Summary and Conclusions
CHAPTER- IV
SUMMARY AND CONCLUSIONS

The present investigation entitled “Studies on Alternaria blight of mustard crop and approach to its control in Bastar plateau” was undertaken with the objectives of identification of pathogen; period of occurrence of disease; extent of infection; disease development in different varieties and sowing date; losses in yield and integrated management of Alternaria blight of mustard. The salient findings obtained during the course of investigation are summarized below.

Mustard leaves exhibiting typical symptoms of Alternaria blight in the form of concentric rings were collected. The pathogen was isolated from infected leaves, stems and pods. The characters of the pathogen on isolation was recorded and confirmed with the standard text. The pathogen was further inoculated at the seedling stage and the symptoms were noticed. The pathogen on confirmation was identified as Alternaria brassicae. Other species of Alternaria were also inoculated on mustard, which were found to be pathogenic during the course of present study.

Prevalence of Alternaria blight in Jagdalpur and Danewada districts was carried out during winter 2003-2004. Alternaria blight of
mustard was found to be prevalent in all the villages under survey. The disease severity was more at flowering stage than silique stage in both the districts. The disease severity in general was more in Dantewada district than Jagdalpur district and varied from 25.40-41.51 per cent. Farmers in both the districts were found to use both local as well as improved varieties of mustard.

Alternaria blight of mustard was noticed at 55-65 DAS in all the varieties during both the years, 2003-2004 and 2004-2005. The disease then spread depending upon the susceptibility of the varieties and prevailing environmental conditions. During early stage of the crop growth, the disease spread gradually but sudden increase in disease severity was observed between 5th to 12th February during both the years of cultivation when the maximum temperature varied from 23.83 to 30.6°C, minimum temperature varied from 10.0 to 15.3°C, decrease or almost absence of rainfall, lower relative humidity during morning and noon and moderate wind velocity. In later stages of crop growth, the disease further increased in some of the varieties whereas, decrease in disease severity was also observed in some of the varieties during winter, 2003-2004 and 2004-2005.

The assessment of yield losses due to Alternaria blight in mustard was determined with respect to number of pods/plant, grain weight/1000 seed and yield (kg/ha) during 2003-2004 and 2004-
2005. The results clearly indicate that the number of pods/plant and grain yield were significantly higher under protected conditions compared to that of unprotected condition. However, the difference in grain weight/1000 seeds between protected and unprotected condition was non significant in all the varieties except Bio-902 during 2004-2005. The extent of severity in different varieties was not found to influence the yield under both protected and unprotected conditions.

None of the entries was found to be highly resistant to Alternaria blight of mustard under natural field conditions during both winter, 2003-2004 and 2004-2005. Only one entry i.e. Ec-399301 was found to be resistant to Alternaria blight during both the years of screening under moderate to high disease pressure. Rest of the entries exhibited susceptible to highly susceptible reaction against Alternaria blight of mustard.

Leaf extracts of Callotropis procera and Bachkand at 10000 ppm were found to be highly effective in inhibiting the radial growth of Alternaria brassicae (61.10 to 65.55%). Plant extracts at 5000 and 2500 ppm did not work well.

Of seven leaf extracts evaluated under field conditions during winter 2003-2004 and 2004-2005, leaf extract of Nagbail was found
to significantly reduce the incidence and severity of Alternaria blight and increased the grain yield significantly during both the years of testing. Leaf extract of *Eucalyptus globosus* was also found to be promising as it significantly reduced the disease but no increase in yield was recorded during both 2003-2004 and 2004-2005. Mancozeb and Blitox-50 which were kept as check fungicides did also perform excellently in minimizing the incidence and severity of disease and increasing the grain yield during both the years of testing.

Management of Alternaria blight through adjustment in sowing dates revealed that the incidence and severity of Alternaria blight was significantly higher in early and mid sown crop during both the years of cultivation. Similarly, the grain yield was also higher in early and mid sown crop during 2003-2004 as well as 2004-2005 but, the yield was drastically reduced with delay in sowing and less incidence and severity of Alternaria blight. It was found that the variation in incidence and severity of Alternaria blight did not influence the grain yield in different sowing dates during both the years of cultivation.
Conclusions:

- The pathogen associated with mustard leaves, stems and pods was identified as Alternaria brassicae on isolation and pathogenicity tests.

- Alternaria blight in mustard was found to be widely prevalent in different locations of Jagdalpur and Dantewada district and the severity varied from 25.40 to 21.51 per cent.

- Maximum air temperature was found to have positive influence on development of Alternaria blight whereas, relative humidity during morning, noon and wind velocity have negative influence on disease development. Occurrence of these environmental conditions during flowering stage of the crop helped in faster development of the disease.

- Number of pods/ plant and grain yield kg/ha were found to be significantly increased under protected conditions. However, no significant difference in grain weight/1000 seeds was recorded under protected as well as unprotected conditions in all the varieties under test.

- Mustard cv. EC-399301 was found to be resistant to Alternaria blight during two years of testing, 2003-2004 and 2004-2005.
Among seven plant extracts evaluated, leaf extracts of *Callotropis procera* and Bachkand were found to be highly effective in inhibiting the radial growth of *Alternaria brassicae* at 10000 ppm under *in-vitro* conditions. Under field conditions, leaf extract of Nagbail was found to significantly reduce the disease and increased the yield. Leaf extract of *Eucalyptus globosus* was also found to be promising.

The incidence, severity of *Alternaria* blight and grain yield of mustard were found to be significantly higher in early and mid sown crop during both the years of cultivation. However, the grain yield was significantly less in delayed sowing with less or high disease severity of *Alternaria* blight.