Review of Literatures
The study of nematodes first began in the 17th century. T. Needham (1743) first discovered plant parasitic nematodes as eelworms in seed galls of wheat from England. Scopoli (1777) proposed the genus *Anguina* for these nematodes. Steinbuch (1799) named it *Vibrio tritici* and described *Vibrio agrostis* from seeds of bent grass. Hardy (1850) described *Vibrio graminis*, a species which causes galls on grass leaves. It was later transferred to *Anguina tritici*, Kuhn (1857) reported *Anguillula dipsaci* from teasel plant, now known as *Ditylenchus dipsaci*. Bastian (1865) described the original genus *Tylenchus* for those species possessing a knobbed spear and caudal alae in male and he also produced an outstanding monograph on Anguillulidae, describing 100 new species. Many nematologists like Durjadin (1845), Schmidt (1871), Butschili (1873,1876), De Man (1880), Leibscher (1892), Cobb (1893a, 1913), Zimmermann (1898), Steiner (1931a, 1945), Taylor (1936), Thorne (1941,1961) described a number of species and genera under the family Tylenchidae Örley, 1880. Loof (1961) redescribed the genera of sub-family Tylenchinae. The genus *Tylenchus* was re-established by Filipjev (1936) which was originally proposed by Bastian (1865) and described *Ditylenchus* and *Tetylenchus* (or *Telotylenchus*). Thorne (1949) gave full original status to the genus *Tylenchus*. Later several lower taxa were also raised to higher
ranks. Golden (1971) included 2 sub orders, 6 super families, 23 families, 46 sub families and 136 genera. According to Andrassy (1978) the total numbers of nematodes were 1940 in which 1788 was established as genera, 152 as sub-genera. And further classified 570 in Secernentea (including Tylenchida) with rhabditids comprising 241 and Tylenchida (including Aphelenchidas) 329 genera respectively. Extensive contribution to tylenchids were made by several workers like Golden (1971), Andrassy (1976), Baqri (1978), Bajaj and Bhatti (1978), Dhanachand & Jairajpuri (1980), Maggenti (1983), Inglis (1983) and Nickle (1984). They and others have produced large number of books and monographs with descriptions of several new taxa. The new classification system of Tylenchida which included 4 sub orders (Tylenchina, Hoplolaimina, Criconematina, and Hexatyliina) was proposed by Siddiqi (2000). He also established 2 Infra-orders viz. Tylenchata and Anguinata respectively under Tylenchina. There were 9 superfamilies, 27 families, 63 sub-families, 211 genera and 29 sub-genera including newly erected sub-families, genera and sub-genera. The classification of Siddiqi (2000) created much confusion. So, to avoid this, the classification system proposed by Maggenti et al., (1987) is followed in the present study. In this system of classification Aphelenchina and Tylenchina Thorne (1949) was reunited in the order Tylenchida under class Secernentea and subclass Diplogasteria. Order Tylenchida was divided into 4 sub-orders as Tylenchina, Aphelenchina, Sphaorularina and Hexatyliina. Sub-order Tylenchina had two superfamilies - Tylenchoidea and Criconematoidea. Seven families under Tylenchoidea were established as - Tylenchidae, Anguinidae, Dolicodoridae, Belonolaimidae, Pratylenchidae, Hoplolaimidae and Heterodoridae, two families under Criconematoidea - Criconematidae and Tylenchulidae. Under the 9 families, 15 sub-families were recognized in Tylenchoidea and 4 in Criconematoidea. Maggenti et al., (1987) accepted the phylum Nemata established by Cobb (1919). However phylum Nematoda Rudolphi, 1800 (Lankester, 1877) is used instead of the phylum Nemata Cobb (1919) in the present study. Aglenchus was proposed by Andrassy (1954) as a sub-genus under the genus Tylenchus Bastian,
