECTIVES

GENERAL OBJECTIVE
The general objective of my project was to improve food production and be able to prevent losses obtained by farmers during cultivation due to black rot and therefore being able to reduce the cost of production

SPECIFIC OBJECTIVE
The specific aim of the presented work was;
1)To investigate the ability of *Bacillus subtilis* strain CA10 and *Bacillus subtilis* strain CA72 to control the severity of black rot of cabbages under the same conditions
LITERATURE REVIEW

• *Xanthomonas campestris* is an aerobic, Gram-negative rod known to cause the black rot in crucifers by darkening the vascular tissues.

• This bacterium is mesophilic.

• Spraying healthy plants with copper fungicides may reduce the spread of the bacteria in the field.

• *X. campestris* acquire carbon from the host converting it to glucose through gluconeogenesis.
MATERIALS

1) Certified cabbage seeds
2) manure
3) D.A.P fertilizer
4) farming tools like jembes, slashers and water cans
5) *Bacillus subtilis* strains
6) Black rot infected cabbage tissue
7) scalpel
8) incubator
9) lamina flow hood
10) nutrient agar
11) petri dishes
12) spirit lamp
13) autoclave
14) pots
15) media bottle
16) hand sprayer
17) sodium hypochloride
18) ethanol
19) syringe and needle
20) labels
METHODS

- The nursery was established at the field station
- Preparation of bacterial inoculum
- The cabbage seedlings were transplanted into pots
- Application of treatment
- Collection of data
Treatment

- Treatment one was (control)
- Treatment two was (*Bacillus subtilis* CA10)
- Treatment three was (*Bacillus subtilis* CA72)
- The treatment were applied in 10cm$^3$ solutions
# BUDGET

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<tr>
<th>ITEM</th>
<th>SEEDS</th>
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<tr>
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<td>150/=</td>
<td>170/=</td>
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<tr>
<td>TOTAL</td>
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<td>170/=</td>
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<td>SP2</td>
<td>SP3</td>
<td>SP4</td>
<td>SP5</td>
<td>Mean</td>
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DISCUSSION

*Bacillus subtilis* has proven to be able to control blackrot in cabbages, by suppressing the spread of the pathogen. The application of different strains have also been observed to be having different reaction on the serverity of the pathogen.
CONCLUSION AND RECOMMENDATION

The effectiveness of *Bacillus subtilis* can only last for a certain period of time after which the pathogen symptoms regain infection of the plant, so I would like to recommend experiments to be done on the antagonist’s efficiency as a control measure of black rot in cabbages.
REFERENCES


• Williams PH. "Black rot: a continuing threat to world crucifers." Plant Disease 64.8 (1980): 736-742

THANK YOU