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Reproduction Behavior of *Aphelenchoides composticola* (Nematoda: Aphelenchoididae) on Cultivated Mushrooms

***Mehmet KARAKAŞ, Ilgaz AKATA**

Ankara Üniversitesi Fen Fakültesi Biyoloji Bölümü 06100 Tandoğan-Ankara

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Abstract: In this study, *Aphelenchoides composticola* which is known as the mycophagous nematode were inoculated onto 10 mushroom seedlings growing in malt-extract glucose agar on Petri plates. After sixteen days of inoculation, the nematodes were extracted and counted. Out of 10 species of mushrooms tested, *Aphelenchoides composticola* fed and multiplied on 6 of samples with *Agaricus bisporus* being the most favourable host. *Macrolepiota procera var. procera* also favoured the reproduction of the nematode. Fortunately, some species of *Pleurotus* and *Clitocybe gibba*, *Infundibulicybe geotropa* showed a genetic resistance to the nematode.

Key Words: *Aphelenchoides composticola*, mycophagous nematode, reproduction

Kültürü Yapılmış Mantarlarda *Aphelenchoides composticola* (Nematoda:Aphelenchoididae)'nınÜreme Davranışı

Özet: Bu çalışmada, mantar nematodu olarak bilinen *Aphelenchoides composticola*, Petri tabaklarındaki malt ekstract glukoz agar katı besiyerinde geliştirilen 10 mantar fidesine aşılandı. Aşılamadan 60 gün sonra, nematodların ekstraksiyonu ve sayımı yapıldı. Test edilmiş olan 10 mantardan, 6 tanesi üzerinde *Aphelenchoides composticola* beslendi ve çoğaldı. *Agaricus bisporus*'un en uygun konak olduğu, *Macrolepiota procera var. procera* nın da nematodun çoğalmasında elverişli olduğu belirlendi. *Pleurotus*'un bazı türleri, *Clitocybe gibba* ve *Infundibulicybe geotropa* nematoda direnç gösterdi.

Anahtar Sözcükler: *Aphelenchoides composticola*, mantar nematodu, üreme

e-mail: Mehmet.Karakas@science.ankara.edu.tr

Introduction

Aphelenchoides composticola Franklin, 1957 has been reported from themost of mushroom-growing countries and which is a mycophagous nematode in temperate areas. It is an economic pest on the cultivated mushroom, *Agaricus bisporus* (Hesling 1966, Arnold and Blake 1968, Chhabra and Kaul 1982, Khanna and Sharma 1988, Giannakis and Sanders 1989, Grewal 1990, Sharma and Khanna 1992, Sharma and Seth 1993). It is the second most harmful species for mushroom crops. *Aphelenchoides composticola* causes heavy losses in the commercial cultivation of *A. bisporus* (Klinger and Tscheirbe 1980, Grewal 1989, Khanna 1991).

Choleva (1973) observed that *A. composticola* also multiplies on other fungi including the species of *Fusarium* and *Sepedonium*. It feeds on many other common fungi and hosts have been recorded in the fungal genera *Armillaria, Botrytis, Mycelium, Myriococcum, Neurospora, Phytophthora, Pythium, Suillus* and *Trichothecium* (Hesling 1977).

This paper reports the results of an investigation conducted on the multiplication of *A. composticola* on various cultivated mushrooms.

Materials And Methods

Aphelenchoides composticola was cultured in glass bottles on grain spawn of the mushroom, *A. bisporus* Strain A-32. The nematodes were extracted from the infested spawn using Baermann funnel technique (Hooper 1986) in sterilized and distilled water under aseptic conditions.

Cultures of all the fungi were sub-cultured on malt-extract glucose agar (MEA) medium.

Edible fungi including *Agaricus bisporus* (J.E. Lange) Imbach, *Macrolepiota excoriata* (Schaeff.) Wasser, *Chlorophyllum rhacodes* (Vittad.) Vellinga, *Macrolepiota procera var. procera* (Scop.) Singer, *Hericium corralloides* (Scop.) Pers., *Pleurotus ostreatus* (Jacq.) P. Kumm., *Pleurotus cornucopiae* (Paulet) Rolland, *Clitocybe gibba* (Pers.) P. Kumm., *Infundibulicybe geotropa* (Bull.) Harmaja and *Chroogomphus rutilus* (Schaeff.) O.K. Mill. were cultured on MEA medium in Petri plates (three plates per test fungus). Petri plates were incubated at 25 ˚C until the plates were fully covered by the mycelium. Nematodes (60 per plate; adults: larvae= 2:1 approx.) were inoculated aseptically and the plates were again incubated at 25 ˚C. After sixteen days of inoculation, the nematodes were extracted and counted, 20 ml distilled water was added to the Petri plate and 4-5 cuts were given through the mycelial-mat of the fungus with a fine needle to facilitate the nematode separation. After two hours, the surface of the plate was washed twice into a beaker using a fine brush and data on nematode population were recorded.

