

OCCURRENCE OF *ISARIOPSIS* LEAF SPOT OR BLIGHT OF *VITIS RUPESTRIS* CAUSED BY *PSEUDOCERCOSPORA VITIS* IN TURKEY

Fatih Mehmet TOK, Sibel DERVIŞ

Mustafa Kemal University, Faculty of Agriculture, Department
of Plant Protection, 31040 Antakya, Hatay, Turkey

Corresponding author email: ftok@mku.edu.tr

Abstract

In mid-autumn 2013, a disease of *Vitis rupestris* affecting 30 to 50% of the plants was observed in an orchard of the Kırıkhan district of Hatay province in the east Mediterranean region of Turkey. Symptoms included presence of initially tiny and angular chlorotic halos but latterly large black spots. On the spots, cercosporoid structures were present. Based on cultural and morphological characteristics of the consistently isolated fungus and pathogenicity tests, the causal agent of this leaf spot or blight was identified as *Pseudocercospora vitis*. This appears to be the first report of *P. vitis* on *V. rupestris* in Turkey. Since *Isariopsis* leaf spot caused by *P. vitis* can also affect grapevines (*V. vinifera*), it might negatively impact orchards and vineyards in the future and might be considered a potential threat to Turkish grapevine production.

Key words: leaf blight, *Vitis rupestris*, *Pseudocercospora vitis*, *Mycosphaerella personata*.

INTRODUCTION

Grapevine is a widely planted and economically important crop in Turkey, hosting valuable grape germplasm resources with a total area under production of 467,093 hectares, producing 4,175,356 tonnes of grapes (FAO, 2014). In Kırıkhan and Hassa districts of Hatay, a coastal southeastern province located in the east Mediterranean region having about 20% of the grapevine growing areas of the country, some family farmers cultivate *Vitis rupestris*, a grape species commonly known as an American grapevine rootstock.

In mid-autumn 2013, a disease of *V. rupestris* plants was observed in an orchard of the Kırıkhan district of Hatay province in the east Mediterranean region of Turkey.

This study represents the first attempt to identify and characterize a cercosporoid species causing *Pseudocercospora* leaf spot, a disease of the aerial part of the *V. rupestris* vines, in Turkey using morphological and pathogenicity approaches.

MATERIALS AND METHODS

In October 2013, symptoms consisting of necrotic leaf spots were observed on *V. rupestris* cv. du Lot grown in an orchard in the

Kırıkhan District and affected leaves sampled. Leaf tissues bordering these lesions surface disinfested with NaOCl (1%) for 2 min, rinsed in sterile water, blotted dry, and plated onto potato dextrose agar (PDA).

Isolated fungus was transferred to V-8 juice agar and malt extract agar (MEA). Plates were incubated for 30 days at 25°C under NUV light and a 12-h light/dark photoperiod for morphological examination. Morphological and colony characteristics of the fungus were examined.

Pathogenicity tests were performed on 10 1-year-old potted plants of grapevine (*V. rupestris*) cv. du Lot. Inoculations were performed by spraying a conidial suspension (3.0×10^4 conidia/ml) prepared in sterile water by harvesting conidia from 2-week-old cultures on V8 agar until runoff onto the leaves of healthy seedlings using manual pressure sprayer. Three control plants were sprayed with sterile water. Inoculated and control plants were covered with plastic bags to maintain a relative humidity of 100% for 48 h and then transferred to a greenhouse.

RESULTS AND DISCUSSIONS

Leaf spots were initially tiny, irregular to angular chlorotic halos or patches on both leaf

surfaces - abaxial (Figure 1) and adaxial (Figure 2), and as the disease progressed, they were progressively turned purplish brown to black lesions. These spots later coalesced (amphigenous or confluent) reaching to 2 cm in diameter mostly with a serpentine and well defined outline encircled with dark borders or chlorotic halos on the upper leaf surfaces and became brittle with age (Figure 3). On the corresponding lower leaf surfaces, only the narrow centers of these lesions were brown to black but surrounding tissue was a large necrotic area (Figure 4). These coalesced spots caused leaf blight and premature defoliation. The disease incidence approached 30 to 50% on vines (cv. du Lot). The leaf spots were more severe on the leaves near the ground and progressed to the upper leaves. When infected tissue was examined under a stereomicroscope, typical cercosporoid hyphomycete structures were observed within the lesions on both leaf sides but mostly on the upper side. A slow-growing fungus was consistently isolated from the affected tissues after 5 days of incubation at 25°C.



