Spiders belong to the arthropod order Araneae (class Arachnida). They are all air-breathing and have four pair of legs. Instead of mandibles, they have a pair of chelicerae that bear fangs through which venom is injected. They are the largest order of arachnids and rank seventh in total species diversity among all other orders of organisms (Sebastin and Peter, 2009). Spiders are cosmopolitan in distribution except for Antarctica, and have become established in nearly every terrestrial habitat. All spiders are predators and are known to be sensitive bioindicators of environmental change either caused naturally or due to anthropogenic stress (Maelfait and Hendrickx, 1998; New, 1999; Norris, 1999; Hodge and Vink, 2000; Kapoor, 2008; Pearce and Venier, 2006; Ossamy et al., 2016). All spiders are predatory and are amongst the most omnipresent and numerous in both agricultural and natural ecosystems (Singh and Singh, 2014). About 300 to 800 species of spiders may be found in a hectare of tropical forest (Coddington et al., 1991) often occurring as many as over 50,000 individuals per acre in vegetated areas (Zahl, 1971). They are nature's master spinners of silken webs and highly proficient predators for, in their absence, the insect pest world would run amok, creating havoc for our health and food resources (Barrion and Litsinger, 1995). Unfortunately, few spiders are poisonous, e.g. the black widow spiders with more potent venom than the poisonous snakes (Gertsch, 1979). Spiders are exceedingly interesting subject for study, for some of the most remarkable exhibitions of intensive powers presented by them. The spider has hit upon the device of turning its food into silk and using it as a trap to catch more food. Spiders feed on insect pests and kill as much as 50 times the
number of prey they actually consume (Kajak, 1978) and thus operating a good natural control of insect pests. Despite this importance, spiders are largely neglected mainly due to ignorance and fear and the subsequent dislike for them. Although more than 1400 species (quite a number is endemic) have been described from India (and many more to be documented), the study on the taxonomy, biology and ecology of Indian spiders remains neglected.

The potential of spiders as natural bioagents against arthropod pests (Riechert and Lockley, 1984) has aroused interest in learning more about them, viz. their abundance and species composition in different ecological systems (Turnbull, 1966; Altieri and Whitcomb, 1980). Spiders are potential biocontrol agents because they are relatively resistant to starvation and desiccation than insect predators and parastoids. In addition, spiders become active as soon as conditions become favourable, and they are among the first predators able to limit pests. The risks associated with using spiders to control pests are minimal. Since diverse species of spiders are naturally present in all ecosystems and are predaceous at all stages of their development, they occupy many niches, attacking many pest species simultaneously. If we can conserve these species, we can save biodiversity, ecosystems and its gene pool as well. The spider fauna of several cultivated crops became well documented in some parts of the world in cotton (Kagan 1943; Whitcomb et al. 1963; Whitcomb and Bell, 1964; Pamanes-Guerrero, 1975; Bishop and Blood, 1977; Bishop 1980); soybean (Lesar and Unzicker, 1978); alfalfa (Wheeler, 1973), maize (Plagens 1985); citrus orchards (Muma, 1975); deciduous orchards (Dondale, 1966), rice fields (Kobayashi, 1961; Okuma, 1968; Chu and Okuma, 1970; Kobayashi and Shibata, 1973; Okuma and Wongsiri, 1973; Okuma et al., 1978; Barrion and Litsinger, 1981a, b, 1984, 1995; Patil and Raghavendra, 2003; Singh and Singh, 2014), etc. Spiders are one of the more diverse arthropod taxa, ranking seventh in global diversity.
Species richness is only one way of assessing habitat quality. The uniqueness of species compositions, as indicated by levels of endemism and habitat specialization, is more important in establishing regional conservation priorities. Despite their size, the ecological importance of spiders is undeniable as they are abundant predators of other forest litter arthropods (Dhali et al., 2017). Forest litter provides a wide range of microhabitats for spiders through variations in moisture, cover material, and litter depth and structure. A strong correlation between species diversity of ground surface spiders and their litter habitat is thought to exist because habitat affects spiders through prey availability, temperature fluctuations, moisture content, and harborage (Wagner et al., 2003).

**Guild composition of spiders**

Hutchinson (1959) was the first to suggest that species were limited to ecological niche boundaries by competing species (Colwell and Futuyma, 1971). Groups of competitors, or “a group of species that exploit the same class of environmental resources in a similar way”, were later called guilds by Root (1967) and Simberloff and Dayan (1991). In the meantime, many different definitions of guilds were used, in a relatively loose way (Hawkins and MacMahon, 1989; Wilson, 1999). The most acknowledged definition differentiates ecological guilds as non-phylogenetic groups of species that share one or a series of important resources (Blondel, 2003). The definition and study of guilds is especially useful if they respond in roughly the same way to similar changes in the environment, independently of the specific taxonomic composition. Studying ecological guilds (or functional groups) can be useful to investigate assemblage response to climate change (Voigt et al., 2007), habitat disturbance and
management among many other areas (Wilson, 1999). Spiders are a good indicator taxon to reflect ecological change. They are in fact the main arthropod predators in many biomes and habitat types. Additionally, they have already been suggested to be an ideal group for predicting extinction debt in other taxa due to habitat destruction (Cardoso et al., 2010). Classifying spiders into guilds seems therefore useful to future studies of ecological change in all kinds of biomes and habitats.

