CHAPTER - 6

General Discussion
As society grows geometrically, its complexity grows geometrically and constraints grow geometrically. Sometimes one wonders if society will concentrate itself one into obvious like the dinosaur. Agriculture and forestry are constrained like every thing else and as they go, so goes plant pathology.

Horsfall and Cowling (1977)

On the basis of experimental findings of all the data of fungi isolation, biological studies and physiological studies has discussed in this chapter comprehensively. The assessment of isolated fungi from *Daucus carota*, *Raphanus sativus* and *Beta vulgaris* at Allahabad, Varanasi and Kushambi are given below.

**Table: 6.1 Isolated fungi from Carrot (Daucus carota)**

<table>
<thead>
<tr>
<th>Untreated Seed</th>
<th>Allahabad</th>
<th>Kaushambi</th>
<th>Varanasi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternaria radicina,</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Alternaria dauci,</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Alternaria alternata,</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Aspergillus clavatus,</td>
<td>+</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Fusarium oxysporum,</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Mucor species</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Aspergillus niger,</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Aspergillus fumigatus,</td>
<td>+</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>Cercospora beticola,</td>
<td>+</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>Cercospora robusta,</td>
<td>+</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>Cercospora carotae,</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Curvularia lunala,</td>
<td>+</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>Curvularia andropogonisi,</td>
<td>+</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>Fusarium roseum,</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Pythium paroecandrum,</td>
<td>+</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>Helminthosporium sp.</td>
<td>_</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Rhizopus stalonifer,</td>
<td>_</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Botrytis cinerea,</td>
<td>_</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Sclerotium rolfsii,</td>
<td>_</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Xanthomonas species</td>
<td>_</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>
Treated Seed

<table>
<thead>
<tr>
<th>Species</th>
<th>Allahabad</th>
<th>Kaushambi</th>
<th>Varanasi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternaria alternata</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Alternaria sp.</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Alternaria dauci</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Aspergillus fumigatus</td>
<td>+</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Aspergillus clavatus</td>
<td>_</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Botrytis cinerea</td>
<td>_</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Fusarium oxysporum</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Fusarium roseum</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Fusarium sp.</td>
<td>_</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Sclerotium rolfsii</td>
<td>_</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Cercospora carotae</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Pythium paroecandrum</td>
<td>_</td>
<td>_</td>
<td>_</td>
</tr>
</tbody>
</table>

There were 32 al species fungi were isolated from *Daucus carota* for all the sites of Allahabad, Kaushambi and Varanasi districts in which 20 fungi were isolated from untreated seeds and 12 fungi were isolated from treated seeds.

**Untreated seeds** - Following fungi has been isolated from untreated seeds *Alternaria radicina, Alternaria dauci, Alternaria alternata and Fusarium roseum* fungi isolated from untreated seed were common to all sites

Aspergillus clavatus, A. niger, A. fumigates, Cercospora carotae, Fusarium roseum, Botrytis cinerea, Helminthosporium sp, Botrytis cinerea and Xanthomonas species isolated from only Allahabad & Kaushabi

*Cercospora beticola, Cercospora robusta, Curvularia lunala, Cercospora carotae, Curvularia andropogonis, Pythium paroecandrum, Rhizopus stalonifer, and Sclerotium rolfsii* these fungi were absent in Allahabad and Varanasi but it was isolated from Kaushambi

Botrytis cinerea, Helminthosporium sp., Rhizopus stalonifer, Sclerotium rolfsii and Xanthomonas species fungi were absent in Allahabad.

Aspergillus fumigates, Cercospora carotae, Cercospora robusta, Curvularia lunala, Curvularia andropogonis, Pythium paroecandrum and Sclerotium rolfsii fungi were absent from Kaushambi.
Aspergillus niger, Cercospora beticola, Cercospora robusta, Cercospora carotae, Curvularia lunata, Curvularia andropogonis, Fusarium roseum, Pythium paroecandrum, and Rhizopus stalonifer fungi were absent from Varanasi.

**Treated seeds** - Following fungi has been isolated from treated seeds *Alternaria alternata, Alternaria sp., A. dauci, Botrytis cinerea and Fusarium oxysporum* fungi isolated from treated seeds were common to all sites

*Aspergillus fumigates, A. clavatus roseum, Fusarium sp.* and *Cercospora carotae* were isolated from only Allahabad & Kaushabi but these fungi were absent at Varanasi

*Aspergillus clavatus, Fusarium sp. and Sclerotium rolfsii* fungi were absent in Allahabad and Varanasi but it was isolated from Kaushabi

*Aspergillus fumigates, Aspergillus clavatus, Sclerotium rolfsii and, Pythium paroecandrum* fungi were absent from Kaushambi.

*Fusarium roseum, Sclerotium rolfsii and Pythium paroecandrum* fungi were absent from Varanasi.

In India the disease has been reported to infect leaflets, petioles and seed stalks (Rao 1964, Gowda et al., 2000, Gupta and Thind 2006) but its occurrence on the inflorescence of carrot seed crop plant in dry temperate zone is reported for the first time. Strandberg (1983) has also reported the infection of carrot inflorescence by *A. dauci*.

Isolation of fungi have also been done by de Bary (1886) and Pandey et al., (2003) it was identified as *Sclerotinia sclerotiorum* (Lib) de Bary. On the basis of the morphological characters of the fungus and their analogy with that given by Rao (1964) and Farrar et al., (2004) it was identified as *Alternaria dauci* (Kuhn) Groves and Skolko. The disease has been reported on carrot in India by Pandey et al., (2003). However present is the first report on its occurrence in dry temperate zone of Himachal Pradesh. On the basis of the morphological characters of the fungal pathogens associated with the diseases these were identified as *Sclerotinia sclerotiorum* (Lib) de Bary causing root rot and *Alternaria dauci* (Kuhn) Groves and Skolko causing inflorescence blight. Both the diseases are reported for the first time from the dry temperate zone of Himachal Pradesh.
Pradesh (Narender K Bharat et al., 2012). A leaf blight of carrot (Daucus carota) caused by Alternaria dauci was found in Alentejo (Ourique, Portugal). Morphological characteristics of the fungus are described (Maria Cristina Lopes and Victor C. Martins 2008).

Table 6.2
Isolated fungi from Radish (Raphanus sativus)

<table>
<thead>
<tr>
<th>Untreated Seed</th>
<th>Allahabad</th>
<th>kaushambi</th>
<th>Varanasi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternaria alternata</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Alternaria brassicicola</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Alternaria raphani</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Aspergillus niger</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Aspergillus clavatus</td>
<td>+</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Fusarium oxysporum</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Sclerotium rolfsii</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Rhizoctonia solani</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Erysiphe polygoni</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Botrytis cinerea</td>
<td>+</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td>Helminthosporium sp</td>
<td>_</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treated Seed</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternaria alternata</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Alternaria raphani</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Aspergillus clavatus</td>
<td>+</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Fusarium oxysporum</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Fusarium solani</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Botrytis cinerea</td>
<td>+</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td>Fusarium sp.</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

There were 18 fungi were isolated from Raphanus sativus for the sites of Allahabad, Kaushambi and Varanasi in which 11 fungi were isolated from untreated seeds and 7 fungi were isolated from treated seeds.

Untreated seeds- Following fungi has been isolated from untreated seeds Alternaria alternata, A. brassicicola, A. raphani, Aspergillus niger, A. clavatus and Fusarium oxysporum fungi isolated from untreated seed were common to all sites.
Aspergillus clavatus, Sclerotium rolfsii, Rhizoctonia solani, Erysiphe polygoni and Helminthosporium sp. isolated from only Allahabad & Kaushabi but these fungi were absent at Varanasi.

Botrytis cinerea these fungi were absent in Kaushabi and Varanasi but it was isolated from Allahabad. Helminthosporium sp. fungi were absent in Allahabad.

