

RESEARCH NOTES—NOTAS DE INVESTIGACION

ATTACHMENT OF *BACILLUS PENETRANS* TO *MELOIDOGYNE INCOGNITA*¹

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RESUMEN

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Suelo seco a temperatura ambiental infestado con esporas de *Bacillus penetrans*, se humedeció y se incubó por 3 días a 28 C, antes de que se agregaran larvas del segundo-estadio de *Meloidogyne incognita*. Este suelo humedecido e incubado incrementó la adhesión de esporas en las larvas de *M. incognita* en un porcentaje promedio de 165, sobre el suelo no incubado.

Dutky (1) reported that soil containing spores of *Bacillus penetrans* (Thorne) Mankau had to be kept moist for 48 hr or longer for maximum spore attachment to nematodes to occur. We found that spore attachment decreased if spore-infested soil was air-dried before adding nematodes and water. The purpose of this study was to determine if moistening air-dried soil containing *B. penetrans* for 3 days before adding second-stage juveniles of *Meloidogyne incognita* (Kofoid and White) Chitwood increased spore attachment over that of no prior moistening of the soil.

Four 30-g, random samples of dried potting soil (90.6% sand, 3.9% silt and 5.5% clay) containing *B. penetrans* originally collected from MacClenny, Florida, were placed in 30-cm³ plastic cups, moistened with 10 ml of distilled water, and incubated for zero or 3 days at 28 C. Then 1000 juveniles of *M. incognita* in water were injected into each cup and incubated at 28 C. After an additional 3 days, the juveniles were extracted from the soil by sieving and centrifugation, and a random sample of 50 juveniles was examined (at 200X) for parasitism by *B. penetrans*. The proportions of parasitized nematodes from these treatments were compared by normal approximation (2). The experiment was repeated once.

Table 1. Numbers of parasitized and healthy juveniles of *Meloidogyne incognita* following a biological assay for *Bacillus penetrans*.

Moist incubation before the addition of nematodes (days)	Number of nematodes		
	Parasitized ^z	Healthy	Total
0	(59,41) ^y	(141,159)	(200,200)
3	(146,119)	(54,81)	(200,200)

^zIn each experiment the proportions of parasitized juveniles from the treatment with 3-day moist incubation was greater than those from the treatment with no moist incubation ($P < 0.001$).

^yIn the ordered pair (A,B), A is the number of juveniles from the first experiment, and B is the number of juveniles from the second experiment.

In each experiment, the proportion of juveniles with attached spores (parasitized) was greater ($P < 0.001$) in the soil moistened for 3 days before adding the nematodes than in that from soil not premoistened (Table 1).

The increase in spore attachment brought about by moist incubation of air-dried spores indicates that once spores modify to accommodate desiccation, a lag period in spore attachment to nematodes is required upon hydration. Although we did not determine the optimum period of moist incubation to maximize spore attachment, 3 days of moist incubation before exposing juveniles of *M. incognita* to spores increased attachment dramatically. As a result of our study, we now use a 3-day moist incubation period when we assay for *B. penetrans* and we apply dry spores to irrigated field plots several days before the planting of crops.

LITERATURE CITED

1. DUTKY, E. M. 1978. Some factors affecting infection of plant parasitic nematodes by a bacterial spore parasite. Thesis. University of Maryland, College Park, Maryland. 44 p.
2. MENDENHALL, W., R. L. SCHEAFFER, and D. D. WACKERLY. 1981. Mathematical statistics with applications. 2nd ed. Duxbury Press, Boston. 686 pp.

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