

## DISEASES OF CUMIN—A REVIEW

Shahida Perveen and Zakaullah\*

Cumin (*Cuminum cyminum*), an annual low growing herb native of Egypt and Syria, is now widely grown in India and on a small scale in some parts of Pakistan. Its fruit is chiefly employed as spices and medicine. The dry fruits are a rich source of thymol. They contain 17.2% of protein and 13% of fat (Chopra et al, 1958). The area under the valuable crop is expected to increase in the country. Cultivation of cumin is being tried under the Peshawar conditions. Work on the collection of information about the diseases of the crop was initiated and available literature on the subject was reviewed.

Joshi and Agnihotri (1958) described the symptoms, morphology and cultural characteristics of the fungus causing wilt-disease of cumin.

Mathur and Prasad (1962) recorded powdery mildew (*Erysiphe polygoni* DC), blight (*Alternaria burnsii*) and wilt (*Fusarium oxysporum* f. *cumini*) diseases on cumin. Of these, wilt was the most serious one causing heavy losses to the crop. The average loss due to the disease was estimated to be 20%.

Ishaque and Talukdar (1965) recorded *Oidium* sp. occurring on leaves and fruits of *Cuminum cyminum*.

Mathur and Mathur (1965) carried out studies on the metabolites of *F. oxysporum* in relation to cumin wilt.

Mathur and Mathur (1965) studied fungus microflora of 'cumin wilt-sick' soil and their antagonistic effect on wilt-causing *Fusarium* in vitro. The predominant fungi in soil infested with *F. oxysporum* f. sp. *cumini* were *Aspergillus niger*, *A. candidus*, *A. versicolor* and *A. funiculosus*. Ascomycetes were found abundant whereas phycomycetes were infrequent. Two isolates of *A. niger* were antagonistic to *F. oxysporum* f. sp. *cumini*.

Mathur and Mathur (1966) carried out studies on the development of *F. oxysporum*. It was found to be favoured by light soil and was most severe during winter with soil temperature of 12.6° to 19.2°C. All indigenous cumin varieties were found highly susceptible to wilt whereas exotic varieties showed higher disease incidence in the field than in the glasshouse.

\* The authors are Technical Assistant and Forest Pathologist respectively at the Pakistan Forest Institute, Peshawar.

Mathur et al (1967) showed that crop rotation, with bajara (*Pennisetum typhoides*), increased incidence of the disease (*Fusarium oxysporum* f. sp. *cumini*) whereas a summer fallow decreased it. Mixed cropping, fertilizer applications, and green manuring had little effect on the severity of the disease.

Mathur and Mathur (1967) studied the metabolites of *Fusarium oxysporum* f. *cumini* in relation to cumin wilt.

Mathur and Mathur (1967) found that the application of 50% SMDC (metham-Na) sol. followed immediately by 150 ml of water, at 4-days interval for 20 days in the wilt infested soil, improved the seedling emergence and subsequent plant growth. It also helped in reducing population of *F. oxysporum* f. sp. *cumini* and other soil fungi.

Chandola et al (1970) found that cumin variety R.S.I. was early maturing giving 10-12% higher grain yield than the local variety. They also described the control of the fungal diseases: powdery mildew, *Fusarium* wilt and blight.

Mathur and Mathur (1970) studied the role of contaminated seeds in dissemination of cumin wilt fungus. They found that during harvesting and threshing macroconidia and chlamydospores of *Fusarium oxysporum* become seed-borne and serve as a mean for the spread of the pathogen to new areas.

Gemawat and Prasad (1973) found through inoculation experiments, that cumin, after flowering, becomes susceptible to *Alternaria burnsii*. Physiology of the pathogen showed that DL-serine and phenylalanine may be involved in providing optimum conditions for the growth of *A. burnsii*.

Sankhla et al (1973) found that cumin (0.15%) sprays, followed by captan (0.2%), gave the best control of *Alternaria* blight disease of cumin.

Solanki et al (1973) controlled *Alternaria* blight of cumin with difolatan (0.15%) applied 3 times, quite effectively.

Singh and Gupta (1976) tried some chemicals to control powdery mildew (*Erysiphe polygoni*) of cumin. Of these, Elosal, Karathane and Cosan were found to be the best in reducing the incidence and increasing the yield.

Reddy (1977) compiled information on the pests, diseases and nematodes occurring on various spice and condiment crops including cumin.