1865. The full generic name was given by Meyl (1961). But Goodey (1962) regarded *Aglenchus* as a sub-genus of *Tylenchus*. Andrassy (1963) revalidated *Aglenchus* as a genus with some amending and adding of one more species. The genus *Coslenchus* was proposed by Siddiqi (1978) for *Aglenchus costatus* De Man, 1921’ which possess longitudinal cuticular ridges on the body and the position of vulva at right angles to its body axis. The genus *Filenchus* was considered as junior synonym of *Tylenchus* by several workers like Thorne and Malek (1968), Bello (1971), Golden (1971) etc. They were however revalidated by other workers like Goodey (1963), Siddiqi (1971a) and Andrassy (1979). The genus *Ottolenchus* Husain & Khan, 1965 was synonymised with *Filenchus* by Raski & Geraert (1987). Genus *Basiroides* Thorne & Malek (1968), *Clavilenchus* (Jairajpuri, 1966), and *Neopsilenchus* Thorne & Malek (1968) were synonymised with *Basiria* by Fotedar and Mahajan (1973). Bajaj and Bhatti (1978a) later transferred two species of *Basiroides* and three species of *Neopsilenchus* to *Basiria*. Basiria was reviewed by Geraert (1968) and considered 11 species under it and in 1978 he concluded that the position of median oesophageal bulb was a very important taxonomic character which could be used for differentiating the generic level. Geraert and Raski (1987) revalidated *Neopsilenchus* Thorne & Malek, 1968 to its generic status. De Man (1921) described *Psilenchus* with *Psilenchus hilarulus* as the type species. Goodey (1963) and Jairajpuri (1966) synonymised *Psilenchus* with *Tylenchus* which possess a single ovary. Geraert and Raski (1987) restated it as a valid genus under sub-family Boleodorinae Khan, 1964. *Cephalenchus* was proposed by Goodey (1962) as a sub-genus of *Tylenchus* Bastian, 1865. Golden (1971) raised the sub-genus to genus rank because of its offset rounded head, coarse annulations on body and presence of six incisures in the lateral flaps. Dhanachand and Jairajpuri (1980) proposed *Imphalenchus* as a new genus. However, Geraert and Raski (1987) synonymised it with *Cephalenchus* Goody, 1962 because of their many similar characters. Filipjev (1936) proposed *Ditylenchus* for species *Ditylenchus dipsaci* (Kuhn, 1857). Siddiqi (1971b) placed it in the family Anguinidae. Anguinidae were separated
into subfamilies - Ditylenchinae and Anguininae under Tylenchidae by Golden (1971). Brzeski (1981) rejected the arrangement. Siddiqi (1980a) treated Anguinidae as a super-family. Siddiqi (1986) placed *Ditylenchus* under super-family Anguinoida in Hexatylina. Maggenti et al., (1987) recognized the family Anguinidae under Tylenechoidea in Tylentina. Andrassy (1968) proposed *Malenchus* with two species. *Aglenchus machadoi* Andrassy, 1963 was transferred to *Malenchus* and designed as type species *Malenchus machadoi* with another species *Malenchus acaryensis*. Knobloch (1976) first reviewed the genus who also described two new species. Andrassy (1981) provided detailed account of *Malenchus* and described seven new species and concluded *Neomalenchus* to be synonymous with *Malenchus*. Geraet & Raski (1986) reviewed the genera while describing five new species and synonymised *Malenchus cognatus* Andrassy, 1981; *Malenchus eslam* Siddiqi & Khan, 1983b; *Malenchus moini* Siddiqi & Khan, 1983b; *Malenchus tantulus* Siddiqi, 1979 and *Malenchus acaryensis* Andrassy, 1968. Genus *Tylenchorhynchus* was established by Cobb (1913) with *Tylenchorhynchus cylindricus* as type species from California, USA. Genus *Bitylenchus* was proposed by Filipjev (1934a) for the amphidelphic gonads of *Tylenchus* Bastian (1865); but synonymised it with *Tylenchorhynchus* by himself. A number of species of *Tylenchorhynchus* were described during last few years by many workers like Andrassy (1969), Golden (1971), Khan and Darekar (1978), Rashid and Singh (1982) etc. Majority of species were transferred to other closely related genera by Thorne & Malek (1968) and Siddiqi (1970, 1971a). According to Tarjan (1973), genus *Tylenchorhynchus* contains only those species which possess three or four incisures in the lateral field without areolation.

