RESEARCHES ON REPORTING THE ATTACK OF SOME PEANUTS DISEASES CULTIVATED ON SANDY SOILS

PhD Milica Dima [1]
PhD Aurelia Diaconu [2]
PhD Reta Drăghici [3]
PhD student Alina-Nicoleta Paraschiv [4]
PhD student Coteț Gheorghe [5]
[1, 2, 3, 4, 5] Research & Development Station for Plant Culture on Sands Dabuleni, Romania
[5] University of Craiova, Craiova, Romania

ABSTRACT

Peanuts (Arachis hypogaea L.) are widely grown as a food and oleaginous species. Cultivation of peanuts offers important economic benefits, but one of the most important challenges that growers confront is the fight against destructive diseases. Culture is susceptible to a variety of pathogens, such as bacteria, fungi, viruses, and nematodes, resulting in low yields and degradation of grain quality. Among the most devastating fungal diseases of peanuts are Cercospora arachidicola, Puccinia arachidis, Sclerotium rolfsii which cause substantial loss of production. Loss of yields due to the incidence of peanut disease may be up to 50%. Fungicides can be used to combat fungal diseases, but there are alternative disease control options, such as cultural practices, cultivation of resistant varieties, which can be useful in combating diseases by reducing the frequency of application of fungicides.

Keywords: *peanuts, disease, fungi, control*

INTRODUCTION

Peanuts are mainly grown for human consumption, they have many uses, as whole or processed seeds to make peanut butter, oil, and other products. The seeds contain 25-30% protein and 42-52% oil [3].

Cultivating peanuts offers important economic benefits, but one of the most important challenges peanuts that farmers confront is disease control. Culture is susceptible to a variety of pathogens, such as bacteria, fungi, viruses and nematodes, resulting in low yields and degradation of grain quality. Among the most devastating fungal diseases of peanuts are Cercospora arachidicola, Cercosporidium personatum, Puccinia arachidis, Sclerotium rolfsii which cause substantial losses at the production level. Loss of yields due to the incidence of peanut disease may be up to 50%. The damage caused depends on the stage of plant development when the disease occurs. The largest damage is recorded when the disease is on the leaves before the flowering of the plants. Cercospora arachidicola greatly reduces the weight of the pods, the number of ginophores and not only the number of pods, but also the average weight of the grains. In peanut cultures in

southern Oltenia, Cercospora occurs towards the end of the vegetation period, therefore the damage is small and varies according to the variety.

The integrated pest management system of resistant varieties improved soil cultivation practices and cultural practices, together with the low application of chemical fungicides, can help combat fungal diseases in peanuts.

In peanuts, erect growth varieties are less susceptible to the attack of pathogens than those with a protuberant growth whose leaves can get more into contact with soil [7]. Growing erect growth varieties reduces the incidence of disease by limiting the contact between the plant and the soil mushroom spores [7].

MATERIAL AND METHODOLOGY

The study was conducted at SCDCPN Dabuleni during 2013-2015 on some peanut varieties in the germplasm collection. Biological material with fungal attack symptoms from the peanut brew field was taken.

The biologically affected material was maintained in the humid chamber until the formation of taxonomic mycelia. From these, pure cultures were obtained on the nutritive medium, which was identified by microscope according to the morphological characteristics of the specialists.

RESULTS AND DISCUSSIONS

The environmental-specific conditions to sandy soils favour the spread and evolution of a wide spectrum of pathogenic fungi. Along with the known and ubicvistic species, the soils of Fusarium, Rhizoctonia, Sclerotinia, Macrophomina, Phoma, Roesleria and Eutypa have been reported as frequent in the area of sandy soils.

Within these genres have been identified species that produce fusarium peanuts Fusarium oxysporum f.sp. [8], Roesleria hypogea and Eutypa lata [6], the drying and decline of vines (Phoma viniferae), Cytospora vitis, Fusarium oxisporium, Fusarium equiseti, Fusarium sambucinum [2], [7] wilting and staining of green melons - Fusarium oxysporum, Fusarium equiseti [14], Drying of castor oil - Macrophomina phaseolina, Fusarium moniliforme [1], Fusarium oxysporum f.sp. niveum [9].

In the collection of peanut germ plasm, during the period 2013-2015, SCDCPN Dăbuleni observed partial or total drying of peanut plants, more frequently in August-September.

In 2014, the drying of the plants was sporadic, evidencing the associated attack of fungi Fusarium oxysporum f.sp. vasinfectum, Rhizoctonia solani and Sclerotinia minor, and 2015 there was a frequency of dried plants with a very large amplitude of between 0.1 and 62.8% (Table 1). Depending on the genotype, the frequency of dry plants ranged from 0-6.1% for the Viviana variety (germ cell culture variety) and 13.4-62.8% (33.8% for the average / 3 repetitions) to the Brazilian Begici variety. Plant drying, variable from one genotype to another, was induced

predominantly by the attack of the fungus Fusarium oxysporum f.sp. vasinfectum identified on plants in different phenological phases.

The fungus produces damage to peanuts cultivated at SCDCPN Dăbuleni [9], [10] and in all peanut cultivation countries [4].

