Short Communication
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FIRST REPORT OF *ALTERNARIA ALTERNATA* LEAF SPOTS ON SPINACH IN SAUDI ARABIA

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Spinach (*Spinacia oleracea* L.), family Chenopodiaceae, is native to central and southwestern Asia. It is one of the most common vegetables cultivated worldwide **(**Sato *et al.,* 2010**).** It is a rich source of vitamin A, B_2, B_6, B_9, C, E and K (Ball, 2006; Koren, 2007). Spinach, along with other green leafy vegetables, is considered to be a rich source of iron. Spinach also has a high calcium content (Weaver and Heaney, 2006).

In 2009 a new disease was observed on spinach in kingdom of Saudi Arabia. Symptoms appeared to be small and circular spots with concentric rings at first which latter became irregular lesions. These circular spots were dark black colored along the margins which encircled the necrotic region. With the spread of disease, these necrotic spots turned to appear as blight (Fig. 1 and 2). Mortality due to the disease was found to be 20-80%. The disease started in October, remained in full gloom from November to January, markedly decline in March and consequently ended in April.

Lesion pieces were surface sterilized with 1% sodium hypochlorite, rinsed thrice with sterile water, and cultured on potato dextrose agar in a growth incubator at 25±1°C. The pure culture of the fungal colony appeared to be grayish white at first and became black later on. The fungus produced abundant, conidia having 3-8 trasverse septations and 1–2 longitudinal septation. Conidia were solitary, or in short chains, mostly ovoid with a short conical or cylindrical apical beaks and smooth walled. Hyphae were branched, septate, brownish with simple olive-brown, septate conidiophores that were variable in length. Olive brown septate condiophore were observed (Fig. 3). Based on these characters, the isolated fungus was identified as *Alternaria alternata* (Domsch et al., 1980). Pathogenicity test was performed by spraying 1×10^7 conidia per mL on 2–5 leaf stage of the plants. Control plants were sprayed with sterile water. Plants were covered for 24 h with plastic bags to maintain 100% relative humidity. Plants were kept under observation for 10 days in the laboratory garden at 30±5 °C. The pathogenicity tests were repeated three times. The first lesion appeared after a period of 7 days. Pathogen was consistently reisolated from the lesions. To our knowledge, it is the first report of disease on spinach in Saudi Arabia.

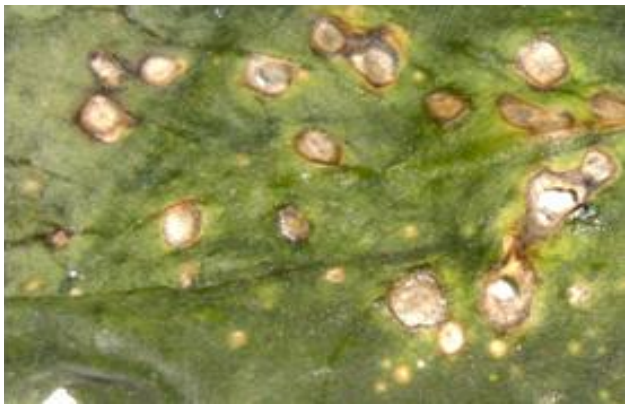

Fig. 1: Spinach leaf spots caused by *Alternaria alternata* showing concentric rings.

Fig. 2: Spinach leaf spots turning into blight lesions caused by *Alternaria alternata.*

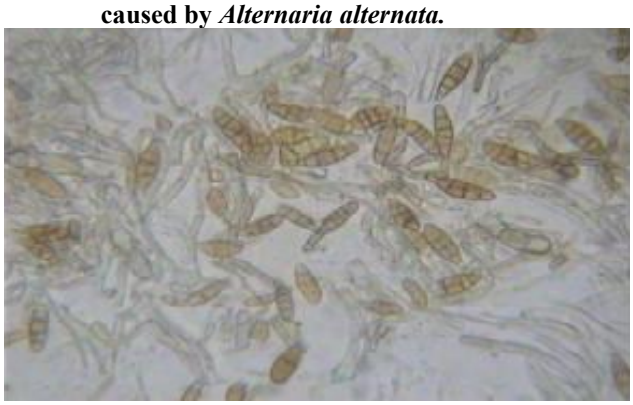

Fig. 3: Condiophores and conidia of *Alternaria alternata.*

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REFERENCES

Ball, G. F. M. (2006). *Vitamins in foods: analysis, bioavailability, and stability*. CRC Press.

Domsch K.H., Gams W. and T.H. Anderson (1980). Compendium of soil fungi. Volume 1, Academic Press. A subsidiary of Harcourt Brace Jovanovich Publishers, don New York, Toronto Sydney San Franciso.

Koren, G. (2007). Medication safety in pregnancy and breastfeeding. McGraw-Hill Professional. pp. 279

Sato, A., H. Takeda, W. Oyanagi, E. Nishihara and M. Murakami. (2010). Reduction of cadmium uptake in spinach (*Spinacia oleracea* L.) by soil amendment with animal waste compost. J. Hazard. Mater. 181: 298-304.

Weaver, C. M. and R.P. Heaney, (2006). *Calcium in human health*. Humana Press, USA. pp. 135.