## References

1. CHANDOLA, R.P. et al (1970). Cumin cultivation in Rajasthan. Indian farming 20(4): 13-16. Tropical Abstract 1971 Vol. 26 No. 3 Abstr. u774.
2. CHOPRA et al. (1958). Chopra's indigenous drugs of India. 2nd. Edition. U.N. Dhur and Sons Private Limited 51, Bankim Chatterjee Street Calcutta 12, 1958.
3. GEMAWAT, P.D. and PRASAD, N. (1973). *Alternaria* blight of *Cuminum cyminum* L. Physiology of Pathogenesis. Proceedings of the Indian National Science Academy, B 38(1/2): 38-43. Review of Plant Pathology 1975 Vol. 54 No. 8 Abstr. 3435.
4. ISHAQUE, M. and M.J. TALUKDAR. (1965). Survey of Fungal Flora of East Pakistan. Agriculture Pakistan 1967 No. 1 pp. 17-26.
5. JOSHI, N.C. and AGNIHOTRI, J.P. (1958). Studies on the wilt disease of cumin (*Cuminum cyminum* L.) in Ajmer State, India. Lloydia 21(1): 29-33. Tropical Abstract 1959 Vol. XIV No. 3 Abstr. g724.
6. MATHUR, B.L. and PRASAD, N. (1964). Studies on wilt disease of cumin caused by *Fusarium oxysporum*, *F. cumini*. Indian Journal of Agriculture Science 34(2): 131-137.
7. MATHUR, B.L. and MATHUR, R.L. (1970). Role of contaminated seeds in dissemination of cumin wilt fungus *Fusarium oxysporum* f. *cumini*. Rajasthan Journal of Agricultural Sciences (2): 80-82. Review of Plant Pathology 1975 Vol. 54 No. 1 Abstr. 209.
8. MATHUR, B.L. and MATHUR, R.L. (1967). Effect of SMDC on germination, plant growth and *Fusarium* wilt incidence in cumin (*Cuminum cyminum*). Pl. Dis. Repr. 51(8): 629-631. Review of Applied Mycology 1968 Vol. 47 No. 1 Abstr. 279.
9. MATHUR B.L.; SANKHLA, H.C. and MATHUR, R.L. (1967). Influence of cultural practices on cumin wilt incidence. Indian Phytopath. 20(1): 32-35. Review of Applied Mycology 1968 Vol. 47 No. 4 Abstr. 866.
10. MATHUR, B.L. and MATHUR, R.L. (1967). Metabolites of *Fusarium oxysporum* f. *cumini* in relation to cumin wilt. II. Influence of growth period, and dilution. Indian Phytopath. 20(1): 42-44. Review of Applied Mycology 1968 Vol. 47 No. 4 Abstr. 867.
11. MATHUR, B.L. and MATHUR, R.L. (1966). *Fusarium* wilt of cumin-Influence of certain factors on disease incidence. Proc. natn. Acad. Sci. India, Sect. B. 36(1): 33-38. Review of Applied Mycology 1967 Vol. 46 No. 5 Abstr. 1306.
12. MATHUR, B.L. and MATHUR, R.L. (1965). Metabolites of *Fusarium oxysporum* f. *cumini*. in relation to cumin wilt. Review of Applied Mycology 1966 Vol. 45 No. 8 Abstr. 2198.
13. MATHUR, B.L. and MATHUR, R.L. (1965). The fungal microflora of the 'Cumin wilt-sick' soil and their antagonistic effect on wilt-causing *Fusarium* in vitro. Proc. natn. Acad. Sci. India, Sect. B 35(3): 275-280. Review of Applied Mycology 1966 Vol. 45 No. 10 Abstr. 3187.
14. SANKHLA, B; SANKHLA, H.C. and MATHUR, R.L. (1973). Evaluation of fungicides against *Alternaria* blight disease of cumin (*Cuminum cyminum*).

- Indian Phytopathology 26(1): 154-155. Review of Plant Pathology 1974 Vol. 53 No. 10 Abstr. 4080.
15. SINGH, C. and GUPTA, R.B.L. (1976). Chemical control of powdery mildew (*Erysiphe polygoni*) of *Cuminum cyminum*. Indian Journal of Mycology and Plant Pathology 6(1): 73-74. Review of Plant Pathology 1978 Vol. 57 No. 3 Abstr. 1341.
  16. SOLANKI, J.S.; SINGH, R.R. and DALELA, C.C. (1973). Field Evaluation of fungicides in controlling Alternaria blight of *Cuminum cyminum*. Indian Journal of Mycology and Plant Pathology 3(2): 196-197. Review of Plant Pathology 1975 Vol. 54 No. 1 Abstr. 2924.
  17. REDDY, D.B. (1977). Pests, diseases and nematodes of major spices and condiments in Asia and the Pacific. Regional Office for Asia and the Far East, F.A.O., Bangkok, Thailand—Technical Document—Plant Protection Committee for the South East Asia and Pacific Region (FAO) FAO Bangkok (Thailand) no. 108, 18 p.; Tropical Abstract 1978 Vol. 4 No. 1 Abstr. 18488.