

POTENTIAL USE OF OLEJAN 85 EC FOR PROTECTING SOME SPECIES OF ORNAMENTAL PLANTS AGAINST DISEASES

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Abstract: The object of the studies was to assess the effectiveness of the product Olejan 85 EC (85% rapeseed oil) against the disease casual agents of powdery mildew, rust, leaf spot and grey mould. Depending on a casual agent, Olejan 85 EC at the concentration of 1% was used for 2–6 spraying treatments at 7-day intervals.

The results of performed experiments revealed that Olejan 85 EC used as a curative spraying treatment on rose and pansy plants significantly reduced the development of powdery mildew. After 4 treatments, it caused a 3.3-fold reduction to complete inhibition of *Sphaerotheca pannosa* var. *rosae* development on roses. In the case of pansy plants, it caused a complete inhibition of the development of the fungus *S. humuli*.

The preparation Olejan 85 EC applied curatively against leaf spot, significantly inhibited the development of this disease on rose and pansy. After 6 spray treatments, the product caused at least a 1.9-fold reduction in the development of *Diplocarpon rosae* on rose. On pansy plants, after 4 applications, it caused a 3.1-to-4-fold reduction in the development of *Colletotrichum* spp.

Olejan 85 EC applied as a curative spraying treatment on chrysanthemum and willow inhibited the development of rust. After 4 applications on chrysanthemum, the product caused at least a 2-fold reduction in the development of *Puccinia horiana*, with 58% of brown and malformed telia. In the protection of willow, after 2 applications, Olejan 85 EC caused at least a 2.3-fold reduction in the development of *Melampsora epitea*, and from 32 to 75% of the uredinia turned brown and malformed.

Key words: Olejan 85 EC, spraying foliar pathogens, control

INTRODUCTION

Olejan 85 EC (85% rapeseed oil), is recommended as an adjuvant, i.e. an auxiliary substance, in a form of liquid for use in a combination with working solutions of some plant protection products. In the experiments carried out on roses, it was shown that the oils Atpolan 80 EC and Olejan 85 EC at a concentration of 0.3% could be used as additional components to working solutions, in order to reduce the dose of the emulsion fungicides recommended for controlling of powdery mildew and black spot by 30–50% (Zdonek *et al.* 1986; Orlikowski and Wojdyła 1995; Wojdyła 1998; Wojdyła 1999). Literature data also indicated a high efficacy of the oils used individually (without mixing them with fungicides) in controlling disease fungal casual agents (Dell *et al.* 1998; Ko *et al.* 2003; Picton and Humer 2003; Wojdyła 2000). Northover and Schneider (1993) demonstrated the efficacy of 99%, and even higher, of corn, rapeseed, soya, sunflower and grape oils used preventively or curatively to control *Podosphaera leucotricha* (powdery mildew) on apple trees. Azam *et al.* (1998) reported that 0.5% rapeseed oil used to control *Uncinula necator* on grapevine was as effective as sulfur-based fungicides and fenarimol. In the case of controlling *Diplocarpon rosae* on roses, a high efficacy of the tested oils, including rapeseed oil, was found when they were

used in a mixture with NaHCO₃ (Osnaya-Gonzalez and Schlösser 1998). In particular, as a result of using 1% rapeseed oil with 1% NaHCO₃, the area of necrotic spots was reduced 4.8 to 89 times, and the number of conidia formed on the spots was lowered 11.4 to 15.5 times, depending on an experiment. The author's own studies, carried out over many years, have also shown a high efficacy of mineral and vegetable oils used at concentrations of 0.25–4% in controlling of powdery mildew of rose (*Sphaerotheca pannosa* var. *rosae*) (Wojdyła 2002), black spot of rose (*D. rosae*) (Wojdyła unpublished), willow rust (*Melampsora epitea*) (Wojdyła and Jankiewicz 2004), and grey mould on rose (*Botrytis cinerea*) (Wojdyła 2003).

The aim of performed experiments was to evaluate the efficacy of Olejan 85 EC in controlling the fungal casual agents of powdery mildew, leaf spot, rust, and grey mould.

