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Peculiarities of wheat leaf disease distribution in coastal area in Albania

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Abstract

Septoria leaf blotch (*Septoria tritici)*, leaf rust (*Puccinia triticina)* and powdery mildew (*Blumeria graminis)* are the most important wheat leaf diseases in costal area in Albania. Observations were done every weak starting from tillering till milk ripening in wheat production fields. It was carried out in "Kaloshi" farm in Grabian village, Lushnja the district of Fier in year 2011. Based on the data obtained during surveys conducted to determine the most frequent air diseases of wheat in the low coastal area, Lushnja, for 2011, we can say that: First affections from the powdery mildew (*Blumeria graminis)* of wheat was observed since the first survey, March 15, with a level of disease incidence 3 %, and then during the middle of April disease incidence from diseases, was 12 %. During the beginning of April were observed Septoria leaf blotch (*Septoria tritici)* disease incidence by 5% and then at the end of May to the maximum value of 25%. Leaf rust (*Puccinia triticina)* on leaves was observed in mid-April at the extent of 2 %, where at the end of May reached the maximum value of 23 %. Changes in disease epidemics were determined and showed the differences between the analyzed diseases.

Key-words: Wheat, brown rust, septoria leaf blotch, powdery mildew, disease incidence.

1. Introduction

Diseases, including leaf diseases, are a significant risk factor which influences the quantity and quality of grain production under conditions of Albania. The spectrum and harmfulness of diseases has changed over the years [16]. Winter wheat is one of the most important and economically beneficial crops in Albania. Distribution of pathogens is a complex phenomenon – it is set by host distribution and susceptibility levels, crop management and environment [8]. Knowledge about regularity of disease emergence may play a significant role in building up an effective and sustainable control system of wheat diseases.

Diseases, especially those affecting the leaves are causing important losses in yield Annually, global yield losses due to wheat diseases in the field or in storage are estimated to be 20% [3]. Yield losses may amount to as much as 40% and are greatest when disease development precedes or accompanies flowering [3]. An important part of wheat research in the last two decades has been the behaviour of wheat to airborne fungal diseases with particular focus on leaf rust (*Puccinia recondita* Roberge), powdery mildew (*Blumeria graminis* sp. Syd.), Septoria leaf blotch (*Septoria tritici* Rob et Desm), *Fusarium* spp). [14]. At the Agricultural University of Tirana trials for wheat breeding has been in place in the last five decades enabling also long-term resistance trials [14].

Conditions that favour development of these diseases usually coincide with conditions that favour crop growth and their main effects are yield reduction and quality deterioration in years with the highest productive potential. The larges damage (50%) from the leaf rust was recorded during 1988 – 1990 due to high humidity during May and June [4].

Management of these diseases should be based on the use of resistant varieties since the persistence of available fungicides is not sufficient to protect the plant during the whole cycle [1].

2. Materials and Methods

2.1.Place of experiment

Dynamics of development for major leafy diseases in Wheat leaf rust (*Puccinia recondita* f.sp. *tritici*; *Prt*), Septoria leaf blotch (*Septoria tritici* Rob et Desm) and Powdery mildew (*Blumeria graminis* sp. Syd) was carried out in "Kaloshi" farm in Grabian village, Lushnja the district of Fier, which is located in geographic latitudes 40° 55'55.21" north, 19°37'00.10" east, in height above sea level of 1m. Annual rainfall is 730 – 957 mm per year and average annual temperatures range from 6.1°C in January and 23.1°C in June.

2.2.Time of diseases assessment

Assessments of diseases were performed every 15 days starting from April 15 till June 30 (ie in total were carried 5 assessments) ranging from stage 5 to stage 10.5, according to Feekesit and according to Large, E.C. [11]

Sampling method:

In experimental trials were evaluated at random 50 plants (in five points diagonal) with 10 plants each point and were evaluated two upper leaves (a total of 100 leaves) giving each leaf the class value that corresponds from 0 to 5 and recording corresponding frequencies of leaves for each class.

