PREFACE
In India commercial floriculture, especially the cut flower trade, has not passed its infancy. Among the several kinds of ornamental plants grown commercially, tuberose and carnation produce delightfully scented beautiful flowers. While tuberose is mainly grown for its high quality cut flowers, carnation is excellent for cut flowers as well as for growing in beds, borders, rock gardens and pots. Although the production and marketing of tuberose and carnation have been found to be a profitable enterprise, the cultivation of these two important ornamental crops on commercial basis has not expanded to desirable extent. The main reason for limited expansion and intensification of commercial production of tuberose and carnation is the nonavailability of information about the cultural schedule for these two crops. In this investigation, with a view to improving the yield and quality of flowers, an attempt has been made to standardize the agrotechniques for these two ornamental plants.

Tuberose, *Polianthes tuberosa* L. belonging to the family *Amaryllidaceae*, has 4 cultivars, viz. 'Single', 'Double', 'Semi-double' and 'Variegated' (Bankar and Mukhopadhyay, 1980), but the cultivar 'Single' is more widely cultivated than others (Sadhu and Bose, 1973). This flower is cultivated commercially in Midnapore district near Calcutta, around Bangalore city, near Poona in Maharashtra State and also in Coimbatore in Tamil Nadu State (Sharga, 1977), for the supply of cut flowers either for vase decoration or for making floral ornaments. Pure tuberose absolute is perhaps the most expensive natural flower-oil used in high grade perfumery (Sharga, 1977 and Frances Percy, 1972). As reported by Sharga (1977), the fresh flower yield of tuberose per acre amounts to 20 to 22 quintals which by solvent extraction method yield 2.0 to 2.8 kg of tuberose concrete, when improved cultural
practices are adopted. According to him, pure absolute tuberose fetches 4000 to 8000 U.S. dollars per kg. In addition, 80 quintals of tuberose bulbs and bulblets are produced per acre, which can fetch an additional income. Thus, it is clearly evident that tuberose has got vast potential for providing substantial income to the growers and can also bring valuable foreign exchange to the country by the sale of the concrete. It may also be possible to explore the feasibility of exporting the flower spikes. According to Sadhu and Bose (1973) this flower is now more popular than ever in Europe. But, in spite of its importance in commercial floriculture, the basic research information on standard agro-techniques are very meagre. The need to conduct research on the basic aspects of tuberose cultivation is, therefore, felt essential.

The cultivation of carnation in India is still limited largely for aesthetic purpose. This is grown for display in beds in the garden, or grown as a pot plant for the purpose of competition in flower shows and for decorating the house-front. Although some research results are available in tuberose, little work has been done in India on various aspects of carnation growing. With varied climatic conditions available in India, this flower has a great potential of becoming a major cut-flower crop, not only for the home market, but also for markets abroad. In the Western countries during the winter months (November - March) this flower is grown under glass in controlled conditions, resulting in substantial increase in the cost of production. In our climatic conditions during this period of the year the flower is grown in the open. Moreover, during these months the demand for cut-flowers in Europe is quite high because of Christmas and New Year. With the cheap labour force available here, and because of the less cost of production as a field-grown crop, it may not be difficult to market this cut flower abroad, provided its cultural practices are standardized. One major aim of such agro-
technique will be to extend the flowering season by staggering planting time. According to Arora and John (1976) the sowing time of carnation in India is between September to October in the plains and from February to March in the hills. However there are places in India, like Bangalore or Poona, where the sowing time can be extended further than what has been stated above. Another possible method of regulating the flowering time and also the quality is by adjusting the pinching (stopping) time. The flowering could be regulated by pinching the plants at proper time under a particular climatic condition. Such practices have been standardized in other countries by various workers (Levonen, 1971; Hillard and Hannon, 1976; Stolova et al., 1976). This will be of particular interest, especially for export market, if the production schedule could be adjusted to the peak demand period. One more immediate need is to have a good potted plant, as at present this is mostly grown in pots in the congested metropolitan cities. The usefulness of Cycocel in producing dwarf and better potted carnation has been reported by several workers (Kofranek et al., 1962; Smith, 1968 and Scott, 1970). Other chemicals like ethrel could also be useful in this regard.

As already stated that since even the preliminary knowledge on the cultural practices of carnation is lacking under our conditions, it was felt necessary that the basic agro-techniques for carnation should be standardized with an eye to benefit few commercial growers of today and many others in future, as well as the large number of carnation lovers who grow the crop in beds and pots.

With the above objectives in view, a series of experiments was carried on tuberose and carnation.