

Chapter 17

Importance of Pest and Pathogen Control System With Special Emphasis on Coriander Crop on the Indian Subcontinent

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ABSTRACT

*India is a country known for its status as the largest producer and consumer for the crop *Coriandrum sativum* (L.). Improvement and alteration of cultivation techniques is highly required as the crop is highly susceptible to various diseases that are responsible for crop loss with small and marginal farmers every year. Proper guidance for soil preparation and nutritional fulfillment can result in a better yield of the spice crop. Integrated efforts for soil fertility with on-time pest management will enhance both productivity and profit. Therefore, a concise approach for pest-crop- pathogen management systems of coriander crops have been vividly presented in the present review chapter.*

INTRODUCTION

Coriander of commerce is the dried ripe fruits of *Coriandrum sativum* (L.), also known as cilantro or Chinese parsley. It is one of the first spices to be used by humankind, having been identified as early as 5,000 B.C. The plant is an important member of the family Umbelliferae (Apiaceae) along with other 200 genera and 2900 species. The plant is indigenous to the Mediterranean region, extensively in India, Morocco, Russia, Hungary, Poland, Rumania, Czechoslovakia, Guatemala, Mexico, Turkey, and

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Argentina (Coskuner and Karababa, 2007). It is a small aromatic annual herb, attaining a height of 0.3-1 meters. The lower leaves are broad with crenate-lobed Margins, and the upper one is finely cut with linear lobes. The flowers are white or pinkish arranged in compound terminal umbels (Burdock and Carabin, 2009). The fruit is a nearly globular, yellow-brown schizocarp. The plant requires a warm, dry summer with short, rainy winters and is cultivated as a cold-weather crop in northern India, mainly in Rajasthan, Uttar Pradesh, and Utrakhand. The chemical composition of coriander seeds varies depending upon the country of its origin, agro-climatic, harvesting, and storage conditions. On average, seeds contain moisture (6.3%), protein (1.3%), fat (19.6%), carbohydrates (24%), mineral matter (5.3%), crude fiber (31.5%), and few traces of vitamin. Seeds are a good source of volatile and crude oil, tannins, saponins, cellulose, pentosans, and pigments. The seed oil is colorless or sometimes a pale yellow with a characteristic odor and taste. Indian coriander contains 45-70% coriander oil, which possesses a sweet and pleasant odor (Axel Diederichsen et al., 1996). The main components of the essential oil include linalool, linalyl acetate, geranial, camphor, limonene, geranyl acetate, γ -terpinene, etc. Linalool is the bioactive compound found to occur at high concentrations (70%) in the extract. It is used as an additive for processed foods, beverages, and as a fragrance ingredient in cosmetics and household detergent. It is the main compound responsible for its anti-microbial and anti-diabetic effects of cilantro seeds. As a medicinal plant, coriander has been used as an antifungal (Basilico and Basilico, 1999), antioxidant (Chithra and Leelamma, 1999), hypolipidemic (Chithra and Leelamma, 2000), antimicrobial (Singh, 2002), hypocholesterolemic (Chithra and Leelamma, 1997), and anticonvulsant substance (Hossein and Mohammad, 2000). In the traditional medicinal system, the leaves and fruits of the plant have been used to treat skin disease, and its paste is applied by mixing in water to wash the face and forehead. Also, it has been used as a carminative, stimulating, diuretic, tonic, stomachic agent by the people to get rid of the bad breath and mouth diseases. The leaves have been reported to treat convulsion, insomnia and anxiety and used to improve appetite (Heider, 1992) and much more, as shown in Figure 1.

The present review gives an overview of the better growth conditions required by plants so that it can be protected from pests and pathogens. Pests belong to the phylum arthropods, which can harm the standing crop that has been listed here with preventive measures required, and the farmers must follow control strategies. In a nut-shell, the present review can be proven helpful for betterment for marginal and small farmers.

Diseases and Pests Affecting Coriander Crop Every Year

All developing nations are in high demand for better food and nutritional security. Still, there are few shortcomings, like numerous abiotic and biotic factors that are responsible for the fall in yield every year. Among the biotic factors, pathogens are highly accountable for the loss. These pathogens can get associated with the plants or crops since the very first day of sowing or can gain access to the produce after harvesting. During storage, these can be associated easily with the seeds externally or internally and extramurally or intramurally as a contaminant as well as related to inert matter. The most crucial step is to trace the exact location of the pathogen in the field or in storage for better management.

Coriander or cilantro has been affected by various pests and pathogens and a few are specifically attacking the crop, the rest of others are generalized pathogens, which have been summarized in Tables 1 and 2, respectively. According to Palamarja and Chotina (1953), fruits of coriander after harvesting will redistribute the bacteria among the healthy crop in the next sowing season. In 1995, Toben was able to describe biology, etiology, and the lifecycle of

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