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Effects of Different Fungicide In-Crop Treatments on Plant Health Status of Sunflower (Helianthus annuus L.)

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Abstract : Phytosanitary condition of sunflower (Helianthus annuus L.) was endangered by several phytopathogenic agents, mainly microfungi, such as Sclerotinia sclerotiorum, Diaporthe helianthi, Plasmopara halstedtii, Macrophomina phaseolina and so on. There are more agrotechnical and chemical technologies against them, for instance, tolerant hybrids, crop rotations and eventually several in-crop chemical treatments. There are different fungicide treatment methods in sunflower in Hungarian agricultural practice in the quest of obtaining healthy and economic plant products. Besides, there are many choices of useable active ingredients in Hungarian sunflower protection. This study carried out into the examination of the effect of five different fungicide active substances (found on the market) and three different application modes (early; late; and early and late treatments) in a total number of 9 sample plots, 0.1 ha each other. Five successive vegetation periods have been investigated in long term, between 2013 and 2017. The treatments were: 1)untreated control; 2) boscalid and dimoxystrobin late treatment (July); 3) boscalid and dimoxystrobin early treatment (June); 4) picoxystrobin and cyproconazole early treatment; 5) picoxystrobin and cymoxanil and famoxadone early treatment; 6) picoxystrobin and cyproconazole early; cymoxanil and famoxadone late treatments; 7) picoxystrobin and cyproconazole early; picoxystrobin and cymoxanil and famoxadone late treatments; 8) trifloxystrobin and cyproconazole early treatment; and 9) trifloxystrobin and cyproconazole both early and late treatments. Due to the very different yearly weather conditions different phytopathogenic fungi were dominant in the particular years: Diaporthe and Alternaria in 2013; Alternaria and Sclerotinia in 2014 and 2015; Alternaria, Sclerotinia and Diaporthe in 2016; and Alternaria in 2017. As a result of treatments ‘infection frequency’ and ‘infestation rate’ showed a significant decrease compared to the control plot. There were no significant differences between the efficacies of the different fungicide mixes; all were almost the same effective against the phytopathogenic fungi. The most dangerous Sclerotinia infection was practically eliminated in all of the treatments. Among the single treatments, the late treatment realised in July was the less efficient, followed by the early treatments effectuated in June. The most efficient was the double treatments realised in both June and July, resulting 70-80% decrease of the infection frequency, respectively 75-90% decrease of the infestation rate, comparing with the control plot in the particular years. The lowest yield quantity was observed in the control plot, followed by the late single treatment. The yield of the early single treatments was higher, while the double treatments showed the highest yield quantities (18.3-22.5% higher than the control plot in particular years). In total, according to our five years investigation, the most effective application mode is the double in-crop treatment per vegetation time, which is reflected by the yield surplus.

Keywords : fungicides, treatments, phytopathogens, sunflower
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