Several authors have defined spider guilds by using their foraging strategies to predict arthropod prey group as the shared resource (Dias et al., 2010). Flying arthropods are mainly captured by different types of webs, arboreal arthropods by wandering spiders or tube web hunters, arboreal arthropods by sheet webs, etc. Therefore, although many guild classification systems exist for spiders, these are usually based solely on foraging strategy, although different strategies may be directed towards similar prey and similar strategies may be directed towards different prey (Cardoso et al., 2010). Usually following guild composition was observed in the field population:

(a) **Orb web weavers:** The typical orb-weaver spiders are the most common group of builders of spiral wheel-shaped webs often found in gardens, fields and forests. Their common name is taken from the round shape of this typical web, example, most of the members of Araneidae and Tetragnathidae.

(b) **Stalkers:** Stalkers or jumping spiders are active hunters often seen during the day walking up and down walls in houses as well as in the fields. They hunt small arthropods by stalking them slowly and finally jumping on them. Most of the members of Oxyopidae and Salticidae in constitute this foraging guild.
(c) **Ground runners**: Ground runner spiders do spin silk, but they do not trap prey within their webs as they do not construct any kind of web. Rather, they hunt and chase prey along the ground. The members of the family Gnaphosidae comes under this guild.

(d) **Foliage runners**: The name indicate such group of spiders spent most of their times running on the foliage of the crops, for example, the members of Clubionidae and Sparassidae.

(e) **Space builders**: The space builders construct webs but the web has no adhesive properties like orb web but the irregular structure traps insects, making escape difficult. The spider quickly envelops its prey with silk and then inflicts the fatal bite. The prey may be eaten immediately or stored for later. The members of the family Pholcidae are example of this category.

(f) **Ambushers**: The spiders belonging to the family Thomisidae do not build webs to trap their prey, but they ambush unsuspecting insects that come within contact, grasping them with their strong, spiky, curved front legs, similar to Venus flytrap plant.

**Biodiversity of spiders in India and its different states**

Information pertaining to Indian spiders is rather scattered as mentioned in the introduction. Keswani et al. (2013) updated Indian spider fauna upto 1685 species belonging to 438 genera and 60 families. So far, in India, state level checklists have not been compiled and updated and information available is sporadic and urgently need compilation. This information is crucial for the forest department to understand the wealth of biodiversity in their states. In the present century, a lot of work has been done in different states, but still several places and habitats were not explored for the
spider fauna. Following description give an idea of the work done so far in different states, particularly in the present century.

**a. Biodiversity of spiders in Andman and Nicobar Islands:**
Tikader (1977) was the first to study the spider of this island comprehensively and reported 32 species known and 26 species new to science. The new species belong to 22 genera distributed in 12 families. Later on, Biswas and Majumdar (2000) added few more species.

**b. Biodiversity of spiders in Andhra Pradesh and Telangana:**
Srinivasulu et al. (2013) reported three comb-footed spiders from the state. Subba Reddy (2016) surveyed Nallamala forest distributed in 3 districts of Andhra Pradesh and 2 districts of Telangana state for the spider diversity. The study had revealed a total of 7 poisonous species belonging to 4 genera and 3 families. Later, Palem et al. (2017) studied four ecosystems of Andhra Pradesh viz., Sri Lankamala wildlife Sanctuary, Rapur Ghat forest, Pallakondalu and Seshachalam Biosphere Reserve forest. They reported the existence of a total of 19, 25 and 31, 41 spider families, respectively from these four ecosystems.

**c. Biodiversity of spiders in Arunachal Pradesh:**
Biswas and Biswas (2006) reported the occurrence of 58 species of spiders belonging to 28 genera and 11 families from Arunachal Pradesh, among these 4 species were new to science, whereas 25 species were recorded for the first time from this region. Later on, Siliwal et al. (2015a) described two new species of spiders from this area. Recently, Singh (2016) reported a total of 47 species belonging to 35 genera and 16 families with Araneidae, Salticidae and Nephilidae being the dominant families from Namdapha National Park.

**d. Biodiversity of spiders in Assam:**
Chetia and Kalita (2012a, b) described the spider assemblages with respect to their diversity and
distribution in the semi evergreen forest, Gibbon Wildlife Sanctuary, Assam. A total of 95 species of spiders belonging to 56 genera and 18 families were recorded. Singh (2014) studied the biodiversity of spiders in Barpeta district of Assam and reported 69 species belonging to 44 genera distributed in 16 families (Araneidae, Salticidae, Theridiidae, Tetragnathidae, Lycosidae, Oxyopidae, Pholcidae, Sparassidae, Pisauridae, Nephilidae, Thomisidae, Linyphiidae, Theraphosidae, Uloboridae, Philodromidae and Hersilidae). Basumatary and Brahma (2017) studied the fauna of spider in Chakrashila Wildlife Sanctuary and reported a total of 65 spider species belonging to 47 genera under 16 families. Amongst the families, the Araneidae was the most abundant (21 species) with orb weavers being the dominant guild type (43%).

e. Biodiversity of spiders in Bihar: Sinha (1951a) described 34 species of spiders belonging to Araneidae. Recently, Yadav et al. (2015, 2016) reported 6 families, 10 genera and 16 species of spiders forming 4 guilds, namely, ground runner, orb weavers, stalkers and ambushers from irrigated rice fields in Experimental Farm, BAC, Sabour. The orb weavers (55.8%) dominated over the other guilds of spiders followed by stalkers (24.2%), ground runners (16.2%) and ambushers (3.8%). Amongst the different families, Tetragnathidae constituted highest number of individuals (42.8%) followed by Oxyopidae (18.8%), Lycosidae (16.2%), Araneidae (13.0%), Salticidae (5.4%) and Thomosidae (3.8%).

