PATHOGENICITY AND RELATIVE VIRULENCE OF *FUSICOCCUM* - LIKE ISOLATES ON PEACH TREES

Exadaktylou E., T. Thomidis, A. Rubos

A.T.E.I. Thessaloniki, School of Agricultural Technology, Department of Crop Production, Sindos Macedonia, P.C. 57400, Thessaloniki, Greece

Abstract

Fungi of the genus Fusicoccum have been reported as pathogens causing shoot blights and fruit rots on peaches. In this study, the virulence of 13 Fusicoccum-like isolates, originated from different hosts (rotted peaches, blighted shoots of pistachio, blighted shoots of walnut) on peach shoots were investigated. Annual shoots of peaches (cultivar Andross) were artificially inoculated by using mycelial disk. In addition, artificial inoculations were made on excised shoots (10 cm in length and 1,5 cm in diameter). Results were collected by recording the length of necrosis.

The results showed that all isolates were pathogenic on excised shoots and shoots of peach. However some statistical differences were found in the level of virulence among isolates in the experiments with excised shoots. More investigation should be done to clarify the possibly effect of Fusicoccum-like isolates origination on their virulence on peach trees.

Generally, this study showed that the fungi of genus Fusicoccum could cause important problems on peach trees, independent on the host originated. Therefore, different plant species infected from fungi of genus Fusicoccum can serve as inoculum sources for infections of peach trees and, in this case, a programme of management for this pathogen should be taken.

Keywords: Andross, *Fusicoccum*-like, pathogenicity, virulence

INTRODUCTION

Imathia County is the main fresh and canned peach production area of Greece. Preharvest fruit rots and shoot blights constitute serious problems in cultivation of peach trees in this area due to humid environment. Brown rot, caused by *Monilinia laxa*, is believed as the main cause of fruit rots and shoot blights on peaches in Greece. Some other pathogens such as *Colletotrichum* spp., *Fusarium* spp., *Botrytis cinerea*, *Rhizopus stolonifer*, *Mucor piriformis* and *Aspergillus niger* have been isolated from rotted peaches, while the pathogens *Colletotrichum* spp., *Fusicoccum* sp., and *Cytospora* sp. have also been reported as causal agent of shoot blights in Greece (Pantidou, 1973). Fungi of the genus *Fusicoccum* (Damm et al., 2007; Sippers et al., 2007) and *Botryosphaeria* (Beckman et al., 2003; Brown and Britton, 1996; Cedelo et al., 1994; Caponero et al., 1999; Combrink et al., 1984). have been reported to cause shoot blights and fruit rots in peaches in many coutries.

According to previous works, pathogenicity and relative virulence of different *Fusicoccum* isolates can be differed depending on the host isolated (Niekerk *et al.*, 2004). Data related to the pathogenicity and virulence of a pathogen are very important to apply the appropriate control methods

The main aim of this study was to investigate the pathogenicity and relative virulence of 13 *Fusicoccum*-like isolates, originated from different hosts (peach fruits, pistachio shoots, walnut shoots) on peach trees.

MATERIALS AND METHODS

All the experiments were conducted in the experimental field of the Pomology Institute (NAGREF), Naoussa Greece. The pathogenicity and virulence of 13 *Fusicoccum*-like isolates from different hosts were compared (Table 1). The isolates were cultured in Petri dishes containing PDA and incubated at 25°C. For inoculation of annual shoots (10 shoots for each isolate) of peach cultivar Andross, a mycelial plug of 6 mm in diameter taken from the margins of a 4-day-old culture was inserted in the middle of each shoot under the bark. The plug and the wound were covered with petroleum jelly and wrapped with adhesive tape to prevent desiccation. Data were collected by recording the length of the resulting necrosis 30 days later. This experiment was repeated twice.

In addition, experiments were conducted in the laboratory. The assay using excised shoots described by Matheron and Mircetich (1985) was used. Segments of woody shoots, 10 cm in length and 1.5 to 2 cm in diameter, were collected from peach cultivar Andross, and 10 each per isolate. Inoculation was made according the method described above. Inoculated shoot segments were incubated at 25°C in moist chambers for 14 days after which the length of the resulting necrosis was recorded.

The experimental design was completely randomized. Shoots inoculated with agar plug without mycelium were used as control.

RESULTS AND DISCUSSION

The results shwed that all isolates were pathogenic independent on their origination in both laboratory and field experiments (Table 1). In addition, there was no statistical differences in their relative virulence in field experiment. In contrast, some significant differences were found in laboratory experiment. The isolates BD-7, BD-5B, and BD-13 showed the lowest virulence, while the isolate BD-17 the highest. These differences possibly were independent from their origination. In contrast to our resutls, Niekerk et al., (2004) found that the pathogenicity of different *Botryosphaeria* species was related with the host of their origination. Amponsah et al., (2009) working with diffrenet members of Botryosphaeriaceae from various hosts (i.e. *B. parvum, B. lutea, B. australis, B. stevensii*, and *B. obtusa*) found different virulence among the isolates on green grapevine shoots. Ma and Michailides (2002) found that isolates of *B. dothidea* from different hosts showed different levels of virulence on pistachio trees. Genetic variation among *B. dothidea* isolates from different host has been reported by Ma et al., (2001).

