Chapter - I

Introduction
INTRODUCTION

The agrochemical companies became more active after the Second World War and realizing the potential of fungicide use in crop protection, developed several classes of versatile non-systemic, protectant fungicides like sulphur, copper-based, dithiocarbamates, phthalimides, crotonates, organotins, dodine, quintozene etc. between 1930s and 1950s. These were unable to control pathogens already established within the plant tissues. The introduction of systemic fungicides in late 1960s caused a revolution in plant disease control and several damaging diseases, which were difficult to be controlled by earlier non – systemic protectant fungicides, could be effectively managed by the use of these systemic compounds (Thind, 2007).

In late 1960s and 1970s, several new classes of fungicides, mostly systemic in nature, such asoxathiins, 2 aminopyrimidines, benzimidazoles morpholines, dicarboximides phenylamides, phosphorothiolates, phenylamides, alkyl-phosphonates were introduced and development of their related compounds with improved properties continued thereafter in 1980s. These fungicides were more potent and specific in their activity and were effective at much lower doses than the earlier surface protect ants. Presently, more than 155 fungicidal compounds are used in the world over to manage different diseases. Out of total pesticides sales of $32.5 billion, total sale value of fungicides is $6.0 billion. Europe leads the world in usage of fungicides (40%) followed by Japan (28%) and USA (21%). Major share of fungicide consumption in Europe is on wheat, vines and barley (87% of the total) while Japan has maximum usage of fungicides in rice and top fruits (Gullino et al., 2000).

Overall use of pesticides in India is quite low as compared to developed countries. In India, consumption of pesticides is about 500g/ha
while it is 12000 g/ha in Japan, 3000 g/ha in Europe and 2500 g/ha in USA (Singhal, 2000). The use of fungicides in India is less than insecticides herbicides. Therefore, of C. indica fruit rot diseases was managed by chemical pesticides and biopesticides.

*Coccinia indica*

Ivy gourd (*Coccinia indica* Wight & Arn.) of the family *Cucurbitaceae.* It is most important vegetable and medicinal plant, distributed in Tropical Asia, Africa, Pakistan, India and Sri Lanka (Cooke, 1903; Sastri; 1950). It is a climber and trailer (Nasir and Ali, 1973). Different names of Ivy gourd like parwal, kundru, tondli in market. It is native to Africa and has been present in the Indomalayan region of Asia form many centuries (Burkhart, 1993; Singh, 1990). It has white flowers and small cucumber like fruit which turn bright scarlet red when ripened.

Ivy gourd is an aggressive climbing vine that can spread quickly over trees, shrubs, fences and other supporters. It is an outdoor plant but prefers a sunny sheltered position and a sandy soil. Being a perennial plant, it can spread vegetative or by seed. The stem is an herbaceous perennial slender climber with occasional adventitious roots forming where the stem runs along the ground. Both roots and stems are succulent with the length of the root stock as long as 5cm. The tendrils are long, elastic with coil-like springs. The leaves are simple with five palmate lobes while the shape varies from the heart to pentagonal form. The size of the leaves is approximately 5-10cm in width and length. The flower is large and white about 4cm in diameter and contains five long tubular petals. (Plate-I) Ivy gourd is a dioeciously plant of which male and female flowers grow separately. Female flowers have a two-lobed stigma while the male flowers have long (6mm) filamentous stamens. At least two plants of different sexes must be present to form available seed. The ivy gourd fruit belongs to the berry type, oval and hairless with thick and
sticky skin. The raw fruit is green in color. The mature fruit is usually 25 to 60 mm long by 15-35mm in diameter and contains several pale, flat seed 6-7mm long (Emorn, et al., 2003).

There are about 120 genera and 825 species in this family. Members of the Cucurbitaceae are commonly known as gourds or cucurbits and include some important crop species such as Cucumber, Squash, Pumpkin, Luffa and Melons (Andres, 2004) most of the plants in this family are annual vines but there are also woody vines, thorny shrubs and trees (Renner et al, 2007). Ivy gourd has vitamin ‘A’, β - carotene and is a good source of protein. The phytochemical screening of the 50% methanolic extract obtained from whole parts of ivy gourd was done by Chandira et al. (2010) which reveals that it contains carbohydrates, glycosides, oil and fats, proteins, amino acids, saponins, tannins, phytosterol, alkaloids, phenolic compounds gum, mucilage and flavonoids.

The fruit of C. indica is used as vegetable when green and eaten fresh when ripened into bright scarlet color. The young leaves and shoot tips of ivy gourd are used in Asian cooking (Facciola et al., 1990). Aqueous and ethanolic extracts from the plant have shown hypoglycaemic principles (Chopra et al., 1986; Manandhar, 2002). Every part of this plant is valuable in medicine and various preparations have been mentioned in indigenous system of medicine for skin diseases, bronchial catarrh, and bronchitis and unani systems of medicine (Behl et al., 1993). It shows also hypoglycemic activities (Gupta, 1963; Mukerjee et al., 1972; and Nahar et al., 1998). The juice of the roots and leaves is considered to be a useful in treatment of diabetes (Chopra et al., 1986). Oil of this plant is used as an injection in to chronic sinuses. The plant is used in decoction for gonnorhoeae (Nadkarni,1976), diabetes and also useful in dropsical condition,pyelitis,cystitis,strangury, snake bite, urinary
gravel and calculi (Jayaweera, 1980; Nadkarni, 1976). It is also useful to induce perspiration in fever and cures sores in the tongue (Anonymous, et al., 1992). It has antilithic, hypolipidimic (Presanna Kumar et al., 1997), antimutagenic (Kusamran et al., 1998).

A post and pre harvest fruit and food loss constitutes a vast complex of physical and biological changes due to microorganisms like fungi and bacteria.

Diseases are very important in reducing field and market quality and are primarily responsible for the post and pre harvest losses up to 10-35%. However, ivy gourd fruits during field and storage are attacked by many pathogenic fungi such as soft rot Bipolaris tetramera (Mc kinney) and Alternaria pluriseptata (Karst &Har) and hard rot Macroholina phaseolina Tassi (Goid) and Geotrichum candidus Link: Leman, which is severe in Marathwada region of Maharashtra State. Therefore the present investigation was made to management of fruit rot diseases of Ivy gourd.

Considering, all the above mentioned characters the following steps has been selected to minimize the fruit rot diseases of ivy gourd. 1) Survey of the fungal diseases. 2) Isolation and pathogenicity of the pathogens. 3) Sensitivity of the pathogens to different fungicides (MIC). 4) Physiological and biochemical changes of the pathogens. 5) Synergistic effects of other agro-chemicals of the pathogens. 6) Study of enzymes and toxins of the pathogens. 7) Eco-friendly approaches for the management of the pathogens.

The aim of the present study was undertaken to examine the possibility of the development of fungicides resistant of their pathogens and management of fruit rot diseases of C. indica.