Among all 7 families dominant over other families, e.g. Araneidae (15 species), Gnaphosidae (13 species), Thomisidae (10 species), Lycosidae (9 species), Oxyopidae (5 species). Ekka and Kujur (2016) surveyed Gomarda Wildlife Sanctuary, Raigarh district of Chhattisgarh for spider fauna and prepared a checklist containing 120 species representing 49 genera under 16 families. Families indicating excessive member of species were Thomisidae (24 species) followed by Araneidae (22 species).

g. Biodiversity of spiders in Delhi: Malik et al. (2015) studied the fauna of Delhi and reported a total of 51 species belonging to 41 genera and 15 families. Among these, species richness was found to be highest for family Araneidae (13 species) followed by Salticidae (9 species), and Lycosidae (6 species).

h. Biodiversity of spiders in Goa: Karthikeyani (2003) reported only few species from Goa. Later on, Borkar et al. (2006) for the first time reported a whip spider Phrynicus phipsoni Pocock from Goa. More comprehensive study regarding the fauna of spider in Taleigao plateau, Goa was carried out by Pandit and Pai (2017) and had revealed occurrence of 74 species of spiders belonging to 17 families. The spiders such as Hersilia savignyi, Plexippus petersi were the predominant species of spiders in the study area. The spiders also belonged to 9 foraging guilds. Later on, Halarnkar and Pai (2018) provided a checklist and the diversity of spiders from two different habitats namely Akhada, St. Estevam, Goa, an island and the other Tivrem-Orgao, Marcela, Goa, a plantation area and revealed the presence of 29 spider species belonging to the 8 families and 19 genera at Akhada and 30 spider species belonging to 7 families, 18 genera at Tivrem-Orgao.

i. Biodiversity of spiders in Gujarat: Siliwal et al. (2003a, b) recorded 116 species from 66 genera and 25 families of spiders from
Purna wildlife Sanctuary, Dangs, Gujarat. Parmar (2013) surveyed five sites around Biosciences, Vallabh Vidyanagar and reported 90 species belonging to 66 genera spread over 24 families. The dominant family Araneidae had the highest number of species (18), followed by Salticidae (13), Thomisidae (10) and Tetragnathidae (7), Oxyopidae (5). Parmar and Patel (2015) studied the spider diversity of Taranga hills located in Satlasana Taluka of North Gujarat and reported 62 spider species belonging to 42 genera and 15 families. The most dominant families were Araneidae and Salticidae, followed by Lycosidae, Tetragnathidae, and Thomisidae. Gujarat Biodiversity Board initiated projects for compilation and documentation of biodiversity of various taxa in Gujarat. were collected in and around Taranga hills using Hand picking, Ground Hand Collecting, Aerial Hand Collecting and visual searching methods. Total 62 spider species identified were belonging to 42 genera and 15 families. The most dominant families are Araneidae and Salticidae, followed by Lycosidae, Tetragnathidae, and Thomisidae. The other families contribute to about less than 5% in the total collected species. Yadav et al. (2017) compiled the diversity of the state on the basis of existing recent past literature (Patel, 1973, 2003b; Patel and Vyas, 2001; Bhatt, 2008; Kumar and Shivakumar, 2004, 2006; Trivedi, 2009; Warghat et al., 2010; Patel et al., 2012, 2013; Vachhani et al., 2012; Parmar and Acharya, 2013; Parasharya and Pathan, 2013; Patel and Patel, 2015; Prajapati et al., 2016; Suthar et al., 2017) and reported that the spider diversity of Gujarat consists of 415 species under 169 genera and 40 families. Out of these, 29 genera and 17 families are endemic to Gujarat. Overall, high spider diversity was recorded from middle Gujarat with 33 families, 132 genera and 278 species. Whereas, the zone with the least spider records was southern Saurashtra with only 16 families, 39 genera and 70 species. However, Vyas and Parasharya (2018) found certain mistakes and omissions of certain published information given by Yadav et al.
(2017) and mentioned those errors to rectify it and to prepare a fresh checklist.

j. Biodiversity of spiders in Haryana: Arora and Monga (1992, 1994) described few species of three genera, viz., *Stegodyphus* Simon (Eresidae), *Pardosa* Koch and *Hippasa* Simon (Lycosidae) from Haryana. After a long gap, Malik and Goyal (2017) surveyed 3 districts of western Haryana (Sirsa, Fatehabad and Hisar) for the biodiversity of spiders and reported a total 45 species of spiders belonging to 29 genera, from 12 families. The maximum number of species were found to belong Salticidae (10 species) followed by Araneidae (7 species) and Thomisidae (6 species). According to guild structure ground runners, orb weavers, stalkers, ambushers and sheet web weavers spiders were observed.