MATERIALS AND METHODS

Control of powdery mildew

Trials were done on roses and pansy. Roses *cv.* Monika grown in a plastic tunnel were sprayed with Olejan 85 EC at the conc. of 1% 4 times, at 7-day intervals, after the appearance of powdery mildew (*S. pannosa* var. *rosae*) symptoms. During the experiment, watering was carried out

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by directing a flow of water directly onto the substrate. The degree of infection on plants was assessed by a rating scale before applying tested products, after 2 spray treatments, and finally 3 and 14 days after the last treatment (Table 1).

Seedlings of pansy were planted in 1 dm³ pots filled with a peat substrate and placed in an outdoor area in container-grown plants. From the time of placing the plants outside until the middle of September, the plants were shaded with agro-fibre mats during sunny days. From the first days of June, the plants were often wetted in the evening so to maintain them in a damp state by overnight. At the same time, pansy plants with powdery mildew symptoms were placed among the healthy plants. Before applying any protective measures, and following 2 spray treatments, and also 3 and 14 days after the last treatment, the degree of infection was assessed by a rating scale (Table 3).

Control of black spot of roses and leaf spot of pansy

The experiments were carried out on roses cv. Red Berlin and Monika open field grown, and susceptible to black spot. During the course of the experiments roses were watered using a capillary system to prevent the applied agents from being washed off the surface of the plants during sprinkling. When the symptoms of black spot (*D. rosae*) were found on plants – 6 spraying treatments were performed at 7-day intervals, with Olejan 85 EC at the conc. of 1%. Before performing treatments, and after 3 spray treatments, and then 3 and 14 days after the last treatment, the assessments of infection degree was carried out according to a rating scale (Table 5). The experiments with the control *Colletotrichum* spp. on pansy were done on the some plants, as with the powdery mildew investigation and infection degree was carried out according to a rating scale (Table 7).

Control of chrysanthemum and willow rusts

Seedlings of chrysanthemum cv. Melba, susceptible to *Puccinia horiana*, were planted in 1 dm³ pots filled with a peat substrate. The plants were placed in a greenhouse on window sills covered with capillary mats. A chrysanthemum plant with symptoms of rust sporulation was placed among healthy, newly-planted plants. In order to ensure air humidity above 90%, favourable to pathogen development, the sills were covered with a thin plastic tunnel. Spraying treatments were performed after the first rust spots were found on leaves, before any telia formation. Chrysanthemum plants were sprayed 4 times at 7-day intervals. The degree of infection was assessed by a rating scale before spraying treatment, 3 and 14 days after the last spraying treatment (Table 9). 14 days after the last spraying treatment, the average number and percentage of dried-up telia was also recorded.

Willow trees cv. Iwa growing on a loamy soil in an open field were sprayed twice, at 7-day intervals, with Olejan 85 EC at the conc. of 1% after the first signs of sporulation (clusters of uredinia) of rust (*M. epitea*) appeared on the underside surface of their leaves. Prior to the experiment, and after two spray treatments, the degree of leaf infection on selected shoots was assessed by a rank-

ing scale (Table 11). The assessment also included the average number of uredinia formed on leaves and percentage value of those ones turned brown and malformed.

Control of grey mould

The experiments were carried out on roses cv. Mercedes grown in a plastic tunnel. To increase air humidity, the walkways were frequently sprinkled with water. After the first symptoms of infection were found on flower petals, Olejan 85 EC was used at the concentrations of 0.5% and 1.0% to spray rose bushes twice, at 7-day intervals. Observations of the degree of flower infection were conducted according to a ranking scale before spraying treatments, and then twice, 3 and 14 days after the last treatment (Tab. 13).

In all experiments, plants were sprayed in the morning using 1 dm³ of working solution per 10 m² of surface area. Both the upper and underside surface of leaf blade were thoroughly covered. Depending on the pathogen being controlled, the standard fungicides used included the following preparations: Biosept 33 SL (33% grapefruit extract) and Score 250 EC (250 g/l difenoconazole) (against powdery mildew, leaf spot, rust), and Rovral Flo 255 SC (255 g/l iprodione) to control grey mould.

The experiments were set up in a random block design in 4 replications, with 10 plants (roses, pansy) or 25 leaves (willow) per one replication.

RESULTS AND DISCUSSION

Control of powdery mildew

In the first experiment on the effectiveness of Olejan 85 EC in controlling *S. pannosa* var. *rosae*, after the first 10 days the degree of infection of protected bushes with Olejan 85 EC was more than 5 times lower comparing to the control roses (Table 1). Three days after spraying treatments, no disease symptoms were found on protected bushes with the product. 14 days after the last treatments the mean value degree of shoots' infection was almost 27 times lower.

