Chapter - 1

INTRODUCTION
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The success of “green revolution” in India, was the outcome of the adoption of high yielding cultivars, supplemented with the optimal level of inorganic fertilizers. However, the yielding capacity of most of these crops has now attained a plateau. therefore, the application of additional quantities of fertilizers is not only proving to be wasteful but also counter productive. Moreover, the excessive use of inorganic fertilizers is spoiling the soil characteristics as is evident from nitrogenous fertilizers, releasing nitrate to a toxic level in the soil and the drinking water (Thenabadue, 1989).

Agrophysiologists are, therefore, trying to evolve additional ways to break the present yield limits of the existing and those of newly evolved cultivars to fill the gap between productivity and demand. The most feasible, and successfully adopted technique is the application of dilute, aqueous solutions of phytohormones to the standing plants at an appropriate stage of growth, that may be together with the insecticide/pesticide which are applied in routine, to cut short the cost of the spray. These regulators are known to enhance the physiological efficiency of the cells and thus exploit the genetic potential to a maximum extent. Some of these hormones are known to enhance the rate of photosynthesis and the nitrogen fixation (Arteca and Dong, 1981; Meena and Goswami, 1992; Hayat et al., 2000 and 2001a and b; Ahmad et al., 2001), delay leaf senescence (Hopkins, 1995; Arteca, 1997), treated plants develop higher stress resistance (Sairam, 1994) and finally exhibit better harvest
index (Ghosh and Biswas, 1991; Khan et al., 2002). The hormone treated plants, therefore, have high seed/grain productivity (Bhatia and Kaur, 1997; Helmy et al., 1997; Khripach et al., 1997; Krishnan et al., 1999; Khan et al., 2002).

Compared with auxins, gibberellins, cytokinins, abscisic acid and ethylene, there is a new class of phytohormones that includes steroids (brassinosteroids). These brassinosteroids (BRs) not only regulate natural growth and development (Clouse, 1996; Li and Chory, 1999) but have higher potential in improving agricultural productivity by their exogenous application (Ramraj et al., 1997; Khripach et al., 2000) through an increase in the rate of cell elongation, activation of proton pump, differentiation of vascular tissues (Mandava, 1988; Sakurai and Fujioka, 1993; Yokota, 1997; Clouse and Sasse, 1998) and various other metabolic activities (Khripach et al., 1999).

In certain aspects, kinetins are comparable with BRs (Arteca, 1997), therefore, in the present study, a comparative account has been approached keeping in view the state of the plant because the plant response is the result of the interaction between hormone/s and the responsiveness of the tissue (Trewavas, 1982). Two crops (Vigna radiata L. Wilczek and Brassica juncea czern and coss) were selected because of their economical value and adoptibility by the local farmers. Moreover, each crop is grown in different seasons of the year, covering the two important climatic conditions (summer and winter). Kinetin (KN) and/or 28-homobrassinolide (HBR) were applied, as aqueous solution, to the plants at varied stages of growth to assess:
(a) the best concentration of the hormone/s

(b) the most suitable stage of growth having best interaction with the applied hormone/s

(c) the metabolic and growth parameter showing maximum response to the treatment and may be designated as a scale for forecasting future growth and productivity.