

QUANTIFICATION OF THE ATTACK PRODUCED BY SPHAEROTHECA PANNOSA (WALLR.) LEV. COUSIN. ROSAE WORON AND DIPLOCARPON ROSAE WOLF IN SOME ROSE VARIETIES

Adelina Larisa MUNTEANU¹, Rodi MITREA²

(1) University of Craiova, PhD student, Faculty of Horticulture, Doctoral School of Animal and Plant Resources Engineering, Plant Protection – Phytopathology
E-mail: adelinamunteanu94@yahoo.com

(2) University of Craiova, Faculty of Horticulture, Faculty of Horticulture, Department of Biology and Engineering, Strada Alexandru Ioan Cuza, Number 200585, Craiova.
E-mail: rodimitrea@yahoo.com

Corresponding author email: adelinamunteanu94@yahoo.com

Abstract

In order for rose plants to develop normally, one of the conditions is the timely detection of attacks of damaging agents, an important place within which belongs to the phytopathogens *Sphaerotheca Pannosa* (Wallr.) Lev. Var. *Rosae Woron* and *Diplocarpon Rosae Wolf*. Quantifying the effect of the attack of pathogens *Sphaerotheca pannosa* and *Diplocarpon rosae* on the monitored rose varieties, revealed changes in some biological failures related to the ratio of the length / width of the leaflets and the diameter of the flower compared to the same parameters in the case of unattached organs.

Key words: pathogens, attack quantification, degree of attack, the diminution of entanglement P%

INTRODUCTION

The rose is undoubtedly the most cultivated species for cut flowers, being considered – par excellence – the queen of flowers or the flower of love. With a very old history, which is lost in the mists of time, the rose is certainly the most sung and adored flower (Thomas, 2009).

The rose is attacked by a series of phytopathogens of particular economic importance is *Sphaerotheca pannosa* (Wallr.) Lev. var. *rosae Woron* and *Diplocarpon rosae Wolf*.

Sphaerotheca pannosa* var. *rosae is the pathogen responsible for the flowering of the rose, the attack having a negative influence in terms of the growth of the stem, leaves as well as the size of the flowers and implicitly on the commercial appearance.

Flowering is managed by growers through various management practices. One of the practices used is that of applying

fungicides that has become a remarkable component in the management of the disease.

Scarito et al. (2007) states that this disease can be controlled using organic synthesis chemicals, and Tjosvold and Koike (2001) noted that a large amount of pesticides are consumed to keep the pathogen under control.

The use of these substances in large and repeated quantities also brings with it disadvantages, the pathogen develops resistance to fungicides, thus leading to the emergence of new strains but also representing a danger to the environment. Seeing the adverse effects related to the use of pesticides, specialists recommend reducing the use of these products and introducing in the crop some resistant varieties (Săuleanu (Ioniță) et al. 2019). Biological control is also recommended, for example salicylic acid is a natural phenolic compound that is present in

many plants and is an important component in the transduction pathway and is locally involved in systemic resistance to pathogens (Delaney et al. 1995 and Maleck et al., 2000).

Diplocarpon rosae Wolf is the pathogen that produces the black staining of the rose. The disease manifests itself especially on the leaves, but young branches, calyx and petals can also be attacked.

Black spotting has traditionally been managed by applying fungicides either exclusively or as part of an integrated pest management system. Every year many treatments are needed to control the disease, due to the macrocyclic life cycle of the pathogen responsible for this disease (Harp et al., 2009)

As a result of this, a very high demand has arisen for rose varieties that require ,, a low maintenance,, but which are resistant to diseases and harmful, tolerant to abiotic stress and aesthetically pleasing (Zlesak, 2006; Harp et al., 2009; Byrne, 2015; Waliczek et al., 2015)

MATERIALS AND METHODS

The researches were undertaken in the summer of 2022 on 5 varieties of rose grown in the rosary in the Alexandru Buia Botanical Garden in Craiova.

Paul McCartney – is a rose that belongs to the group of theatrical roses, strongly fragrant, with large flowers of a bright pink, the leaves are semi-glossy of a medium green. The bush reaches a height of 90-180 cm and a diameter of 60 cm.

Melina - dwarf climbing rose is of exceptional variety among climbing plants. Although it is one of the dwarf climbing roses it reaches a height of between 150-200 cm. The flowers are double, the color of the leaves is a light green.

Dekora – has a height of 120 cm and a width of 70 cm. Flowers of this variety are fragrant, the foliage is brilliant green.

Asja – is a theatrical, reaches a height of 90-100 cm, diameter of 70-90 cm, the foliage is of a living green.

Terracotta – belongs to the theatrical group, has a height of 90-110 cm and a diameter of 80-90cm. The flowers are fragrant, the foliage is glossy of a bright green.

