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Note

Survival of *Pochonia chlamydosporia* on the soil surface after different exposure intervals at ambient conditions

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ABSTRACT

Background: Exposure of the nematophagous fungus *Pochonia chlamydosporia* to solar radiation and elevated temperatures before being incorporated into the soil can reduce its survival and efficiency as biocontrol agent.
Aims: A field experiment was carried out to assess the effect of the exposure period on the viability of *P. chlamydosporia* applied on the soil surface.
Methods: A commercial bionematicide based on *P. chlamydosporia* was sprayed on soil, and soil samples were collected before and at 0, 30, 60, 90, 120, and 150 min after fungal application. Relative humidity (RH), the irradiance (IR), air temperature (AT), and soil temperature (ST) were recorded. The number of *P. chlamydosporia* colony forming units (CFUs) was evaluated after 20 days of incubation.
Results: *P. chlamydosporia* survival decreased over the time of exposure on the soil surface. Overall, the number of CFUs decreased by more than 90% at 150 min after application. Exposure to RH ≥61%, ST and AT between 25–35 °C and 19–29 °C, and IR between 1172 and 2126 μmol of photons m^{-2} s^{-1} induced a negative exponential effect on the survival of the fungus over the time.
Conclusions: Exposure to climatic conditions on the soil surface reduces *P. chlamydosporia* viability.

Supervivencia de *Pochonia chlamydosporia* en la superficie del suelo después de diferentes intervalos de exposición a condiciones ambientales

Palabras clave:
Control biológico
Irradiación
Humedad relativa
Radiación ultravioleta
Viabilidad

RESUMEN

Antecedentes: La exposición del hongo nematófago *Pochonia chlamydosporia* a la radiación solar y la temperatura elevada antes de ser incorporado al suelo puede reducir su supervivencia y eficiencia como agente de biocontrol.
Objetivos: Se realizó un experimento de campo para evaluar el efecto del período de exposición a condiciones ambientales sobre la viabilidad de *P. chlamydosporia* en la superficie del suelo.
Métodos: Se pulverizó sobre el suelo un bionematicida comercial hecho a base de *P. chlamydosporia* y se recogieron muestras de suelo antes y después de 0, 30, 60, 90, 120 y 150 min tras la aplicación del hongo. Se registraron la humedad relativa (HR), la irradiación (IR), la temperatura del aire (TA) y la temperatura del suelo (TS). Se evaluó el número de unidades formadoras de colonias (UFC) de *P. chlamydosporia* después de 20 días de incubación.
Resultados: La supervivencia de *P. chlamydosporia* disminuyó durante el tiempo de exposición en la superficie del suelo. En general, el número de UFC disminuyó en más de un 90% a los 150 min después de la aplicación. La exposición a HR ≥ 61%, TS y TA entre 25-35 °C y 19-29 °C, e IR entre 1.172 y 2.126 μmol de fotones m^{-2} s^{-1} indujo un efecto exponencial negativo en la supervivencia del hongo.
Conclusiones: La exposición a las condiciones climáticas en la superficie del suelo reduce la viabilidad de *P. chlamydosporia*.

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Pochonia chlamydosporia parasitizes phytonematodes.[12,23] It produces chlamydospores that enhance its establishment and survival in the soil.[12] Incorporating chlamydospores into the soil increases the probability of nematode egg parasitism and protects them from adverse surface environmental conditions.[3] In some cases, however, *P. chlamydosporia*-based bionematicides are applied on the soil surface[3] and knowledge is scarce about the effect on this fungus of high temperatures and solar radiation.

We hypothesize that temperatures higher than the optimal range of 24–28 °C[1] and extended exposure to ultraviolet radiation reduce *P. chlamydosporia* viability, as reported for other fungi,[4,15,18] despite producing chlamydospores. We assessed *P. chlamydosporia* viability after exposure on the soil surface for 0, 30, 60, 90, 120, and 150 min.