2.3.Assessment of diseases

Assessment of Wheat leaf rust (*Puccinia recondita* f.sp. *tritici*; *Prt*), Septoria leaf blotch (*Septoria tritici* Rob et Desm) and Powdery mildew (*Blumeria graminis* sp. Syd) is realized using the five class (degrees) system, which is based on physiological reactions and pustule size in affected organs. For Powdery mildew (*Blumeria graminis* sp. Syd) we have modified scales from 0-9 by [10]. For Wheat leaf rust (*Puccinia recondita* f.sp. *tritici*;*Prt*), we have modified scales from 0-9 of Coob by [12]. For Septoria leaf blotch (*Septoria tritici* Rob et Desm) we have modified scales from 0-9 [5]. These modifications are presented by Vrapi.H.[15]. See. Figure.1

The main parameter for quantitative evaluation of diseases was the disease intensity I (DS), which is given by the formula:

I (DS) = % s / S * 100 [5]

Where: I = intensity of the disease, s = % of leaf area affected by disease, S = % total leaf area

The medium McKinney index [9], has been used for the severity of the diseases $I = \Sigma\{(ni*xi) / N \bullet X\} \bullet 100$.

Where: I = Mckinney index, Σ = Total of productions ni.*xi, ni = frequency or number of plants observed for each class, xi = value of each class, N = total number of plants assessed, X = value of the highest class.

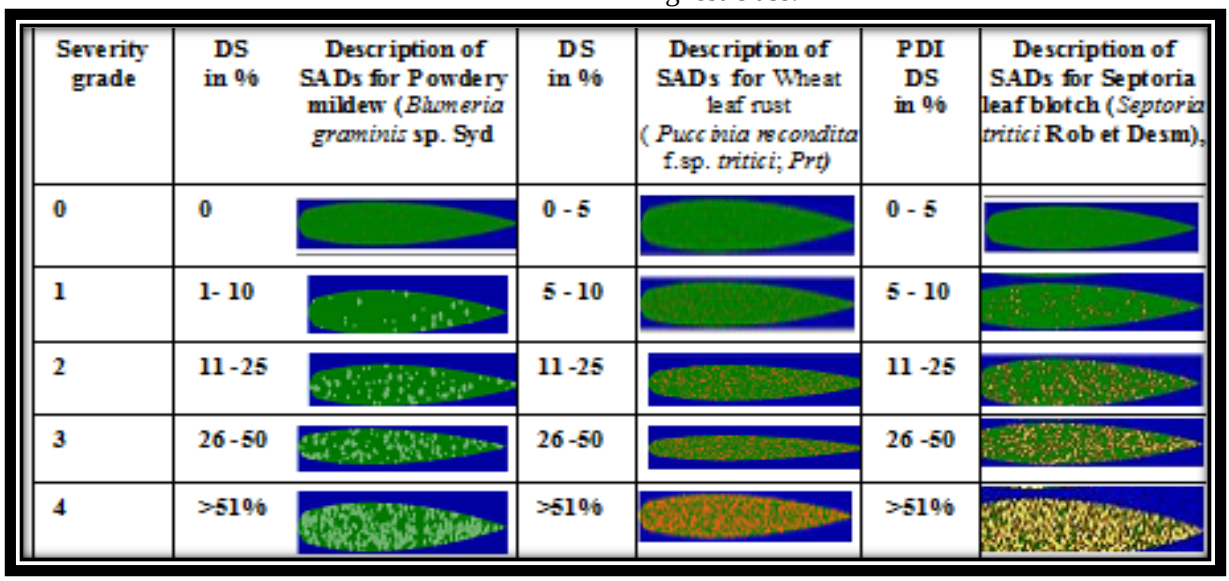

Figure 1 Standard area diagrams used to estimate Wheat leaf rust (*Puccinia recondita* f.sp. *tritici*; *Prt*) , Septoria leaf blotch (*Septoria tritici* Rob et Desm and Powdery mildew (*Blumeria graminis* sp. Syd in the Lushnje, Albania. (Images for SAD s created using Severity Pro software [15])

Statistical data analysis

Data processing for all environments test for variance, was done using analysis of variance (ANOVA) and three factorial analysis was done by using statistical program ASSISTAT (2013) - Website http://www.assistat.com By Francisco de AS the DEAG-CTRN-Silva UFC [2].

Comparisons of averages of disease index (Imc in%) with variant control (without treatment) was performed using the Tukey Kramer test for two levels of probability p = 0:05 and p = 0:01 with SAS statistical program 2009 [17].

3. Results and Discussion

The climatic conditions in the low coastal area for 2011:

Weather data for 2011 for the months of April, May and June are shown in Table 1. Environmental

factors (especially temperature) affected the degree of diseases development in wheat, but also affected the behavior of the cultivars themselves against them. However, genetic factors play a determining role in the behavior of cultivars to disease within the action of external climatic factors. It looks in the behavior of cultivars in the same environment, which represents internal genetical sustainability of studied cultivars.