l. Biodiversity of spiders in Karnataka: Vijayakumar (2002) on insect pest management mention the occurrence of a few spider species in the agriculture ecosystems from Dharwad region. Further, Bastawade et al. (2004) made a cursory mention of the distribution of a species of thomisid spider from North Kanara, Karnataka. Siliwal et al. (2011) while studying the occurrence of genus *Tigidia* in the Western Ghats reports the availability of one species from the Karnataka region of Western Ghats, however, Nalini and Ravindranatha (2012) reported the spider diversity in IISc campus, Bangalore, where in 40 species belonging to 33 genera under 14
families viz. Araneidae, Ctenidae, Deinopidae, Eresidae, Hersiliidae, Lycosidae, Nephilidae, Oxyopidae, Pholcidae, Salticidae, Tetragnathidae, Theridiidae, Thomisidae, and Uloboridae. Recently, Deshpande and Paul (2016) explore the spider fauna of Gulbarga, a prominent town of northern Karnataka located in the Deccan Plateau and spiders belonging to 25 species from 10 families and 17 genera were recorded. Araneidae, Salticidae and Oxyopidae were numerically predominant families forming 20% of the total specimens collected. The most abundant genus recorded was Neoscona. Deshpande and Paul (2016) divided the guild structure of these spiders into 5 functional groups or guilds based on foraging behaviour. The families with the highest number of the total species are the foliage runners belonging to Salticidae, Hersiliidae, Oxyopidae with 10 species (40% of the all species) followed by ground runners belonging to Gnaphosidae, Lycosidae, Sparassidae with 5 species (20% of all species) and orb-web builders belonging to Araneidae and Tetragnathidae with 5 species (20% of all species), scattered-line weavers including Pholcidae with 3 species (12% of all species) followed by ambushers belonging to Thomisidae with 2 species (8% of all species). Prashanthakumara et al. (2015) studied diversity of spiders in different locations of Jnana Sahyadri campus, Kuvempu University, Shimoga and reported a total of 17 species belonging to 10 families. Pawar and Ganesh (2016) investigated the spider diversity in Londa (Belagavi District), located at the foothills of Western Ghats and reported a total of 36 species from 30 genera, 15 families. The Araneidae (9 species) was dominant followed by Salticidae (6 species), Tetragnathidae (4 species). Spider diversity in different agro-ecosystem of Chikmagalur (parts of Western Ghats) was conducted by Prashanthakumara and Venkateshwarlu (2017a). They reported 45 species belonging to 13 families, Araneidae (16 species) was the most dominant family followed by Salticidae (9 species). Prashanthakumara and Venkateshwarlu (2017b) reported 71 species of spiders belonging to 58 genera from 18 families from
Gudvi bird Sanctuary, Shivamogga District, Karnataka. The dominant families was Salticidae (17 species), Araneidae (16 species) and Theridiidae (9 species). Among the feeding guilds stalkers were most dominant (28%) group followed by orb web weavers (25%), ground runner (23%), and space web spiders (13%). The other groups like foliage runners (4%), sheet web spiders (3%), Ambushers (3%) and Burrowers (1%) are have very less number of species. Vaibhav et al. (2017) studied the university campus, Dharwad for fauna of spiders and observed 41 species belonging to 32 genera under 15 families. Of which individuals belonging to Salticidae and Araneidae are dominant with 8 species each.

**m. Biodiversity of spiders in Kerala:** Patel (2003a) described 91 species belonging to 53 genera from Parabikulum Wildlife Sanctuary, Kerala. Sudhikumar et al. (2005a, b) studied the spider fauna of Mannavan shola Forest in Kerala and reported the existence of a total of 72 species of spiders belonging to 57 genera of 20 families out of which 15 species were endemic. Six guild structure were observed viz., orb-web builders, foliage hunters, ground hunters, sheet web builders, scattered line weavers and ambushers. The families Araneidae (17 species) had maximum species diversity. Jose (2005) conducted extensive survey of Kerala and reported 418 species belonging to 161 genera and 38 families. Salticidae being the dominant family having 87 species followed by Areneidae (51 species), Theridiidae (38 species) and Tetragnathidae (25 species). Amon them 35 species were new to science. Adarsh and Nameer (2015) observed a total of 86 species of spiders belonging to 56 genera of 20 families from the Kerala Agricultural University campus, Thrissur. The dominant spider family was Araneidae with 18 species of 9 genera followed by Salticidae (14 species of 13 genera) among them 16 species were endemic. Guild structure analysis showed that spiders belong to seven feeding guilds: Orb-web builders are the dominant (34%), followed by stalkers (22%), ground runners (20%),
ambushers (8%), scattered line weavers (8%), foliage runners (7%) and sheet-web builders (1%). Adarsh and Nameer (2016) documented 101 species of spiders belonging to 65 genera from 29 families from Chinnar Wildlife Sanctuary, Idukki District were identified from the sanctuary. The dominant families were Lycosidae (11 species) and Araneidae (10 species). Seven feeding guilds such as orb weavers, stalkers, ground runners, foliage runners, sheet web builders, space web builders and ambushers were observed. Recently, Jose et al. (2018) studied the spider fauna of Kavvayi river basin in the Northern part of Kerala, which holds various ecological units such as lateritic vegetation, agro-ecosystems, seasonal pools, grass lands, sacred groves, mangrove marsh and riparian vegetation. They reported 112 species of spiders belonging to 81 genera and 21 families, Araneidae being most dominant family constituting 21.5% of the total spider species followed by Salticidae (19.5%) having 7 guilds, viz. stalkers, orb web builders, ambushers, foliage runners, space web builders, ground runners and wandering sheet weavers.