Generally, this study showed that *Fusicoccum*-like fungi can cause serious damages in peach trees independant from their origination. Therefore, different plant species infected from fungi of genus *Fusicoccum* can serve as inoculum sources for infections of peach trees and, in this case, a programme of management for this pathogen should be taken. More investigation should be done to clarify the possibly effect of *Fusicoccum*-like isolates origination on their virulence on peach trees.

Table 1.

Pathogenicity and relative virulence of 13 *Fusicoccum*-like isolates originated from different host on shoots of peach cultivar Andross.

		Length of Necrosis (mm)			
Isolation	Origin	Excised Shoots		Shoots	
BD-7	Pistachio – Shoot Blight	5.10	a[1]	28.7	a
BD-5B	Pistachio – Shoot Blight	5.17	a	31.5	a
BD-13	Peach – Fruit Rot	5.38	a	32.1	a
BD-9B	Pistachio – Shoot Blight	6.33	b	30.2	a
BD-35	Walnut – Shoot Blight	6.35	b	27.9	a
BD-3	Pistachio – Shoot Blight	6.44	b	29.2	a
BD-1	Pistachio – Shoot Blight	6.56	b	32.6	a
BD-0	Pistachio – Shoot Blight	6.83	bc	28.8	a
BD-39	Walnut – Shoot Blight	7.50	cd	29.4	a
BD-15	Peach – Fruit Rot	7.93	d	30.4	a
BD-9A	Pistachio – Shoot Blight	8.00	d	30.3	a
BD-20	Peach – Fruit Rot	8.39	d	27.9	a
BD-17	Peach – Fruit Rot	9.69	e	32.6	a

[1] Values in the same column followed by different letters were significantly different at P=0.05 according to the Wald Test.

REFERENCES

1. Amponsah, N.T., Jones, E.E., Ridgway, H.J. and Jaspers, M.V. 2009. Factors that affect the infection of grapevine tissues with *Botryosphaeria* species. Phytopathol. Mediter. 48:176.
2. Beckman, T.G., Pusey, P.L. and Bertrand, P.F. 2003. Impact of fungal gummosis on peach trees. HortScience 38:1141-1143.
3. Brown, E.A. and Britton, K.O. 1986. Botryosphaeria diseases of apple and peach in the southeastern United States. Plant Dis.70:480-484.
4. Cedelo, L., Mohali S., Carrero, C. 1994. First report in Venezuela of *Dothiorella dothidea* as the cause of brown rot of peach fruits. Fitopatologia Venezolana 7: 34-36.
5. Caponero, A., Vena, G.M. and Frisullo, S. 1999. Preliminary studies of canker in stone fruits in the Metaponto region. Italus Hortus 6:107-108.
6. Combrink, J.C., Fourie, J.F. and Grobbelaar, C.J. 1984. Botryosphaeria spp. on decayed deciduous fruits in South Africa. Phytophylactica 16:251-253.
7. Damm, U., Crous, P.W. and Fourie, P.H. 2007. *Botryosphaeriaceae* as potential pathogens of *Prunus* species in South Africa, with descriptions of *Diplodia africana* and *Lasiodiplodia plurivora* sp *nov*. Mycologia 5:664-680.
8. Ma, Z.H., Boehm, E.W.A., Luo Y. and Michailides, T.J. 2001. Population structure of *Botryosphaeria dothidea* from pistachio and other hosts in California. Phytopathology 91:665-672.
9. Ma, Z.H. and Michailides, T.J. 2002. Characterization of *Botryosphaeria dothidea* isolates collected from pistachio and other plant hosts in California. Phytopathology 92:519-526.
10. Matheron, M.E. and Mircetich, J.C. 1985. Differential virulence of *Phytophthora parasitica* recovered from citrus and other plants to rough lemon and tomato. Plant Dis. 74:138–140.
11. Niekerk, J., Crous, P., Groenewald, J.Z., Fourie, P. and Hallen, F. 2004. DNA phylogeny, morphology and pathogenicity of *Botryosphaeria* species on grapevines. Mycologia 96:781-798.
12. Pantidou, E.M. 1973. *List of fungi and hosts in Greece*. (Greek), Benaki Phytopathological Institute, Kifisia, Athens, Pp. 223-234.
13. Slippers, B., Smit, W.A., Crous, P.W., Coutinho, T.A. and Wingfield, M.J. 2007. Taxonomy, phylogeny and identification of *Botryosphaeriaceae* associated with pome and stone fruit trees in South Africa and other regions of the world. Plant Pathol. 56:128-139.