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Rice diseases in Turkey

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Abstract. All the rice diseases recorded in other rice growing countries do not occur in Turkey. The three fungal diseases observed on the rice crop are: Blast disease (*Pyricularia oryzae*), Brown leaf spot (*Helminthosporium oryzae*), and Bakanea and Foot rot (*Fusarium moniliforme*).

The earliest attempts to study pathogenic fungi in Turkey were made by Bremer and Özkan (1946), and Göbelez (1953). They reported that blast was the most important rice disease in Turkey.

This disease especially affected certain local varieties, such as Sary Çeltik, Sary Kılçık, Dervis, and Akçeltik.

Introduced rice varieties from different European countries were tested. Some of them seemed resistant, such as Krasnodarsky-424, Rodina, and Iskra. In addition, some of our new developed varieties, like Trakya and Serhat-92, appeared to be resistant to the blast disease.

Depending on climatic conditions, the infection rate varies from region to region. However, diseases do not cause economically important damage to the rice crop in Turkey.

I – Introduction

Turkey has seven geographical regions and rice can be cultivated in all of them. It is grown under continuous irrigated conditions with full water control. The rice area covers about 50,000-60,000 ha in Turkey and varies from year to year according to the irrigation water available and market prices. The average rough rice yield is 5 t/ha. The total milled rice production is approximately 200,000 tons which is not enough for domestic consumption. Therefore, some milled rice is imported every year. The climate varies changing from temperate in the Black Sea region to continental in the interior and to Mediterranean in the Aegean and Mediterranean coastal regions.

II – The rice disease situation with special reference to blast disease

All the rice diseases recorded in other rice growing countries do not occur in Turkey. The three fungal rice diseases observed are: Blast disease, Brown leaf spot, Bakanea and Foot rot, caused by *Pyricularia oryzae*, *Helminthosporium oryzae*, and *Fusarium moniliforme*, respectively.

The earliest attempts to study pathogenic fungi in Turkey were made by Bremer and Özkan (1946) and Göbelez (1953). They reported that blast was the most important rice disease in Turkey. Göbelez also observed up to 25-75% yield losses in some rice fields in the Black Sea region.

A survey was carried out by Tekinel et al. (1980) to determine disease infections on the rice crop in Turkey. Its results indicated that blast was the most important disease in all rice growing regions. The most severe infection (up to 90%) was observed in the Mediterranean coastal areas. They also noted the presence of brown leaf spot (*Helminthosporium oryzae*) in some rice fields.

Oran (1975) reported about 8.33% yield reduction due to blast in the southeastern part of Turkey. The blast disease occurred especially on certain local varieties. Tekinel et al. (1980) tested some local and introduced rice varieties using artificial inoculation in the greenhouse to determine their reaction against the blast disease. They reported the following results.

<u>Variety name</u>	<u>Reaction</u>	<u>Variety name</u>	<u>Reaction</u>
Maratelli	S	Ranballi	S
Besani	MS	Gritna	MR
Baldo	MS	Ribe	MS
Europa	R	Vialone Nano	MS
Sary Çeltik	VS	Akçeltik	S
Sary Kylçyk	MS	Monticelli	S
Dervis	S		

Four of the varieties above: Sary Kylçyk, Sary Çeltik, Dervis, and Akçeltik, are local varieties. All of them were susceptible to blast.

Rice varieties from different European countries have been introduced so as to find high yielding varieties, with good grain quality and disease resistance. In 1986 and 1987, some of these varieties were tested by Ataç (1987) for their blast resistance in the Mediterranean coastal areas. He used spore suspension from the same area for artificial inoculation in the greenhouse. The results obtained appear in Table 1. Some of the introduced varieties, such as Krasnodarsky-424, Rodina, and Iskra, seemed to be resistant, the other varieties showed moderate susceptibility (MS) or susceptible reaction (S).

Table 1. The reaction of rice varieties against the *Pyricularia oryzae* population obtained from the southeast Mediterranean region

<u>Variety name</u>	<u>Reaction</u>	
	1986	1987
Gritna	MS	MS
Rocca	MS	MS
Ribe	MS	MS
Krasnodarsky-424	R	MR
Plovdiv	MR	MR
Rodina	R	R
Ranballi	MS	MS
Baldo	MS	MS
Maratelli	S	S
Veneria	MS	MS
Iskra	R	MR
N1-41T-1T-0T	MS	MS
Balilla-28	MS	MS
Sequial	MS	MS
Vialone Nano	S	S
Carolla	S	MS
Lido	MS	MS
Steralla	MS	MS

One of our breeding objectives is to develop varieties resistant to diseases in our institute. As a national Rice Research Project Center, we always take this into consideration. But, unfortunately the environmental conditions are less favorable to disease infection in the northwestern part of Turkey, where our institute is established and where blast is not a severe problem. Growing our newly developed lines or varieties in the other regions, we can observe blast infection due to climatic conditions more favourable to blast occurrence. In addition, in these regions, cultural practices are less developed than in the northwest of Turkey.

During the last decade, the varieties developed in our institute were grown in field conditions in the Black Sea region in 1993. Although, they appeared to be resistant to blast in our region (Table 2), some of them, like Altynyazy, Ergene, and Meriç, were susceptible to it. But Trakya and Serhat-92 were resistant to blast in that region as well. Weather conditions, with high relative humidity (80% average) and high rainfall during the rice growing period are most favourable to blast in the Black Sea region.

The blast disease occurs in Central Anatolia due to cool water and low night temperatures, i.e. a typical continental climate with great night and day temperature differences.

Table 2. The reaction of rice varieties to *Pyricularia oryzae* in the Black Sea region in 1993

Variety name	Leaf blast	Node blast %	Panicle blast %	Yield tons/ha
Trakya	R	3	1	6.2
Rocca	MR	10	1	5.9
Serhat-92	VR	40	1	5.8
Ypsala	MR	10	-	5.5
Meriç	S	70	3	5.1
Altynyazy	VS	60	2	5.0
Ergene	S	70	4	4.8
TOAG-92	MS	40	—	4.8
Krasnadarsky-424	VR	—	—	5.7
Ribe	MR	—	—	5.3

The blast disease occurs in the southeastern Mediterranean coastal areas, because of high relative humidity (average: 80-85%) and high temperatures (average: 25-30°C). Blast infection in southeastern Turkey is due to high temperatures and semi-upland conditions rice is cultivated there with irrigation, but without standing water in the fields. These conditions favour disease development. A low incidence was observed for Bakanae and Foot rot (*Fusarium moniliforme*), especially on certain varieties. We observed up to 13-15% and 7-10% of infection by Foot rot for the Italian varieties Baldo and Gritna respectively in northwestern Turkey in 1981. In general, we have varieties resistant to this disease.

III – Conclusion

The blast disease caused by *Pyricularia oryzae* was occasionally present in all areas, and in a certain situation. The main blast manifestations were leaf, node and neck blasts. The severity of this disease is influenced by varietal susceptibility, heavy nitrogen fertilization, soil type, planting date, plant density and environmental conditions.

The other diseases, Brown leaf spot and Bakanea and Foot rot, are less important than blast in Turkey.

In general, diseases no longer cause economically important damages to the rice crop in Turkey as in the past due to the susceptibility of local varieties. By replacing local varieties by new resistant ones and by developing new cultural management practices, the problem has been solved.

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