

Effect Host Plant Resistance and Fungicides Application on Ascochyta blight (*Ascochyta pinodes*) Severity and Yield of Field pea (*Pisum sativum* L.) in Gedeb and Bulle Districts, Southern Ethiopia

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obstacles in the way of increased pea production are the diseases caused by the fungal, viral and bacterial pathogens (Kemal, 2002).

(Gortu and Beshir, 1994). It often causes serious yield and quality losses that were mostly dependent on time and level of infection, host reaction and prevailing local climatic conditions (Nasir and Hoppe, 1998). In Ethiopia, a mean seed yield loss of 31% rising to

about 53% was reported (Gorfu, 2000) warranting a control measure. This pathogen, *A. pinodes*, affects all stages of field pea crop by decreasing plant growth, biomass, and ultimately the seed yield that

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mitigate yield losses. The objective of this study is to determine the effect of varieties and fungicides on severity *Ascochyta* blight and yield.

Material and Methods

Description of the study area

The study conducted in Bulle and Gedeb districts of the Southern Nations Nationalities People Region, Ethiopia during the 2020/20201 main crop season. Gedeb district is located in Gedeo zone of SN-NPR, 160 km from the capital of SNNPR – Hawassa and 74 kilometers from Dilla which is the administrative seat of Gedeo zone. The area of the district is estimated to be 30,909 hectare. The altitude

of Gedeb district ranges from 1950 m.a.s.l up to 2650 m.a.s.l, the annual rain fall ranges from 1290 -1800 mm and the temperature ranges from 16-21°C. The land use system of the district is mostly

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Year of release
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Treatments

The experiment done by using three new registered fungicides: Matico (Metalaxyl 8% WG+ Mancozeb 64% WP), Azonine 480 SC (Chlorothalonil 400 g/L + Azoxystrobin 80 g/L) (Azoxystrobin 6% + Chlorothalonil 50%) and Othello-Top (Azoxystrobin 200 g/L + Difenconazole 125 g/L). Fungicides sprayed starting from first disease symptom with company recommended rate. Othello-Top, Azonine 480 SC and Matico WP fungicides applied at the rate of 500ml/ha (10ml/20 liters of water), 500ml/ha (10ml/10 lit of water) and 2.5 kg/ha, respectively.

No	Treatments	No	Treatments
1	Megeri + Othello-Top foliar	7	Burkitu + Matico
2			
3			
4			
5			
6			

$$\text{Disease severity index (DSI)} = \frac{\sum(\text{score} \times \text{number of plants with this score})}{\text{Total number of plants} \times \text{greater score}}$$

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lesions prominent on the apical stems; 3, lesions up to 5–10 mm in size and slight drooping of apical stems; 4, lesions obvious on all plant parts and clear drooping of apical stems; 5, lesions on all plants parts, defoliation initiated, breaking and drying of branches slight to moderate; 6, lesions as in 5, defoliation, broken, dry branches common, some plants killed; 7, lesions as in 5, defoliation, broken, dry branches very common, up to 25% of plants killed; 8, symptoms as in 7 but up to 50% of the plants killed and 9, symptoms as in 7 but up to 100% of the plants. Disease severity recorded at final pod filling stage when the disease attained maximum (Villegas-Fernandez et al., 2012). The severity grades converted into percentage severity index (PSI) for analysis:

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(39.1%) mean disease severity reduction was recorded with the spray of Othello-Top on local c. (Gonder). This might be due to the fact that “Othello-Top” fungicide has ability to reduce primary infection and at the same time it is able to manage spreading of ascochyta blight secondary inoculum between neighboring plants. As reported by Mohammed and Fufa, (2014) foliar sprays with Top can effectively manage Ascochyta blight of chickpea (*A. pinodes*). Fungicides, including mancozeb, chlorothalonil and benomyl, have been used to effectively control ascochyta blight and increase yield (Bretag et al., 2006).

Varieties	Fungicides	Ascochyta blight severity index							
		Gedeb				Bulle			
		Year-2020	Year-2021	Average	PDR	Year-2020	Year-2021	Average	PDR
Megeri	Matico	33.3	77.7	55.5 ^c	0.5	33.3	52.9	43.1 ^c	11.6
	Othello-Top	27.7	44.4	36.1 ^e	35.3	25	45.5	35.3 ^{ed}	27.7
	Azonine 480 SC	38.8	55.5	47.2 ^e	15.4	33.3	51.9	42.6 ^c	12.6
	Unsprayed	48.6	62.9	55.8 ^c	-	35.3	62.2	48.8 ^b	-
Burkitu	Matico	61.1	70.3	65.7 ^a	1.4	50	60.3	55.2 ^a	1.6
	Othello-Top	37.8	51.8	44.8 ^f	32.7	30.6	52.9	41.8 ^c	25.5

Grain

There were significant differences in grain yield between fungicide treatments in both districts. The average grain yield of field pea was 1.6 t/ha in Gedeb and 1.6 t/ha in Bulle. The highest grain yield was recorded from Megeri variety with the spray of Othello-Top at Gedeb (31.6 gm) and Burkitu variety with the spray of Matico at Bulle (61.1 gm). The lowest grain yield was recorded from Megeri variety with the spray of Othello-Top at Gedeb (27.7 gm) and Burkitu variety with the spray of Othello-Top at Bulle (37.8 gm). Generally, in this study and previous ones also, seed yield of field pea was dependent on blight pressure and the varieties used. Application with fungicides reduced the infection of *A. pinodes* and increased the seed yield. Garry et al. (1998) also

The heavier seed weight was recorded from Megeri (31.6 gm) with spray of Othello-Top at Gedeb (Table 5). Similarly, at Bulle the heavier seed (28.0 gm) was recorded from Megeri variety with the spray of Othello-Top. Generally, in this study and previous ones also, seed yield of field pea was dependent on blight pressure and the varieties used. Application with fungicides reduced the infection of *A. pinodes* and increased the seed yield. Garry et al. (1998) also

were achieved from Burkitu sprayed by a fungicide Othello-Top and Azonine 480 SC at Gedeb, respectively. While the lowest average grain yield of 789 kg/ha and 901.8 kg/ha were recorded from local cv an unsprayed plot and Megeri unsprayed plot at Bulle. Therefore, both Othello-Top and Azonine 480 SC can be used for the management of *Ascochyta* blight disease caused by *A. pinodes*.

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Varieties	Fungicides	Yield (kg/ha)	
		Gedeb	Bulle

Suspended

Varieties	Fungicides	Gedeb		Bulle		Mean	CV (%)
		Yield	Yield	Yield	Yield		
Local cultivar/Gonder	Othello-Top	31.4	31.8	31.6 ^a	27.4	28.7	28.0 ^a
	Azonine 480 SC	28.6	31.9	30.2 ^{ba}	24.5	28.9	26.7 ^{ba}
	Unsprayed	26.1	30.3	28.2 ^{bc}	22.1	27.3	24.7 ^{bc}
Local cultivar/Gonder	Matico	23.3	30	26.6 ^{cd}	19.3	27.0	23.2 ^{cd}
	Othello-Top	31.7	23.8	27.7 ^{bcd}	27.7	20.8	24.3 ^{bc}
	Azonine 480 SC	21.1	21.2	21.2 ^{gf}	17.1	18.2	17.6 ^{gf}
	Unsprayed	19.2	21.7	20.4 ^g	15.2	18.7	16.9 ^g
Mean		26.3	27.1	26.7	22.3	24.1	23.3
CV (%)				6.62			7.55
LSD				2.98			2.96

Table 5: Interaction effects of host plant resistance and types of fungicides on 100-seed of field pea.

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