**n. Biodiversity of spiders in Madhya Pradesh:** Comparatively spider fauna of Madhya Pradesh was better known as several reports exist from several ecosystems. Rane and Singh (1977) recorded five species and Gajbe (1995b) 14 species from Kanha Tiger Reserve, Madhya Pradesh. Gajbe (2003) prepared a checklist of 186 species of spiders in 69 genera under 24 families distributed in Madhya Pradesh. Sharma et al. (2010, 2015) studied diversity and abundance of spider fauna of Narmada river at Rajghat Barwani and recorded 50 species belonging to 12 families. Most representative family was Araneidae representing 17 species followed by Salticidae (9 species), and others. Vyas (2012) also reported 95 species belonging to 60 genera and 24 families from Narmada region from upstream Omkareshwar to downstream Rajghat. Thereafter, Shirbhate and Vyas (2012) reported 23 species belonging 10 genera of family Araneidae from middle plains of Narmada basin. Kanhere
and Kanare (2016) studied the biodiversity of spider at Ralamandal sanctuary, Indore and documented 41 spider species belonging to 10 families. Family Araneidae represented maximum 16 species.

**o. Biodiversity of spiders in Maharashtra:** Bastawade (2004) described arachnid fauna from Melghat Tiger Reserve, Amravati, Maharashtra State. Hippargi et al. (2011) reported occurrence of spiders from 19, 25, 31 families from Lonar, Melghat and Southern Tropical thorn forest, Solapur, respectively. In later studies, Vairale (2010) reported 517 spider species from Melghat Sanctuary (Amarawati district). Bhatkar (2011) surveyed Wan Sanctuary and recorded spiders belonging to 17 different families. Study show that spiders belonging to the Family Araneidae, Lycosidae, salticidae, Thomisidae, Tetragnathidae, Nephilidae, Uloboridae and Eresidae are found in abundance. Rithe (2012) observed a total of 254 species belonging to 113 genera and 27 families from Koha, Kund and Bori meadows of Melghat Tiger Reserve. Meshram (2011) also worked on spiders from Toranmal Sanctuary. Survey resulted the existence of 117 species belonging to 55 genera from 20 families. The spider diversity was in the order of Araneidae (26 species), Gnaphosidae and Oxyopidae (14 species each), Salticidae and Thomisidae (12 species each) and Lycosidae (8 species). More and Sawant (2013) investigated the diversity of spiders from Radhanagari Wildlife Sanctuary, Chandoli National Park and Koyna Wildlife Sanctuary in Western Ghats describing a total of 247 species belonging to 119 genera and 28 families with a dominance of Araneidae, Salticidae and Lycosidae. Deshmukh and Raut (2014) observed the faunal diversity of spiders in the Salbardi forest, Satpura Range, district Amravati and observed the occurrence of 104 species belonging to 18 families. More (2015) studied the spider diversity from Northern Western Ghats of Chandoli National Park and reported a total of 58 species belonging to 38 genera and 16 families. The spiders from Family Araneidae, Lycosidae, Salticidae and Thomisidae are the
characteristic families of this region. Of these Salticidae were predominant (19.23 %) and Araneidae contributed 18.26%. Gajbe P.U. (2016) observed the spider fauna of Umred-Karhandla Wildlife Sanctuary located in Nagpur district and a total of 21 species of spiders in 19 genera of 13 families were recorded. Sawane (2016) studied the biodiversity of spiders in Chandrapur district of Maharashtra and recorded a total of 90 species belonging to 57 genera and 21 families. Recent studies of Shirbhate and Shirbhate (2017) in the Katepurna Sanctuary, Akola resulted a total of 11 genera and 26 species of Araneidae.

p. Biodiversity of spiders in Manipur: Biswas and Biswas (2004) contributed significantly to spider diversity and recorded a total 52 species belonging to 30 genera under 11 families with the remark that all the families, genera and species form new records for the state. Kananbala et al. (2011, 2014, 2016) recorded few species from Manipur.

q. Biodiversity of spiders in Meghalaya: Biswas and Majumder (1995) reported the occurrence of 92 species of spiders belonging to 39 genera and 7 families from Meghalaya, among these two species belonging to 2 genera and 2 families were new to science, whereas 31 species of 17 genera under 5 families were recorded for the first time from this region. Recently, Bhattacharya et al. (2017) found 24 species of spider belonging to 10 families in Jowai area of Meghalaya.

r. Biodiversity of spiders in Mizoram: Biswas and Biswas (2007) first time compiled the fauna of spider in the state and recorded a total 44 species belonging to 27 genera under 13 families. Out of these, 3 species belonging to 3 genera under 3 families were described as new to science. Siliwal et al. (2015b) described two species of spiders from Mizoram. Chowdhury et al. (2017) studied the spider fauna of rice growing area of Kolasib, Mizoram and reported a total of 31 species belonging to 20 genera in 10 families. The most
dominant species were *Oxyopes javanus*, *Phidippus audax* in the ground sample while Tetragnathidae was the most dominant in the foliage sample.

