Nitrogen is one of the most limiting factor in Agricultural production. In the 20th century, application of nitrogen fertilizers improved world grain production substantially, however, world population growth has reached to almost quadruple. Excessive use of the nitrogen fertilizer has become a serious environment problem. Initially the productivity rate was increased as consumption of fertilizers but from 2001 the food grain production in India hovering around 210-240M MT, however, the total fertilizer consumption increased from 210M MT to over 275M MT from 2001 to 2011. Now most states of India facing increase in fertilizer consumption with slower pace of productivity. In order to deal with the challenge of continued global population growth, food production and supply, and resource and environment protection, modern agriculture must develop more sustainable practices (Smil, 1997).

Nitrogen (N$_2$) is also an essential component of atmosphere, as the nitrogen cycle maintains its equilibrium in the atmosphere. Approximately 3x10$^9$ tones of N$_2$ are produced in the cycle per year (Postgate, 1982). The fertilizer industry provides large quantities of chemically fixed nitrogen and the biological processes account for about 60% of the earth’s newly fixed nitrogen. Globally the consumption of fertilizer-N increased from 3286000 tones in 2007-2008 to 15.059 000 tones in 2011-2012 (FAO, 2008)

For more than 100 years, biological nitrogen fixation (BNF) has commanded the attention of scientists concerned with plant mineral nutrition, and it has been exploited extensively in agricultural practice (Burris, 1994; Dixon and Wheeler, 1986). Currently, the subject of BNF is of great practical importance because the use of nitrogenous fertilizers has resulted in unacceptable levels of water pollution (increasing concentrations of toxic nitrates in drinking water supplies) lakes and rivers (Al-Sherif, 1998; Dixon and Wheeler, 1986; Sprent and Sprent, 1990). Wide ranges of organisms have the ability to fix nitrogen. About 87 species in 2 genera of archaea, 38 genera of bacteria and 20 genera of cyanobacteria have been identified as diazotrophs or organisms that can fix nitrogen (Dixon and Wheeler, 1986; Sprent and Sprent, 1990; Zahran, Ahmed and Afkar, 1995). All organisms which reduce di nitrogen (N$_2$) to ammonia (NH$_3$) do so with the aid of an enzyme complex, nitrogenase (Dixon and Wheeler, 1986).
An examination of the history of BNF shows that interest generally has been focused on the symbiotic system of leguminous plants and *rhizobia*, because these associations have the greatest quantitative impact on the nitrogen cycle. Estimates are that the *rhizobial* symbiosis with the somewhat greater than 100 agriculturally important legumes contributes nearly half the annual quantity of BNF entering soil ecosystems (Tate, 1995). Legumes are one of the largest family of crops plant and a corner stone in biological nitrogen cycle (Choi, *et al*. 2004). The 670 to 750 genera and 18000-20000 species of legumes include important grain, pasture and agro forestry species. Legumes have been used industrially to prepare biodegradable plastic, oil, gums, dyes and inks (Duke, 1992).

Legumes provide 20-35% of the protein consumed worldwide. Approximately 250 M ha of legumes are grown worldwide and fix about 90 MT N per year. To replace this amount of fixed N with synthetic N fertilizer would require 288 MT of fossil fuel and cost approximately $30 billion USD annually (Vance, *et al*. 1997).

Thus, the use of *Rhizobium* for improving the efficiency of biological nitrogen fixation by legumes has both environmental and economic significance. Only crop specific compatible strain of a particular species has the ability to form nodule in particular legume crop (Dowling and Broughton,1986).Baldwin *et al*., (1932) has classified all *Rhizobium* in seven cross inoculation group namely Alfalfa, Clover, Pea, Phaseoli, Lupini, Soybean and Cowpea group on the basis of their ability to form nodulation.

