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# Detection of Pre-symptomatic Rose Powdery-Mildew and Gray-Mold Diseases Based on Thermal vision

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**Abstract**

Roses are the most important plants in ornamental horticulture. Roses are susceptible to a number of phytopathogenic diseases. Among the most serious diseases of rose, powdery mildew (*Podosphaera pannosa var. rosae*) and gray mold (*Botrytis cinerea*) are widespread which require considerable attention. In this study, the potential of implementing thermal imaging to detect the pre-symptomatic appearance of these fungal diseases was investigated. Effects of powdery mildew and gray mold diseases on rose plants (*Rosa hybrida* L.) were examined by two experiments conducted in a growth chamber. To classify the healthy and infected plants, feature selection was carried out and the best extracted thermal features with the largest linguistic hedge values were chosen. Two neuro-fuzzy classifiers were trained to distinguish between the healthy and infected plants. Best estimation rates of 92.55% and 92.3% were achieved in training and testing the classifier with 8 clusters in order to identify the leaves infected with powdery mildew. In addition, the best estimation rates of 97.5%

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