In the second experiment, 10 days after applied treatments, the degree of the infection of protected bushes with Olejan 85 EC was more than 3 times lower than in the control roses (Table 2). And later, 3 and 14 days after the last spraying treatment, the degree of infection on the protected bushes was 39 and 19.6 times lower, respectively. Olejan 85 EC used to control *S. pannosa* var. *rosae* on roses was significantly more effective in comparison with the biopreparation Biosept 33 SL and fungicide Score 250 EC.

In the first experiment on the efficacy of Olejan 85 EC in controlling of *S. humuli* on pansy, after 2 spraying treatments, as well as 3 and 14 days after the last treatment, no disease symptoms were found on the plants protected with this product (Table 3).

In the second experiment, on the basis of all performed observations, Olejan 85 EC completely inhibited the development of powdery mildew symptoms and caused disappearance of existing mycelium and sporulation of the pathogen (Table 4). Olejan 85 EC used to control *S. pannosa* var. *rosae* on rose was significantly more effective in comparison with the biopreparation Biosept 33 SL and the fungicide Score 250 EC). Author's earlier studies

Table 1. Effectiveness of Olejan 85 EC in the control of *S. pannosa* var. *rosae* on rose cv. Monika
Beginning of experiment and initial infection level: 2005.08.09 = 0.7

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of shoots' infection		
			after 10 days	days after the last treatment	
				3	14
Control	–	–	3.38 d	4.18 d	4.85 d
Olejan 85 EC	1.0	7	0.64 a	0.00 a	0.18 a
Biosept 33 SL	0.1	7	1.84 c	1.65 c	1.93 c
Score 250 EC	0.05	7	1.63 b	0.17 b	0.42 b

Means in columns, followed by the same letter, do not differ with 5% of significance (Duncan's multiple range test).
Disease index: 0 – no symptoms, 1 – up to 1% of plant area covered with mycelium, 2 – 1,1 up to 5%, 3 – 5,1 up to 10%, 4 – 10,1 up to 20%, 5 – over 20% of shoot area covered with mycelium.

Table 2. Effectiveness of Olejan 85 EC in the control of *S. pannosa* var. *rosae* on rose cv. Monika
Beginning of experiment and initial infection level: 2005.08.16 = 1.3

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of shoots' infection		
			after 10 days	days after the last treatment	
				3	14
Control	–	–	3.66 d	4.71 d	4.89 d
Olejan 85 EC	1.0	7	1.10 a	0.12 a	0.25 a
Biosept 33 SL	0.1	7	1.83 c	1.72 c	2.13 c
Score 250 EC	0.05	7	1.32 b	0.22 b	0.43 b

Explanation – see table 1

Table 3. Effectiveness of Olejan 85 EC in the control of *S. humuli* on pansy cv. Firman Gold
Beginning of experiment and initial infection level: 2005.09.20 = 1.6

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of leaves' infection		
			after 10 days	days after the last treatment	
				3	14
Control	–	–	2.75 d	3.83 d	4.10 d
Olejan 85 EC	1.0	7	0.00 a	0.00 a	0.00 a
Biosept 33 SL	0.1	7	0.86 c	0.28 c	0.27 c
Score 250 EC	0.05	7	0.17 b	0.10 b	0.13 b

Explanation – see table 1
Disease index: 0 – no symptoms, 1 – up to 5% of plant area covered with mycelium, 2 – 5,1 up to 10%, 3 – 10,1 up to 25%, 4 – 25,1 up to 50%, 5 – over 50% of shoot area covered with mycelium

Table 4. Effectiveness of Olejan 85 EC in the control of *S. humuli* on pansy cv. Firman Gold
Beginning of experiment and initial infection level: 2005.09.27 = 1.2

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of leaves' infection		
			after 10 days	days after the last treatment	
				3	14
Control	–	–	2.22 d	3.82 d	4.09 d
Olejan 85 EC	1.0	7	0.00 a	0.00 a	0.00 a
Biosept 33 SL	0.1	7	1.31 c	1.06 c	1.03 c
Score 250 EC	0.05	7	0.21 b	0.09 b	0.10 b

Explanation – see table 1.

