VERTICILLIUM LATERITIUM BERTK. - AN AGENT OF WILT IN SUNFLOWER

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SUMMARY

In Yugoslavia, Verticillium lateritium has been observed on wilted sunflower plants in the last ten years. The fungus was found in the second half of the sunflower growing season. It formed an orange-red mycelial film on the roots of infected plants. The mycelia were hyaline, the hyphae and conidiophores branched in a manner typical for Verticillium genus. Hyaline, small, single-cell conidia developed on conidiophores. Their size was 3.11 - 8.30 x 1.73 - 3.46 µm. Verticillium lateritium developed well on PDA, at the optimum temperature of 25°C, the minimum temperatures between 5 and 10°C, and the maximum temperature between 30 and 35°C. The incubation period following inoculation was 60 days in a greenhouse and 20 days in field.

INTRODUCTION

Two species are described in the literature as agents of sunflower wilt: Verticillium alboatrum and Verticillium dahliae. They were studied extensively in Argentina (Bruni, 1970, Bertero and Vasquez, 1985), Canada (Moser and Sackston, 1973), and the United States (Zimmer, Kinman and Fick. 1973).

In Europe, these parasites have been observed in France, Romania, Spain, Portugal, and Yugoslavia. They have also been reported in Pakistan and Australia (Aćimović, 1984, 1987).

Besides these two Verticillium species, Verticillium lateritium, which has not been described on sunflowers before, was observed on wilted sunflower plants in Yugoslavia, Hungary, and Bulgaria in last 10 years (Aćimović, 1984, 1987).

MATERIALS AND METHODS

A pure culture of the fungus was isolated on potato dextrose agar (PDA) from samples taken from wilted sunflower plants. Developmental, morphological, and biological characters of the fungus were also followed on PDA. NS-H-26-RM was sown in 60 pots previously filled with sterilized soil and kept in a greenhouse. Naturally infected parts of sunflower root and stem were ground and mixed with the soil in 20 pots.

Next 20 pots were inoculated one week after the emergence of sunflower seedlings with a suspension of a pure culture of Verticillium lateritium. The uninoculated plants in the remaining 20 pots served as the control. The experiment in the greenhouse lasted for 90 days.
Sunflower plants grown in field were inoculated by the toothpick method at the beginning of flower.

RESULTS

Infected plants, both in field and in greenhouse, exhibited typical symptoms of wilting. In field, plants wilted in August and the first half of September. The orange-red film occurred on the root, the basal part of the stalk and seeds of infected plants.

A medium-rank mycelial film of orange-red color developed on PDA. The optimum temperature for fungus development on PDA was about 25°C, the minimum temperature between 5 and 10°C, and the maximum temperature between 30 and 35°C.
The mycelia were hyaline, divided by transversal septa. The hyphae and conidiophores branched in a manner typical for Verticillium genus.
The conidia were hyaline, single-celled, small and ovoid. Their dimension were 3.11-8.30 x 1.73-3.46 µm. The incubation period after the inoculation of young plants in the greenhouse lasted about 60 days and in the field about 20 days. The parasite overwintered in the soil, in infected plant but it may also be transmitted by seeds.

DISCUSSION

Verticillium lateritium is a new parasite of the sunflower. Its significance for sunflower production and area of distribution have not been determined yet. Nevertheless, it may be stated that the parasite is present on sunflowers in Central European countries and perhaps in other countries with a moderate climate.
Further investigations will supply answer as to the significance of the fungus in countries where it occurs.

CONCLUSIONS

Verticillium lateritium is a new parasite of the sunflower. It has been registered on sunflower in Yugoslavia, Hungary, and Bulgari.
On the roots of infected plants and in pure culture on PDA it develops a medium-rank mycelial film of orange-red color. The mycelium is septated and hyaline. The conidium is hyaline, single-celled, and ovoid, its dimensions being 3.11-8.13 x 1.73-3.46 µm.
The optimum temperature for the development of the fungus on PDA is about 25°C, the minimum temperature between 5 nad 10°C, the maximum temperature between 30 and 35°C.
The incubation period on young sunflower plants in a greenhouse is about 60 days, on plants inoculated in field at the stage of flower about 20 days.

LITERATURE

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