INTRODUCTION

Rice yield is contributed by three factors namely (i) number of ear bearing tillers per unit area (ii) number of grains per panicle and (iii) 1000 grain weight(Murata, 1969). The latter two constitute the panicle weight. In order to improve rice yield either one or more of these factors have to be increased. The increase in ear bearing tillers per unit area depends on the inherent tillering potential of the variety, environmental factors affecting tillering and cultural conditions of growth (Katayama, 1949). The panicle weight on the other hand is influenced mostly by the number of spikelets per panicle, spikelet size, photosynthetic potential of a variety, translocation efficiency from the '' source'' of carbohydrates after the flowering stage. The 1000 grain weight is mostly a stable character since it is dependant on the size of the spikelets (Murata, 1969). Based on these two main yield determining attributes i.e. number of ear bearing tillers and panicle weight, rice breeders evolved varieties of either panicle number type or panicle weight type.

In India the area under assured irrigation for growing rice is only 30 per cent of the total acreage. In the remaining 70 per cent of the area, rice cultivation is dependent upon the monsoon and only one crop is grown during kharif (June - December) which is the main rice growing season. The methods followed in these areas are either transplanting, drilling or dibbling. For

transplanted crop, usually, the photosensitive, long duration varieties are used, while under direct seeding or dibbling under upland conditions, short duration photo-insensitive varieties are grown. Broadcasting is the most common method of sowing, however, the practice of dibbling the seed behind the furrows of the country plough at regular intervals is also practised in many parts of Tamilnadu and Maharashtra states for easy inter-culturing and weeding. This method is also an improvement over that of broadcasting in reducing the seed rate by 30 per cent. It was reported that the crop dibbled or drilled in lines is able to resist drought better than broadcast or transplanted crop and is more uniform in flowering (Ghose, et al.,1960). However, it is observed often that the grain yields are consistently lower in direct seeded dry-sown crop than in transplanted crop. The low yields under dry-sown crop are mostly due to weed infestation (Vega, 1970), heavy tiller mortality and less number of grains per panicle (Sanchez and Bradfield, 1970; Bhan et al., 1966), heavier nitrogen losses due to denitrification and leaching (Sakanoue and Mizunuma 1962). In recent years the labour cost increased enormously and even in areas with assured irrigation small farmers cannot transplant at proper time, due to high labour cost and consequently they harvest less yields. In India rice is dependent on monsoon and the direct seeded crop stands better under unfavourable periods like drought than transplanted crop (Ghose et al., 1960). With these problems in view it was felt necessary to assess the growth

behaviour and nutrient uptake pattern of different rice varieties under dry-sown conditions so as to understand the growth factors that limit the yield under such conditions.

It is reported earlier that the percentage of productive tillers and yield per tiller or panicle weight were considerably impaired under upland direct seeded conditions. Hence an attempt has been made in the present investigations to assess the physiological factors affecting tillering potential and panicle weight in rice with special reference to direct seeded, upland conditions. Investigations were also conducted on the effect of different nutrients on tillering, varietal differences in tillering and yield under transplanted and upland dry-sown conditions to see how these factors influence tillering in rice.