Seedborne nature of *Peronospora parasitica* in *Raphanus sativus*

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Abstract. The alkali maceration technique was used to detect the seedborne nature of *Peronospora parasitica* in *Raphanus sativus*. Four cultivars 'Japanese white', 'Arka nishant' 'Pusa desi' and 'Pusa reshmi' were used to confirm the presence of pathogen in the seed. The percentage of embryonal infection in the cultivars were 12.5, 0.5, 0.25 and 0.1 respectively. The percentage of seedling infection is directly correlated to the percentage of embryo infection. The possibility of using this technique in quarantine screening is discussed.

Keywords. Radish; embryo; pericarp; internal inoculum; seedborne.

1. Introduction

*Peronospora parasitica* (Pers. ex. Fr.) Fr. causes downy mildew in many Cruciferous hosts. In many situations, partial or complete destruction of some leaves, is the total expression of the disease in the field, but in certain crops such as cauliflower and broccoli the infection may extend to the curds both in field (Chorin 1946; Davison *et al* 1962; Jenkins 1964; Shiraishi *et al* 1975) and in store (Lund and Wyatt 1978). The radish downy mildew pathogen has attracted few workers (Baudys 1928; Shiraishi *et al* 1975; Sharma and Sohi 1982). The seedborne nature of the fungus has not been established. Hence the present study was set out to detect the seedborne nature of the pathogen and the percentage of viable inoculum in the seeds.

2. Materials and methods

Four cultivars ‘Japanese white’, ‘Arka nishant’, ‘Pusa desi’ and ‘Pusa reshmi’ were sown in the field at Downy Mildew nursery at Mysore.

Seeds (400) from each cultivar were sown in separate plots which were observed periodically for the occurrence of downy mildew disease. At the seed setting stage, seeds from infected plants were subjected to maceration technique (Shetty *et al* 1978). Seeds were placed in 250 ml of 10% NaOH for 24, 36, and 48 h respectively, at 22°C along with 0.5 g of Trypan blue stain. After the alkali treatment the seeds were agitated in warm water (60-70°C) for 5 min. Hard seeds were softened by boiling in 5% NaOH for an additional 5-10 min. Seeds were then sieved, excess water drained off and lactophenol added to a beaker containing the treated seeds. The lactophenol completed detachment of the embryo from the seed coat. The beaker with the embryos and the seed coats was placed in water bath and heated with low flame until the embryos were cleared. The embryos and seed coats were examined under stereomicroscope.
To determine the viability of the internally borne mycelium, seedling symptom test was carried out. Seeds (400) from the above samples were sown under control conditions in a glass house which is free from airborne inoculum. Before sowing, the seeds were surface sterilised using 0.1% mercuric chloride solution for 5 min, followed by 5 washings in sterile distilled water. Such seeds were sown in pots containing steam sterilized soil (20 pound pressure for 15 min). After seedling emergence, observation was made daily and disease incidence was recorded. Number of seedlings infected from each cultivar was recorded. The seeds from the first harvest were subjected to alkali maceration technique to determine the rate of transmission of the pathogen in the seeds.

3. Results

The results of the maceration technique showed the presence of mycelium in the

![Figure 1. Mycelium of P. parasitica in radish seeds. (A) Pericarp (x 200). (B) Embryo (x 200).](image)