Welds regarding changes in some biological attributes following the natural attack of the pathogens *Sphaerotheca pannosa* and *Diplocarpon rosae* involved making measurements of the length and width of the leaflets as well as the diameter of the flower compared to the attacked and unattached organs.

The measurements were made on 5 plants/variety, on each plant being measured 25 leaflets and all the flowers.

The loss for each analyzed parameter was calculated according to the formula:

$$P \% = \left(1 - \frac{b}{a}\right) \times 100 \text{ (after Săvescu, 1967)}$$

In which: b = values to the attacked organ
a = values at the unattached organ.

For the two pathogens studied, the incidence of the attack (F%), the intensity of the attack (I%) was established in order to calculate the degree of attack (GA%).

The attack frequency (F %) is the number of plants, or organs of the attacked plant, as opposed to the number or organs analysed, expressed as a percentage by the formula:

$$F \% = \frac{n \cdot 100}{N}$$

where: n - the number of plants or organs of the plant attacked,

N – the number or bodies attacked.

The intensity of the attack (I %) represents the degree of disease of the plant or its organ.

To calculate the intensity of the attack, the formula is used:

$$I = \frac{\sum(i \times f)}{n}$$

where: i = note or percentage of coverage;
f = the number of cases with attack on each note;

n = the total number of cases with attack.

The degree of attack (GA %) represents, the level of attack to all plants on a given surface, or to all organs on the plant. In this case, the analysis of the frequency of attack is made on the organ/ plant.

The degree of value attack is given by the relationship:

$$\%GA = \frac{F\% \times I\%}{100}$$

In which: F % = frequency of attack;

I % = the intensity of the attack

RESULTS AND DISCUSSIONS

The attack of flour produced by the fungus *Sphaerotheca pannosa* var. *rose* was detected on the leaves, shoots and floral buds, starting with the appearance of whitish, felty spots following the development of the ectoparasite mycelium (Fig.1).



Fig.1 *Sphaerotheca pannosa* var. *rose* - attack on the leaves (original)

Subsequently, the areas became dusty, when the sexuete fructifications (conidiophores and conidia of the *Oidium* type) developed.

Towards autumn, following the formation of the sexuete part of the fungus, namely the cleistotecs, the Mycelean felt acquired

a grayish tint, the cleistothecques presenting themselves in the form of black dots. The attack on the leaves began in May, at different points of the foliar limbus, after which it spread over increasing areas on the limbus, on both sides of the leaflets and continued until November following a series of successive series of secondary infections.

Also, the attack of flouring, spread to the flower shoots and buds, which, over time, acquired the appearance of sifting with flour.

The attack was manifested with high frequency and intensity, the average value of the degree of attack (G.A. %) in the 5 varieties studied being between 3.01 % (Melina variety) and 7.15 % (Dekora variety) (Table 1).

As for the width of the leaflets, in the unattached leaves it had values ranging from 3.1 cm in the Dekora variety to 4.7 cm in the Melina variety.

From the analysis of the data entered in the table, it is observed on the other hand, as in the organs with symptoms of disease coming from the varieties taken in the study, the values of the determined sequences were lower compared to those of the unattached plants for each variety. It is apparent from the quantitative determinations that in the folio attacks the length was reduced by 9,6 % (Dekora) and 7,2 % (Terracotta).

As regards the width, it was found that the sharpest reduction of 39,5 % was recorded in the Paul Mc Cartney variety.

The data show that the attack of the fungus responsible for the flouring of the rose leads especially to the narrowing of the foliar limbus following the decrease of its width .

The quantitative decrease was also recorded in the case of folioli that had symptoms of flouring.

Table 1. Quantification of the effect of the attack of the fungus *Sphaerotheca Pannosa* (Wallr.) Lev. Var. *Rosae Woronon* on some biological failures in some varieties (original)

No.	Variety	Variable	Foliola		Flower	Interced ^e G.A. %
			Length cm	Width cm	Diameter cm	
1.	Paul Mc Cartney	Unattached	5,4	4,3	8,7	5,61%
		Attacked	4,9	2,6	6,9	
		Mitigation of P% appropriati on	9,2 %	39,5 %	20,6 %	
2.	Melina	Unattached	5,95	4,7	5,6	3,01%
		Attacked	5,5	4,1	4,7	
		Mitigation of P% appropriati on	7,5 %	12,7 %	16,0 %	
3.	Dekora	Unattached	4,65	3,1	7,1	7,15 %
		Attacked	4,20	2,9	6,3	
		Mitigation of P% appropriati on	9,6 %	6,4 %	11,2 %	
4.	Asja	Unattached	5,35	4	8,9	6,07 %
		Attacked	4,90	3,35	7,0	
		Mitigation of P% appropriati on	8,4 %	16,2 %	21,3 %	
5.	Terracotta	Unattached	4,15	3,55	10,5	3,70 %
		Attacked	3,85	3,25	9,1	
		Mitigation of P% appropriati on	7,2 %	8,4 %	13,3 %	

Their diameter was reduced by between 11,2 % in the case of the Dekora variety and 21,3 % in the case of the Asja variety compared to the diameter of the unattached flowers.