Table 5. Effectiveness of Olejan 85 EC in the control of *D. rosae* on rose cv. Red Berlin
Beginning of experiment and initial infection level: 2005.07.05 = 0.3

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of shoots' infection		
			after 17 days	days after the last treatment	
				3	14
Control	–	–	1.74 c	4.42 c	5.27 d
Olejan 85 EC	1.0	7	0.46 b	2.18 b	2.78 c
Biosept 33 SL	0.1	7	0.45 b	2.25 b	2.66 b
Score 250 EC	0.05	7	0.21 a	1.41 a	1.50 a

Explanation – see table 1

Disease index: 0 – no symptoms, 1 – 0,1 up to 25% of plant leaves with disease symptoms, 2 – over 25% leaves with disease symptoms, 3 – up to 25% of fallen leaves and rest of the leaves with disease symptoms, 4 – up to 50% of fallen leaves and rest of the leaves with disease symptoms, 5 – from 50,1 up to 90% of fallen leaves, 6 – over 90% of fallen leaves

Table 6. Effectiveness of Olejan 85 EC in the control of *D. rosae* on rose cv. Monika
Beginning of experiment and initial infection level: 2005.07.12 = 0.2

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of shoots' infection		
			after 17 days	days after the last treatment	
				3	14
Control	–	–	1.35 d	2.94 d	5.85 d
Olejan 85 EC	1.0	7	0.46 c	1.48 c	2.73 b
Biosept 33 SL	0.1	7	0.34 b	1.42 b	3.09 c
Score 250 EC	0.05	7	0.19 a	0.58 a	1.18 a

Explanation – see table 1

Table 7. Effectiveness of Olejan 85 EC in the control of leaf spot (*Colletotrichum* spp.) on pansy cv. Firman Gold
Beginning of experiment and initial infection level: 2005.09.20 = 1.3

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of leaves' infection		
			after 10 days	days after the last treatment	
				3	14
Control	–	–	2.42 d	4.13 d	4.22 d
Olejan 85 EC	1.0	7	1.11 c	1.22 c	1.37 c
Biosept 33 SL	0.1	7	0.90 b	0.89 b	1.09 b
Score 250 EC	0.05	7	0.29 a	0.19 a	0.21 a

Explanation – see table 1

Disease index: 0 – no disease symptoms, 1 – from 0.1 to 5% of leaf surface covered with spots, 2 – 5,1 to 10%, 3 – 10.1 to 25%, 4 – 25 to 50%, 5 – more than 50% of leaf covered with spots

Table 8. Effectiveness of Olejan 85 EC in the control of leaf spot (*Colletotrichum* spp.) on pansy cv. Firman Gold
Beginning of experiment and initial infection level: 2005.09.27 = 1.0

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of leaves' infection		
			after 10 days	days after the last treatment	
				3	14
Control	–	–	2.11 d	3.96 c	4.14 d
Olejan 85 EC	1.0	7	0.89 c	0.98 b	1.14 c
Biosept 33 SL	0.1	7	0.74 b	0.93 b	0.96 b
Score 250 EC	0.05	7	0.32 a	0.74 a	0.75 a

Explanation – see table 1

Table 9. Effectiveness of Olejan 85 EC in the control of white rust (*P. horiana*) on chrysanthemum cv. Melba
Beginning of experiment and initial infection level: 2005.09.13 = 1.4

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of leaves' infection/ days after the last treatment		Mean number of pustules per diseased leaf	Average percent of dried pustules
			3	14		
Control	–	–	3.82 d	4.18 d	14.20 c	0.0 a
Olejan 85 EC	0.1	7	1.46 b	1.82 c	3.46 b	58.1 b
Biosept 33 SL	0.1	7	1.65 c	1.40 b	2.39 ab	66.8 b
Score 250 EC	0.05	7	0.99 a	0.61 a	0.83 a	87.4 c

Explanation – see table 1

Disease index: 0 – no disease symptoms, 1 – 0.1 to 1% of leaf surface with disease symptoms, 2 – 1,1 to 5%, 3 – 5,1 to 10%, 4 – 10,1 to 25%, 5 - 25,1 to 50%, 6 – more than 50% leaf surface with disease symptoms

Table 10. Effectiveness of Olejan 85 EC in the control of white rust (*Puccinia horiana*) on chrysanthemum cv. Melba
Beginning of experiment and initial infection level: 2005.09.20 = 1.6

