Rice, an annual grass (Poaceae), belongs to the genus *Oryza* which includes twenty wild species and two cultivated species, *O. sativa* (Asian rice) and *O. glaberrima* (African rice). *Oryza sativa* is the most commonly grown species throughout the world today. In Asia, *O. sativa* is differentiated into three subspecies based on geographic conditions; *indica, javanica* and *japonica*. *O. indica* refers to the tropical and subtropical varieties grown throughout South and Southeast Asia and southern China. Rice is the most important cereal crop in the developing world and is the staple food of over half of the world’s population. Rice cultivation is thought to be the oldest form of intensive agriculture by man. Cultivation of this crop probably dates back to the earliest age of man and, long before the era for which there is historical evidence; rice was a staple food and the first cultivated crop in Asia. It is generally believed that rice cultivation in India was started by Aryan immigrants before about 540 B.C. (more than 2500 years ago), where it was probably grown as a dryland crop. Domestication of *O. sativa* occurred some 10,000 years ago in the river valleys of South and Southeast Asia and China.

Historical records from Korea and Japan provides information on rice insect pests during the last two millennia. In 1733, a migratory locust outbreak occurred in the Ise district of Japan and a brown planthopper outbreak in 1875 was reported as one of the most damaging insect outbreaks in the history of rice production in Japan. About 2.6 million persons were affected and 12,000 died from hunger. Insects reduce yields substantially, especially in tropical Asia. Cramer, by reviewing the literature up to 1966, estimated crop losses ranging from 31.5% in Asia to 2% in Europe due to insects. The importance of insects and other pests is indicated by the fact that only a 10% increase or decrease in food grain production, on a global scale, can make the difference between a glut and acute scarcity.

As rice scientists and farmers have gained experience in the cultivation of the modern varieties and the agronomic practices that have accompanied the "Green Revolution", there has been a shift from a primarily unilateral approach of insect control, with a strong reliance on insecticides, to a multilateral approach involving a mix of control tactics. This approach, known as Integrated Pest Management (IPM), in the simplest terms is referred to as "a broad ecological attack combining several tactics including biological, chemical, and cultural control methods and insect resistant rice varieties, for the economic control and management of pest populations". IPM programs have a significant
impact on minimizing the adverse effects of insecticides, and in increasing the profitability of rice production. It has been estimated that the cost savings from research leading to increased insect pest management efficiency on rice in South and Southeast Asia will be $973 million by the year 2010.

Ecologists have long studied the feeding interactions that occur between species in a food web in an attempt to understand how the interactions determine the population dynamics of the interacting species. The interactions considered include competition, herbivory, predation, and parasitism, all of which are involved in natural control in agroecosystems. Biological control thus focuses on the manipulation of these interactions to reduce pest numbers and limit crop damage. The fact that some organisms are designated as “pest” by humans is an indication that natural control factors have failed to sufficiently limit the organism’s numbers once system had been disturbed. Certain potential pests, however, are kept under natural control by the set of endemic natural enemies that occur in an area. Biological control keeps the number of an organism below the point at which it interferes with human activity.

Biological control is an important tactic in IPM systems and should be utilized wherever feasible. There are several advantages to the use of biological control in comparison with other pest control tactics. If populations of effective biological control agents can be established in an area, there is essentially no further cost. Successful biological control is thus relatively inexpensive once the initial costs of establishing the natural enemies are met. For a successfully established biological control programme, the pest never exceeds economic injury levels. If the pest population starts to increase, the biological control agents increases and reduce pest population growth rate in a density-dependent fashion. Biological control leaves no pesticide residues capable of contaminating the crop or the environment.

Spiders are very important biological control agents in agroecosystems and play a major role as potential defenders by suppressing the pest population to a safe level which emphasizes the concept of Integrated Pest Management (IPM) in modern agriculture. Faced with the need to reduce pesticide usage on crops and optimize natural biological control, full investigation on the means by which spiders influence pest abundance is long over due. Also in recent years, there has been a realization by ecologists that the components of agroecosystems are tractable to manipulate and that spiders are convenient model organisms. Consequently, there are a growing number of investigations in which spiders in agroecosystems are used as tools to gain insight into the role of generalist predators in community and ecosystem function.
While arachnologists and others working in agroecosystems have been encouraged by the results of recent studies suggesting that spiders can impact pest populations and reduce crop damage, most would agree that agricultural arachnology is still in its infancy compared with the breadth and depth of entomological research on IPM and biological control. More than 600 arthropod pest species regularly take more than 10% of our agricultural production. Total reliance on synthetic pesticides for the pest suppression entails much severe and costly health, environmental and even pest management side effects. Spiders, despite their ubiquity and high densities, have not received the recognition they need in order to be fully utilized in this enterprise, although their treatment in several recent compendia is encouraging. Being highly diverse and abundant predators, spiders are important regulators of terrestrial arthropod populations and proved to be useful indicators of the overall species richness and health of terrestrial communities. Many field experiments performed over the last 35 years have demonstrated that spiders can reduce insect population and crop damage they cause.

Conservation and augmentation of spiders in the fields is a simple, yet efficient method of pest control. Spiders are predators of pests like thrips, caterpillars, aphids, plant bugs, leaf hoppers, flies, etc. Their importance as pest control agents is not a recent discovery. On the contrary, their value has been acknowledged by farmers from time immemorial. Several ancient books on agriculture mention their importance. In China, even today, many elderly people in villages count the spiders in a field as a measure of its potential agricultural productivity. Fields abundant in spiders, prior to the introduction of chemical pesticides are now witnessing a change in the scenario. In addition to killing pests, these chemicals are also taking a heavy toll on useful insects. Once pesticides are kept away from the fields, spiders invariably take shelter in the fields, feed on the pests and add to the productivity. Spiders have always been known to be effective predators, though their potential as biocontrol agents has not been exploited to its fullest, at least in India. Conservation of spiders necessitates abandoning of pesticides, or spot treatment and rational use of the same.

Since Blackwall first described *Oxyopes lepidus* (*Sphasus lepidus*) in 1864, there have been many publications about spiders in India. Currently, a total of 60 families, 374 genera and 1448 species of spiders are recorded from India. Until 1975, most of the research on spiders concentrated on identification. From the end of 1970s, researchers began to study the basic ecological and biological characteristics of spiders as biological control agents. However, most of these studies were limited to the identification of spiders' only. There were few studies on the dominant spider species, spatial distribution,
how this is related to their ecological role, seasonal fluctuation of spider community, how many insect pests they consume in the fields, the effect of insecticides on spider populations, etc.

A survey of diversity of spider community along with a detailed analysis of their population fluctuation, biology, feeding potential and the effect of different insecticides on dominant spiders used in agriculture are indispensable to formulate a framework of research into the role of spiders as natural predators and their economic importance in this agroecosystem. At this juncture, a preliminary study was made with a comprehensive survey of spiders in paddy fields of Kuttanad region in Kerala state. An account of taxonomy, biology and ecology of more common spiders in the paddy fields is given in this thesis. The principal spider species present and their phenology are studied, which is important as an inevitable component of biological control and pest management in any agroecosystem. Information was obtained not only regarding to the principal species present in the field, but also on where they were present, their feeding habits and life histories. Similarly, the factors influencing the increase and decrease of spider population were also studied to some extent. Predatory potential and feeding capacity of spiders on insect pests were also evaluated and discussed in this thesis. A preliminary study also was conducted on the effect of different insecticides on dominant spiders of Kuttanad rice agroecosystem in the laboratory condition.

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