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Hilal Ertürk
Aziz Karakaya
Arzu Çelik Oğuz
Ankara University, Ankara-Turkey
Hilal.boluk@hotmail.com; karakaya@agri.ankara.edu.tr;
acelik@agri.ankara.edu.tr

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ORCID ID	0000-0002-7439-508X	0000-0003-3019-9009
	0000-0002-0906-6407	
CORRESPONDING AUTHOR	Aziz Karakaya	

LEAF DISEASES OCCURRING ON BARLEY PLANTS IN BALA DISTRICT OF ANKARA PROVINCE, TURKEY

ABSTRACT

Leaf diseases occurring on barley fields in Bala district of Ankara province, Turkey were determined. Survey studies were carried out in Bala district in 2018 and prevalence and severity of these diseases were determined. A total of 50 fields were examined. The following barley disease causing agents were found: Drechslera teres f. maculata, Drechslera teres f. teres, Drechslera graminea, Rhynchosporium secalis and Erysiphe graminis f. sp. hordei. Mean prevalences of these diseases were determined as Drechslera teres f. teres 30.7%, Drechslera teres f. maculata 11.7%, Drechslera graminea 1.16%, Rhynchosporium secalis 4.67% and Erysiphe graminis f. sp. Hordei 0.2%. Drechslera teres f. teres and Drechslera teres f. maculata were found as the most common disease agents. Disease severity values ranged between 4-8 using a 1-9 scale.

Keywords: Barley, Hordeum Vulgare, Barley Leaf Diseases, Ungal Diseases, Ankara

1. INTRODUCTION

Barley (Hordeum vulgare) is a commonly grown cereal crop in Turkey. It is generally used as animal feed and in malt industry [1]. Barley is a common cereal crop in the world following wheat, maize and rice [2]. Turkey is producing about 5% of the barley in the world [3]. In Ankara province of Turkey barley planting area is 203.586 hectares. In Bala district of Ankara province 33.591 hectares of barley production area is present and from this area 81.604 tonnes of barley is produced [4]. Numerous diseases affect barley crop. Among these diseases net blotch incited by Drechslera teres, barley stripe incited by D. graminea, brown (leaf) rust incited by Puccinia hordei, scald incited by Rhynchosporium secalis, powdery mildew incited by Erysiphe graminis f. sp. hordei are important [5, 6, 7 and 8]. In this study, leaf diseases occurring in barley growing ares of Bala district of Ankara province of Turkey were determined.

2. RESEARCH SIGNIFICANCE

Leaf diseases of barley reduce the yield and lower the quality of barley. With this study, barley leaf diseases occurring in Bala District of Ankara province, Turkey were determined. Determination of the barley leaf diseases will be the first step in controlling the diseases in this area.

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3. EXPERIMENTAL METHODS

This study was carried out in 2018 in barley growing areas of Bala central district and its villages. Fifty barley fields were inspected. Plants were at the soft dough stage. Disease causing agents were diagnosed in the field according to their characteristic symptoms. For surveying, the systematic sampling method was used [9]. Samples were taken at every 1-10 kilometers. At each field at least 100 barley plants were inspected, and percentages of diseases were calculated. For determination of mean disease prevalences both disease occurring and no disease occurring fields were considered. For diagnosis of diseases Mathre [5] was used. For determining disease severity, a 1-9 scale developed by Saari and Prescott was used [10]. An abstract of this study has been published previously [11].

4. FINDINGS AND DISCUSSIONS

Both forms of net blotch caused by Drechslera teres f. maculata (spot form of net blotch) and Drechslera teres f. teres (net form of net blotch), barley stripe caused by Drechslera graminea, scald caused by Rhynchosporium secalis and powdery mildew caused by Erysiphe graminis f. sp. hordei was found in barley fields (Table 1). In some fields more than one disease was found. The most commonly encountered pathogen, Drechslera teres f. teres was present in 47 barley fields out of 50 barley fields inspected. The prevalence of Drechslera teres f. teres among the diseased fields ranged between 1%-80%. Mean prevalence of net form of net blotch disease was 30.7%. Disease severity values of this pathogen ranged between 5-8. Drechslera teres f. maculata was found in 34 fields. The prevalence of Drechslera teres f. maculata among the diseased fields ranged between 1%-50%. Mean prevalence of spot form of net blotch disease was 11.7%. Disease severity values of this pathogen ranged between 5-8. Rhynchosporium secalis was found in 30 fields. The prevalence of Rhynchosporium secalis among the diseased fields ranged between 1%-70%. Mean prevalence of scald disease was 4.67%. Disease severity values of this pathogen ranged between 5-7. Drechslera graminea was found in 20 fields. The prevalence of Drechslera graminea among the diseased fields ranged between 1%-10%. Mean prevalence of barley stripe disease was 1.16%. Erysiphe graminis f. sp. hordei was found in 6 fields. The prevalence of Erysiphe graminis f. sp. hordei among the diseased fields ranged between 1%-5%. Mean prevalence of powdery mildew disease was 0.22%. Disease severity values of this pathogen ranged between 4-5.