**s. Biodiversity of spiders in Odisha:** Biswas (1987) compiled the spider fauna of Odisha and stated the existence of 81 species of spiders under 17 families from the state. Siliwal et al. (2009) described two species from Odisha. Mallick et al. (2017) studied the spiders associated with brinjal ecosystem in coastal Odisha and reported 11 species of spiders represented by 8 families. They observed spiders belonging to Oxyopidae predominated in brinjal ecosystem followed by the Tetragnathidae, Dictynidae and Theridiidae. Recently, De and Palita (2018) prepared a checklist of spiders from six sacred groves of Koraput district, Eastern Ghats of Southern Odisha and recorded a total of 81 species under 51 genera from 19 families. Highest numbers of spiders were reported under family Araneidae (26 species) and Salticidae (17 species). In Kanta Bausuni sacred grove De and Palita (2018) recorded the maximum, 67 species, of spiders with 25 exclusive species.

**t. Biodiversity of spiders in Rajasthan:** Spider fauna of Rajasthan was studied earlier by Pocock (1903), Tikader (1961, 1980, 1982a, b), Subramanyam (1968, 1969), Roonwall (1982), and Nigam (2004). Sivaperuman and Rathore (2004) studied the spiders in Desert National Park, Rajasthan. Chauhan et al. (2009) studied the biodiversity of spiders in Jhalana Forest Range in Jaipur and reported 39 species of spiders under 29 genera in 16 families. Sivaperuman and Rathore (2009) explored the Thar Desert and reported a total of 28 species belonging to 13 families and 21 genera. Saini et al. (2012a, b) studied the spider fauna in Shekhawati Aravalian region of Rajasthan and reported a total 32 species belonging to 25 genera and 12 families. The maximum number of spiders was found in woodland habitat belonging to 12 families and
the minimum number of spiders from wetland area. In woodland, Araneidae and Salticidae were found as most abundant families while Lycosidae was found as most abundant family in both wetland and grassland habitats. Lawania et al. (2013a) observed the spider fauna of Deeg-is, a historic town near Bharatpur and reported 24 species belonging to 16 genera from 10 families. Salticidae (Jumping spiders) were most commonly occurred species, whereas Araneidae and Salticidae dominated the agriculture fields. Kaur et al., al. (2014) surveyed for spiders of the Keoladeo National Park, Bharatpur, and observed 30 species of spiders belonging to 6 genera and 11 families. Saha et al. (2015) recorded 12 species of 10 genera belonging to 9 families of spiders from Ranthambore National Park. Lawania and Trigunayat (2015) prepared a preliminary checklist of spiders of the three reserve areas namely, Keoladeo National Park (KNP), Nahargarh Wildlife Sanctuary (NWS) and Sur-Sarovar Bird Sanctuary. A total of 88 species belonging to 54 genera and 17 families were recorded from the said areas were listed. In all these areas, Salticidae (ground runner), Araneidae (orb web weaver), Lycocidae (ground-active runner) and Oxyopidae (foliage runner) were most diverse families. Patil et al. (2016) reported only 5 species of spiders belonging to 3 genera under 2 families in Jaisalmer district of Rajasthan. Lawania and Mathur (2017a, b, c) reported a total of 59 species of spiders belonging to 40 genera of 17 families in the eastern region of Rajasthan with 7 feeding guilds viz., irregular web weaver, sheet web weaver, funnel web weaver, orb-web weaver, single-line web weaver, dome shape web weaver and ambushers. The families Araneidae and Salticidae exhibited maximum species diversity. Kumari et al. (2017) documented the diversity of spider fauna in arid and semi-arid (Ajmer and Jodhpur) region of Rajasthan and reported a total of 46 species representing 17 families. In woodland, Araneidae and Oxyopidae were found as most abundant families with 41.44% and 15.78% of total spider fauna while Lycosidae was found as the most
abundant family in wetland but was at par with Araneidae in pasture habitats.

**u. Biodiversity of spiders in Sikkim:** For the first time Tikader (1970) prepared checklist of spider fauna of Sikkim and enlisted 65 species belonging to 33 genera and 11 families out of which 44 species were new to science.