Aspergillus clavatus and Botrytis cinerea fungi were absent from Kaushabi.

Sclerotium rolfsii, Rhizoctonia solani, Erysiphe polygoni and Botrytis cinerea fungi were absent from Varanasi.

Treated seeds- Following fungi has been isolated from treated seeds Alternaria alternate, Alternaria raphani, Fusarium oxysporum, Fusarium solani and Fusarium sp. Aspergillus clavatus fungi isolated from treated seed were common to all sites.

Aspergillus clavatus isolated from only Allahabad & Varanasi but these fungi were absent at Kaushabi.

Botrytis cinerea these fungi were absent in Kaushabi and Varanasi but it was isolated from Allahabad.

Aspergillus clavatus, Botrytis cinerea fungi were absent from Kaushabi.

Botrytis cinerea fungi were absent from Varanasi.

These isolates were in agreement with those described for both A. brassicicola and A. brassicae by Ellis (1971) and Simmons (1995, 2007). Although long conidial chains observed in all A. brassicicola isolates are also a characteristic of A. alternata, a fungus that colonizes decaying leaf tissue of many plant species (Ellis, 1971), The Alternaria brassicae and A. brassicicola are causal fungi for Alternaria blight of radish is supported by Mondal et al., (1989) and Alternaria alternata is corroborated with Suhag et al., (1985). Maximum fungal growth was observed in the centre of the spot. The leaves spot was turned into blight at severe infection. Initial infection was started from soil level on older leaves and gradually increased upward including petiole, flower stalk, pod, green and matured seed are agreement with the Kubota et al., (2003) and King (1994).
### Isolated fungi from Sugar beet (*Beta vulgaris*)

<table>
<thead>
<tr>
<th>Untreated Seed</th>
<th>Allahabad</th>
<th>kaushambi</th>
<th>Varanasi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternaria alternata</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Alternaria brassicicola</td>
<td>+</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Botrytis cinerea</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Erysiphe polygoni</td>
<td>+</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Botryotinia fuckeliana</td>
<td>_</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Rhizoctonia solani</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Phoma betae</td>
<td>_</td>
<td>+</td>
<td>_</td>
</tr>
<tr>
<td>Sclerotium rolfsii</td>
<td>+</td>
<td>_</td>
<td>+</td>
</tr>
<tr>
<td>Cercospora beticola</td>
<td>+</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td>Fusarium oxysporum</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treated Seed</th>
<th>Allahabad</th>
<th>kaushambi</th>
<th>Varanasi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternaria alternata</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Botrytis cinerea</td>
<td>_</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td>Botryotinia fuckeliana</td>
<td>+</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td>Fusarium oxysporum</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Erysiphe polygoni</td>
<td>+</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td>Alternaria brassicicola</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Rhizoctonia solani</td>
<td>+</td>
<td>+</td>
<td>_</td>
</tr>
</tbody>
</table>
There were 17 fungi were isolated from *Beta vulgaris* for all the sites of Allahabad, Kaushambi and Varanasi in which 10 fungi were isolated from untreated seeds and 7 fungi were isolated from treated seeds

**Untreated seeds** - Following fungi has been isolated from untreated seeds *Alternaria alternata*, *Botrytis cinerea* and *Fusarium oxysporum* fungi isolated from untreated seed were common to all sites

*Alternaria brassicicola*, *Erysiphe polygoni*, *Rhizoctonia solani* and *Sclerotium* fungi isolated from untreated seed were two sites.

*Botryotinia fuckeliana*, *Phoma betae* and *Cercospora beticola* fungi isolated from untreated seed were one site.

*Botryotinia fuckeliana* and *Phoma betae* fungi were absent in Allahabad.

*Alternaria brassicicola*, *Erysiphe polygoni*, *Sclerotium rolfsii* and *Cercospora beticola* fungi were absent in Kaushambi.

*Phoma betae* and *Cercospora beticola* fungi were absent in Varanasi.

**Treated seeds** - Following fungi has been isolated from treated seeds *Alternaria alternata*, *Fusarium oxysporum* and *Alternaria brassicicola* fungi isolated from treated seeds were common to all sites.

*Rhizoctonia solani* fungi isolated from treated seed were two sites.

*Botrytis cinerea*, *Botryotinia fuckeliana* and *Erysiphe polygoni* fungi isolated from treated seed were one site.

*Botrytis cinerea* fungi were absent in Allahabad.

*Botrytis cinerea*, *Botryotinia fuckeliana* and *Erysiphe polygoni* fungi were absent in Kaushabi.

*Botryotinia fuckeliana*, *Erysiphe polygoni* and *Rhizoctonia solani* fungi were in Varanasi.

*Alternaria* causes leaf spot of sugarbeet (Mukhopadhyay 1969; Singh *et al.*1971) and damping- off of seedling (untreated, treated table). Species of *Alternaria* are known to cause pre- and post-emergence damping- off of other seeds also (McClellan 1944; Jain and Patel 1969). Similarly, species of *Fusarium* also cause mortality of sugar beet seedling (Mukhopadhyay and Thakur 1970; Singh *et al.*,1971 For the first time in 2000
and 2001, the occurrence of Alternaria leaves spot (ALS) on sugar beet was observed in Slovakia, at Bučany and Nitra. According to keys (FASSATIOVÁ 1979; SAMSON et al., 1995), Alternaria alternate (Fr.) Keissler (syn. A. tenuis C.G. Nees) was identified as the causal agent of these spots).

Fig. 6.1 shows that use of Benlate fungicide on 50 ppm, 100 ppm, 500 ppm and 1000 ppm Alternaria raphani shows more resistant in comparison to the other fungi Benlate was wane effective on 500 ppm and 1000 ppm concentration.

The fungicidal amendment in soil Mycoflora of root vegetables (carrot, radish, and sugar beet). Table-5.7 indicates that when the fungicide Benlate was used at 50 ppm concentration, 4 species of Alternaria dauci, 5 species of Alternaria radicina, 7 species of Aspergillus niger, 5 species of Botrytis cinerea, 6 species of Cercospora bticola, 5 species of Cercospora carotae, 4 species of Fusarium oxysporum and 5 species of Sclerotium rolfsii were recovered.

Benlate was used at 100 ppm concentration, 2 species of Alternaria dauci, 3 species of Alternaria radicina, 4 species of Aspergillus niger, 2 species of Botrytis cinerea, 2 species of Cercospora bticola, 2 species of Cercospora carotae, 2 species of Fusarium oxysporum and 2 species of Sclerotium rolfsii were recovered respectively which was slightly less number of fungi in compared to 50 ppm concentration of Benlate. There were no fungi recovered on 500 and 1000 ppm of Benlate concentration.

Similar reports have been made by Shahzad (1994) that Vitavax inhibited colony growth Fusarium oxysporum at 1000 ppm. Benlate has been reported to be most effective for checking the mycelial growth of F.oxysporum at low concentrations (Hussain et al., 1981; Shahzad, 1994; Arshad et al., 1996). The effectiveness of Benlate has already been reported against pathogenic fungi viz., Fusarium oxysporum (Chavan et al., 1977; Ahmad et al., 1996) experiment four fungicides with 10, 20 and 40 ppm concentrations were used against F. solani and A. alternata colony growth. Among these treatments, Benlate and Captan were the most effective against F. solani and A. alternata, respectively as compared to other treatments (Amer Habib et al., 2007)

Fig. 6.2 shows that Alternaria dauci was found more resistant when the fungicide Cerobin was used that of fungi on 1000 ppm concentration of the Cerobin were killed. So this concentration was most effective in comparison to other concentration.

General Discussion

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When the different concentrations of Cercobin were used during fungicidal amendment in soil different number of fungi were recorded on different concentration.