Figure 1. Irregular to angular chlorotic halos on the abaxial leaf surface of *Vitis rupestris* du Lot

Colonies were gray with black stromatic structures in the centers on the upper side (Figure 5) and dark green on the underside. The fruiting structures were slender, black, bristlelike synnemata (200-500 µm long) bearing pale olivaceous to pale brown, elongate conidia (25 to 100 × 4 to 7 µm) 3 to 7 transverse septa and no longisepta (Figure 6). Morphological characteristics of the fungus were consistent with previous descriptions of

Pseudocercospora vitis (Lév.) Speg. (Ascomycetes, Mycosphaerellales), the anamorph of *Mycosphaerella personata* Higgins as described by Ellis (1971) and Harvey and Wenham (1972).



Figure 2. Initial symptoms of Isariopsis leaf spot on the adaxial leaf surface of *Vitis rupestris* du Lot

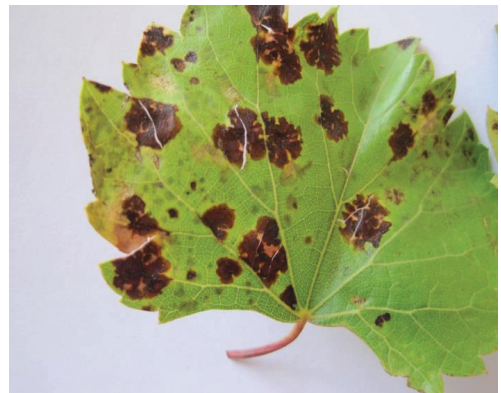


Figure 3. Leaves of *Vitis rupestris* du Lot, with leaf spots on abaxial surface, late in the season

Pathogenicity was confirmed by fulfilling Koch's postulates. Necrotic spots appeared on the inoculated leaves 20 days after inoculation, and were identical to the ones observed in the field. Disease incidence on inoculated leaves varied from 30% to 91% and severity from 2 to 3 to 3 to 6 lesions per leaf. No symptoms were

observed on control plants. Fungal colonies morphologically identified as *P. vitis* were reisolated from lesions on inoculated leaf tissues, fulfilling Koch's postulates. Control plants remained symptomless.



Figure 4. Leaves of *Vitis rupestris* du Lot, with leaf spots on adaxial surface, late in the season

Based on these results, the disease was identified as *Pseudocercospora* or *Isariopsis* leaf spot of *V. rupestris* caused by *P. vitis*. Since the pathogen was named *Isariopsis clavispora* formerly, the disease is still often referred to as *Isariopsis* leaf spot. Its occurrence primarily reported on *V. vinifera* and vines of wild species in the United States and throughout the warmer grape-growing areas of the world under one or another of its several synonyms (Pearson, 1998).

On *V. rupestris*, it was only recorded in Italy (Chupp, 1953) and Kansas (Anonymous, 1960) based on Farr and Rossman (2017).

To our knowledge, this is the first report of *P. vitis* on this host plant species in Turkey. Therefore, this present report is considered one of the few reports of this grapevine disease on *V. rupestris* in the world.

The appearance of the disease was more frequent at the end of the plant's vegetative cycle, in this American cultivar.

The main damage resulting from the attack of the pathogen was the premature fall of leaves, which caused a weakening of the plant and reduction of production in the following year, in 2014.

Cultural practices that increase air circulation such as shoot positioning and thinning may aid in management of the disease.



Figure 5. Colony of *Pseudocercospora vitis* after 30 days growth on potato dextrose agar

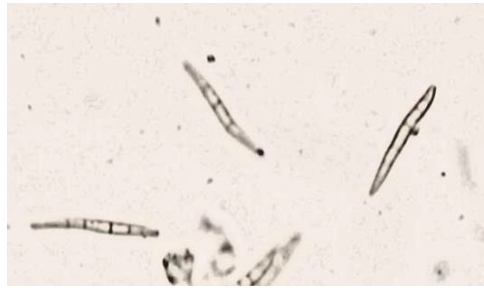


Figure 6. Conidia of *Pseudocercospora vitis*

CONCLUSIONS

A prominent leaf spot disease was found to occur on *V. rupestris* in Kırıkhan district of Hatay province in Turkey. A leaf spotting hyphomycete, *P. vitis*, was isolated, identified and proved to be pathogenic on grapevine. Associated symptoms were described and illustrated. Keeping vines healthy, destroying crop residues and spraying with standard fungicides (mid to late season) are recommended to perform in the case of severe attacks of the disease.

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