**v. Biodiversity of spiders in Tamil Nadu:** Taxonomic studies on spiders in Tamil Nadu were carried out by several workers from 19th to 21st century, with about 63 publications related to spiders until 2015 (Karthikeyani et al., 2017). Sugumaran (2001) listed 56 species of spiders in eighteen families from the state of which Araneidae was the most predominant group containing 26 species under 14 genera on the basis of literature published before 2000. Jayakumar and Sankari (2010) observed only 5 species of spider in riceland agroecosystem in Tamil Nadu. Kumar et al. (2013) surveyed betelvine agroecosystem and recorded 21 species of spiders belonging to 21 genera and 9 families. Araneidae was the most dominant family recording 5 species belonging to 5 genera. Guild structure analysis revealed five feeding guilds, namely orb weavers and ground runners were dominant feeding guilds of the total collection. Muthukumaravel et al. (2013) recorded 9 species of spiders belonging to 6 genera under 5 families in mangroves at Adirampattinam coast, Tamil Nadu. Umarani and Umamaheswari (2013) explored the abundance and diversity of spider fauna at different sites of Palani hills, Dindigul District, Tamil Nadu and reported a total of 43 species of spiders belonging to 25 genera in 12 families. The families Araneidae and Lycosidae were the most dominant families exploring 9 species each. Jeyarparvathi (2014) conducted a survey in the Ayya Nadar Janaki Ammal College campus and recorded 25 species belonging to 21 genera representing 11 families. Jeyarpavathi and Mahalakshmi (2014) conducted extensive
survey of cotton fields of Thailakulam, Srivilliputtur taluk, Virudhunagar district, Tamil Nadu and recorded 19 species of spiders belonging to 18 genera and 8 families. The Salticidae (31.57%) harboured highest population followed by Araneidae, Lycosidae and Oxyopidae (15.78%). Dharmaraj et al. (2017) described a total of 40 species of spiders belonging to 36 genera and 11 families from The Nilgiris, Tamil Nadu, and later they (Dharmaraj et al., 2018) revised the list reporting a total of 59 species belonging to 25 genera of 11 families. Dominant families were Oxyopidae, Salticidae, Araneidae and Lycosidae. Krishnaveni and Kandeepan (2017) conducted a pilot study to reveal the spider diversity in Sirumalai hills of Dindigul district in Tamil Nadu. A total of 112 species of spiders belonging to 78 genera of 35 families were recorded. Guild structure analysis of the recorded spiders revealed 6 feeding guilds viz., orb-web builders, foliage hunters, ground hunters, sheet web builders, scattered line weavers and ambushers. The families Araneidae, Tetragnathidae, Salticidae and Thomisidae exhibited maximum species diversity. Karthikeyani et al. (2017) also prepared checklist of spiders of Tamil Nadu enlisting 226 species belonging to 120 genera representing 33 families but seems to be incomplete. Spider diversity in Salticids was dominated followed by Araneidae, Lycosidae, Thomisidae and Sparassidae. Recently, Vijaya et al. (2018) recorded a total of 217 species and 5 families of spiders from V.V.V. college campus in Virudhunagar district and observed the family Araneidae (27.65%) harboured highest population followed by families Pholcidae (24.42%), Herisiliidae (17.51%) and the least number of spiders recorded under the family Oxyopidae (15.67%) and Tetragnathidae (14.75%).

**w. Biodiversity of spiders in Tripura:** Dey et al. (2013) surveyed house garden in Khayerpur of west Tripura district and reported a total of 47 spider species belonging to 36 genera of 14 families. Among all the families, Salticidae dominated representing
approximately 38% of the total species. Recently, Mirza et al. (2017) described a new genus and species from Tripura.

x. Biodiversity of spiders in Uttar Pradesh: Patel and Nigam (1994) described two species of spiders from Kanpur district. De (2001) listed 19 species of spider from Dudhwa Tiger Reserve. Anjali and Prakash (2012) explore the spider fauna in the forest area of Agra region and recorded a total of 34 species belonging to 12 families of which the dominant ones were Salticidae, Oxyopidae, Lycosidae, Araneidae, and Pholcidae and 3 guilds, orb-web builders, ground dwellers, and sheet-web builders were observed in the ratio of 5:28:1. Singh and Singh (2014) studied the biodiversity of spiders in Riceland ecosystem in Gorakhpur Division of northeast Uttar Pradesh. They reported a total of 58 species belonging to 28 genera and 10 families. Of the total species 9 species were most dominant (accounted for 53.3% of the total population), 11 species were dominant (accounted for 33.6% of the total population), 35 species were agrophile (accounted for 12.8% of the total population), and 3 species were rare (accounted for 0.3% of the total population). The most dominant species were Tetragnatha javana (Thorell) (7.23%); Pardosa pseudoannulata (Bösenberg and Strand) (6.89%); Tetragnatha mandibulata Walckenaer (6.34%); Pardosa birmanica Simon (6.33%); Hippasa holmerae Thorell (5.70%); Tetragnatha maxillosa Thorell (5.46%); Oxyopes javanus Thorell (5.31%); Hippasa partita (O.P.-Cambridge) (5.05%); and Camaricus formosus Thorell (4.95%). Next 11 species viz. Araneus ellipticus (Tikader and Bal) (4.89%), Clubiona japonica Boesenberg and Strand (4.43%), Leucauge decorata (Blackwall (4.19%), Neoscona theisi (Walckenaer) (3.88%), Lycosa mackenziei Gravely (3.86%), Plexippus paykulli (Audouin) (3.00%), Plexippus calcutaensis (Tikader) (2.52%), Plexippus petersi (Karsch) (2.01%), Leucauge celebesiana (Walckenaer) (1.99%), Pardosa sumatrana (Thorell) (1.58%), and an unidentified araneid species (1.29%) collectively constitute about
87% of the individuals collected from rice fields of northeastern Uttar Pradesh. Rest of the 38 species represented only 13% of the collected individuals. Family Lycosidae and Tetragnathidae accounted for the largest population of the species of spiders, each representing 29.85% and 27.95% of all the species, respectively, followed by Araneidae (16.33%) and Salticidae (9.74%). The collected spiders were grouped by Singh and Singh (2014) into 6 foraging guilds according to Uetz et al. (1999). These guilds were orb weavers (44.3%, Araneidae and Tetragnathidae), stalkers (15.2%, Oxyopidae and Salticidae), ground runners (30.0%, Gnaphosidae), foliage runners (5.3%, Clubionidae and Sparassidae), space builders (0.1%, Pholcidae), and ambushers (5.1%, Thomisidae). Recently, Kumar et al. (2017a) investigated the diversity of spiders in Kukrail Reserve Forest, a subtropical dry deciduous forest, covering an area of 5,000 hectare, located in Lucknow. They recorded a total of 61 spider species belonging to 45 genera and 16 families. Out of this, majority of spiders were belonging to family Salticidae followed by Araneidae. Kumar et al. (2017b) also studied the spider fauna of Nawabganj Bird Sanctuary which is a large wetland located in Unnao district and recorded 55 spider species belonging to 41 genera and 14 families; majority of spiders were Araneidae (20%) followed by Salticidae (18%) and Lycosidae (10%).