Table 1. Summary of air temperature (°C) and precipitation (mm) recorded in April, May and June (2011) in the Lushnje,Albania

Year	*Location*	*Weather variable*	*April*	*May*	*June*
2011	Lushnje	Temperature	14	18.1	22.6
		Precipitation	58	64	12

In this aspect, in conditions of this year, ie 2011, in both areas of study have different Imc in % regarding the three diseases in the study. See Table 2 and Figure 2.

The development dynamics of the major leafy diseases in low coastal area forYear 2011:

Based on the data obtained during surveys conducted to determine the most frequent air diseases of wheat in the low coastal area Lushnja, for 2011, we can say that:

First affections from the Powdery mildew (*Blumeria graminis* sp. Syd) of wheat was observed since the first survey, March 15, with a level of 3 %, and then during the middle of April affection from diseases, was 12 % (Table .2)

During the beginning of April were observed the Septoria leaf blotch (*Septoria tritici* Rob et Desm) ingested by 5% and then at the end of May to the maximum value of 25% (Table 2).

Leaf rust (*Puccinia recondita* f.sp. *tritici*; *Prt*) on leaves was observed in mid-April at the extent of 2 %, where at the end of May reached the maximum value of 23 % (Table 2)

The following table provided data for three main leafy diseases affecting wheat and their dynamics that appear in Figure 2.

Table 2. Data on the disease intensity (DS) for the three main leafy diseases affecting wheat and their dynamics in the low coastal area.

Nr	***Time of diseases assessment***	***Septoria leaf blotch (Septoria tritici Rob et Desm),***	***Leaf rust (Puccinia recondita Roberge)***	***Powdery mildew (Blumeria graminis sp. Syd)***
1	**15 March 2011**	**0**	**0**	**3**
2	**2 April 2011**	**5**	**0**	**8**
3	**16 April 2011**	**5**	**2**	**12**
4	**28 April 2011**	**8**	**6**	**6**
5	**13 May 2011**	**15**	**10**	**3**
6	**26 May 2011**	**25**	**23**	**0**

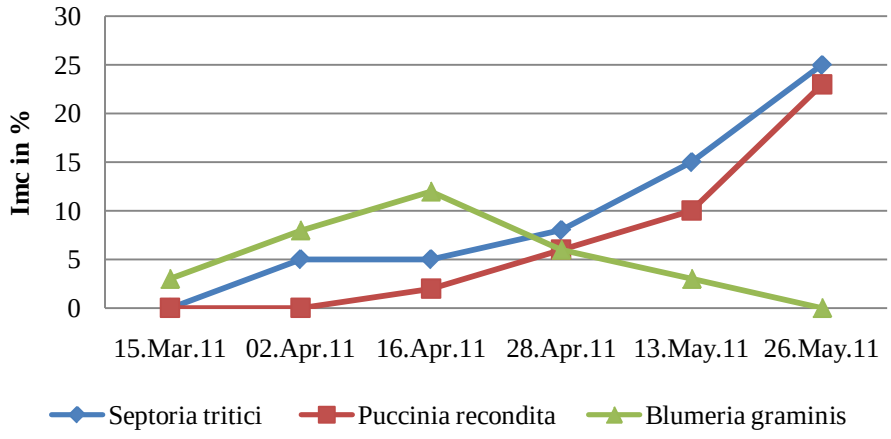

Figure. 2. On the data on the disease intensity (DS) for three main leafy diseases affecting wheat and their dynamics in low coastal area

4. Conclusions

Based on the data obtained during surveys conducted to determine the most frequent air diseases of wheat in the low coastal area, Lushnja, for 2011, we can say that:

First affections from the powdery mildew (*Blumeria graminis)* of wheat was observed since the first survey, March 15, with a level of disease incidence 3 %, and then during the middle of April disease incidence from diseases, was 12 %.

During the beginning of April were observed Septoria leaf blotch (*Septoria tritici)* disease incidence by 5% and then at the end of May to the maximum value of 25%.

Leaf rust (*Puccinia recondita* f.sp. *tritici*; *Prt*) on leaves was observed in mid-April at the extent of 2 %, where at the end of May reached the maximum value of 23 %.

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