

Survey on major diseases of Horticultural crops in South Gondar Zone, Ethiopia

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Abstract: A survey was conducted in major Horticultural crops of South Gondar zone of Amhara Regional State during 2019 cropping season with an aim of identifying problematic diseases and providing baseline information on diseases of major horticultural crops in the study area. Random sampling was applied to select farm field in each district i.e. every selected crop field at interval of 5-10 km based on vehicle odometers following the main roads and accessible routes were assessed. A total of 118 farmers field were enclosed by this survey. It was founded that about 12 diseases of major horticultural crops of the study area were recorded. The result of this survey showed, major diseases of major horticultural crops of South Gondar zone in order of their importance were: 1) Late blight of potato, 2) Wilt complex diseases of hot pepper, 3) Downy mildew of onion, 4) Purple blotch of Garlic, 5) Cercospora leaf spot of pepper; respectively each with a magnitude of percentage disease severity of 68.16, 26.1, 18.33, 17.33 and 14.9 %. Thus, information's gave some clue on the development or adopting integrated disease management options for those prioritized major diseases of the area.

Keywords: Diseases, potato, pepper, late blight, wilt.

1. INTRODUCTION

Ethiopia has different agro-ecology, and fertile soil for the production of Horticultural crop. Both tropical subtropical and temperate horticultural crops can be grown in different parts of the country. Likewise, South Gondar Zone is the potential area for the production of Horticultural crops like potato, tomato, hot pepper, onion and garlic. However the production and productivity of vegetables in the area as well as at country level is very low. Some of the production constraints include improper agronomic practices; limited accessibility to improved agricultural technologies; shortage of inputs; occurrence of diseases and insect pests; improper harvesting and harvest handling; poor packaging, sorting, and processing [1]. Among disease constraints bacterial wilt and late blight on potato [2] ; damping off, late blight and powdery mildew on tomato and pepper; white-rot and garlic rust on garlic; downy mildew and purple blotch on the crops onion and shallot are also the most economically important diseases in Ethiopia [3]. Successful plant protection depends upon early detection of the disease severity followed by timely adoption and application of preventive measures [4]. But, information is lacking on the prevalence, incidence, severity and management aspects of the disease in South Gondar zone. Therefore, this study was conducted to assess the prevalence and severity of the diseases of horticultural crops south Gondar zone of Ethiopia.

2. MATERIALS AND METHODS

The survey was conducted at South Gondar zone (in Dera, Libo kemkem, Fogera ,Farta, Guna Begemdir, and Lay Gaint districts or 'Woredas') of Amhara region. The districts were selected based on horticultural crops area coverage that was obtained from zone agricultural offices. In each district horticultural crops of major importance (potato, pepper, onion and garlic) were selected and attention was given to those selected crops of the area at the time of implementing the survey. This survey was assessed thoroughly in a total of 118 farmer fields in 2019 main cropping season and 2020 off season. Within selected fields a quadrant of 1m x 1m was thrown and disease incidence and severity were taken for every quadrant by crossing the fields diagonally. All plants within the quadrant were thoroughly observed starting from the ground up to the tip shoots of the crop and the disease incidence was recorded based on plants showing symptoms divided

by total observations. For estimation of disease severity, the whole plant was considered as 100 and thereby the infected area was determined by eye estimation for Percent of Disease Severity (PSI). By the scale of [5] for late blight of potato pepper, and tomato; Koike et al.(2001) [6], for garlic rust; [7], for purple blotch ; [8], for downy mildew and [9], for measuring the severity of other diseases was maintained properly. During survey variety grown, Crop growth stage, Present and previous agronomic practices, Farmers disease management practices, GPS data and soil types was also recorded.

3. RESULTS AND DISCUSSION

The major horticultural crops of South Gondar zone were Potato, Hot pepper and Garlic in main season and onion in off season. Therefore, this survey was focused on these crops of the study area. The result of this assessment founded that, twelve diseases were recorded on major horticultural crops of study area (Table 1). Among them, Late blight of potato, Cercospora leaf spot disease of Hot pepper, Downy mildew and Purple blotch of Garlic were found in all assessed fields of the study area with a mean disease incidence of 94%, 65.8%, 55% and 49.1%, respectively. Moreover as illustrated in table 2, the most important major horticultural crops diseases of South Gondar zone that need management intervention in their descending order were Late blight of potato, Wilt complex of Hot pepper, Downy mildew, Purple blotch of Garlic and Cercospora leaf spot of Hot pepper with disease severity of 68.16%, 26.1%, 18.33%, 17.7% and 14.9%, respectively.