In 1960, Siddiqi proposed Telotylenchinae with *Telotylenchus* Siddiqi as its type genus. Telotylenchinae was proposed as a junior synonym of Belonolaiminae by Jairajpuri (1963), but Sauer (1966) rejected that proposal. Siddiqi (1970) raised Belonolaiminae to family rank and assigned Telotylenchinae to it. The close relationship of *Telotylenchus* with *Tylenchorhynchus* was pointed out by Siddiqi (1961b). Although *Telotylenchus* differs from *Tylenchorhynchus*
only in having the dorsal oesophageal gland extending over the intestine and in having a different face view and structure of the gubernaculums, yet, in past, the two genera have been considered to belong to separate families (Siddiqi 1970, 1971a; Fotedar & Handoo 1978). The two genera belong to the same subfamily, Telotylenchinae. Filipjev (1936) described the root-lesion nematode *Pratylenchus* for the species *Pratylenchus pratensis* which was characterized by its medium sized, stout body, wide, low and anteriorly flattened lip area, not or weakly set off, with no marked sexual dimorphism in anterior region. Prior to Filipjev, many workers like De Man (1880), Zimmermann (1898) and Godfrey (1929) worked on the member of this genus but were not assigned properly. Workers like Loof (1960), Ferris (1961), Seinhorst (1968), Thorne & Malek (1968), Namdakumar & Khera (1970), Wu (1971), Khan & Singh (1975), Das and Sultan (1979). Ryss (1982), Quraishi (1982), Bajaj and Bhatti (1978b) added a number of species to the genus. Filipjev (1936) redescribed *Rotylenchus*. At first the differentiation of *Rotylenchus* with related genera was difficult. Sher (1965) reviewed the type species and accepted *Rotylenchus robustus* (De Man, 1876) Filipjev. 1936. He also synonymised *Gottholdsteineria* Andrassy, 1958 with *Rotylenchus* and differentiated *Rotylenchus* from *Helicotylenchus*. *Calvatylenchus* Jairajpuri & Siddiqi, 1977 was proposed as a different genus from *Rotylenchus* taking into account the continuous labial region with body contour, without annuli or longitudinal striae and male having very short tail. Ferraz (1980) synonymised *Calvatylenchus* with *Rotylenchus* neglecting those minute variations that might have happened in the same population. Fortuner (1987) accepted its synonymisation. *Orientylus* Jairajpuri & Siddiqi, 1977 was placed as separate genus, though it was already proposed by Zancada & Lima (1986). *Varotylus* was proposed as a new genus by Siddiqi (1986) differentiating it from *Orientylus* in the posterior genital branch. However, Fortuner (1987) synonymised these two genera with *Rotylenchus*. Daday (1905) described the genus *Hoplolaimus* based on a single specimen from South America. Cobb (1913) described the genera under the name *Nemonchus*. Menzel (1917) synonymised three genera - *Iota* Cobb (1913), *lota* Cobb (1913).