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of leaves' infection/ days after the last treatment		Mean number of pustules per diseased leaf	Average percent of dried pustules
			3	14		
Control	–	–	3.78 c	3.98 c	9.19 b	0.00 a
Olejan 85 EC	0.1	7	1.88 b	1.88 b	2.68 a	70.45 c
Biosept 33 SL	0.1	7	1.86 b	1.86 b	2.54 a	37.31 b
Score 250 EC	0.05	7	0.94 a	1.06 a	1.59 a	100.0 d

Explanation – see table 1

Table 11. Effectiveness of Olejan 85 EC in the control of rust (*M. epitea*) on willow cv. Iwa
Beginning of experiment and initial infection level: 2005.07.05 = 0.9

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of leaves' / days after the last treatment		Mean number of uredinia per diseased leaf	Average percent of dried uredinia
			3	14		
Control	–	–	4.14 d	5.31 c	54.54 c	0.00 a
Olejan 85 EC	1.0	7	1.77 c	1.72 b	20.28 b	23.48 c
Biosept 33 SL	0.1	7	1.59 b	1.72 b	19.49 b	5.35 b
Score 250 EC	0.05	7	1.18 a	1.02 a	5.14 a	5.13 b

Explanation – see table 1

Disease index: 0 – no disease symptoms, 1 – 0.1 to 1% of leaf surface with disease symptoms, 2 – 1.1 to 5%, 3 – 5.1 to 10%, 4 – 10.1 to 25%, 5 – 25.1 to 50%, 6 – more than 50% leaf surface with disease symptoms

Table 12. Effectiveness of Olejan 85 EC in the control of rust (*M. epitea*) on willow cv. Iwa
Beginning of experiment and initial infection level: 2005.07.12 = 0.6

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of leaves' infection/ days after the last treatment		Mean number of uredinia per diseased leaf	Average percent of dried uredinia
			3	14		
Control	–	–	3.35 c	4.73 d	60.56 b	0.00 a
Olejan 85 EC	1.0	7	1.47 b	1.61 c	35.56 a	74.70 bc
Biosept 33 SL	0.1	7	1.38 a	1.44 b	53.25 ab	43.16 b
Score 250 EC	0.05	7	1.38 a	1.31 a	37.7 a	91.74 c

Explanation – see table 1

Table 13. Effectiveness of Olejan 85 EC in the control of gray mould (*B. cinerea*) on rose cv. Mercedes
Beginning of experiment and initial infection level: 2005.09.06 = 0.7

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of flower infection after days of the last treatment	
			3	14
Control	–	–	1.51 d	2.44 d
Olejan 85 EC	0.5	7	0.80 c	1.45 c
Olejan 85 EC	1.0	7	0.51 b	1.10 b
Rovral Flo 255 SC	0.2	7	0.18 a	0.32 a

Explanation – see table 1

Disease index: 0 – no symptoms, 1 – sporadically petals spots, 2 – heavy petals spots, 3 – beginning of petals necrosis, 4 – necroses of flower and flower stalk

Table 14. Effectiveness of Olejan 85 EC in the control of gray mould (*B. cinerea*) on rose cv. Mercedes
Beginning of experiment and initial infection level: 2005.09.13 = 0.4

Treatments	Concentration in %	Frequency of spraying in days	Mean degree of flower infection after days of the last treatment	
			3	14
Control	–	–	1.69 d	2.67 d
Olejan 85 EC	0.5	7	0.70 c	1.58 c
Olejan 85 EC	1.0	7	0.38 b	1.41 b
Rovral Flo 255 SC	0.2	7	0.18 a	0.65 a

Explanation – see table 1

also revealed a high effectiveness of rapeseed and sunflower oils in controlling *S. pannosa* var. *rosae* (Wojdyła 2002). The two oils used curatively at a concentration of 1% proved to be more effective than triforine.

Control of black spot of roses and leaf spot of pansy

In the first experiment on the efficacy of Olejan 85 EC in controlling *D. rosae*, 10 days after the beginning of the experiment the degree of pathogen's infection of rose bushes protected with the product was almost 4 times lower than in the control roses (Table 5). Later, 3 and 14 days after the last spraying treatment, the degree of infection of the rose bushes protected with Olejan 85 EC was almost twice lower.

