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The Effectiveness of Chemical and Biological Agents Against the Pear Scab Pathogen *Fusicladium pyrorum* (Lib.) Fuckel

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Conidia of the pear scab fungus *Fusicladium pyrorum* (Lib.) Fuckel provide massive spread of the disease during the growing season. The aim of this study was to determine the effectiveness of several new fungicides and agrochemicals against scab of pome fruit crops and to find out the effect of the ingredients on conidia of *F. pyrorum*. We tested the efficacy of Vitaplan® (biological product containing a mixture of *Bacillus subtilis* strains, titer 10^{10} CFU/g) at 0.01%, the growth regulator Amulet® (linear polyamino saccharides in a aqueous solution of succinic acid) at 0.12%, and Strekar® (mixture of 25 g/l phytobacteriomicyn and 70 g/l carbendazim) at 0.15-0.2% on the infected leaves of pear cultivar Cathedral on the fifth day after the end of flowering in natural infectious background. The fungicide Score® (250 g/l difenoconazole) at 0.02% was used as reference treatment. Control plants were sprayed with water.

Morphology of *F. pyrorum* conidia was examined with the scanning electron microscope LEO-1430 VP (Carl Zeiss) equipped with 4QBSD electron detector (detector of backscattered electrons) and refrigerating unit Deben Coolstage. Under high vacuum an accelerating voltage of 20 kV and a working distance of 9 mm were used. Specimens were mounted on Peltier cooling stage with the help of heat-conducting paste. The images were further processed using the program ImageJ. The number of conidia on an area of 10^4 μm^2 was counted in 10 replicates per treatment. The reference fungicide difenoconazole and the mixture phytobacteriomicyn with carbendazim had the strongest effects on conidia of *F.* pyrorum (Figure 1). Almost total destruction of the fungal structures was noted. A small amount of non-viable conidial inoculum was observed on the cuticle. Conidia and conidiophores were

The biological product Vitaplan® significantly reduced sporulation and vitality of conidia. Treated conidiophores become brittle and break off at the base.

The growth regulator Amulet® slowed down the development of the fungus, reduced sporulation frequency on the plant surface, and resulted in conidia more shrunken and weakened. The number of intact conidiophores was lower compared to the water-treated control (Figure 2).

The tested products inhibited scab to different degrees; they were effective against mild and moderate epidemics as assessed by theirs effects on the proportion of infected plants and rates of fungal development. They may be used in systems for protecting pear from scab.

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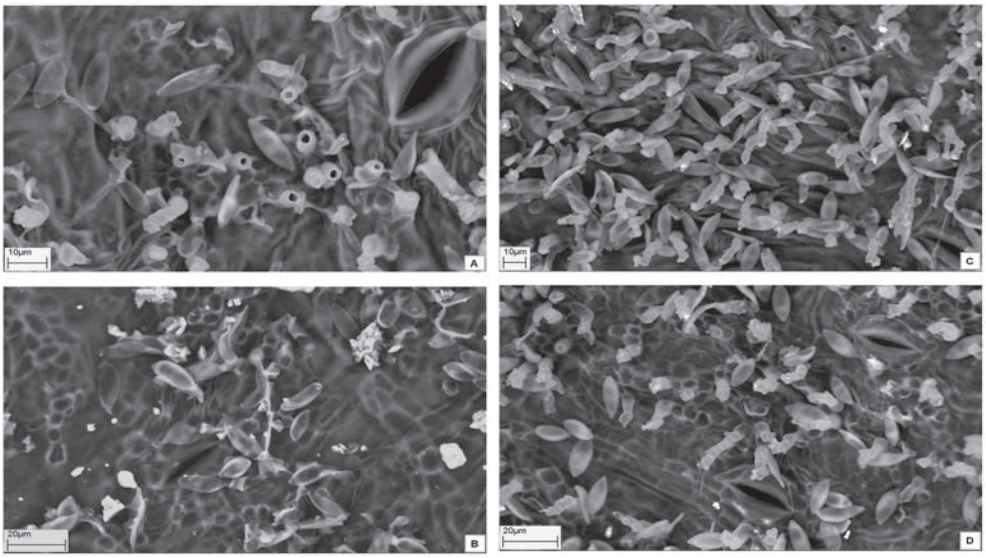

Figure 1 Overview on the effect of treatments on conidiophores and conidia of *F. pyrorum* on leaves of pear, cv. Cathedral; A - effect of Vitaplan® (mixture of *B. subtilis* strains); B - effect of Score® (difenoconazole); C - water-treated control; D - effect of growth regulator Amulet®.

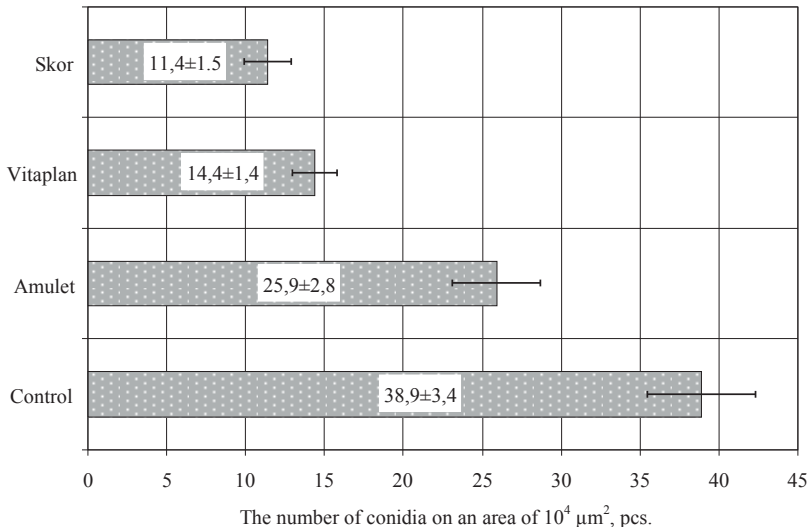

Figure 2 Effect of fungicide treatmens on the number of *F. pyrorum* conidia per 10^4 µm^2 on pear leaves, cv. Cathedral; control leaves were sprayed with water (mean ± standard error).