Criconema Hofmannre and Menzel (1914) and Ogma Southern (1914) with the genus Hoplolaimus. Cobb (1923) redefined the genus Hoplolaimus. Andrassy (1958) redescribed the type species, the genus and gave a new description of genus Hoplolaimus. He considered the presence of large phasmids, the first being located in the anterior part of the body and the other opposite to vulva. Sher (1961) amended its genera diagnosis. Shamsi (1979) splitted Hoplolaimus into two. He retained under Hoplolaimus only those species which possess three oesophageal gland nuclei and shifted all those species having 5 or 6 gland nuclei to a new genus Basirolaimus but Luc (1981) synonymised it with Hoplolaimus. Andrassy (1958) described the genus Scutellonema for those species of the genus Rotylenchus Filipjev, 1936 which possess large phasmids (scutella) located at the same level in the anal region, opposite or almost opposite each other on both sides of the body, oesophageal gland dorsally or laterally overlapping the intestine. Sher (1961) synonymised Scutellonema coheni and Scutellonema boocki with Scutellonema brachyyurum. Although Scutellonema bradys (Steiner & Le Hew, 1933), Scutellonema blaberrum (Steiner, 1937) were entirely identical and based on the rules of priority S. bradys was older, Scutellonema blaberrum (Steiner, 1937) Andrassy, 1958 was regarded as the type species. Sher (1963) further enlarged the generic diagnosis and continued his study of the genus in greater details by describing twenty new species. Khan and Basir (1965) described Scutellonema imphallus. Steiner (1945) proposed genera Helicotylenchus with Helicotylenchus nannus as the type species which possess a spiral body, annulated lip region, powerful well-developed stylet and overlapping oesophageal glands. Goodey (1951) considered Helicotylenchus synonymous with genus Rotylenchus Filipjev, 1936. Golden (1956) separated the genus from Rotylenchus as an independent genus primarily on the position of dorsal oesophageal gland orifice which is one-third or more of the length of stylet. Sher (1961) revised this genus recognizing Helicotylenchus dihystera (Cobb, 1893b) as type species.

Certes (1889) reported species of Criconemella as Dorylaimus giardi and Eubostrichus guerni. Southern (1914) established the genus Ogma based on a
female *Ogma* under the sub-family Criconematinae. They were differentiated from other genera in possessing non-membranous cuticular appendages, annules in anterior region of the body with scales, spines or other outgrowths and body annules excluding extremities lobed without a continuous fringe of spines. Several genera like *Croserinema* Khan et al., (1976a), *Pseudocriconema* Minagawa (1984), *Variasquamata* (Mehta & Raski, 1971) Khan et al., (1976a) were synonymised with the genus *Ogma*. Genus *Ogma* was subdivided into 7 sub­genera by Siddiqi (1986). Andrassy (1979) described 15 species of *Ogma*. However, Raski and Luc (1984) considered these species as congeneric with *Seriespinula, Croserinema* and *Crossonema*. De Grisse and Loof (1965) established the genus *Criconemella* with 4 species *Criconemella parva, Criconemella parvula, Criconemella goodey* and *Criconemella zavadskii*. Female were mainly characterized (De Grisse & Loof, 1965; Loof & De Grisse, 1974) by a small body size (0.20 – 0.37mm) with 100 – 200 finely crenate body annules, the absence of sub median lobes, differentiated head annules, closed vulva, presence of male with a conoid anterior end, 3 lateral lines and distinct bursa. But the morphological characters of the species were not always constant. Sub median lobes exist in *Criconemella parva*. The crenation of the body annules was noted by the authors for *C. parva* (Raski, 1952) and *C. parvula* (Siddiqi, 1961a), although further population of these species show it (De Grisse & Loof, 1965; Luc, 1970). Luc and Raski (1981) reviewed and justified synonymization of several genera like *Macroposthomia, Criconemoides* and *Xenocriconemella* with *Criconemella*. Raski and Luc (1987) regarded the genus *Macroposthomia* as synonym of *Criconemella*. Ahmad (1996) also transferred a number of species of *Macroposthomia* described from Manipur and elsewhere in India to *Criconemella*. De Grisse & Loof (1965) established the genus *Discocriconemella* for those species of the genus *Criconemoides* Taylor, 1936 which possess head annules disc-like formed by fusion of sub median body lobes, body annules finely crenate and occasional anastomoses in female. Later De Grisse (1967) expanded this genus. De Grisse & Mass (1970) revised *Discocriconemella* and suggested that eight
known species of the genus could be divided into 3 groups. *Discocriconemella* was reviewed by Williams (1981) with fifteen species and transferred to *Macroposthomia* and 9 of the remainders were assigned to *Discocriconemella* and 5 species were with *Acrozostron*. Although Ebsary (1982) synonymised *Acrozostron* with *Discocriconemella*, this synonymisation was restudied as well as reviewed by Raski & Luc (1987) and accepted Ebsary’s concept. They also transferred *Madinema thiobromi* Chawla and Samathanam (1980) to *Discocriconemella* as *Discocriconemella theobromae* considering *Theobroma* as feminine in gender. Chitwood and Birchfield (1957) established the genus *Hemicriconemoides* as intermediate between *Criconemoides* Taylor, 1936 and *Hemicycliophora* De Man (1921) with *Hemicriconemoides wessoni* Chitwood & Birchfield (1957) as type species. In the same genus, they assigned *Hemicriconemoides bifermis* and *Hemicriconemoides floridensis* in *Hemicycliophora*.

