INTRODUCTION

Beginning of agriculture is the beginning of civilization. It was an important moment when the stick was turned into plough and man chose to settle in the river valleys leaving his nomadic life, and for the first time some human hand, probably that of an woman, scattered seed, perhaps of barley, with an intention of raising seed for human food. Recognising the importance of plants, efforts were continued for adaption and domestication of wild species to satisfy their needs. Since then there had been constant search for new crops and varieties for cultivation.

Barley is one of the earliest crops cultivated as indicated by religious ceremonies of Hindus and Greeks. Since ancient times it has played an important role in the agricultural economy. By virtue of its short duration, resistance to drought and tolerance to soil salinity and alkalinity it has great elasticity of adaption from below sea level to high hills.

Origin of barley is shrouded in mystery. According to Vavilov (1926) there were two very widely separated primary centres of distribution; one in the North-East Africa and the other in the South East Asia and China. Barleys now existing in these two areas present wide spectrum of morphological and physiological variation and exhibit striking adaption for these areas.

There are about twenty species of barley, comprising both diploid and tetraploid forms. Unlike wheat and oats only diploid barleys are cultivated. The six rowed barley, *Hordeum vulgare*, is the most commonly grown species. *Hordeum distichum*,

the two rowed barley is another cultivated species.

In India six-rowed types are preferred. With the development of industries demand for two-rowed types is increasing for malt. This utilization is bound to increase with the development of the industry.

Though barley is grown in this country in an extension area, but the average production per hectare is only 10.9 q. as against 38.6, 37.5 and 33.5 q. in Germany, U.K. and France respectively. Due to this poor yield and availability of high yielding varieties of wheat the cultivation of barley is being pushed back to adverse soil conditions and under poor management. However a considerable area will continue to remain under barley as high yielding varieties of wheat cannot be extended to all the areas due to paucity of irrigation and fertilizers. With the development of industries the demand for 2-rowed barley is likely to increase. It is therefore essential to accelerate improvement work on this crop for making it more remunerative than what it is at present as it has the inherent capacity to give higher yield in marginal and sub-marginal lands.

Selection as a method of crop improvement has been in vogue since the time immemorial. However this method has a limitation beyond which further improvement in the crop is not possible. Hybridization regenerates variability and thus opens up an immense scope for selection and consequently improvement. This method is most effective in self as well as open pollinated crops. For the adoption of this method the selection of suitable parents is an important step. The criterion for the selection of the
complementary pairs of parents holds good only for few characters. At the same time selection of parents on the basis of their phenotypic performance is not an ideal procedure as better performing parents often release poor recombinants. It is therefore essential to select the parents on the basis of their genetic potential. Recently several techniques like line x tester, diallel, partial diallel, fractional diallels etc. have been developed for an efficient evaluation. Each of these techniques for screening germ plasm has some limitations. However partial diallel cross technique provides an opportunity of evaluating a considerably large number of lines at a time with fairly high precision and considerably saving time and energy.

Among the genetic parameters components of variance provides information about the heritable and non-heritable components of variability. When variability is largely due to additive effects, selection breeding method may be followed advantageously. When it is due to dominance and non-allelic gene effects, hybrid breeding programme may be adopted. Since barley is an autogamous crop where selection breeding programme can be followed, the parental material showing variability due to additive type of gene action would be quite ideal. Besides the variability, the breeding potential of parental lines judged by their general combining ability may be used as a guidance for the selection of parental material. Since the general combining ability is due to additive type of gene action, this parameter together with the components of variance may help in selecting and advancing the material effectively.

Though heterosis may not be exploited commercially in
most of the self pollinated crops due to limitation of hybrid seed production, its estimates together with the values of inbreeding depression indicate indirectly about the components of heterosis. When the heterosis is retained in $F_2$ and subsequent generations it is largely manifested by fixable type of variance, where as sudden decline in the performance is merely due to non-fixable type of variance. It is, therefore, advantageous to select the crosses, exhibiting retentive hybrid vigour.

Heritability indicates the index of transmissibility of the characters from parents to offsprings, and genetic advance about the genetic improvement through differential selection intensity. These two genetic parameters guide the breeder about the magnitude of the segregating population for bringing about significant improvement.

Hence considering the importance of barley as an important grain and industrial crop and having a potential for greater food production the present investigation on "Breeding behaviour of yield and its components in barley" was taken up by adopting partial diallel technique as an efficient tool for screening the germ plasm.