Mean Multiplication Index (MMI) for each fungus was calculated by dividing the total final nematode population by the numbers of nematodes inoculated.

Results

The experimental nematode, *Aphelenchoides composticola* fed and multiplied on six species of mushrooms out of the ten species tested (Fig. 1). *Agaricus bisporus* was the most favourable host on which the nematode produced maximum populations (MMI: 1420 nematodes per inoculated nematode at 25 ˚C after sixteen days). *Macrolepiota procera var. procera* also favoured the multiplication of the test nematode considerably (MMI: 614). Moreover, *A. composticola* multiplied on

Macrolepiota excoriata (MMI: 176) and *Chlorophyllum rhacodes* (MMI: 164). *Aphelenchoides composticola* also multiplied on *Hericium coralloides* (MMI: 144) and *Chroogomphus rutilus* (MMI: 120), but produced small populations.

No nematode multiplication was recorded on *Pleurotus ostreatus*, *P. cornucopiae*, *Clitocybe gibba* and *Infundibulicybe geotropa*.

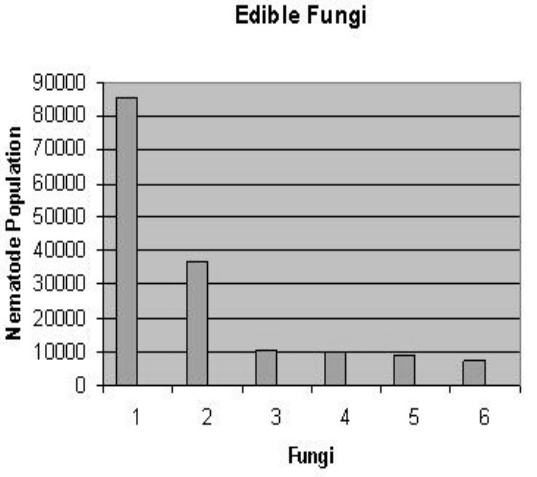

Fig. 1. Mean total populations of *Aphelenchoides composticola* Franklin at 16 days post inoculation (60 nematodes per plate) on the cultures of various fungi including; 1. *Agaricus bisporus* (J.E. Lange) Imbach, 2. *Macrolepiota procera var. procera* (Scop.) Singer, 3. *M. excoriata* (Schaeff.) Wasser, 4. *Chlorophyllum rhacodes* (Vittad.) Vellinga, 5. *Hericium coralloides* (Scop.) Pers., 6. *Chroogomphus rutilus* (Schaeff.) O.K.Mill..

Discussion

Sohi and Upadhyay (1987) have developed a simple technique for the cultivation of *Stropharia rugoso-annulata* on wheat straw compost.

Grewal (1990) observed that *Aphelenchoides composticola* multiplied on cultivated mushrooms especially, *Agaricus bisporus* and *Stropharia rugoso-annulata*.

Khanna and Sharma (1992) showed that males are important for the reproduction of mushroom nematode *Aphelenchoides agarici*.

Since the substrate is similar to that of the *A. bisporus*, there is a potential danger of *A. composticola* becoming a pest on this mushroom. Fortunately, some species of *Pleurotus* and *Clitocybe gibba*, *Infundibulicybe geotropa* screened showed an genetic resistance to the *A. composticola*. The test nematode also multiplied on cultivated *Macrolepiota procera var. procera.*

Temperature effects on growth and nitrogen mineralization of fungi are very important factors for reproduction of mushroom nematodes on cultivated mushrooms (Chen and Ferris 2000, Okada and Ferris 2001). Paper reports is supported these results.

Mushroom cultivation is a relatively young and progressive industry. The facilities of most of the growers are meager and their awareness of various nematode parasites and the sources of contamination is limited. Following are some areas, which need the attention of mushroom and nematode scientists in the near future for effective management of nematodes.

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