CHAPTER – I

INTRODUCTION
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Citrus is one of the most important fruit crops since antiquity and is a good source of vitamin-C with high antioxidant potential (Gorinstein et al. 2004). Currently, citrus is cultivated in the subtropical and tropical regions of the world between 40° North and 40° South latitude in 137 countries spread over six continents and generates about 105 billion US dollar per year in the world fruit market (Ismail and Zhang, 2004). Annually, more than 104 million tonnes of citrus are produced and about 15 million tonnes are traded (FAO, 2004). The main citrus producing countries are Brazil and USA. Spain is the leading citrus producing country in the European Union. The USA and Brazil are the leading producing countries of processed citrus. Other major citrus producing countries are Israel, Morocco, South Africa, Japan, Turkey and Cuba. Most of the orange juice is produced in Florida and China. These countries represent more than two thirds in global citrus production. In the world, Brazil occupies first position in total citrus production (20.68 million tonnes). India tops in Lime and Lemon production (2.06 million tonnes), whereas USA, Brazil and China rank first in production of Grape fruit (1.58 million tonnes), Oranges (18.28 million tonnes) and Tangerines (14.15 million tonnes), respectively in the world (FAO, 2007). India ranks sixth in the production of citrus in the world.

In India citrus occupies third position in fruit production after mango and banana. The important citrus growing states are Andhra Pradesh, Maharashtra, Karnataka, Punjab, Haryana, Rajasthan, Uttar Pradesh, Meghalaya, Sikkim, Arunachal Pradesh, Orissa, Tripura and Assam. The area under orange cultivation in India increased by 67 % from 1.19 lakh ha in 1991-92 to 1.99 lakh ha in 2001-02 and the production increased by 57 % from 10.58 to 16.60 lakh tonnes (NHB, 2001-02). The area, production and productivity of citrus in India is 5.63 lakh ha, 56.77
lakh tonnes and 10.08 tonne/ha, respectively (NHB, 2006-07). The most important commercial citrus species are the mandarin (*Citrus reticulata*), sweet orange (*Citrus sinensis*), and lime (*Citrus aurantifolia*) sharing 41, 23 and 23 %, respectively of the total production in India. Besides these three species, quite a good number of citrus species are grown in the country, most of which are used for root stock purpose. They are grape fruit (*Citrus paradisi*), pummelo (*Citrus grandis*), trifoliate orange (*Poncirus trifoliata*), jambhiri (*Citrus jambhiri*), sweet lime (*Citrus limettioides*), tahiti lime (*Citrus latifolia*), and rangpur lime (*Citrus limonia*).

In Orissa, citrus is mainly cultivated in the districts of Mayurbhanj (3550 ha), Ganjam (2560 ha), Angul (1580 ha), Sundergarh (1480 ha), Gajapati (1420 ha) and Keonjhar (1380 ha) (FAI, 2002-03). During 2007-08, Orissa produced about 2.11 lakh tonnes of citrus fruits from an area of 26, 765 ha. In many parts of Orissa, particularly in the districts of Angul, Dhenkanal, Deogarh, Ganjam, Gajapati, Koraput, Mayurbhanj and Sambalpur a large number of citrus species are grown, many of which appear to be quite important. However, not much attention has been paid to identify, characterize and document those outstanding local types. This could be accomplished only through extensive survey followed by identification of the species and screening through selection.

Currently ten species of edible citrus are known, of which eight are commercially cultivated and five are of great economic importance. The classification of citrus is undoubtedly a complex problem. It is mainly due to the peculiarities of the citrus plant, such as inter-crossability between different citrus species and allied genera, occurrence of polyembryony in most of the citrus species and untraceability of the ancestral wild forms of citrus. It is further accentuated by numerous attempts towards classification of citrus during the past hundred years by many workers. The multiplicities of the cultigens have led to great divergence of opinion on the subject. The earlier workers have recognized only three or four species under the genus, whereas the later ones have recognized many more.
Swingle (1948) and Tanaka (1954) have recognized 16 and 144 species, respectively. The two have used different characters for separating the major taxons. Tanaka has created two sub-genera, Archicitrus and Metacitrus and eight sections on the basis of the nature of the flowering along the shoots, the colour of the cotyledons, adherence of the rind and shape of the fruit. On the other hand, Swingle has separated *Fortunella* and *Poncirus* from the genus *Citrus* on the basis of number of carpels, number of seeds, nature of the stalk of the vesicles and hairiness of the rind, etc. He has divided the genus citrus into subgenera and further into species Papeda and Eucitrus on the basis of the acrid oil in juice sacs, size of the petiole wing and coherence of the stamens, etc. Richards (1958) separated *C. hystrix* and sweet and sour limes, mostly having four petals, from the other species having five petals. It is, therefore, apparent that the various workers have based their classification on different characters of the plant. Even after so much work on the classification of *Citrus*, there is little published work available indicating the importance of the different characters in its classification. The only published schedule containing the important characters is by Webber (1948), which deals only with fruit characters.

Despite of the large variability, fruits of the citrus group having regular bearing habit, desirable quality and resistance against biotic and abiotic stress conditions are yet to be developed. Simultaneously, suitable crop specific rootstocks for different agro-ecological conditions are to be identified.

The present study basically aims at the following objectives:

1. Survey and identification of major and minor *Citrus* species grown in different parts of Orissa.

2. Evaluation of identified genotypes basing upon the morphological characters.

3. Recommendation of the identified types for commercial cultivation or use as rootstock.