On of 50 ppm concentration of Cercobin 40 species of Alternaria dauci, 22 species of Alternaria radicina, 24 species of Aspergillus niger, 20 species of Botrytis cinerea, 15 species of Cercospora beticola, 16 species of Cercospora carotae, 7 species of Fusarium oxysporum and 10 species of Sclerotium rolfsii were recorded. On 100 ppm concentration of Cercobin 35 species of Alternaria dauci, 10 species of Alternaria radicina, 12 species of Aspergillus niger, 14 species of Botrytis cinerea, 10 species of Cercospora beticola, 10 species of Cercospora carotae, 5 species of Fusarium oxysporum and 8 species of Sclerotium rolfsii were recovered.

On 500 ppm concentration 5 species of Alternaria dauci, 7 species of Alternaria radicina, 5 species of Aspergillus niger, 5 species of Botrytis cinerea, 10 species of Cercospora beticola, 10 species of Cercospora carotae, 4 species of Fusarium oxysporum and 4 species of Sclerotium rolfsii were recovered obtain. Where as on 1000 ppm concentration no species of Alternaria dauci, 2 species of Alternaria radicina, 2 species of Aspergillus niger, 1 species of Botrytis cinerea, 5 species of Cercospora beticola, no species of Cercospora carotae, no species of Fusarium oxysporum and no species of Sclerotium rolfsii were recovered.

Fig. 6.3 shows that the use of Difolatan on deferen t concentration i. e. 500 ppm, 100 ppm 500 ppm and 1000 ppm. 500 ppm and 1000 ppm were found most effective in comparison on the other concentration.

During the treatment with the fungicide Difolatan type of effect were noted. When 50 ppm concentration were used 6 species of Alternaria dauci, 8 species of Alternaria radicina, 4 species of Aspergillus niger, 3 species of Botrytis cinerea, 2 species of Cercospora beticola, 2 species of Cercospora carotae, 3 species of Fusarium oxysporum and 4 species of Sclerotium rolfsii were recovered of Difolatan. On 100 ppm concentration 1 species of Alternaria dauci, 1 species of Alternaria radicina, 1 species of Aspergillus niger, 1 species of Botrytis cinerea, 1 species of Cercospora beticola, 1 species of Cercospora carotae, 1 species of Fusarium oxysporum and 1 species of Sclerotium rolfsii were recovered of Difolatan. There were no fungi recovered on 500 and 1000 ppm of Difolatan concentration.
Fig. 6.4 shows that Plantvax fungicide used on different concentration. But concentration on 1000 ppm of Plantvax is more effect that the other concentration i. e. 50 ppm, 100 ppm and 500 ppm.

When the fungicide Plantvax was used at 50 ppm concentration were used 30 species of Alternaria dauci, 20 species of Alternaria radicina, 16 species of Aspergillus niger, 24 species of Botrytis cinerea, 28 species of Cercospora beticola, 30 species of Cercospora carotae, 20 species of Fusarium oxysporum and 16 species of Sclerotium rolfsii were recovered of Plantvax. On 100 ppm concentration 20 species of Alternaria dauci, 17 species of Alternaria radicina, 17 species of Aspergillus niger, 16 species of Botrytis cinerea, 18 species of Cercospora beticola, 20 species of Cercospora carotae, 10 species of Fusarium oxysporum and 10 species of Sclerotium rolfsii were recovered. On 500 ppm concentration 5 species of Alternaria dauci, 4 species of Alternaria radicina, no species of Aspergillus niger, no species of Botrytis cinerea, no species of Cercospora beticola, 4 species of Cercospora carotae, 3 species of Fusarium oxysporum and 4 species of Sclerotium rolfsii were recovered obtain. Where as on 1000 ppm concentration 1 species of Alternaria dauci, species of Alternaria radicina, 1 species of Aspergillus niger, no species of Botrytis cinerea, no species of Cercospora beticola, no species of Cercospora carotae, no species of Fusarium oxysporum and no species of Sclerotium rolfsii were recovered.

Fig. 6.5 shows that 500 ppm and 1000 ppm is more different that the 50 ppm, 100 ppm Cercospora beticola is more resistant on 50 ppm concentration.

When the fungicide Tecto-40 was used at 50 ppm concentration were used 18 species of Alternaria dauci, 20 species of Alternaria radicina, 8 species of Aspergillus niger, 18 species of Botrytis cinerea, 21 species of Cercospora beticola, 15 species of Cercospora carotae, 20 species of Fusarium oxysporum and 14 species of Sclerotium rolfsii were recovered of Plantvax. On 100 ppm concentration 7 species of Alternaria dauci, 9 species of Alternaria radicina, 4 species of Aspergillus niger, 6 species of Botrytis cinerea, 7 species of Cercospora beticola, 4 species of Cercospora carotae, 6 species of Fusarium oxysporum and 9 species of Sclerotium rolfsii were recovered. There were no fungi recovered on 500 ppm and 1000 ppm of Tecto-40 concentration.
Effect of fungicidal amendment on soil mycoflora of *Daucus carota* in the field

**Effect of different concentration of Benlate on fungal growth**

*Fig-6.1*

**Effect of different concentration of Cercobin on fungal growth**

*Fig-6.2*
Effect of different concentration of Difolatan on fungal growth

Effect of different concentration of Plantvax on fungal growth

**Fig-6.3**

**Fig.-6.4**
Effect of different concentration of Tecto-40 on fungal growth

![Graph showing the effect of different concentrations of Tecto-40 on fungal growth. The x-axis represents different fungi, and the y-axis represents concentration in ppm. Different colors represent concentrations of 50, 100, 500, and 1000 ppm.](image)

**Fig.-6.5**

Effect of different concentration of Vetavax on fungal growth

![Graph showing the effect of different concentrations of Vetavax on fungal growth. The x-axis represents different fungi, and the y-axis represents concentration in ppm. Different colors represent concentrations of 50, 100, 500, and 1000 ppm.](image)

**Fig.-6.6**
Fig. 6.6 shows that the use of Vetavax 100 ppm concentration was found were effective in comparison to 500 ppm, 100 ppm and 50 ppm Alternaria dauci and Cercospora beticola were found most resistant fungi on 50 ppm concentration.

During the treatment with the fungicide Vetavax type of effect were noted When the 50 ppm concentration were used 35 species of Alternaria dauci, 25 species of Alternaria radicina, 30 species of Aspergillus niger, 30 species of Botrytis cinerea, 35 species of Cercospora beticola, 25 species of Cercospora carotae, 24 species of Fusarium oxysporum and 28 species of Sclerotium rolfsii were recovered of Plantvax. On 100 ppm concentration 25 species of Alternaria dauci, 20 species of Alternaria radicina, 24 species of Aspergillus niger, 22 species of Botrytis cinerea, 23 species of Cercospora beticola, 14 species of Cercospora carotae, 18 species of Fusarium oxysporum and 16 species of Sclerotium rolfsii were recovered. On 500 ppm concentration 5 species of Alternaria dauci, 6 species of Alternaria radicina, 2 species of Aspergillus niger, 4 species of Botrytis cinerea, 2 species of Cercospora beticola, no species of Cercospora carotae, no species of Fusarium oxysporum and 5 species of Sclerotium rolfsii were recovered. There were no fungi recovered on 1000 ppm of Vetavax concentration.

Fig. 6.7 shows that use of Benlate fungicide on 50 ppm, 100 ppm, 500 ppm and 1000 ppm Cercospora beticola shows more resistant in comparison to the other fungi Benlate was wane effective on 500 ppm and 1000 ppm concentration.

There were six fungicides of different concentration (50,100,500, and 1000 ppm) were used to investigate. The fungicidal amendment in soil Mycoflora of root sugar beet. Table- indicates that when the fungicide Benlate was used at 50 ppm concentration, 2 species of Alternaria alternata, 4 species of Phoma betae, 6 species of Alternaria brassicae, 4 species of Botrytis cinerea, 3 species of Cercospora beticola, 5 species of Erysiphi polygoni, 4 species of Fusarium oxysporum and 3 species of Sclerotium rolfsii were recovered.