Andrassy (1979) proposed the genus Colbran, but was synonymised with *Hemicycliophora* by Raski & Luc (1987). Siddiqi (1980a) proposed two genera *Aulosphora* and *Loofia* under the family Caloosidae. Raski & Luc (1987) regarded them as synonyms of *Hemicycliophora* in the family Criconematidae Taylor, 1936. Many workers like Tarjan (1952), Thorne (1955), Goodey (1963), Brazeski (1974), and Eroshenko (1976) reviewed as well as added several new species to this genus. The genus *Caloosia* proposed by Siddiqi and Goodey (1963) were differentiated with those species of *Hemicycliophora* which has no cuticular sheath in larvae and adult and spicules almost straight in males. Loos (1948) proposed *Caloosia longicaudata* as the type species and *Caloosia paralongicaudata* to be another species of the genus. Several species were reviewed and added to this genus by many workers viz., *Caloosia paxi* and *Caloosia axilis*. Mathur et al. (1969), *Caloosia delpradi* Mass et al. (1970). Brzeski (1974) transferred *Hemicycliophora nudata* Colbran (1960) and *Hemicycliophora paradoxa* Luc (1959) to *Caloosia*. Ray and Das (1978) established a new genus *Hemicaloosia* taking into account the presence of cuticular sheath. Siddiqi (1980c) transferred *Caloosia delpradi* Mass, 1970 to *Hemicaloosia* due to the presence of a thin cuticular sheath and two closely spaced incisures in lateral regions of females. Many workers like Khan, et al.,(1976a), Ray & Das(1980), Chawla and Samathanam (1980) added several species to the genus *Caloosia*. *Hemicaloosia* and *Caloosia* had been separated mainly on the presence or absence of extra cuticular layer, e.g. extra-cuticular layer in *Hemicaloosia* and without it in *Caloosia*. However, in some species of *Hemicaloosia*, the extracuticular sheath is thinner, membranous and more over in some species like *Caloosia delpradi* and *Caloosia nudata*, it was so difficult to differentiate that even the original descriptions are overlooked. Further the other differential characters seemed to be less important as they were related with characters like the lateral field in female and marked head of male. For all these reasons, Raski & Luc (1987) synonymised the genus *Hemicaloosia* to the genus *Caloosia*. Therefore, all the species of
Hemicaloosia were transferred to Caloosia including Hemicaloosia luci described by Dhanachand and Jairajpuri (1979).

The members of Aphelenchids and Tylenchids have been placed in different orders (Aphelenchida and Tylenchida) by Cobb (1923) taking into account the opening of dorsal oesophageal glands within the median oesophageal bulb in Aphelenchids. Geraert (1966) gave subordinal rank to Aphelenchs while Siddiqi (1980b) upgraded it to an ordinal rank with respect to the oesophageal gland opening in the metacarpus, shape of spear and oesophageous, monoprodelphic female reproductive system with elongated post-vulval uterine sac, absence of bursa or if present supported by papillary rays and in having rose-thorn shaped spicule in male; although the characters of the species of the order Aphelenchida were closely related to the order Tylenchida. Several aphelenchids were associate with insects, some spending a part of the life-cycle in insects besides being obligate phytophagous to mycophagous, sometimes acting as predators. Some of them even attack the aerial parts of plants, while many of them were found around root tips.

