



Distribution of Barley Stripe Disease in Central Anatolia, Turkey

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ABSTRACT

Barley stripe disease caused by *Drechslera graminea* is an important disease of barley worldwide. During 2012, 205 barley fields were surveyed for the presence of this disease in Central Anatolia, Turkey. Eighty-two fields (40%) were found to be infected with *Drechslera graminea*. Disease incidence ranged between 1-70%. Generally low amount of disease was observed, however, disease incidence was high (up to 70%) in some fields of Kayseri, Sivas, Yozgat and Aksaray provinces. Large differences were observed among provinces for the proportion of crops infected.

1. Introduction

Barley stripe disease caused by the fungus *Drechslera graminea* (teleomorph: *Pyrenophora graminea*) is an important disease of barley worldwide. It is a seedborne and single-cycle disease (Mathre 1982). The use of clean seed and seed treatment fungicides effectively control this disease. However, the disease can be a threat if clean seed is not used or no seed treatment is employed. The disease is also present in Turkey and cause yield losses (Mamluk et al. 1997, Aktaş 2001, Kavak 2004). In this study, 11 provinces in Central Anatolia region of Turkey were surveyed for the presence of disease. An abstract of this study has been published previously (Karakaya et al. 2014).

2. Materials and Methods

Distribution of barley stripe disease in Central Anatolia was investigated in 2012. Twenty-one, 4, 26, 21, 3, 3, 5, 27, 12, 38 and 45 fields were surveyed in Kayseri, Kırıkkale, Sivas, Yozgat, Aksaray, Kırşehir, Nevşehir, Ankara, Çankırı, Konya and Eskişehir provinces. For survey studies, systematic sampling method was used (Aktaş 2001). Depending on field distances, fields in every 5-30 km of the road were surveyed for the presence of *Drechslera graminea*. Each field was surveyed

following a W pattern in the field and at least 100 plants were examined.

3. Results and Discussion

Eighty-two fields (40%) were found to be infected with *Drechslera graminea*. Four fields surveyed in Kırıkkale province (in Central district and Yahşihan, Balıseyh and Delice districts) and 3 fields surveyed in Kırşehir province (in Central district and Akpınar and Kaman districts) were disease free.

In Ankara province out of 27 fields inspected only two fields were found to be infected with *Drechslera graminea*. In Ankara province, 5, 5, 4, 3, 3, 3, 1 and 1 fields in Şereflikoçhisar, Gölbaşı, Kalecik, Akyurt, Haymana, Polatlı, Lalahan and Elmadağ districts were disease free, respectively. *Drechslera graminea* was detected in one field in Nallıhan (1%) and in one field in Bala (5%) districts.

In Konya province out of 38 fields inspected five fields were found to be infected with *Drechslera graminea*. In Konya province, 2, 2, 2, 1, 2, 2, 2, 1, 3, 3, 3, 3, 2, 2 and 3 fields in Yunak, Akşehir, Doğanhisar, Hüyük, Beyşehir, Seydişehir, Meram, Akören, Bozkır, Güneysınır, Karatay, Selçuklu, Altnekin, Cihanbeyli and Kulu districts were disease free, respectively. *Drechslera graminea* was detected in a total of 5 fields

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in Yunak, Meram, Çumra, Cihanbeyli and Ereğli districts. Disease incidence in these districts was low (1% each).

In Çankırı province, 5, 3 and 1 fields in Central district and Ilgaz and Korgun districts were disease free, respectively. *Drechslera graminea* was detected in three fields in Central district. Diseases incidence was 1% in two fields and 3% in one field.

In Nevşehir province, 3 fields in Hacibektaş district were disease free. In Nevşehir, *Drechslera graminea* was detected in two fields in Hacibektaş district. Diseases incidence in these fields was 1% and 5% respectively.

In Aksaray province, 3 fields in Central district was surveyed and *D. graminea* was found in all 3 fields. Disease incidence in these fields was 1%, 15 % and 20%, respectively.

In Yozgat province, 21 fields were surveyed and *D. graminea* was found in 8 fields. In Yozgat province, 4, 1, 1, 1, 1, 2 and 3 fields in Yerköy, Central, Sorgun, Saraykent, Akdağmadeni, Boğazlıyan and Yenifakılı districts were disease free, respectively. *Drechslera graminea* was detected in 1, 1, 1 and 5 fields in Central, Akdağmadeni, Boğazlıyan, and Yenifakılı districts, respectively. Disease incidence was 1% in Boğazlıyan field, 15% in Central district field and 5% in Akdağmadeni field. In Yenifakılı district, disease incidence in 3 fields was 1% and in 2 fields was 2%.