When the fungicide Benlate was used at 100 ppm concentration, 3 species of Alternaria alternata, 4 species of Phoma betae, 5 species of Alternaria brassicae, 2 species of Botrytis cinerea, 1 species of Cercospora beticola, 2 species of Erysiphi polygoni, 4
species of *Fusarium oxysporum* and 2 species of *Sclerotium rolfsii* were recovered. There were no fungi recovered on 500 and 1000 ppm of Benlate concentration.

Fig. 6.8 shows that *Alternaria alternata* was found more resistant when the fungicide Cerobin was used that of fungi on 1000 ppm concentration of the Cerobin were killed. So this concentration was most effective in comparison to other concentration.

When the different concentrations of Cerobin were used during fungicidal amendment in soil different number of fungi were recorded on different concentration. On of 50 ppm concentration 35 species of *Alternaria alternata*, 20 species of *Phoma betae*, 25 species of *Alternaria brassicae*, 25 species of *Botrytis cinerea*, 15 species of *Cercospora beticola*, 17 species of *Erysiphi polygoni*, 8 species of *Fusarium oxysporum* and 15 species of *Sclerotium rolfsii* were recovered.

On 100 ppm concentration 40 species of *Alternaria alternata*, 15 species of *Phoma betae*, 10 species of *Alternaria brassicae*, 13 species of *Botrytis cinerea*, 12 species of *Cercospora beticola*, 10 species of *Erysiphi polygoni*, 6 species of *Fusarium oxysporum* and 7 species of *Sclerotium rolfsii* were recovered.

On 500 ppm concentration 06 species of *Alternaria alternata*, 05 species of *Phoma betae*, 04 species of *Alternaria brassicae*, 10 species of *Botrytis cinerea*, 13 species of *Cercospora beticola*, 14 species of *Erysiphi polygoni*, 05 species of *Fusarium oxysporum* and 05 species of *Sclerotium rolfsii* were recovered.

On 1000 ppm concentration no species of *Alternaria alternata*, 03 species of *Phoma betae*, 05 species of *Alternaria brassicae*, 01 species of *Botrytis cinerea*, 04 species of *Cercospora beticola*, no species of *Erysiphi polygoni*, no species of *Fusarium oxysporum* and no species of *Sclerotium rolfsii* were recovered.

Fig. 6.9 shows that the use of Difolatan on deferent concentration i. e. 500 ppm, 100 ppm 500 ppm and 1000 ppm. 500 ppm and 1000 ppm were found most effective in comparison on the other concentration.

When the different concentrations of Difolatan were used during fungicidal amendment in soil different number of fungi were recorded on different concentration. On of 50 ppm concentration 5 species of *Alternaria alternata*, 7 species of *Phoma betae*, 5 species of...
Alternaria brassicae, 3 species of Botrytis cinerea, 4 species of Cercospora beticola, 2 species of Erysiphi polygoni, 2 species of Fusarium oxysporum and 3 species of Sclerotium rolfsii were recovered.

On 100 ppm concentration 2 species of Alternaria alternata, 2 species of Phoma betae, 1 species of Alternaria brassicae, 2 species of Botrytis cinerea, 1 species of Cercospora beticola, 2 species of Erysiphi polygoni, 1 species of Fusarium oxysporum and 2 species of Sclerotium rolfsii were recovered. There were no fungi recovered on 500 and 1000 ppm of Difolatan concentration.

Fig. 6.10 shows that Plantvax fungicide used on different concentration. But concentration on 1000 ppm of Plantvax is more effect that the other concentration i. e. 50 ppm, 100 ppm and 500 ppm.

When the different concentrations of Plantvax were used during fungicidal amendment in soil different number of fungi were recorded on different concentration. On of 50 ppm concentration 35 species of Alternaria alternata, 25 species of Phoma betae, 15 species of Alternaria brassicae, 20 species of Botrytis cinerea, 30 species of Cercospora beticola, 20 species of Erysiphi polygoni, 25 species of Fusarium oxysporum and 15 species of Sclerotium rolfsii were recovered.

On 100 ppm concentration 25 species of Alternaria alternata, 18 species of Phoma betae, 18 species of Alternaria brassicae, 17 species of Botrytis cinerea, 18 species of Cercospora beticola, 20 species of Erysiphi polygoni, 10 species of Fusarium oxysporum and 10 species of Sclerotium rolfsii were recovered.

On 500 ppm concentration 07 species of Alternaria alternata, 05 species of Phoma betae, 02 species of Alternaria brassicae, 01 species of Botrytis cinerea, 05 species of Cercospora beticola, 04 species of Erysiphi polygoni, 04 species of Fusarium oxysporum and 06 species of Sclerotium rolfsii were recovered.

On 1000 ppm concentration 02 species of Alternaria alternata, 02 species of Phoma betae, no species of Alternaria brassicae, no species of Botrytis cinerea, no species of Cercospora beticola, no species of Erysiphi polygoni, no species of Fusarium oxysporum and no species of Sclerotium rolfsii were recovered.

Fig. 6.11 shows that 500 ppm and 1000 ppm is more different that the 50 ppm, 100 ppm
Cercospora beticola is more resistant on 50 ppm concentration

When the different concentrations of Tecto-40 were used during fungicidal amendment in soil different number of fungi were recorded on different concentration On of 50 ppm concentration 20 species of Alternaria alternata, 25 species of Phoma betae, 10 species of Alternaria brassicae, 20 species of Botrytis cinerea, 21 species of Cercospora beticola, 16 species of Erysiphi polygoni, 20 species of Fusarium oxysporum and 14 species of Sclerotium rolfsii were recovered.

On 100 ppm concentration 8 species of Alternaria alternata, 7 species of Phoma betae 5 species of Alternaria brassicae, 6 species of Botrytis cinerea, 7 species of Cercospora beticola, 5 species of Erysiphi polygoni, 5 species of Fusarium oxysporum and 10 species of Sclerotium rolfsii were recovered. There were no fungi recovered on 500 and 1000 ppm of Tecto-40 concentration.

Fig. 6.12 shows that the use of Vetavax 100 ppm concentration was found were effective in comparison to 500 ppm, 100 ppm and 50 ppm Alternaria alternata and Cercospora beticola were found most resistant fungi on 50 ppm concentration.

When the different concentrations of Vetavax were used during fungicidal amendment in soil different number of fungi were recorded on different concentration On of 50 ppm concentration 30 species of Alternaria alternata, 25 species of Aspergillus fumigatus, 20 species of Alternaria brassicae, 20 species of Botrytis cinerea, 35 species of Cercospora beticola, 25 species of Erysiphi polygoni, 25 species of Fusarium oxysporum and 30 species of Sclerotium rolfsii were recovered.

On 100 ppm concentration 20 species of Alternaria alternata, 25 species of Phoma betae, 20 species of Alternaria brassicae, 23 species of Botrytis cinerea, 22 species of Cercospora beticola, 15 species of Erysiphi polygoni, 17 species of Fusarium oxysporum and 18 species of Sclerotium rolfsii were recovered.

On 500 ppm concentration 06 species of Alternaria alternata, 07 species of Phoma betae, 03 species of Alternaria brassicae, 05 species of Botrytis cinerea, 03 species of Cercospora beticola, no species of Erysiphi polygoni, no species of Fusarium oxysporum and 06 species of Sclerotium rolfsii were recovered. There were no fungi recovered on 1000 ppm of Difolatan concentration.
Effect of fungicidal amendment on soil Mycoflora of *Beeta vulgaris* in the field.