On the nutritive medium the fungus forms white colonies with characteristic hyphae and elongated conidia. The diameter of the colony after 7 days of development measures 73 mm at 3-10 values of the pH of the nutrient medium, which means that the fungus can grow on any soil regardless of its reaction (Table 2).

Table 1. *Attack of pathogenic fungi in the field of peanuts*

Genotype Genotype	Frequency of dry plants(%)	
	Amplitude	Average/3repetitions
Dăbuleni	12,1-26,3	18,3
Brazilian Begici	13,4-62,8	33,8
Velican	6-9,2	8,1
Early of China	2,6-17,8	10,2
T55	7,5-41	23,5
Provenance China 1	3,9-35	17,3
Provenance China 2	7,1-19,2	13,3
Ning	3,8-8,9	5,0
Henan Province	2,3-6,8	3,5
Viviana	0-6,1	1,9
Provenance Turkish	0-6,2	2,3

Table 2. *Influence of the pH values of the nutrient medium on the development of some fungal fungi after 7 days of development*

Fungus	The diameter of the colony (mm) to the pH values of the nucleating medium							
	3	4	5	6	7	8	9	10
Fusarium oxysporum f.sp. vasinfectum	73	73	73	73	73	73	73	73
Phoma arachidicola	18	40	71	73	73	73	57	41
Cylindrocladium(Calonectria) crotalariae	37	48	70	73	73	73	42	26
Fusarium oxysporum f.sp. niveum	73	73	73	73	73	73	73	73

From the dried and defoliated plants of line T55, the pathogenic fungus Phoma arachidicola was isolated. It forms on the nutritive medium colonies white-yellowish, peach with brown-reddish reverse. Between hyphae there is a growing number of dark-brown, conspicuous picnids, which at maturity release a number of oval and hyalini picnosporids through osteol. The attack produced by this fungus in peanuts cultivated in the USA, Japan, China, Australia was associated with a decrease in production [5], [11].

In the Early of China variety from the dried herbs was isolated Cylindrocladium (Calonectria) crotalariae. The dried roots of these plants showed numerous

microscleroses that transferred to the nutrient medium, forming yellowish, then brown, brownish-colored colonies. The highest growth (73 mm diameter) of the colony of this fungus was recorded at the pH values of the nutrient medium ranging from 6-8 (Table 2). The attack of this fungus causes the rotting of the pods, roots and stems [13]. Since its first appearance in Georgia in 1965, the disease has spread, with significant damage being reported to peanut cultures in the USA, India and Australia [12].

The determinations made in some peanut genotypes revealed a significant reduction in the waste and production of the attacked plants. Due to the attack of the predominant fungus Fusarium oxysporum f.sp. vasinfectum, to the Provenienta China 2 genotype was determined the most significant reduction in the waist and production of the attacked plants (Table 3). The production of pods on an unattacked plant was 121.5 g compared to 26.1 g in an attacked plant.

Table 3. *Pathogenic action of fungi identified in some peanut genotypes*

Genotype Genotype	Dominant pathogenic pathogepapathogenic fungus Dominant pathogenic fungus	The height of the plant				The production of pods			
		Unattacked plants		Attacked plants		Unattacked plants		Attacked plants	
		1	2	1	2	1	2	1	2
Dăbuleni	Fusarium oxysporum f.sp. vasinfectum	41	-	26	-	37	-	0	-
Brazilian Begici	Fusarium oxysporum f.sp. vasinfectum	37	-	22	-	37,2	-	0	-
Velican	Fusarium oxysporum f.sp. vasinfectum	44	-	41	-	56	-	0	5
Early of China	Cylindrocladium(Calonectria) crotalariae	28	-	27	-	53,3	-	14,6	-
T55	Phoma arachidicola	27	-	20	25	35,5	-	0	16,2
Provenence China 1	Fusarium oxysporum f.sp. vasinfectum	26	-	20	23	40,2	-	6,0	11,2
Provenence China 2	Fusarium oxysporum f.sp. vasinfectum	32	-	31	-	121,5	-	26,1	-
Ning	Fusarium oxysporum f.sp. vasinfectum	42	-	18	33	21,2	-	0	11,8
Henan Province	Fusarium oxysporum f.sp. vasinfectum	35	-	24	-	38,2	-	6,4	-
Viviana	Fusarium oxysporum f.sp. vasinfectum	31	-	26	27	42,3	-	0	12,3
Provenence Turkish	Fusarium oxysporum f.sp. vasinfectum	41	-	40	-	55	-	0	5

*Determinations made on unleavened plants (production = 0) were completed with those from plant 2.

CONCLUSION

Under the ecological conditions of sandy soils, pathogenic fungi have been identified in peanuts: Fusarium oxysporum f.sp. vasinfectum, Phoma arachidicola, Cylindrocladium (Calonectria) crotalariae.

It has been observed that the genotypes in the peanut germ cell collection all three pathogenic species are transmissible through soil and seeds.

In order to limit the area of peanuts, marked on peanuts it is necessary to cultivate resistant varieties within an integrated protection system.

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