

Monitoring of *Botrytis cinerea* Sensitivity to Fungicides in Strawberry Fields in Serbia

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INTRODUCTION

Gray mold is a common disease of strawberries caused by the fungus *Botrytis cinerea* Pers. Fr. (teleomorph *Botryotinia fuckeliana* (de Bary) Whetzel). Numerous treatments with fungicides are required for management of the gray mold in strawberry production in Serbia, which intensifies the risk of resistance development since *B. cinerea* has a high risk of resistance development (FRAC, www.frac.info). Sensitivity of *B. cinerea* was monitored in 2014 and 2015 in two strawberry growing regions in Serbia, Sabac and Topola. Sensitivity to Thiophanate-methyl, Fenhexamid, Iprodione and Fludioxonil were assessed based on mycelial growth measurements at a discriminatory concentration. A spore germination assay was set up to examine the sensitivity of *B. cinerea* to pyraclostrobin with addition of salicylhydroxamic acid (SHAM; Trkulja et al., 2016). The main aim of this study was to determine sensitivity of *B. cinerea* to different fungicides from different chemical groups and to determine differences between two growing regions in Serbia.

MATERIAL AND METHODS

Conidia from infected strawberry fruits with sporulating lesions were collected during the fruit ripening from several fields per region and single spore isolates of *B. cinerea* were established. Discriminatory concentration (DC) tests with the fungicides Thiophanate-methyl, Fenhexamid, Iprodione and Fludioxonil prepared on potato dextrose agar medium at 1 µg ml⁻¹, 0.6 µg ml⁻¹, 25 µg ml⁻¹, 0.2 µg ml⁻¹, respectively, were performed in order to determine the frequency of resistant isolates (De Miccolis Angelini et al. 2014). A spore germination assay was carried out on water agar medium to determine the *B. cinerea* sensitivity to pyraclostrobin (DC= 5 µg ml⁻¹; SHAM 100 µg ml⁻¹) as described in Trkulja et al. (2016). Isolates were classified as resistant, when the colony growth or the germination of spores on DC was ≥ 50% compared to control.

RESULTS AND DISCUSSION

An intensive sensitivity monitoring conducted in strawberry fields in Serbia revealed prevalence of *B. cinerea* populations resistant to fungicides commonly applied in strawberry production. In both strawberry growing regions inspected, Sabac and Topola, *B. cinerea* populations expressed the highest resistance for Pyraclostrobin ranging from 92.4% to 98.1%. Resistance to Thiophanate-methyl ranged from 12.2% to 18.2%, while the frequency of resistance to Iprodion and Fenhexamid was much lower with 5.8% - 7.6% and 1.7 – 4.5%, respectively. Isolates resistant to Fludioxonil was not detected in either of the inspected regions. For all fungicides tested, the frequency of resistant *B. cinerea* isolates was higher in the Topola region than in the Sabac growing region. Therefore, further usage of these fungicides should be reduced, while fungicides with lower resistance risk need to be more utilized in accordance with the anti-resistant strategy in order to control *B. cinerea* and delay the development of fungicide resistance.

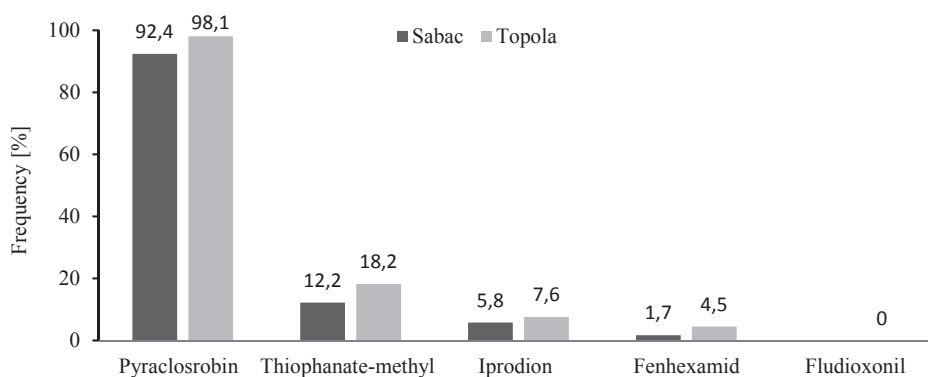


Figure 1 Frequency of resistance (%) of *B.cinerea* from strawberries to different fungicides in two growing regions in Serbia.

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REFERENCES

- De Miccolis Angelini RM, Masiello M, Rotolo C, Pollastro S, Faretra F (2014). Molecular characterization and detection of resistance to succinate dehydrogenase inhibitor fungicides in *Botryotinia fuckeliana* (*Botrytis cinerea*). *Pest Management Science* 70: 1884-93.
- Trkulja N, Pfaf-Dolovac E, Milosavljević A, Bošković J, Jović J, Mitrović M (2016). First report of QoI resistance in *Botrytis cinerea* isolates causing gray mold in strawberry fields in Serbia. *Plant Disease* 100: 221.