**Fig. 6.7**

Effect of different concentration of Benlate on fungal growth

**Fig. 6.8**

Effect of different concentration of Cerobin on fungal growth
Effect of different concentration of Difolatan on fungal growth

![Fig. 6.9](image-url)

Effect of different concentration of Plantvax on fungal growth

![Fig. 6.10](image-url)
Effect of different concentration of Tecto-40 on fungal growth

Fig. 6.11

Effect of different concentration of Vetavax on fungal growth

Fig. 6.12
Fig. 6.13 shows that use of Benlate fungicide on 50 ppm, 100 ppm, 500 ppm and 1000 ppm *Aspergillus niger* shows more resistant in comparison to the other fungi Benlate was wane effective on 500 ppm and 1000 ppm concentration.

When the fungicide Benlate was used at 50 ppm concentration, 3 species of *Alternaria alternata*, 4 species of *A. raphani*, 6 species of *Aspergillus niger*, 4 species of *Botrytis cinerea*, 5 species of *Curvularia lunata*, 4 species of *Survularia rousta*, 3 species of *Fusarium oxysporum* and 5 species of *Sclerotium rolfsii* were recovered.

On of 100 ppm concentration, 3 species of *Alternaria alternata*, 5 species of *A. raphani*, 2 species of *Aspergillus niger*, 4 species of *Botrytis cinerea*, 3 species of *Curvularia lunata*, 3 species of *Survularia rousta*, 4 species of *Fusarium oxysporum* and 6 species of *Sclerotium rolfsii* were recovered. There were no fungi recovered on 500 and 1000 ppm of Benlate concentration.

Fig. 6.14 shows that *Alternaria alternata* was found more resistant when the fungicide Cercobin was used that of fungi on 1000 ppm concentration of the Cerobin were killed. So this concentration was most effective in comparison to other concentration.

When the fungicide Cercobin was used at 50 ppm concentration, 35 species of *Alternaria alternata*, 25 species of *A. raphani*, 20 species of *Aspergillus niger*, 24 species of *Botrytis cinerea*, 15 species of *Curvularia lunata*, 18 species of *Survularia rousta*, 8 species of *Fusarium oxysporum* and 15 species of *Sclerotium rolfsii* were recovered.

On 100 ppm concentration, 40 species of *Alternaria alternata*, 15 species of *A. raphani*, 13 species of *Aspergillus niger*, 15 species of *Botrytis cinerea*, 10 species of *Curvularia lunata*, 15 species of *Survularia rousta*, 7 species of *Fusarium oxysporum* and 8 species of *Sclerotium rolfsii* were recovered.

On 500 ppm concentration, 05 species of *Alternaria alternata*, 06 species of *A. raphani*, 04 species of *Aspergillus niger*, 04 species of *Botrytis cinerea*, 10 species of *Curvularia lunata*, 15 species of *Survularia rousta*, 05 species of *Fusarium oxysporum* and 04 species of *Sclerotium rolfsii* were recovered.
Fig. 6.15 shows that the use of Difolatan on different concentration i.e. 500 ppm, 100 ppm 500 ppm and 1000 ppm. 500 ppm and 1000 ppm were found most effective in comparison on the other concentration.

When the fungicide Difolatan was used at 50 ppm concentration, 5 species of Alternaria alternata, 7 species of A. raphani, 5 species of Aspergillus niger, 3 species of Botrytis cinerea, 4 species of Curvularia lunata, 2 species of Survularia rousta, 2 species of Fusarium oxysporum and 3 species of Sclerotium rolfsii were recovered.

On 100 ppm concentration, 1 species of Alternaria alternata, 1 species of A. raphani, 1 species of Aspergillus niger, 1 species of Botrytis cinerea, 1 species of Curvularia lunata, 1 species of Survularia rousta, 1 species of Fusarium oxysporum and 1 species of Sclerotium rolfsii were recovered. There were no fungi recovered on 500 and 1000 ppm of Difolatan concentration.

Fig. 6.16 shows that Plantvax fungicide used on different concentration. But concentration on 1000 ppm of Plantvax is more effective that the other concentration i.e. 50 ppm, 100 ppm and 500 ppm concentration.

When the fungicide Plantvax was used at 50 ppm concentration, 35 species of Alternaria alternata, 25 species of A. raphani, 15 species of Aspergillus niger, 25 species of Botrytis cinerea, 30 species of Curvularia lunata, 25 species of Survularia rousta, 15 species of Fusarium oxysporum and 20 species of Sclerotium rolfsii were recovered.

On 100 ppm concentration, 20 species of Alternaria alternata, 18 species of A. raphani, 17 species of Aspergillus niger, 20 species of Botrytis cinerea, 25 species of Curvularia lunata, 20 species of Survularia rousta, 15 species of Fusarium oxysporum and 10 species of Sclerotium rolfsii were recovered.

On 500 ppm concentration, 06 species of Alternaria alternata, 05 species of A. raphani, no species of Aspergillus niger, and no species of Botrytis cinerea, 05 species of Curvularia lunata, 05 species of Survularia rousta, 04 species of Fusarium oxysporum and 05 species of Sclerotium rolfsii were recovered.

On 1000 ppm concentration, 01 species of Alternaria alternata, 01 species of A. raphani, no species of Aspergillus niger, no species of Botrytis cinerea, no species of Curvularia
lunata, no species of Survularia rousta, no species of Fusarium oxysporum and no species of Sclerotium rolfsii were recovered.

Fig. 6.17 shows that 500 ppm and 1000 ppm is more different that the 50 ppm, 100 ppm Curvularia lunata is more resistant on 50 ppm concentration.

When the fungicide Tecto-40 was used at 50 ppm concentration, 20 species of Alternaria alternata, 25 species of A. raphani, 10 species of Aspergillus niger, 20 species of Botrytis cinerea, 21 species of Curvularia lunata, 16 species of Survularia rousta, 20 species of Fusarium oxysporum and 14 species of Sclerotium rolfsii were recovered.

On 100 ppm concentration, 8 species of Alternaria alternata, 7 species of A. raphani, 5 species of Aspergillus niger, 6 species of Botrytis cinerea, 7 species of Curvularia lunata, 5 species of Survularia rousta, 5 species of Fusarium oxysporum and 10 species of Sclerotium rolfsii were recovered. There were no fungi recouered on 500 and 1000 ppm of Tecto-40 concentration.

Fig. 6.18 shows that the use of Vetavax 100 ppm concentration was found were effective in comparison to 500 ppm, 100 ppm and 50 ppm Alternaria alternata and Curvularia lunata were found most resistant fungi on 50 ppm concentration.

When the fungicide Vetavax was used at 50 ppm concentration, 30 species of Alternaria alternata, 25 species of A. raphani, 20 species of Aspergillus niger, 20 species of Botrytis cinerea, 35 species of Curvularia lunata, 25 species of Survularia rousta, 25 species of Fusarium oxysporum and 30 species of Sclerotium rolfsii were recovered.

On 100 ppm concentration, 20 species of Alternaria alternata, 25 species of A. raphani, 20 species of Aspergillus niger, 23 species of Botrytis cinerea, 22 species of Curvularia lunata, 15 species of Survularia rousta, 17 species of Fusarium oxysporum and 18 species of Sclerotium rolfsii were recovered.

On 500 ppm concentration, 04 species of Alternaria alternata, 05 species of A. raphani, 03 species of Aspergillus niger, 03 species of Botrytis cinerea, 02 species of Curvularia lunata, no species of Survularia rousta, no species of Fusarium oxysporum and 05 species of Sclerotium rolfsii were recovered. There were no fungi recouered on 1000 ppm of Vetavax concentration.
Effect of fungicidal amendment in soil Mycoflora of (*Raphanus sativus*) in the field.

**Fig. 6.13**

**Fig. 6.14**
**Effect of different concentration of Difolatan on fungal growth**

![](Fig. 6.15)

**Effect of different concentration of Plantvax on fungal growth**

![](Fig. 6.16)
Effect of different concentration of Tecto-40 on fungal growth

Fig. 6.17

Effect of different concentration of Vetavax on fungal growth

Fig. 6.18
Showing effect of fungicidal seed treatment on survival of seedling of root vegetables.

