Seed-borne fungi of date-palm, *Phoenix dactylifera* L. from Saudi Arabia

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**KEYWORDS**

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**Abstract**

Six different varieties of date-palm viz. Sukhari, Saggae, Rotana, Kholasi, Rashoodia and Nabtat Ali, were screened for seed-borne fungi. Eleven species belonging to nine different genera of fungi were isolated. The genera isolated were *Alternaria*, *Eurotium*, and *Fusarium* (two species), *Aspergillus*, *Drechslera*, *Penicillium*, *Rhizopus*, and *Curvularia* (one species each). This is the first record of seed-borne fungi from *Phoenix dactylifera* L. in Saudi Arabia.

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1. Introduction

Saudi Arabia is one of the most important countries and is considered to be the genetic center for the origin of date palm. Historically this tree has been crucial for the survival of nomadic tribes in Saudi Arabia (Hoop, 2003). Saudi Arabia is considered to be one of the major date producing and exporting countries (Al-Showiman and BaOsman, 1992). There are more than 400 cultivars of fruiting date palm of economic value (Fayadh and Al-Showiman, 1990; Date-palm Symposium, 1982). The nutritional values of date palm have been well studied regarding the presence of amino acids, vitamins, carbohydrates, minerals (Al-Whaibi et al., 1985; Al-Showiman, 1990).

Bacterial, fungal, nematodal and other diseases of date-palm have been well studied in Saudi Arabia (Abdalla, 1985; Lhudaib et al., 2007; El-Hassni et al., 2004; Mansoori and Kord, 2006; FAO, 2004; Al-Rokibah, 1991). There are several fungal diseases of date palm that cause severe damage to plant like Bayoud cause by *Fusarium oxysporum* (El-Hassni et al., 2007). Belaat caused by *Phytophthora* sp. (Howard and Carpenter, 1993), bending head cause by *Ceratocystis paradoxa* and *Lasiodiplodia theobromae*, Black leaf spot caused by *Chaeotosphaeropsis* sp., *Dipodia phoenicium*, while *Alternaria, Aspergillus, Fusarium* and *Penicillium* cause Fruitrots of date-palm. Other important fungal diseases that cause significant damage to date-palm are Graphiola leaf spot, Inflorescence rot, Khaledj, Omphalia root rot, Pestalotia leaf spot, Taches brunes (brown leafspot), and Terminal bud rot. Also diseases of unknown cause like Al-Hijm, Berhee disorder, Faround, Internal browning and Rapid decline are the cause of concern for the survival of date-palm, Nematodes are also causing severe diseases of date palm like Root Knot and Root lesion. Lethal yellowing disease of date-palm is cause by mycoplasma like organism (Al-Rokibah, 1991;
Abbas and Abdullah, 2003; Elliot et al., 2004; Al-Swaidi, 2003; Mansoori and Kord, 2006; Wikipedia, 2008). To the best of my knowledge, no work has been done to explore the seed-borne fungi in Saudi Arabia and surrounding countries. Therefore, this study was focused on isolation of seed-borne fungi from date palm.

2. Materials and methods

Seeds of six varieties of date-palm namely Sukhari, Saggae, Rotana, Kholasi, Rashoodia and Nabtat Ali were purchased from the market.

Methodology for the isolation of seed-borne fungi adopted is similar to those adopted earlier by the author for other types of seeds (Bokhary, 1986a,b).

Seeds were surface sterilized by dipping in 1% commercial chlorox (7% sodium hypochlorite) for 2 minutes. These seeds were then washed with sterilized water three times. Then 20 seeds were put into each 15 cm. Petridish over the moist paper put over the appropriate agar medium.

2.1. Medium used for isolation of fungi

Commercially supplied media Czapeck dox agar (CZA), Potato dextrose agar (added with 2% yeast extract) and Malt extract agar were used for preliminary isolation of seed-borne fungi from different varieties of date-palm. Later on cultures of isolated fungi were maintained on Czapek dox slants in tissue culture tubes. All the inoculated plates were incubated at room temperature (24 ± 2).

3. Results and discussion

Six different varieties of Phoenix dactylifera purchased from the local market were studied for seed-borne fungi. These are Sukhari, Saggae, Rotana, Kholasi, Rashoodia and Nabtat Ali. A total of eleven fungal species belonging to nine genera were isolated (Table 1). F. oxysporum, Fusarium solani and Alternaria alternate were isolated from all of the varieties, showing the predominancy over other species. Curvularia lunata was isolated from five varieties out of six. Monilia sp. was isolated from Sukhari only. Rhizopus oryzae was isolated from four varieties. Other fungi are restricted to two or three varieties only.

Three different media were used to isolate seed-borne fungi from different varieties of date palm (Table 2). F. solani was isolated from highest number of seeds on all types of media followed by F. oxysporum. Alternaria alternate ranked at number three followed by A. chlamydosporum. Other species showed a very low percentage of appearance as compared to Fusarium and Alternaria species.

As far as author is knowledge, goes no report is available about the seed borne fungi of date-palm from Saudi Arabia, or from neighbouring countries or elsewhere except the report of Fusarium wilt of seedlings (El-Hassan et al., 2005). All the fungi reported here were already reported as seed-borne fungi from other types of seeds from Saudi Arabia (Bokhary, 1986a,b).

The World Wide Web search like Google, Yahoo, Wikipedia and others yielded so far no published work regarding the seed-born fungi of date-palm.

| Table 1 | Seed-borne fungi isolated from different varieties of Date-palm. |
|---|---|
| Fungi | Date-palm varieties |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Alternaria alternate | + | + | + | + | + | + |
| A. clamydiospora | + | - | - | + | - | + |
| Aspergillus flavus | - | + | - | - | - | - |
| Curvularia lunata | + | + | - | + | + | + |
| Drechslera hawaiensis | + | - | - | - | + | + |
| Fusarium oxysporum | + | + | + | + | + | + |
| Fusarium solani | + | + | + | + | + | + |
| Eurotium sp. | - | + | - | - | + | - |
| Monilia sp. | + | - | - | - | - | - |
| Penicillium chrysogenum | - | + | - | - | - | - |
| Rhizopus oryzae | + | + | + | + | + | + |
| Species | 8 | 8 | 5 | 6 | 6 | 7 |

| Table 2 | Seed-borne fungi isolated at different medium (total number of 60 seed incubated on each medium). |
|---|---|
| Fungi | Media/No. of seed positive |
| | Czapek dox | Potato dextrose agar + 2% yeast extract | Malt extract agar |
| Alternaria alternate | 30 | 36 | 12 | 78 |
| A. clamydiospora | 23 | 30 | 13 | 66 |
| Aspergillus flavus | 6 | 10 | 5 | 21 |
| Curvularia lunata | 10 | 10 | 5 | 25 |
| Drechslera hawaiensis | 12 | 25 | 10 | 47 |
| Eurotium sp. | 10 | 12 | 4 | 26 |
| Fusarium oxysporum | 70 | 86 | 36 | 192 |
| Fusarium solani | 76 | 88 | 39 | 203 |
| Monilia sp. | 6 | 12 | 8 | 26 |
| Penicillium chrysogenum | 4 | 10 | 6 | 20 |
| Rhizopus oryzae | 6 | 12 | 8 | 26 |
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