Table 1: Intensity of major crops disease in South Gondar Zone

Major crops	Elevations (m.a.s.l)	Diseases of major crops	Status of diseases				
			DP(%)	Incidence (%)		Severity (%)	
				Mean	Range	Mean	Range
Potato	1869 – 3235	Late blight	100	94	20-100	68.16	5-100
		Early blight	50	43.4	5-100	9.22	5-30
		Wilt	12	7.4	2-10	7.4	2-10
Pepper	1806 – 2063	CLS	100	65.8	30-100	14.995	5-50
		Early blight	36	12.56	5-100	6.1	5-30
		Wilt	36	26.1	5-70	26.1	5-70
		Fruit rot	12	7	1-10	7	1-10
Garlic	1826-1914	Rust	80	26.8	5-80	8.7	2-30
		Purple blotch	100	49.1	10-100	17.7	5-60
		Purple blotch	22.2	8	5-20	3.75	0-5
Onion	1880-1914	Downy mildew	100	55	5-100	18.33	5-80
		Basal rot	30	5	1-10	5	1-10

Table 2: Most important diseases of major horticultural crops in South Gondar zone

No	Diseases	Mean DS(%)	Priority Rank
1	Late blight of potato	68.16	1
2	Wilt complex of pepper	26.1	2
3	Downy mildew of onion	18.33	3
4	Purple blotch of Garlic	17.7	4
5	CLS of pepper	14.9	5

Potato Diseases of South Gondar Zone

Potato is a very important food and cash crop especially on the four potato growing districts (Farta, Guna Begemdr, Lay Gayient and Dera) of South Gondar Zone. The survey results revealed that a total of three diseases were founded from potato field of the study area. The overall disease severity of Late blight ranged from 5 % to 100 %, early blight ranged from 5 to 30 % and bacterial wilt ranged from 2 to 10 % (Table 1). Late blight and early blight diseases were severe in all the four potato growing districts surveyed, where as bacterial wilt was severe in Dera district (Table 3).

Table 3: Intensity of Potato disease in each districts of South Gondar Zone

Districts	Scores of major diseases on the study area					
	Late Blight		Early blight		Bacterial Wilt	
	DI(%)	DS(%)	DI(%)	DS(%)	DI(%)	DS(%)
Farta	100	74.86	42.14	7.57	0	0
G.Begemdr	100	77	20	6	0	0
L.Gayient	100	80.9	45.6	6.6	0	0
Dera	79.2	46.3	45.8	10	7.4	7.4

Hot Pepper Diseases of South Gondar Zone

Hot pepper is one of the cash crops in two major growing district (Dera and Libo kemkem) of the study area .A total of four diseases were founded from Hot pepper field of the study area. The overall disease severity of wilt diseases ranged from 5 to 70 % cercospora leaf spot ranged from 5-50, early blight ranged from 5-30 and pod wilt ranged from 1-10 (Table 1). The higher mean incidence (40 %) of pepper wilt was noticed in Dera district (Table 4).

Garlic and Onion Diseases of South Gondar Zone

Garlic is widely grown in Libo kemkem district of South Gondar zone. A total of two diseases were founded from Garlic field of the study area. The overall disease severity of purple blotch diseases ranged from 5 to 60% and Garlic Rust ranged from 2-30 % (Table 1). The higher (17.7 %) mean diseases severity of purple blotch was observed in Libo kemkem district. Onion is one of major cash crop in three major growing district (Fogera, Dera and Libo kemkem) of the study area during off season . A total of three diseases were founded from onion fields of the study area. Among the three diseases downy mildew was the most important disease of onion and the severity ranged 5-80 % (Table 1). The higher severity (80%) of) downy mildew was observed in Fogera district (Table 4).

Table 4: Intensity of major Vegetable crops disease in each districts of South Gondar Zone

Vegetable crops	Diseases	Scores of diseases on major vegetable crops of the study area					
		Dera		L.kemkem		Fogera	
		DI(%)	DS(%)	DI(%)	DS(%)	DI(%)	DS(%)
Hot Pepper	Cercospora Leaf spot	72.5	17.4	70	12.7	0	0
	Early Blight	17	3.7	5	1.3	0	0
	Wilt	17	17	40	40	0	0
	Pod wilt	0	0	7	7	0	0
Garlic	Garlic Rust	0	0	26.8	8.7	0	0
	Purple blotch	0	0	49.1	17.7	0	0
Onion	Downy mildew	56.11	17.8	10	5	73.5	34.2
	Purple blotch	12.5	5	0	0	5	5
	Basal rot	5	5	5	5	5	5

4. CONCLUSION AND RECOMMENDATIONS

The major horticultural crops of South Gondar zone were Potato, Hot pepper and Garlic in main season and onion in off season. From these crops, twelve diseases were recorded by this survey in the study area, among them, the major Horticultural crop diseases of the area were Late blight of potato, Wilt complex of Hot pepper, Downy mildew of Onion , Purple blotch of Garlic and Cercospora leaf spot of Hot pepper. Thus, information’s gave some clue on the development or adopting integrated disease management options for those prioritized major diseases of the area.

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International Journal of Novel Research in Engineering and Science

Vol. 8, Issue 2, pp: (1-4), Month: September 2021 - February 2022, Available at: www.noveltyjournals.com

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