Fig. 6.19 shows 500 ppm concentration of Cereson dry was used for seed treatment the survival percentage was record different for different vegetables species. It was 86% for Beta vulgaris, 80% for Daucus carota, and 94% for Raphanus sativus.

On 750 ppm concentration the survival rate was 98% for Beta vulgaris, 94% for Daucus carota and 98% for Raphanus sativus.

On 1000 ppm concentration the survival rate record as 98% for Beta vulgaris, 94% for Daucus carota and 98% for Raphanus sativus.

Fig. 6.20 shows 500 ppm concentration of Agrosan GN was used for seed treatment the survival percentage was record different for different vegetable species. It was 60% for Beta vulgaris, 64% for Daucus carota, and 48% for Raphanus sativus.

On 750 ppm concentration the survival rate was 90% for Beta vulgaris, 80% for Daucus carota and 64% for Raphanus sativus.

On 1000 ppm concentration the survival rate record as 90% for Beta vulgaris, 90% for Daucus carota and 96% for Raphanus sativus.

Fig. 6.21 shows 500 ppm concentration of Thiram was used for seed treatment the survival percentage was record different for different vegetable species. It was 72% for Beta vulgaris, 86% for Daucus carota, and 84% for Raphanus sativus.

On 750 ppm concentration the survival rate was 80% for Beta vulgaris, 98% for Daucus carota and 90% for Raphanus sativus.

On 1000 ppm concentration the survival rate record as 84% for Beta vulgaris, 98% for Daucus carota and 90% for Raphanus sativus.

Fig. 6.22 shows 500 ppm concentration of Vitavax was used for seed treatment the survival percentage was record different for different vegetable species. It was 98% for Beta vulgaris, 66% for Daucus carota, and 64% for Raphanus sativus.

On 750 ppm concentration the survival rate was 88% for Beta vulgaris, 94% for Daucus carota and 86% for Raphanus sativus.

On 1000 ppm concentration the survival rate record as 94% for Beta vulgaris, 94% for Daucus carota and 86% for Raphanus sativus.
Showing effect of fungicidal seed treatment on survival of seedling of root vegetables.

**Fig. 6.19**

**Effect of fungicidal seed treatment on survival of seedlings of root vegetable**

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<th>Concentration of Ceresan</th>
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<th>Daucus carota</th>
<th>Raphanus sativus</th>
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</table>

**Fig. 6.20**

**Effect of fungicidal seed treatment on survival of seedlings of root vegetables**

<table>
<thead>
<tr>
<th>Concentration of Agrosan GN</th>
<th>Beta vulgaris</th>
<th>Daucus carota</th>
<th>Raphanus sativus</th>
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</thead>
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</tr>
<tr>
<td>1000</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>
Fig. 6.21

Fig. 6.22
Test of spore germination on seed of \textit{(Beta vulgaris)} by the treatment of various Plant leaf-extracts

Fig. 6.23 indicate that when extract of Strychnos nux-vomica in different concentration \textit{i.e.} 50 ppm, 75 ppm and 100 ppm were to treat of the seed of \textit{Beeta vulgaris} the leaf-extract on 100 ppm concentration is most effective where as 75 ppm and 50 ppm is less effective respectively. Spore germination was found less on 100 ppm concentration of leaf-extract of \textit{Strychnos nux-vomica}.

The effect of leaf-extract of various plant on spore germination is presented in table. Three types of concentration 50 ppm, 75 ppm and 100 ppm was used to test the spore germinate on seed of \textit{Beta vulgaris}. There were 100 seeds used to carry out this test. When the leaf-extract taken from \textit{Strychnos nux-vomica} on 50 ppm concentration 40 spores of \textit{Alternaria alternata}, 60 spores of \textit{A.brassicae}, 35 spore \textit{Botrytis cinerea}, 3 spore \textit{Cercospora beticola} and 51 spore \textit{Fusarium oxysporum} were found. On 75 ppm concentration 30 spore of \textit{Alternaria alternata}, spores, 45 spores of \textit{A.brassicae}, 32 spore \textit{Botrytis cinerea}, 20 spore \textit{Cercospora beticola}, and 26 spore \textit{Fusarium oxysporum} were found. On 100 ppm concentration no spore of \textit{Alternaria alternata}, 02 spores of \textit{A.beasscae}, 02 spores \textit{Botrytis cinerea}, no spore \textit{Cercospora beticola}, no spore \textit{Cercospora carotae}, and 05 spores \textit{Fusarium oxysporum} were found.

The present investigation was carried the antimicrobial activity of N-Butanol, Methanol and aqueous leaf extract of two medicinal plants followed Cassia agustifolia and Strychnos nux vomica were tested against the human pathogenic micro-organisms (Gnanavel et al, 2012).

Figure- 6.24 When leaf-extract of \textit{Allium sepa} was used to treat the seed of \textit{Beeta vulgaris} then 100 ppm concentration was found most effective in comparison to other concentration \textit{i.e.} 75 ppm and 50 ppm.

The effect of leaf-extract of various \textit{Allium cepa} on spore germination is presented in table. Three types of concentration 50 ppm, 75 ppm and 100 ppm was used to test the
spores germinate on seed of *Beta vulgaris*. There were 100 seeds used to carry out this test. When the leaf-extract taken from Allium cepa on 50 ppm concentration 50 spores of *Alternaria alternata*, 40 spores of *A. brassicaceae*, 40 spores *Botrytis cinerea*, 45 spores *Cercospora beticola* and 57 spores *Fusarium oxysporum* were found. On 75 ppm concentration 30 spore of *Alternaria alternata*, 30 spores of *A. brassicaceae*, 20 spore *Botrytis cinerea*, 27 spores *Cercospora beticola*, and 36 spores *Fusarium oxysporum* were found. On 100 ppm concentration no of *Alternaria alternata*, 02 spores of *A. brassicaceae*, 05 spore *Botrytis cinerea*, no spores *Cercospora beticola* and 05 spores *Fusarium oxysporum* were found.

Extract of *Allium cepa* was effective against *Alternaria tenuis* and *Curvularia lunata* (Misra and Dixit, 1976)

*Allium cepa, Allium sativum, Azadirachta indica, Calotropis procera, Datura stramonium, Ocimum sanctum, Tagetes erecta, Vinca rosea* and *Withania somnifera* showed fungicidal property against *Fusarium oxysporum* and *Rhizoctonia solani* (Shivpuri *et al.*, 1997).

The extracts of *Adhatoda vasica, Allium cepa, A. sativum,* and *Azadirachta indica* caused inhibition of *Curvularia penneseti* (Singh, 2008).

The extracts of onion bulbs and garlic cloves were effective against *Drechslera oryzae* (Sunder *et al.*, 2010). The extracts of *Allium sativum, A. cepa* and *Azadirachta indica* showed antifungal activity against white rust and blight of mustard (Yadav, 2009) Garlic clove extract inhibited growth of for *Sclerotinia sclerotiorum* (Yadav *et al.*, 2011). *Azadirachta indica, Allium cepa* and *A. sativum* showed antifungal property against *Alternaria alternata* (Lakshman Prasad Balai and Ahir, 2011)

Figure-6.25 Indicate that when fungicide taken from leaf-extract of *Azadirachta indica* was used to treat the seed of *Beta vulgaris*, the 100 ppm concentration was more effective in compression to 75 ppm and 50 ppm respectively.
The effect of leaf-extract of various *Azadiracta indica* on spore germination is presented in table. Three types of concentration 50 ppm, 75 ppm and 100 ppm was used to test the spore germinate on seed of *Beta vulgaris*. There were 100 seeds used to carry out this test. When the leaf-extract taken from Azadirachta indica on 50 ppm concentration 04 spores of *Alternaria alternata*, 05 spores of *A. brassicaceae*, 20 spores *Botrytis cinerea*, 10 spores *Cercospora beticola* and 10 spores *Fusarium oxysporum* were found. On 75 ppm concentration no spore of *Alternaria alternata*, spores, 02 spores of *A. brassicaceae*, 02 spores *Botrytis cinerea*, no spores *Cercospora beticola*, and no spores *Fusarium oxysporum* were found. On 100 ppm concentration there is no spore was found with any fungi

Figure-6.26 indicate that when extract of *Occimum sanctum* in different concentration *i.e.* 50 ppm, 75 ppm and 100 ppm were to treat of the seed of *Beeta vulgaris* the leaf-extract on 100 ppm concentration is most effective where as 75 ppm and 50 ppm is less effective respeelively. Spore germination was found less on 100 ppm concentration of leaf-extract of *Occimum sanctum*.

