Chapter I

INTRODUCTION
INTRODUCTION

Citrus fruits, belonging to family Rutaceae occupy a place of prominence in the world fruit industry. Citrus is a large group of fruits, characterized by the fruit type hesperidium, containing varied number of segments composed of many juice sacs. Citrus fruits are cultivated widely in the sub-tropical and tropical regions and to some extent under some favourable parts of the temperate regions. Citrus is the world’s leading tree-fruit crop and is adaptable to wide range of soils, terrain, planting and cultural arrangements. Being belonging to tender evergreen subtropical group citrus thrives well in frost free sub-tropical to semi tropical climate. However, occasional light frost can be tolerated by most of the citrus species.

Citrus include mandarin (Citrus reticulata Blanco), sweet orange (Citrus sinensis Osbeck), grapefruit (Citrus paradisi Macf), pummelo (Citrus grandis Osbeck), tangors, tangerines etc., very important to be used as table fruit or for juice making, whereas sour lime (Citrus aurantifolia Swingle) and lemon (Citrus limon Burm) form an integral part of citrus fruits for their utilization as refreshing cool drinks in summer and also for decorating the salads. Sour lime, commonly called as Kagzi nimboo, is thin skinned small sized fruit having moderate juice content whereas lemon (Baramasi lemon, Pant lemon-I except galgal), a medium sized fruit, is little thick skinned and abundantly juicy.

Among the Asian countries, India is the largest producer of limes and lemons. In India, sour lime is commercially cultivated in Vidharba region comprising the parts of Maharashtra and Madhya Pradesh states. Whereas, lemon is quite popularly grown in the northern plains of India comprising the states of Punjab, Haryana, Uttrakhand where lemon has gained the importance as kitchen garden fruit.

Lemon is a leading acid citrus fruit because of its very appealing colour, odour and flavour and is known in Italy as limone, in Spain as lemon real, in German as limonene in French as citronnier and in Dutch as Citreun. Various strains/types of lemon are grown in different areas/regions. In Punjab, Baramasi lemon is quite popular where it is cultivated mainly in the arid-irrigated regions and also in the submontane zone. Pant lemon-I reported from Agriculture University, Pant Nagar is a promising lemon selection from this area.
Lemon cultivation is becoming exceedingly popular because of its wider utilization than any other citrus fruit. In India fresh fruits of lemons are primarily used for cooling effects in summers. One of the greatest properties is its ability to "digest" proteins when put on meat, poultry, fish and eggs. The principal byproducts obtained from the fruit are citric acid from the juice and pectin and lemon oil from the fruit rind, which has a variety of industrial and cosmetic uses. Lemon juice is widely used in the preparation of soft drinks and possesses special dietic and medicinal values, associated with its high vitamin C content. Lemon juice is widely known as a diuretic, antiscorbutic, astringent and febrifuge. Lemon oil is one of the most important citrus oils used for flavouring purposes in soft drinks, baked foods, confectionery etc. and is of good demand. Lemon is also used for making pickles, squash, jam, jellies, and marmalades. In certain countries, it is also used with tea. Lemon strawberry tooth powder is a new bleaching agent for teeth darkened by film and alkaline deposits. Lemon is also used as preventive medicine for cold, influenza and constipation (Aman, 1980).

The lemons are extremely sensitive to extreme cold and heat that any other citrus fruit and thus are confined to mild winter climates. They are resistant to canker. Lemon in general, has the edge over sour lime due to its characterization of bearing fruit in many flushes making its availability throughout the year. But simultaneously, lemon is confronted with a very serious problem of fruit cracking. Fruit cracking is a serious problem, which affects a number of important fruits like apple, cherry, citrus, date, pomegranate, banana, mango, litchi and guava (Gourley and Howlett, 1947; Hayes, 1957; Randhawa et al., 1958; Teaotia et al., 1971; Sekse, 1995; Proctor and Lougheed, 1980). Losses due to this malady are sometimes as high as 75 per cent (Verner, 1935).

The disorder renders the fruit unfit for consumption, causing considerable wastage of marketable fruit leading to heavy economic losses to the growers. A loss to the extent of 44 per cent due to this disorder has been reported in Pant Lemon-1 (Lavania et al., 1986). Various factors, both external and internal, are responsible for this malady (Randhawa et al., 1958 and Gourley and Howlett, 1947). Application of growth regulators, nutrients and maintenance of adequate soil moisture and nutrient status
reduced this malady to a great extent in different fruits (Chakrawar and Rane, 1980; and Callan, 1986).

Although, some work has been done to understand the causes of fruit cracking in various fruits like Valencia and Navel oranges, litchi, apple, and lemon and to find out suitable measures to check this malady but more detailed and systematic work is needed in this direction. Therefore, the present investigations were undertaken on lemon cv. Baramasi to ascertain the possible causes and to find out suitable integrated control measures for this malady with the following objectives:

1. To study the effect of irrigation and mulching treatments on fruit cracking, quality and tree characters in lemon cv. Baramasi.

2. To study the effect of organic manure (FYM), inorganic fertilizer and biofertilizer (Azotobacter) on fruit cracking, quality and tree characters in lemon cv. Baramasi.

3. To study the effect of growth regulator (NAA) and nutrient sprays on fruit cracking, quality and tree characters in lemon cv. Baramasi.

4. To study the effect of treatment combinations of irrigation and mulching with organic, inorganic and biofertilizer and growth regulator and nutrients spray on fruit cracking, quality and tree characters in lemon cv. Baramasi.