Table 1. Barley leaf diseases, their prevalence and severity values in Bala district of Ankara province, Turkey. For disease severity, a 1-9 scale developed by Saari and Prescott [10] was used

Causal Agents and Diseases	Disease Prevalence (%)	Disease Severity
Drechslera teres f. teres (net form of net blotch)	30.7	(5-8)
Drechslera teres f. maculata (spot form of net blotch)	11.7	(5-8)
Rhynchosporium secalis (scald)	4.67	(5-7)
Drechslera graminea (barley stripe)	1.16	
Erysiphe graminis f. sp. hordei (powdery mildew)	0.22	(4-5)

Both forms of net blotch, scald, barley stripe and powdery mildew diseases were found in barley fields of Bala District, Ankara, Turkey. Net form of net blotch was found as the most common disease followed by spot form of net blotch and scald. These diseases are commonly encountered barley diseases [5, 6, 7, 8, 12 and 13]. Disease

severity values of these diseases ranged between 4-8 using a 1-9 scale.

Çelik and Karakaya [6] inspected 121 barley fields in Eskişehir province of Turkey. They found Drechslera teres in 114 barley fields. Mean prevalence of net blotch was found as 22.5%. Both forms of the diseases were present. Özdemir, et al., [7] observed both forms of net blotch in Kırıkkale province of Turkey. They found Drechslera teres f. maculata in 101 barley fields out of 128 inspected fields. Drechslera teres f. teres was present in 60 fields out of 128 fields. Mean prevalence values for Drechslera teres f. maculata and Drechslera teres f. teres were 5.63% and 1.77%, respectively. İlgen, et al., [8] also reported both forms of net blotch in Çubuk district of Ankara province, Turkey. In their study, the mean prevalence values of net form of net blotch and spot form of net blotch were 5.2% and 2.1%, respectively. In the current study, the mean prevalence values of net form of net blotch and spot form of net blotch were 30.7% and 11.7%, respectively.

In Eskişehir province of Turkey, Çelik and Karakaya [6] reported Rhynchosporium secalis in 108 barley fields out of 121 inspected fields and mean prevalence of scald was found as 22.07%. In Kırıkkale province of Turkey, Özdemir, et al., [7] found Rhynchosporium secalis in 117 barley fields out of 128 inspected fields. In their study, mean prevalence of scald was reported as 4.37%. İlgen, et al., [8] found the scald disease in 13 fields out of 18 inspected fields in Çubuk district of Ankara province, Turkey. In Çubuk district, the mean prevalence of Rhynchosporium secalis was found as 24.6%. In the current study, scald was found in 30 fields out of 50 inspected fields with a mean prevalence of 4.67%.

Çelik and Karakaya [6] observed barley stripe disease in 59 barley fields out of 121 inspected fields in Eskişehir province of Turkey. The mean prevalence of Drechslera graminea was reported as 1.75%. In Kırıkkale province of Turkey, Özdemir, et al., [7] reported baley stripe disease in 14 fields out of 128 inspected fields. The mean prevalence of barley stripe disease in Kırıkkale province was 0.35%. In Çubuk distict of Ankara province, Turkey, İlgen, et al., [8] observed barley stripe disease in limited fields with a mean prevalence of 0.33%. In the current study, barley stripe disease was present in 20 fields out of 50 inspected fields with a mean prevalence value of 1.16%.

Powdery mildew caused by E. graminis f. sp. hordei was detected in 11 fields out of 121 inspected barley fields with a mean prevalence value of 0.47% in Eskişehir province of Turkey [6]. In another study performed in Kırıkkale province of Turkey, E. graminis f. sp. hordei was present in 34 of 128 inspected barley fields with a mean prevalence value of 0.53% [7]. This disease was detected in limited fields in Çubuk district of Ankara province, Turkey with a mean prevalence value of 1.1% [8]. In the current study, this disease was detected in 6 out of 50 inspected fields with a mean prevalence value of 0.22%.

Net form of net blotch, spot form of net blotch, scald, barley stripe and powdery mildew diseases were found in barley growing areas of Bala district, Ankara, Turkey. Net form of net blotch was found as the most common disease followed by spot form of net blotch and scald. Control measures should be taken in order to control these diseases.

6. CONCLUSION AND RECOMMENDATIONS

Both forms of net blotch, scald, barley stripe and powdery mildew diseases were found in barley fields of Bala District, Ankara, Turkey. Net form of net blotch was found as the most common disease

followed by spot form of net blotch and scald. Disease severity values of these diseases ranged between 4-8 using a 1-9 scale. Control strategies should be developed in order to control these diseases.

NOTICE

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