

## Short Communication

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### LOCATION OF FUNGI IN PUMPKIN SEED

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Pumpkin (*Cucurbita pepo* L.) is an important and widely cultivated cucurbitaceous vegetable crop in Pakistan. Over forty-five seed-borne fungi have been reported to be associated with pumpkin seeds in Pakistan (Yunis & Kauser, 1966; Sheikh 1990; Sultana *et al* 1992; Ahmed *et al* 1993). *Macrophomina phaseolina*, *Botryodiplodia theobromae*, *Fusarium equiseti*, *F. semitectum*, *F. solani* and *F. oxysporum* were found in high frequencies in cucurbits seed (Maholay

& Sohi 1982; Maholay 1988, 1989; Sheikh 1990; Sultana *et al* 1992). A knowledge of the exact location of seed-borne fungi in different seed components will be helpful in understanding their seed to plant transmission, effect in seed germination, disease cycle and control strategy. Studies were therefore carried out to locate the fungi on different components of pumpkin seed.

Six samples of pumpkin seeds were collected from market and farmer field in Pakistan, used to study the location of seedborne fungi. For determining the location of fungi in seeds, they were washed and soaked in distilled water for 2 hrs and then aseptically dissected to separate the different components viz. seed coat, tegmen, cotyledon and embryo. Dissected seed parts were surface disinfected with 0.5% NaOCl solution and placed on blotters in petri dishes (Du-Hyunglee *et al* 1984). The dishes were incubated at 24°C for 7 days and fungi, growing on different parts, were identified by using references of Raper & Fennel (1965),

**Table 1**  
Percentage recovery of fungi from different seed parts of 6 seed samples of pumpkin

| Name of fungi                    | Seed coat |             | Tegmen |             | Cotyledons |           | Embryo |           |
|----------------------------------|-----------|-------------|--------|-------------|------------|-----------|--------|-----------|
|                                  | SI        | PI          | SI     | PI          | SI         | PI        | SI     | PI        |
| <i>Alternaria alternata</i>      | 3         | 2.30±0.51   | -      | -           | -          | -         | -      | -         |
| <i>Aspergillus flavus</i>        | 4         | 4.25±0.59   | 1      | 1.00±0.00   | 3          | 1.67±0.38 | -      | -         |
| <i>A. niger</i>                  | 4         | 3.75±0.31   | -      | -           | -          | -         | -      | -         |
| <i>A. terreus</i>                | 2         | 3.50±1.06   | 1      | 1.00±0.00   | -          | -         | -      | -         |
| <i>A. wentii</i>                 | 3         | 2.50±0.23   | 1      | 1.00±0.00   | 2          | 1.50±0.35 | -      | -         |
| <i>Botryodiplodia theobromae</i> | 2         | 37.00±23.33 | 2      | 28.50±16.61 | 1          | 3.00±0.00 | 1      | 1.00±0.00 |
| <i>Chaetomium funicola</i>       | 1         | 5.00±0.00   | 1      | 1.00±0.00   | -          | -         | -      | -         |
| <i>C. globosum</i>               | 1         | 6.00±0.00   | -      | -           | -          | -         | -      | -         |
| <i>C. olivaceum</i>              | 1         | 4.00±0.00   | 1      | 1.00±0.00   | -          | -         | -      | -         |
| <i>Cephalophora irregularis</i>  | 1         | 1.00±0.00   | -      | -           | -          | -         | -      | -         |
| <i>Curvularia clavata</i>        | 1         | 1.00±0.00   | 1      | 1.00±0.00   | -          | -         | -      | -         |
| <i>C. lunata</i>                 | 2         | 1.50±0.35   | -      | -           | -          | -         | -      | -         |
| <i>Drechslera halodes</i>        | 4         | 2.67±0.14   | 2      | 1.50±0.35   | 1          | 2.00±0.00 | -      | -         |
| <i>D. spicifera</i>              | 3         | 2.00±0.33   | -      | -           | -          | -         | -      | -         |
| <i>Fusarium moniliforme</i>      | 4         | 4.00±0.79   | 2      | 2.50±1.06   | 2          | 1.50±0.35 | 1      | 1.00±0.00 |
| <i>F. oxysporum</i>              | 5         | 14.60±2.02  | 5      | 7.00±0.80   | 4          | 6.40±0.89 | 3      | 2.20±0.82 |
| <i>F. semitectum</i>             | 4         | 2.75±0.37   | 2      | 1.00±0.00   | 2          | 2.00±0.00 | -      | -         |
| <i>F. solani</i>                 | 3         | 4.00±0.66   | 2      | 2.00±0.00   | 2          | 1.00±0.00 | 1      | 1.00±0.00 |
| <i>Macrophomina phaseolina</i>   | 3         | 28.30±15.20 | 3      | 30.00±13.57 | 1          | 9.00±0.00 | 1      | 5.00±0.00 |
| <i>Myrothecium roridum</i>       | 2         | 2.50±0.35   | -      | -           | -          | -         | -      | -         |
| <i>M. verrucaria</i>             | 1         | 6.00±0.00   | -      | -           | -          | -         | -      | -         |
| <i>Penicillium purpurogenum</i>  | 3         | 3.00±0.57   | 2      | 1.50±0.35   | 3          | 1.00±0.00 | -      | -         |
| <i>Stachybotrys atra</i>         | 2         | 2.00±0.70   | -      | -           | -          | -         | -      | -         |
| <i>Sordaria tetraspora</i>       | 1         | 3.00±0.00   | -      | -           | -          | -         | -      | -         |
| <i>S. fumicola</i>               | 1         | 4.00±0.00   | -      | -           | -          | -         | -      | -         |
| <i>Ulocladium atrum</i>          | 1         | 2.00±0.00   | -      | -           | -          | -         | -      | -         |