The effect of leaf-extract of various plant on spore germination is presented in table. Three types of concentration 50 ppm, 75 ppm and 100 ppm was used to test the spore germinate on seed of *Beta vulgaris*. There were 100 seeds used to carry out this test. When the leaf-extract taken from *Occimum sanctum* on 50 ppm concentration 50 spores of *Alternaria alternata*, 40 spores of *A. brassicaceae*, 30 spores *Botrytis cinerea*, 25 spores *Cercospora beticola* and 47 spores *Fusarium oxysporum* were found. On 75 ppm concentration 30 spore of *Alternaria alternata*, spores, 25 spores of *A. brassicaceae*, 15 spore *Botrytis cinerea*, 12 spores *Cercospora beticola*, 20 spores *Fusariain oxysporum* were found. On 100 ppm concentration 10 of *Alternaria alternata*, 17 spores of *A. brassicaceae*, no spore *Botrytis cinerea*, no spores *Cercospora beticola* and 02 spores *Fusarium oxysporum* were found

Figure-6.27 Indicate that when fungicide taken from leaf-extract of *Allium sativum* used to treat the seed of *Beeta vulgaris*, the 100 ppm concentration was more effective in compression to 75 ppm and 50 ppm respectively.
The effect of leaf-extract of various plant on spore germination is presented in table. Three types of concentration 50 ppm, 75 ppm and 100 ppm was used to test the spore germinate on seed of *Beta vulgaris*. There were 100 seeds used to carry out this test. When the leaf-extract taken from *Allium sativum* on 50 ppm concentration 05 spores of *Alternaria alternata*, 05 spores of *A.brassicae*, 07 spores *Botrytis cinerea*, 15 spores *Cercospora beticola* and 15 spores *Fusaria oxysporum* were found. On 75 ppm concentration 03 spores of *Alternaria alternata*, 04 spores of *A. brassicae*, 03 spores *Botrytis cinerea*, no spores *Cercospora beticola*, and 02 spores *Fusaria oxysporum* were found. On 100 ppm concentration there is no spore was found with any fungi.

**Test of spore germination on seed of (*Beta vulgaris*) by the treatment of various Plant leaf-extracts**

![Fig. 6.23](image-url)
Fig. 6.24

Effect of leaf-extract taken from Allium cepa on fungal flora

Fig. 6.25

Effect of leaf-extract taken from Azadirachta indica on fungal flora
Effect of leaf-extract taken from Occimum sanctum on fungal flora

Fig. 6.26

Effect of leaf-extract taken from Allium sativum on fungal flora

Fig. 6.27
Effect of fungal spore germination on seeds of (*Daucus carota*) by the treatment of various Plant leaf-extracts

Figure-6.28 indicate that when extract of Strychnos nux-vomica in different concentration *i.e.* 50 ppm, 75 ppm and 100 ppm were to treat of the seed of *Daucus carota* the leaf- extract on 100 ppm concentration is most effective where as 75 ppm and 50 ppm is less effective respeelively. Spore germination was found less on 100 ppm concentration of leaf-extract of Strychnos nux-vomica.

The effect of leaf-extract of various plants on spore germination is presented in table. Three types of concentration 50 ppm, 75 ppm and 100 ppm was used to test the spore germinate on seed of *Daucus carota*. There were 100 seeds used to carry out this test. When the leaf-extract taken from *Strychnos nux-vomica* on 50 ppm concentration 45 spores of *Alternaria dauci*, 55 spores of *A. radicina*, 45 spores *Botrytis cinerea*, 40 spores *Cercospora carotae* and 55 spores of *Sclerotium rolfsii* were found. On 75 ppm concentration 35 spores of *Alternaria dauci*, 40 spores of *A. radicina*, 35 spores *Botrytis cinerea*, 30 spores *Cercospora carotae*, and 35 spores of *Sclerotium rolfsii* were found. On 100 ppm concentration no spores of *Alternaria dauci*, 03 spores of *A. radicina*, 02 spores *Botrytis cinerea*, , 05 spores *Cercospora carotae* and 05 spores of *Sclerotium rolfsii* were found.

Figure-6.29 indicate that when extract of *Allium cepa* in different concentration *i.e.* 50 ppm, 75 ppm and 100 ppm were to treat of the seed of *Daucus carota* the leaf- extract on 100 ppm concentration is most effective where as 75 ppm and 50 ppm is less effective respeelively. Spore germination was found less on 100 ppm concentration of leaf-extract of *Allium cepa*.

When the leaf-extract from *Allium cepa*. On 50 ppm concentration 50 spores of *Alternaria dauci*, 45 spores of *A. radicina*, 35 spores *Botrytis cinerea*, 55 spores *Cercospora carotae*, and 45 spores of *Sclerotium rolfsii* were found. On 75 ppm concentration 35 spores of *Alternaria dauci*, 30 spores of *A. radicina*, 30 spores *Botrytis*
cinerea, 40 spores Cercospora carotae and 35 spores of Sclerotium rolfsii were found. On 100 ppm concentration no spores of Alternaria dauci, 03 spores of A.radicina, 05 spores Botrytis cinerea, 05 spores Cercospora carotae, and 03 spores of Sclerotium rolfsii were found.

Figure-6.30 Indicate that when fungicide taken from leaf-extract of Azadirachta indica was used to treat the seed of Daucus carota the 100 ppm concentration was more effective in compression to 75 ppm and 50 ppm respectively.

When the leaf-extract from Azadirachta indica. On 50 ppm concentration 05 spores of Alternaria dauci, 04 spores of A.radicina, 20 spores Botrytis cinerea, 10 spores Cercospora carotae, and 15 spores of Sclerotium rolfsii were found. On 75 ppm concentration no spores of Alternaria dauci, 02 spores of A.radicina, 02 spores Botrytis cinerea, no spores Cercospora carotae and 03 spores of Sclerotium rolfsii were found. When was used on 100 ppm concentration there is no spores was found with any fungi.

Figure-6.31 indicate that when extract of Ocimum sanctum in different concentration i.e. 50 ppm, 75 ppm and 100 ppm were to treat of the seed of Daucus carota the leaf-extract on 100 ppm concentration is most effective where as 75 ppm and 50 ppm is less effective respectively. Spores germination was found less on 100 ppm concentration of leaf-extract of Ocimum sanctum.

When the leaf-extract from Ocimum sanctum. On 50 ppm concentration 55 spores of Alternaria dauci, 40 spores of A.radicina, 35 spores Botrytis cinerea, 45 spores Cercospora carotae and 40 spores of Sclerotium rolfsii were found. On 75 ppm concentration 35 spores of Alternaria dauci, 30 spores of A. radicina, 20 spores Botrytis cinerea, 20 spores Cercospora carotae and 20 spores of Sclerotium rolfsii were found. On 100 ppm concentration 15 spores of Alternaria dauci, 13 spores of A.radicina, 05 spores Botrytis cinerea, 15 spores Cercospora carotae and 10 spores of Sclerotium rolfsii were found.
Figure-6.32 Indicate that when fungicide taken from leaf-extract of Allium sativum used to treat the seed of Daucus carota the 100 ppm concentration was more effective in compression to 75 ppm and 50 ppm respectively.

