

## Original Research Article

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## Status of Sesame Diseases Grown in Different Agroclimatic Zones of Odisha

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### ABSTRACT

#### Keywords

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An intensive survey was conducted at flowering to ripening of capsule to record the incidence of charcoal rot in ten agroclimatic zones of Odisha during *rabi* 2014-15. Almost all the fields were infected by more than one disease. The major diseases of sesame recorded were *Macrophomina* stem and root rot, *Cercospora* leaf spot, *Alternaria* blight, powdery mildew, *Phytophthora* blight and phyllody to some extent. Incidence of foliar diseases such as *Alternaria* blight, Powdery mildew, *Cercospora* leaf spot ranged from grade 2-4, 0-3 and 1-2 respectively with maximum incidence at Baliana. Phyllody, a phytoplasma disease was also seen in many fields ranging from 0-2.3%. *Phytophthora* blight was observed in some patches. *Fusarium* wilt recorded 0.5-9.78% with highest incidence at Bheden. *Macrophomina* stem and root rot was found in all the fields surveyed ranging from 8.0-23.8% with highest incidence at Baliana and lowest at Agarpada.

### Introduction

Sesame (*Sesamum indicum* L.) is an important edible oilseed crop which is valued as quality food, nutrition, edible oil, bio-medicine and health care, all in one. It is mostly grown in hotter and drier areas of tropical and subtropical regions. Around 60-65 countries of the world produce sesame seed. China, India, Sudan, Myanmar, Uganda, Nigeria, Bangladesh, Pakistan, Tanzania, Mexico, Thailand and Egypt are major producer of sesame. India is the world leader with the maximum (25.8%) production from the largest (29.8%) area and highest (40%) export in the world. India produces 870 thousand metric tons in fiscal year 2015-2016. Sesame is

largely cultivated in the western, southern and eastern parts of with productivity of 413 kg/ha India (Annual report, 2016-17, Department of Agriculture, Cooperation & Farmers Welfare Ministry of Agriculture & Farmers Welfare Government of India). In Odisha, it is generally grown in all most all districts, mainly in Ganjam, Angul, Sundergarh, Dhenkanal, Raygada, Subarnapur, Bargarh and Bolangir. Being a drought-tolerant, short duration crop, it is adapted to many cropping system. There is a large yield gap and farm loss exists in sesame crop because of knowledge gap, poor crop management practices and disease pest infestation. In Odisha, sesame is generally grown in rainfed condition in uplands, poor light textured soil

during *rabi* and *summer* season. Out of all these constraints, disease prevalence is most important. To critically investigate the disease prevalence, this survey work was carried out in ten agroclimatic zones of Odisha.

## Materials and Methods

A survey work was undertaken in ten agroclimatic zones of Odisha, during *rabi*, 2014-15 at flowering stage to pod formation stage and detail information regarding crop history, crop stage, variety grown, soil type, soil P<sup>H</sup> were recorded. The foliar diseases such as *alternaria* leaf spot, *cercospora* leaf spot and powdery mildew were recorded in scale. In each plot 10 random plants were selected and all the leaves were scored for the severity of *Cercospora* leaf spot, *alternaria* leaf spot and powdery mildew by using 0-5 scale. Incidence of *fusarium* wilt and *Macrophomina* stem and root rot were expressed in percentage. The per cent disease incidence was calculated as follows

$$PDI = \frac{\text{Total number of infected plants}}{\text{Total number of plants in the plot}} \times 100$$

## Results and Discussion

During the survey work different diseases were recorded from different fields (Table 1). Almost all the fields were affected by more than one disease. None of the field witnessed healthy crop. Among the foliar diseases, *Alternaria* blight, *Cercospora* leaf spot, powdery mildew, *phytophthora* blight were serious disease. Phyllody was also reported from some areas. Incidence of *Alternaria* was very common and seen in almost all the field surveyed. It ranged from grade 2-4 with maximum incidence at Baliana (Table 2). Powdery mildew another important disease occurred in a range of grade 0-3 with highest incidence at Baliana causing huge loss in field. *Cercospora* leaf spot also seen in all the fields surveyed during the period ranging from

grade 1-2. Phyllody, a phytoplasma disease was also observed in some fields ranging from 0-2.3%. *Phytophthora* blight was also observed in some patches. Among the soil borne disease, *Fusarium* wilt and *macrophomina* stem and root rot is very important. *Fusarium* wilt was recorded highest at Bheden with disease incidence of 9.78% followed by Baliana (8.0%) with lowest incidence at Betanati (0.5%).