y. Biodiversity of spiders in Uttarakhand: Quasin and Uniyal (2010) studied spider diversity from Kedarnath wildlife Sanctuary, Chamoli district and reported a total of 64 species/morphospecies under 40 genera and 19 families. Majority of the spiders collected were orb web weavers. Later, Uniyal et al. (2011) extensively studied the spider fauna of Nanda Devi Biosphere Reserve, Uttarakhand and explored the presence of a total of 244 species belonging to 108 genera and 33 families. Gupta and Siliwal (2012) investigated the spiders of the Wildlife Institute of India campus at Chandrabani, Dehradun and reported a total of 102 species belonging to 78 genera.
and 23 families. Salticidae, Araneidae and Thomisidae were dominant families adding 4 new records of spider species for India.

**z. Biodiversity of spiders in West Bengal:** Long back Tikader and Biswas (1981) recorded 99 species of spiders belonging to 47 genera under 15 families from Kolkata and its vicinity. Majumdar (2004a, b) studied about the spiders of Sundarbans described two species of *Pardosa*. Biswas and Biswas (2004) contributed significantly to spider diversity by rendering comprehensive lists of new recorded spider species from West Bengal. Majumder and Talukdar (2013) studied the spider fauna of Darjeeling hills and reported 119 species belonging to 55 genera under 23 families. Sen et al. (2015) compiled the fauna of spiders of Gorumara National Park, Chapramari Wildlife Sanctuary and Mahananda Wildlife Sanctuary of Reserve Forests of Dooars and listed a total of 148 species under 81 genera and 22 families. Of these 8 species were new to the World and 7 species new from the country while 25 species from the state. Fifty five species are reported as endemic to India. Saha et al. (2017) surveyed for the spiders of tea ecosystem of Dooars, West Bengal and sampled 32 species of araneids under 14 genera from eight tea estates. The spider fauna of Barasat and Basirhat of North 24 Parganas was explored and a total of 23 species belonging to 20 genera and 11 families were recorded. The dominant guild was constituted by the orb web weavers (30.43%). Among the recorded species apart from being Oriental also includes some Australian (23%), Palaearctic (21.73%) and Ethiopian, Nearctic and Neotropical (each 17.39%) elements. Spiders were mostly abundant during post-monsoon (82.60%), followed by pre-monsoon (60.86%) and monsoon (47.82%) which was in co-incidence of the insect species as food. Two species, *Eriovixia excelsa* (Simon) and *Leucauge decorata* (Blackwall) were recorded throughout the year. Ranking sequence of the most abundant species in descending order were: *Leucauge decorata* (25.68%) > *Eriovixia excelsa* (19.13%) > *Pholcus phalangioides*
(11.48%) > *Plexippus paykullii* (8.74%) > *Anepsion maritatum* (7.10%) > *Cyrtophora cicatrosa* (6.56%). Roy et al. (2017) studied the spider fauna of the other tea estates of Dooars and recorded 32 species under 14 genera. Dhali et al. (2017) have accounted litter and ground dwelling spiders of reserve forests of Dooars, West Bengal and listed a total of 89 species under 38 genera and 13 families. Of these one species was new to the world, one from the country while 7 from the state. Thirty eight species were reported as endemic to India.

Uniyal (2006) recorded a total of 19 species of spiders belonging to 10 families from Indian-Trans Himalayan region. Hore and Uniyal (2008a, b) worked on the spider assemblage and the diversity and composition of spider assemblages in different vegetation types in Terai Conservation Area (TCA) and as indicator species for monitoring of habitat condition in TCA. Hore and Uniyal (2008a) also studied on the effect of prescribed fire on spider assemblages in TCA. Saha et al. (2017) also studied the guild structure of spiders of Barasat and Basirhat and found most dominant guild as the Orb web weavers (30.43%) followed by foliage hunters (17.39%), ground runners (13.04%), stalkers (21.73%), space web builders (8.69%), sheet web builders and ambushers (4.34% each).

In the present work, faunal composition of spiders species were given. Each species were redescribed, well illustrated with their distribution in India (statewise) as well as elsewhere are provided. The citations for each species are given along with their description and not repeated in reference section. The distribution pattern of all reported spider species in different districts is given in detail.