A TECHNIQUE FOR SCREENING BLACK PEPPER (*PIPER NIGRUM* L.) WITH *PHYTOPHTHORA PALMIVORA* (BUTL.) BUTL.

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ABSTRACT

Three different procedures of inoculation were adopted to screen the pepper cultivars. (1) Adding the inoculum directly to the rooted cuttings raised in polythene bag. (2) Dipping root system in inoculum for 10 minutes and later transplanting. (3) Keeping the rooted cuttings in inoculum for 48 hrs. and later transplanting. The last procedure gave consistant results and was hence adopted for rapid screening.

INTRODUCTION

Quick wilt (Foot-rot and root rot) of black pepper (*Piper nigrum* L.) caused by *Phytophthora palmivora* (Butl.) Butl. is a serious menace limiting the production of black pepper in all pepper growing countries and has been reviewed recently (Nambiar and Sarma, 1977). Locating resistance/tolerance in cultivars of black pepper and also in wild types, and if found incorporating the same into high yielding cultivars is one of the approaches to tackle the problem.

Black pepper being the native of Western Ghats in India, germplasm collection of both cultivars as well as wild types of *Piper* sp. has been started by Central Plantation Crops Research Institute. In view of the high variability of the seedlings raised from the open pollinated seed of the cultivars in Kerala the seedling progenies of different cultivars are also being screened for resistance. A rapid screening technique has been standardised and is reported herein.

MATERIALS AND METHODS

Phytophthora isolate from the Collar infections of black pepper was raised on Oatmeal agar medium on 90 mm petri plates.

Two discs, 15 mm diameter, were taken from the fast growing edges of 4 day old colony and inoculated into 250 ml Conical flasks containing Oat meal medium (5 g Oats + 45 ml of deionized water) and the flasks were incubated 24 — 28°C. Eight month old rooted cuttings of Karimunda variety of pepper @ 3/bag were raised in polythene bags (16 × 25 cm) containing potting mixture. Seedlings were raised in smaller bags (8 × 12 cm). Ten day old sporulating fungal mat was removed, later washed thoroughly to make it free from medium traces, and blended in 100 ml of deionized water. The resulting suspension was made upto 250 ml. The following procedures of inoculation were tested based on the initial inoculation tests.

1) The inoculum was applied to the bag containing rooted cutting @ 15 ml/cutting.

2) Plants were removed from the bag, the root system washed under running tap water. Later the cuttings were dipped in the inoculum (10 cuttings in 150 ml of inoculum) for 10 minutes, transplanted into the polythene bags and watered copiously.

3) The procedure was similar to 2, except that the rooted cuttings were kept with inoculum for 48 hours, and later transplanted into the bags and were irrigated.

All the bags were regularly irrigated and were incubated at 20—22°C until they wilted. The plants treated with deionised water served as control. The degree of resistance was assessed based on the time taken for the total wilting of the plant.

Results and Discussion

The results are presented in the Table 1. From the results it is clear that treatment 3 gave high percentage of infection. This might be due to the congenial conditions conducive to infection prevailing because of the presence of inoculum in free water and might have helped in quick colonisation of the host. Lack of competition from other soil microbes at the time of infection is

another advantage in this situation as compared to the treatments 1 and 2, where the inoculum is in competition with the natural microflora of the soil.

Table 1. Screening of black pepper seedlings and rooted cuttings with *Phytophthora palmivora*

Sl. No.	Treatment	Rooted Cuttings			Seedlings			Time taken for wilting (in days)
		Inoculated	Wilted	%	Inoculated	Wilted	%	
1a	Irrigating the bags with inoculum	30	8	26.6	60	13	23.6	20—25
1b	Control	10	0	0	20	0	0	—
2a	Instant root dip in inoculum and transplantation	30	12	40	60	4	6.6	15—20
2b	Control	10	0	0	20	0	—	—
3a	Root dip in inoculum for 48 hrs. and transplantation	30	22	73.3	60	52	86.6	6—12
3b	Control	30	2	6.6	20	0		—

Turner (1971, 1973) used exclusive zoospore suspension as inoculum and incubated the rooted cuttings for 24 hr. and later transferred them to nutrient solution for further 6 days. He assessed the resistance based on % root necrosis. Holiday and Mowat (1963) adopted both leaf and root inoculation techniques. For pot culture experiments he used 2.3 cm discs of inoculum kept in petrils solution with daily changes for 3 days and later transferred the discs to the pots (3 for low inoculum and 6 for high inoculum). He also adopted % of root necrosis and also the number of plants wilted/number of plants inoculated.

In this present study the technique adopted is easy, and less cumbersome, for rapid inoculation, to get consistent results. The number of days taken for wilt and the % of plants wilted are taken as the criteria for ten degree of resistance/susceptibility. So far *P. colubrinum*, *P. obliquum* (Turner, 1971) and *P. guinense* (Anonymous, 1977) have been reported to be resistant to foot rot pathogen. The authors so far could not locate resistance in any one of the cultivated types and wild types screened so far.

References

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