In the second experiment, after the first 10 days, the degree of infection of the rose bushes protected with Olejan 85 EC was 3 times lower than that one of the control roses (Table 6). And 3 and 14 days after the last spray treatment, the degree of infection on the rose bushes protected with the product was almost twice lower. On the basis of obtained results from it was shown that, Olejan 85 EC had a significantly lower efficacy in comparison with Score 250 EC, and similar to Biosept 33 SL.

In the first experiment testing the effectiveness of Olejan 85 EC in controlling of *Colletotrichum* spp. on pansy, after the first 10 days the degree of leaves' infection of plants protected with the product was 2.2 times lower than in the control plants (Table 7). The degree of infection of protected plants 3 and 14 days after the last treatment was more than 3 times lower.

In the second experiment, 10 days after spraying treatment, the degree of infection of protected plants with

Olejan 85 EC was 2.4 times lower than in the case of control plants (Table 8). The degree of infection of the plants protected with the product, 3 and 14 days after the last treatment was more than 3.6 times lower. In both experiments, Olejan 85 EC showed a significantly lower efficacy compared to Score 250 EC.

Control of chrysanthemum and willow rusts

In the first experiment on the efficacy of Olejan 85 EC in controlling *P. horiana* on chrysanthemum, after 3 and 14 days from the last spraying treatment, the degree of infection of the plants protected with the product was more than 2.3 times lower (Table 9). A four-times lower number of telia was found on leaves sprayed with Olejan 85 EC, and more than 58% of them turned brown and were malformed.

In the second experiment, 3 and 14 days after the last spraying treatment of chrysanthemum plants, it was found that the infection degree of protected plants was two times lower (Table 10). The leaves sprayed with Olejan 85 EC revealed 3.4 times smaller number of telia, and over 70% of them were brown and malformed. In both experiments, basing on all the observations, Olejan 85 EC showed a significantly lower efficacy than Score 250 EC.

In the first experiment on the effectiveness of Olejan 85 EC in controlling of *M. epitea* on willow, the degree of infection of the plants protected with the product, 3 and 14 days after the last treatment, was 2.3 and 3.1 times lower, respectively (Table 11). The number of uredinia found on the leaves sprayed with Olejan 85 EC was almost 2.7 times lower, and more than 23% of them were malformed and turned brown.

In the second experiment, 3 and 14 days after the last spraying treatment of willow, the degree of infection was found to be 2.3 and 2.9 times lower, respectively, on plants protected with Olejan 85 EC (Table 12). The leaves sprayed with the product showed a smaller number of uredinia, and more than 74% of them were already brown and malformed. Olejan 85 EC was significantly less effective in controlling of willow rust than the fungicide Score 250 EC. The results of earlier experiments also revealed a high efficacy of Olejan 85 EC in controlling willow rust (Wojdyła and Jankiewicz 2004). The product, depending on its concentration, caused a 2-to-14-fold reduction in the formation of uredinia clusters, about 10–61% of them were brown and malformed. Similar studies performed on geranium plants confirmed a high efficacy of Olejan 85 EC in controlling of *P. pelargonii-zonalis* (Wojdyła 2005). The author reported that the product at the concentration of 1% applied 4 times at 7-day intervals caused an almost two-fold reduction in the number of uredinia, 23% of them dried-up, in comparison with the control plants.

Control of grey mould

In the first experiment on the efficacy of Olejan 85 EC in controlling of *B. cinerea* on rose, 3 and 14 days after the last spraying treatment the degree of infection of protected bushes with the product at the conc. of 0.5% was over 1.7 times lower than in the case of control plants (Table 13). The degree of infection of the bushes protected with Olejan 85 EC at the conc. of 1% was more than 2.2 times lower in comparison with the control bushes.

In the second experiment, after 3 and 14 days from the last treatment, the degree of infection of the bushes protected with Olejan 85 EC at the conc. of 0.5% was more than 1.7 times lower than in the control plants (Table 14). In the case of bushes protected with Olejan 85 EC at the conc. of 1% the degree of infection was 4.4 times lower after 3 days and 1.9 times lower after 14 days after the last treatment in comparison with the control. Increasing the concentration of Olejan 85 EC resulted in a significantly higher efficacy of the preparation. The product proved, however, to have a significantly lower efficacy in controlling of grey mould than the fungicide Rovral Flo 255 SC. A similar efficacy of the preparation was shown in the case of rapeseed oil used at the concentration of 0.25–2% in protecting rose flower petals against *B. cinerea* (Wojdyła 2003).

