

Main diseases of safflower (*Carthamus tinctorus* L.) in Uzbekistan

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Abstract: In Uzbekistan the disease of rust in safflower is widely spread. Furthermore, safflower is being partially diseased with Fusarium wilt, Alternaria and Ramularia leaf spots. It is important to carry out agro-technical issues in disease management, neutralize seeds before planting, when strongly damaged it is appropriate to use fungicides.

Keywords: safflower, diseases, fungicides, spreading, agriculture, crop

INTRODUCTION

Safflower – (*Carthamus tinctorus* L), is a one year valuable technical crop, originating from Afghanistan and Ethiopia. The roots are very deep stretching from 2 to 3 meters downwards. The crop of safflower is being grown in less irrigated lands or lands irrigated by rain water as it is resistant for drought and heat. Another distinctive feature of safflower is that it does not choose soil; the fertility of the crop does not decrease noticeably even in sandy, rocky or salty soil. Its vegetal growth period lasts 95- 135 days. The fertility makes up average 8- 10 centners in irrigated lands by rain water and 20- 25 centners in irrigated lands. The safflower seed is contained of 30- 37% oil, according to its chemical structure it is considered one of the most quality oil for consumption [1].

Oil can be taken from safflower seed for food provision and its hay is considered a nutritious food in cattle breeding. As well as carrying out quality agro-technical issues on time, pests and disease control is equally important in order to get a highly effective yield from safflower.

Safflower is known to be infected by 57 pathogens including 40 fungi, 2 bacteria, 14 viruses and one mycoplasma [2]. Due to our observations, in 2011-2017 the crops of safflower in our Republic are diseased mainly with Rust, Fusarium wilt, Alternaria, Ramularia leaf spot of safflower. According to the statistics, 25- 30% yield loss and the deterioration of the oil quality are observed owing to these diseases in our territory.

Main diseases of safflower such as Rust, Fusarium wilt, Alternaria and Ramularia leaf spots have been observed under the conditions of Uzbekistan.

Rust

The fungus of *Puccinia carthami* causes the disease [3,4]. It is one of the most harmful diseases for safflower in our climate conditions. We have identified in our researches that the disease of rust can be observed in all the fields of safflower in our Republic.

Above-ground symptoms: The initial symptoms of rust appear in the stem and in the lower leaves, in the part where they are connected to the ground, in the form of white postules; yellow tiny

postules appear on the surface of upper leaves when the crops are mature. Diseased leaves turn yellow, wither and the colour of the postules become dark brown in the last stage of growth. If the conditions are not favorable for the crops and the development weakens the postules colour turn dark.

Fusarium wilt

The fungus of *Fusarium oxysporum f.sp. carthami* causes the disease [5,6]. The fungus damages the plant strongly in the low-lying and flooded areas and under a low temperature conditions. Generally, any factor that resists the root growth will create favourable conditions for the development of the fungus and intensify the Fusarium wilt.

Above-ground symptoms: The initial symptoms of the Fusarium wilt in safflower appear in the leaves, sides of the leaves turn yellow. If the plant is diseased in the period of young growth, it stops growing. The tissues in the main root of the stem which carry food become clogged and turn brown, which is one of the specific features of Fusarium wilt. If safflower is seriously diseased with Fusarium wilt, the leaves of the plant wilt and turn yellow after which dry

and collapse, the quality of the seeds will deteriorate and become unusable.

Ramularia leaf spots

The fungus of *Ramularia carthami* Zapr. causes this disease [7,8].

Above -ground symptoms: The above-ground symptoms of this disease on safflower are initially in yellowish brown or brown colour. Sometimes the irregular spots cover both sides of the leaves with grey dust. The surroundings of the spots are in yellow colour and surround them as a circle. In some cases several spots twist together to form big yellow or brown spots. The leaf withers when several spots appear on it.

Alternaria leaf spots

The fungus of *Alternaria carthami* causes this disease [9,10]. This disease also damages the plant seriously when the temperature falls and the moisture increases.

Above -ground symptoms: the initial above-ground symptoms of Alternaria disease appears on the leaves, light brown and dark brown spots emerge on the leaves, they twist each other and make round and irregular big spots on both sides of the leaves. When the plant is seriously damaged with Alternaria disease dark lines appear on the stem, the leaves turn yellow and wither.

Main diseases of safflower: rust, Fusarium wilt, Alternaria and leaf spots.



Picture-1

Picture-2

Picture-3

Picture-4

Picture-1: The leaf diseased with rust

Picture-2: The leaf diseased with leaf spots

Picture-3: The leaf diseased with Fusarium wilt

Picture-4: The plant diseased with Alternaria (the author's illustrations)

MATERIALS AND METHODS

Besides this, several methodological manuals and foreign scientific literatures have been used to identify the types and damages of diseases of safflower. In order to identify the spreading of diseases of safflower 10 plants have been selected from 10 different places, totally 100 plants have been selected for research.

RESULTS & DISCUSSION

When we observed "Milyutin 114" sort of safflower which were planted in Kibray District, Tashkent Region in the farmers' society of "Turkistan-Saidazimov Habibulla" we have identified that the spreading rate of rust made up 74%, Fusarium wilt made up 16%, Alternaria made up 21%, whereas the spreading rate of Ramularia made up 25%. In "Alijon Baraka" farmers' society the spreading rate of rust reached 70%, whereas

the other diseases showed the following rates: Fusarium wilt- 14%, Alternaria- 18%, Ramularia – 20%.

In Kashkadarya Region, Chirakchi District, in the farmers' society of "Maxmatkarim" the "Milyutin 114" sort of safflower were diseased with rust for 75%, Fusarium wilt- 10.0%, Alternaria- 12.0%, Ramularia leaf spots-15.0%. Kamashi District, "Kamay korosuv lalmisi" farmers' society the disease rates in "Gallaaral" sort of safflower showed the following numbers: rust made up 56%, Fusarium wilt- 6%, Alternaria- 13.0%, while the spreading rate of leaf spot reached 18.0%. In "Keldiyar Bazarov" farmers' society the spreading rate of rust reached 80 %, whereas the other diseases showed the following rates: Fusarium wilt- 11%, Alternaria- 6%, Ramularia leaf spots- 32%.

Spreading of main diseases of safflower in 2014-2017 years.

№	Places in which observations have been carried out	Spreading of diseases, %			
		Rust	Fusarium wilt	Alternaria leaf spots	Ramularia leaf spots
Tashkent Region					
1	“Turkistan-Saidzimov Habibulla” farmers’	74,0	16,0	21,0	25,0
2	“Alijon Baraka” farmers’	70,0	14,0	18,0	20,0
Kashkadarya Region					
3	“Maxmatkarim” farmers’	75,0	10,0	12,0	15,0
4	“Kamay korosuv lalmisi” farmers’	56,0	6,0	13,0	18,0
5	“Keldiyar Bazarov” farmers’	80,0	11,0	6,0	32,0

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