Maggenti (1981) supported the view of Siddiqi (1980b) on the separation of Aphelenchids from Tylenchina as the order Aphelenchida. Later in 1983, he changed his view. Maggenti, Luc, Raski, Fortuner and Geraert (1987) did not approve the work of Siddiqi and placed Aphelenchids under the sub-order Aphelenchina under the order Tylenchina. The suborder Aphelenchina comprises 2 super-families - Aphelenchoidea and Aphelenchoidea. Under Aphelenchoidea, there were only one family and 2 sub-families - Aphelenchoidae and Bursaphelenchinae. Bastian (1865) established Aphelenchus with some species namely A. avenae, A. parientinus, A. pyri and A. villosus but type species was not described at that time. Several years later Bastian (1905) designated Aphelenchus avenae as type species in a letter to Stiles and Hassal. Ritzema Bos (1891) recorded Aphelenchus fragariae an economically important phytophagous species for the first time which was later synonymised to Aphelenchoides fragariae (Ritzema Bos, 1891) Christi, 1932.
Fischer (1894) established genus *Aphelenchoides* with type species *Aphelenchoides kueheini*. Though his work was overlooked by Steiner (1932a) several species have been transferred to this genus from *Aphelenchus* and added many new species to the genus. Micoltezky (1922) established the subgenus *Chitinaophelenchus* to include *Aphelenchus ritzema-bosi, A.cocophilus* and other plant parasitic species. All these had been later transferred to *Aphelenchoides*. At the same time, he erected the sub-genus *Paraphelenchus* for *Aphelenchus (Paraphelenchus) pseudoparietinun* and similar species which possess a definite basal oesophageal bulb. Later in 1925 he raised *Paraphelenchus* to full generic status. Goodey (1923) compiled pertinent information on the known plant parasitic species of *Aphelenchus* and later in 1928 made a complete review of all species described up to that time.

Micoletzky (1922a) proposed the genera *Longidorus* as a subgenus for *Dorylaimus elongatus*. Thome and Swanger (1936) gave a full generic rank because of its large symmetrically bilobed amphid pouches with hardly visible minute pore-like amphidial opening, a greatly attenuated spear with a long plain spear extension and single guiding ring located near lip region. Cobb (1913) proposed *Xiphinema* with *X. americanum* as the type species under the family Xiphinematidae Dalmasso, 1969; sub-family Xiphinematinae Dalmasso, 1969. Sub-family Xiphinematinae (=Xiphinemadae) was proposed by Dalmasso (1969) for *Xiphinema* under Longidoridae. Loof and Coomans (1973) agreed with Dalmasso. Khan & Ahmad (1975) raised Longidoridae to a super familial rank with 2 families viz. Longidoridae and Xiphinematidae (=Xiphinemadae). The genus *Californidorus* was established by Robbins & Weiner (1978) with a new sub-family Californidorinae under Longidoridae and synonymised Xiphinematinae with Longidorinae. Jairajpuri (1982) reviewed Robbins & Weiner’s (1978) work and finally re-validated the Xiphinematinae under Longidoridae as proposed by Dalmasso (1969). Many workers like Goodey (1936), Thorne (1939), Schuurmann et al. (1938), Loos (1949), Heyns (1965, 1966, 1971, 1974a and 1974b), Tarjan and Luc (1963), Loof and Mass (1973) added a large number of species to the
genus *Xiphinema*. Cohn and Sher (1972) proposed 8 sub-genera under *Xiphinema*. Considerable work on the genus have been done by various workers like Heyns (1971, 1974a, 1974b, 1976, 1977, 1979 and 1986), Kruger and Heyns (1984), Hutsebaut *et al.*, (1987) etc. Bajaj and Jairajpuri (1979) published a monograph containing descriptions, morphology and systematic of all India species of *Xiphinema*.