*Macrophomina* stem and root rot which is an emerging disease was recorded in almost all the fields surveyed causing huge economic loss. It is a serious disease of sesame in Odish ranging from 8.0-23.8% with average incidence of 15.34%. The highest *macrophomina* incidence was observed at Baliana (23.8%) followed by Bhawanipatna (19.2%) and lowest at Agarpada (8.0%).

Similar finding were also given by earlier workers. Maiti *et al.*, (1985) stated *sesamum* phyllody is the most destructive disease in India. He also stated Leaf curl is also responsible for heavy losses when it infects at early growth stages of the crop. Bacterial leaf spot, *Pseudomonas sesami* causes considerable yield reduction whenever it infects the *sesamum* crop. Bacterial blight, *Xanthomonas sesami* is serious during the monsoon and to young plants. He also reported among the fungal diseases, leaf blight (*Alternaria sesami*), leaf spot (*Cercospora* sp.) and leaf blight (*Phytophthora parasitica*) are important. Charcoal rot, *Macromorphomina phaseolina* is a widespread and destructive disease and it is difficult to control. Mildew is not a serious disease (Maiti *et al.*, 1985). Ransingh and Samal (2013) found low productivity of sesame in Odisha due to major fungal diseases like wilt caused by *Macrophomina* sp. and *Fusarium* sp., leaf spot disease caused by *Alternaria* sp. and *Cercospora* sp. as well as Phyllody and insect attack by capsule borer and hawk moth.

**Table.1** Survey of sesame fields under different agroclimatic zones

Sl. No.	Place of survey	Agroclimatic zones	Soil texture	pH	Crop history
1	Bheden	Western Central Table Land	Loamy	6.3	Paddy –sesame- paddy
2	Balianta	East & South Eastern Coastal Plain	Sandy loam	6.02	Sesame –sesame-sesame
3	Nuagaon	Mid Central Table Land	Loamy sand	6.9	Paddy –vegetable-sesame
4	Papadahandi	Eastern Ghat High Land	Sandy clay	6.41	Paddy –maize-sesame
5	Betanati	North Central Plateau	Sandy loam	6.27	Paddy –maize- sesame
6	Kalimela	South Eastern Ghat	Loam	6.8	Paddy – sesame-paddy
7	Agarpada	North Eastern Coastal Plain	Clay loam	6.9	Paddy –paddy- sesame
8	Kirei	<b>North Western Plateau</b>	Loamy sand	6.5	Paddy-vegetable-sesame
9	Khajuripada	North Eastern Ghat	Loamy	6.4	Paddy- vegetable-sesame
10	Bhawanipatna	Western Undulating Zone	Clay loam	6.8	Paddy –sesame-paddy

**Table.2** Disease incidence of sesame in different zones

Sl. No.	Place	Variety	Mac (%)	Fus (%)	Alt (Grade)	PM (Grade)	Cer (Grade)	Phy (%)
1	Bheden	Bheden local	18.09	9.78	3	0	2	0
2	Balianta	VRI-1	23.8	8.0	4	3	2	2.3
3	Nuagaon	Nuagaon local	12.8	3.0	3	0	2	0.6
4	Papadahandi	Papdahandi local	15.2	4.1	2	0	2	1.0
5	Betanati	Betanati local	18.8	0.5	2	2	1	0
6	Kalimela	Kalimela local	11.3	0.8	3	1	2	0.8
7	Agarpada	Agarpada local	8.0	1.0	3	1	1	0.6
8	Kirei	Sundergarh local	15.8	3.9	2	0	1	1.4
9	Khajuripada	Phulbani local	10.5	2.9	3	3	1	0.0
10	Bhawanipatna	Narla local	19.2	4.8	4	0	2	1.4

Mac=*Macrophomina*, Fus= *Fusarium*, Alt= *Alternaria*, PM= Powdery Mildew, Cer= *Cercospora*, Phy= Phyllody

Sahani and Mahapatra (2014) reported *Alternaria* leafspot is an important disease of sesame in Odisha causing huge economic loss. *Macrophomina* stem rot has a vast geographical distribution and is especially problematic in tropical and subtropical countries with arid to semi-arid climates in Africa, Asia, Europe and North and South America (Gray *et al.*, 1990; Abawi and Pastor-Corrales, 1990; Diourte *et al.*, 1995 and Wrather *et al.*, 2001). Reports of these workers are in the line of support to the present findings.

Survey for disease in different agroclimatic zones is a preliminary work to know the prevalence of the disease. Further studies should be done to correlate the influence of weather conditions, soil types, cropping system as well as variety grown which will be beneficial for formulation of Integrated Disease Management module for proper management of the disease.

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