RESEARCH NOTES—NOTAS DE INVESTIGACION

RESPONSE OF THREE TOBACCO CULTIVARS TO THREE *ROTYLENCHULUS RENIFORMIS* POPULATIONS

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RESUMEN

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El efecto de poblaciones de *Rotylenchulus reniformis* Linford & Oliveira procedentes de Baton Rouge, Louisiana; El Sombrero, Venezuela; y Weslaco, Texas sobre los cultivares de tabaco (*Nicotiana tabacum* L.) Hicks, McNair 944 y NC 95 fue estudiado en invernadero en Weslaco. *Rotylenchulus reniformis* de El Sombrero disminuyó significativamente (P=0.05) la altura y el peso seco aéreo de las plantas de los tres cultivares en relación a las plantas testigo. La poblaciones de Baton Rouge y Weslaco disminuyeron solamente el peso seco aéreo de estos cultivares, con excepción del cv Hicks que no fue afectado por la población de Baton Rouge. Las densidades finales de *R. reniformis* de El Sombrero fueron mayores (P=0.05) que aquellas de las poblaciones de Baton Rouge y Weslaco en cv NC 95. La tasa máxima de incremento del nematodo, 52X, fue obtenida de la población de El Sombrero en cv McNair 944.

Palabras claves adicionales: nematodo reniforme, Nicotiana tabacum, Hicks, NC 95, McNair 944, tasa de reproducción.

Infections of *Rotylenchulus reniformis* Linford and Oliveira on tobacco (*Nicotiana tabacum* L.) are common in India (1,2), Trinidad (3), and especially in Venezuela where, in several areas, the junior author has observed *R. reniformis* to be the dominant nematode species on tobacco. However, there is a lack of information on the pathogenicity of *R. reniformis* on this crop. In the United States, where tobacco is grown in *R. reniformis*-infested fields, the effect of this pest on tobacco production is not known. To study *R. reniformis* infections on the growth of tobacco, research was conducted in Weslaco, Texas, using three tobacco cultivars and two *R. reniformis* populations from the U.S.A. and one from Venezuela. The tobacco cultivars selected were 'Hicks' and 'McNair 944' which are susceptible to *Meloidogyne incognita* (Kofoid and White) Chitwood, and 'NC 95' which is resistant to *M. incognita.*

Seventy-two 15-cm-diam. plastic pots were filled with steam pas-

teurized Hidalgo sandy loam soil (13% clay, 8% silt, 79% sand, pH 7.8). The pots were divided into 3 groups of 24 each. In each group of pots, single one-month-old seedlings of one of the three cultivars was planted. Two *R. reniformis* populations from cotton (*Gossypium hirsutum* L.) collected at Baton Rouge, Louisiana (LA) and Weslaco, Texas (TX) and one from tomato (*Lycopersicon esculentum* Mill.) collected at El Sombrero, Venezuela (VE) were used in the experiment. To increase nematode numbers and obtain inocula for experimentation, the two populations from LA and TX were reared on cantaloupe (*Cucumis melo* L.) cv Perlita and that from VE was reared on tomato cv Rutgers in a greenhouse. Nematodes were extracted from roots by placing the roots on a Baermann funnel and collecting the nematodes daily. Two days after the tobacco cultivars were planted, six pots of each were infested with a suspension of 10 juveniles and preinfective females of one of the three *R. reniformis* populations/cm^3 of soil. Nematodes suspended in 100 ml of water were injected by syringe into 15 holes, 5 cm deep, evenly distributed over the soil surface. Pots were randomized on a greenhouse bench, replicated 6 times, with non-infested pots as controls, and maintained at 28± 4 C. Plants received normal greenhouse maintenance and were fertilized every 10 days. Sixty-three days after soil infestation, the experiment was terminated and plant height and dry top weight were recorded. To extract juveniles and preinfective females for the final density count, two 50-g soil cores with roots were removed from each pot and placed in Baermann funnels. After the soil was wetted, roots were carefully removed from the funnels for egg mass extraction. Remaining roots and soil from each pot were placed in a one-cm-pore sieve and immersed repeatedly in a bucket of distilled water to remove adhering soil without removing the nematode egg masses from roots. To collect egg masses, a 1.0-g root aliquot was separated from each root system and cut into 5-cm segments. Root segments were macerated in water in a blender with a rubber blade at 20,000 rpm for 30 sec. After maceration, root segments were removed from the water suspension by filtering through a 710-μm sieve, and egg masses were recovered on a 150-μm sieve. Egg masses were collected with a small brush with the aid of a stereomicroscope and crushed in a glass tube to remove eggs embedded in the gelatinous matrix. Eggs per g of root were adjusted to the total fresh root weight and combined with the juvenile soil counts per pot to equal the final counts.

