

REACTION OF TWO CULTIVARS OF MAIZE (*ZEA MAYS* L.) TO STUNT NEMATODE, *QUINISULCIUS CURVUS*

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The effect of the stunt nematode, *Quinisulcius curvus* (Williams, 1960) Siddiqi, 1971, on growth parameters of two maize cultivars, Kashmir Gold and Pirsabak, was studied. The results showed cultivar Pirsabak growth to be adversely affected by this nematode at 100, 200 and 400 inoculum levels. With Kashmir Gold, only the 400 inoculum level had an adverse effect and this was on shoot and root length only.

Key words: Stunt nematode, *Quinisulcius curvus*, Maize, Pathogenicity.

INTRODUCTION

Maize (*Zea mays* L.) is one of the important crops of Pakistan, extensively cultivated in Punjab, North West Frontier Province and Baluchistan as a staple crop. In Sind, however, its cultivation as a staple food is limited but as fodder, it occupies a significant place since it can be cultivated almost throughout the year. This way it has become a cash crop for the farmers. However yield of this crop is seriously affected by a number of diseases including those caused by, plant parasitic nematodes.

In earlier studies, Norton and Hoffman [1], Norton and Hinz [2], Egunjobi [3], Tarte [4] and Oteifa and Taha [5] reported maize decline to be associated with nematodes.

As the stunt nematode *Quinisulcius curvus* (Williams, 1960) Siddiqi, 1971, has been reported in high frequency associated with maize in Sind (Khan *et al.* [6]) and in consideration of the importance of this crop, an attempt was made to investigate the effect of this stunt nematode on growth parameters during critical growth period of the plant of two important commercial cultivars of maize viz., Kashmir Gold and Pirsabak.

MATERIALS AND METHODS

Three seeds of each of the cultivars were sown in 11 cm diameter plastic pots containing 700 g steam sterilized soil. After germination, plants were thinned to one per pot and inoculated with freshly isolated specimens of *Quinisulcius curvus* at the rates of 100, 200 and 400 per plant respectively. Uninoculated plants served as control. Each treatment was replicated four times. The pots were kept at room temperature ($28 \pm 2^\circ$) and watered on alternate days.

The experiment was terminated 14 days after inoculation and plant growth parameters (length and fresh weight of root and shoot) were measured.

Data was subjected to statistical analysis and differences determined using L.S.D. at both 5% and 1% levels.

RESULTS AND DISCUSSION

The result presented in Table 1 show that the plant growth (length and weight of shoot and root) of the cultivar Pirsabak was adversely affected by the infection of this nematode. Significant damage was observed at 100, 200 and 400 inoculum levels. The plants at 400 inoculum levels seemed to be stunted in growth.

Table 1. Effect of different inoculum levels of *Quinisulcius curvus* (Williams, 1960) Siddiqi, 1971 on two cultivars of maize*.

Maize cultivars	Inoculum level	Shoot and root length (cm)	Reduction over control (%)	Shoot and root weight (g)	Reduction over control (%)
Kashmir Gold	0	40.22	—	2.32	—
	100	41.12	—	2.12	8.63
	200	40.10	0.30	2.12	8.63
	400	26.35	34.48	1.97	15.08
	L.S.D. at 5% level	—	4.95	—	0.65
L.S.D. at 1% level	—	5.86	—	0.77	—
Pirsabak	0	57.20	—	3.97	—
	100	40.75	26.84	2.62	34.01
	200	41.14	27.93	2.64	33.51
	400	30.25	45.69	1.89	52.39
	L.S.D. at 5% level	—	8.96	—	0.63
L.S.D. at 1% level	—	10.62	—	0.75	—

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* Data given represent the mean of 4 replicates.

On the contrary, the cultivar Kashmir Gold was less adversely affected as no statistically significant damage was observed on shoot and root weight at inoculum levels 100 and 200. However, significant reduction was noted in shoot and root lengths at higher inoculum levels of 400 nematodes per plant. Because of the importance of this crop and the widespread distribution of *Q. curvus*, more trials on other cultivars are planned.

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INTRODUCTION

The soils of Pakistan are generally deficient in nitrogen and organic matter. Moreover, recent increase in the cost of commercial fertilizers in response to the acute oil crisis have caused a decline in N application rates to several crops [1, 2]. This shift may eventually result in lower crop yields. There is extensive evidence to indicate that legumes incorporated in a cropping sequence increases soil fertility, particularly soil N content [3, 4] and consequently the productivity of succeeding cereal crops [5-9]. Quantitative data on the contribution of various leguminous crops to succeeding cereals are meagre. The present investigations were therefore undertaken to evaluate the performance of different cropping sequences including leguminous and non leguminous crops on the productivity of a succeeding wheat crop.

MATERIALS AND METHODS

A field experiment was conducted at the experimental farm of Atomic Energy Agricultural Research Centre, Tarnan during 1984-85 on a sandy clay loam soil containing 0.033% N, 0.099% organic matter, 24 and 330 ppm available P (Olsen's method) and K (1N NH₄OAc extractable), respectively, and a pH of 7.4 in top 30 cm of soil. The treatment comprised of six rotations viz. cotton-wheat, fallow-wheat, cotton plus soybean-wheat, clusterbean (C) + soybean (S) + wheat, soybean (S) + wheat and clusterbean (C) + soybean (S) + wheat. The design of the experiment was a randomized complete block with 4 replicates using plots of 9x10 m in size. Among summer crops, cotton received 75 kg N and 50 kg P₂O₅ as urea and single super phosphate, respectively. Legumes like pi-

geonpas and soybean (cv. Bhaag) received 30 kg N and 50 kg P₂O₅. Clusterbean was fertilized at the rate of 30 kg N and 60 kg P₂O₅ and ploughed into the soil on 25.6.1984 at peak flowering stage. The fallow (no crop) treatment was kept free of weeds throughout the growing season by hand hoeing. The legumes incorporated in crop-rotation sequences were grown without any inoculation. After harvest of the summer crops, all above ground residues of the preceding crops were removed. The land was properly prepared and seeded to wheat as a second crop of the sequence on 4.12.1984. A recommended dose of 120 kg N and 60 kg P₂O₅ was applied to all the treatments uniformly. Grain and straw samples were obtained at maturity and analysed for total N content using micro Kjeldahl method. The data regarding dry matter, grain and straw yields, N content and total N uptake by wheat were analysed statistically using Duncan's multiple range test.

RESULTS AND DISCUSSION

The growth of summer crops was normal (Table I) with pigeonpea producing significantly highest dry matter yield (14382 kg/ha) followed by sole cotton (10214 kg) and cotton + soybean (9981 kg). The differences between the N uptake of various crops was statistically non significant. Inter-cropping of cotton and soybean produced higher N yield (13349 kg/ha) than cotton alone (12023 kg). The sequence of different crops with regard to total N uptake was pigeonpea (184.92 kg/ha), soybean (163.75 kg), cotton + soybean (132.49 kg), cotton (120.23 kg) and clusterbean (88.72 kg). The data regarding effect of preceding crops on wheat. The data regarding residual N left over by grain legumes (soybean and pigeonpea), green manuring of clusterbean and fallow (no crop) on subsequent wheat crop have been presented in Table 2. The results indicated that all previous treatments

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