CONCLUSIONS

1. Olejan 85 EC used as a curative spraying treatment of rose and pansy at the concentration of 1% significantly inhibited the development of powdery mildew. After 4 applications, the product caused a 3.3-fold reduction to complete inhibition of *S. pannosa* var. *rosae* development on rose, whereas pansy plants, in turn, it caused a complete reduction in *S. humuli* development.
2. Olejan 85 EC used curatively on rose and pansy plants at the concentration of 1% significantly inhibited the development of leaf spot. After 6 applications, the product caused at least a 1.9-fold reduction in the

development of *D. rosae* on rose. On pansy plants, in turn, after 4 applications it caused a 3.1-to-4-fold reduction in the development of *Colletotrichum* spp.

3. Olejan 85 EC used in curative spray treatments of chrysanthemum and willow inhibited development of rusts. After 4 applications on chrysanthemum plants, the product caused at least a 2-fold reduction in the development of *P. horiana*, and 58% of telia were malformed and turned brown. In protection of willow, after 2 applications, Olejan 85 EC caused at least a 2.3-fold reduction in the development of *M. epitea*, and from 23 to 75% of the uredinia were malformed and turned brown.
4. After 2 spray treatments of rose bushes, Olejan 85 EC at the concentrations of 0.5% and 1% reduced the development of *B. cinerea* from 1.5 to 4.4 times. The increase of the concentration of the product resulted in its higher effectiveness.

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POLISH SUMMARY

MOŻLIWOŚĆ ZASTOSOWANIA ŚRODKA OLEJAN 85 EC W OCHRONIE NIEKTÓRYCH GATUNKÓW ROŚLIN OZDOBNYCH PRZED CHOROBIAMI

W przeprowadzonych badaniach oceniano skuteczność środka Olejan 85 EC (85% oleju rzepakowego) w ochronie roślin ozdobnych przed niektórymi patogenami – sprawcami: mączniaka prawdziwego, rdzy, plamistości liści oraz szarej pleśni. W zależności od zwalczanego czynnika chorobotwórczego, Olejan 85 EC w stężeniu 1% stosowano 2 do 6-krotnego opryskiwania w odstępach 7-dniowych.

W przeprowadzonych badaniach wykazano, że Olejan 85 EC zastosowany interwencyjnie do opryskiwania róży i bratka istotnie ograniczał rozwój mączniaka praw-

dziwego. Po 4-krotnym opryskiwaniu roślin powodował 3,3-krotne do całkowitego zahamowania rozwoju *Sphaerotheca pannosa* var. *rosae* na róży. Z kolei na bratku powodował całkowite zahamowanie rozwoju grzyba *Sphaerotheca humuli*.

Środek zastosowany interwencyjnie do opryskiwania róży i bratka istotnie ograniczał rozwój plamistości liści. Po 6-krotnym zastosowaniu powodował on przynajmniej 1,9-krotne zahamowania rozwoju *Diplocarpon rosae* na róży. Z kolei na bratku, po 4-krotnym zastosowaniu do opryskiwania, powodował od 3,1 do 4-krotne zahamowanie rozwoju *Colletotrichum* spp.

Olejan 85 EC zastosowany interwencyjnie do opryskiwania chryzantemy i wierzby istotnie ograniczał rozwój rdzy. Po 4-krotnym opryskaniu chryzantemy Olejan 85 EC powodował przynajmniej 2-krotne ograniczenie rozwoju *Puccinia horiana* oraz powodował ponad 58% brązowienie i rozpad telii. Z kolei w ochronie wierzby po 2-krotnym opryskiwaniu Olejan 85 EC powodował przynajmniej 2,3-krotne ograniczenie rozwoju *Melampsora epitea* oraz od 23 do 75% brązowienie i rozpad uredinii.

Po 2-krotnym opryskiwaniu róż Olejan 85 EC w stężeniu 0,5% oraz 1% powodował od 1,5 do 4,4-krotne ograniczenie rozwoju *Botrytis cinerea* sprawcy szarej pleśni. W przypadku zwalczania tego patogena wzrost stężenia badanego środka wiązał się ze wzrostem jego skuteczności.