The attack of black spotting was manifested especially on the leaves, on the upper part of the leaflets. The onset of

the attack occurred in May, with the appearance on the folio leaves of basal leaves of blackish, circular spots with radiar appearance and unspecified edges (fig. 2).

The circular appearance of the spots is given by the mycelium, which develops radiar around the point of infection.

In a more advanced phase of the attack, the central part of the petals became grayish, and protruding black dots appeared, which represent the asexual part of the causative pathogen, represented by conidiophores with conidiacs grouped in the subcuticular palisade.

In the varieties analysed, the attack degree values oscillated between 0,01 % (Asja) and 1,70 % (Dekora) (Table 2).



Fig. 2. *Diplocarpon rosae* – attack on the leaves (original)

Table 2. Quantification of the effect of the attack of *the fungus Diplocarpon rosae* Wolf. on some biological failures in some varieties (original)

No.crt.	Variety	Variable	Foliola		Flower	Intercede G.A. %
			Length cm	Width cm	Diameter cm	
1.	Paul Mc Cartney	Unattached	5,4	4,31	8,5	0,10%
		Attacked	5,2	4,27	7,3	
		Mitigation of P% appropriation	3,7 %	0,9 %	14,1 %	
2.	Melina	Unattached	6,15	5,35	5,6	0,32 %
		Attacked	5	4,69	5,0	
		Mitigation of P% appropriation	18,7 %	14,0 %	10,7 %	
3.	Dekora	Unattached	4,45	3,75	6,9	1,70 %
		Attacked	4,05	3,25	6,1	
		Mitigation of P% appropriation	8,9%	13,3 %	11,5 %	
4.	Asja	Unattached	5,40	4,0	8,5	0,01 %
		Attacked	5,13	3,91	7,6	
		Mitigation of P% appropriation	5 %	2,25 %	10,5 %	
5.	Terracotta	Unattached	4,15	3,85	10,3	0,63 %
		Attacked	3,85	3,45	9,5	
		Mitigation of P% appropriation	7,2 %	10,3 %	7,7 %	

From the data of the same table, the quantitative effect of the attack of *Diplocarpon rosae* in the 5 varieties of rose analyzed is observed. Thus, it was found reductions in the size of the folios by modifying the length-width ratio depending on the variety compared to the unattached leaflets.

The sharpest reduction was recorded for folios of the Melina variety by 18.7 % in terms of length of folio and 14.0 % in terms of width.

Based on these data it can be said that the black staining of the rose influences by ceasing the rate of growth of the leaves, respectively, the reduction of the foliar surface, the normal development of the plant.

Changes following the attack also occurred in terms of the diameter of the flower. For unattached flowers it had values between 5.6 cm in Melina and 10.3

cm Terracotta, but the most pronounced reduction in flower diameter was recorded in the Paul Mc Cartney variety of 14.1% followed by the Dekora variety with 11.5%.

CONCLUSIONS

The quantification of the attack of pathogens *Sphaerotheca pannosa* (wallr.) Lev. var. *rosaeworon* and *Diplocarpon Rosae* wolf in some varieties of rose have revealed changes in the growth and development of plants.

The flour produced by the fungus *Sphaerotheca pannosa* was present with average values of the degree of attack, ranging from 3,01 % in the Melina variety to 7,15 % in the Dekora variety.

In rose varieties analysed following the attack of *Sphaerotheca pannosa*, the length of the leaves was reduced by between 7.2 % (Terracotta) and 9.6 % (Dekora) and width between 6.4 %

(Dekora) and 39.50 % (Paul Mc Cartney) respectively.

As regards the diameter of the flowers, they suffered reductions of 21.3% (Asja) and 11.2% (Dekora) respectively.

Black staining of rose leaves, caused by the *diplocarpon rosae* fungus, was present with average attack values ranging from 1.70 % (Dekora) and 0.01 (Asja) respectively.

For rose varieties studied following the attack of *Diplocarpon rosae*, the length of the leaves was reduced by between 3.7% (Paul Mc Cartney) and 18.7% (Melina), and the width between 0.9% (Melina) and 14.0% respectively.

As regards the diameter of the flower, they suffered reductions of 14.1% (Paul Mc Cartney) and 7.7% (Terracotta).

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