Chapter I

INTRODUCTION

Garden pea (*Pisum sativum* L.), a member of the family Fabaceae, is one of the most important cool season vegetable crops grown throughout the world. In India, it is cultivated over an area of about 3,14,000 ha with an annual production of 25,60,000 tonnes (Anonymous, 2007-08). It occupies a position of considerable worth because of its importance in agricultural economy of the country. Ethiopia is probably the main centre of origin of the garden peas. It is very palatable and nutritious for human consumption and is taken fresh, canned, frozen or in dehydrated form. It contains higher proportion of digestible proteins alongwith carbohydrates, vitamins and mineral matter (Choudhary, 1996). Green tender foliage of garden pea is also used as vegetable in parts of Asia and Africa. Leaves are used as a pot herb in Myanmar and parts of Africa (Kay, 1979). Garden pea is a cool season crop and is mainly grown in Uttar Pradesh, Bihar, Haryana, Himachal Pradesh and Punjab. However, Uttar Pradesh accounts for 70 per cent of the total output of peas in India (Singhal, 2003).

In Himachal Pradesh, the districts of Lahaul and Spiti, Kinnaur, Shimla, Kullu and Mandi are the major pea producing areas. The area under pea crop in Himachal Pradesh is 16,348 hectares with an annual production of 1,77,036 metric tonnes (Anonymous, 2006). With steady increase in acreage and production over the years, it has occupied the position of the most leading cash crop especially in the high (zone III and zone IV) and mid hills (zone II), from where the green pods are available during the period April to October and they find ready market in the plains bringing remunerative returns to the growers. In zone IV, garden pea cultivation is under assured irrigation conditions only. In zone III and II, majority of the area is either rainfed or has limited irrigation water. The main season garden pea varieties are sown during November (zone II and III) and March – June (zone IV) and inadequate soil moisture is usually a limiting factor in ensuring proper germination. Quality seed has been well recognized as the basic...
input in any production programme. Availability of water and nutrients especially phosphorus in legumes in acidic soils is of great significance in improving not only the seed yield but also the seed quality. About 81 per cent of the total cultivated area in the state is rainfed (Anonymous, 2004) and there exists limited opportunity for new water development projects for expanding irrigated area.

Water is an important natural resource and its efficient management is a key to success in augmenting crop production. During the 21st century, water would be a crucial factor in enhancing food production, in meeting food deficit experienced by almost two-thirds of the world’s population since irrigated farming is expected to continue to develop intensively in future (UNESCO, 2000). Judicious management of irrigation water resources is important not only for enhancing and sustaining crop production but also for prevention of salinity, alkalinity, water logging and degradation of environment. For farmers with a limited supply of water, improving productivity is a chance to improve incomes and livelihoods (Sharma, 2002). Irrigation water being a scarce and economically high cost input, especially in hilly areas, its optimality in pea cultivation is crucial to realize the maximum yield as well as improve the water use efficiency.

The growth of plants depends on the availability of nutrients from soil which has to be supplied by appropriate use of fertilizers for sustenance of growth. Phosphorus is an essential constituent of several enzymes and co-enzymes which are involved in basic reactions of photosynthesis. It has specific action on encouraging root development in many legume crop species (Brady, 1984). The most essential function of phosphorus in plants is in energy storage and transfer. Adenosine di- and triphosphates (ADP and ATP) act as “energy currency” within plants. Phosphorus is associated with early maturity of crops (Tisdale et al., 1995). However, deficiency of phosphorus in Indian soils is widespread and majority of soils are unable to furnish sufficient quantities of phosphorus for higher yield on a sustained basis (Tandon, 1987). Limited study, investigating the role of irrigation water and phosphorus nutrient on garden pea, has been carried out earlier under mid-hill (zone II) conditions of Himachal Pradesh. Therefore, there is a need for
technological intervention, which will help in sustaining the precious resources and maximizing crop production.

Keeping in view the above facts, the present study was planned and executed to economize irrigation water and phosphorus nutrition on one hand and optimize seed yield along with improved seed quality on the other, with the following objectives:

1. To study the effect of irrigation and phosphorus levels on growth, seed yield and quality of garden pea.
2. To determine water use efficiency (WUE) of garden pea.
3. To find the best irrigation schedules and phosphorus level for garden pea.