When the leaf-extract from Allium sativum. On 50 ppm concentration 06 spores of Alternaria dauci, 05 spores of A.radicina, 07 spores Botrytis cinerea, 10 spores Cercospora carotae, and 10 spores of Sclerotium rolfsii were found. On 75 ppm concentration 04 spores of Alternaria dauci, 05 spores of A.radicina, 05 spores Botrytis cinereaam, 03 spores Cercospora carotae and 02 spores of Sclerotium rolfsii were found. When was used on 100 ppm concentration there is no spores was found with any fungi.

Effect of fungal spore germination on seeds of (Daucus carota) by the treatment of various Plant leaf-extracts

![Effect of leaf-extract taken from Strychnos nux-vomica on fungal flora](image)

**Fig. 6.28**
Effect of leaf-extract taken from Allium cepa on fungal flora

![Graph showing the effect of leaf-extract on fungal flora from Allium cepa.](image)

**Fig. 6.29**

Effect of leaf-extract taken from Azadirachta indica on fungal flora

![Graph showing the effect of leaf-extract on fungal flora from Azadirachta indica.](image)

**Fig. 6.30**
Effect of leaf-extract taken from *Occimum sanctum* on fungal flora

![Effect of leaf-extract taken from *Occimum sanctum* on fungal flora](image)

Fig. 6.31

Effect of different fungicide on fungal flora of *Allium sativum*

![Effect of different fungicide on fungal flora of *Allium sativum*](image)

Fig. 6.32
Effect of fungal spore germination on seeds of (*Raphanus sativus*) by the treatment of various Plant leaf-extracts

Figure-6.33 indicate that when extract of Strychnos nux-vomica in different concentration *i.e.* 50 ppm, 75 ppm and 100 ppm were to treat of the seed of *Raphanus sativus* the leaf- extract on 100 ppm concentration is most effective where as 75 ppm and 50 ppm is less effective respectively. Spore germination was found less on 100 ppm concentration of leaf-extract of *Strychnos nux-vomica*.

The effect of leaf-extract of various plant on spores germination is presented in table Three types of concentration 50 ppm, 75 ppm and 100 ppm was used to test the spores germinate on seeds of *Raphanus sativus*. There were 100 seeds used to carry out this test. When the leaf-extract taken from *Strychnos nux-vomica* on 50 ppm concentration 50 spores of *Alternaria dauci*, 40 spores of *A.radicina*, 55 spores of *A.raphani*, 35 spores *Botrytis cinerea* and 50 spores of *Sclerotium rolfsii* were found. On 75 ppm concentration 40 spores of *Alternaria dauci*, 45 spores of *A.radicina*, and 30 spores of *A.raphani*, 40 spores *Botrytis cinerea* and 35 spores of *Sclerotium rolfsii* were found. On 100 ppm ppm concentration no spores of *Alternaria dauci*, 02 spores of *A.radicina*, 03 spores of *A.raphani*, 03 spores *Botrytis cinerea* and 05 spores of *Sclerotium rolfsii* were found.

Figure-6.34 indicate that when extract of *Allium cepa* in different concentration *i.e.* 50 ppm, 75 ppm and 100 ppm were to treat of the seed of *Raphanus sativus* the leaf- extract on 100 ppm concentration is most effective where as 75 ppm and 50 ppm is less effective respectively. Spore germination was found less on 100 ppm concentration of leaf-extract of *Allium cepa*.

When the leaf-extract from *Allium cepa*. On 50 ppm concentration 55 spores of *Alternaria brassicae*, 40 spores of *A.brassicicola*, 45 spores of *A.raphani*, 40 spores *Botrytis cinerea* and 40 spores of *Sclerotium rolfsii* were found. On 75 ppm concentration 40 spores of *Alternaria brassicae*, 30 spores of *A.brassicicola*, and 32 spores of *A.raphani*, 35 spores *Botrytis cinerea* and 30 spores of *Sclerotium rolfsii* were found. On
100 ppm concentration 01 spores of *Alternaria brassicae*, 02 spores of *A. brassicicola*, 03 spores of *A. raphani*, 04 spores *Botrytis cinerea* and 04 spores of *Sclerotium rolfsii* were found.

Figure-6.35 Indicate that when fungicide taken from leaf-extract of *Azadirachta indica* was used to treat the seed of *Raphanus sativus* the 100 ppm concentration was more effective in compression to 75 ppm and 50 ppm respectively.

When the leaf-extract from *Azadirachta indica*. On 50 ppm concentration 03 spores of *Alternaria brassicae*, 05 spores of *A. brassicicola*, and 20 spores of *A. raphani*, 25 spores *Botrytis cinerea* and 10 spores of *Sclerotium rolfsii* were found. On 75 ppm concentration 02 spores of *Alternaria brassicae*, 03 spores of *A. brassicicola*, and 04 spores of *A. raphani*, 03 spores *Botrytis cinerea* and 04 spores of *Sclerotium rolfsii* were found. When was used on 100 ppm concentration there is no spores was found with any fungi

Figure-6.36 indicate that when extract of *Occimum sanctum* in different concentration *i.e.* 50 ppm, 75 ppm and 100 ppm were to treat of the seeds of *Raphanus sativus* the leaf-extract on 100 ppm concentration is most effective where as 75 ppm and 50 ppm is less effective respeelively. Spore germination was found less on 100 ppm concentration of leaf-extract of *Occimum sanctum*.

When the leaf-extract from *Occimum sanctum*. On 50 ppm concentration 50 spores of *Alternaria brassicae*, 45 spores of *A. brassicicola*, and 35 spores of *A. raphani*, 40 spores *Botrytis cinerea* and 45 spores of *Sclerotium rolfsii* were found. On 75 ppm concentration 40 spores of *Alternaria brassicae*, 35 spores of *A. brassicicola*, and 40 spores of *A. raphani*, 25 spores *Botrytis cinerea* and 25 spores of *Sclerotium rolfsii* were found. On 100 ppm concentration 17 spores of *Alternaria brassicae*, 10 spores of *A. brassicicola*, 13 spores of *A. raphani*, 04 spores *Botrytis cinerea* and 15 spores of *Sclerotium rolfsii* were found.
Figure-6.37 Indicate that when fungicide taken from leaf-extract of *Allium sativum* used to treat the seed of *Raphanus sativus* the 100 ppm concentration was more effective in compression to 75 ppm and 50 ppm respectively.

When the leaf-extract from *Allium sativum*. On 50 ppm concentration 05 spores of *Alternaria brassicae*, 06 spores of *A.brassicicola*, and 15 spores of *A.raphani*, 05 spores *Botrytis cinerea* and 15 spores of *Sclerotium rolfsii* were found. On 75 ppm concentration 05 spores of *Alternaria brassicae*, 04 spores of *A.brassicicola*, and 03 spores of *A.raphani*, 04 spores *Botrytis cinerea* and 03 spores of *Sclerotium rolfsii* were found. When was used on 100 ppm concentration there is no spore was found with any fungi.

**Effect of fungal spore germination on seeds of (Raphanus sativus) by the treatment of various Plant leaf-extracts**

![Graph showing the effect of leaf-extract taken from Strychnos nux-vomica on fungal flora](image)

**Fig. 6.33**
Fig. 6.34

Effect of leaf-extract taken from Allium cepa on fungal flora

Fig. 6.35

Effect of leaf-extract taken from Azadirachta indica on fungal flora
Effect of leaf-extract taken from *Occimum sanctum* fungal flora

**Fig. 6.36**

Effect of leaf-extract taken from *Allium sativum* on fungal flora

**Fig. 6.37**