The heights and dry top weights of the three tobacco cultivars infected with *R. reniformis* from VE were smaller (P=0.05) than those of the uninoculated controls. *Rotylenchulus reniformis* populations from LA and TX had less adverse effect on the three tobacco cultivars compared to the VE population (Table 1). However, these two populations (LA, TX) also suppressed (P=0.05) the dry top weight of the three tobacco

Table 1. Influence of three *Rotylenchulus reniformis* populations on the growth of three tobacco cultivars after 63 days.

Origin of population[y]	'Hicks'		'McNair 944'		'NC 95'	
	Height (cm)[z]	Dry top weight (g)[z]	Height (cm)	Dry top weight (g)	Height (cm)	Dry top weight (g)
Control	85.8 a	26.8 a	55.6 a	28.6 a	54.2 a	23.7 a
Baton Rouge (LA)	82.8 a (– 3.5)	25.1 ab(– 6.4)	52.6 ab(– 5.4)	24.1 bc(–15.8)	47.2 b (–13.0)	21.2 bc(–10.6)
El Sombrero (VE)	73.0 b (–15.0)	21.1 c (–21.3)	50.5 b (– 9.2)	22.2 c (–22.4)	44.6 b (–17.8)	19.9 c (–16.1)
Weslaco (TX)	79.3 ab(– 7.6)	23.5 bc(–12.4)	54.0 ab(– 2.9)	24.3 b (–15.1)	51.8 ab(– 4.5)	22.5 ab(– 5.1)

[y]Control treatments were uninfested soil; soil from other treatments was infested with 10 nematodes/cm^3 of the appropriate population.

[z]Values are means of 6 replicates. Column means followed by the same letters are not statistically different according to split-plot analysis of variance (P=0.05). The values in parentheses indicate the percent decrease of infected plants compared to controls.

Table 2. Final densities (P_f) and final to initial density ratios (P_f/P_i) of 3 populations of *Rotylenchulus reniformis* detected on 3 tobacco cultivars grown for 63 days in soil infested with 10 nematodes/cm³.

Origin of population[y]	'Hicks'[z]		'McNair 944'[z]		'NC 95'[z]	
	P_f	P_f/P_i	P_f	P_f/P_i	P_f	P_f/P_i
Baton Rouge (LA)	208,000 a	13.8 a	512,100 ab	34.1 ab	324,400 a	21.6 a
El Sombrero (VE)	497,700 b	33.1 b	793,400 a	52.8 a	548,200 b	36.5 b
Weslaco (TX)	377,300 ab	25.1 ab	269,900 b	17.9 b	234,400 a	15.6 a

[y]Soil infested with 10 nematodes/cm³ of the appropriate population.
[z]Values are means of 6 replicates. Column means followed by the same letters are not statistically different according to analysis of variance (P=0.05). P_f and P_i are expressed as juveniles + eggs of *R. reniformis*/plant.

cultivars, except for 'Hicks', which was not adversely affected by the LA population compared to non-infected controls.

Rotylenchulus reniformis final densities (P_f) from VE were greater (P=0.05) than those from the LA and TX populations on 'NC 95' and also were higher than that from LA on 'Hicks' and that from TX on 'McNair 944' (Table 2). A maximum rate of nematode population increase, 52-fold, was attained by the VE population on 'McNair 944' tobacco (Table 2).

The results of this test indicate that all three tobacco cultivars were good hosts of *R. reniformis*. The *M. incognita*-resistant 'NC 95' tobacco was susceptible to *R. reniformis*.

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