In Eskişehir province, 22 out of 45 fields found infected with *D. graminea*. In Eskişehir province 2, 1, 2, 2, 1, 2, 2, 2, 1, 7 and 1 fields in Central, Han, Seyitgazi, Alpu, Sarıcakaya, Mihallıççık, Çifteler, Mahmudiye, Beylikova, Sivrihisar and Günyüzü districts were disease free, respectively. *Drechslera graminea* was detected in 3, 1, 2, 2, 1, 2, 2, 2, 2, 2 and 1 fields in Central, Han, Seyitgazi, Alpu, Sarıcakaya, Mihallıççık, Çifteler, Mahmudiye, Beylikova, Sivrihisar, Günyüzü and İnönü districts, respectively. Disease incidence was 2%, 2% and 10% in 3 Central district fields, 2% in Han field, 2% and 5% in 2 Seyitgazi fields, 1% and 3% in 2 Alpu fields, 2% in Sarıcakaya field, 1% and 2% in 2 Mihallıççık fields, 2% and 7% in 2 Çifteler fields, 1% and 1% in 2 Mahmudiye fields, 2% and 5% in 2 Beylikova fields, 1% and 2% in 2 Sivrihisar fields and 4% in Günyüzü field.

In Kayseri province, 21 fields were surveyed and *D. graminea* was found in 17 fields. In Kayseri province, 3 fields in Kocasinan and 1 field in Tomarza districts were disease free. *Drechslera graminea* was detected in 1, 3, 1, 4, 3 and 5 fields in Sarioğlan, Bünyan, Melikgazi, Pınarbaşı, Tomarza and Kocasinan districts, respectively. Disease incidence was 5% in Sarioğlan field, 2%, 2% and 10% in 3 Bünyan fields, 1% in Melikgazi field, 1%, 1%, 2% and 2% in 4 Pınarbaşı fields, 1%, 1% and 60% in 3 Tomarza fields and 1%, 2%, 3%, 5% and 40% in 5 Kocasinan fields.

In Sivas province, 26 fields were surveyed and *D. graminea* was found in 20 fields. In Sivas province, 3 fields in Ulaş, 2 fields in Şarkışla and 1 field in Gemerek districts were disease free. *Drechslera graminea* was detected in 1, 4, 3, 4 and 8 fields in Yıldızeli, Central, Ulaş, Şarkışla and Gemerek districts, respectively. Disease incidence was 10% in Yıldızeli field, 2%, 2%, 10% and 10% in 4 Central district fields, 5% , 5% and 10% in 3 Ulaş fields, 1%, 2%, 2%, and 2% in 4 Şarkışla fields, 2%, 2%, %2, %2, 10%, 30%, 40% and 70% in 8 Gemerek fields.

Drechslera graminea was found in all provinces with the exception of Kırıkkale and Nevşehir provinces. *D. graminea* was found in all 3 Aksaray fields surveyed. However, limited fields were surveyed in Kırıkkale, Nevşehir and Aksaray provinces. Large differences were observed among provinces for the proportion of crops infected. Limited fields were found infected with *D. graminea* in Ankara, Konya and Çankırı provinces. Disease incidence was low in these provinces. Disease was present in about half of the fields inspected in Eskişehir province. Disease incidence was also low in Eskişehir province, however, one field with a diseases incidence rate of 10% in Central district and one field with a disease incidence rate of 7% in Çifteler district were observed. In Yozgat province disease was present in 8 out of 21 fields. In this province, the incidence rates of disease ranged between 1% and 15%. In Sivas and Kayseri provinces high amount of disease was observed. In Sivas province 20 out of 26 fields surveyed found to be infected with *D. graminea*. In this province disease incidence ranged between 1% and 70%. In Kayseri province disease was present in 17 out of 21 fields. In this province, the incidence rates of disease ranged between 1% and 60%. It appears that the disease is common in some provinces and in some fields surveyed. In surveys carried out in Ankara province during the years 1989, 1990 and 1991 disease intensity values were found as 9.37%, 2.32%, 6.17%, respectively (Tunalı 1992). In our study, disease was found in 2 out of 27 Ankara fields surveyed. Mamluk et al. (1997) noted barley stripe as the most commonly encountered disease in the Central Anatolia Plateau of Turkey with disease intensity values up to 10% in majority of the fields. In another study performed in Central Anatolia, disease incidence was found as 4.7%, 5.5% and 4.2% in 1987, 1988 and 1989, respectively. The disease was found to be widespread in all 11 provinces surveyed (Damgacı and Aktuna 1988). Although disease is easily controlled by using clean seed and treatment of seeds with fungicides, disease was observed in most of the provinces surveyed. In some provinces disease was found in considerable number of fields. Especially in areas with high disease incidence, farmers should be educated about possible control methods. Farmers should be encouraged to use clean seed and if necessary, seed treatment with fungicides should be practised. Variability in the fungus should be studied and resistant cultivars should be developed.

4. References

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