INTRODUCTION

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Chapter 1
INTRODUCTION

Rice is one of the staple foods of the world which feeds about half of the world's population. About 90% of the world's total rice production is from Asia and the balance from Africa and Latin America. The innumerable land races of rice distributed throughout the tropics and its wild relatives constitute the rich genetic diversity of the crop.

Oryza sativa L. (Asian rice) and Oryza glaberrima Steud. (African rice) are the two cultivated rice species and there are about 22 wild species of Oryza which contribute significantly towards the diversity of the genus (IRRI, 2006a). World rice production in 2004 was about 610 million tons. At least 114 countries grow rice and more than fifty of them have got an annual production of 100,000 tons or more.

Rice is the most important crop of India and it occupies 23.3% of gross cropped area of the country and contributes 43% of total food grain production. India has about 45 million hectares of land under rice crop and it ranks first in rice cultivated area. However, in production it is second to China (DACNET, 2006). Rice production in India is presently above 90 million tons.
Green revolution brought significant increase in rice productivity and production. Even though green revolution established the technical feasibility of maintaining rice production well ahead of the population growth in many developing countries, it virtually bypassed the poor resourced and problem soil areas. New technology areas need to be explored to increase the rice production in low income food deficit countries. Environment friendly and socio economically acceptable technologies need to be developed to optimize the use of water, fertilizers and other inputs and to enhance productivity (Riveros, 2000).

Rice is grown mainly in four ecosystems namely irrigated land, rain fed low land, upland and deep water and tidal swamps. Because of intensive cropping especially in the irrigated low lands of Asia, growth in rice yield has levelled off and in some cases declined (Riveros, 2000).

Roschevicz (1931) considered India as the region of the greatest diversity of wild rice which might have given rise to a large number of forms of cultivated rice. According to Richharia (1960) mutations, recombinations and selection for local adaptation might have played an extensive role in the origin of rice varieties. However, the advent of green revolution and the subsequent replacement of native rice genotypes by introduced and improved varieties resulted in acute erosion of the native rice genetic resources. Moreover, changes in cropping patterns and crop preferences also resulted in the
loss of rice genetic diversity. In such a critical situation any effort to study the diversity of rice genetic resources and its conservation is very important. The present study has been planned in such a way that the native rice varieties of Kerala are collected and characterized so that a background effort is made for their conservation.

Most of the pre green revolution rice varieties were tall and leafy with weak stems and lodging habit. Their harvest index was only around 0.3 indicating their low yield potential. During the course of development of rice varieties suitable for green revolution, the harvest index and biomass production were increased mainly by the reduction of plant height through the incorporation of the recessive gene \( sd-1 \) for short stature from a Chinese variety Deo-Geo-Woo-Gen and also by the development of high tillering varieties. However, further studies indicated certain drawbacks in the case of the high tillering varieties like non synchronized flowering of tillers resulting in non uniform maturity.

Khush (1994) has conceptualized a new plant type in rice with lower tillering capacity, absence of unproductive tillers, higher number of grains per panicle, medium height, sturdy stems, dark green, thick and erect leaves, thickened, deepened roots, multiple disease and insect resistance and acceptable grain quality. Under these circumstances an effort has been made presently to study the
performance of different types of rice tillers in relation to relative contribution to yield.

Even though rice is traditionally seed propagated, \textit{in vivo} and \textit{in vitro} clonal propagation has been recommended for rice under different circumstances by earlier workers. \textit{In vivo} clonal propagation by way of tiller splitting and transplantation at appropriate times is a farmer friendly method that can be adopted to multiply, conserve and propagate rice genotypes especially under critical conditions. The technique helps to maintain the genetic identity of rare and endangered genotypes of rice since the sexual cycle is bypassed. An effort has been made presently to standardize an effective \textit{in vivo} clonal propagation protocol for rice.