SI, Number of samples infected; PI, Percentage of infected seed ± standard error.

Booth (1971), Ellis (1971), Barnett & Hunter (1972), Nelson *et al* (1983).

The results indicated that most of the fungi were located on seed coat followed by tegmen (14), cotyledons (10) and embryo (5) with an average infection of 5.87, 5.71, 2.71 and 2.04% respectively. A total of 26 fungal species had been isolated Table 1. *B. theobromae*, *F. moniliforme*, *F. oxysporum*, *F. solani* and *M. phaseolina* were recovered from each component of the seed. The inoculum level decreased with the depth. Mathur *et al* (1975) and Sultana *et al* (1988) found that infection of *F. moniliforme* was more conveniently detected in the endosperm than seed coat and embryo whereas Bhutta *et al* (1996) and Dawer & Ghaffar (1998) found equal infection level of *M. phaseolina* in the pericarp, endosperm and embryo. In the present study *B. theobromae* and *M. phaseolina* were having high infection level in seed coat and tegmen while it was recovered from the embryo of only one seed samples.

*Aspergillus flavus*, *A. wentii*, *Drechslera halodes*, *Fusarium semitectum* and *Penicillium purpurogenum* were showing high level of infection on seed coat and cotyledons as compared to tegmens. High infection and deep penetration of the fungus in endosperm/cotyledons and embryo are considered as the major factors in germination failure and pre-emergence mortality (Raut 1983; Sultana *et al* 1994). *Aspergillus terreus*, *Chaetomium fumicola*, *C. olivaceum* and *Curvularia clavata* were having infection in seed coat and tegmen while rest of the fungi viz. *Alternaria alternata*, *Aspergillus niger*, *Chaetomium globosum*, *Cephalophora irregularis*, *Curvularia lunata*, *Drechslera spicifera*, *Myrothecium roridum*, *M. vermaria*, *Stachybotrys atra*, *Sordaria tetrapora*, *S. fumicola* and *Ulocladium atrum* were found in seed coat only.

It is evident from these studies that the pathogenic fungi like *B. theobromae*, *F. moniliforme*, *F. oxysporum*, *F. solani* and *M. phaseolina* having both extra and intra embryonal infection affect seed quality immensely. Saprophytic as well as pathogenic fungi like *Aspergillus flavus*, *A. wentii*, *Drechslera halodes* and *Fusarium semitectum* occur not only in the seed coat but also in inner part of the seed of pumpkin, which impaired the seed quality.

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