We carried out a field experiment at the UFV-CRP. *P. chlamydosporia* isolate Pc-10 was used as a wettable pow-

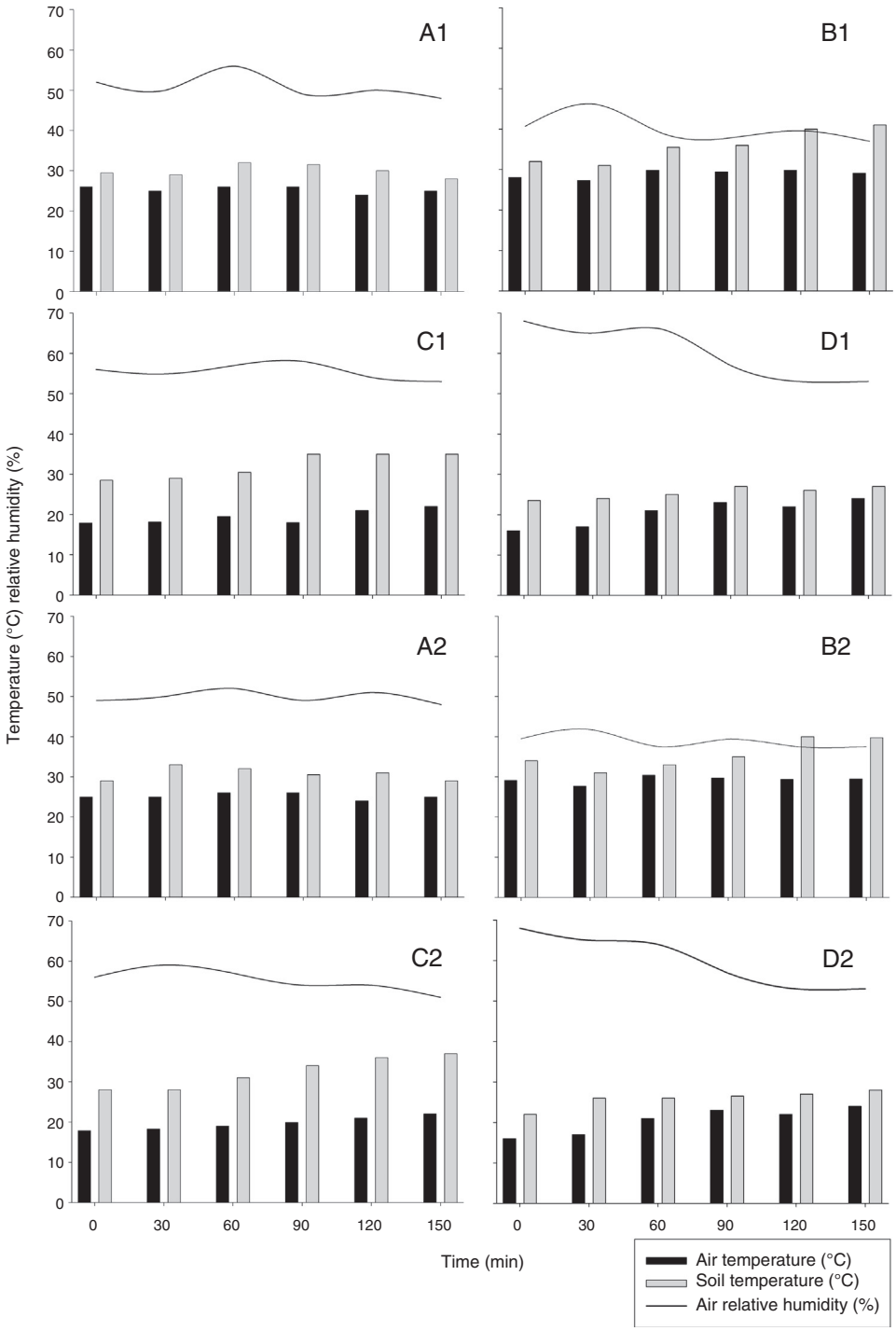

Fig. 1. Air and soil temperature (°C) and relative humidity (%) at sampling time after the application of *Pochonia chlamydosporia* var. *chlamydosporia* isolate Pc-10 on the soil surface. Replica 1: 1st week (A1); 2nd week (B1); 3rd week (C1); 4th week (D1). Replica 2: 1st week (A2); 2nd week (B2); 3rd week (C2); 4th week (D2).

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