Different workers reported different nematodes species frequently associated with mulberry plants. *Meloidogyne incognita* (Swamy & Govindu, 1965), *M. javanica* (Mathur et al., 1969), *M. arenaria* (Wang & Chen, 1989), *Xiphinema index* (Martelli & Raski, 1963), *X. meovultenezi* (Dalmasso, 1969), *X. basiri* (Yokko, 1970), *Helicotylenchus digitiformis* (Kiryanova & Shagalina, 1976), *Rotylenchus reniformis* (Swanup et al., 1964), *Hoplolaimus seinhorsti* (Kureewan & Leeprasert, 1975), *Longidorus martini* (Ohishima et al., 1971) and *Pratylenchus* sp. (Edward et al., 1963) were reported as frequently associated nematodes with mulberry by the these workers. Several workers reported on the pathogenicity of mulberry plants caused by nematodes of the family Hoplolaimidae. Jensen et al., (1959) observed *Helicotylenchus dihystera* with the head end embedded in cane roots and remarked that secondary infection generally seemed to occur around the feeding sites. Apt & Koike (1962) observed blunt, malformed roots and reduction in the number of small branch rootlets. Reduction in length and weight of leaves and number of leaf buds were characteristic symptoms of infection of the spiral nematodes in mulberry (Deka, 1994).
Scutellonema spp. feed on the peripheral tissues and cause necrosis on tubers even during storage, thus causing huge qualitative loss as well. Necrosis also leads to secondary attack by fungi and bacteria (Walia & Bajaj 2003). The magnitude of crop losses depends upon factors such as population density of the plant parasitic nematodes present, susceptibility of the crop and environmental condition (Hanounik et al., 1975).

The root-knot nematode, Meloidogyne sp. is a universal problem due to its polyphagous nature and has more than 3000 host species. The species is also one of the most important nematode pests of mulberry. They feed on xylem and phloem tissue of vascular sheaths of plants forming giant cells at the site of feeding. Sivagami (1996) studied on the pathogenicity of the nematode and revealed that the egg masses of nematodes were also found embedded inside root tissue. Ramakrishnan & Senthilkumar (2003) indicated that the disease incidence was very high in sandy soil followed by red loamy soil and black cotton soil. Sharma et al., (2001) revealed that the disease incidence was not at all noticed under rain fed conditions. Regarding pathogenicity of the nematode 500 nematode population was attributed to the production of more roots to counteract light infection of plant root system which was below the damaging threshold level. Such increase have been cited and discussed by Wallace (1963), Raut & Sethi (1980) and Chahal & Chahal (1987) on soyabean and Vigna radiate. Stunting of plants, yellowing and wilting of leaves were observed on chilli and French bean by Rajagopalan & Sheshadri (1969) and Mohan & Mishra (1996) respectively. From Manipur, similar results were shown by Solitary & Dhanachand (1998), Romabati & Dhanachand (2000) on tomato and Allium porrum respectively. Singh & Goswami (2000) reported that 1000 nematode per 500 gm soil significantly reduce plant growth on cowpea. Haidar et al., (2001) also reported that 10,000 level of M. incognita on Carum copticum and Nigella sativa were effective in reducing plant growth patterns.

Control of plant parasitic nematodes may be carried out through chemical, physical, biological or cultural practices. Management through chemicals was one

Nematodes cause direct harm to plants as parasites or due to their relation with other disease agents like fungi. The nematodes enables opportunistic fungi like *Fusarium* and *Meloidogyne* to form disease complexes (Haggag & Amin 2001, Hasseb et al., 2005). During the last two decades, plant parasitic nematode control using antagonistic fungi had emerged. Direct pathogenicity of fungal biocontrol agents was one of the main mechanisms responsible for plant parasitic nematode control (Kerry, 1987 and Stirling, 1991). Different species of *Aspergillus, Penicillium* and *Trichoderma* were worked out for control of parasitic nematodes by Subramanian (1964). Shukla & Swarup (1971) used *Sclerotium rolfsii* for control of *M. incognita* larvae. Mankau (1969a, 1969b) and Desai et al., (1972) found *Aspergillus niger* to have nematicidal properties. Sikora (1992) and