RESEARCH NOTE—NOTA DE INVESTIGACION

HOST STATUS OF SEVERAL ECONOMIC PLANTS TO *PRATYLENCHUS ZEAE* FROM PAKISTAN

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RESUMEN

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En un estudio realizado en invernáculo se determinó la respuesta a *Pratylenchus zeae* de 20 cultivares correspondientes a 10 especies de cultivos. *Pratylenchus zeae* se reprodujo bién en los seis cultivares de maíz (*Zea mays*) utilizados en el ensayo. La población de nematodos incrementó ligeramente en papa (*Solanum tuberosum*), ajo (*Allium cepa*), cebolla (*Allium sativum*), y cebada (*Hordeum vulgare*), en tanto decreció en nabo (*Raphanus sativus*), zanahoria (*Daucus carota*), tomate (*Lycopersicon esculentum*), garbanzo (*Cicer arietinum*) y trigo (*Triticum aestivum*).

Palabras claves: nematodo lesionado, *Pratylenchus zeae,* plantas hospedantes.

Several plant species in Pakistan are hosts for lesion nematodes, including *Pratylenchus zeae* Graham which has been associated with important agricultural crops such as tobacco (*Nicotiana tabacum* L.), maize (*Zea mays* L.) and sugarcane (*Saccharum officinarum* L.) in North West Frontier Province of Pakistan. However, no specific data are available on the host status of many crops to *P. zea* in Pakistan. The reproductive potential of this nematode on wheat (*Triticum aestivum* L.) and maize in a maize rotation program was studied previously (6). Our objective was to determine the host status of ten important economic crops in Pakistan to *P. zeae* under greenhouse conditions.

The population of *P. zeae* used was obtained from a field of maize located near Peshawar, North West Frontier Province, Pakistan. The nematode was increased on 'Azam' maize in the greenhouse. Twenty cultivars of ten plant species were included in this experiment (Table 1). Test plants propagated from seed or eyes were grown in 30-cm-diam pots containing steam-sterilized sandy soil (85% sand, 10% silt, 5% clay). Three weeks after planting, 5 ml of an aqueous suspension containing 1 000 *P. zeae* were pipeted into a hole 2–3 cm deep near the seedlings and the hole was filled with soil. Controls included plants growing in

soil without nematodes and nematodes added to soil in pots without plants.

Each crop cultivar was replicated four times and arranged in a randomized complete block design on a greenhouse bench. Air temperature during experiment was 25–35 C. All plants were fertilized regularly, and soil moisture was maintained at a level optimum for plant growth.

The experiment was terminated after 3 months. Plants were removed from each pot and washed under tap water. A 500 g aliquant of soil was collected from each pot and the nematodes extracted by sieving and a modified Baermann funnel (7). After 48 hours nematodes were collected and the number of nematodes per pot were calculated. Nematodes were extracted from roots by the method of Coolen and D'Herde (1). Data were subjected to the analysis of variance and means were separated using Duncan's multiple range test. The host status of plants was evaluated as described for *P. coffeae* (2).

RESULTS AND DISCUSSION

The rate of multiplication of *P. zeae* was very uniform, 6.4–6.8 fold on all cultivars of maize (Table 1). Potato, garlic, onion, and barley were

Table 1. Numbers of *Pratylenchus zeae* recovered from plant roots and soil 3 months after inoculation with 1 000 nematodes per pot, N = 4.

Host	Cultivars	*P. zeae*/ 5 g roots	Total *P. zeae*/ pot	Pf/Pi
Fallow soil		—	154 c	0.2
Raphanus sativus L.	Local red	0 d	180 c	0.2
	Local white	0 d	176 c	0.2
Daucus carota L.	Local	0 d	200 c	0.2
Lycopersicon esculentum Mill.	Rutgers	0 d	150 c	0.2
	Walter Giant	0 d	180 c	0.2
	Roforto	0 d	180 c	0.2
	Roma VF	0 d	200 c	0.2
Cicer arietinum L.	Local	0 d	280 c	0.3
Triticum aestivum L.	Blue silver	0 d	290 c	0.3
	Pak 81	0 d	300 c	0.3
Solanum tuberosum L.	Desiree	0 d	1 480 b	1.5
Allium sativum L.	Local	0 d	1 560 b	1.6
Allium cepa L.	Local	0 d	1 600 b	1.6
Hordeum vulgare L.	Local	0 d	1 800 b	1.8
Zea mays L.	Akber zard	1 900 c	6 430 a	6.4
	Sarhad yellow	1 975 bc	6 410 a	6.1
	Shaheen	2 010 abc	6 400 a	6.4
	Ehsan	2 100 ab	6 450 a	6.5
	Sultan	2 175 a	6 400 a	6.4
	Azam	2 100 ab	6 750 a	6.8

Means in columns followed by the same letter are not significantly different ($P < 0.05$) according to Duncan's multiple-range test.

poor hosts of *P. zeae* since the final nematode population barely exceeded the initial populations by 1.5–1.8 fold. Nematode populations decreased from the initial populations on radish, carrot, tomato, chickpea, and wheat. Few nematodes were recovered from these plant species or from fallow soil.

Poor growth of many plant species has been attributed to parasitism by *P. zea* (3,4,8). All cultivars of maize tested were good hosts for *P. zeae* and plants of all cultivars tested grew poorly and had severely damaged root systems in the presence of *P. zeae*. Endo (3) demonstrated that maize, crabgrass (*Digitaria sanguinalis* (L.) Scop.), millet (*Setaria italica* (L.) Beauv), sorghum (*Sorghum bicolor* (L.) Moench), rye (*Secale cereale* L.), soybean (*Glycine max* (L.) Merr.) supported good reproduction of *P. zeae*, but many other plants including wheat, tomato, barley, potato, pepper (*Capsicum frutescens* L.), bean (*Phaseolus vulgaris* L.), clover (*Trifolium repens* L.), and alfalfa (*Medicago sativa* L.) were not favorable for its reproduction.

Although the research reported herein does not examine the pathogenicity of *P. zeae*, it does provide information on the host status of certain crop species. The plant species determined to be nonhosts for *P. zeae* in this study could be included in crop rotation systems to manage this nematode in problem areas in Pakistan.

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