In India, *Cowpea* (*Vigna unguiculata* L. Walp) is cultivated by commercial and subsistence farmers. They provide a valuable source of protein and thereby sustaining the nutritional balances of low income populations (Singh, *et al*. 1997).*Guar or cluster bean* (*Cyamopsis tetragonoloba*) is a drought tolerant annual legume grown principally in India and Pakistan, but in small area. It can be eaten green like snap bean feed to cattle and used as green manure (Hymowitz *et al*.1963).*Moth bean* (*Vigna aconitifolia*) is widely grown in arid and semi arid part of the country, mostly as a dry crop either sole or in mixture for grain or fodder. It is minor kharif pulse crop and considered as one of the most drought tolerant among the grain legumes. In India, it is grown in an area of 1.65
million hectares, mostly confined to Gujarat, Rajasthan, Haryana, Maharashtra and north Karnataka with a production of 0.48 million tones (Anon., 2001).

In some part of MP in India the survey showed that about in half the area, the nodulation status is poor for one reason or the other. The non-traditional legumes (cowpea, guar, moth bean) are grown in the area for a long time, under rain fed condition indicating low efficiency of the specific kind of native rhizobia at most of the location. Besides the seasonal variation and exotic rhizobial strains, legumes have not been tested in many areas of M.P. Poor nodulation in most region of MP indicates the absences of homologous Rhizobium in the soil.

Some other biotic and abiotic factors like, soil, pH, low organic matter, low vegetation, very high summer temperature, soil depth, salinity/alkanancy and acidity, mineral nutrition etc are responsible for poor nodulation in legumes crops.

Apart from these factors moisture content and environmental factors also have important role in symbiotic effectiveness of the inoculant strains, efficiency of host plant and survival of native rhizobia present in the soil. Although, it is possible to control the soil temperature and moisture under field conditions and to adjust the cropping pattern to select suitable Rhizobium and host plant, there is a need of extensive survey for the occurrence of native Rhizobium status in non–traditional legume crops grown in Gird region of Madhya Pradesh.

Gird (also can be known as Gopasetra in ancient times, or Gwalior region later) is a region of Madhya Pradesh state in central India. It includes the districts of Bhind, Gwalior, Morena, Sheopur and Shivpuri.

Gird region of Madhya Pradesh, which is mostly a level agricultural plain, dotted with ranges of low hills. The divisions include the northern, contiguous portion of the former princely state of Gwalior together with the former princely state of Datia, the non-contiguous southern portions of the former state of Gwalior which are currently part of Bhopal, Indore and Ujjain divisions.

Plants thriving in arid and semi arid regions of poor agricultural land are supporting commodity for poor laborious and innocent local people. These plants give
them food, fodder, shelter as well as provide medical / health support in famine and uncongenial conditions. Food legumes also constitute an important part of the diet of a large section of the population in the developing world, as a good source of proteins, carbohydrates, minerals and B-vitamins. Inoculation of forage and grain legumes with rhizobia is an important process to maximize biological N$_2$ fixation capacity in these crops. Inoculation has also the potential of increasing dry matter yield, N yield, and residual N level. Therefore such plant is thought to be given priorities in the work and the current investigation will be useful for improving plant performance (Rathore, et al.2009).

Very limited reports are available in literature with special reference to native Rhizobia of Gird region of Madhya Pradesh. Hence the proposed research work is undertaken for collection of native Rhizobia specific to non-traditional legume crops that can be used as the biofertilizer to improve crop yield and soil fertility which is beneficial for the local farmers.
AIM AND OBJECTIVES

The study has been undertaken with the aim to conduct intensive survey of the occurrence of nodules in native *Rhizobium* population status of non-traditional legumes grown in Gird region (Gwalior, Morena, Bhind, Shivpuri, Sheopur) of the Madhya Pradesh.

The study includes following objectives

1. To survey the native *Rhizobium* sp. population in Gird region of the Madhya Pradesh where non-traditional legumes crops viz. cowpea, guar and moth bean are grown.
2. Collection of nodules from the region of native *Rhizobium* population of Gird.
3. Isolation and identification of *Rhizobium* sp. from the soil samples collected from cowpea, guar and moth bean are grown.
4. Selection of highly efficient *Rhizobium* sp. from cowpea, guar and moth bean.
5. Evaluation of competitive location specific *Rhizobium* sp strain under pot house to test the nitrogen fixing ability.